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1.1 Water Facility Inventory



### WATER FACILITIES INVENTORY (WFI) FORM

Quarter: 1 Updated: 01/05/2023

#### ONE FORM PER SYSTEM

Printed: 2/7/2023 WFI Printed For: On-Demand

Submission Reason: Contact Update

RETURN TO: Central Services	- WFI	. PO Box 47822	Olympia, WA	. 98504-7822 or email	wfi@doh.wa.gov
		.,	•	,	

1. SYSTEM ID NO.	2. SYSTEM NAME			3. COUNTY		4. GROUP	5. TYPE
83100 K	SPOKANE CITY OF			SPOKANE		А	Comm
6. PRIMARY CONTAC	T NAME & MAILING ADDRES	SS	7. OWNER	R NAME & MAILII	NG ADDRESS		
JAME: 914 E SPOK	S S. SAKAMOTO [PRINC NORTH FOOTHILLS DR ANE, WA 99207-2794	. ENGINEER]	SPOKAN LOREN ( WATER 914 E. N SPOKAN	IE, CITY OF J. SEARL DEPARTMENT ORTH FOOTH IE, WA 99207-1	D ILLS DRIVE 2794	IRECTOR	
STREET ADDRESS IF	DIFFERENT FROM ABOVE		STREET A	DDRESS IF DIFF	ERENT FROM ABOVE	I	
ATTN ADDRESS CITY	STATE ZIP		ATTN ADDRESS CITY	WATER AC 808 W SPC SPOKANE	CCOUNTING DEPT. DKANE FALLS BLVD. STATE WA	A ZIP 99201	
9. 24 HOUR PRIMARY	CONTACT INFORMATION		10. OWNE	R CONTACT INF	ORMATION		
Primary Contact Daytim	e Phone: (509) 625-7854		Owner Day	time Phone:	(509) 625-7821		
Primary Contact Mobile/	Cell Phone: (509) 590-6791		Owner Mo	oile/Cell Phone:	(509) 993-9940		
Primary Contact Evenin	g Phone: (xxx)-xxx-xxxx		Owner Eve	ning Phone:	(xxx)-xxx-xxxx		
Fax: (509) 625-7816	E-mail: jxxxxxxxo@spokan	ecity.org	Fax: (509)	625-7816	E-mail: Lxxxxl@spoka	anecity.org	
11. SATELLITE MANAG	EMENT AGENCY - SMA (che	eck only one)	•				
Not applicat Owned and Managed O Owned Only	ile (Skip to #12) Managed nly	SMA NAME:			SMA	Number:	
12. WATER SYSTE	M CHARACTERISTICS (	mark all that apply)					
Agricultural Commercial / Bu Day Care Food Service/Fo	siness od Permit erson event for 2 or more days	H X In X Li X Li Per year X R	ospital/Clinic dustrial censed Resi odging ecreational /	dential Facility RV Park	X Residential X School Temporary F X Other (churc	arm Worker h, fire station, etc.):	
13. WATER SYSTEM O	WNERSHIP (mark only one)				14.	STORAGE CAPA	CITY (gallons)
Association	County Federal					105,176,0	00

EXT PAGE FOR A COMPLETE LIST OF SOURCES

# WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. S	. SYSTEM ID NO. 2. SYSTEM NAME 3					3. COUNTY							4. GROUP		5. TYPE														
	83100 K SPOKANE CITY OF					SPOKANE							А		Comm														
15	SOU	16 RCE NAME	17 INTERTIE		so	DUF	RCE	18 E C/	S Ate	EGC	R	ŕ		1 US	9 SE	2	20	Т	RE	21 AT	ME	NT		22 DEPTH	23	SOUR	24 CE L	t OCA	ΓΙΟΝ
Source Number	LIST UTILITY'S AND WELL Example: IF SOURCE IN IN LIST SE Examp	NAME FOR SOURCE TAG ID NUMBER. WELL #1 XYZ456 S PURCHASED OR FERTIED, LLER'S NAME Ie: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING FIELD	SPRING IN SPRINGFIELD	SEA WATER	SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT		EMERGENCY	SOURCE METERED	NONE	CHI ORINATION	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	Nevada St - AHC7	25		х										х			Y		х					122	31000	NE NE	31	26N	43E
S02	Well Electric - AHC	2996		х										х			Y	2	х					50	39160	NE NE	31	26N	43E
S03	Park Water - AHC7	722		х										х			Y	2	х					126	62500	NE SE	11	25N	43E
S04	Ray St - AHC723			х										х			Y	2	х					75	21550	SE NW	22	25N	43E
S05	Hoffman Ave - AHO	C728		х										>	(		Y	2	х					235	5460	NW NE	04	25N	43E
S06	Grace Ave - AHC7	24		х										>	(		Y	2	х					124	19000	NE NE	08	25N	43E
S08	Central Ave - AHC	726		х				Τ					Ι	х	Τ		Y	ľ	х					272	16800	NE NE	31	26N	43E
S09	InAct 04/07/1995 In	ndian Canyon - AHC		х										>	(		Y	2	х					60	1450	SW SE	14	25N	42E
S10	InAct 08/23/1995 S	SIA 1(abandoned)		х											>	X	Y	2	х					367	500	SE SE	29	25N	42E

# WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO.	2. SYSTEM NAME				3. 0	COUNTY				4. GRC	DUP	5. TYP	E
83100 K	SPOKANE CITY OF				SPC	OKANE				А		Co	mm
								ACTI SERV CONNEC	VE ICE CTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS		DOH USE ONLY! APPROVED CONNECTIONS	
25. SINGLE FAMILY RE	SIDENCES (How many of the following d	lo you ha	ive?)							757	10	Unspe	ecified
A. Full Time Single Famil	y Residences (Occupied 180 days or more	per year)						706	52				
B. Part Time Single Family Residences (Occupied less than 180 days per year) 0 26. MULTI FAMILY RESIDENTIAL RULL DINCS (How many of the following do you have?)													
26. MULTI-FAMILY RES	DENTIAL BUILDINGS (How many of the	following	j do you l	have?)									
A. Apartment Buildings, o	condos, duplexes, barracks, dorms							2797					
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied m					ore than 18	30 days/ye	ear	505	58				
C. Part Time Residential	Units in the Apartments, Condos, Duplexes	, Dorms t	hat are or	ccupied les	ss than 18	0 days/ye	ar	0					
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)													
A. Recreational Services a	and/or Transient Accommodations (Campsit	es, RV sit	tes, hotel/	motel/ove	rnight unit	S)		0	70	0	70		
B. Institutional, Commerci	al/Business, School, Day Care, Industrial S	ervices, e	atC.			ONNECTI	ONE	111	/2	11172			
			20. 1	UTAL SE		UNNECT	0113			000	02		
A How many residents a	re served by this system 180 or more days r	or voar?			244817								
												Nev	
30. PART-TIME RESIDE	INITIAL POPULATION	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	001	NOV	DEC
A. How many part-time re	esidents are present each month?												
B. How many days per m	nonth are they present?												
31. TEMPORARY & TRA	ANSIENT USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC
A. How many total visitor or customers have access	s, attendees, travelers, campers, patients to the water system each month?												
B. How many days per m	nonth is water accessible to the public?												
32. REGULAR NON-RE	SIDENTIAL USERS	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC
A. If you have schools, d water system, how many s employees are present ea the residential population?	aycares, or businesses connected to your students, daycare children and/or ch month that are NOT already included in												
B. How many days per m	onth are they present?												
33. ROUTINE COLIFORM	M SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ОСТ	NOV	DEC
		150	150	150	150	150	150	150	150	150	150	150	150
34. NITRATE SCHEDULE QUARTERLY						ANNU	IALLY		ON	ICE EVEF	RY 3 YEA	RS	
(One Sample per source by time period)													
35. Reason for Submitti	ng WFI:												
Update - Change	Update - Change Update - No Change Inactivate Re-Activate Name Change New System Other												
36. I certify that the inf	36. I certify that the information stated on this WFI form is correct to the best of my knowledge.												
SIGNATURE:					DATE:								
PRINT NAME:					TITLE:								

Intentionally left blank

WS IDWS Name83100SPOKANE CITY OF

**Total WFI Printed: 1** 



### Water Facilities Inventory (WFI)

Report Create Date:	2/7/2023	
Water System Id(s):	83100	
Print Data on Distribution Page:	Yes	
Print Copies For:	DOH Copy	
Water System Name:	ALL	
County:	Any	
Region:	ALL	
Group:	ALL	
Туре:	ALL	
Permit Renewal Quarter:	ALL	
Water System Is New:	ALL	
Water System Status:	ALL	
Water Status Date From:	ALL	To ALL
Water System Update Date	ALL	To ALL
Owner Number:	ALL	
SMA Number:	ALL	
SMA Name:	ALL	
Active Connection Count From:	ALL	To: ALL
Approved Connection Count	ALL	To: ALL
Full-Time Population From:	ALL	To: ALL
Water System Expanding	ALL	
Source Type:	ALL	
Source Use:	ALL	
WFI Printed For:	On-Demand	

# 1.2 Annexation Covenant example

# REQUEST FOR UTILITY CONNECTION ANNEXATION COVENANT

Date		
1ame		
Address		
Phone		
_egal Description		
Address of Legal Description		
Owner has requested City approval of: (Check one)	🗌 Sewer	🗌 Water
ж. Ж		
Taken by		

ihilorms\annx'cov.irm

Exhibit 1.8.3 Water Main Oversize Policy

### CITY OF SPOKANE WATER & HYDROELECTRIC SERVICES

### Water Main Oversize Policy

#### Introduction:

Anyone (hereafter, applicant) desiring City water service to be extended to their property(ies) where such City water service does not exist, must request permission to construct an extension of water service to such location(s) by submitting such request to the City of Spokane through the Developer Services Section of Engineering Services.

Typically such a request is just for a water distribution main extension(s), including fire hydrants as needed, to the desired location(s). However, in some cases, in order to extend City water service which will provide acceptable water pressure and quantity necessary for domestic needs as well as for fire protection, additional water system infrastructure components may need to be constructed (such as reservoir(s), pumping station(s) and transmission water main(s)).

The sizing of all necessary mains and appropriate water system infrastructure shall be determined based on the needs of the applicant for the water service extension such that the quantity of water necessary for domestic, irrigation, and fire protection needs can be delivered at acceptable water pressure. A hydraulic analysis, to be submitted by the applicant, may be necessary to support the plans submitted for City approval towards obtaining permission for construction of the water system extension.

The necessary quantity of water for domestic service shall be determined by the applicant's consultant engineer and such determination shall be subject to the approval of the City's Director of Water & Hydroelectric Services.

The necessary quantity of water for fire protection shall be determined by the fire district of jurisdiction and the Director of Water & Hydroelectric Services.

The applicant shall be responsible for all costs necessary for the construction of all needed water main(s) and appropriate water system infrastructure required for project(s).

#### The Policy:

In reviewing the water plans submitted by the applicant, the Director of Water & Hydroelectric Services may determine that the water main(s) should be constructed at a larger size than needed for the applicant's project or development in order to meet the City's future needs relative the City's water system.

When the Director of Water & Hydroelectric Services makes such determination, the Director shall order the water plans to be revised to reflect the pipe size(s) so deemed

necessary by the Director and, further, to require the that construction be in conformance with the revised water plans.

The Director, in making such determination, shall have City staff complete the attached justification form entitled "WATER MAIN OVERSIZE JUSTIFICATION & APPROVAL. The completed form shall then be signed by the Director and the applicant and be made a part of the project records.

Further, the Director shall authorize that the applicant be reimbursed for such costs incurred relative the oversizing of the water main(s) upon the City Council's approval of the improvement(s) for the City's operation and maintenance.

#### Determination of Eligible Cost(s) for Oversizing Water Main(s):

The portion of the project that is reimbursable is limited to the water main infrastructure system which is part of the public water system or is intended to become part of the public water system. Further, the portion of the project that is reimbursable is the difference in material cost only, including pipes, valves, fittings and pipe restrainment.

The process for determining the amount to be reimbursed is established by the City utilizing bids provided by local material suppliers. The difference in material costs is established on the lowest of the bids received as a package for all materials involved as follows:

First, the lowest bid for all materials necessary for the construction of the water main(s) based the size(s) representing the required needs of the applicant.

Second, the lowest bid for all materials necessary for the construction of the water main(s) based the size(s) representing the required needs of the City.

Utilizing the two low bids received, the City will compute the eligible reimbursable amount, including applicable sales tax, relative water main oversizing cost(s) for the project(s).

The City of Spokane Water Main Oversize Policy is hereby adapted this 28<sup>th</sup> day of May, 1999.

#### Brad W. Blegen

Brad W. Blegen, P.E., Director Water & Hydroelectric Services Exhibit 1.8.4 Water Main Oversize Form

### WATER MAIN OVERSIZE JUSTIFICATION & APPROVAL

	Date	
For Water Main Located:(Street or	r Location)	
From:	То:	
File No	Project No	
Applicant:		
Size Water Main Required:	Oversize Water Main Required:	
Estimated Cost for Oversizing:		
Reason for Oversizing:		
Will Cost of Oversizing Be Recovered	By Future Special Connection Fees? Yes_	No
If yes, Identify Benefitting Properties:		
Provide Formula or Procedure for Calc	ulating Future Special Connection Fees:	
Is applicant requesting latecomers' rein	nbursement fee? YesNo	
COMMENTS:		
APPROVED:	ACCEPTED:	Data
Director - water & Hydro.	Sves. Applicant	Date
NOTE: This form is to be completed pri	to construction.	

Exhibit 1.8.5 Water Tap Work Order Form

9303 N Z Cod	SORENSON CT le: 99208			Acct. NO: 10734	4/S109173
legal:	MCCARROLL EAST 3	RD ADDITION 1	BLK 3 LO	OT 13	
Tap On: ST Widt Acct TY Firm Pr SUN 700 SPO 993 Cap Mea Curb Me	SORENSON CT th: ************************************	Btwn 00 Tap Size Main Size s Sewer Sys 00 S INC	n: BELM( e: 1" e: 8" s: 1 Excava	ONT DR AND END OF CULL Purpose: DOM LID/Work #: Water Sys: J In/Out City? I ator:	DESAC
rotect dditio	10n Box Measurement nal Information:				
===== QTY	DESCRIPTION	======================================		DESCRIPTION	======================================
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			!		
			i	HRS. TRUCK @	-
		_	11	TOTAL_EQUIPMENT	
		-	!	HDC INDOD O	-
			i	HRS. LABOR @	
		-	!	HRS. LABOR @	-
				LTOTAL LABOR	
		S	ETPM*	****	•

Exhibit 1.8.6 Water Meter Work Order Form

3806 W JA	Y AVE			Acct. NO: 106497	/S108260
Z. Code:	99208				,
Legal: H	FALCON RIDGE 1ST A	DDITION BI	JK 3 LOT	15	
Tap On: JA	AY AVE	Btv	vn: 'L' A	AND DORSET RD	
SI WIUUN:		Meter Siz	ze: 1" ze: 1"	Purpose: DOM - 03	
Acct TYPE	PE 1 Unito	nstalled ]	n: BOX	LID/Work #:	
Firm Price	e:******1,006.00	sewer sy	/S: 1	The Mater Sys: N	
Applicant:	,		Excava	ator:	
HOMEST	TEAD CONSTRUCTION	INC	F	HOMESTEAD CONSTRUCTION	INC
312 S GDOVAN	FARR RD		3	12 S FARR RD	
509 89	NE WA 99206 12 0454		5	SPOKANE WA 99206	
Trench OK'	d By:			Date:	
METER Furn	n. By:	MFG:	Kir	nd: Size:	Owner.
Curb Meas:				Serial #:	
MAINT NUME	BER DIGITS	LOCATION			
	METER				
	AKB METER				
	ARB				
	METER				
	ARB				
Fireline?	YES NO				-
=========	Information:				
QTY	DESCRIPTION	AMOUNT	! QTY	DESCRIPTION	======================================
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TURNED Wate	er ONOFF[	Date:			
FOUND Wate	er ON OFF				
- : WOIK (	al Materiala Ame	Ċ	Comple	eted By:	
WOX113 (Tot	al Equipment Amt)	? \$			
WOX111 (Tot	tal Labor Amt)	š			
WOX114 (Tot	al Sales Tax)	Ş			

# 1.3 Request for LID Covenant example

## REQUEST FOR L.I.D. COVENANT

Date		
Requestor		
Name	<u> </u>	
Address		
Phone		
Legal Description		
		<u> </u>
Address of Legal Description		
Owner has requested City approval of		
	·	

# 1.4 Administrative Policy: Duty to Provide Water Service (Admin 5200-16-03)

2-25-16



#### CITY OF SPOKANE ADMINISTRATIVE POLICY AND PROCEDURE

#### ADMIN 5200-16-03 LGL 2016-0020

TITLE: DUTY TO PROVIDE WATER SERVICE EFFECTIVE DATE: March 18, 2016 REVISION EFFECTIVE DATE: N/A

#### 1.0 GENERAL

1.1 The City of Spokane ("City") Water and Hydroelectric Services Department owns and operates a public water system; and is the regional water purveyor. The City has a duty to provide water to new service connections within the retail water service area, when such service is available in a timely and reasonable manner; there exists sufficient water rights to provide water service; there exists sufficient capacity to provide water service in a safe and reliable manner under Washington State Department of Health regulations; and such service is consistent with the requirements of local plans and regulations and the City's utility service extension ordinances. (WAC 246-290-106).

#### 1.2 TABLE OF CONTENTS

- 1.0 GENERAL
- 2.0 DEPARTMENTS/DIVISIONS AFFECTED
- 3.0 REFERENCES
- 4.0 DEFINITIONS
- 5.0 POLICY
- 6.0 PROCEDURE
- 7.0 RESPONSIBILITIES .
- 8.0 APPENDICES

#### 2.0 DEPARTMENTS/DIVISIONS AFFECTED

This policy shall apply to the City Water and Hydroelectric Services Department.

#### 3.0 REFERENCES

RCW 35.92.020 RCW 36.70A.030 RCW 36.70A.110 WAC 246-290-106 WAC 246-290-108 City of Spokane Comprehensive Plan CFU 3.6 Comprehensive Water System Plan figure 1.8.0a SMC 13.04.1921 SMC 13.04.1922

#### 4.0 DEFINITIONS

None

#### 5.0 POLICY

- 5.1 Domestic water service is a rural and urban governmental service and the City of Spokane is the regional water purveyor. Therefore the City has a duty to provide service to new water service connections within its retail water service area as outlined in the Comprehensive Water System Plan when:
  - Water service is available in a timely and reasonable manner;
  - b. There exist sufficient water rights available to provide water service;
  - c. There is sufficient capacity to serve in a safe and reliable manner per the Department of Health rules and regulations; and
  - Extension of service is consistent with the requirements of local plans and regulations, including the City's Water System Plan and utility service extension ordinances.
- 5.2 City water service is intended to provide for the needs of the residents of the City and for residents outside the City who are within the City's Retail Service Area. Pursuant to RCW 35.92.020, the City may enter into agreements for extension of water service outside the City's boundaries upon terms and conditions, when there is a determination that such extension will not overload or imperil the City's water system, including domestic and fire flow pressure, supply resources and municipal water rights, all as may be needed by current or future city customer needs, and are subject to any other applicable laws or regulations. (SMC 13.04.1922). Therefore, customers outside the City must complete an annexation covenant and service agreement as a condition of water service.
- 5.3 The City's Comprehensive Water System Plan provides for extension of water service beyond the City's boundaries and inside the Retail Service Area as identified in Chapter 1, Figure 1.6.1
- 5.4 Request for City Water Service outside the existing Retail Service area as identified in the Comprehensive Water System Plan in Chapter 1, Figure 1.6.1 are dependent upon the completion of the City's Application and Certificate of Water Availability form. Changing the Retail Water Service boundaries to provide water service to areas outside the current Retail Water Service Area requires a City Council approved amendment to the City's Water System Plan.
- 5.5 The City's comprehensive plan provides that it is appropriate to extend or expand water services outside the UGA in limited circumstances which are shown to be necessary to protect basic public health and safety and the environment and when such services are financially supportable at rural densities and do not permit urban development. (CFU 3.6; RCW 36.70A.110(4)).

#### 6.0 PROCEDURE

6.1 Analysis Needed For Requests To Provide Water Service.

6.1.1 Requests Inside City Boundaries:

Duty to Serve

6.1.2 Outside City boundaries - Inside Retail Water Service Area:

Duty to Serve Inside Water Service Area Subject To Limitations:

- Water service is available in timely and reasonable manner as determined by City Utility;
- b. There are sufficient water rights to provide water service;
- c. There is sufficient capacity to serve in a safe and reliable manner;
- It is consistent with requirements of local plans and regulations and the City's Water System Plan and utility service extension ordinances;
- Annexation covenant must be signed, as applicable;
- f. Written contract with cost allocation, indemnity and all applicable liabilities; and
- g. Developer agrees to pay one hundred percent (100%) costs of construction; liability; indemnification; permitting without sewer and all applicable liabilities.
- 6.1.3 Outside City Boundaries Prior Commitment to Serve Inside Future Service Area:

The City will honor prior commitments for water service. In the case of a prior commitment for water service, the vested water capacity exists with the commitment and the parcels included in the prior commitment will be included in the retail water service area and service will be analyzed and provided pursuant to paragraph 6.1.2.

6.1.4 Outside Retail Water Service Area – Inside Future Water Service Area:

The City will evaluate any new requests for retail water service which are outside the City's retail water service area within 120 days of the request or as prescribed by State Law, pursuant to the flow chart for retail water service requests, as attached hereto.

It is the policy of the City to ensure that requests for expansion of the Retail Service Area be considered at least annually.

- No Duty to Serve outside Retail Service Area unless amend Retail Service Area:
- Amendment to Retail Service Area requires a City Council approved amendment to the Water System Plan/Retail Service Area.
- Amended Water System Plan is subject to approval by Department of Health.
- Extension of service necessary to protect basic health / safety / environment and does not conflict with GMA requirements.

6.1.5 Outside Water Service Area:

No Duty to Serve

Wholesale Water Supply Agreement or Interlocal Agreement subject to City Council approval.

7.0 RESPONSIBILITIES

The City of Spokane Water and Hydroelectric Services Department shall administer this policy.

#### 8.0 APPENDICES

Water Service Area Chart Flow Chart for Retail Water Service Requests

APPROVED BY:

City Attorney

mmon

Director - Utilities

males una City Administrator

Date

Date

3/3/16

Date

4

Water Service Areas:

07-07-7

	Inside City	Outside City boundaries –	Outside Retail Water Service	Outside Water Service Area
	Boundaries	Inside Retail Water Service Area	Area	Wholesale Water Service Agreements
		Duty To Serve inside water	No Duty To Serve outside Retail	No Duty to Serve
		service area - subject to	Water Service Area unless:	
		IIIIIIduous.	1 City Council approvae	Wholesale / water supply agreement or
		1. Water is available in timely	amendment of RSA	Council approval.
		and reasonable manner as	2. Requires DOH approval	
		determined by City Utility	Can serve after amendment:	Sufficient water rights to provide water
		2. Sufficient water rights	3.Water is available in timely and	service
		available to provide water	reasonable manner	
		service	<ol> <li>Sufficient water rights available</li> </ol>	Sufflicient capacity to serve in safe and
		3. Sufficient capacity to serve	to provide water service	reliable manner
		in safe and reliable manner	<ol><li>Sufficient capacity to serve in</li></ol>	
		4. Consistent with	safe and reliable manner	Consistent with requirements of local
		requirements of local plans	6. Consistent with	plans and regulations and the City's utility
	Duty To	and regulations and the	requirements of local plans	service extension ordinances and Water
	Serve	City's utility service	and regulations and the City's	System Plan
		extension ordinances	utility service extension	
		5. Annexation covenant must	ordinances including Water	Subject to approval by the Department of
		be signed	System Plan and service area	Health
		6. Written contract with cost	boundaries	
1		allocation, indemnity,	7. Annexation covenant must be	AND
		applicable liabilities	signed	
		7. Developer to pay 100%	8. Developer to pay 100% costs of	May Require an amendment to the Water
		costs of construction;	construction; liability;	System Plan
		liability; indemnification;	indemnification; permitting	
		permitting with or without	with or without sewer and	
		sewer	applicable liabilities	
			<ol><li>Extension of service is</li></ol>	
			necessary to protect basic	
			health/safety/environment	

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01-03-3

Proposed, Jan. 2015

9

# 1.5 Consistency Checklist



**Local Government Consistency Determination Form** 

Water System Name: City of Spokane Water System	PWS ID: 83100
Planning/Engineering Document Title: Water System Plan	Plan Date: February 2023
Local Government with Jurisdiction Conducting Review	

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

		For use by water system	Yes or Not Applicable
	Local Government Consistency Statement	ldentify the page(s) in submittal	
a)	The water system service area is consistent with the adopted <u>land use</u> and zoning within the service area.	1-14 to 1-18	
b)	The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	2-13 to 2-19	NUL. Yes
c)	For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	1-21; 7-3 to 7-4	Yes
d)	Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	7-4	Yes
e)	Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	1-10 to 1-12; 1-19 to1-22 5-2 to 5-7 8-2	Yes

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.

4/13/2023 Date

Signature Donnis D. Fuller, P.E. City Engineer, City of At new Height 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 service area and any additional areas where a <u>municipal water supplier</u> 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 <u>municipal water supplier</u> 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 <u>municipal water</u> <u>supplier</u> wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity 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 (WAC 246-290-110(4)(b)(ii)).

- A) Documenting Consistency: The planning or engineering document must include the following when applicable.
  - a) 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 relate to water supply planning.
  - b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
  - c) 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.*
  - d) All service area policies for how new water service will be provided to new customers.
  - e) **Other relevant elements** the Department of Health determines are related to water supply planning. 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 explain how to resolve the inconsistency.
- C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did <u>not</u> provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). 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).

#### Washington State Department of Health Incidence of Factoremental Health Incidence State

Local Government Consistency Determination Form

Water System Name: <u>City of Spokane Water System</u>	PWS ID: <u>83100</u>
Planning/Engineering Document Title: Water System Plan	Plan Date: <u>February 2023</u>
Local Government with Jurisdiction Conducting Review: _	Spokane County Public Works / Environ. Services

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

		For use by water system	For use by local government
	Local Government Consistency Statement	Identify the page(s) in submittal	Yes or Not Applicable
a)	The water system service area is consistent with the adopted <u>land use</u> <u>and zoning</u> within the service area.	1-14 to 1-18	NA
b)	The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	2-13 to 2-19	NA
c)	For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	1-21; 7-3 to 7-4	NA
d)	Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	7-4	NA
e)	Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	1-10 to 1-12; 1-19 to1-22 5-2 to 5-7 8-2	CWSP

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.

Robert Lindsay

8/31/23

Date

Signature Rob Lindsay, Environmental Services Administrator, Spokane County PW

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 service area and any additional areas where a <u>municipal water supplier</u> 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 <u>municipal water supplier</u> 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 <u>municipal water</u> <u>supplier</u> wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity 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 (WAC 246-290-110(4)(b)(ii)).

- **A) Documenting Consistency:** The planning or engineering document must include the following when applicable.
  - a) 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 relate to water supply planning.
  - b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
  - c) 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.*
  - d) All service area policies for how new water service will be provided to new customers.
  - e) **Other relevant elements** the Department of Health determines are related to water supply planning. 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 explain how to resolve the inconsistency.
- **C)** Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did <u>not</u> provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

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# 10 Health

Local Government Consistency Determination Form

Water System Name: <u>City of Spokane Water System</u>	PWS ID: 83100
Planning/Engineering Document Title: Water System Plan	Plan Date: February 2023
Local Government with Jurisdiction Conducting Review:	of Spokene Valley

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

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		For use by water system	Yes or Not Applicable
	Local Government Consistency Statement	ldentify the page(s) in submittal	
a)	The water system service area is consistent with the adopted <u>land use</u> <u>and zoning</u> within the service area.	1-14 to 1-18	Yes
b)	The growth projection used to forecast water demand is consistent with the adopted city or county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	2-13 to 2-19	Yes
c)	For cities and towns that provide water service: All water service area policies of the city or town described in the plan conform to all relevant utility service extension ordinances.	1-21; 7-3 to 7-4	Yes
d)	Service area policies for new service connections conform to the adopted local plans and adopted development regulations of all cities and counties with jurisdiction over the service area.	7-4	Yes
e)	Other relevant elements related to water supply are addressed in the water system plan, if applicable. This may include Coordinated Water System Plans, Regional Wastewater Plans, Reclaimed Water Plans, Groundwater Management Area Plans, and the Capital Facilities Element of local comprehensive plans.	1-10 to 1-12; 1-19 to1-22 5-2 to 5-7 8-2	Yes

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 Levi Basinger Planner COSV

03-21-28 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 service area and any additional areas where a <u>municipal water supplier</u> wants to expand its water right's place of use.

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For **engineering documents**, a consistency review is required for areas where a <u>municipal water</u> <u>supplier</u> wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity 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 (WAC 246-290-110(4)(b)(ii)).

- A) **Documenting Consistency:** The planning or engineering document must include the following when applicable.
  - a) 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 relate to water supply planning.
  - b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
  - c) 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.*
  - d) All service area policies for how new water service will be provided to new customers.
  - e) **Other relevant elements** the Department of Health determines are related to water supply planning. 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 explain how to resolve the inconsistency.
- **C)** Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did <u>not</u> provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

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## 1.6 Coordinated Water System Plan (CWSP) Section 3

<u>Water &amp; Kydro</u> Submitting Dep	artment Contact Person	7820 Phone Ext.		
CONSENT AGENDA	LEGISLATIVE SESSION	COUNCIL PRIORITY		V22222221
0 Contract	0 Resolution	0 Communications	Clerk's Files:	# OPR 49-474
Report	0 Emergency Ordinance	0 Economic Development	D	
	0 First Reading Ordinance	0 Human Services	Kenews:	
	0 Special Consideration 0 Hearing	0 Neighborhoods UN - 2 1999 0 Public Safety	Cross Reference:	#
	-	• Quality Sanyice Delivery CFCCF O Racial Equity & Cultural Diversity	ENG/LID:	#
		Q Rebuild & Maintaro Infrastructure	BID:	#
NEIGHBORHOOD/COM	MISSION/COMMITTEE NOTIFIED	BY SUBNITTING DEPARTMENT:		
Public Works	Committee			

Approved Action Taken:

#### AGENDA WORDING:

Concurrence with the 1999 Spokane County Water System Plan Update and authorize the Director of Water and Hydroelectric Services to sign with other area water purveyors the necessary submitting documents for County Commissioner approval.

#### BACKGROUND (Attach separate sheet if necessary):

The Spokane County Coordinated Water System Plan 1999 Update is based on State Law requirements that counties have plan(s) that address how water service will be provided to the citizens within the county and the plan(s) are to be consistent with each county's Comprehensive Plan and other planning documents. As part of this plan, the interrelationships and boundaries between all the different water purveyors must be addressed. This 1999 Update is basically the same as the previously approved 1989 Plan, except it is updated to address changes that have occurred since 1989, such as growth management, utility boundary adjustments, design standards revisions, well head protection, water quality monitoring, and conservation issues. The new updated plan has been prepared by the consulting firm of Economic and Engineering Services in conjunction with staff from Spokane County and each water purveyor in the northern two thirds of Spokane County.

**RECOMMENDATION:** Approve

FISCAL IMPACT:

Expenditure - \$ Revenue - \$

**Budget Account:** # Ħ

LIST ATTACHMENTS AS FOLLOWS: On file for Review in Office of City Clerk: The entire plan.

Include in Packets: Executive Summary

OFFICERS (sign legibly):

DISTRIBUTION AFTER COUNCIL ACTION:

Water & Hydro - Brad Blegen Legal

COUNCIL ACTION: APPROVED COUNCIL: SPOKANE CITY 100 10 CITY EXHIBIT 1/7.

Finance

## Exhibit 3-2

## WATER UTILITY SERVICE AREA AGREEMENT

## SPOKANE COUNTY COORDINATED WATER SYSTEM PLAN

The intent of this agreement is to define service areas in a manner which assures that time, effort, and money are best used by avoiding any unnecessary duplication of service. Spokane County and the Washington State Department of Health will recognize these boundaries as the exclusive service area of the undersigned utility, giving the utility right of first refusal for service.

As a condition of being granted this designated service area, the utility will be required to ensure that the same boundary is utilized for preparation of its individual water system plan. The utility agrees to adhere to the Service Area Boundary Amendment procedures specified in the Spokane County Coordinated Water System Plan (CWSP). The utility will also provide service in a manner consistent with its own individual water system plan and service policies. The utility also fully recognizes that this Service Area Agreement is developed in fulfillment of the Spokane County CWSP.

It is further agreed that neighboring utilities may provide water service to customers within the service area boundary of an adjacent utility only if a mutually acceptable agreement is developed to specify the conditions and term of such service. Existing service on boundary streets shall remain as connected unless transfer of service is agreed to by the neighboring utilities. Depth of service on boundary streets identified on the attached map shall be limited to one platted lot if the adjacent area is unclaimed.

The person signing below assures that he or she has been authorized to sign the Service Area Agreement on behalf of the utility. Attached is documentation verifying this authority.

City of Spokane Water Utility

Authorized Representative

2/15/01 Date

Receipt Acknowledged By:

Spokane County, Division of Utilities

26/2001

Date

## AMENDMENT NO. 1 WATER UTILITY SERVICE AREA AGREEMENT SPOKANE COUNTY COORDINATED WATER SYSTEM PLAN

This Amendment documents a change in the water service area boundary for the <u>City</u> <u>of Spokane</u>, as established in accordance with the Service Area Agreement dated <u>February 26, 2001</u>, for the Spokane County Coordinated Water System Plan.

The amended water service area boundary is accurately reflected on the attached official map prepared by the Spokane County Division of Utilities. No changes, other than those attached to the Amendment, have occurred in either boundaries or special working agreements between affected utilities. Other provisions of the Service Area Agreement have not been altered by this Amendment.

The <u>City of Spokane</u> acknowledges that it will coordinate with the Washington State Department of Health any modifications to its individual Water System Plan as a result of this Amendment.

IN WITNESS WHEREOF, the undersigned has executed this Amendment acting as the authorized or designated representative of <u>City of Spokane</u> on <u>1/26/05</u>.

**Désignated Representative** 

**Receipt Acknowledged:** 

Water Department Director

n Bune Paula

 $C \in C$ 

Spokane County, Division of Utilities

City of Spokane Water Utility

1,0/05

Date

CWSP Service Area Boundary Amendment Procedure

## Exhibit 3-4

## SPOKANE COUNTY COORDINATED WATER SYSTEM PLAN SERVICE AREA BOUNDARY AMENDMENT PROCEDURE

Application: Amendments in water utility service area boundaries will occur when a utility or adjacent utilities wish to expand or reduce their service area and will be approved by the procedures defined herein only if a new conflict in service areas is not created by the modification.

Potential Utility proposing the Amendment; Adjacent utilities; Spokane Stakeholders: County Division of Utilities (SCDU), Planning Department, and Boundary Review Board (BRB); Spokane County Health District; Washington State Department of Health (DOH); and the Chair of the Water Utility Coordinating Committee (WUCC).

- Procedures: 1. The water utility requesting the service area boundary amendment shall submit their request in writing to SCDU along with a map identifying the existing and requested boundaries. The written request shall specify the reason or justification for the change.
  - 2. SCDU will also insure that written confirmation is obtained from any adjacent utilities, at least within 1/4 mile of the proposed boundary change, and that the proposed change does not create a service conflict.
  - 3. If a conflict exists, then no further boundary modification occurs until the conflict is resolved between the impacted utilities. The remaining procedural steps are followed once it is established that there are no conflicts.
  - 4. SCDU will ensure that the water utility requesting the service area boundary amendment seeks public input regarding the requested amendment through a public notice in the County's official newspaper which specifies a time and place for comments to be submitted to the utility. SCDU will also provide a similar notice on the County's web-site. SCDU will take no action on the requested boundary change until an affidavit of publication is submitted and the comment period has expired. All comments will be directed to the affected utilities for appropriate action. All costs associated with the public notification procedures are the responsibility of the utility requesting the boundary amendment.

## Exhibit 3-4 (cont)

- 5. SCDU prepares two copies of revised service area map and an Amendment to the Service Area Agreement and submits them to affected utilities for their review, signature, and return to SCDU of one signed copy with the remaining copy kept in their files. Special working Agreements, if they exist, between all affected utilities shall be submitted as attachments to the Service Area Agreement Amendment.
- 6. All submittals of requests for amendments (Procedure No. 1), confirmation of non-conflict (Procedure No. 3), and signed Service Area Agreement Amendments (Procedure No. 5) must bear the signature of an official authorized to represent the respective utility. Some form of written confirmation of this authority and/or agreement with the requested boundary amendment by the utility's governing body must be submitted to SCDU.
- 7. Convene WUCC Executive Committee to review change request and once all issues of interest are resolved authorize the WUCC Chair to concur with the Amendment.
- 8. Once the above documentation is received, a Certificate of Completion following the format of Exhibit 3-5 is executed by the Director of the SCDU and the Chair of the WUCC. The Certificate formally acknowledges that the Service Area Boundary Amendment Procedures, described herein, has been completed and approves the requested change. A copy of the Certificate will then be transmitted to the affected utilities.
- 9. The "official" service area maps are updated on GIS and hard copy, and shall be reviewed and updated with all changes at least quarterly and kept on file by SCDU.
- 10. Copies of updated "official" service area maps are transmitted to the Spokane County Planning Department, Spokane County Health District, BRB, and DOH.
- 10.SCDU directs the applicant and all adjacent utilities, whose service area boundaries are adjusted, to the DOH for modifications required to their individual Water System Plans.
- 11. Copies of all signed Service Area Agreement Amendments and related correspondence shall be date stamped and kept on file for each participating utility by SCDU.

CWSP Service Area Boundary Amendment Form

June 10, 1999

## Exhibit 3-5

## AMENDMENT NO. \_\_\_\_\_ WATER UTILITY SERVICE AREA AGREEMENT SPOKANE COUNTY COORDINATED WATER SYSTEM PLAN

This Amendment documents a change in the water service area boundary for the (<u>Name of Water Utility</u>) as established in accordance with the Service Area Agreement, dated \_\_\_\_\_\_, for the Spokane County Coordinated Water System Plan.

The amended water service area boundary is accurately reflected on the attached official map prepared by the Spokane County Division of Utilities. No changes, other than those attached to the Amendment, have occurred in either boundaries or special working agreements between affected utilities. Other provisions of the Service Area Agreement have not been altered by this Amendment.

The (<u>Name of Water Utility</u>) acknowledges that it will coordinate with the Washington State Department of Health any modifications to its individual Water System Plan as a result of this Amendment.

IN WITNESS WHEREOF, the undersigned has executed this Amendment acting as the authorized or designated representative of the (<u>Name of Water Utility</u>) on (<u>date</u>).

Designated Representative

Receipt Acknowledged:

Title

Spokane County, Division of Utilities

Water Utility

Date

Certificate of Completion Service Area Adjustment

June 10, 1999

## Exhibit 3-6

## CERTIFICATE OF COMPLETION SERVICE AREA ADJUSTMENT

# THIS CERTIFICATE OF COMPLETION ACKNOWLEDGES AMENDMENT OF SERVICE AREA BOUNDARIES; (fill-in blank describing type of requested change)

WHEREAS, the Spokane County Coordinated Water System Plan, hereinafter "CWSP," provides for the establishment and adjustment of service area boundaries for the purveyors of public water service in Spokane County and;

WHEREAS, (number of purveyors(s)) public water service purveyors, (Name No. 1) and (Name No. 2, etal) have agreed to ("fill-in blank" with description of requested type of change and reference to location and any agreements between adjacent utility(ies)):

WHEREAS, the CWSP provides for approval of all Service Area Amendments by the Spokane County Division of Utilities (SCDU) and the local Water Utility Coordinating Committee (WUCC) and;

WHEREAS, it appears there is no reason not to approve the wishes of the utilities concerned and no conflict is created by said modification;

NOW THEREFORE, BE IT CERTIFIED BY THE SPOKANE COUNTY WATER UTILITY COORDINATING COMMITTEE AND THE SPOKANE COUNTY DIVISION OF UTILITIES:

That the service area change procedures have been completed and boundaries for the <u>(Name of Utility(ies))</u> be changed and amended to <u>("fill-in blank" with</u> <u>description of change)</u>, subject in addition to such terms and conditions as the two parties may now or hereafter mutually agree.

PASSED and adopted by the Water Utility Coordinating Committee and Spokane County Division of Utilities this \_\_\_\_\_ day of \_\_\_\_\_.

("Name") Chair, Water Utility Coordinating Committee N. Bruce Rawls, P.E. Director Spokane County Division of Utilities 1.7 State Environmental Policy Act Checklist (SEPA) and Determination of Nonsignificance (DNS)

#### SPOKANE ENVIRONMENTAL ORDINANCE

(WAC 197-11-970) Section 11.10.230(3) Determination of Non-Significance (DNS) File No. 2020102

## **DETERMINATION OF NON-SIGNIFICANCE**

Description of Proposal: City of Spokane Water System Plan

Proponent: City of Spokane, Integrated Capital Management (ICM)

Location of proposal, including street address, section, township and range if any: City of Spokane Water System Service Area as defined by the Spokane County Coordinated Water System Plan.

Lead agency: City of Spokane, Integrated Capital Management

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed Environmental Checklist and other information on file with the lead agency. This information is available to the public on request.

- [ ] There is no comment period for this DNS.
- [ ] This DNS is issued after using the optional DNS process in Section 197-11-355 WAC. There is no further comment period on the DNS.
- [X] This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by March 23, 2023.

Responsible official: Marcia Davis

Position/Title: Interim Director of ICM

Phone: (509) 625-6700

Address: 2nd Floor, City Hall, 808 W. Spokane Falls Blvd., Spokane, WA 99201-3343

Date: March 9, 2023 Signature:

Marin & Deuto You may appeal this determination

to Marcia Davis, Interim Director of ICM

at (location): 2nd Floor, City Hall, Spokane, WA 99201-3343

no later than (date): March 23, 2023

by (method): written

You should be prepared to make specific factual objections.

Contact Jillann Hansen at (509) 625-6700 to read or ask about the procedures for SEPA appeals.

## **DISTRIBUTION LIST**

## Updated as of January 24, 2023

PROJECT NAME: City of Spokane Water System Plan

FILE No.: 2020102

via email <sup>.</sup>		Mever Fric	Spokane Regional Health District
Abrahamson Randy	Spokane Tribe	Miller Katherine F	City of Spokane ICM
Addressing	City of Spokane	Moore David	Army Corps of Engineers
Allenton Scotty	City of Spokane ICM	Moore James	Spokane County
Anderson Cindy	Ecology	Moore Michael	Williams Northwest Pipeline
			City of Spokano, Wastowator
Austiev, Eugene	City of Spokano, Solid Wasto	Murphy Dormott C	City of Spokane, Wastewater
Averyt, Chris	City of Spokane, Solid Waste	Murphy, Dermou G.	City of Spokane, DSC
Barlow, LOII			
Basinger, Mike	City of Spokane Valley	Nelman, Saegen	Spokane County
Becker, Zachary	City of Airway Heights	Nelson, Connie	Inland Power and Light
	City of Spokane, DSC		City of Spokane, DSC
Brecto, Jason		Note, Inga	City of Spokane, ICM
Brown, Eldon	City of Spokane, DSC	Nyberg, Gary	Spokane County
Buller, Dan	City of Spokane, Engineering	Okihara, Gerald	City of Spokane, Streets
Cannon, Mike	City of Spokane,	Owen, Melissa	City of Spokane, DSC
Carson, Barb	Spokane Schools	Palmquist, Tami	City of Spokane, DSC
Chanse, Andrew	City of Spokane, Libraries	Perkins, Johnnie	City of Spokane, Mayor's Office
Chesney, Scott	Spokane County	Planning Review	City of Spokane, Planning
Chouinard, Sonya	Spokane Schools	Pruitt, Larissa	Avista
Corcoran, Lisa	Spokane Airports	Quinn-Hurst, Colin	City of Spokane, DSC
Conklin, John	Spokane Clean Air	Raymond, Amanda	Bonneville Power Administration
Davis, Marcia	City of Spokane, ICM	Rehfeldt, Melissa	Spokane Transit Authority
Deatrich, Kerry	City of Spokane	Richman, James	City of Spokane, Legal
Archaeology and	State of Washington	Robertson, Renee	City of Spokane, Accounting
<b>Historic Preservation</b>		Sheehan, Ryan	Spokane Airports
DNR Aquatics	State of Washington	Sakamoto, James	City of Spokane, Water
Duvall, Megan	City of Spokane, Historic	Saywers, John	City of Spokane, Water
	Preservation	Searl, Loren	City of Spokane, Water
Eliason, Joelie	City of Spokane, DSC	Spokane Regional	City of Spokane, SREC
Engineering Admin	City of Spokane, Engineering	Emergency	
Eveland, Marcus	City of Spokane, Streets	Communications	
Feist, Marlene	City of Spokane, Public Works	Steele, David	City of Spokane, Asset Management
Figg, Greg	WSDOT	Stewart, Ryan	Spokane Regional Transportation
Fisher, Matt	Ecology		Center
Forsyth, Greg	Spokane Schools	Studer, Duane	City of Spokane, Water
Fredrickson, Beryl	City of Spokane, ICM	Tagnani, Angela	City of Spokane, Wastewater
Gardner, Spencer	City of Spokane, Planning	Taylor, Dannette	USPS
Gennett, Raylene	City of Spokane, Wastewater	Taylor, Joel	City of Spokane, DSC
Graff, Joel	City of Spokane, Engineering	Trautman, Heather	City of Airway Heights
Greene, Barry	Spokane County	Treasury Accounting	City of Spokane, Accounting
Halbig, Bobby	City of Spokane, Streets	Turner, Bob	Spokane Schools
Hamad, Nicholas	City of Spokane. Parks	Weinand, Kathleen	Spokane Transit Authority
Hanson, Rich	City of Spokane. Wastewater	Wendle, Ned	Mead School District
Hanson, Tonilee	Spokane Aquifer Joint Board	Westby, April	Spokane Clean Air
Harris, Clint E.	City of Spokane. Streets	Westerman, Kile	Department of Fish and Wildlife
Hayden, Adam	City of Spokane, DSC	White, Jerry	Spokane River Keeper
Hughes. Rick	City of Spokane. Solid Waste		· ·
<b>J</b> ,	Collection		
Johnson. Erik D.	City of Spokane. DSC	_	
Johnson, Jeffrev	Fairchild Air Force Base	_	
Jones, Garrett	City of Spokane, Parks	_	
Jones, Tammy	Spokane County	_	
Jordan, Jess	Army Corps of Engineers	_	
Kay, Char	WSDOT	_	
Keller, Kevin	City of Spokane, Police		
Kells, Patty	City of Spokane, DSC	_	
Kinnick, Renee	DFW Government	—	
Kincheloe Melanie	Ecology	—	
Kokot Dave	City of Spokane Fire	—	
limon Tara	Spokane Transit Authority		
Main Steve	Spokane Regional Health District		
Marsh Denise		—	
McClure leff	Cheney School District	—	

## REQUEST FOR COMMENTS PROJECT NAME: City of Spokane Water System Plan FILE No.: 2020102

COMMENTS: (Use additional sheets if necessary)

#### State Environmental Policy Act (SEPA) ENVIRONMENTAL CHECKLIST File No. 2020102

#### PLEASE READ CAREFULLY BEFORE COMPLETING THE CHECKLIST!

#### **Purpose of Checklist:**

The State Environmental Policy Act (SEPA) chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An Environmental Impact Statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

#### Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

#### Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered "*does not apply*."

IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (Part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

## A. BACKGROUND

- 1. Name of proposed project: City of Spokane Water System Plan
- 2. Applicant: City of Spokane, Integrated Capital Management Department
- Address: 808 W. Spokane Falls Boulevard
  City/State/Zip: Spokane, WA 99201 Phone: (509) 625-6700
  Agent or Primary Contact: Marcia Davis
  Address: 808 W. Spokane Falls Blvd.
  City/State/Zip: Spokane, WA 99201 Phone: 509-625-6398
  Location of Project: N/A-This is a non-project SEPA
  Address: N/A
  Section: N/A Quarter: N/A Township: N/A Range: N/A

Tax Parcel Number(s) <u>N/A</u>

- 4. Date checklist prepared: 1/5/2023\_\_\_\_
- 5. Agency requesting checklist: City of Spokane, Integrated Capital Management Department
- 6. Proposed timing or schedule (including phasing, if applicable): <u>Water System Plan will be submitted to the Washington State Department of Health in March</u> <u>2023 for approval.</u>
- **7.** a. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

Yes.

- 1) <u>6-Year Capital Improvement Plan projects approved by City of Spokane City Council and</u> <u>included by reference in Chapter 8 of the Water System Plan.</u>
- 2) <u>Ongoing Wellhead Protection Program included by reference in Chapter 5 of the Water System</u> <u>Plan.</u>
- 3) <u>City of Spokane Water Conservation Plan (April 27, 2020)</u>
- b. Do you own or have options on land nearby or adjacent to this proposal? If yes, explain.

<u>N/A</u>

**8.** List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

#### Delineation of Well Head Protection Areas (WHPA) in 1, 5 and year capture zones.

**9.** Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

No.

10. List any government approvals or permits that will be needed for your proposal, if known.

## Water System Plan approved by the Washington State Department of Health.

**11.** Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

The City of Spokane, being a Group A water system, must submit a Water System Plan (WSP) for review and approval to the Washington State Department of Health. In accordance with WAC 246-290-100, the WSP is intended to provide water purveyors a process to:

- 1) <u>Demonstrate the system's operational, technical, managerial, and financial capability to achieve</u> <u>and maintain compliance with relevant local, state and federal plans and regulations;</u>
- 2) <u>Demonstrate how the system will address present and future needs in a manner consistent with</u> <u>other relevant plans and local, state, and federal laws, including applicable land use plans.</u>
- 12. Location of the proposal: Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit application related to this checklist.

<u>City of Spokane Water Service Area as defined by the Spokane County Coordinated Water System</u> <u>plan.</u> 13. Does the proposed action lie within the Aquifer Sensitive Area (ASA)? The General Sewer Service Area? The Priority Sewer Service Area? The City of Spokane? (See: Spokane County's ASA Overlay Zone Atlas for boundaries).

## ASA, General Sewer Service Area, Priority Sewer Service Area, City of Spokane

- 14. The following questions supplement Part A.
- a. Critical Aquifer Recharge Area (CARA) / Aquifer Sensitive Area (ASA)
  - (1) Describe any systems, other than those designed for the disposal of sanitary waste installed for the purpose of discharging fluids below the ground surface (includes systems such as those for the disposal of stormwater or drainage from floor drains). Describe the type of system, the amount of material to be disposed of through the system and the types of material likely to be disposed of (including materials which may enter the system inadvertently through spills or as a result of firefighting activities).

## None.

(2) Will any chemicals (especially organic solvents or petroleum fuels) be stored in aboveground or underground storage tanks? If so, what types and quantities of material will be stored?

## <u>No.</u>

(3) What protective measures will be taken to insure that leaks or spills of any chemicals stored or used on site will not be allowed to percolate to groundwater.

## <u>N/A</u>

(4) Will any chemicals be stored, handled or used on the site in a location where a spill or leak will drain to surface or groundwater or to a stormwater disposal system discharging to surface or groundwater?

<u>No.</u>

b. Stormwater

(1) What are the depths on the site to groundwater and to bedrock (if known)?

## <u>N/A</u>

(2) Will stormwater be discharged into the ground? If so, describe any potential impacts.

<u>No.</u>

## **B. ENVIRONMENTAL ELEMENTS**

1. Earth

a.	General description of the site (check one): N/A									
		Flat		Rolling		Hilly		Steep slopes		Mountainous
	Other	:								

b. What is the steepest slope on the site (approximate percent slope)?

<u>N/A</u>

*c.* What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils.

<u>N/A</u>

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. \_

<u>N/A</u>

*e.* Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill:

<u>N/A</u>

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

<u>N/A</u>

*g.* About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt, or buildings)?

<u>N/A</u>

*h.* Proposed measures to reduce or control erosion or other impacts to the earth, if any:

<u>N/A</u>

#### 2. Air

*a.* What type of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known.

## None, N/A

*b.* Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

#### None, N/A

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

<u>N/A</u>

## 3. Water

- a. SURFACE WATER:
  - (1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

#### Spokane River

(2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

## <u>No, N/A</u>

(3) Estimate the amount of fill and dredge material that would be placed in or removed from the surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

#### <u>None</u>

(4) Will the proposal require surface water withdrawals or diversions? If yes, give general description, purpose, and approximate quantities if known.

## <u>No</u>

(5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

## <u>N/A</u>

(6) Does the proposal involve any discharge of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

## <u>No</u>

## b. GROUNDWATER:

(1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known.

<u>No direct groundwater withdrawals will result from the non-project action.</u> All groundwater withdrawals discussed or referenced in the WSP will be within existing water rights held by the <u>City of Spokane.</u> (2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

<u>N/A</u>

- c. WATER RUNOFF (INCLUDING STORMWATER):
  - (1) Describe the source of runoff (including stormwater) and method of collection and disposal if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

N/A

(2) Could waste materials enter ground or surface waters? If so, generally describe.

<u>N/A</u>

(3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.

## <u>N/A</u>

*d.* PROPOSED MEASURES to reduce or control surface, ground, and runoff water, and drainage patter impacts, if any.

<u>N/A</u>

## 4. Plants

a. Check the type of vegetation found on the site: N/A

Deciduous tree: Alder Maple Aspen
Other:
Evergreen tree: Fir Cedar Pine
Other:
Shrubs Grass Pasture Crop or grain
Orchards, vineyards or other permanent crops
Wet soil plants: Cattail Buttercup Bullrush Skunk Cabbage
Other:
Water plants: Water Lily Eelgrass Milfoil
Other:
Other types of vegetation:

b. What kind and amount of vegetation will be removed or altered?

## <u>N/A</u>

c. List threatened and endangered species known to be on or near the site.

## <u>N/A</u>

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

<u>N/A</u>

e. List all noxious weeds and invasive species known to be on or near the site.

<u>N/A</u>

## 5. Animals

a. <u>Check and List</u> any birds and other animals which have been observed on or near the site or are known to be on or near the site: *N*/*A* 

Birds: Hawk Heron Eagle Songbirds
Other:
Mammals: Deer Bear Elk Beaver
Other:
Fish: Bass Salmon Trout Herring Shellfish
Other:
Other ( <u>not</u> listed in above categories):

b. List any threatened or endangered animal species known to be on or near the site.

## <u>N/A</u>

c. Is the site part of a migration route? If so, explain.

#### Yes. Within 20 miles of a bird sanctuary.

d. Proposed measures to preserve or enhance wildlife, if any:

## <u>N/A</u>

e. List any invasive animal species known to be on or near the site.

<u>N/A</u>

#### 6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

<u>N/A</u>

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

<u>No</u>

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

<u>N/A</u>

## 7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste that could occur as a result of this proposal? If so, describe.

## <u>No.</u>

(1) Describe any known or possible contamination at the site from present or past uses.

## None known.

(2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity.

#### None known.

(3) Describe any toxic or hazardous chemicals/conditions that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project.

## None known.

(4) Describe special emergency services that might be required.

#### None known.

(5) Proposed measures to reduce or control environmental health hazards, if any:

## None.

- b. NOISE:
  - (1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

## None.

(2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site.

## <u>N/A</u>

(3) Proposed measure to reduce or control noise impacts, if any:

<u>N/A</u>

#### 8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe.

<u>N/A</u>

b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

<u>N/A</u>

1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how:

<u>N/A</u>

c. Describe any structures on the site.

## <u>N/A</u>

d. Will any structures be demolished? If so, which?

## <u>N/A</u>

e. What is the current zoning classification of the site?

## Non-project SEPA. Water service area covers all zoning classifications.

f. What is the current comprehensive plan designation of the site?

#### Non-project SEPA. Water service area covers all comp plan designations.

g. If applicable, what is the current shoreline master program designation of the site?

#### <u>N/A</u>

h. Has any part of the site been classified as a critical area by the city or the county? If so, specify.

<u>A portion of the City of Spokane Water Service area is contained within the "Aquifer Sensitive Area"</u> as outlined by the Spokane County Engineer's "208" Water Quality Management Program.

i. Approximately how many people would reside or work in the completed project?

<u>N/A</u>

j. Approximately how many people would the completed project displace?

## <u>None</u>

k. Proposed measures to avoid or reduce displacement impacts, if any:

## <u>N/A</u>

I. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

## <u>None</u>

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

#### <u>None</u>

## 9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or lowincome housing.

#### None.

b. Approximately how many units, if any, would be eliminated? Indicate whether high-, middle- or lowincome housing.

#### None.

c. Proposed measures to reduce or control housing impacts, if any:

#### <u>N/A</u>

## 10. Aesthetics

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

<u>N/A</u>

b. What views in the immediate vicinity would be altered or obstructed?

None

c. Proposed measures to reduce or control aesthetic impacts, if any:

<u>None</u>

## 11. Light and Glare

a. What type of light or glare will the proposal produce? What time of day would it mainly occur?

<u>None</u>

b. Could light or glare from the finished project be a safety hazard or interfere with views?

<u>No</u>

c. What existing off-site sources of light or glare may affect your proposal?

<u>None</u>

d. Proposed measures to reduce or control light and glare impacts, if any:

<u>None</u>

## 12. Recreation

a. What designated and informal recreational opportunities are in the immediate vicinity?

## City Parks, Spokane River

b. Would the proposed project displace any existing recreational uses? If so, describe.

<u>No.</u>

c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:

<u>N/A</u>

#### 13. Historic and Cultural Preservation

 Are there any buildings, structures, or sites, located on or near the sited that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe.

<u>No.</u>

b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Is there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources.

<u>No.</u>

*c.* Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archaeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

<u>N/A</u>

*d.* Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

<u>N/A</u>

#### 14. Transportation

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any.

<u>N/A</u>

*b.* Is site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop?

<u>N/A</u>

*c.* How many additional parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

<u>N/A</u>

*d.* Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? If so, generally describe (indicate whether public or private).

<u>N/A</u>

*e.* Will the project or proposal use (or occur in the immediate vicinity of) water, rail or air transportation? If so, generally describe.

<u>No.</u>

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and non-passenger vehicles). What data or transportation models were used to make these estimates?

<u>N/A</u>

(Note: to assist in review and if known, indicate vehicle trips during PM peak, AM Peak, and Weekday (24 hours).)

*g.* Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, general describe.

<u>No</u>

h. Proposed measures to reduce or control transportation impacts, if any:

<u>None.</u>

#### **15. Public Services**

a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe.

No.

b. Proposed measures to reduce or control direct impacts on public services, if any:

<u>None.</u>

#### 16. Utilities

a. Check utilities currently available at the site: N/A

electricity
natural gas
water
refuse service
telephone
sanitary sewer
septic system
Other:
Describe the utilities that are proposed for the project, the utility providing the convice, and the gas

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed:

<u>N/A</u>

## C. SIGNATURE

I, the undersigned, swear under penalty of perjury that the above responses are made truthfully and to the best of my knowledge. I also understand that, should there be any willful misrepresentation or willful lack of full disclosure on my part, the *agency* must withdraw any determination of Nonsignificance that it might issue in reliance upon this checklist.

0		•		MALL .	Thata
Date:	3/7/2	023	Signature:	ann	1 Oans
Please	Print c	or Type:			
Propon	ent: <i>Ci</i>	ty of Spokane	_Address:	808 W. Spokane	Falls Boulevard
Phone:	(509)	625-6700	_		
Person	comple	eting form (if different	from proponent):	Mark Papich	
Phone:	(509)	625-6700	Address:	308 W. Spokar Spokane, WA 9	e Falls Blvd. 99201
FOR	STAFF	USE ONLY	2	Malton	
Staff	membe	r(s) reviewing checkl	ist:	1 ac	
Based concluc	on this les that	staff review of the	environmental che	ecklist and other p	pertinent information, the staff
X	A. the Nor	re are no probable nsignificance.	significant adverse	e impacts and rec	ommends a Determination of
	B. prol rece	bable significant adv ommends a Mitigated	erse environmenta I Determination of I	al impacts do exist Nonsignificance wit	t for the current proposal and h conditions.

C. there are probable significant adverse environmental impacts and recommends a Determination of Significance.

## D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

#### (Do not use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substances; or production of noise?

Not likely, the non-project action is for the City of Spokane Water System Plan (WSP). The WSP document is a means to demonstrate the system's operational, technical, managerial, and financial capability to achieve and maintain compliance with relevant local, state and federal plans and regulations as well as demonstrate how the system will address the present and future needs in a manner consistent with other relevant plans and local, state, and federals saws, including applicable land use plans. The WSP does not generate project actions and only reports proposed activities in the City's Capital Improvement Plan, wellhead protection activities and water use efficiency activities.

Proposed measures to avoid or reduce such increases are:

The Water System Plan includes reporting on wellhead protection, water use efficiency activities and distribution system loss control measures. Although the Water System Plan does not implement these activities and measures and only report them, it demonstrates the City's commitment to their implementation and the protection of resources. Any project activities related to the Capital Improvement Plan reported in the WSP will require its own project SEPA action and will be subject to its own environmental review.

2. How would the proposal be likely to affect plants, animals, fish or marine life?

Not likely, as previously stated, the non-project action for the City of Spokane Water System Plan (WSP) is a reporting document to demonstrate the operational and technical capabilities of the water system. The Water System Plan includes reporting on the City's Capital Improvement Plan which includes project activities.

Proposed measures to protect or conserve plants, animals, fish or marine life are:

Any project activities related to the Capital Improvement Plan reported in the Water System Plan will require its own project SEPA action and will be subject to its own environmental review for its potential affect and conservation efforts to plants, animals, fish, or marine life.

3. How would the proposal be likely to deplete energy or natural resources?

Not likely, as previously stated, the non-project action for the City of Spokane Water System Plan (WSP) is a reporting document to demonstrate the operation and technical capabilities of the water system. The Water System Plan reports on the withdrawal of groundwater from the Spokane Rathdrum Prairie Aquifer for drinking water purposes. The groundwater withdrawals are from existing perfected well sites and within existing water rights held by the City.

Proposed measures to protect or conserve energy and natural resources are:

Future upgrades of pumps, motors and equipment in well and booster stations reported in the Capital Improvement Plan chapter on the Water System Plan with more efficient equipment as service life is reached will conserve energy and promote efficient operation.

The City of Spokane has implemented a Water Use Efficiency Program meeting the requirements of WAC 246-290-800 and adopted water use efficiency goals by Resolution 2014-0043 for conservation of water reported in the Water System Plan.

Included in the Water System Plan is a distribution system loss control plan to identify and control distribution system loss.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection, such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, flood plains or prime farmlands?

Not likely, as previously stated, the non-project action for the City of Spokane Water System Plan is a reporting document to demonstrate the operation and technical capabilities of the water system. The Water System Plan includes reporting on the City's Capital Improvement Plan which includes project activities which could affect parks.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Any project activities related to the Capital Improvement Plan reported in the Water System Plan will require its own project SEPA action and will be subject to its own environmental review for its potential affect to shoreline or land use.
5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans?

Not likely, the non-project action for the City of Spokane Water System Plan (WSP) is a reporting document to demonstrate the operation and technical capabilities of the water system. The Water System Plan includes reporting on the City's Capital Improvement Plan which includes project activities which could impact shoreline or land us.

Proposed measures to avoid or reduce shoreline and land use impacts are:

Any project activities related to the Capital Improvement Plan reported in the Water System Plan will require its own project SEPA action and will be subject to its own environmental review for its potential affect to shoreline or land use.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

Not likely, the Water System Plan reports on the operation and maintenance of existing and future water infrastructure. In general, water infrastructure such as well and stations, water storage reservoirs and transmission and distribution mains do not generate trip demands that would increase demand on transportation or provide a destination resulting in additional services or utilities required.

Proposed measures to reduce or respond to such demand(s) are:

N/A

7. Identify, if possible, whether the proposal may conflict with local, state or federal laws or requirements for the protection of the environment.

No conflicts identified.

### C. SIGNATURE

I, the undersigned, swear under penalty of perjury that the above responses are made truthfully and to the best of my knowledge. I also understand that, should there be any willful misrepresentation or willful lack of full disclosure on my part, the *agency* may withdraw any Determination of Nonsignificance that it might issue in reliance upon this checklist.

Date:	3/7/2023	Signature:	Marin J Dailo	
Please	Print or Type:			
Propone Phone:	ent: <i>Marcia Davis</i> 509-625-6398	Address:	808 W Spokane Falls Blvd Spokane, WA 99201	
Person	completing form (if diffe	erent from proponent):	Mark Papich	
Phone:	509-625-6310	Address:	808 W SPOKANE FALLS Spokane, WA 99201	

FOR STAFF USE ONLY	Mallow
Staff member(s) reviewing checklist:	las
Based on this staff review of the environmental check information, the staff concludes that:	klist and other pertinent
A. X there are no probable significant adverse Nonsignificance.	impacts and recommends a Determination of
B probable significant adverse impacts do ex Mitigated Determination of Nonsignificance w	kist for the current proposal and recommends a /ith conditions.
C. there are probable significant adverse enviror of Significance.	mental impacts and recommends a Determination



#### Spokane Tribe of Indians Tribal Historic Preservation Officer P.O. Box 100 Wellpinit WA99040

March 9, 2023

TO: Jill Hanson, Clerk II

### **RE: Water System plan**

Ms. Hanson

Thank you for contacting the Tribe's Historic Preservation Office, we appreciate the opportunity to provide a cultural consent for your project, the intent of this process is to preserve and protect all cultural resources whenever protection is feasible.

With no ground disturbing activity, we have no concern on this project

With this letter is your notification that this project may move forward.

As always, if any artifacts or human remains are found upon excavation this office should be immediately notified and the work in the immediate area cease.

Should additional information become available or scope of work change our assessment may be revised. Again, thank you for this opportunity to comment and consider this a positive action that will assist in protecting our shared heritage.

If questions arise, please contact me at (509) 258 – 4222.

Sincerely,

Randy Abrahamson Spokane Tribal Historic Preservation Officer (T.H.P.O.)

## 2.1 Equivalent Residential Unit Calculation Technical Memo

### 2021 ERU Calculation - Technical Memorandum

### June 3, 2021 Updated: October 27, 2021

### Introduction

An Equivalent Residential Unit, or ERU, is the basis for measurement for determining water system capacity and requirements for capital facility planning. In Washington State, an ERU is defined as a specific unit of measure used to express the amount of water consumed by a typical full-time single-family residence (WAC 246-290-010). This Technical Memorandum seeks to outline the method used to calculate the following outcomes for the City of Spokane:

### **Objective / Outcomes**

- 1. ERU values in gallon per day per unit in each pressure zone for:
  - a. average daily demand, ERU<sub>ADD</sub>.
  - b. max day demand, ERU<sub>MDD</sub>, and
  - c. winter average water use (or indoor only/no irrigation), ERUWINTER
- 2. Multipliers to compare ADD to MDD and winter use for each pressure zone
- 3. ERUs from DOH-DSL ERUs (difference between pumped volume and meter consumption)

### Data Used

Meter records generated from the City of Spokane Business Intelligence Server for 2018 through 2020 broken out by pressure zone and by month were utilized to complete the calculations. The 3-year analysis period was chosen for the same period of DSL calculations, as recommended in Section 4.4.1 of the Department of Health Water System Design Manual Publication 331-123 (DOH WSDM), Revised 2019. Three years of data was utilized because the older data is less accurate and not representative of the growth in the City.

### **Calculation Method Considerations**

For existing systems, design engineers should quantify ERU<sub>MDD</sub> and ERU<sub>ADD</sub> by using actual water consumption records per DOH WSDM Section 4.4.1. The method to calculate the ERU values is explained in Chapter 3 of the DOH-WSDM. The City of Spokane has historical actual metered records.

The method follows the consideration listed in 3.2.1 in the DOH WSDM.

- <u>Use actual water demand information</u>. The ERU is calculated from actual meter data. Meter data is collected monthly, on different monthly dates for each customer. The data is categorized by customer class. Single family residential (RE) data is used to determine ERU<sub>ADD</sub> and ERU<sub>MDD</sub>.
- Use multiple years of data when possible. The meter data was compiled in 2021 from monthly meter records of 2018, 2019, and 2020. The meter data was averaged for each pressure zone, for each year, for the Single Family Residential (RE) Dwelling Code, and for all code categories. This data represents consumption and does not include distribution system leakage (DSL) or other losses.

- a. <u>Distribution System Leakage</u>: Consumption during this period is subtracted from water production data from booster and well pumps to verify data and determine DSL for each pressure zone.
- 3. <u>Normalize data based on climatic conditions</u>. The temperature records from 2018 to 2020 represent year that are both hotter than normal (2018) and cooler than normal (2019 and 2020), but average temperatures are ±6 percent of normal. Rainfall for all three years was lower than normal, ranging from 2 to 5 percent less than normal. Normal period data is from http://www.wrcc.dri.edu/summary/Climsmwa.html, for Spokane COOP (457933) <u>https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?wa7933</u>. Annual temperature and precipitation are from National Weather Service (non-certified data). While this record period was generally cooler and drier than normal, it was not significant enough to skew the results.

				Normal Period
Weather Data	2018	2019	2020	1981-2010
Average Maximum	58.8	56.5	54.8	
Difference from Normal	+0.7	-1.6	-3.3	58.1
Average Minimum	40.3	38.5	37.3	
Temperature (°F)				38.0
Difference from Normal	+2.3	+0.5	-0.7	
Annual Precipitation (IN)	15.95	15.45	15.36	16.25
Difference from Normal	-0.3	-0.8	-0.89	16.25

 Table 1. NWS Average Annual Weather Data for Spokane, WA, 2018 - 2020

### Calculation Method and Values for ERUADD

The ERU for Average Day Demand (ERU<sub>ADD</sub>) calculation methodology is described as follows.

- 1. Consumption data was extracted from each meter in the water system for the selected time period of 2018 to 2020. This data includes a customer class code for the type of service. There are 34 codes, but only single-family residential was used for calculating the ERU.
- 2. The extracted data was assembled for each pressure zone for
  - The number of single-family residential meters for each of the 3 years.
  - o Annual consumption for residential single-family meters for each of the 3 years.
  - Total consumption for all meter types for each of the 3 years.

- 3. The ERU<sub>ADD</sub> in gallons per day per meter was calculated for each pressure zone by summing the total *annual* consumption for single-family residential meters for each year and then dividing this value by the number of single-family residential meters for that year, dividing by 365 days, and multiplying by 748 to convert from water units to gallons. This provides the value of the average day use for a single-family residence in each pressure zone for each of the 3 years (2018, 2019, and 2020). Then the ERU<sub>ADD</sub> for each year was averaged over the 3-year period for each pressure zone.
- 4. The total number of ERUs per pressure zone was calculated by dividing the average annual consumption for all customer types including single-family over the 3-year period (2018 to 2020) by 365 days and dividing by the ERU<sub>ADD</sub> (calculated in step 3 above).

ERU<sub>ADD</sub> values are shown in Table 2. Values for average day usage vary from 303 to 951 gallons per unit per day. The pressure zones with the highest number of ERUs tend to have the lowest average usage, while the pressure zones with the least number of ERUs tend to have higher average use. As can be seen in Figure 1, the values generally range from about 300 to 700 gal/day. Hatch Pressure Zone is an outlier at 951 gpd/unit. In order to verify the validity of this data, the individual meter readings for the small pressure zone were reviewed and no erroneous data was observed.

#### Table 2. ERUADD summarized by Pressure Zone

Pressure Zone	ERU <sub>ADD</sub> (gpd/unit)
Cedar Hills	443
Eagle Ridge	501
Eagle Ridge 2	455
Five Mile	594
Glennaire	571
Hatch Road	951
High	368
Highland	442
Indian Hills	524
Intermediate	303
Kempe	529
Low	303
Midbank	514
North Hill	347
Northwest Terrace	487
Shawnee	603
SIA	419
Southview	657
Тор	509
West Plains	415
Woodland Heights	463
Woodridge	733



Figure 1. ERUADD (gpd/unit) summarized by Pressure Zone

### Calculation Method for ERUMDD

ERU*MDD* calculations were performed per recommendations from DOH WSDM Section 3.4.1 using the single family residential maximum month from meter records consumption by pressure zone by dwelling code by month reports. The methodology to calculate Maximum Day Demand ERU (ERU<sub>MDD</sub>) is described as follows:

- 1. Data was extracted for single family residential meters for each month in units (in 100 cubic feet) used for each pressure zone.
- 2. The month with the maximum water consumption was determined for each pressure zone for each of the 3 years and was selected for the ERU analysis (2018-2020). The maximum month generally varies from July, August, or September depending on the year and the pressure zone. The maximum month may differ by pressure zone and by year. Across the system approximately 50 percent of the meters are read bimonthly. The bimonthly readings are not limited to any given pressure zone, and are sporadically done across the entire water system. As a result some meters are read monthly, some are read bimonthly, and bimonthly reads are not necessarily on the same read schedule in any given pressure zone. Approximately half of the meters are not read monthly and therefore skew the maximum monthly values by giving months where fewer meters are read a greater influence on the usage. For those zones with bimonthly readings, the maximum month was approximated by determining the range of

months that would even out the data to a representative single month usage by utilizing a rolling average. Typically, the calculation would include a two-month time period, but some pressure zones were not read bimonthly and therefore had to be calculated using the maximum month averaged over the period of time that the meters were read, to best approximate maximum monthly usage. These pressure zones included Five Mile, High, Kempe, Midbank, and Northwest Terrace.

- 3. The average usage for the Maximum Month Average Day Demand (MMADD) for each pressure zone was calculated by multiplying the water consumed by single family residents for the 30-day rolling average maximum month by 748 to convert to gallons and dividing by the number of days in the month. The MMADD represents the gallons per day (gpd) consumed for each day of the maximum month.
- 4. The maximum day demand (MDD) to MMADD ratio was calculated by using the recommended values of the DOH WSDM, Section 3.4.1 based on population. For pressure zone with populations greater than 1,000, a multiplier of 1.35 was used; 1.65 was used for smaller pressure zones. The population was estimated by multiplying the number of single-family residential meters of each pressure zone by 2.5, as suggested in the DOH WSDM Section 4.2.3.
- 5. ERU<sub>MDD</sub> in gpd/unit was calculated for each of the 3 years by multiplying MMADD divided by the number of meters times the MDD/MMADD multiplier for that year. The ERU<sub>MDD</sub> of the 3 years was averaged for the final ERU<sub>MDD</sub> for each pressure zone.
- 6. An MDD-ADD multiplier was calculated by dividing the ERU<sub>MDD</sub> by the ERU<sub>ADD</sub>.

ERU<sub>MDD</sub> and MDD-ADD Multiplier values are shown in Table 3. Values for maximum day usage vary from 734 to 4,460 gallons per unit per day. Eight of the pressure zones have daily uses of greater than 2,000 gallons per unit. The multiplier values show the degree of increase in use on a summer day compared to average use. Nine of the pressure zones have a four times or more increase of usage. Interesting to note, high ERU<sub>MDD</sub> values do not necessarily correspond to high MDD-ADD multiplier values.

#### Table 3. ERUMDD and MDD-ADD Multipliers

Pressure Zone	ERU <sub>MDD</sub> (gpd/unit)	MDD-ADD Multiplier
Cedar Hills	1,906	4.31
Eagle Ridge	2,157	4.31
Eagle Ridge 2	1,821	4.00
Five Mile	2,138	3.60
Glennaire	2,709	4.74
Hatch Road	4,460	4.69
High	1,203	3.27
Highland	1,883	4.26
Indian Hills	2,150	4.10
Intermediate	838	2.76
Кетре	1,970	3.72
Low	734	2.42
Midbank	1,911	3.71
North Hill	1,032	2.98
Northwest Terrace	1,739	3.57
Shawnee	2,277	3.78
SIA	1,661	3.97
Southview	3,001	4.57
Тор	1,718	3.37
West Plains	1,547	3.73
Woodland Heights	1,976	4.27
Woodridge	2,895	3.95

#### Calculation Method for ERU<sub>Winter</sub>

The methodology to calculate Winter Day Demand ERU (ERU<sub>Winter</sub>) is described as follows:

- 1. Data was extracted for single family residential meters for each month in units (in 100 cubic feet) used for each pressure zone.
- 2. The month with the lowest water consumption was determined for each pressure zone for each of the 3 years used in this analysis (2018-2020). The minimum month generally varies from January, February or March depending on the year and the pressure zone. The minimum month was approximated by calculating a moving average (or rolling average) for each two adjacent months. The minimum of the rolling averages was used as the minimum month.
- 3. The average usage for the minimum month for each pressure zone was calculated by multiplying the water consumed by single-family residents for the minimum month by 748 to convert to gallons and dividing by the average number of days in the month. This average daily

rate represents the gallons per day (gpd) consumed for each day of the month during the winter, or average indoor water use.

- 4. ERU<sub>Winter</sub> in gpd/unit was calculated for each of the 3 years by multiplying average minimum month divided by the number of meters and averaged for the 3 years of data.
- 5. A Winter-ADD multiplier was calculated by dividing the ERU<sub>Winter</sub> by the ERU<sub>ADD</sub>.

ERU<sub>Winter</sub> and Winter-ADD Multiplier values are shown in Table 4. Values for winter usage vary from 106 to 166 gallons per unit per day, indicating lower variability in winter use throughout the water system. The winter multiplier values vary from 0.169 to 0.353. A comparison of ERU<sub>Winter</sub>, ERU<sub>ADD</sub>, and ERU<sub>MDD</sub> are shown in Figure 2.

	<b>ERU</b> <sub>Winter</sub>	Winter-ADD
Pressure Zone	(gpd/unit)	Multiplier
Cedar Hills	116	0.262
Eagle Ridge	132	0.263
Eagle Ridge 2	120	0.263
Five Mile	141	0.238
Glennaire	139	0.244
Hatch Road	161	0.169
High	130	0.352
Highland	126	0.286
Indian Hills	147	0.281
Intermediate	107	0.353
Kempe	123	0.232
Low	106	0.350
Midbank	128	0.250
North Hill	120	0.347
Northwest Terrace	120	0.247
Shawnee	148	0.246
SIA	132	0.317
Southview	166	0.252
Тор	127	0.250
West Plains	130	0.314
Woodland Heights	124	0.268
Woodridge	135	0.184

Table 4. ERUwinter and Winter-ADD Multiplier



Figure 2. ERUADD, ERUMDD, and ERUWinter Comparison

### Calculation Method for DSL

DSL was calculated from the difference between pumped volume and all meter consumption records. Calculation for DSL were only performed for pressure zones that have production; pressure zones supplied by PRV are not included.

- 1. The volume pumped for each pressure zone was summed for each year and an average of pumped volume calculated.
- 2. The volume from meter consumption records for each pressure zone was summed for each year and an average calculated.
- 3. The volume from meter consumption records for each pressure zone was summed for each year and an average calculated. To capture authorized but non-metered water from the City's Water, Street, Sewer, Water and Fire Departments were estimated and averaged over the 3-year period. Because most of this water is used at the Upriver Dam Facility, 95% of this volume was assigned to Low Pressure Zone and 5% to North Hill Pressure Zone.
- 4. The DSL volume was divided by 365 days and divided by the ERU<sub>MDD</sub> for each pressure zone. This is the number of DSL ERUs per pressure zone and was added to the total number of ERUs

calculated by ERU<sub>MDD.</sub> The number of DSL ERUs was added to the consumption ERUs for capacity analyses and design calculations.

### Conclusion

The values calculated in this document represent the average, peaks, and valleys of water usage in the City on a pressure zone basis. These values show the range of water usage across the different pressure zones. Tables 5 and 6 below show the pressure zones sorted in ascending order by highest ERU<sub>MDD</sub> and highest MDD multiplier, respectively.

Droce	ERU (Count)	ERU <sub>ADD</sub>	ERU <sub>MDD</sub>	ERU <sub>Winter</sub>	DSL ERU
Pressure Zone	(Count)	(gpa/unit)	(gpa/unit)	(gpa/unit)	(Count)
Hatch Road	198	951	4460	161	n/a
Southview	43	657	3001	166	1
Woodridge	64	733	2895	135	4
Glennaire	522	571	2709	139	8
Shawnee	156	603	2277	148	10
Eagle Ridge	459	501	2157	132	3
Indian Hills	56	524	2150	147	n/a
Five Mile	2047	594	2138	141	20
Woodland Heights	243	463	1976	124	71
Кетре	885	529	1970	123	28
Midbank	573	514	1911	128	12
Cedar Hills	221	443	1906	116	6
Highland	862	442	1883	126	83
Eagle Ridge 2	915	455	1821	120	25
Northwest Terrace	1497	487	1739	120	n/a
Тор	11811	509	1718	127	298
SIA	5840	419	1661	132	31
West Plains	4665	415	1547	130	167
High	9563	368	1203	130	604
North Hill	39531	347	1032	120	1,022
Intermediate	8757	303	838	107	1,073
Low	47166	303	734	106	5,154

#### Table 5. Summary of ERU Flows by Pressure Zone

#### Table 6. Summary of Multipliers by Pressure Zone

		Winter-
	MDD-ADD	ADD
Pressure Zone	Multiplier	Multiplier
Glennaire	4.74	0.244
Hatch Road	4.69	0.169
Southview	4.57	0.252
Cedar Hills	4.31	0.262
Eagle Ridge	4.31	0.263
Woodland Heights	4.27	0.268
Highland	4.26	0.286
Indian Hills	4.10	0.281
Eagle Ridge 2	4.00	0.263
SIA	3.97	0.317
Woodridge	3.95	0.184
Shawnee	3.78	0.246
West Plains	3.73	0.314
Кетре	3.72	0.232
Midbank	3.71	0.250
Five Mile	3.60	0.238
Northwest Terrace	3.57	0.247
Тор	3.37	0.250
High	3.27	0.352
North Hill	2.98	0.347
Intermediate	2.76	0.353
Low	2.42	0.350

# 2.2 Climate Assessment Technical Memo

# **Technical Memorandum**

То:	Marcia Davis, PE and Beryl Fredrickson, PE (City of Spokane)
From:	Mike McMahon, Dan Graves, and Jeff Hansen, PE (HDR)
Cc:	Andrew Staples, PE (HDR)
Date:	3/3/2023
Subject:	Spokane Future Flows – Climate Assessment

## 1.0 Introduction

The City of Spokane (City) will be updating its Water System Plan (WSP) and developing its Link Spokane strategy for integrating transportation and utility infrastructure planning. As a foundational component of these long-range planning efforts, the City is updating its water demand and sewer flow forecasts.

This technical memorandum (TM) assesses the potential future impacts of climate change on water demand. This includes:

- Analysis of historic climate trends
- Evaluation of projected climate trends
- Correlation of climate factors to water demand

This effort is focused solely on the impacts of climate change upon water demand. It does not address questions related to potential impacts upon supply availability (e.g., impacts to groundwater recharge and subsequently to water availability). Supply-related impacts are being examined by the City through a separate, parallel effort to be conducted in 2023.

The results of the analyses presented in this TM will inform the range of water demand forecasts presented in subsequent deliverables of the Spokane Future Flows project, and may also be used in combination with the above-mentioned supply-related analysis to develop a more complete understanding of the range of potential impacts that climate change may impart upon the water utility.

## 2.0 Background

Cities, agencies, communities, businesses, and individuals are facing new and intensifying challenges from extreme weather events, increasing air temperatures, and increased precipitation variability as a result of climate change. The City of Spokane (City) has chosen to be proactive in response to these changes as part of their strategic planning. This step-by-step analysis utilizes historic climate trends to set the baseline for understanding projected future climate trends in air temperatures and precipitation so that the City's risk/vulnerabilities related to water demand can be correlated to those that are anticipated to change at future time scales due to climate change.

There is significant concern within the water management industry regarding changes in precipitation variability and intensity; however, it is very likely that increasing air temperatures are going to cause a greater impact to water resources than changes in precipitation. For example, a recent study (Udall, 2017) found that for every 1°F increase in Colorado River Basin average annual

air temperature, there was a four percent decrease in Colorado River flows. This statistic is, of

course, tied just as much to water demand as it is to the parameters of evaporation and evapotranspiration. Whether it will be watering lawns, fields, gardens, or supplying drinking fountains, as the temperature increases so will the demand for water resources.

## 3.0 Climate Analysis Data Sources

Climate trend data sources are described below.

### 3.1 Historic Climate Trends

Historic climate trends are critical to setting a relationship between observed changes in the historical climate and projected changes in the future climate. They represent the current state of our changing climate and how that change has occurred over time in the observed record. This section investigates current climate trends, as well as their extrapolations into the future so that those extrapolations can be compared with future climate scenarios.

The National Climatic Data Center (NCDC) was the primary source for historic meteorological reporting data for this analysis. The weather reporting station at Spokane International Airport, identified in Figure 1, was the primary source for climatological data and presents a representation of the City as a whole. This station is located approximately four miles west southwest of the city center. It has a period-of-record (POR) that extends from August 1, 1889, to present. The POR of 1950-2021 was utilized for this analysis due to the availability of the most consistent dataset during this time period.



Figure 1. Map of meteorological reporting station used for the development of the historic climate data and climate trends.

### 3.2 Projected Climate Trends

Climate change projections are outputs from global climate models that utilize future climate scenarios (climate forcing) to quantify future changes in atmospheric parameters. Changes in air temperatures and precipitation may result in consequential changes in other water-related parameters such as evaporation and evapotranspiration. The emission of greenhouse gases (GHG) from human activity is expected to be largely responsible for the magnitude of climate change through the end of this century. To develop a range of potential climate change outcomes, this study utilized two future GHG emissions scenarios, or Representative Concentration Pathways (RCP), to provide a perspective on future change. RCP 4.5 represents a future where GHG emissions continue to increase until the year 2050, and then begin decreasing through the year 2100. In this scenario, it takes until the year 2070 before that decrease in emissions after 2050 begins to reverse the climate trend. RCP 8.5 represents a future where emissions continue to accelerate through the year 2100. RCP 4.5 is considered the middle-of-the-road case, while RCP 8.5 represents the highest level of future emissions.

The following sections provide analysis and projections of changes in atmospheric conditions that are expected to have an impact on water availability, as well as on water demand for the City. Climate modeling and regional downscaling at future time scales were developed as part of the work performed for the Coupled Model Intercomparison Project Phase 5 (CMIP5) and using the Localized Constructed Analogs method (LOCA; Pierce et al. 2014). These climate projections were based on the Intergovernmental Panel on Climate Change Assessment Report 5 (IPCC, 2014).

## 4.0 Air Temperature Trends

Increasing air temperatures are anticipated to be an outcome of climate change on a global scale, throughout the United States, and the City. These increasing air temperatures are expected to have an impact on water supply and demand.

### 4.1 Observed Air Temperature Trends

Figure 2 identifies the observed trend showing overall increases in average annual maximum temperature for the City (the average of every daily maximum temperature) while Figure 3 shows the change in average annual minimum temperatures for Spokane during the POR 1950-2021. This same pattern regularly shows up in the analysis of average annual air temperatures across North America. It is a trend that is usually particularly pronounced as it pertains to nighttime minimum temperatures.



Figure 2. Observed average annual maximum air temperatures (°F) for Spokane 1950-2021. Trendline in black. Source Data: National Climatic Data Center (NCDC)



Figure 3. Observed annual mean minimum air temperatures (°F) for Spokane 1950-2021. Trendline in black. Source Data: NCDC

Figure 2 and Figure 3 show increasing trends in annual average temperatures. These trends provide the opportunity to better understand the point and/or inflection in these graphs where the climate of

the City began to warm at a higher rate. As seen elsewhere in North America and on a global scale, significantly higher rates of annual warming began around the year 1977.

Figure 4 and Figure 5 show extrapolations of maximum and minimum temperature trends out to 2050 based on these trendlines. An extrapolation of the observed maximum and minimum temperature trends beginning in the year 1950, indicated by the black trendline, forecast an average annual maximum temperature of 59.2°F and an average annual minimum temperature of 40.2 °F by the year 2050. Based only on the observed data from 1977-2021, these same extrapolations, indicated by the red trendline, forecast an average annual maximum temperature of 60.1°F by 2050, and an average annual minimum temperature of 42.4°F. While climate projections generally indicate a much greater potential for increased warming, these extrapolations of historical data provide a baseline for projected change that have a high likelihood of occurring.



Figure 4. City of Spokane annual average maximum air temperature trends for 1950-2021 (black line) and 1977-2021 (red line), extrapolated to the year 2050. Source Data: NCDC



Figure 5. City of Spokane annual average minimum air temperature trends for 1950-2021 (black line) and 1977-2021 (red line) extrapolated to the year 2050. Source Data: NCDC

### 4.2 Projected Air Temperature Trends

The downscaled climate data provided by the CMIP5 data, specific to the City, were used to quantify expected changes in air temperatures at future time scales. The recent release of IPCC Assessment Report 6 (AR6) (IPCC, 2021) indicates that these projections may be less conservative than those reported in AR5, which used CMIP5 modeling results. However, IPCC AR6 data were unavailable at the time of this writing.

Figure 6 shows the projected average annual maximum air temperatures expected in the City for the years 2020-2099 based on the RCP 4.5 (blue) and RCP 8.5 (red) climate scenarios, based on the IPCC AR5 CMIP5 downscaled projections. Figure 6 shows a significant difference in the outcomes from the two climate scenarios past the year 2050. The projected air temperatures represented in Figure 6 are weighted mean values. A considerable range of possible outcomes exists above and below these mean values.



Figure 6. Projected mean annual maximum air temperatures for Spokane based on RCP 4.5 and RCP 8.5 climate scenarios. Source Data: CMIP5

### 4.3 Relationship of Maximum Air Temperatures to Water Pumping in Spokane

As noted in this Section 3.1, observed air temperature trends indicate that air temperatures in the City are increasing, particularly during the most recent 35 years. While there are many factors that contribute to increased pumping during a given month, such as amount of precipitation, cloud cover, increasing population conservation habits, and land use, this study examined the relationship between June-September daily average pumping per month and observed changes in monthly average maximum air temperatures during these months during the available POR 1994-2021 for pumping data (four months a year times 27 years equals 108 points of comparison).

Figure 7 shows the correlation between June-September monthly average maximum air temperatures and daily average pumping per month values for the City. While the correlation is not exacting ( $R^2$ =0.40), it does show a useable trend wherein months with higher average air temperatures generally indicate increased pumping. There are several outliers in June pumping (very high volume), which could be attributable to many causes, but have not been specifically identified at this time.



Figure 7. June-Sept. daily average pumping (thousands of gallons) per month as a function of monthly average maximum air temperature for the City of Spokane 1994-2021. Trendline shown in black.

Based on the historic correlation between monthly average maximum air temperatures (June-Sept.) and daily average pumping per month in Figure 7, and the percentage change between the current (2020) mean annual maximum temperature (60.1°F) and projected mean annual maximum air temperatures projected in Figure 6, approximate percent changes in future pumping can be determined. Table 1 identifies the percent change in daily average pumping (June-Sept.) based on projected changes in annual maximum air temperatures.

Table 1. Relative percentage change in June-Sept. daily pumping based on changes in air temperatures at future time scales for two climate (emissions) scenarios.

	RCP 4.5			RCP 8.5		
Future Year	2050	2075	2100	2050	2075	2100
Increase in Mean Annual Max T (°F)	1.8	2.9	3.8	2.4	5.7	8.1
Average Percent Pumping Change	3.00%	4.83%	6.32%	3.99%	9.45%	13.43%

# 5.0 Observed Annual Precipitation Trend

As the annual average air temperatures increase, as noted in the previous section, so does the atmosphere's ability to hold and release moisture. This is physically related to the Clausius-Clapeyron equation wherein as air temperatures increase, the atmosphere's ability to hold moisture increases approximately 3.5 percent per degree F of annual mean temperature.

### 5.1 Observed Precipitation Trends

Using Figure 4 and Figure 5, it was determined that the mean annual air temperature in the City has increased 2.16°F between the years 1950-2021. Figure 8 shows the observed annual precipitation trend in the City during those same years. The precipitation trend in Figure 8 represents a 6.90 percent increase in annual precipitation during the years 1950-2021. Applying the Clausius-Clapeyron relationship to the 2.16°F increase in mean annual air temperature indicates that a 7.56 percent increase would have been expected in annual precipitation.



Figure 8. Observed annual total precipitation (1950-2021) for the City of Spokane. Trendline shown in black.

## 5.2 Projected Precipitation Trends

Projected trends in annual precipitation (Figure 9) for the City of Spokane are in-line with the observed trend in annual precipitation as seen in Figure 8. The projected trend in annual precipitation under both emission scenarios clearly indicate the impact of increasing air temperatures on anticipated increases in annual precipitation. While these projections of future annual precipitation, there is



still significant year-over-year variability showing in these projections that should make for increasing demand in dry years and reduced demand in wet years.

Figure 9. Projected annual precipitation based on RCP 4.5 and 8.5 scenarios. RCP 4.5 trendline shown in blue, RCP 8.5 trendline shown in red.

## 6.0 Conclusion

As has been found in many other climate studies in the western U.S., increasing air temperatures are expected to have a much greater impact on water supplies and water management than changes in year-over-year precipitation variability. The analysis performed within this study corroborates these findings. As air temperatures increase, demand will likely increase, and therefore pumping is expected to increase. Yet, as air temperatures increase, annual precipitation and water availability in Spokane will be enough to counteract the impact of increased air temperatures on water demand. Using the year 2050 as an example, based on these study data, Spokane can expect a three to four percent increase in pumping between now and 2050, solely based on increasing air temperatures (see Table 1). During this same time period, annual precipitation is expected to increase two to three percent under the respective climate scenarios (RCP 4.5 and 8.5). Additionally, the seasonality of future precipitation in the region should play a big role in water management and water demand. This would be a consequence of warmer, drier summers and wetter winter/cool season precipitation, which is expected to be a result of climate change in the region. Such relationships could be used by the City in future examination of water supply availability.

For the current purpose of informing the City's future flows evaluation, the relationship between air temperature and water demand has been used to define future water usage scenarios that incorporate the influence of climate change. Moderate and more aggressive levels of climate change impact have been defined as imparting a three and four percent increase in water demand by 2050, respectively. These factors are taken into account along with other variables, such as various levels of water conservation implementation and demographic growth, to develop a range of future water demand projections. The results of that analysis will be presented in a subsequent document that will compile all of the related project elements into one reference.

### 7.0 References

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# 2.3 Spokane River Instream Flow Rule

FILE IN CLERK'S OFFICE SUPREME COURT, STATE OF WASHINGTON AUGUST 6, 2020

CHIEF JUSTICE



SUSAN L. CARLSON SUPREME COURT CLERK

### IN THE SUPREME COURT OF THE STATE OF WASHINGTON

CENTER FOR ENVIRONMENTAL LAW AND POLICY; AMERICAN WHITEWATER; and SIERRA CLUB,	) ) No. 97684-8 )
Respondents,	)
V.	) En Banc
STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, and JAY INSLEE,	)
Petitioners.	) Filed August 6, 2020
	)

MADSEN, J.—This case concerns the authority of the Department of Ecology to set minimum instream flows for the rivers and streams in this state and the parameters of that authority under RCW 90.22.010 and RCW 90.54.020(3)(a) (discussed below). At issue is whether Ecology properly adopted a rule, WAC 173-557-050, setting a summertime minimum instream flow rate for the Spokane River at 850 cfs (cubic feet per second) from June 16 to September 30. We uphold that rule, determining that the challengers<sup>1</sup> of the agency rule fail to carry their burden to show the rule's invalidity. We reverse the Court of Appeals' decision, which reversed the trial court's dismissal of the challengers' suit.

#### I. FACTS

### A. <u>The Spokane River's water challenges</u>

The Spokane River originates at the outlet of Coeur d'Alene Lake in Idaho and flows west for approximately 111 miles to the Columbia River in eastern Washington. The Spokane River and the Spokane Valley-Rathdrum Prairie Aquifer are located in eastern Washington and encompass portions of the cities of Spokane, Spokane Valley, Liberty Lake, and Millwood. The river and the aquifer are shared resources between Idaho and Washington.

Flows in the river are declining due to increased groundwater use from the aquifer. Ecology thus ceased issuing new groundwater rights from the aquifer in the 1990s. The river is central to both the area's local economy and its community.

#### B. Hydroelectric dams shape river flows

Avista Corporation operates five hydroelectric projects located on the Spokane River in northern Idaho and eastern Washington. The uppermost project on the river, the Post Falls development, consists of three dams on three channels with natural islands connecting the structures. The development impounds nine miles of the Spokane River to the outlet of Coeur d'Alene Lake.

<sup>&</sup>lt;sup>1</sup> The "challengers" of Ecology's rule include the Center for Environmental Law and Policy, the Sierra Club, and American Whitewater.

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Avista uses its Post Falls facility to regulate flows in the Spokane River for six months a year starting in summer, after spring runoff flows have peaked and subsided. Avista regulates river flows in accordance with minimum flow requirements in its federal license, which incorporates other considerations of lake level; downstream flow considerations; energy demands; flood control; and upstream recreational, residential, and commercial interests. Throughout the summer recreation season, Coeur d'Alene Lake is maintained at a higher level, but after Labor Day, Avista begins to release stored water at Post Falls, resulting in a gradual drawdown in lake levels. The timing of the drawdown varies annually based on flow conditions, weather forecasts, and energy demands.

Avista, as a condition of its federal license to operate its projects, is required to implement measures to protect and enhance fish, wildlife, water quality, recreation, cultural, and aesthetic resources at the project. The license requires Avista to operate the Monroe Street and Upper Falls dams to provide minimum flows of 850 cfs from June 16 to September 30 each year. The flows are intended to enhance aquatic habitat for rainbow trout and mountain whitefish in the Spokane River. Avista's federal license also requires Avista to release flows from Post Falls dam ranging from 3,300 cfs to 5,500 cfs for whitewater boating. Flows that serve the recreational community occur every year on the Spokane River, but the timing and duration of those recreational flows varies.

To change the actual flow in the river to better suit a particular recreational use would require seeking changes in Avista's license because it has control over water storage and releases as provided in its federal license. Ecology's rule WAC 173-557-050

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does not require control or release of water from storage. An instream flow rule does establish regulatory flows with a priority date as to other water rights, meaning new uses are subject to the prior established instream flow rules.<sup>2</sup> WAC 173-557-050 does not put water in the river or affect existing water rights. Ecology personnel gave a presentation at the public hearing for the proposed instream minimum flow rule in Spokane in October 2014, explaining that Avista's federal license controls minimum releases to the river and that Ecology's instream flow rule addresses only new junior water uses and when they are interruptible to protect the instream flow. The presentation also noted that Ecology's minimum instream flow rule does not change the hydrograph.<sup>3</sup>

### C. Ecology sets minimum river flows via rule making

Ecology began working with watershed planning groups in 1998 to develop instream flow protection for the Spokane River. The planning unit failed to reach consensus on instream flow levels during its planning process. Because no consensus could be reached, Ecology chose to use science-based fish studies as a baseline to develop the instream flow rule.<sup>4</sup>

<sup>&</sup>lt;sup>2</sup> See, e.g., RCW 90.03.247(1) (providing in part, "Whenever an application for a permit to make beneficial use of public waters is approved relating to a stream or other water body for which minimum flows or levels have been adopted and are in effect at the time of approval, the permit shall be conditioned to: (a) [p]rotect the levels or flows; or (b) require water resource mitigation of impacts to instream flows").

<sup>&</sup>lt;sup>3</sup> See Admin. Record (AR) at 2809; see also AR at 3006, 3016 (Ecology's CONCISE EXPLANATORY STATEMENT (2015) (noting that the instream flow rule does not control the hydrograph of the river and that river flow is controlled by dam discharges as regulated under Avista's license issued by the Federal Energy Regulatory Commission)).

<sup>&</sup>lt;sup>4</sup> If a watershed planning unit (local stakeholders) reaches consensus on instream flows during the watershed planning process, then Ecology must adopt those flows by rule. *See* RCW 90.82.080(1)(b). If a planning unit does not reach consensus on flows, as occurred here, then

Ecology formally commenced rule making in January 2014. Using a deliberative process, Ecology ultimately set summer minimum flows at 850 cfs by relying on science-based fish studies that protected fish as a baseline and that also served to protect other instream values, including recreation, navigation, and aesthetics.

In 2012, Washington Department of Fish and Wildlife instream flow biologist Dr. Hal Beecher wrote his flow recommendations for the Spokane River, which Ecology ultimately adopted. In his summary, Dr. Beecher wrote that the recommended minimum instream flow for the Spokane River is 850 cfs from June 16 to September 30. Dr. Beecher notes that "[i]nstream flows should address what the river needs to preserve its values and resources and ecological functions." Admin. Record (AR) at 3831. He notes how flows were developed in cooperation with Ecology with an emphasis on fish and based on the results of four scientific studies:

In developing instream flow recommendations for the lower Spokane River, the Washington Department of Fish and Wildlife . . ., in cooperation with Department of Ecology (Ecology), has emphasized rainbow trout and mountain whitefish. . . .

Results of several studies (EES Consulting 2007, NHC and HD 2004, Parametrix 2003a,b, Addley and Peterson 2011) provide information on trout and whitefish habitat at different flows and different seasons in the lower Spokane River.

AR at 3832.<sup>5</sup> Based on these studies, Dr. Beecher ultimately concluded that "a flow of

850 cfs should be protected." AR at 3834; see also AR at 7753 (Beecher

Ecology may initiate rule making under the Administrative Procedure Act, ch. 34.05 RCW, to adopt flows. *See* RCW 90.82.080(1)(c).

<sup>&</sup>lt;sup>5</sup> The noted studies are found in the AR at 3842, 3883, 4157, and 3981, respectively.

recommendation of 850 cfs flow rate at Spokane gage for June 16 to September 30

period); see also AR at 3831 (Beecher summary stating the same recommendation).

During the rule adoption period, Ecology received many comments regarding its decision to set summer flows at 850 cfs. Ecology responded:

Ecology does not agree that the instream flow levels adopted in this rule are too low to protect instream resources in the Spokane River. Ecology believes the instream flows in this rule, based as they are on four independent fish studies, are science-based. The flows have been vetted by top scientists, staff, and management of all concerned state agencies. The instream flows have been reviewed and analyzed by all local Water Resource Inventory Area Watershed planning groups. *Since these flows were first proposed to the planning unit, no entity has emerged with scientific information to indicate these flows are not appropriate.* It is our opinion these flows are the best flows available to protect the instream resources of the Spokane River. *They are flows necessary for stream health, ecological function, and preservation of other instream resources including scenic, aesthetic, and navigational values.* 

AR at 3031 (emphasis added).

Ecology also responded to concerns about recreation, aesthetics, and navigational values, noting that it considered these issues at multiple stages throughout the rule making process and that the subjects were addressed in detail during Avista's Federal Energy Regulatory Commission (FERC) relicensing process for their hydroelectric facilities.

The subject of recreational, aesthetic, and navigational flows was also addressed during the watershed planning process and during the comment period on preliminary drafts of the minimum instream flow rate rule. Ecology noted that it had reviewed the whitewater paddling study conducted during Avista's relicensing process; listened to many river users; and reviewed anecdotal observations, opinions, and photos submitted

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by whitewater enthusiasts and others. Ecology then explained in detail why it chose not to set flows based on recreational needs and why not setting flows based on those needs is not the same as not considering them:

They [(recreational flows)] were considered by the department and rejected as the primary basis for establishing instream flows. Ecology chose to use science-based fish studies to develop the instream flow values for the rule when the Watershed Planning unit failed to reach consensus about instream flow values . . . While [the flows] are based on fish habitat studies, the instream flow levels established in [the] rule will preserve wildlife, scenic, aesthetic, and other environmental values in the Spokane River, in accordance with RCW 90.54.020.

AR at 2985.

Ecology specifically responded to comments and concerns regarding recreation noting that "[f]lows that serve the recreational community occur every year in the Spokane River." AR at 3009.<sup>6</sup> The agency also addressed and responded to comments on aesthetics and climate change.

Following the Administrative Procedure Act (APA), ch. 34.05 RCW, rule making process, Ecology adopted WAC 173-557-050 on January 27, 2015, and the rule became effective on February 27, 2015. On February 29, 2016, challengers petitioned Ecology to amend the rule pursuant to RCW 34.05.330,<sup>7</sup> asserting that the summer flows were set too low. On April 27, 2016, Ecology denied challengers' petition.

<sup>&</sup>lt;sup>6</sup> Ecology considered in detail the Berger 2004 whitewater boating study, how the whitewater community utilizes the Spokane River, and that such community's members express a significant range of needs and desires. *See* AR at 3031-33.

<sup>&</sup>lt;sup>7</sup> RCW 34.05.330(1) provides that "[a]ny person may petition an agency requesting the adoption, amendment, or repeal of any rule."

### D. The present lawsuit

In May 2016, challengers brought suit against Ecology in Thurston County Superior Court under the APA, challenging the validity of the summer minimum instream flow rate and arguing that setting minimum flows at 850 cfs exceeded Ecology's authority and was arbitrary and capricious. Challengers also argued that in adopting the rule, Ecology had failed to fulfill its responsibilities under the public trust doctrine, and they moved to supplement the record. Ctr. for Envtl. Law & Policy v. Dep't of Ecology, 9 Wn. App. 2d 746, 757, 444 P.3d 622 (2019). The superior court denied challengers' motion to supplement and ultimately denied the petition challenging the validity of Ecology's rule. Id. Challengers sought direct review at this court, but the matter was transferred to Division Two of the Court of Appeals, which affirmed the trial court's rejection of the motion to supplement the record and also rejected challenger's public trust doctrine argument. Id. at 769-74. But the Court of Appeals held the rule was invalid, agreeing with challengers that Ecology's action exceeded its authority and was arbitrary and capricious. Id. at 751. Ecology petitioned for review concerning the exceeded authority and arbitrary and capricious issues. In the challengers' answer, they asked this court to consider the record supplementation issue. This court granted Ecology's petition and denied review of the issue raised in the challengers' answer. 194 Wn.2d 1016 (2020).

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### II. ANALYSIS

### A. <u>Standard of Review</u>

"The Washington Administrative Procedure Act (APA) governs the standard of review for a challenge to an agency rule." *Lenander v. Dep't of Ret. Sys.*, 186 Wn.2d 393, 402, 377 P.3d 199 (2016). "The burden is on the challenger asserting invalidity of an administrative rule." *Id.* (citing ch. 34.05 RCW; *Wash. Pub. Ports Ass'n v. Dep't of Revenue*, 148 Wn.2d 637, 645, 62 P.3d 462 (2003)). "An agency rule may be invalidated only if the court determines it (1) is unconstitutional, (2) is outside the statutory authority of the agency, (3) is arbitrary or capricious, or (4) was adopted without complying with statutory rule making procedures." *Id.* at 402-03 (citing RCW 34.05.570(2)(c)).

Here, the challengers claim that the portion of Ecology's rule WAC 173-557-050 setting instream flows at 850 cfs from June 16 to September 30 is invalid because in promulgating the rule, Ecology exceeded its authority and acted arbitrarily and capriciously. Center for Environmental Law and Policy's (CELP) invalidity assertion rests on its contention that Ecology failed to give consideration to recreational, navigational, and aesthetic values as required by RCW 90.54.020(3)(a).<sup>8</sup> As discussed more fully below, challengers' assertion fails for several reasons: (1) per the plain language of RCW 90.54.020(3)(a), the statute provides general guidelines and not required elements, (2) the administrative record shows that Ecology did consider

<sup>&</sup>lt;sup>8</sup> CELP's opening brief in the trial court asserted that Ecology "appears to have ignored" views expressed at the rule making hearing by member of the public who commented that they felt 850 cfs was too low. Clerk's Papers (CP) at 200 (Pet'rs' Am. Opening Brief at 18 n.59).

recreational and other values during the rule making process, and (3) evidence in the record shows that, in fact, the summer flow rate rule provides base flows that sustain recreation and navigation as well as fish habitat.

### B. <u>Burden</u>

The validity of an agency rule is a question of law subject to de novo review. *Wash. Rest. Ass'n v. Wash. State Liquor Control Bd.*, 200 Wn. App. 119, 126, 401 P.3d 428 (2017) (citing *Kabbae v. Dep't of Soc. & Health Servs.*, 144 Wn. App. 432, 439, 192 P.3d 903 (2008)). "When an agency acts within its authority, a rule is presumed to be valid and, therefore, the 'burden of demonstrating the invalidity of agency action is on the party asserting the invalidity." Wash. Fed'n of State Emps. v. Dep't of Gen. Admin., 152 Wn. App. 368, 378, 216 P.3d 1061 (2009) (quoting RCW 34.05.570(1)(a)). "The party asserting the invalidity must show compelling reasons why the rule conflicts with the intent and purpose of the legislation." *Id.* (citing *Weyerhaeuser Co. v. Dep't of Ecology*, 86 Wn.2d 310, 317, 545 P.2d 5 (1976)). "Any rule that is 'reasonably consistent' with the underlying statute should be upheld." *Id.* (quoting *Green River Cmty. Coll. v. Higher Educ. Pers. Bd.*, 95 Wn.2d 108, 112, 622 P.2d 826 (1980), modified on reh'g by 95 Wn.2d 962, 633 P.2d 1324 (1981)).

### C. <u>Plain meaning</u>

When construing a statute, this court's goal is to determine and effectuate legislative intent. *Swinomish Indian Tribal Cmty. v. Dep't of Ecology*, 178 Wn.2d 571, 581, 311 P.3d 6 (2013) (citing *TracFone Wireless, Inc. v. Dep't of Revenue*, 170 Wn.2d 273, 281, 242 P.3d 810 (2010); *Dep't of Ecology v. Campbell & Gwinn, LLC*, 146 Wn.2d

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1, 9-10, 43 P.3d 4 (2002)). Where possible, the court gives effect to the plain meaning of the language used as the embodiment of legislative intent. *Id.* (citing *TracFone*, 170 Wn.2d at 281; *Campbell & Gwinn*, 146 Wn.2d at 9-10). The court determines plain meaning from all that the legislature has said in the statute and related statutes that disclose legislative intent about the provision in question. *See id.*; *see also TracFone*, 170 Wn.2d at 281; *State v. J.P.*, 149 Wn.2d 444, 450, 69 P.3d 318 (2003); *Campbell & Gwinn*, 146 Wn.2d at 11. In general, words are given their ordinary meaning, but when technical terms and terms of art are used, the court gives these terms their technical meaning. *Swinomish Indian Tribal Cmty*, 178 Wn.2d at 581-82 (citing *Tingey v. Haisch*, 159 Wn.2d 652, 658, 152 P.3d 1020 (2007); *City of Spokane ex rel. Wastewater Mgmt. Dep't v. Dep't of Revenue*, 145 Wn.2d 445, 452, 454, 38 P.3d 1010 (2002)).

And, as this court noted in *Swinomish Indian Tribal Community*, "resolving the meaning of a statutory provision concerning water rights almost always requires consideration of numerous related statutes in the water code." *Id.* at 582 (citing *Campbell & Gwinn*, 146 Wn.2d at 12-17; *Postema v. Pollution Control Hr'gs Bd.*, 142 Wn.2d 68, 77-83, 11 P.3d 726 (2000)). Accordingly, this court considers "the statutory context, related statutes, and the entire statutory scheme" when ascertaining the plain meaning of a statute concerning water rights. *Id.* (citing *TracFone*, 170 Wn.2d at 281; *Unruh v. Cacchiotti*, 172 Wn.2d 98, 113, 257 P.3d 631 (2011)).

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## D. <u>Ecology did not act beyond its authority when promulgating the summertime</u> <u>minimum flow rule at issue</u>

The case concerns the interplay of two statutes, RCW 90.22.010 and RCW 90.54.020(3)(a). RCW 90.22.010 states in relevant part, "The department of ecology *may* establish minimum water flows or levels for streams, lakes or other public waters *for the purposes of protecting fish*, game, birds *or* other wildlife resources, *or* recreational or aesthetic values of said public waters whenever it appears to be in the public interest to establish the same." (Emphasis added.)

RCW 90.54.020 is a "[g]eneral declaration of fundamentals for utilization and management of waters of the state," and provides that "[u]tilization and management of the waters of the state shall be guided by the following general declaration of fundamentals: [including] . . . The quality of the natural environment shall be protected and, where possible, enhanced as follows: . . . Perennial rivers and streams of the state *shall* be retained with base flows necessary to provide for preservation of wildlife, fish, scenic, aesthetic *and* other environmental values, and navigational values." RCW 90.54.020, .020(3)(a) (emphasis added) (boldface omitted).

Division Two read the above emphasized language in RCW 90.54.020(3)(a) as requirements and held that "Ecology must meaningfully consider the instream values enumerated in RCW 90.54.020(3)(a), and attempt to preserve them to the fullest extent possible." *Ctr. for Envtl. Law & Policy*, 9 Wn. App. 2d at 764-65. The Court of Appeals reversed the dismissal of the challengers' suit. As explained below, this was error.

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### E. <u>"Shall," "or," "and"</u>

As for the language used in these statutes, this court has noted the general rule that "It is well settled that the word 'shall' in a statute is presumptively imperative and operates to create a duty. The word 'shall' in a statute thus imposes a mandatory requirement *unless a contrary legislative intent is apparent.*" *Erection Co. v. Dep't of Labor & Indus.*, 121 Wn.2d 513, 518, 852 P.2d 288 (1993) (citations omitted). As discussed below, a contrary legislative intent is apparent from the context and language of RCW 90.54.020. Further, and more relevant here, this court has also noted that "[t]he meaning of 'shall' is not gleaned from that word alone because our purpose is to ascertain legislative intent of the statute as a whole." *State v. Krall*, 125 Wn.2d 146, 148, 881 P.2d 1040 (1994). Accordingly, the *Krall* court applied the following rule,

"In determining the meaning of the word 'shall' we traditionally have considered the legislative intent as evidenced by all the terms and provisions of the act in relation to the subject of the legislation, the nature of the act, the general object to be accomplished and consequences that would result from construing the particular statute in one way or another."

Id. (quoting State v. Huntzinger, 92 Wn.2d 128, 133, 594 P.2d 917 (1979)).

Here, the express language of RCW 90.54.020(3)(a) provides "general declaration of fundamentals," it provides guidelines, not elements that must be met. Even if this court were to interpret RCW 90.54.020(3)(a) as embodying a mandatory requirement, the plain language at issue would direct only that "[p]erennial rivers . . . of the state shall be retained with *base flows* necessary to provide for preservation of . . . fish . . . and other environmental values, and navigational values." (Emphasis added.) Ecology's summer

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instream flow rule at issue achieves such base flows as borne out by the administrative record (as discussed below).

The Court of Appeals' elevations of the *general guidance* provided in RCW 90.54.020(3)(a) to required elements does not comport with the plain language of that statute read as a whole and is error. Further, the Court of Appeals' imposed requirement that Ecology "attempt to preserve [listed values] to the fullest extent possible" also adds language to RCW 90.54.020(3)(a). *Ctr. for Envtl. Law & Policy*, 9 Wn. App. 2d at 765. Courts "must not add words [to a statute] where the legislature has chosen not to include them." *Rest. Dev., Inc. v. Cananwill, Inc.*, 150 Wn.2d 674, 682, 80 P.3d 598 (2003).

We agree with Ecology that RCW 90.22.010's plain language provides it with the authority to "establish minimum water flows . . . *for the purposes of protecting fish*, game, birds *or* other wildlife resources, *or* recreational or aesthetic values of said public waters whenever it appears to be in the public interest to establish the same." (Emphasis added.) And thus, Ecology has the authority to balance competing interests and values when setting instream flow rates. That Ecology has such authority and discretion here comports with other statutes (i.e., the general statutory scheme) concerning Ecology's mandate.<sup>9</sup>

<sup>&</sup>lt;sup>9</sup> The legislature has given Ecology broad authority and discretion to manage matters concerning water. *See, e.g.*, RCW 43.21A.020 (creating the department of ecology "to undertake, in an integrated manner, the various water regulation, management, planning and development programs [which were] authorized to be performed by the department of water resources and the water pollution control commission"); RCW 90.03.247(2) (expressly providing "exclusive" authority to Ecology to establish minimum flows for any state stream as provided in statutes including RCW 90.22.010; noting that in setting minimum flow levels, Ecology must "during all

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Further, "[a]s a default rule, the word 'or' does not mean 'and' unless legislative intent clearly indicates to the contrary." *Tesoro Ref. & Mktg. Co. v. Dep't of Revenue*, 164 Wn.2d 310, 319, 190 P.3d 28 (2008) (plurality opinion). As noted, the court assesses the plain meaning of a statute viewing the words of a particular provision in the context of the statute in which they are found, together with related statutory provisions, and the statutory scheme as a whole. *Id.* And the court considers the subject, nature, and purpose of the statute as well as the consequences of adopting one interpretation over another. *Id.* Accordingly, here, the legislature's use of the disjunctive "or" in RCW 90.22.010 indicates that Ecology has authority to establish minimum water flows based on *any* of the listed values, and there is no legislative intent suggesting otherwise. Indeed, the

stages of development . . . of minimum flow proposals, consult with, and carefully consider the recommendations of, the department of fish and wildlife"), .005 (noting state policy to promote use of public waters to provide maximum net benefits regarding both diversionary uses and the retention of waters within streams in sufficient quantity and quality to protect instream and natural values and rights, and providing further that "based on the tenet of water law which precludes wasteful practices in the exercise of rights to the use of waters, the department of ecology shall reduce these practices to the maximum extent practicable"); RCW 77.57.020 (noting state policy that "a flow of water sufficient to support game fish and food fish populations be maintained at all times in the streams of this state" and that "[t]he director of ecology may refuse to issue a permit if, in [her/his] opinion . . ., issuing the permit might result in lowering the flow of water in a stream below the flow necessary to adequately support food fish and game fish populations in the stream"). See also WAC 173-557-010(2)(a) (noting the purposes in adopting Ecology's instream flow rule at issue here include: to "[e]stablish instream flow levels necessary to protect wildlife, fish, scenic, aesthetic, recreation, water quality and other environmental values, navigational values, and stock watering requirements"), (1) (noting that Ecology "adopts this rule under the authority of the Watershed Planning Act (chapter 90.82 RCW), Water Resources Act of 1971 (chapter 90.54 RCW), Water code (chapter 90.03 RCW), Regulation of public groundwaters (chapter 90.44 RCW), Minimum Water Flows and Levels Act (chapter 90.22 RCW), Water well construction (chapter 18.104 RCW); RCW 43.21A.064(9) and 43.21A.080; and in accordance with the water resources management program regulation (chapter 173-500 WAC)").

broad mandate imposed on Ecology to oversee and integrate various water regulation, management, planning and development programs, *see supra* note 9, attests to the appropriateness of Ecology applying its discretion in the present circumstance.

As noted, the statutes discussed give Ecology the authority to decide instream flows and to exercise its discretion in doing so, guided by the statutes. Moreover, the administrative record (some 19,000 pages) concerning rule making supports that Ecology appropriately did so. That record included multiple fish habitat studies and recreational considerations as contained in dam license renewals that were included in the record (i.e., a survey study seeking input from whitewater users regarding their preferences/comments about different specific flow rates). Also, many comments were submitted by recreational users stating that they *preferred* to have greater summer cfs flows (they typically preferred 1500 cfs). Ecology responded to all such comments, explaining that its rule provided for both fish habitat and other values (recreation, navigation, and aesthetics). This conclusion is supported by the record, which contained photographs of recreational/navigational use of the river at flow rates lower than those provided in the rule.<sup>10</sup>

For the reasons noted above, challengers' contention that Ecology acted outside its authority in promulgating a rule setting the minimum instream summertime flow rates for the Spokane River at 850 cfs fails.

<sup>&</sup>lt;sup>10</sup> See AR at 11590, 11594, 11595, 11597, 11599, 11603 (showing various craft recreating/navigating the river at 770 cfs including hard-shell kayak, inflatable kayak, a small cataraft, and tubes).

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## F. <u>Ecology did not act arbitrarily or capriciously in promulgating the summertime</u> <u>minimum flow rule at issue</u>

As noted, the challengers in this case also asserted that Ecology's rule that set summertime minimum flow rates for the Spokane River is invalid because it is arbitrary and capricious. This court may grant relief if the agency's action or order is "arbitrary or capricious." Port of Seattle v. Pollution Control Hr'gs Bd., 151 Wn.2d 568, 589, 90 P.3d 659 (2004) (quoting RCW 34.05.570(3)(i)). This court has defined arbitrary or capricious agency action as action that is willful and unreasoning and taken without regard to the attending facts or circumstances. Id. "Where there is room for two opinions, and the agency acted honestly and upon due consideration, this court should not find that an action was arbitrary and capricious, even though this court may have reached the opposite conclusion." Id. "This court should not 'undertake to exercise the discretion that the legislature has placed in the agency." Id. (quoting RCW 34.05.574(1)); see also Hillis v. Dep't of Ecology, 131 Wn.2d 373, 383, 932 P.2d 139 (1997) (if there is room for two opinions, an action taken after due consideration is not arbitrary and capricious even though a reviewing court may believe it to be erroneous). Further, "neither the existence of contradictory evidence nor the possibility of deriving conflicting conclusions from the evidence renders an agency decision arbitrary and capricious." Rios v. Dep't of Labor & Indus., 145 Wn.2d 483, 504, 39 P.3d 961 (2002); see id. at 504-05 (challengers of agency rule making decision had not met their burden to show that the agency's rule making was "arbitrary or capricious" in light of the record; that is, challengers failed to show that the agency action was "unreasoning," meaning not rational at the time it was made).

Here, it cannot be said that Ecology's promulgation of the rule concerning summertime minimum flow rates was unreasoning. As noted, the substantial administrative record concerning the rule making included multiple fish habitat studies<sup>11</sup> and recreational considerations contained in documentation concerning dam license renewals that were included in the record.<sup>12</sup> Also, many comments were submitted by recreational users stating that they *preferred* to have greater summer cfs flows. Ecology responded to all such comments, explaining that its rule provided for both fish habitat and other values (recreation, navigation, and aesthetics).<sup>13</sup>

CP at 439 (AR at 3009). In another published response to a submitted comment, Ecology stated: Ecology does not agree the requested [higher] instream flow levels are better than those set in this rule. No data or studies are presented in these comments to support the suggested flows. The instream flow numbers established in this rule are supported by four scientific studies conducted specifically to evaluate the instream needs of the fisheries resources present in the river at all of their various life stages. Flows suitable for rafting in the River occur every year and the timing of these suitable flows is dependent on each year's hydrograph. An instream flow rule does not change the hydrograph, it simply functions to condition new, junior, water uses to be interruptible to protect the instream flow. To physically manipulate and modify the flow in the river to satisfy any particular use, it would

<sup>&</sup>lt;sup>11</sup> See CP at 389 (AR at 2803) (noting four campaigns of fish science investigations from 2000 through 2011, which served as the basis for setting minimum flows to protect fish at 850 cfs for June 16 to September 30).

<sup>&</sup>lt;sup>12</sup>See CP at 310-74 (AR at 2225-89) (WHITEWATER PADDLING INSTREAM FLOW ASSESSMENT STUDY REPORT SPOKANE RIVER PROJECT, FERC No. 2545 (2004)); CP at 330 (AR at 2245) (noting that nearly all whitewater survey participants preferred higher flows than those they experienced during the survey).

<sup>&</sup>lt;sup>13</sup> Ecology's published response to one comment requesting higher cfs flows stated: Flows that serve the recreational community occur every year in the Spokane River. What varies from year-to-year is the timing and duration of those recreational flows. The instream flow rule cannot change the hydrograph or control river operations. The proposed instream flows are protective of fisheries uses. While the instream flow levels are based on fish studies, they also ensure flow in the river for preservation of other instream values, including scenic, aesthetic and navigational values.

The administrative record establishes that Ecology's promulgation of the summertime minimum flow rate for the Spokane River was not unreasoning. Challengers have failed to establish that Ecology's action was arbitrary or capricious.

For the reasons discussed above, the challengers failed to meet their burden to show that Ecology's rule that set summertime minimum flow rates for the Spokane River was invalid. Accordingly, the Court of Appeals erred in reversing the trial court's dismissal of challengers' suit alleging invalidity of Ecology's rule WAC 173-557-050.<sup>14</sup>

### **III. CONCLUSION**

Ecology has authority under RCW 90.22.010 to set minimum instream flows for

the rivers and streams in this state and properly promulgated WAC 173-557-050, a rule

setting a summertime minimum instream flow rate for the Spokane River at 850 cfs from

June 16 to September 30. Challengers of that rule fail to carry their burden to show the

take a modification of the FERC licenses issued for Avista's dams on the Spokane River. Those licenses were most recently re-issued in 2009.

CP at 468 (AR at 3038); *see also* Ecology's "Concise Explanatory Statement" at CP at 402 (AR at 2972). This explanatory statement included "Reasons for Adopting the Rule" (CP at 408) (AR at 2978), which stated in part, "Instream resources that need protection in the mainstem Spokane River include Redband Trout, Mountain Whitefish, and all aquatic species that require water for habitat. Additional resources and beneficial uses include: water quality, riparian habitat, wildlife, recreation such as fishing, rafting, kayaking, boating and swimming, and the scenic and aesthetic value of the river." CP at 409 (AR at 2979).

<sup>&</sup>lt;sup>14</sup> Amicus Washington Kayak Club and Paddle Trails Canoe Club attempt to reargue application of the public trust doctrine. The Court of Appeals rejected the public trust doctrine's application here as an additional basis for attacking the validity of Ecology's rule, and the challengers did not seek review of that determination. Application of the public trust doctrine is not properly before this court. "'This court generally does not consider issues that are raised only by an amicus." *State v. James-Buhl*, 190 Wn.2d 470, 478 n.4, 415 P.3d 234 (2018) (quoting *Harris v. Dep't of Labor & Indus.*, 120 Wn.2d 461, 467, 843 P.2d 1056 (1993)); *see also State v. Hirschfelder*, 170 Wn.2d 536, 552, 242 P.3d 876 (2010) ("We need not address issues raised only by amici.").

rule's invalidity. We reverse the Court of Appeals' decision to the extent it reversed the trial court's dismissal of challengers' suit.

WE CONCURR:

cren Nel

# 2.4 Intertie Agreements

AGENDA SHEET FO	R COUNCIL MEETIN	G OF: January 22, 2001	5208 SPOKANE
Submitting Dept.	Contact Per	son Phone No.	
Water	George Mille	" DECEN/ED	X011111
ADMINISTRATIVE SESSION Contract Report Claims	<ul> <li>LEGISLATIVE SESSION</li> <li>Emergency Ord</li> <li>Resolution</li> <li>Final Reading Ord</li> <li>First Reading Ord</li> <li>Special Consideration</li> <li>Hearing</li> </ul>	CITY PRIORITY COMMUNICATIONS JAN 11 2004LERK'S FILE Constructions JAN 11 2004LERK'S FILE Constructions Development Constructions Development Constructi	OPROF32

### AGENDA WORDING:

Agreement for Water Systems Intertie for Water Supply Emergencies with the United States Government Department of Defense for Fairchild Air Force Base.

**BACKGROUND:** (Attach additional sheet if necessary) Fairchild Air Force Base (FAFB) has requested that an intertie with the City of Spokane water system be established with the FAFB water system at the FAFB facilities on Airport Drive west of Spotted Rd. FAFB desires to improve the reliability of water service for domestic & fire protection to the Fairchild Air Force Base during emergencies in their water system supply by the backup provided by the inertie between the water systems. The Agreement provides the formal understanding between the Parties for the intertie of the water system for emergency purposes.

### **RECOMMENDATION:**

Approve the Agreement & Authorize the Mayor to sign.



### ATTACHMENTS:

On file for Review in Office of City Clerk: Include in Packets:

SIGNATURES

Public Works & Utilities

Directo dro. Svcs

Intertie Agreement

FAFB

Finance Uner, esident Council

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**DISTRIBUTION:** 

Director of Accounting Budget Control Legal Attn: Bob Beaumier Water (George Miller)

**COUNCIL ACTION:** 

APPROVED BY SPOKANE CITY COUNCIL: Aru Da CITY CLER

Spokane City Clerk file no. OPRO132

9/13/00 rgb/gwm

<u>ب</u>

,

FAFB file no.\_\_\_\_\_

### AGREEMENT FOR WATER SYSTEMS INTERTIE FOR WATER SUPPLY EMERGENCIES

This Agreement made and entered into this \_\_\_\_\_\_day of \_\_\_\_\_\_, 2000, by and between the CITY OF SPOKANE, a municipal corporation of the State of Washington, acting through its Department of Water and Hydroelectric Services (hereinafter "City" or "City Water Department"), and the United States Government, acting through its Department of Defense, as owner and operator of Fairchild Air Force Base (hereafter also "FAFB") in Spokane County, Washington.

WHEREAS, the parties are public water supply purveyors owning and operating water systems to supply their customers with potable water for domestic and fire protection needs, and

WHEREAS, the parties desire to mutually improve the reliability of the water supply by means of an emergency water system intertie, and

WHEREAS, the City system includes an existing 24" transmission water main in Spotted Road at Airport Drive in Spokane County. Said location is near FAFB water system supply facilities known as the Geiger Reservoir/Geiger Pumping Station. An intertie location convenient for both parties could be achieved by installing a new water line from said existing City main to the FAFB Geiger Reservoir; and

WHEREAS, the current Spokane County Coordinated Water System Plan Update, June 1999, under Section 7, paragraph 7.6 promotes the creation of water system interties between water purveyors to increase the reliability of water service locally; and

WHEREAS, the State of Washington Administrative Code (WAC), Chapter 246-290, section 246-290-132, deals with establishing interties between public water systems;

NOW, THEREFORE, the parties agree as follows:

1. Intertie; Location; Facilities

A. The parties agree FAFB may extend a necessary water main, including all other necessary infrastructure components, to intertie the FAFB water system supply facilities at the Geiger Reservoir/Geiger Pumping Station with the City's water system at the existing City water main in Spotted Road at Airport Drive, in Spokane County.

B. In addition to the intertie line, FAFB agrees to install such necessary facilities as may be ordered by the City Water Department Director. Such facilities shall include necessary water meter(s), backflow prevention device(s), and a control valve on the intertie with such necessary features so as to open and close at controlled speeds in order to control flows and mitigate creating water pressure surges, known as "water hammer."

C. Further, said control valve must be designed to be adjustable to govern the flow rate of water in order to mitigate creating low water pressure and water supply problems. As such, FAFB agrees to set the initial flow rate of the control valve at such setting so as not to exceed 2,500 gallons per minute.

D. All facilities and devices are to be installed at FAFB's sole expense and liability, and must be approved by the City Water Department Director.

## 2. Adjustment by City Water Department Director

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A. The City reserves the right to require the setting of valve operating control speeds to be adjusted as necessary to protect the City's water system from unacceptable water hammer. Further, the City reserves the right to require the setting of flow to be adjusted downward as necessary to protect the operations of the City's water system from unacceptable impacts from flow rates drawn into the FAFB water system. These determinations are at the sole discretion of the City Water Department Director.

B. Verbal notice of any desired municipal adjustments may be given in person or by telephone from the City Water Department Director to FAFB, and may be followed by written notice from the Director to FAFB. Further, upon written authorization by the City Water Department Director, FAFB may be allowed to increase the flow rate to a specified rate above the aforementioned 2,500 gallons per minute, upon such additional terms or conditions as the Director may specify.

## 3. FAFB responsible for engineering, installation, maintenance

A. FAFB agrees that all liability and costs of the engineering and installation of all infrastructure, devices, controls and all other components necessary to provide a functional and reliable intertie with the City's water system are the sole responsibility of FAFB and the United States Department of Defense.

B. FAFB agrees to provide all necessary maintenance of all facilities, except the meter and water meter calibrations, so as to assure the continuing proper performance of the devices at its sole expense and liability. FAFB agrees to provide all necessary maintenance of all other water system infrastructure components, including the service line, located on the FAFB side of the water meter.

C. FAFB agrees to allow inspections of the intertie infrastructure components by City Water Department personnel at any time with advanced notification to FAFB, or in

case of urgency as ordered by the City Water Department Director, without advance notice.

### 3. City to keep meter in repair; damage

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A. The City agrees to provide maintenance and calibration of the water meter at no additional cost, PROVIDED, FAFB agrees to pay any maintenance calibration or meter repair or replacement charges where the City Water Department Director determines that the water meter was damaged as a result of actions, processes and/or procedures caused by FAFB, its agents, employees or contractors, or third parties outside the City of Spokane. Such charges may be billed by the City on a time and materials basis and must be paid within 30 days of billing.

B. FAFB agrees to promptly advise the City of any known or suspected maintenance or repair needs on the City's water mains, including service line, or water meter.

### 4. Activation; times of use

A. FAFB may activate the intertie in times of emergency, which shall include the following circumstances: at such times as FAFB's water system cannot furnish adequate water from its own water system, as necessary to supply FAFB system needs to avoid base closure, for the purpose of testing the intertie for readiness of service, for the purpose of maintaining the quality of the water within the intertie plumbing at acceptable levels by periodic flowing of fresh water into the system, when necessitated because of scheduled or unscheduled system repairs or maintenance, or for any other reasons in the interests of national defense or the public safety.

B. FAFB agrees to give the City Water Department Director or designee at least 24 hours' advance notice of any activation of the intertie by calling the City's Water & Hydroelectric Services' dispatch office at 625-7800, except that during an unplanned emergency, the call may be made, as soon as possible, after the activation of the intertie.

C. The City reserves the right to temporarily discontinue the furnishing of water service upon the City Water Department Director's determination that the City is unable to adequately provide water service due to operational difficulties, which includes water system failure needing repairs, maintenance, or replacement. As much advanced notice as possible will be provided by the City to FAFB should such need to temporarily discontinue the furnishing of water service occurs, but in no event shall such time be less than 48 hours except that during an unplanned emergency the call may be made, as soon as possible, after the interruption of water service.

D. The City of Spokane reserves the right to renegotiate this agreement if the furnishing of water becomes other than on the basis provided for herein.

## 5. FAFB must pay for water usage

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FAFB shall pay for all water furnished by the City, as measured through the water meter on the FAFB intertie service line, or if the meter is inoperative, a reasonable estimate of consumption by the City Water Department Director. Charges shall be at established City of Spokane water rates in effect at the time of consumption as listed in the Spokane Municipal Code under Section 13.04.2014 for Outside City Service Area. FAFB understands current City practice is to read the water meter on a monthly basis, which will result in the generation of monthly billings for water usage. FAFB agrees to make payment within 30 days of billing. FAFB is responsible promptly to notify the City of any errors in billing, but in any event, no longer than twelve (12) months after billing, and shall be subject to other generally applicable provisions of municipal water service ordinances, policies and requirements, as determined by the City Water Department Director.

## 6. Information for FAFB

The City agrees to provide FAFB, upon request, any available information relative to the City's water, on an annual basis by or before the deadlines prescribed by the U.S. Environmental Protection Agency pursuant to federal regulations, to assist the FAFB personnel in preparing their Annual Consumer Confidence Report as prescribed by federal regulations.

## 7. DOH, Ecology approval may be required

The parties understand this agreement may be subject to approval by the Washington State Department of Health (DOH), the Washington State Department of Ecology (Ecology) or other jurisdictional agencies prior to taking effect. As such, the parties agree to cooperate and assist each other, combining their respective technical and legal resources into a unified team unit or consortium, so as to jointly prepare and submit the necessary documents to DOH, Ecology, or other appropriate jurisdictional agencies for approval of this agreement and the intertie, so long as both parties believe the purpose of the agreement may be fulfilled.

## 8. Liability; Limit; Additional.

A. Notwithstanding any other provision, the parties agree that the City shall have no liability whatsoever for failure to furnish water in amounts or at rates needed or requested by FAFB, whether under this agreement or otherwise. Should any liability or damages nonetheless be determined to arise because of such failure or other default by the City, whether under the terms of this agreement or otherwise, the parties agree that the total amount of any claim may not exceed actual damages or the total payments by FAFB under this contract for a time not to exceed the past five (5) years, whichever is less.

B. The City shall never be liable for any incidental or consequential damages or otherwise to pay any costs of furnishing water to any FAFB customer and shall not be considered a purveyor to any FAFB customer. This agreement establishes no right to receive utility service for any area, person, or premises, and no such right or estoppel against the City shall be deemed extended or created by any action or inaction taken, in the administration of this agreement or otherwise.

C. This Agreement is not assignable by FAFB without written consent of the City Water Department Director.

D. This Agreement shall be construed as being made and delivered in the State of Washington with federal law being applicable to its construction and enforcement. Any action at law, suit in equity or judicial proceeding for the enforcement of this agreement or any provision herein shall be commenced in U.S. District Court.

E. This document is the entire agreement, which may not be amended, except in writing, mutually signed by both sides. Each party has had an opportunity to consult with legal counsel and the agreement shall not be construed to favor or disfavor either party.

CITY OF SPOKA Βv Intrim City Administrator Attest: Approved as Assistant City Attorne

FAFB; UNITED STATES DEPARTMENT OF DEFENSE

Emi 7. Lunde Bv:

Commander, 92d Air Refueling Wing

STATE OF WASHINGTON )

County of Spokane

On this <u>22</u> day of <u>January</u>, 2006, before me personally appeared Hank Miggins and Terri Pfister, to me known to be the <u>City Manager</u> and the City Clerk, respectively, of the City of Spokane, a municipal corporation, that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of the corporation, for the uses and purposes therein mentioned, and on oath stated that they were authorized to execute said instrument.

) ss.

)

In witness whereof I have hereunto set my hand and affixed my official seal the day and year first above written.

Notary Public and for of Washington, residing et S My commission expires (

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	STATE OF WASHINGT	ON)	
	$\rightarrow$	) ss.	
	County of Spokane	$\overline{}$	.:

On this day of 2000, before me, the undersigned, a Notary Public in and for the State of Washington, personally appeared Erwin F. Lessel III me known to to be the , of Fairchild Air Force Base, United States Commonuter Department of Defense, the agency that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of said agency, for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument and that the seal affixed is the seal of said agency.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year first above written.

SCOTT B. BRUSO. SSGT, USAF Paralegal Craftsman, 10 U.S.C. 1044a 92 ARW/JA 1 E. Bong St., Suite 135 Fairchild AFB, WA 99011

Notary Public in and for the State of Washington, residing at Spokane. My commission expires NIA

Emergency intertie agreement between City and FAFB Page 6

### STATE OF WASHINGTON ) ) ss. County of Spokane )

\* \*

On this \_\_\_\_\_\_day of \_\_\_\_\_\_, 2001, before me personally appeared John Powers and Terri Pfister, to me known to be the Mayor and the City Clerk, respectively, of the City of Spokane, a municipal corporation, that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of the corporation, for the uses and purposes therein mentioned, and on oath stated that they were authorized to execute said instrument.

In witness whereof I have hereunto set my hand and affixed my official seal the day and year first above written.

> Notary Public in and for the State of Washington, residing at Spokane. My commission expires \_\_\_\_\_\_.

Water & Hydro Submitting Dep	<u>Svsc.</u> Dartment	George Hiller Contact Person	 Phone Ext		
ONSENT AGENDA Contract	LEGISLATI O Resolut	IVE SESSION tion	COUNCIL PRIORITRECEIV	ED Clerk's Files:	*000 2000- 10
Report	0 Emerger 0 Final   0 First	ncy Ordinance Reading Ordinance Reading Ordinance	0 Economic Development 0 Growth Management 07 2 1 2 0 Human Services	Renews:	#
	0 Special 0 Kearing	l Consideration B	0 Neighborhood CITY CLERK'S ( D Public Safet)	DFFICE <sup>Cross Reference:</sup>	#
			Quality Service Dela POKANE, M O Racial Equity & Cultural Diver	A ENG/LID:	#

NEIGHBORHOOD/COMMISSION/COMMITTEE NOTIFIED BY SUBMITTING DEPARTMENT:

N/A	

### AGENDA WORDING:

Agreement for Water Systems Interties for Standby Water Service with Whitworth Water District No. 2 (WWD #2).

### BACKGROUND (Attach separate sheet if necessary):

Between the years 1968 and 1990, two interties were established between the City's and WWD #2's water systems for standby and emergency needs by the WWD #2 water system.

The interties were established by informal mutual unwritten agreements.

The Washington State Department of Health is now requiring that all existing interties between public water supply purveyors be formalized by written agreements. Management of both water agencies, the City of Spokane Water & Hydroelectric Services Department and WWD #2, agree that this needs to be accomplished as well.

The Agreement formalizes the understandings between the Parties, under which these connections were established.

**<u>RECOMMENDATION</u>**: Approve the Agreement & Authorize the City Manager to sign.

FISCAL IMPACT:	Expenditure – None	Budget Account:	# N/A
	Revenue – Varies depending	on water sales	#

LIST ATTACHMENTS AS FOLLOWS: On file for Review in Office of City Clerk:  $\chi$ 

Include in Packets:

SIGNATURES OF SUBMITTING OFFICERS (sign legibly):

Direct

DISTRIBUTION AFTER COUNCIL ACTION: Director of Accounting Budget Control Legal Attn: Bob Beaumier Water & Hydroelectric Services Whitworth Water District No. 2 duplic. org.

Operations

Finance Jelis la

COUNCIL ACTION: APPROVED BY SPOKANE CITY COUNCIL:

11/7/00 rgb/gwm 11/14/00

Spokane City Clerk file no.00 2 2000-100 2-

WWD #2 file no.\_\_\_\_\_

## AGREEMENT FOR WATER SYSTEMS INTERTIES FOR STANDBY WATER SERVICE

This Agreement made and entered into this  $4^{45}$  day of <u>December</u>, 2000, by and between Whitworth Water District No. 2, a public municipal water district of the State of Washington, having offices for the transaction of business at 10828 N. Waikiki Road, Spokane, Washington 99218, hereinafter referred to as "WWD #2"; and the City of Spokane, a municipal corporation of the State of Washington, providing public water service to areas inside and outside the City limits pursuant to RCW 35.92.010, through its Department of Water and Hydroelectric Services having offices for the transaction of business at 914 E. North Foothills Drive, Spokane, Washington 99207-2794 (hereinafter "CITY WD").

WITNESSETH:

WHEREAS, the parties are public water supply purveyors owning and operating water systems to supply their customers with potable water for domestic and fire protection needs, and

WHEREAS, the current Spokane County Coordinated Water System Plan Update, June 1999, under Section 7, paragraph 7.6 promotes the creation of water system interties between water purveyors to increase the reliability of water service locally; and

WHEREAS, the State of Washington Administrative Code (WAC), Chapter 246-290, section 246-290-132, deals with establishing interties between public water systems;

WHEREAS, currently two (2) interconnections exist between the WWD #2 and the CITY WD water systems as described in Attachments "A" and "B" hereto; and

WHEREAS, all of the existing interconnections were established between the years 1968 and 1990; and

WHEREAS, all existing interconnections were established Pre-1991 whereby the existing interconnections (hereafter "interties") become eligible to qualify under the provision of "PRE-1991 'GRANDFATHERED' INTERTIES" of RCW 90.03.383; and

WHEREAS, RCW 90.03.383 (3) required notice of such Pre-1991 interties to be submitted to the State of Washington Department of Ecology (Ecology) and the State of Washington Department of Health (DOH) by June 30, 1996 so as to receive approvals;

and

WHEREAS, The CITY WD complied with RCW 90.03.383 (3) by providing such necessary notice by letter dated June 28, 1996, to both Ecology and DOH; and

WHEREAS, no written agreement currently exists for the aforementioned existing interties as these were established by informal mutual unwritten agreements;

WHEREAS, both jurisdictions are now desirous and able to enter into this formal Agreement, pursuant to the provisions of RCW Chapter 39.34, as may apply, for the continued operations of the existing interties between the water systems so as to provide standby water service for the benefit to WWD #2 for emergency auxiliary water supply, storage and fire protection; and

WHEREAS, by this formal Agreement, the Parties furthermore desire to establish their respective rights and responsibilities with regard to the interties of their respective water systems;

NOW, THEREFORE, for and in consideration of the mutual benefits to be derived herefrom, the Parties confirm and ratify their informal agreement with the following specific details for the existing interties as set forth herein and further described in Attachments "A" and "B" hereto:

- The CITY WD shall make emergency auxiliary water supply, storage and fire protection service available to WWD #2 through the interties. However, the emergency auxiliary water service may be subject to limitation as the CITY WD determines necessary if the CITY WD suffers a deficiency in water supply available to its own customers or other emergency circumstances. WWD #2 may only appropriate the amount of water that the CITY WD determines it can provide without risk or damage to the CITY WD's system or CITY WD customers.
- 2. In the event that the CITY WD cannot meet or supply both the water demand of it's customers and the auxiliary needs of WWD #2, then the CITY WD may choose to first meet the needs of it's own customers and services. The CITY WD shall not be responsible for any damages to WWD #2 or it's customers, it being understood that no customer relationship is created by this agreement or otherwise as between the CITY WD and WWD #2 customers or between WWD #2 and CITY WD customers.
- 3. The Administration of this Agreement shall be the joint responsibility of WWD #2's Administrator and the Administrator of the CITY WD.
- 4. If either Party contaminates or damages the water system of the other Party, then the Party responsible for the contamination or damage shall pay the cost of correcting, removing and eliminating the contamination or damage incurred by the other Party, whether foreseen or unforeseen. Further, the responsible Party shall indemnify and hold harmless the other Party for injury to persons or property resulting from such contamination or damage.

5. In order to minimize the possibility of such contamination or damage, the Parties agree that any contamination detected through a water sample must be reported to the other Party as follows: 1.) At the time of the detection. 2.) After the system has been declared free of the contaminant. 3.) At the time any disinfection methods are discontinued. The Party reporting the contamination is subject to possible refusal by the uncontaminated Party from intertie usage during the period of contamination.

THIS AGREEMENT shall remain in full force and effect and continue until such time as either Party gives the other Party at least thirty (30) days written notice of their intention to withdraw from and terminate this Agreement. In the event this Agreement is terminated, the terminating Party shall disconnect the systems at their expense. No modification or amendment shall be valid until mutually agreed upon, reduced to writing and executed by authorized representatives of the Parties.

CITY OF SPOKARE Mana Attest: **Elerk** Approved as to form: Assistant City Attorney

Whitworth Water District No. 2

By: <u>6</u>@

Chairman of the Board of Commissioners

Approved as to form: Counsel for District

STATE OF WASHINGTON )

) ss.

County of Spokane

On this 4 m day of  $1 e^{-1}$ , 2000, before me personally appeared Hank Miggins and Terri Pfister, to me known to be the City Manager and the City Clerk, respectively, of the City of Spokane, a municipal corporation, that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of the corporation, for the uses and purposes therein mentioned, and on oath stated that they were authorized to execute said instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.

OFFICIAL SEAL CONNIE J. KENSOK NOTARY PUSLIC - STATE OF WASHINGTON COUNTY OF SPOKANE My Commission Evolves August 16, 2001

Notary Public in and for the State of Washington, residing at Spokane. My commission expires

## STATE OF WASHINGTON ) ) ss. County of Spokane )

On this <u>fleth</u> day of <u>free mention</u>, 2000, before mentioned, a Notary Public in and for the State of Washington, personally appeared <u>fact of Kalonda</u>, to me known to be the Chairman of the Board of Commissioners, of Whitworth Water District No. 2, a public municipal water district that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of the water district, for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year first above written.



Notary Public in and for the State of Washington, residing at Spokane. My commission expires <u>5-10-01</u>.

## ATTACHMENT "A"

## NORTH MONROE STREET & FRANCIS AVENUE INTERTIE

- (1) Location: This metered, one-way connection is located at the intersection of North Monroe Street and Francis Avenue (6300 North Monroe), Spokane County, Washington,
- (2) Purpose: The Purpose of this 6-inch diameter connection is for standby emergency water supply, storage and fire flow for WWD #2. This connection was made at the request of Whitworth Water District #2.
- (3) Date of Installation: October 16, 1968.
- (4) Cost of Construction: The cost of construction for this intertie was borne by WWD #2.
- (5) Operating Procedure: This intertie contains a meter and a check valve at the point of intertie. WWD #2 shall notify the CITY WD regarding the need for the auxiliary water supply prior to operating the manual valves between each system. Each Party's designated representative shall meet at the intertie location and coordinate the operation of the intertie valves.
- (6) Rate Schedule. This intertie is metered. At the end of each month that water is used the meter will be read by the CITY WD and an accounting will be made of any water used. This water consumption will be billed in accordance with the water rates charged to regular "Commercial" CITY WD customers "City Commercial and Industrial Rates" in effect at the time of use.

## ATTACHMENT "B"

### HAWTHORNE ROAD & NEVADA STREET INTERTIE

- (1) Location: This metered, one-way connection is located at the intersection of Hawthorne Road and Nevada Street, Spokane County, Washington.
- (2) Purpose: The Purpose of this 12-inch diameter connection is for emergency auxiliary water supply, storage and fire flow for WWD #2. This connection was made at the request of Whitworth Water District #2.
- (3) Date of Installation: August 1990.
- (4) Cost of Construction: The cost of construction for this intertie was borne by WWD #2.
- (5) Operating Procedure: This intertie contains a meter and a one-way pressure sensitive hydraulically operated value at the point of intertie which automatically opens in the case of a drop in pressure in the WWD #2 system. This value is adjusted to open intermittently to augment the water supply to the higher elevation area of WWD #2's system.
- (6) Rate Schedule. This intertie is metered. At the end of each month that water is used the meter will be read by the CITY WD and an accounting will be made of any water used. This water consumption will be billed in accordance with the water rates charged to regular "Commercial" CITY WD customers "Outside the City Commercial and Industrial Rates" in effect at the time of use.



SPOKANE Agenda She	et for City Council Meeting of:	Date Rec'd	5/7/2014
05/19/2014		Clerk's File #	OPR 2014-0385
		Renews #	
Submitting Dept	WATER & HYDROELECTRIC SERVICES	Cross Ref #	
Contact	CHRIS 7803	Project #	
Contact E-Mail	CPETERSCHMIDT@SPOKANECITY.ORG	Bid #	
Agenda Item Type	Contract Item	Requisition #	
Agenda Item Name	4100 - INTERTIE AGREEMENT BETWEEN	WATER DEPARTMENT	& N SPOKANE IRR
Agenda Wording			

Intertie Water Supply Agreement for Auxiliary Water Supply between the City of Spokane Water Department(SWD) and North Spokane Irrigation District No. 8.

## Summary (Background)

The City of Spokane Water Department(SWD) and the North Spokane Irrigation District No. 8 (NSID #8) have independent water systems that abut each other along their northern and southern boundaries, respectively. NSID #8 has constructed, in 2006, an emergency metered connection to the SWD water system, for emergency use in the event that some event should interrupt their water supply from their own sources. NSID #8 has the capability to provide its own primary water supply and is only seeking

Fiscal Impact		Budget Account	
Neutral 💲		#	
Select \$		#	
Select \$		#	
Select \$		#	
Approvals		Council Notificat	tions
Dept Head	SHUPE, LYNN	Study Session	
Division Director	ROMERO, RICK	Other	PWC 4/28/2014
Finance	BUSTOS, KIM	<b>Distribution List</b>	
<u>Legal</u>	DALTON, PAT	acline	
For the Mayor	SANDERS, THERESA	dkegley	
<b>Additional Approv</b>	als	cpeterschmidt	
Purchasing		jsakamoto	

APPROVED BY SPOKANE CITY COUNCIL ON



## Continuation of Wording, Summary, Budget, and Distribution

## Agenda Wording

## Summary (Background)

auxiliary emergency supply from SWD. SWD has the capability to fulfill and implement its role as regional water supplier by including NSID #8 as an auxiliary water customer. Should it be needed, it would be turned on and water sold from SWD to NSID #8 through the metered connection. This is a one-way connection, and no water would flow or be sold from NSID #8 to the SWD.

Fiscal I	mpact	Budget Account
Select	\$	#
Select	\$	#
<u>Distribu</u>	tion List	

### INTERTIE WATER SUPPLY AGREEMENT FOR AUXILIARY WATER SUPPLY

THIS AGREEMENT, is made and entered into this <u>introductory</u>, 2014 by and between North Spokane Irrigation District No. 8, an Irrigation District and quasi-municipality of the State of Washington, having offices for the transaction of business at 7221 North Regal Street (Mailing address: 7221 N. Regal, Spokane, Washington 99217-7846), hereinafter referred to as "<u>NSID #8</u>"; and the City of Spokane, a municipal corporation of the State of Washington, providing public water service to areas inside and outside the City limits pursuant to RCW 35.92.010, through the City Department of Water and Hydroelectric Services having offices for the transaction of business at 914 E. North Foothills Drive, Spokane, Washington 99207-2794 hereinafter referred to as the "<u>SWD</u>."

### **RECITALS:**

- A. SWD owns and operates a Chapter 70.119A Group A Public Water System ("Spokane Water System") that supplies and distributes potable water to its own resident customers.
- B. The Spokane Water System currently has the water resources, capital facilities and infrastructure, and funding to regionally supply and distribute treated domestic water to at least five (5) other wholesale purveyors and numerous retail customers outside Spokane's corporate limits, and has done so historically.
- C. SWD owns and operates a series of wells pursuant to a series of water rights that are authorized to provide wholesale water within a regional wholesale service area, as approved in its Water System Plan ("Spokane Water System Plan"), promulgated in accordance with Chapter 43.20 RCW and entitled "City of Spokane, Comprehensive Water System Plan," Volumes 1 and 2, dated January, 2007, adopted and approved the City of Spokane City Council by Resolution dated February 26, 2007, and approved by the State Department of Health ("State DOH"), as said document may be amended, revised, or updated through time.
- D. NSID #8 owns and operates a Chapter 70.119A Group A Public Water System that supplies and distributes water to its customers.
- E. NSID #8 has the capability to provide its own primary water supply and is only seeking auxiliary emergency supply from SWD. SWD has the capability to fulfill and implement its role as regional water supplier by including NSID #8 as an auxiliary water customer.
- F. Both jurisdictions are desirous and able to enter into this Interlocal Agreement, pursuant to the provisions of RCW Chapter 39.34 and standby water service will be of benefit to NSID #8 for auxiliary emergency water supply and fire protection.
- G. NSID #8 and the SWD have installed a single connection between the water distribution systems of each party for auxiliary emergency supply and fire protection purposes.
- H. NSID #8 and the SWD desire to enter into this Agreement establishing the rights and responsibilities of the Parties with regard to the interconnections of their respective water systems.

NOW, THEREFORE, for and in consideration of the foregoing recitals, incorporated herein, and the mutual promises and benefits exchanged by the parties herein, the Parties agree to the following specific details for the existing interconnections as set forth herein and further described in Attachment "A" hereto:

### 1. <u>Term and Interconnections Governed.</u>

- 1.1 This Agreement shall take effect on the date that both Parties have duly executed the Agreement. This Agreement shall remain in full force and effect for a term of twenty (20) years.
- 1.2 The Term of this Agreement may be extended or modified by written agreement of the Parties and by a duly executed Amendment to this Agreement.
- 1.3 There shall be one (1) interconnection location governed by this Agreement, described as follows:

City of Spokane Point of Delivery—Francis Street and Freya Street Intertie (as described in Attachment "A" which is incorporated herein by reference).

### 2. <u>Water Delivery.</u>

- 2.1 The SWD shall make emergency auxiliary water supply and fire protection service available to NSID #8 through the interconnection, as described in Attachment "A".
- 2.2 In the event that the SWD cannot meet or supply both the water demand of its customers and the auxiliary needs of NSID #8, then the SWD shall be obligated to first meet the needs of its own customers and services. The SWD shall not be responsible for any damages to NSID #8.
- 2.3 NSID #8 may only appropriate the amount of water that the SWD can provide without risk or damage to the SWD's system.
- 2.4 All water supplied by SWD for use or sale by NSID #8 shall be upon the express condition that after water passes the Point of Delivery, it becomes the property and exclusive responsibility of NSID #8. SWD shall not be liable for any degradation of water quality, for acts of sabotage or vandalism, or for other events and resulting damages that may occur beyond the Point of Delivery and within the NSID #8 Water System.
- 2.5 The quality of wholesale water made available to NSID #8 pursuant to this Agreement shall be of the same standard and quality as normally delivered to SWD's other customers and shall be in compliance with all applicable state and federal drinking water laws, regulations and standards at the Point of Delivery. NSID #8 shall be responsible for maintaining compliance with all applicable state and federal drinking water laws, regulations and standards past the Point of Delivery.

### 3. The Administration of this Agreement.

The Administration of this Agreement shall be the joint responsibility of NSID #8's Administrator and the Administrator of the SWD.

### 4. Contamination or Damage to the Water System.

If either Party contaminates or damages the water system of the other Party, then the Party responsible for the contamination or damage shall pay the cost of correcting, removing, and eliminating the contamination or damage incurred by the other Party, whether foreseen or unforeseen. Further, the responsible Party shall indemnify and hold harmless the other Party for injury to persons or property resulting from such contamination or damage.

### 5. Reports of Contamination.

NSID #8 agrees to have its double check valve assembly tested annually and to report the results of its annual test to SWD.

In addition to the annual test, and in order to minimize the possibility of such contamination or damage, the Parties agree that any contamination detected through a water sample must be reported to the other Party as follows: 1) At the time of the detection. 2) After the system has been declared free of the contaminant. 3) At the time any disinfection methods are discontinued. The Party reporting the contamination is subject to possible refusal by the uncontaminated Party from interconnection usage during the period of contamination.

THIS AGREEMENT shall remain in full force and effect and continue for a period of twenty (20) years. In the event this Agreement is terminated, the terminating Party shall disconnect the system at its expense. No modification or amendment shall be valid until mutually agreed upon, reduced to writing and executed by authorized representatives of the Parties.

6. Financing.

There is no separate financing or budget for this Agreement. The costs shall be paid as provided for herein.

7. Separate Entity Status.

No separate entity is created by this Agreement.

Signed this <u>11th</u>day of <u>June</u>, 2014.

City of Spokane

Approved as to form: Assistant City Attorney ATTEST:

North Spokane Irrigation District No. 8

Rν Chairman of the Board of Commissioners

Approved as to form:



#### ATTACHMENT A

### FRANCIS AVENUE & FREYA STREET INTERTIE

- (1) Location: This metered, one way connection is located near the Northwest corner of Francis Avenue and Freya Street, Spokane County, Washington.
- (2) Purpose: The Purpose of this 8-inch diameter counection is for standby water supply and fire flow for NSID #8. This connection was made at the request of NSID #8, in part due to the area behind the NSID #8 Reservoir being turned into a gravel pit for the North Spokane Corridor Program and mining and blasting of the hillside.
- (3) Date of Installation: 2008.
- (4) Cost of Construction: The cost of construction for this intertie was borne by NSID #8.
- (5) Operating Procedure: This intertie contains a meter and a check valve at the point of interconnection. NSID #8 shall notify the SWD regarding the need for the auxiliary water supply prior to operating the manual valves between each system. Each Party's designated representative shall meet at the intertie location and coordinate the operation of the intertie valves.
- (6) Rate Schedule. This interconnection is metered. At the end of each month that water is used, the meter will be read by the SWD and an accounting will be made of any water used. This water consumption will be billed in accordance with the water rates charged to regular "Commercial" SWD customers outside the City's Utility Service Area in effect at the time of use. Monthly service connection charges shall apply during any month that water is actually supplied through the intertie from SWD to NSID #8.
- (7) Estimated Capacity. As of September 20, 2012, SWD estimated the flow rate and pressure performance available at the SWD side of the intertie as follows: Boundary conditions: max day demand with a residential diurnal demand curve over a three day extended period simulation (EPS), peak hour from EPS is analyzed, critical node is same as flow node (the intertie)

Static pressure = 67 psi Residual pressure at 1,500 gpm = 55 psiResidual pressure at 3,280 pgm = 20 psi

SWD will periodically update the estimated flow rate and pressure performance available at the SWD side of the intertie and provide the information to NSID #8 if future estimates indicate a decrease in performance greater than 500 gpm from the performance stated herein.

(8) Hydraulic Valve. In the future, NSID #8 may, at NSID #8's cost, replace the manual valve at the intertie with an automatic hydraulic valve. Prior to any installation of a hydraulic valve by NSID #8, NSID #8 shall inform SWD of the change in the valve to a hydraulic valve. In the event of the change to an automatic hydraulic valve, SWD shall be entitled to bill NSID #8 a monthly service connection charge in addition to any charge for water used, based on SWD's regular commercial rates for SWD customers outside the SWD service area effective at the time of use. In that event, the monthly service connection charge shall be due regardless of use of water or lack thereof.



OFFICE OF THE CITY CLERK 808 W. Spokane Falls Blvd. Spokane, Washington 99201-3342 (509) 625-6350

March 12, 2003

City Clerk File Nos.: CPR 03-2 OPR 03-144

### COUNCIL ACTION MEMORANDUM

RE: AGREEMENT WITH VELVIEW WATER DISTRICT 13 FOR EMERGENCY WATER INTERTIE

During its 3:30 p.m. Briefing Session held Monday, March 10, 2003, the Spokane City Council took the following action:

**Motion** by Council Member Greene, seconded by Council Member Hession, that the Agreement with Velview Water District 13 for Emergency Water Intertie be added to the (March 10, 2003) Consent Agenda (thereby removing the item off the table) **carried unanimously (Council Members Eugster and French absent)**.

Subsequently during the 3:30 p.m. Briefing Session, the Council took the following action:

Motion by Council Member Greene, seconded by Council Member Rodgers, to approve the March 10 Current Consent Agenda Items, excluding Item No. 5, carried unanimously (Council Members Eugster and French absent). This action included the approval of the Agreement with Velview Water District 13 for Emergency Water Intertie.

Terri L. Pfister, CMC Spokane City Clerk

c: Water – Brad Blegen Engineering Services Mike Ormsby – Preston Gates Law Firm

, 1960	AGENDA SHEET FOR		G OF: February 24, 2(		0KANE
~م	<u>Submitting Dept.</u> WATER	<u>Contact Pers</u> Brad Blegen	on Phone N 7839	NO. RECEIVED	6000
	ADMINISTRATIVE SESSION X Contract o Report o Claims	<b>LEGISLATIVE SESSION</b> o Emergency Ord o Resolution o Final Reading Ord o First Reading Ord	<b><u>CITY PRIORITY</u></b> o Communications o Economic Development o Growth Management o Human Services	CITY CLERKS OFFICE CLER <b>GROKANE</b> , WA OPR 200 RENEWS CROSS REF ENG	03-144
	STANDING COMMITTEES (Date of Notification) o Finance o Neighborhoods o Planning/Community & Ecol	o Special Consideration o Hearing o Public Safety o Public Works n Dev	o Neighborhoods o Public Safety o Quality Service Delivery o Racial Equity/Cultural Diversity X Rebuild/Malntain Infrastructure	BID REQUISITION Neighborhood/Commission/Comm Action Taken:	nittee Notified:

### AGENDA WORDING

	Agreement with Velview Water District 13 for Emergency Water Intertie
i:	

### **BACKGROUND**:

(Attach additional sheet if necessary)

This provides authority for an intertie with Velview water system to support emergency needs only.

### **RECOMMENDATION:**

APPROVE

Fiscal Impact: • N/A	Budget Account: • N/A	
o Expenditure: \$	#	
o Revenue: \$	#	
o Budget Neutral		

**<u>ATTACHMENTS</u>**: Include in Packets: On file for Review in Office of City Clerk:

SIGNAT E **Department Head** 

Leca

Division Director strator for Mayor

Council President

DISTRIBUTION: Water Mike Ormsby- Preston Gates Law Firm Engineering

## <u>COUNCIL ACTION:</u>

**February 17, 2003:** See Council Action Memorandum dated February 18, 2003, for Council Action on February 17, 2003.

March 10, 2003: See Council Action Memorandum dated March 12, 2003, for Council Action on March 10, 2003.

.11


After Recording Return to: Office of the City Clerk 808 W Spokane Falls Boulevard Spokane, WA 99201-3342

## Spokane City Clerk's file no. <u>OPR 03</u>.144 Velview WD #13 file no.\_\_\_\_

#### AGREEMENT FOR EMERGENCY WATER SYSTEMS INTERTIE

This Agreement made and entered into this \_\_\_\_\_day of \_\_\_\_\_, 2002, by and between the CITY OF SPOKANE, a municipal corporation of the State of Washington (hereinafter "CITY"), and the Velview Water District #13 PWS #91445F- Spokane County (hereinafter also "VELVIEW" or "District").

WHEREAS, the Velview development was platted in the late 1960's and served by a water system that was formerly recognized as a municipal water district in 1982; and

WHEREAS, there are currently 22 homes served by the District and another 10 lots within the District's service area who either have their own well or no water service at all; and

WHEREAS, the Department of Health has issued a moratorium on any additional hook-ups to the water system of the District; and

WHEREAS, the District has had problems with its well both in terms of quality and quantity of water; and

WHEREAS, the District is desirous of providing sufficient water to meet the demand and emergency situations facing its residents and with

Emergency intertie agreement between City and VELVIEW Page 1



03119/2003 12:17P Spokane Co. WA

OFFICE OF CITY CLERK

certain limitations, the City is prepared to provide water on an emergency basis subject to such limitations as stated, and with the District retaining all service obligations to its own customers; and

WHEREAS, the District must pay certain costs associated with the connection of its system to the City and intends to finance these necessary improvements through the formation of a local improvement district ("LID"); and

WHEREAS, in order to assess property in an LID for improvements, the benefit from such improvements must be provided or available to any properties assessed; and

WHEREAS, both parties own and operate public water systems in Spokane County WA and VELVIEW requests permission to connect to the City system for emergency backup purposes; and

WHEREAS, the City is willing to grant VELVIEW's request, without guarantees from the City of the permissibility or reliability of such connection or the adequacy of the City's water supply;

NOW THEREFORE, VELVIEW and the City agree as follows:

#### **1. ADMINISTRATION; EFFECTIVE DATE**

A. The City's representative administering this agreement is the Director of Water and Hydroelectric Services ("Director" or "City Water Director"). Designation of this official may be changed by written notice from the City Administrator to VELVIEW notwithstanding any references hereafter. VELVIEW's representative is the System Manager ("Manager"). VELVIEW may change this designation by written notice to the City Administrator.

B. This agreement is effective as of the date first above given, provided also 1) both parties have executed the same and 2) approvals from jurisdictional regulatory agencies have been granted, as necessary. Notwithstanding any other provision relating to conditions of performance herein, this agreement may be cancelled at any time by either party by written notice to the other and the intertie disconnected without further liability of either party to the other. VELVIEW's notice must be signed by the VELVIEW System Manager. The City's notice must be signed by the City Water Director. The actual date and details of

#### **Emergency intertie agreement between City and VELVIEW** Page 2



03/19/2003 12:17P Spokane Co. WA

physical connection of the intertie may be determined by the Director and Manager.

## 2. REGULATORY REQUIREMENTS

A. The parties will work together to address any regulatory requirements. These may include WAC 246-290-132 (4), which references prerequisites for State Health Department approval of emergency interties:

(a) In an approved coordinated water system plan, water system plan, water system plan update, water system plan amendment, or small water system management plan including:

(i) Description of the intended use of the emergency intertie;

(ii) Location of the proposed intertie;

(iii) Date the intertie is intended to be operational;

(iv) Copy of the intertie agreement between purveyors detailing the conditions and limitations of such intertie; and

(v) Hydraulic analysis conducted to identify the impacts upon each water system.

(b) In a project report in accordance with WAC 246-290-110 or in a construction document in accordance with WAC 246-290-120.

B. This agreement or its provisions may be incorporated in an appropriate water system plan, as required by the applicable regulations. In any regulatory agency decision affecting performance of this agreement, the parties agree to work together to supply any further information and accomplish necessary approvals, provided VELVIEW must pay any reasonable engineering, staff time, or other costs incurred by the City.

## 3. MECHANICS

#### A. Connection Location

The City agrees to allow VELVIEW to hookup to its system at the following location: The vicinity of Prescott Road and Velview Drive.

The details of location may be modified by written approval of the Water Director and VELVIEW Manager, on mutual written consent, subject also to any regulatory agency requirements. All expenses and liability for the

# Emergency intertie agreement between City and VELVIEW Page 3



hookup shall be VELVIEW's. VELVIEW Manager may request reasonable advance notice of the estimated costs.

B. <u>Purpose/Date/Maximum Flow.</u> This is an emergency backup intertie for VELVIEW. The purpose of this agreement is to establish an interconnection between the two public water systems permitting the temporary exchange or delivery of water between those systems only in cases of emergency that result in permanent supplies being unavailable for use or emergency from inadequate water pressure as defined in WAC 246-290, all as further conditioned herein. The maximum emergency flow permitted by the City is 1,500 gallons per minute. During activation, the City reserves the right to control such activation or use, in the Water Director's exercise of reasonable discretion.

## 4. VELVIEW RESPONSIBILITIES

A. The City will provide at VELVIEW's expense the necessary manual and pressure activated valves necessary for the operation of the intertie.

B. <u>Meter, Backflow prevention</u>. The City will provide at VELVIEW's expense the meter necessary to measure water consumption and the back flow prevention device necessary to protect the City's water system from reverse flow of water from the VELVIEW water system to the City's water system.

C. VELVIEW is solely responsible for the emergency intertie after the point of connection with City facilities. Not by way of limitation, this includes:

1. VELVIEW agrees that all liability and costs of the engineering and installation of all infrastructure, devises, controls and all other components necessary to provide a functional and reliable emergency intertie with the City's water system is the sole responsibility of VELVIEW.

2. The City will perform any maintenance on the control valve or other fixtures determined necessary by the City, and VELVIEW must pay any charges therefore.

3. VELVIEW agrees to provide all necessary maintenance of all other water system infrastructure components, including the service line, located on the VELVIEW side of the water meter.

## Emergency intertie agreement between City and VELVIEW Page 4



OFFICE OF CITY CLERK

Spokane Co. WA

4. VELVIEW agrees to allow inspections of the emergency intertie infrastructure components by the City Water Department at any time.

## 5. ACTIVATION; TIMES OF USE

A. The City Water Director shall at all times maintain control of activating the connection and determine the parameters of any automatic activation. Activation is premised as follows:

1. VELVIEW shall continue to operate its own wells and may not reduce pumpage or operations in reliance upon the emergency connection herein.

2. The purpose of activation is strictly in response to conditions whereby VELVIEW's water system cannot furnish adequate water from its own water system, does not have adequate water pressure, for testing the intertie for readiness of service, and/or for the purpose of maintaining the quality of the water within the intertie plumbing at acceptable levels by periodic flowing of fresh water into the system.

3. Since this is an emergency intertie, under no circumstances may VELVIEW expand service beyond a total of 32 single family customer style lots. Such lots may not be further subdivided or developed to increase or exacerbate the needs of VELVIEW, the intent of this term being to express the concern, accepted by VELVIEW, that the City is willing to support VELVIEW meet its emergency needs as now presented, but not facilitate actions by VELVIEW or others in allowing such needs to be increased or worsened. Any modification of this term must be approved in writing by the City Water Director. Modification in one instance shall in no respect imply further modifications.

4. As an emergency intertie, under no circumstances may VELVIEW ever agree to serve any adjacent areas requesting service from VELVIEW.

B. Supplementing other terms, the City reserves the right to discontinue the furnishing of water service if at any time the City Water Director determines that municipal water needs or demands exceed the City's capacity to meet intertie needs in the Director's sole discretion.

## 6. ADDITIONAL VELVIEW OBLIGATIONS

**Emergency intertie agreement between City and VELVIEW** Page 5





VELVIEW promises further:

A. To support and pursue inclusion of VELVIEW territory within the City Urban Growth Area boundary and support any proposal or petition for annexation of VELVIEW territory into the City of Spokane, it being a mutual declared goal of the parties to facilitate annexation of the area served by VELVIEW into the City of Spokane at an appropriate time.

B. To record notice of this agreement on the plat of all properties within VELVIEW boundaries. Prior to connecting the intertie herein, VELVIEW agrees to obtain from all its current customers a covenant approved by the City binding connected VELVIEW customer's premises to annex to the City of Spokane. VELVIEW agrees to enforce this requirement and not to release its customers from such covenant unless approved by the City Engineer or designee in writing. Such covenant shall be likewise obtained by VELVIEW as a condition of connection of all future customers. In the event VELVIEW is not able to obtain 100% participation from each and every existing connected customer, but shows it has exercised due diligence, VELVIEW may appeal to the Director for limited relief from 100% compliance with this requirement. In requesting relief or considering a request for relief, both VELVIEW and the City shall act in mutual good faith. VELVIEW further agrees that no new hookups will be permitted and no increase or modification of service to any existing nonsignatory customers allowed without a recorded covenant. In recording the notice of this agreement, VELVIEW will include due notice of this covenant requirement on all property within its territory as in the nature of a disclosure per RCW 65.08.170.

#### 7. PAYMENT

A. VELVIEW shall pay for all water furnished by the City, as measured through the water meter on the VELVIEW intertie service line, or if the meter is inoperative, a reasonable estimate of consumption as ordered by the Water Director. Charges shall be at established City of Spokane water rates currently in effect at the time of consumption as listed in the Spokane Municipal Code for Outside City Service Area or similar applicable water rate provisions as determined by the Director to apply, as well as any other or additional costs incurred by the Water Department not otherwise provided for in City Water Rates. The VELVIEW Manager may request advance information as reasonably available from the Water Director.

# Emergency intertie agreement between City and VELVIEW Page 6





B. VELVIEW understands that current City practice is to read the water meter on a monthly basis. This results in monthly billings for water usage. VELVIEW agrees to make payment within 30 days of billing.

## 8. METER REPAIRS

A. The City agrees to provide maintenance and calibration of the water meter at no additional cost, PROVIDED, VELVIEW agrees to pay any maintenance calibration or meter repair or replacement charges where the Water Director determines that the water meter was damaged as a result of actions, processes and/or procedures caused by VELVIEW, its agents, employees or contractors, or third parties outside the City of Spokane. Such charges may be billed by the City on a time and materials basis and must be paid within 30 days of billing.

B. VELVIEW agrees to promptly advise the Director of any known or suspected maintenance or repair needs on the City's water mains, including service line, or water meter.

## 9. NO GUARANTEES, OTHER RELATIONS CREATED

A. <u>No guarantees by City</u>. VELVIEW understands that the City's consent to this agreement is given with the strict understanding that the City water supplies and facilities are reserved exclusively for the benefit of the City and its residents. No guarantees of water supply availability or willingness by the City to continue such arrangements are made by the City. No estoppel against the City shall be deemed extended or created by any action or inaction taken, in the administration of this agreement.

B. <u>No third party beneficiaries</u>. This agreement creates no third party beneficiaries or relationships. The City shall never be liable for any incidental or consequential damages or otherwise to pay any costs of furnishing water to any VELVIEW customers and shall never be considered a purveyor to any VELVIEW customers for any purpose.

C. <u>City takes no responsibility for limitations in VELVIEW system, water</u> <u>supply</u>. Any limitations in the VELVIEW system or supply to provide its customers or others with safe and reliable service remain 100% upon VELVIEW's shoulders and this agreement is not intended either to remove or enhance any duty on the part of VELVIEW to serve its customers now or hereafter. The City has no liability for failure to furnish water, whether under this agreement or otherwise. In the event, for any

## Emergency intertie agreement between City and VELVIEW Page 7



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reason, any claim shall arise under this agreement or otherwise in connection with any relationship created by this agreement VELVIEW further agrees that the amount of any liability or damages nonetheless determined to arise shall not exceed the total amounts paid to the City by VELVIEW for a total of five (5) years. The measuring period is the immediate period of five (5) years or less prior to any event upon which municipal fault or liability is determined to have arisen. This provision shall control any other in case of ambiguity or conflict.

#### 10. ADDITIONAL

A. This Agreement is not assignable without written consent of the non assigning party.

B. This Agreement shall be construed as being made and delivered in the State of Washington with the laws of the State of Washington being applicable to its construction and enforcement. Any action at law, suit in equity or judicial proceeding for the enforcement of this agreement or any provision herein shall be instituted in the Superior Court of Spokane County, Washington.

C. This document is the entire agreement, which may not be amended, except in writing, mutually signed by both sides. Each party has had an opportunity to consult with legal counsel and the agreement shall not be construed to favor or disfavor either party. In the event any clause shall be declared illegal or unenforceable, it shall not affect the remainder.



**VELVIEW WATER DISTRICT #13** 

Emergency intertie agreement between City and VELVIEW Page 8



e W. In

Approved as to form: ťv Attornev Assistant

Counsel for VELVIEW

STATE OF WASHINGTON

County of Spokane

On this 13th day of March, 2003, before me personally appeared Jack Lynch and Terri Pfister, to me known to be the City Administrator and the City Clerk, respectively, of the City of Spokane, a municipal corporation, that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of the corporation, for the uses and purposes therein mentioned, and on oath stated that they were authorized to execute said instrument.

) ss.

In witness whereof I have hereunto set my hand and affixed my official seal the day and year first above written.

Notary Public in and State of Washington, re at Spokane. My commission expires ()

STATE OF WASHINGTON

County of Spokane

Emergency intertie agreement between City and VELVIEW Page 9

) ss.



On this  $20^{44}$  day of  $50^{44}$ ,  $200^{3}$ , before me, the undersigned, a Notary Public in and for the State of Washington, personally appeared  $60^{44}$ ,  $10^{1$ 

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year first above written.



Notary Public in and for the State

of Washington, residing at Spokane

My commission expires October 15, 2006

Emergency intertie agreement between City and VELVIEW Page 10

SPOKANE Agenda Shee	Agenda Sheet for City Council Meeting of:		10/6/2017
10/23/2017		Clerk's File # Renews #	OPR 2017-0726
Submitting Dept	WATER & HYDROELECTRIC SERVICES	Cross Ref #	
Contact Name/Phone	DAN KEGLEY EXT. 7821	Project #	
Contact E-Mail	DKEGLEY@SPOKANECITY.ORG	Bid #	
Agenda Item Type Contract Item		Requisition #	
Agenda Item Name	4100 - MEDICAL LAKE WATER SUPPLY INTERTIE AGREEMENT		
Agenda Wording			

Intertie agreement with the City of Medical Lake to supply water in the event of shortages and emergency needs.

#### Summary (Background)

The City of Medical Lake requested an emergency intertie with the City of Spokane in 2009. This intertie will provide supplemental water in drought conditions during a stressed aquifer and in case of emergencies. Medical Lake will be responsible for all costs of construction and for appurtenance maintenance past the point of delivery. Usage cannot exceed 800 gallons per minute without a new agreement. Revenue estimate based on four months supplemental use and a thirty day emergency.

Fiscal Impact G	rant related? NO	<b>Budget Account</b>			
P	ublic Works? NO				
Revenue \$ 100,000	.00	# 4100-42410-34052-34328-99999			
Select \$		#			
Select \$		#			
Select \$		#			
Approvals		Council Notifications			
Dept Head	KEGLEY, DANIEL	Study Session			
Division Director	SIMMONS, SCOTT M.	Other	PWC 9/25/2017		
Finance	nance CLINE, ANGELA		Distribution List		
Legal SCHOEDEL, ELIZABETH		dkegley@spokanecity.org			
For the Mayor DUNIVANT, TIMOTHY		jsakamoto@spokanecity.org			
Additional Approv	/als	sjohnson@spokanecity.org			
Purchasing		acline@spokanecity.or	rg		
		APPROVE	D BY		
		SPOKANE CITY COUNCIL:			

in the CITY CI

Spokane City Clerk File No. OP R.2017 0720 Medical Lake City Clerk File No. 02-2018

## WATER SUPPLY AGREEMENT BETWEEN MEDICAL LAKE and the CITY OF SPOKANE

THIS WATER SUPPLY AGREEMENT ("Agreement") is entered into by THE CITY OF SPOKANE ("Spokane"), a municipal corporation of the State of Washington and First Class Charter City, with a principal place of business located at 808 West Spokane Falls Boulevard, Spokane, Washington, 99201, and the CITY OF MEDICAL LAKE ("Medical Lake"), a municipal corporation of the State of Washington and Optional Municipal Code City, with a principal place of business located at 124 S Lefevre, Medical Lake, Washington, each a "Party" and collectively the "Parties."

#### RECITALS

- A. Spokane owns and operates a Chapter 70.119A Group A Public Water System ("Spokane Water System") that supplies and distributes potable water to its own resident customers.
- B. The Spokane Water System currently has the water resources, capital facilities and infrastructure, and funding to regionally supply and distribute treated domestic water to wholesale purveyors and numerous retail customers outside the Spokane's corporate limits, and has done so historically.
- C. Spokane owns and operates a series of wells pursuant to a series of water rights that are authorized to provide wholesale water within a regional wholesale service area, as approved in its Water System Plan ("Spokane Water System Plan"), promulgated in accordance with Chapter 43.20 RCW and entitled "City of Spokane, Comprehensive Water System Plan," Volumes 1 and 2, dated January 12th, 2017 adopted and approved by the City of Spokane City Council by Resolution dated March 2015 and approved by the State Department of Health ("State DOH"), as said document may be amended, revised, or updated from time to time.
- D. In accordance with the planning and goals set forth in its Spokane Water System Plan, Spokane seeks to fulfill and implement its role as regional water supplier by including the City of Medical Lake as a wholesale water customer.
- E. Medical Lake, owner of its own Chapter 70.119A Group A Public Water System ("Medical Lake Water System"), seeks to supplement and stabilize its existing water supply portfolio by interconnecting to the Spokane Water System.
- F. Medical Lake has requested Spokane provide drinking water to supplement Medical Lake's existing water resource portfolio as their current water source, the Grande Ronde Aquifer is shared by a number of other jurisdictions, including

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Airway Heights, Pullman and the Tri-Cities and the entire Aquifer is experiencing declining water supplies. The Grand Ronde Aquifer has been in steady decline for the past several decades, has a slow recharge rate and high withdrawal rate.

- G. Medical Lake's ability to pump water from the Grand Ronde Aquifer has decreased from 1500 gallons per minute in 1997 to less than 800 gallons per minute in 2018. If any of Medical Lake's wells were to fail or the contamination experienced in other areas of the Aquifer were to migrate, Medical Lake would experience severe water shortage.
- H. The Parties acknowledge that numerous state and local regulatory approvals will be required in addition to design and construction completion before Spokane provides and Medical Lake accepts water delivery under this Agreement.
- I. The Parties recognize and desire to form a mutually beneficial stewardship relationship to manage the water resources. The Parties agree to cooperate with each other to the greatest extent feasible to secure state and local regulatory approvals, revise respective comprehensive water plans and implement the terms of this Agreement.

NOW, THEREFORE, in consideration of the foregoing recitals, incorporated herein, and the mutual promises and benefits exchanged by the parties herein, the Parties do hereby agree as follows:

#### 1. <u>Term</u>.

- 1.1. This Agreement shall take effect on the date that both Parties have duly executed the Agreement. This Agreement shall remain in full force and effect for a period of twenty (20) years, unless earlier terminated (in whole or in part) ("<u>Term</u>"). The Parties agree to review and modify as necessary at five (5) year intervals for supplemental supply and two (2) year intervals for emergency supply.
- 1.2. The provisions of section 1.1 notwithstanding, the Term of this Agreement may be extended by written agreement of the Parties and by a duly executed Amendment to this Agreement. Extensions may be in five (5) year intervals or as agreed by the Parties.
- 1.3. Future Connection/Increased Capacity. Any additional capacity or terms beyond those contained in this Agreement will be through a written executed amendment to this Agreement.
- 1.4. All obligations incurred during the Term shall survive expiration or termination of the Agreement.
- 1.5. Either Party may provide notice of Termination without cause upon five (5) years written notice to the other party.

7-20-18

- 1.6. Either Party may provide Notice of Termination with cause upon one (1) years written notice to the other party, such cause may include by is not limited to the contractually required conservation measures.
- 2. <u>Regulatory Approvals</u>. The Parties acknowledge and agree that the following regulatory approvals and property rights are necessary before water deliveries may begin. Medical Lake is currently designated as a place of use for Spokane's water rights under Spokane's Coordinated Water System Plan, as approved by Washington State Department of Health.

2.1 Approvals have been obtained and copies will be provided to Medical Lake after they have been obtained

2.2 Spokane will bear all initial costs of obtaining any applicable state and local regulatory approval. Spokane will keep Medical Lake informed of status, will advise Medical Lake when these approvals have been obtained, and will provide copies of these approvals to Medical Lake after they have been obtained.

2.3 Medical Lake will bear all initial costs of obtaining any applicable regulatory approvals. Medical Lake will keep Spokane informed of status, will advise Spokane when these approvals have been obtained, and will provide copies of these approvals to Spokane promptly after they have been obtained.

- 2.1. The Parties shall collaborate on obtaining any approvals necessary from Spokane County and shall bear their own initials costs of obtaining any such approval.
- 2.2. If unanticipated permits, regulatory approvals, or property or access rights (collectively, with the approvals described in Section 2, "<u>Regulatory Approvals</u>") are necessary, the Parties will meet and confer in good faith to allocate costs and responsibility for the same. If the parties are unable to resolve the allocation of costs and responsibilities, they will follow the dispute resolution provisions as provided herein.

## 3. Construction, Funding, and Responsibility for Improvements.

- 3.1. Medical Lake shall apply and pay for all Spokane Application(s) for Connection required to deliver wholesale water pursuant to this Agreement in accordance with Title 13, Chapter 13.04, Section 13.04.0502, and Applications for Connection Spokane Municipal Code ("<u>Application for Connection</u>"). Medical Lake shall also pay a Water General Facilities Charge as outlined in Title 13 Chapter 13.04, Section 13.04.2042 E-1.
  - 3.1.1. Medical Lake shall purchase a backflow prevention device or assembly consistent with Chapter 246.290 WAC, from and approved by Spokane, designed and tested to counteract back pressure and back siphonage

("<u>Medical Lake Backflow Prevention Device</u>"). Medical Lake shall have the Medical Lake Backflow Prevention Device tested by a certified Backflow Assembly Tester, approved by the Water Department for compliance with Legal Requirements. A copy of each year's test along with a certification that the backflow assembly complies with Legal Requirements and is in good working condition shall be provided to Spokane each year.

- 3.1.2. Medical Lake shall purchase from Spokane a tap ("<u>Tap</u>") and initial master meter ("<u>Initial Master Meter</u>") in accordance with Spokane Municipal Code Title 13, Chapter 13.04, Section 13.04.0602 A, including, any initial testing and/or inspection fees required by Spokane.
- 3.1.3. Medical Lake shall purchase/construct a vault of adequate dimension to accommodate the initial master meter, the backflow assembly and the flow regulating valve.
- 3.1.3 Spokane will design and construct a Flow Control Valve. Said design and construction shall be at the sole discretion of Spokane. Spokane shall bear all costs associated with the design and construction of the Flow Control Valve.
- 3.1.4 Spokane shall install the Medical Lake Backflow Prevention Device, the Initial Master Meter, the Flow Regulating Valve, the Tap, and perform the initial backflow assembly test.
- 3.2. The Parties agree that additional improvements are required to effectuate the terms of this Agreement. The Improvements' general location and layout are shown and described on Exhibit "A". The Parties shall design and construct their respective improvements in a manner that is consistent with the provisions of all applicable local, state, and federal law, permits, regulatory approvals, manufacturers' specifications and in a good and workman-like manner.
- 3.3. The Parties agree to allocate cost for the additional improvements' design and construction as follows.
  - 3.3.1. Medical Lake agrees to full and complete responsibility for the design and construction of the following Improvements ("<u>Medical Lake Improvements</u>"). All costs associated with the Medical Lake Improvements shall be borne by Medical Lake.
    - 3.3.1.1. Medical Lake shall submit to Spokane for review, revision, and approval of designs, specifications, and construction schedule for all Medical Lake Improvements ("Medical Lake Plans") required to effectuate the delivery of wholesale water pursuant to this Agreement except as otherwise provided by Section 3.4. Such plans shall include,

without limit, the limits of excavation for and placement of any vault(s). Subject to the requirements set forth in Section 3.1, the Medical Lake Improvements shall also include the Application for Connection, the Tap, and the Initial Master Meter. Medical Lake shall not commence construction of the Medical Lake Improvements until Medical Lake has received from Spokane approved Medical Lake Plans (as such documents may be revised by Spokane) and Spokane's written authorization to proceed with construction ("Notice to Proceed").

- 3.4. Spokane agrees to full and complete responsibility for the following improvements ("<u>Spokane Improvements</u>"). All costs of the Spokane Improvements shall be borne by Spokane.
  - 3.4.1. Except as provided in Section 3.1, Spokane shall tap the Spokane transmission line necessary to deliver wholesale water pursuant to this Agreement.
  - 3.4.2. Spokane shall timely review the Medical Lake Plans, and will not unreasonably withhold its approval of the Medical Lake Plans.
  - 3.4.3. Spokane shall design, construct, own, operate and maintain the water quality monitoring equipment.

#### 4. Point of Delivery.

4.1 The "<u>Point of Delivery</u>" shall be that specifically identified point between transmission mains of the Parties to this Agreement where water will be transferred through the meter from Spokane to Medical Lake. The Point of Delivery is identified and described on <u>Exhibit A</u>.

4.2 The Parties agree that: (1) after design and construction of the Medical Lake Improvements are complete, Medical Lake will assume full and complete ownership, operation, maintenance (including testing and monitoring), and insurance responsibilities, including the costs thereof, for the Medical Lake Improvements and associated facilities consistent with water system standards and applicable laws, regulations, rules, provisions, interpretations, orders, injunctions, decrees, rulings, awards, and decisions of governmental entities, orders of governmental entities ("Legal Requirements"); and (2) after design and construction of the Spokane Improvements are complete, Spokane will assume full and complete ownership, operation, maintenance (including testing and monitoring), and insurance responsibilities, including the costs thereof, for the Spokane Improvements and associated facilities consistent with water system standards Legal Requirements. The aforementioned sentence notwithstanding, the Parties further agree as follows:

4.2.1 Spokane shall operate and maintain the Initial Master Meter, including, without limit, any additional replacement meters.

4.2.2 Spokane shall own, operate, and maintain the Spokane WQ Monitoring Equipment. Spokane shall, in its sole discretion and at its sole expense, routinely monitor water quality using the Spokane WQ Monitoring Equipment in accordance with the Spokane Water Quality Monitoring Protocol.

4.2.3 If Spokane elects to construct a Spokane Flow Control Valve, Spokane shall own, operate, and maintain it.

- 5. <u>Water Delivery and Quantity</u>. Following completion of the Spokane Improvements and Medical Lake Improvements (as set forth above), receipt of all Regulatory Approvals, and any other preconditions to water delivery provided in this Agreement, Spokane will supply wholesale water to Medical Lake, as follows.
  - 5.1. The wholesale water sold to Medical Lake by Spokane pursuant to this Agreement shall be water available from Spokane's water rights. Spokane has reviewed Medical Lake's service area as described in its approved Comprehensive Water Plan ("Medical Lake Service Area"). Spokane determines that Medical Lake may beneficially use Spokane's water delivered pursuant to this Agreement within the Medical Lake Service Area. Medical Lake confirms the water received from Spokane is being used by Medical Lake consistent with all applicable Water System Plans and Legal Requirements. Medical Lake shall ensure any future plan amendments will comply with both Comprehensive Water System Plans and all applicable laws. Water provided under this contract is for the use in Medical Lake's designated service area and Medical Lake shall not wheel or wholesale any water received from Spokane beyond what is set out in its existing water system plan or an existing agreement at the time this contract is signed.
  - 5.2. All water supplied by Spokane for use or sale by Medical Lake shall be upon the express condition that after water passes the Point of Delivery, it becomes the property and exclusive responsibility of Medical Lake. Spokane shall not be liable for any degradation of water quality, for acts of sabotage or vandalism, or for other events and resulting damages that may occur beyond the Point of Delivery and within the Medical Lake Improvements and Medical Lake Water System.
  - 5.3. The quality of wholesale water made available to Medical Lake pursuant to this Agreement shall be of the same standard and quality as normally delivered to Spokane's other customers and shall be in compliance with all applicable state and federal drinking water laws, regulations and standards at the Point of Delivery. Medical Lake shall be responsible for maintaining compliance with all applicable state and federal drinking water laws, regulations and standards past the Point of Delivery and within the Medical Lake Improvements and Medical Lake Water System.

- 5.4. Supplemental Quantity. From the Initial Delivery Date until the date that Spokane ceases making wholesale water sales, Spokane shall make available to Medical Lake at the Point of Delivery wholesale water in the amount not to exceed 200 gallons per minute (GPM) or 105 million gallons annually for supplemental use and at a pressure meeting Legal Requirements as described herein.
- 5.5. Spokane shall record the amounts of monthly wholesale water deliveries made to Medical Lake at the Initial Master Meter (or any replacement meter thereof).
  - 5.5.1. Spokane will read the meter and keep records of the monthly and annual total water accepted by Medical Lake.
  - 5.5.2. The Initial Master Meter (or any replacement meter thereof) shall at all times be accessible to Spokane personnel. If it becomes necessary for Medical Lake to place the meter under lock and key, Medical Lake shall furnish Spokane with a copy of the key.
- 5.6. Should Spokane determine that Medical Lake is receiving deliveries of wholesale water at the Point of Delivery in excess of the amounts set forth in section 5 herein, Spokane shall notify Medical Lake of the excess deliveries, and Medical Lake shall promptly take the steps necessary to reduce its deliveries accordingly. If Medical Lake has not taken action within twenty-four (24) hours of receiving notice from Spokane pursuant to Section 13.2, Spokane may take any action it deems necessary to reduce the deliveries to a level equal to Medical Lake's scheduled amounts, and charge Medical Lake for any excess deliveries made after the expiration of the twenty-four (24) hour notice period.
- 5.7. Spokane's delivery of wholesale water and Medical Lake's acceptance of such delivery shall be governed by the terms of this Agreement No future wholesale service connections shall be permissible without a subsequent and separate written agreement between the Parties. Neither Party shall be obligated to agree to or execute any agreement or permit with the other Party to construct additional wholesale service connection(s).
- 5.8. Short Term Emergency Quantity. In the event Medical Lake notifies Spokane of an emergency situation whereby they need additional capacity of water for a limited time, after consultation with the Director of Spokane's Water and Hydroelectric Department, Spokane agrees to make available to Medical Lake at the Point of Delivery wholesale water in an additional amount not to exceed six hundred (600) gallons per minute or 70 million gallons annually of emergency wholesale water at a pressure meeting Legal Requirements.

#### 6. Rates, Future Capital Projects, Invoicing, and Payment.

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6.1. Medical Lake shall pay to Spokane a service fee as follows:

- 7-20-18
- 6.1.1.1. The amount of wholesale water delivered in such a month, as measured at the Initial Master Meter, times Outside City Rate to Other Purveyors, plus any other fees, taxes, or charges billed to other Spokane wholesale customers pursuant to the Spokane Municipal Code.
  - 6.1.1.1.1. The term "Outside City Rate to Other Purveyors" means that rate as set forth in Title 13, Chapter 13.04, Section 13.04.2014 of the Spokane Municipal Code or its succeeding provision as such may be revised or amended through time. This rate may be periodically adjusted and shall be applicable as set forth in the rate schedule as adopted by the Public Works and Utility Division and Spokane City Council.
- 6.2. Future Connection/Increased Capacity. Any additional capacity or terms beyond those contained in this Agreement, will be negotiated between the Parties and may include assessed capital fees to meet the increase in capacity prior to expansion.
- 6.3. Spokane shall during the Term prepare and forward to Medical Lake an invoice for the payment of any and all amounts due Spokane pursuant to this Agreement for the preceding month in accordance with Spokane's normal business practices. Each such invoice shall set forth the payment due from Medical Lake to Spokane. Medical Lake may request from Spokane, and Spokane shall promptly provide to Medical Lake, any documentation or other information that Medical Lake may reasonably require to understand the nature of the costs contained in any invoice issued pursuant to this Section.
- 6.4. Payment of any and all invoices forwarded to Medical Lake by Spokane pursuant to this Section shall be due and payable by Medical Lake on or before the Due Date, with payment to be made by wire transfer or such other means as may be agreed to in writing by the parties.
  - 6.4.1. The term "<u>Due Date</u>" shall mean the date by which payment of any invoice issued pursuant to this Section of the Agreement is due to Spokane, which date shall be the close of business on the thirtieth (30<sup>th</sup>) day after an invoice is issued, provided, however, that if such thirtieth day falls on a Saturday, Sunday, or legal holiday observed by Spokane, the Due Date shall be extended until the close of business of the next regular business day of Spokane.
- 6.5. If Medical Lake disputes all or any portion of an invoice issued by Spokane pursuant to this Section, Medical Lake shall pay such invoice in full, and shall indicate in writing to Spokane the portions of the invoice that Medical Lake disputes and the reasons therefore. The Parties shall make a good faith effort to

resolve such dispute. If such efforts are unsuccessful, either Spokane or Medical Lake may seek resolution of the dispute pursuant to this Agreement.

6.6. Medical Lake hereby covenants and agrees that it shall establish, maintain, and collect rates or charges for water and other services, facilities, and commodities sold, furnished or supplied by it to its members which shall be adequate to provide revenues sufficient to enable Medical Lake to make the payments required to be made pursuant to the terms of this Agreement, and to pay all other charges and obligations payable from or constituting a charge or lien upon such revenues.

#### 7. Conservation and Efficiency.

- 7.1. The Parties agree and acknowledge that wise stewardship of water resources through conservation and maintenance of each system's operational efficiency is critically important and an important ongoing tool in managing the water resources of the region. Accordingly, the Parties agree to adopt conservation plans, to be updated on an annual basis or as otherwise required by Legal Requirements, and shall coordinate regional supply scheduling and other operational programs that promote efficient use of water supplies, facilities, and financial staff resources.
- 7.2. To accomplish these goals, the Parties agree:
  - 7.2.1. To prepare and exchange conservation plans on an annual basis, at a minimum;
  - 7.2.2. To track and collect data on at least a monthly basis for each Party's operational components and to exchange the same on at least an annual basis;
  - 7.2.3. All Parties will have a written water conservation plan consistent with state law with specific reasonable goals and are required to implement and maintain annual water conservation, reduction of system loss in accordance with Chapter 246-290-810 WAC and efficiency measures with a goal of reducing the annual amount of water consumed per capita year over year especially during Summer and early Fall. The plan will include program effectiveness consultations at least every three years with the City of Spokane Water Department, including documentation of changes in total gallons used and per capita use on an annual and seasonal basis by customer class.
  - 7.2.4. All Parties shall participate in any drought response water conservation measures triggered by weather conditions and/or Spokane River flows as may be developed and adopted by the City for all retail and wholesale customers with a methodology for reasonable notice included in the contract;

and an acknowledgement that the wholesale water supply may be curtailed or interrupted due to drought, low flows in the Spokane River, or shortage all consistent with city code, adopted plans, state law, and such reasonable rules or measures as adopted by the water department.

#### 8. Delivery Interruptions, Default and Rights of Termination.

- 8.1. The Spokane Water System shall be operated and maintained in a manner consistent with water system standards and Legal Requirements in order to provide reliability of service to Medical Lake. However, Medical Lake understands and agrees that Spokane can make no warranty or guarantee as to pressure, quantity, or continuity of service.
- 8.2. Spokane shall engage in commercially reasonable standards for delivery of wholesale water pursuant to this Agreement. Medical Lake agrees that it has only a contractual right to wholesale water as set forth in this Agreement, and further agrees that Medical Lake has no claim or right to a supply of water from Spokane or to any water right upon the expiration or termination of this Agreement on any basis whatsoever.
- 8.3. Notwithstanding any other provisions of this Agreement, neither Spokane nor Medical Lake shall be liable to the other for indirect, incidental, special, exemplary, punitive, or consequential damages, including but not limited to damages for lost profits, revenues or benefits, loss of property use, the cost of capital, or the cost of purchased or replacement water, even if such party has been advised of the possibility or existence of such damages.
- 8.4. The Parties agree and acknowledge that Spokane shall not be liable for any losses, damages, or claims due to, caused by, relating to, or arising from events enumerated in this Section.
  - 8.4.1. Emergency
    - 8.4.1.1. In the event that Spokane determines, in its reasonable discretion, that there is an emergency directly affecting the ability of Spokane to deliver water to Medical Lake that: (a) creates an immediate threat of bodily harm to persons; (b) causes damage to the Spokane Water System such that Spokane cannot supply Medical Lake; or (c) is the result of a Regulatory Requirement, Spokane shall provide oral notice to Medical Lake and may temporarily interrupt or reduce deliveries of water to Medical Lake if Spokane determines, in its sole discretion, that such interruptions and reductions are necessary or reasonable in case of such an emergency. Medical Lake shall assist and support Spokane to meet such an emergency condition, including, without limit, implementing emergency, Spokane shall take all reasonable and necessary actions to restore the delivery of water to Medical Lake as

<u>quickly as possible.</u> Emergencies may include, but are not limited to, failure of or accidents involving Spokane's Water System infrastructure or equipment, uncontrollable forces, unforeseen or unavoidable events, legal restrictions or limitation, and/or regulatory restrictions or limitations prior to the point of delivery.

8.4.1.2. In the event that Spokane determines, in its reasonable discretion, to institute a water rationing or water use restriction program, as a result of water shortage due to causes beyond the reasonable control of Spokane, that necessitates water rationing or use restrictions, the Parties shall meet and confer in order to reach a reasonable accommodation. Any rationing or use restrictions shall be based on the specifics of the problem and the water distribution system and availability of the water resource. Spokane will follow its water shortage policies and protocols and its emergency planning as identified in Spokane's Comprehensive Water System Plan. Should the Parties not be able to resolve a water rationing or use restriction through the meet and confer process, then either Party may seek resolution through the Dispute Resolution Process herein.

#### 8.4.2. Non-Emergency

8.4.2.1. Except in cases of emergency under this Section, and in order that Medical Lake's operations will not be unreasonably interfered with, Spokane shall give Medical Lake seven (7) calendar days notice of any other interruptions or reduction in service, the reason therefore, and the probable duration thereof, including any interruptions or reduction in services that will be caused by the installation of equipment, repairs, replacements, investigations, inspections or other maintenance performed by the Spokane on its water system or those parts of the system supplying Medical Lake pursuant to this Agreement. The Parties will work in good faith to address any specific issues in the event of non-emergency interruption of service.

#### 8.4.3. Regulatory

8.4.3.1. Medical Lake understands and agrees that the operation of this Agreement, and the water available from Spokane's water rights are subject to Legal Requirements as defined in section 3.6 and the proceedings, litigation, orders, rulings of courts of competent jurisdiction ("Judicial Requirements") regarding the Agreement and Spokane's water rights. Medical Lake understands and agrees that Spokane must comply with all such Legal Requirements and Judicial Requirements may affect, limit, diminish or remove the ability of Spokane to fulfill its wholesale water deliveries under this Agreement.

- 8.4.3.2. The Parties expressly acknowledge and agree that the inability or preclusion of the City of Spokane to perform, in whole or material part, this Agreement caused by an order or directive of governmental authority or a court with jurisdiction shall constitute a force majeure or change in law event hereunder and Spokane can terminate this Agreement.
- 8.4.3.3. If Spokane is materially limited or prohibited from performance of this Agreement through Judicial or Regulatory Requirements, the water delivered to Medical Lake shall be reduced as set forth in Section 8.4.1.2.
- 8.5. Payment and Performance Default.
  - 8.5.1. If Medical Lake fails to make any payment in full when due under this Agreement for a period of thirty (30) days or more after the Due Date ("Payment Default"), Spokane shall make written demand upon Medical Lake to make payment within twenty (20) days of the date of such written demand. If the Payment Default is not cured or the Parties fail to reach mutual agreement for payment terms within the twenty (20) day time period, Medical Lake shall be deemed to be in default of this Agreement, and Spokane may suspend the continued delivery of water to Medical Lake. Upon delivery of amounts due by Medical Lake, Spokane shall within a reasonable period of time restore the delivery of water to the Medical Lake's Water System.
  - 8.5.2. Event of Default; Remedies.
    - 8.5.2.1. Performance Default. Upon the occurrence of any one or more of the following Events of Default which shall continue and not be cured in accordance with the notice and opportunity to cure provisions set forth in this section, a Party may, at its option, declare through written notice a "Performance Default" under this Agreement when:

(a) a Party fails to comply with any term or fails to perform any of its obligations under this Agreement and such failure has a material adverse effect on the operation of Spokane Water System, Medical Lake Water System or creates a material risk of injury to persons or damage to property; or

(b) a Party fails to comply with any term or fails to perform any of its obligations under this Agreement, where such failure is not within the terms of Section 8.5.1 above, and such failure continues for a period of fifteen (15) days after written notice ("Cure Period").

The written notice delivered by the non-defaulting party shall identify the alleged breach, the requested remedy and any other relevant information.

- 8.5.2.2. Cure. Following receipt of written notice, if a Performance Default is not reasonably susceptible of cure within the cure period provided above, but the defaulting party commences to cure such default within the applicable cure period and thereafter diligently prosecutes the cure, and completes such cure within twenty (20) days of commencing such default shall not become an Event of Default. If the Default is not capable of cure, but the defaulting party is diligently pursuing a cure, a reasonable period shall be afforded to complete the cure not to exceed twenty (10) days.
- Upon the occurrence of any Event of Default, the 8.5.2.3. Remedies. non-defaulting Party may, upon forty-eight (48) hours written notice, in addition to any other rights granted under of this Agreement, but without waiving such other rights: (a) perform any and all work necessary to complete, secure and/or protect its property; (b) specifically enforce and perform the defaulting Party's unperformed obligations; and/or (c) request dispute resolution as set forth in section 11 herein to include seeking a preliminary injunction through a court with personal and subject matter jurisdiction. Amounts paid and costs and expenses incurred by a non-defaulting Party under any of this Section 8.5.2.1 by reason of an Event of Default of the other Party shall be reimbursed by the defaulting Party upon demand for its costs and attorney fees and shall bear interest at the rate of twelve percent (12%) per annum from the date of demand until paid.
- 9. <u>Force Majeure</u>. Neither Medical Lake nor Spokane shall be considered to be in default in respect to any obligations hereunder if prevented from fulfilling such obligations due to conditions beyond their reasonable control including acts of God, fire, flood, earthquake, other natural disaster, acts of war, insurrection or riot, or change in the law or directive of governmental authority. If a Party is unable to perform in whole or in part because of such condition, the Party shall diligently and promptly take reasonable steps to allow it to perform.
- 10. Indemnification by Spokane. To the fullest extent permitted by law, Spokane hereby releases and agrees to indemnify, defend and hold harmless each of the Medical Lake Indemnified Parties (defined below) from and against any claim, liability, loss, expense (including but not limited to attorneys' fees and expenses), damage, demand, lawsuit, cause of action, order, strict liability claim, penalty, fine, administrative law action and/or cost of every kind and character (collectively, "Claim/Liability"), arising out of or in any way incident to the design or construction of the Spokane Improvements if due to the negligence, gross negligence, or intentional act or omission by Spokane, including in each case (but not limited to) any Claim/Liability on account of defective work, breach of contract, personal injuries,

death, damage to property, damage to the environment, or infringement of any patent, trademark, copyright or other property right, regardless of whether such harm is to Spokane, its employees or officers, the Medical Lake Indemnified Parties, or any other person or entity. "<u>Medical Lake Indemnified Parties</u>" means, individually and collectively, Medical Lake, its officers, shareholders, and members of each of the foregoing entities. Notwithstanding any provision in this Agreement to the contrary, the Spokane's duties under this Section shall survive the termination, revocation, or expiration of this Agreement.

- 11. Indemnification by Medical Lake. To the fullest extent permitted by law, Medical Lake hereby releases and agrees to indemnify, defend and hold harmless each of the Spokane Indemnified Parties (defined below) from and against any Claim/Liability arising out of or in any way incident to the use by Medical Lake of the water supplied by Spokane hereunder, or arising out of or in any way incident to the design or construction of the Medical Lake Improvements if due to the negligence, gross negligence, or intentional act or omission by Medical Lake, including in each case (but not limited to) any Claim/Liability on account of defective work, negligence, breach of contract, personal injuries, death, damage to property, damage to the environment, or infringement of any patent, trademark, copyright or other property right, regardless of whether such harm is to Medical Lake, its members or officers, the Spokane Indemnified Parties, or any other person or entity. "Spokane Indemnified Parties" means, individually and collectively, Spokane, its elected officials, officers, employees, and agents. Notwithstanding anything in this Agreement to the contrary, Medical Lake's duties under this Section shall survive the termination, revocation, or expiration of this Agreement.
- 12. <u>Dispute Resolution</u>. Dispute resolution shall proceed as follows:
  - 12.1. The Parties agree to use their best efforts to resolve disputes arising out of or related to this Agreement using good faith negotiations by engaging in the following dispute resolution process should any such disputes arise. The Parties agree that cooperation and communication are essential to resolving issues efficiently.
  - 12.2. Any disputes or questions of interpretation of this Agreement or the performance of either Party under this Agreement that may arise between Spokane and Medical Lake will be governed under the dispute resolution process set forth in this Section. Either Party may refer a dispute to the dispute resolution process by providing written notice of such referral to the other Party's Designated Representative
    - 12.2.1. Before either Party may refer a dispute to mediation or provide a notice of the same to the other Party, the Parties will seek to resolve the dispute at the lowest possible level by completing the following steps.

12.2.2. Spokane's Director of Water

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- 12.2.2. Spokane's Director of Water and Hydroelectric Department and Medical Lake's Public Works Director, shall meet to discuss and attempt to resolve the dispute in a timely manner. If they cannot resolve the dispute within ten (10) business days, then the Parties will refer the dispute to Spokane's Director of Utilities and Medical Lake City Manager.
- 12.3. Within 15 days of the completion of the steps above, each Party shall propose to the other party in writing not more than five (5) candidates to act as mediator. Within seven (7) days of exchanging lists of mediator candidates, the parties will meet and confer to choose one name from the list. If the Parties are unable to agree on a mediator 30 days after completion of the steps above, then the Parties will jointly petition the Presiding Judge of the Spokane County Superior Court to appoint a mediator.
- 12.4. The Parties shall use reasonable efforts to resolve the dispute within thirty (30) days with the assistance of the mediator.
- 12.5. Except as otherwise provided by this Agreement, the Parties shall continue to fulfill their respective duties under this Agreement pending resolution of any dispute.
- 12.6. If mediation fails to resolve the dispute within thirty (30) days of selection of the mediatory, the Parties may thereafter seek redress in court subject to Section 13.11.

#### 13. Miscellaneous Provisions.

#### 13.1. Access to Records.

- 13.1.1. <u>Medical Lake's Access to Spokane Records</u>. Upon reasonable prior notice to Spokane, Medical Lake, or any consultant of Medical Lake, shall be given access during normal business hours to the books, records, and accounts related to this Agreement in the possession of Spokane at the location where such books, records, and accounts are located. Spokane shall not be obligated to collate, organize, or analyze the information sought by Medical Lake or by Medical Lake's consultant.
- 13.1.2. <u>Spokane's Access to Medical Lake Records</u>. Upon reasonable prior notice to Medical Lake, Spokane, or any consultant of Spokane, shall be given access during normal business hours to the books, records, and accounts related to this Agreement in the possession of Medical Lake at the location where such books, records, and accounts are located. Medical Lake shall not be obligated to collate, organize, or analyze the information sought by Spokane or by Spokane's consultant.
- 13.2. <u>Notices</u>.

- 13.2.1. All notices, requests, demands, waivers, consents and other communications required under this Agreement shall be in writing except as provided in Section 8.4.1, and shall be delivered by the following means: (i) by certified mail, return-receipt requested, (ii) by facsimile providing confirmation of completed transmission, or (ii) by such other means as may be approved in writing by the Parties. Service of any such notice, request, demand, waiver, consent, or other communication, shall be deemed to have been duly given and to have become effective upon receipt.
- 13.2.2. Any and all notices, demands, waivers, consents and other communications shall be forwarded to each of the Parties at the following addresses:
  - To Spokane: Director, City of Spokane Water Department 914 N Foothills Dr. Spokane, WA 99207 Telephone: (509) 625-7800 Facsimile: (509) 625-7816
  - With a copy to: City Attorney Office of the City Attorney City of Spokane – City Hall 808 West Spokane Falls Boulevard Spokane, WA 99201 Telephone: (509) 625-6225 Facsimile: (509) 625-6277

To Medical Lake: \_\_\_\_

With a copy to:

or to such other address as may be agreed to in writing by the Parties.

13.3. <u>Assignment</u>. Neither this Agreement nor any of the rights, interests or obligations created hereunder may be assigned, sold, or otherwise transferred in whole or in part by either Party without the prior written consent of the other Party.

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- 13.4. <u>No Third Party Beneficiaries</u>. Nothing in this Agreement is intended to confer upon any person or entity, other than the Parties hereto, any rights, benefits, or obligations. No such third-party shall have any right to enforce any of the provisions of this Agreement. Unless expressly stated otherwise herein.
- 13.5. <u>Medical Lake Water System No Spokane Responsibility</u>. It is understood that Spokane does not own or have any responsibilities outside of this Agreement whatsoever to maintain Medical Lake's Water System.
- 13.6. <u>Compliance with Local, State, Federal Rule or Regulation</u>. In the event Spokane is required to comply with any local, state, or federal rule or regulation governing its operation of its water rights and said rule or regulation requires the compliance of wholesale water customers of Spokane, Medical Lake agrees to comply.
- 13.7. <u>Waiver</u>. Except as otherwise provided herein or as agreed by the Parties, no provision of this Agreement may be waived except as documented or confirmed in writing. Any waiver at any time by a Party of its rights with respect to a default under this Agreement or with any other matter arising in connection therewith shall not be deemed a waiver with respect to any subsequent default or matter. Either Party may waive any notice or agree to accept a shorter notice than specified by this Agreement. Such waiver of notice or acceptance of shorter notice by a Party at any time regarding a notice shall not be considered a waiver with respect to any subsequent notice required by this Agreement.
- 13.8. <u>Entire Agreement</u>. All prior negotiations and agreements between the Parties hereto relating to the subject matter hereof are merged into and superseded by this Agreement, and shall constitute the entire agreement between Spokane and Medical Lake concerning the sale of wholesale water to Medical Lake for use as hereinbefore provided. The rights and obligations of the Parties hereunder shall be subject to and shall be governed by this Agreement.
- 13.9. <u>Representations and Warranties</u>. The Parties hereby represent and warrant to one another the following:
  - 13.9.1. Each party is duly authorized and validly existing under the laws of, and is authorized to exercise its powers, rights, and privileges and is in good standing in, the State of Washington, and has full power and authority to carry on its business as presently conducted and execute this Agreement and perform the transactions on its part contemplated by this Agreement.
  - 13.9.2. The execution, delivery and performance of this Agreement, and the consummation of the transactions contemplated hereby have been duly authorized by the appropriate board or council, and no other act or proceeding on the part of any Party is necessary to authorize this Agreement, or the transactions contemplated hereby.

- 13.9.3. The execution, delivery, and performance by each of the Parties of this Agreement does not: (a) contravene any law; or (b) conflict with or result in a breach of or default under any material agreement or instrument to which any Party is a party or by which it is bound.
- 13.9.4. There are no actions, suits, claims, or proceedings pending, or, to the best of each Party's knowledge, threatened against either Party that is likely to impair the consummation or the transactions contemplated hereby.
- 13.9.5. This Agreement, when executed and delivered, will constitute a valid and binding obligation of each Party, and will be enforceable against each such Party in accordance with its terms.
- 13.10. <u>Amendments</u>. No change, amendment or modification of any provision of this Agreement shall be valid unless set forth in a written Amendment to this Agreement signed by the Parties.
- 13.11. <u>Governing Law and Venue</u>. This Agreement shall be governed by and construed in accordance with the laws of the State of Washington (regardless of the laws that might otherwise govern under applicable principles of conflicts of law of such state). The Parties (i) agree that any lawsuit, judicial action, or proceeding arising out of or relating to this Agreement must be heard in the Superior Court of the State of Washington in and for the County of Spokane, or in the United States District Court for the Eastern District of Washington, (ii) waive any objection to the venue of any such suit, action, or proceeding, and (iii) irrevocably submit to the jurisdiction of any such court in any such lawsuit or judicial action or proceeding.
- 13.12. <u>Reasonable and Good Faith Efforts</u>. Each Party will make all reasonable and good faith efforts to coordinate with the other Party to complete the Medical Lake and Spokane Improvements, to secure the Regulatory Approvals, and accomplish tasks provided for in this Agreement in a timely manner.
- 13.13. <u>Severability</u>. If any term or other provision of this Agreement is invalid, illegal, or incapable of being enforced, all other terms or provisions of the Agreement shall nevertheless remain in full force and effect so long as the economic or legal substance of the transactions contemplated hereunder is not affected in any manner or materially adverse to any Party. Upon such determination that any term or other provision is invalid, illegal, or incapable of being enforced, the Parties shall negotiate in good faith to modify this Agreement so as to effect the original intent of the Parties as closely as possible in an acceptable manner in order that the transactions contemplated hereunder are consummated as originally contemplated and to the greatest extent possible.

7-20-18

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- 13.14. <u>Rights and Remedies Cumulative</u>. The rights and remedies available under this Agreement or otherwise available shall be cumulative of all other rights and remedies and may be exercised successively.
- 13.15. <u>Counterparts</u>. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

7-20-18

IN WITNESS WHEREOF, the Parties have duly executed this Agreement on the date first above written.

DATED:

CITY OF SPOKANE

Tand A. C.m. By: Title: Mayor

ATTEST:

City Clerk

City Clerk City of Spokane

DATED:

116/2018

8 15 2018

APPROVED AS TO LEGAL FORM:

Peceto

City Attorney City of Spokane





7-20-18

DATED:

8-24-2018

CITY OF MEDICAL LAKE By: Title: 11

APPROVED AS TO LEGAL FORM:

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City Attorney City of Medical Lake

ATTEST:

<u>Z-K Llal</u> City Clerk

City of Medical Lake

DATED:

8-24-2018



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-	Water & Hydro. Submitting Dep	Svsc.	Ges de Miller Contact Person	Phone Ext.		
	CONSENT AGENDA Contract Report	LEGISLATI O Resolut O Emerger O Final F O First F	IVE SESSION tion hey Ordinance teading Ordinance teading Ordinance	COUNCIL PRIORITY 0 Communication 0 Economic Development 0 Growth Management 0 Human Services	Clerk's Files: Renews:	operado 1003
		O Special O Hearing	Consideration	O Neighborhoods NOV 2 1 2000 O Public Safety O Racial Equity & Evicutar Diversity C O Racial Equity & Evicutar Diversity C O Rebuild & Maintain Entreperpreture	Cross Reference: ENG/LID: BID:	-

N/A		
m/n		

#### AGENDA WORDING:

Agreement for Water Systems Interties for Standby and Continuous Water Service with Spokane County Water District No. 3 (SCWD #3).

#### BACKGROUND (Attach separate sheet if necessary):

Between the years 1960 and 1987, five interties were established between the City's and SCWD #3's water systems for standby, emergency and continuous needs by the SCWD #3 water system.

The interties were established by informal mutual unwritten agreements.

The Washington State Department of Health is now requiring that all existing interties between public water supply purveyors be formalized by written agreements. Management of both water agencies, the City of Spokane Water & Hydroelectric Services Department and SCWD #3, agree that this needs to be accomplished as well.

The Agreement formalizes the understandings between the Parties, under which these connections were established.

RECOMMENDATION: Approve the Agreement & Authorize the City Manager to sign.

FISCAL IMPACT: Expenditure – None Budget Account: # N/A Revenue – Varies depending on water sales #

LIST ATTACHMENTS AS FOLLOWS: On file for Review in Office of City Clerk:

Include in Packets:

SIGNATURES OF SUBMITTING OFFICERS (sign legibly):

Director, Water & Hydro Service

isst. City Mgr. - Operations

Legal

DISTRIBUTION AFTER COUNCIL ACTION: Director of Accounting Budget Control Legal Attn: Bob Beaumier Water & Hydroelectric Services Spokane County Water District No. 3 - duplic. ang.

City Manager COUNCIL ACTION: APPROVED BY SPOKANE CITY COUNCIL: CITY C

Finance
Spokane City Clerk file no.022200-1003

SCWD #3 file no.\_\_\_\_\_

# AGREEMENT FOR WATER SYSTEMS INTERTIES FOR STANDBY AND CONTINUOUS WATER SERVICE

This Agreement made and entered into this  $4^{4}$  day of <u>December</u>, 2000, by and between Spokane County Water District No. 3, a public municipal water district of the State of Washington, having offices for the transaction of business at 5221 East Desmet Avenue (Mailing address: P O BOX 11187, Spokane, Washington 99211-1187), hereinafter referred to as "SCWD #3"; and the City of Spokane, a municipal corporation of the State of Washington, providing public water service to areas inside and outside the City limits pursuant to RCW 35.92.010, through its Department of Water and Hydroelectric Services having offices for the transaction of business at 914 E. North Foothills Drive, Spokane, Washington 99207-2794 (hereinafter "CITY WD").

WITNESSETH:

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WHEREAS, the parties are public water supply purveyors owning and operating water systems to supply their customers with potable water for domestic and fire protection needs, and

WHEREAS, the current Spokane County Coordinated Water System Plan Update, June 1999, under Section 7, paragraph 7.6 promotes the creation of water system interties between water purveyors to increase the reliability of water service locally; and

WHEREAS, the State of Washington Administrative Code (WAC), Chapter 246-290, section 246-290-132, deals with establishing interties between public water systems;

WHEREAS, currently five (5) interconnections exist between the SCWD #3 and the CITY WD water systems as described in Attachments "A" through "E" hereto; and

WHEREAS, all of the existing interconnections were established between the years 1960 and 1987; and

WHEREAS, all existing interconnections were established Pre-1991 whereby the existing interconnections (hereafter "interties") become eligible to qualify under the provision of "PRE-1991 'GRANDFATHERED' INTERTIES" of RCW 90.03.383; and

WHEREAS, RCW 90.03.383 (3) required notice of such Pre-1991 interties to be submitted to the State of Washington Department of Ecology (Ecology) and the State of Washington Department of Health (DOH) by June 30, 1996 so as to receive approvals; and

WHEREAS, The CITY WD complied with RCW 90.03.383 (3) by providing such necessary notice by letter dated June 28, 1996, to both Ecology and DOH; and

WHEREAS, no written agreement currently exists for the aforementioned existing interties as these were established by informal mutual unwritten agreements;

WHEREAS, both jurisdictions are now desirous and able to enter into this formal Agreement, pursuant to the provisions of RCW Chapter 39.34, as may apply, for the continued operations of the existing interties between the water systems so as to provide standby and continuous water service for the benefit to SCWD #3 for auxiliary water supply, storage and fire protection; and

WHEREAS, by this formal Agreement, the Parties furthermore desire to establish their respective rights and responsibilities with regard to the interties of their respective water systems;

NOW, THEREFORE, for and in consideration of the mutual benefits to be derived herefrom, the Parties confirm and ratify their informal agreement with the following specific details for the existing interties as set forth herein and further described in Attachments "A" through "E" hereto:

- The CITY WD shall make auxiliary water supply, storage and fire protection service available to SCWD #3 through the interties. However, the auxiliary water service may be subject to limitation as the CITY WD determines necessary if the CITY WD suffers a deficiency in water supply available to its own customers or other emergency circumstances. SCWD #3 may only appropriate the amount of water that the CITY WD determines it can provide without risk or damage to the CITY WD's system or CITY WD customers.
- 2. In the event that the CITY WD cannot meet or supply both the water demand of it's customers and the auxiliary needs of SCWD #3, then the CITY WD shall be obligated to first meet the needs of it's own customers and services. The CITY WD shall not be responsible for any damages to SCWD #3 and acts taken under this provision shall always be in the sole discretion of the CITY WD.

However, the CITY WD hereby acknowledges that as to one existing intertie located near the intersection of Perry Road and 54<sup>th</sup> Avenue, as described in Attachment "E" hereto, this particular intertie provides the only source of water for SCWD #3's Water Service Area #4 and, thus, SCWD #3 Water Service Area #4 is dependent on the CITY WD for the water supply. As such, because of the uniqueness of this particular intertie, and as to Water Service Area #4 only, the CITY WD agrees to regard that service intertie for this area on the same priority for service as locations within the CITY WD service area; PROVIDED, SCWD # 3 shall remain the purveyor to said customers in its Water Service Area #4, and no direct customer service obligation between the CITY WD and said customers is created. Such circumstance may arise where the CITY WD formally agrees to take over this area as part of its water system. At such time, then the need for the intertie shall

no longer exist as the SCWD #3 customers in this area shall become the customers of the CITY WD and this agreement shall expire with respect to the intertie as described in Attachment "E" (Perry and 54<sup>th</sup>).

- The Administration of this Agreement shall be the joint responsibility of SCWD #3's Administrator and the Administrator of the CITY WD.
- 4. If either Party contaminates or damages the water system of the other Party, then the Party responsible for the contamination or damage shall pay the cost of correcting, removing and eliminating the contamination or damage incurred by the other Party, whether foreseen or unforeseen. Further, the responsible Party shall indemnify and hold harmless the other Party for injury to persons or property resulting from such contamination or damage.
- 5. In order to minimize the possibility of such contamination or damage, the Parties agree that any contamination detected through a water sample must be reported to the other Party as follows: 1.) At the time of the detection. 2.) After the system has been declared free of the contaminant. 3.) At the time any disinfection methods are discontinued. The Party reporting the contamination is subject to possible refusal by the uncontaminated Party from intertie usage during the period of contamination.

THIS AGREEMENT shall remain in full force and effect and continue until such time as either Party gives the other Party at least thirty (30) days written notice of their intention to withdraw from and terminate this Agreement. In the event this Agreement is terminated, the terminating Party shall disconnect the systems at their expense. No modification or amendment shall be valid until mutually agreed upon, reduced to writing and executed by authorized representatives of the Parties.

CITY OF SPOKAL Attest City Clerk Approved as to form: Assistant City Attorney Spokane County Water District No. 3 Chairman of the Board of Commissioners Approved as to form:

3

Counsel for District

## STATE OF WASHINGTON

County of Spokane

On this <u>Hn</u> day of <u>UccenBer</u>, 2000, before me personally appeared Hank Miggins and Terri Pfister, to me known to be the City Manager and the City Clerk, respectively, of the City of Spokane, a municipal corporation, that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of the corporation, for the uses and purposes therein mentioned, and on oath stated that they were authorized to execute said instrument.

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IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.

OFFICIAL SEAL CONNIE J. KENSOK NOTARY PUBLIC - STATE OF WASHINGTON COUNTY OF SPOKANE My Commission Expires August 16, 2001

STATE OF WASHINGTON

County of Spokane

Notary Public in and for the State of Washington, residing at Spokane. My commission expires\_\_\_\_\_

On this day of <u>Notwork</u>, 2000, before me personally appeared Herbert Carlson, to me known to be the Chairman of the Board of Commissioners, of Spokane County Water District No. 3, a public municipal water district that executed the within and foregoing instrument, and acknowledged the said instrument to be the free and voluntary act and deed of the water district, for the uses and purposes therein mentioned, and on oath stated that he was authorized to execute said instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal the day and year first above written.



marcin Notary Public in and for the State

of Washington, residing at Spokane. My commission expires 41303.

# ATTACHMENT "A"

## **HAVANA STREET & SPRAGUE AVENUE INTERTIE**

- (1) Location: This metered, one-way connection is located near the intersection of Havana Street and Sprague Avenue, Spokane County, Washington.
- (2) Purpose: The Purpose of this 12-inch diameter connection (a 12-inch service tap & service connection split into a 12-inch service line and an 8-inch service line) is for standby water supply, storage and fire flow for SCWD #3. This connection was made at the request of the Washington Water Power Company (WWP), a predecessor to SCWD #3.
- (3) Date of Installation: September 16, 1960.
- (4) Cost of Construction: The cost of construction for this intertie was borne by WWP.
- (5) Operating Procedure: This intertie contains a meter and a check valve at the point of intertie. SCWD #3 shall notify the CITY WD regarding the need for the auxiliary water supply prior to operating the manual valves between each system. Each Party's designated representative shall meet at the intertie location and coordinate the operation of the intertie valves.
- (6) Rate Schedule. This intertie is metered. At the end of each month that water is used the meter will be read by the CITY WD and an accounting will be made of any water used. This water consumption will be billed in accordance with the water rates charged to regular "Commercial" CITY WD customers outside the City's Utility Service Area in effect at the time of use.

# ATTACHMENT "B"

### CARNAHAN & GLENROSE ROADS INTERTIE

- (7) Location: This metered, one-way connection is located near the intersection of Carnahan and Glenrose Roads, Spokane County, Washington.
- (8) Purpose: The Purpose of this 6-inch diameter connection is for auxiliary water supply, storage and fire flow for SCWD #3. This connection was made at the request of the Washington Water Power Company (WWP), a predecessor to SCWD #3.
- (9) Date of Installation: February 1, 1978.

- (10) Cost of Construction: The cost of construction for this intertie was borne by WWP.
- (11) Operating Procedure: This intertie contains a meter and a one-way pressure sensitive hydraulically operated value at the point of intertie which automatically opens in the case of a drop in pressure in the SCWD #3 system. This value is adjusted to open intermittently to augment the water supply to the higher elevation area of SCWD #3's system.
- (12) Rate Schedule. This intertie is metered. At the end of each month that water is used the meter will be read by the CITY WD and an accounting will be made of any water used. This water consumption will be billed in accordance with the water rates charged to regular "Commercial" CITY WD customers outside the City's Utility Service Area in effect at the time of use.

# ATTACHMENT "C"

### MISSION AVENUE & THIERMAN ROAD INTERTIE

- (1) Location: This metered, one-way connection is located near the intersection of Mission Avenue and Thierman Road, Spokane County, Washington.
- (2) Purpose: The Purpose of this 8-inch diameter connection is for standby water supply, storage and fire flow for SCWD #3. This connection was made at the request of the Washington Water Power Company (WWP), a predecessor to SCWD #3.
- (3) Date of Installation: October 28, 1974.

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- (4) Cost of Construction: The cost of construction for this intertie was borne by WWP.
- (5) Operating Procedure: This intertie contains a meter and a one-way pressure sensitive hydraulically operated valve at the point of intertie which automatically opens in the case of a drop in pressure in the SCWD #3 system. This valve is adjusted to open only in the event of a significant demand and subsequent loss of pressure caused by an emergency or major breakdown of equipment in SCWD #3's system.
- (6) Rate Schedule. This intertie is metered. At the end of each month that water is used the meter will be read by the CITY WD and an accounting will be made of any water used. This water consumption will be billed in accordance with the water rates charged to regular "Commercial" CITY WD customers outside the City's Utility Service Area in effect at the time of use.

# ATTACHMENT "D"

### FRANCIS AVENUE & WALL STREET INTERTIE

- (1) Location: This metered, one-way connection is located near the intersection of Francis Avenue and Wall Street, Spokane County, Washington.
- (2) Purpose: The Purpose of this 8-inch diameter connection is for standby water supply, storage and fire flow for SCWD #3. This connection was made at the request of the Washington Water Power Company (WWP), a predecessor to SCWD #3.
- (3) Date of Installation: March 6, 1987.

S 4 5 1

- (4) Cost of Construction: The cost of construction for this intertie was borne by WWP.
- (5) Operating Procedure: This intertie contains a meter and a check valve at the point of intertie. SCWD #3 shall notify the CITY WD regarding the need for the auxiliary water supply prior to operating the manual valves between each system. Each Party's designated representative shall meet at the intertie location and coordinate the operation of the intertie valves.
- (6) Rate Schedule. This intertie is metered. At the end of each month that water is used the meter will be read by the CITY WD and an accounting will be made of any water used. This water consumption will be billed in accordance with the water rates charged to regular "Commercial" CITY WD customers outside the City's Utility Service Area in effect at the time of use.



# PERRY ROAD & 54<sup>TH</sup> AVENUE INTERTIE

- (1) Location: This metered, one-way connection is located near the intersection of Perry Road and 54<sup>th</sup> Avenue, Spokane County, Washington.
- (2) Purpose: The Purpose of this 8-inch diameter connection is for water supply, storage and fire flow for SCWD #3. This connection was made at the request of the Washington Water Power Company (WWP), a predecessor to SCWD #3.
- (3) Date of Installation: June 2, 1960.

. . . .

- (4) Cost of Construction: The cost of construction for this intertie was borne by WWP.
- (5) Operating Procedure: This intertie contains a meter and a check valve at the point of interconnection. This intertie is the only source of water for Water Service Area #4.
- (6) Rate Schedule. This interconnection is metered. At the end of each month the meter is read by the CITY WD and an accounting is made of any water used. This water consumption is billed in accordance with the water rates charged to regular "Commercial" CITY WD customers inside the City's Utility Service Area in effect at the time of use.

Spokane City Clerk File No. OPR 1984-0475 Airway Heights City Clerk File No.

# AMENDED WATER SUPPLY AGREEMENT BETWEEN AIRWAY HEIGHTS and the CITY OF SPOKANE AND EMERGENCY WATER SERVICE

THIS AMENDMENT and EMERGENCY WATER SUPPLY AGREEEMENT ("<u>Amendment</u>") is entered into by THE CITY OF SPOKANE ("<u>Spokane</u>"), a municipal corporation of the State of Washington and First Class Charter City, with a principal place of business located at 808 West Spokane Falls Boulevard, Spokane, Washington, 99201, and the CITY OF AIRWAY HEIGHTS ("<u>Airway</u> <u>Heights</u>"), a municipal corporation of the State of Washington, operating as a Code City, with a principal place of business located at 1208 South Lundstrom, Airway Heights, Washington, 99001 each a "<u>Party</u>" and collectively the "<u>Parties</u>."

#### RECITALS

- A. Spokane owns and operates a Chapter 70.119A Group A Public Water System ("<u>Spokane Water System</u>") that supplies and distributes potable water to its own customers.
- B. Spokane owns and operates a series of wells pursuant to a series of water rights and is authorized to provide wholesale water within a regional wholesale service area, as approved in its Water System Plan ("Spokane Water System Plan"), promulgated in accordance with Chapter 43.20 RCW and entitled "City of Spokane, Comprehensive Water System Plan," Volumes 1 and 2, January 12, 2017 adopted and approved by the City of Spokane City Council and approved by the State Department of Health ("State DOH"), as said document may be amended, revised, or updated from time to time.
- C. Airway Heights owns and operates its own Chapter 70.119A Group A Public Water System ("<u>Airway Heights Water System</u>") which draws from a separate water source than Spokane and serves customers as designated by its Water System Plan as approved by State DOH. Airway Heights wishes to continue to supplement and stabilize its existing water supply portfolio through the connection with Spokane.
- D. Spokane currently supplies Airway Heights with water through an intertie connection located at Highway 2 and Hayford Road, Spokane City Clerk's File

No. OPR 1984-0475 ("Water Intertie Agreement"). Airway Heights takes wholesale water at a rate of 1,500 gallons per minute ("gpm").

- E. In May 2017, Airway Heights was notified by representatives of Fairchild Air Force Base that its primary water wells were contaminated with perfluorinated chemicals (PFAs). This contamination has in essence reduced and interrupted Airway Heights' ability to supply water to its customers from its primary water source.
- F. Airway Heights is working to secure and construct a new water system or treatment options in order to serve its residents and businesses ("Water Solution"). It is anticipated that a Water Solution will be finalized within two (2) or three (3) years.
- G Until a Water Solution is reached, Airway Heights has need of short term supplemental emergency water from Spokane in the amount of approximately 1,400 gpm.
- H. The Parties agree it would be mutually beneficial to add a second point of connection between the two water systems at Craig and McFarlane Roads ("Emergency Supplemental Connection"). This would also allow for optimal operational management of both Spokane and Airway Heights' water systems and would provide emergency water service.
- I. The Parties acknowledge that numerous state and local regulatory approvals may be required before Spokane provides and Airway Heights accepts water delivery under this Agreement.
- J. The Parties recognize and desire to form a mutually beneficial stewardship relationship to manage the water resources. The Parties agree to cooperate with each other to the greatest extent feasible to secure state and local regulatory approvals, revise their respective comprehensive water plans, secure Spokane County approval of any necessary revision to the Coordinated Water System Plan, and implement the terms of this Agreement.

NOW, THEREFORE, in consideration of the foregoing recitals, incorporated herein, and the mutual promises and benefits exchanged by the parties herein, the Parties do hereby agree as follows:

#### 1. Purpose.

1.1. To amend the Water Intertie Agreement between the Parties and provide for clarification as to quantity of water provided by Spokane to Airway Heights, at the connection located at HWY 2 and Hayford Road at a rate of 1,500 gpm.

- 1.2. To authorize emergency water service and supply for supplemental short term emergency water to Airway Heights in an amount not to exceed 1,400 gpm through construction of a new connection point between the Parties water systems at Craig and McFarlane Roads to accommodate the Water Solution for approximately two (2) years.
- 2. <u>Regulatory Approvals</u>. The Parties acknowledge and agree that the following regulatory approvals and property rights may be necessary before water deliveries may begin. The Parties recognize that this Amendment and Emergency Water Service to Airway Heights may increase the water system planning requirements applicable to the Parties. However, Airway Heights is currently a designated place of use for Spokane's water rights under Spokane's Coordinated Water System Plan, as approved by Washington State Department of Health.
- 2.1. Spokane will bear all initial costs of obtaining any applicable state and local regulatory approval. Spokane will keep Airway Heights informed of status, will advise Airway Heights when these approvals have been obtained, and will provide copies of these approvals to Airway Heights promptly after they have been obtained.
- 2.2. Airway Heights will bear all initial costs of obtaining any applicable state and local regulatory approvals. Airway Heights will keep Spokane informed of status, will advise Spokane when these approvals have been obtained, and will provide copies of these approvals to Spokane promptly after they have been obtained.
- 2.3. The Parties shall collaborate on obtaining any approvals necessary from Spokane County and Washington State Department of Health and shall bear their own initial costs of obtaining any such approval.
- 2.4. If unanticipated permits, regulatory approvals, or property or access rights (collectively, with the approvals described in Section 2, "<u>Regulatory</u> <u>Approvals</u>") are necessary, the Parties will meet and confer in good faith to allocate costs and responsibility for the same. If the parties are unable to resolve the allocation of costs and responsibilities, they will follow the dispute resolution provisions in herein.

#### 3. Construction, Funding, and Responsibility for Improvements.

- 3.1. Pursuant to the Water Intertie Agreement Airway Heights has one established historical point of connection with Spokane located at HWY 2 and Hayford Road for supplemental water service, for which all capital connection fees have been paid. Due to the capacity of the pipe, pumps and other facilities, the available volume at this connection is presently 1,500 gallons per minute (GPM).
- 3.2. The Parties agree to one additional point of connection at Craig Road and McFarlane Roads for a limited time as provided by this Amendment in order to

provide for short term emergency water service purposes. This is a new designated point of connection limited to emergency purposes only.

3.3. For the new point of connection at Craig and McFarlane Roads, Airway Heights shall apply and pay for all Spokane Application(s) for Connection required to deliver wholesale water pursuant to this Agreement in accordance with Title 13, Chapter 13.04, Section 13.04.0502, and Applications for Connection Spokane Municipal Code. Airway Heights shall also pay a Water General Facilities Charge as outlined in Title 13 Chapter 13.04, Section 13.04.2042 E-1, for any additional connections.

3.3.1. Airway Heights shall purchase a backflow prevention device or assembly, consistent with state and local regulations to include Chapter 246.290 WAC, from and approved by Spokane, designed and tested to counteract back pressure and back siphonage ("<u>Airway Heights Backflow Prevention Device</u>"). Airway Heights shall have the Airway Heights Backflow Prevention Device tested by a Backflow Assembly Tester for compliance with Legal Requirements. A copy of each year's test along with a certification that the backflow assembly complies with Legal Requirements and is in good working condition shall be provided to Spokane each year.

3.3.2. Airway Heights shall purchase from Spokane a tap ("<u>Tap</u>") and initial master meter ("<u>Initial Master Meter</u>") in accordance with Spokane Municipal Code Title 13, Chapter 13.04, Section 13.04.0602 A, including, any initial testing and/or inspection fees required by Spokane.

3.3.3. Airway Heights shall purchase/construct a vault of adequate dimension to accommodate the initial master meter, the backflow assembly and the flow regulating valve.

3.3.3.1. Airway Heights shall provide plans and specifications to Spokane to include notice of construction activities so that Spokane can monitor and inspect the Airway Heights construction activities performed under this Amendment.

3.3.4. Spokane will design a Flow Control Valve. Said design shall be at the sole discretion of Spokane. Spokane shall bear all costs associated with the design of the Flow Control Valve.

3.3.5. Spokane shall install the Airway Heights Backflow Prevention Device, the Initial Master Meter, the Flow Regulating Valve, and the Tap.

3.4. The Parties nevertheless shall maintain, operate, and monitor their respective Water Systems as is necessary to effectuate the terms of this Agreement in a manner that is consistent with the provisions of all applicable local, state, and federal law, permits, regulatory approvals, manufacturers' specifications and in a good and workman-like manner.

3.5. If any further additional construction, improvements, or quantities are required in the future, the Parties shall reduce the terms of such construction and improvements within a mutually agreeable written amendment to this Agreement (including, without limit, allocation of legal and financial responsibility for design and construction, tapping, plan review, flow control valve design and installation, and future ownership, operation, monitoring/maintenance, and liability/insurance requirements).

### 4. Points of Delivery.

- 4.1 The "<u>Points of Delivery</u>" are those specifically identified points between transmission mains of the Parties where water will be transferred through the meter from Spokane to Airway Heights. The Points of Delivery are identified and described in <u>Exhibit A</u>.
- 4.2 The Parties agree that: (1) Airway Heights will assume full and complete ownership, operation, maintenance (including testing and monitoring), and insurance responsibilities, including the costs thereof, for the improvements and associated facilities consistent with water system standards and applicable laws, regulations, rules, provisions, interpretations, orders, injunctions, decrees, rulings, awards, and decisions of governmental entities, orders of governmental entities ("Legal Requirements") on its respective side of the Points of Delivery; and (2) Spokane continues to assume full and complete ownership, operation, maintenance (including testing and monitoring), and insurance responsibilities, including the costs thereof, for the improvements and associated facilities owned by Spokane consistent with water system standards Legal Requirements. The aforementioned sentence notwithstanding, the Parties further agree as follows:

4.2.1 Spokane shall operate and maintain the Initial Master Meter, including, without limit, any additional replacement meters.

4.2.2 Spokane shall own, operate, and maintain the Spokane WQ Monitoring Equipment. Spokane shall, in its sole discretion and at its sole expense, routinely monitor water quality using the Spokane WQ Monitoring Equipment in accordance with the Spokane Water Quality Monitoring Protocol.

4.2.3 Spokane shall own, operate, and maintain the Flow Control Valve.

5. <u>Water Delivery and Quantity</u>. Following completion of the improvements (set forth in Section 3), receipt of all regulatory approvals, construction of the new point of delivery and other pre-conditions to water delivery provided in this Amendment, Spokane will supply wholesale water to Airway Heights, as follows.

- 5.1. Water Intertie Agreement. The present intertie connection between the Parties is located HWY 2 and Hayford Road.
  - 5.1.1. The Parties agree the Water Intertie Agreement between the Parties is amended to clarify the quantity of water provided at HWY 2 and Hayford Road is limited to a rate not to exceed 1,500 GPM.
  - 5.1.2. All other terms and conditions contained in the Water Intertie Agreement remain in full force and effect.
- 5.2. **Emergency Supplemental Connection** The Emergency Supplemental Connection will be located at Craig and McFarlane Roads.
  - 5.2.1. Term. For a period of two (2) years commencing upon Spokane delivering water to Airway Heights ("Initial Term") at the Point of Delivery, Spokane shall supply water in the amount not to exceed 1,400 GPM through the Emergency Supplemental Connection. Airway Heights may request in writing and the Parties may agree to extend the emergency supplemental water service for three (3) additional one year intervals by written agreement ("Extension Periods"). The maximum term of the Emergency Supplemental Connection shall not exceed five (5) years.
  - 5.2.2. This Emergency Supplemental Connection shall terminate and be disconnected on or before, but no later than October 15, 2023.
  - 5.2.3. Status Updates. During the Initial Term and any Extension Periods, Airway Heights shall provide to Spokane written status updates at least every six (6) months as to its progress in securing a water system independent from Spokane. Failure by Airway Heights to provide such status updates at six (6) month intervals shall be cause for Spokane to decrease or terminate the short term emergency water service, in its reasonable discretion.
  - 5.2.4. Notwithstanding the above, any future delivery of water through the Emergency Supplemental Connection beyond the five (5) years provided for herein will require a separate written agreement, executed by both parties.
  - 5.2.5. It is further agreed this location is for short term emergency purposes only and will terminate, unless a subsequent written agreement is reached between the Parties.
- 5.3. All water supplied by Spokane for use or sale by Airway Heights shall be upon the express condition that after water passes the Points of Delivery, it becomes the property and exclusive responsibility of Airway Heights. Spokane shall not be liable for any degradation of water quality, for acts of sabotage or vandalism, or for other events and resulting damages that may occur beyond the Points of

Delivery and within the Airway Heights Improvements and Airway Heights Water System.

- 5.4. The quality of wholesale water made available to Airway Heights pursuant to this Agreement shall be of the same standard and quality as normally delivered to Spokane's other customers and shall be in compliance with all applicable state and federal drinking water laws, regulations and standards at the Points of Delivery. Airway Heights shall be responsible for maintaining compliance with all applicable state and federal drinking water laws, regulations and standards past the Point of Delivery and within the Airway Heights Improvements and Airway Heights Water System.
- 5.5 Spokane shall record the amounts of monthly wholesale water deliveries made to Airway Heights at the Initial Master Meter (or any replacement meter thereof).

5.5.1 Spokane will read the meter and keep records of the monthly and annual total water accepted by Airway Heights.

5.5.2 The Initial Master Meter (or any replacement meter thereof) shall at all times be accessible to Spokane personnel. If it becomes necessary for Airway Heights to place the meter under lock and key, Airway Heights shall furnish Spokane with a copy of the key.

- 5.6 Should Spokane determine that Airway Heights is receiving deliveries of wholesale water at the Points of Delivery in excess of the amounts set forth in section 5 herein, Spokane shall notify Airway Heights of the excess deliveries, and Airway Heights shall promptly take the steps necessary to reduce its deliveries accordingly. If Airway Heights has not taken action within twenty-four (24) hours of receiving notice from Spokane pursuant to Section 13.2, Spokane may take any action it deems necessary to reduce the deliveries to a level equal to Airway Heights's scheduled amounts, and charge Airway Heights for any excess deliveries made after the expiration of the twenty-four (24) hour notice period.
- 5.7 Spokane's delivery of wholesale water and Airway Heights's acceptance of such delivery shall be governed by the terms of this Agreement. No future wholesale service connections shall be permissible without a subsequent and separate written agreement between the Parties. Neither Party shall be obligated to agree to or execute any agreement or permit with the other Party to construct additional wholesale service connection(s).

### 6. Rates, Future Capital Projects, Invoicing, and Payment.

6.1. Airway Heights shall pay to Spokane a service fee as follows:

6.1.1. The amount of wholesale water delivered in such a month, as measured at the Initial Master Meter, times Outside City Rate to Other Purveyors, plus any

other fees, taxes, or charges billed to other Spokane wholesale customers pursuant to the Spokane Municipal Code.

- 6.2. The term "Outside City Rate to Other Purveyors" is as set forth in Title 13, Chapter 13.04, Section 13.04.2014 of the Spokane Municipal Code, or its succeeding provision(s) as such may be revised or amended through time. This rate may be periodically adjusted and shall be applicable as set forth in the rate schedule adopted by the Public Works and Utility Division and the Spokane City Council.
- 6.3. Future Connection/Increased Capacity. Any additional capacity or terms beyond those contained in this Agreement, will be negotiated between the Parties and may include assessed capital fees to meet the increase in capacity prior to expansion.
- 6.4. Spokane shall during the Term prepare and forward to Airway Heights an invoice for the payment of any and all amounts due Spokane pursuant to this Agreement for the preceding month in accordance with Spokane's normal business practices. Each such invoice shall set forth the payment due from Airway Heights to Spokane. Airway Heights may request from Spokane, and Spokane shall promptly provide to Airway Heights, any documentation or other information that Airway Heights may reasonably require to understand the nature of the costs contained in any invoice issued pursuant to this Section.
- 6.5. Payment of any and all invoices forwarded to Airway Heights by Spokane pursuant to this Section shall be due and payable by Airway Heights on or before the Due Date, with payment to be made by wire transfer or such other means as may be agreed to in writing by the parties.

6.5.1. The term "<u>Due Date</u>" shall mean the date by which payment of any invoice issued pursuant to this Section of the Agreement is due to Spokane, which date shall be the close of business on the thirtieth  $(30^{th})$  day after an invoice is issued, provided, however, that if such thirtieth day falls on a Saturday, Sunday, or legal holiday observed by Spokane, the Due Date shall be extended until the close of business of the next regular business day of Spokane.

- 6.6. If Airway Heights disputes all or any portion of an invoice issued by Spokane pursuant to this Section, Airway Heights shall pay such invoice in full, and shall indicate in writing to Spokane the portions of the invoice that Airway Heights disputes and the reasons therefore. The Parties shall make a good faith effort to resolve such dispute. If such efforts are unsuccessful, either Spokane or Airway Heights may seek resolution of the dispute pursuant to this Amendment.
- 6.7. Airway Heights hereby covenants and agrees that it shall establish, maintain, and collect rates or charges for water and other services, facilities, and commodities sold, furnished or supplied by it to its members which shall be adequate to

provide revenues sufficient to enable Airway Heights to make the payments required to be made pursuant to the terms of this Agreement, and to pay all other charges and obligations payable from or constituting a charge or lien upon such revenues.

### 7. Conservation and Efficiency.

- 7.1. The Parties agree and acknowledge that wise stewardship of water resources through conservation and maintenance of each system's operational efficiency is critically important and an important ongoing tool in managing the water resources of the region. Accordingly, the Parties shall adopt conservation plans, to be updated on an annual basis or as otherwise required by Legal Requirements, and shall coordinate regional supply scheduling and other operational programs that promote efficient use of water supplies, facilities, and staff resources.
- 7.2. To accomplish these goals, the Parties agree:

7.2.1. To prepare and exchange conservation plans on an annual basis, at a minimum;

7.2.2. To track and collect data for each Party's operational components and to exchange the same on at least an annual basis;

7.2.3. To collectively analyze the data collected pursuant to this Section and to identify potential efficiency measures that may be implemented by Airway Heights under the state-mandated Water Use Efficiency requirements, as required by WAC 256-290-810, or as may be subsequently revised or modified in the future.

#### 8. Delivery Interruptions, Default and Rights of Termination.

- 8.1. The Spokane Water System shall be operated and maintained in a manner consistent with water system standards and Legal Requirements in order to provide reliability of service to Airway Heights. However, Airway Heights understands and agrees that Spokane can make no warranty or guarantee as to pressure, quantity, or non-interrupted service.
- 8.2. Spokane shall engage commercially reasonable standards for delivery of wholesale water pursuant to this Agreement. Airway Heights agrees that it has only a contractual right to wholesale water and it has no claim or right to a supply of water from Spokane or to its water rights upon the expiration or termination of this Agreement on any basis whatsoever.
- 8.3. Notwithstanding any other provisions of this Agreement, neither the Spokane nor Airway Heights shall be liable to the other for indirect, incidental, special, exemplary, punitive, or consequential damages, including but not limited to

damages for lost profits, revenues or benefits, loss of property use, the cost of capital, or the cost of purchased or replacement water, even if such party has been advised of the possibility or existence of such damages.

- 8.4. The Parties agree and acknowledge that Spokane shall not be liable for any losses, damages, or claims due to, caused by, relating to, or arising from events enumerated in this Section 8.4.
  - 8.4.1. Emergency

8.4.1.1. In the event that Spokane determines, in its reasonable discretion, that there is an emergency directly affecting the ability of Spokane to deliver water to Airway Heights that: (a) creates an immediate threat of bodily harm to persons; (b) causes damage to the Spokane Water System such that Spokane cannot supply the Airway Water System; or (c) is the result of a Regulatory Requirement, Spokane shall provide oral notice of the same to Airway Heights. Spokane may thereafter temporarily interrupt or reduce deliveries of water to Airway Heights if Spokane determines, in its reasonable discretion, that such interruptions and reductions are necessary or during such an emergency. Airway Heights shall assist and support Spokane to meet such an emergency condition, including, without limit, implementing emergency conservation measures as needed. Upon the occurrence of the emergency, Spokane shall take all reasonable and necessary actions to restore the delivery of water to Airway Heights. Emergencies may include, but are not limited to, failure of or accidents involving Spokane's Water System infrastructure or equipment, uncontrollable forces, unforeseen or unavoidable events, prior to the points of delivery.

8.4.1.2. In the event that Spokane determines, in its reasonable discretion, to institute a water rationing or water use restriction program as a result of water shortage due to causes beyond the reasonable control of Spokane, that necessitates water rationing or use restrictions, the Parties shall meet and confer in order to reach a reasonable accommodation. Any rationing or use restrictions shall be based on the specifics of the problem and the water distribution system and availability of the water resource. Spokane will follow its water shortage policies and protocols and its emergency planning as identified in Spokane's Comprehensive Water System Plan. Should the Parties not be able to resolve a water rationing or use restriction through the meet and confer process, then either Party may seek resolution through the Dispute Resolution Process in Section 12 herein.

8.4.2. Non-Emergency

8.4.2.1. Except in cases of emergency under Section 7.4.1, and in order that Airway Heights's operations will not be unreasonably interfered with, Spokane shall give Airway Heights thirty (30) calendar days' notice of any other interruptions or reduction in service, the reason therefore, and the probable duration thereof, including any interruptions or reduction in services that will be caused by the installation of equipment, repairs, replacements, investigations, inspections or other maintenance performed by the Spokane on its water system or those parts of the system supplying Airway Heights pursuant to this Agreement.

#### 8.4.3. Regulatory

8.4.3.1. Airway Heights understands and agrees that the operation of this Agreement, and the water available from Spokane's water rights are subject to Legal Requirements and the proceedings, litigation, orders, rulings of courts of competent jurisdiction ("Judicial Requirements") regarding the Agreement and Spokane' water rights. Airway Heights understands and agrees that Spokane must comply with all such Legal Requirements and Judicial Requirements and that such Legal Requirements and Judicial Requirements may affect, limit, diminish or remove the ability of Spokane to fulfill its wholesale water deliveries under this Agreement.

8.4.3.2. The Parties expressly acknowledge and agree that the inability or preclusion of the City of Spokane to perform, in whole or material part, this Agreement caused by an order or directive of governmental authority or a court with jurisdiction shall constitute a force majeure or change in law event hereunder.

8.4.3.3. If Spokane remains materially limited or prohibited from performance of this Agreement through Judicial or Regulatory Requirements, the water delivered to Airway Heights shall be reduced as set forth in Section 8.4.1.2.

#### 8.5. Payment and Performance Events of Default.

8.5.1. If Airway Heights fails to make any payment in full when due under this Agreement after notice for a period of thirty (30) days or more after the Due Date ("**Payment Default**"), Spokane shall make written demand upon Airway Heights to make payment within ten (10) days of the date of such written demand. If the Payment Default is not cured or the Parties fail to reach mutual agreement for payment terms within the ten (10) day time period, Airway Heights shall be deemed to be in default of this Agreement and Spokane may suspend the continued delivery of water to the Airway Heights Water System. Upon payment of amounts due by Airway Heights, Spokane shall promptly restore the delivery of water to the Airway Heights Water System.

#### 8.5.2. Events of Default; Remedies.

8.5.2.1. <u>Performance Default</u>. Upon the occurrence of any one or more of the following Events of Default which shall continue and not be cured in accordance with the notice and opportunity to cure provisions set forth in this section, a Party may, at its option, declare through written notice a "**Performance Default**" under this Agreement when:

(a) a Party fails to comply with any term or fails to perform any of its obligations under this Agreement and such failure has a material adverse effect on the operation of Spokane Water System, Airway Heights Water System or creates a material risk of injury to persons or damage to property; or

(b) a Party fails to comply with any term or fails to perform any of its obligations under this Agreement, where such failure is not within the terms of Section 8.5.1(a) above, and such failure continues for a period of fifteen (15) days after written notice ("**Cure Period**").

The written notice delivered by the non-defaulting party shall identify the alleged breach, the requested remedy and any other relevant information.

8.5.3. <u>Cure</u>. Following receipt of written notice, if a Performance Default is not reasonably susceptible of cure within the cure period provided above, but the defaulting party commences to cure such default within the applicable cure period and thereafter diligently prosecutes the cure, and completes such cure within fifteen (15) days of commencement such default shall not become an Event of Default. If the Default is not capable of cure, but the defaulting party is diligently pursuing a cure, a reasonable period shall be afforded to complete the cure not to exceed twenty (20) days.

8.5.4. <u>Remedies</u>. Upon the occurrence of any Event of Default, the nondefaulting Party may, upon forty-eight (48) hours written notice, in addition to any other rights granted under of this Agreement, but without waiving such other rights: (a) perform any and all work necessary to complete, secure and/or protect its property; (b) specifically enforce and perform the defaulting Party's unperformed obligations; and/or (c) request dispute resolution as set forth in section 12 herein to include seeking a preliminary injunction through a court with personal and subject matter jurisdiction. Amounts paid and costs and expenses incurred by a non-defaulting Party under any of this Section 8.5.4 by reason of an Event of Default of the other Party shall be reimbursed by the defaulting Party upon demand for its costs and attorney fees and shall bear interest at the rate of twelve percent (12%) per annum from the date of demand until paid.

- **9.** <u>Force Majeure</u>. Neither Airway Heights nor Spokane shall be considered to be in default in respect to any obligations hereunder if prevented from fulfilling such obligations due to conditions beyond their reasonable control including acts of God, fire, flood, earthquake, other natural disaster, acts of war, insurrection or riot, or change in the law. If a Party is unable to perform in whole or in part because of such condition, the Party shall diligently and promptly take reasonable steps to allow it to perform.
- 10. Indemnification by Spokane. To the fullest extent permitted by law, Spokane hereby releases and agrees to indemnify, defend and hold harmless each of the Airway Heights Indemnified Parties (defined below) from and against any claim, liability, loss, expense (including but not limited to attorneys' fees and expenses), damage, demand, lawsuit, cause of action, order, strict liability claim, penalty, fine, administrative law action and/or cost of every kind and character (collectively, "Claim/Liability"), arising out of or in any way incident to the design or construction of the Spokane Water System if due to the negligence, gross negligence, or intentional act or omission by Spokane, including in each case (but not limited to) any Claim/Liability on account of defective work, breach of contract, personal injuries, death, damage to property, damage to the environment, or infringement of any patent, trademark, copyright or other property right, regardless of whether such harm is to Spokane, its employees or officers, the Airway Heights Indemnified Parties, or any other person or entity. "Airway Heights Indemnified Parties" means, individually and collectively, Airway Heights, its officers, shareholders, and members of each of the foregoing entities. Notwithstanding any provision in this Agreement to the contrary, the Spokane's duties under this Section shall survive the termination, revocation, or expiration of this Agreement.
- 11. Indemnification by Airway Heights. To the fullest extent permitted by law, Airway Heights hereby releases and agrees to indemnify, defend and hold harmless each of the Spokane Indemnified Parties (defined below) from and against any Claim/Liability arising out of or in any way incident to the use by Airway Heights of the water supplied by Spokane hereunder or arising out of or in any way incident to the design or construction of the Airway Heights Water System if due to the negligence, gross negligence, or intentional act or omission by Airway Heights, including in each case (but not limited to) any Claim/Liability on account of defective work, negligence, breach of contract, personal injuries, death, damage to property, damage to the environment, or infringement of any patent, trademark, copyright or other property right, regardless of whether such harm is to Airway Heights, its members or officers, the Spokane Indemnified Parties, or any other person or entity. "Spokane Indemnified Parties" means, individually and collectively, Spokane, its elected officials, officers, employees, and agents. Notwithstanding anything in this Agreement to the contrary, Airway Heights's duties under this Section shall survive the termination, revocation, or expiration of this Agreement.
- **12.** <u>Dispute Resolution</u>. Dispute resolution shall proceed as follows:

- 12.1. The Parties agree to use their best efforts to resolve disputes arising out of or related to this Agreement using good faith negotiations by engaging in the following dispute resolution process should any such disputes arise. The Parties agree that cooperation and communication are essential to resolving issues efficiently.
- 12.2. Any disputes or questions of interpretation of this Agreement or the performance of either Party under this Agreement that may arise between Spokane and Airway Heights will be governed under the dispute resolution process set forth in this Section. Either Party may refer a dispute to the dispute resolution process by providing written notice of such referral to the other Party's Designated Representative.
- 12.3. Before either Party may refer a dispute to mediation or provide a notice of the same to the other Party, the Parties will seek to resolve the dispute at the lowest possible level by completing the following steps.
  - 12.3.1. Spokane's Director of Water and Hydroelectric Department and Airway Heights' Public Works Director, shall meet to discuss and attempt to resolve the dispute in a timely manner. If they cannot resolve the dispute within ten (10) days, then the Parties will refer the dispute to Spokane's Director of Utilities and Airway Heights' City Manager.
  - 12.3.2. Spokane's Director of Utilities and Airway Heights' City Manager will meet and confer and attempt to resolve the dispute. If they cannot resolve the dispute within fourteen (14) days, then either Party may initiate mediation.
- 12.4. Within 15 days of the completion of the steps in the above Section, each Party shall propose to the other party in writing not more than five (5) candidates to act as mediator. Within seven (7) days of exchanging lists of mediator candidates, the parties will meet and confer to choose one name from the list. If the Parties are unable to agree on a mediator 30 days after completion of the steps outlined above, then the Parties will jointly petition the Presiding Judge of the Spokane County Superior Court to appoint a mediator.
- 12.5. The Parties shall use reasonable efforts to resolve the dispute within 30 days with the assistance of the mediator.
- 12.6. Except as otherwise provided by this Agreement, the Parties shall continue to fulfill their respective duties under this Agreement pending resolution of any dispute.
- 12.7. The Parties shall share the costs of the mediator.

12.8. If mediation fails to resolve the dispute within 30 days of selection of the mediator, the Parties may thereafter seek redress in court subject to this Amendment.

#### 13. Miscellaneous Provisions.

#### 13.1. Access to Records.

13.1.1. <u>Airway Heights's Access to Spokane Records</u>. Upon reasonable prior notice to Spokane, Airway Heights, or any consultant of Airway Heights, shall be given access during normal business hours to the books, records, and accounts related to this Agreement in the possession of Spokane at the location where such books, records, and accounts are located. Spokane shall not be obligated to collate, organize, or analyze the information sought by Airway Heights or by Airway Heights's consultant.

13.1.2. <u>Spokane's Access to Airway Heights Records</u>. Upon reasonable prior notice to Airway Heights, Spokane, or any consultant of Spokane, shall be given access during normal business hours to the books, records, and accounts related to this Agreement in the possession of Airway Heights at the location where such books, records, and accounts are located. Airway Heights shall not be obligated to collate, organize, or analyze the information sought by Spokane or by Spokane's consultant.

#### 13.2. Notice.

13.2.1. All notices, requests, demands, waivers, consents and other communications required under this Agreement shall be in writing except as provided herein, and shall be delivered by the following means: (i) by certified mail, return-receipt requested, (ii) by facsimile or email providing confirmation of completed transmission, or (ii) by such other means as may be approved in writing by the Parties. Service of any such notice, request, demand, waiver, consent, or other communication, shall be deemed to have been duly given and to have become effective upon receipt.

13.2.2. Any and all notices, demands, waivers, consents and other communications shall be forwarded to each of the Parties at the following addresses:

To Spokane:	Director, City of Spokane Water Department
	914 N Foothills Dr.
	Spokane, WA 99207
	Telephone: (509) 625-7800
	Facsimile: (509) 625-7816

With a copy to:

City Attorney

Office of the City Attorney City of Spokane – City Hall 808 West Spokane Falls Boulevard Spokane, WA 99201 Telephone: (509) 625-6225 Facsimile: (509) 625-6277

To Airway Heights: City Manager 1208 S. Lundstrom St. Airway Heights, WA 99001 (509) 244-5578 atripp@cawh.org

> Public Works Director 12400 W. 21<sup>st</sup> Ave. Spokane, WA 99201 (509) 244-5429 kanderson@cawh.org

or to such other address as may be agreed to in writing by the Parties.

- 13.3. <u>Assignment</u>. Neither this Agreement nor any of the rights, interests or obligations created hereunder may be assigned, sold, or otherwise transferred in whole or in part by either Party without the prior written consent of the other Party.
- 13.4. <u>No Third Party Beneficiaries</u>. Nothing in this Agreement is intended to confer upon any person or entity, other than the Parties hereto, any rights, benefits, or obligations. No such third-party shall have any right to enforce any of the provisions of this Agreement. Unless expressly stated otherwise herein.
- 13.5. <u>Airway Heights Water System No Spokane Responsibility</u>. It is understood that Spokane does not own or have any responsibilities outside of this Agreement whatsoever to maintain Airway Heights's Water System.
- 13.6. <u>Compliance with Local, State, Federal Rule or Regulation</u>. In the event Spokane is required to comply with any local, state, or federal rule or regulation governing its operation of its water rights and said rule or regulation requires the compliance of wholesale water customers of Spokane, Airway Heights agrees to comply.
- 13.7. <u>Waiver</u>. Except as otherwise provided herein or as agreed by the Parties, no provision of this Agreement may be waived except as documented or confirmed in writing. Any waiver at any time by a Party of its rights with respect to a default under this Agreement or with any other matter arising in connection therewith shall not be deemed a waiver with respect to any subsequent default or matter. Either Party may waive any notice or agree to accept a shorter notice than

specified by this Agreement. Such waiver of notice or acceptance of shorter notice by a Party at any time regarding a notice shall not be considered a waiver with respect to any subsequent notice required by this Agreement.

- 13.8. <u>Entire Agreement</u>. This Amendment contains all prior negotiations and agreements between the Parties hereto relating to the subject matter hereof and along with OPR 1984-0475 shall constitute the entire agreement between Spokane and Airway Heights concerning the sale of wholesale water to Airway Heights for use as hereinbefore provided. The rights and obligations of the Parties hereunder shall be subject to and shall be governed by this Amendment.
- 13.9. <u>Representations and Warranties</u>. The Parties hereby represent and warrant to one another the following:

13.9.1. Each party is duly authorized and validly existing under the laws of, and is authorized to exercise its powers, rights, and privileges and is in good standing in, the State of Washington, and has full power and authority to carry on its business as presently conducted and execute this Agreement and perform the transactions on its part contemplated by this Agreement.

13.9.2. The execution, delivery and performance of this Agreement, and the consummation of the transactions contemplated hereby have been duly authorized by the appropriate board or council, and no other act or proceeding on the part of any Party is necessary to authorize this Agreement, or the transactions contemplated hereby.

13.9.3. The execution, delivery, and performance by each of the Parties of this Agreement does not: (a) contravene any law; or (b) conflict with or result in a breach of or default under any material agreement or instrument to which any Party is a party or by which it is bound.

13.9.4. There are no actions, suits, claims, or proceedings pending, or, to the best of each Party's knowledge, threatened against either Party that is likely to impair the consummation or the transactions contemplated hereby.

13.9.5. This Agreement, when executed and delivered, will constitute a valid and binding obligation of each Party, and will be enforceable against each such Party in accordance with its terms.

- 13.10. <u>Amendments</u>. No change, amendment or modification of any provision of this Agreement shall be valid unless set forth in a written Amendment to this Agreement signed by the Parties.
- 13.11. <u>Governing Law and Venue</u>. This Agreement shall be governed by and construed in accordance with the laws of the State of Washington (regardless of the laws that might otherwise govern under applicable principles of conflicts of law of

such state). The Parties (i) agree that any lawsuit, judicial action, or proceeding arising out of or relating to this Agreement must be heard in the Superior Court of the State of Washington in and for the County of Spokane, or in the United States District Court for the Eastern District of Washington, (ii) waive any objection to the venue of any such suit, action, or proceeding, and (iii) irrevocably submit to the jurisdiction of any such court in any such lawsuit or judicial action or proceeding.

- 13.12. <u>Reasonable and Good Faith Efforts</u>. Each Party will make all reasonable and good faith efforts to coordinate with the other Party to complete all reasonable and necessary improvements, to secure the Regulatory Approvals, and accomplish tasks provided for in this Agreement in a timely manner.
- 13.13. <u>Severability</u>. If any term or other provision of this Agreement is invalid, illegal, or incapable of being enforced, all other terms or provisions of the Agreement shall nevertheless remain in full force and effect so long as the economic or legal substance of the transactions contemplated hereunder is not affected in any manner or materially adverse to any Party. Upon such determination that any term or other provision is invalid, illegal, or incapable of being enforced, the Parties shall negotiate in good faith to modify this Agreement so as to effect the original intent of the Parties as closely as possible in an acceptable manner in order that the transactions contemplated hereunder are consummated as originally contemplated and to the greatest extent possible.
- 13.14. <u>Rights and Remedies Cumulative</u>. The rights and remedies available under this Agreement or otherwise available shall be cumulative of all other rights and remedies and may be exercised successively.
- 13.15. <u>Counterparts</u>. This Agreement may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

IN WITNESS WHEREOF, the Parties have duly executed this Agreement on the last date written below ("Effective Date").

DATED:

CITY OF SPOKANE

JA. Cm By:

Title: MANOR

ATTEST:

City Clerk

4/12/18

City Clerk City of Spokane

DATED:

APPROVED AS TO LEGAL FORM:

City Attorney City of Spokane



DATED:

4-24-18

# CITY OF AIRWAY HEIGHTS

By:

Albert Tripp, City Manager

APPROVED AS TO LEGAL FORM:

1 City Attorney

City of Airway Heights

ATTEST:

arelle City Clerk

City of Airway Heights 4-24-18

DATED:

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## EXHIBIT A Depiction of Points of Connection





EXHBIT 'A-1'

SPOKANE Agenda Sheet	for City Council Meeting of:	Date Rec'd	9/28/2022
10/10/2022		Clerk's File #	OPR 1984-0475
		Renews #	
Submitting Dept	PUBLIC WORKS	Cross Ref #	
Contact Name/Phone	MARLENE FEIST 625-6505	Project #	
Contact E-Mail	MFEIST@SPOKANECITY.ORG	Bid #	
Agenda Item Type	Contract Item	Requisition #	
Agenda Item Name	4100 - AIRWAY HEIGHTS WATER SUPP	LY AGREEMENT	

## Agenda Wording

Agreement with Airway Heights to provide for additional short-term supplemental emergency water supply and water modeling/analysis.

## Summary (Background)

On April 12, 2018, the City approved an agreement to provide the City of Airway Heights with additional shortterm supplemental emergency water. This amendment extends this agreement to June 15, 2026, and provides for increased collaboration as well as reimbursement to the city for water modeling and analysis in relation to Airway Heights water infrastructure analysis.

Lease? NO Gi	rant related? NO	Public Works? NO	
Fiscal Impact		Budget Account	
Revenue \$ 87,884.72		<b>#</b> 0	
Expense \$ 87,884.72		<b>#</b> 0	
Select \$		#	
Select \$		#	
Approvals		<b>Council Notification</b>	<u>s</u>
Dept Head	MILLER, KATHERINE E	Study Session\Other	PIES 9/26
Division Director	MILLER, KATHERINE E	Council Sponsor	Beggs/Bingle
Finance	ALBIN-MOORE, ANGELA	<b>Distribution List</b>	
Legal	HARRINGTON,	publicworksaccounting@sp	ookanecity.org
	MARGARET		
For the Mayor	PERKINS, JOHNNIE	mfeist@spokanecity.org	
Additional Approvals	5	eschoedel@spokanecity.or	g
Purchasing		eraea@spokanecity.org	
		bpatrick@spokanecity.org	
		Approved by Spokane City	/ Council
		on: 10/10/2022	

Jeni Stefete

City Clerk

# **Committee Agenda Sheet**

# Public Infrastructure, Environment & Sustainability (PIES)

Submitting Department	Public Works Division		
Contact Name & Phone	Marlene Feist (509) 625-6505		
Contact Email	mfeist@spokanecity.org		
Council Sponsor(s)	Council Member Kinnear		
Select Agenda Item Type	Consent Discussion Time Requested: 10 mins		
Agenda Item Name	2022 Amendment to Airway Heights Emergency Water Agreement		
Summary (Background)	City of Spokane has been providing emergency water service to Airway Heights due to contamination in Airway Heights groundwater source for drinking water since the contamination was discovered in 2017.		
	On April 12, 2018, the City approved an agreement to provide the City of Airway Heights (AH) with additional short-term supplemental emergency water in the amount of 1,400 gpm. The agreement included a two-year initial term with 3 one-year extensions.		
	Water overall is limited in the two water pressure zones (SIA & West Plains) that serve AH at this time. Delivery of additional water is possible in the future with the completion of infrastructure improvements. Airway Heights has interest in additional water from Spokane, at least until they are able to develop a long-term or permanent solution for water supply.		
	<ul> <li>The City and Airway Heights have reached consensus on an update to our agreement. The update would:</li> <li>Extend the current emergency provisions previously negotiated.</li> <li>Include the last year of the 3 one-year extensions of the original agreement and an additional 3-year term.</li> <li>Provide for close collaboration and cooperation for the life of the agreement.</li> <li>Provide for Airway Heights' support for efforts to gain grants or loans for the West Plains booster station.</li> <li>Provides for Airway Heights to contribute \$87,884.72 for flow modeling, concept designs and cost estimates associated with Spokane's ability to provide continued and increased water supply to Airway Heights.</li> <li>Commits Spokane to evaluate future funding, capacity and water rates.</li> </ul>		
Proposed Council Action & Date:	Approve an amendment & extension of the Spokane-Airway Heights water supply agreement in October 2022.		
Fiscal Impact: Total Cost: Approved in current year budg Funding Source One-til Specify funding source:	et? Yes No N/A		

Expense Occurrence One-time Recurring
Other budget impacts: (revenue generating, match requirements, etc.)
Operations Impacts
What impacts would the proposal have on historically excluded communities?
Public Works services and projects are designed to serve all citizens and businesses. We strive to offer a consistent level of service to all, to distribute public investment throughout the community, and to respond to gaps in services identified in various City plans. We recognize the need to maintain affordability and predictability for utility customers. And we are committed to delivering work that is both financially and environmentally responsible. This item supports the operations of Public Works.
How will data be collected, analyzed, and reported concerning the effect of the program/policy by racial, ethnic, gender identity, national origin, income level, disability, sexual orientation, or other existing disparities?
N/A – This work is designed to manage costs and continue service delivery in support of all citizens and taxpayers. It will not impact racial, gender identity, national origin, income level, disability, sexual orientation or other existing disparity factors.
How will data be collected regarding the effectiveness of this program, policy or product to ensure it is the right solution?
Public Works follows the City's established procurement and public works bidding regulations and policies to bring items forward, and then uses contract management best practices to ensure desired outcomes and regulatory compliance.
Describe how this proposal aligns with current City Policies, including the Comprehensive Plan, Sustainability Action Plan, Capital Improvement Program, Neighborhood Master Plans, Council Resolutions, and others?
This work is consistent with annual budget strategies to limit costs and approved projects in the 6- year CIP.

City Clerk's No. OPR 1984-0475



# <u>City of Spokane</u> #3 of 3 Extension of the Amended Water Supply Agreement between City of Spokane and City of Airway Heights & 1<sup>st</sup> Amendment to the Amended Water Supply Agreement between City of Spokane and City of Airway Heights

This Extension of the Amended Water Supply Agreement between Spokane and Airway Heights and Emergency Water Service Agreement ("Extension") and 1st Amendment of the Amended Water Supply Agreement between Spokane and Airway Heights and Emergency Water Service Agreement ("1st Amendment") is made and entered into by and between the **City of Spokane** ("City" or "Spokane"), a Washington municipal corporation, and **City of Airway Heights**, whose address is 1208 South Lundstrom, Airway Heights, Washington 99001 ("Airway Heights") (collectively referred to as the "Parties").

WHEREAS, the parties entered into an Amended Water Supply Agreement and Emergency Water Service Agreement ("Agreement") on April 12, 2018, wherein the City agreed to provide to Airway Heights additional short term supplemental emergency water in the amount of approximately 1,400 gpm for a period of two (2) years from the initial date of emergency water service; and

WHEREAS, paragraph 5.2.1 of the Agreement provides for the Parties to agree and execute an extension extending the term for emergency supplemental water in additional one-year increments, not to exceed three (3) one-year extensions, effective June 15<sup>th</sup>; and

WHEREAS, Airway Heights has requested extension of the Agreement and said Extension is the final third of 3 one-year extensions as provided for in the Agreement; and

WHEREAS, Airway Heights has requested an amendment of the Agreement to include an additional three-year extension to allow for progress towards a long-term or permanent solution for water supply ("1st Amendment"); and

WHEREAS, Airway Heights has additionally requested an increase in the additional water supplies and volume from Spokane to support its continued water usage and is willing to contribute towards the costs associated with the flow modeling needed to evaluate the impacts of the additional water requested by Airway Heights and possible timing of available water; and

WHEREAS, Airway Heights has filed an application with Washington State Department of Ecology for new water in the Spokane Rathdrum Prairie Aquifer, which remains pending, but also intends to continue to purchase a portion of water from Spokane to supplement water needs; and

WHEREAS, the U.S. Congress has authorized the Infrastructure Investment and Jobs Act to fund drinking water projects in communities with water contaminated by PFAS. Airway Heights is committed to partnering with and supporting Spokane to obtain funding for the additional water infrastructure needed to help Spokane supplement Airway Heights water needs; and
WHEREAS, Spokane is willing to extend the term of the emergency water service an additional four (4) years, through June 15, 2026, on condition that Airway Heights and Spokane are able to cooperate in good faith in short-term and long-term planning efforts related to the availability and projected need for additional supplemental supply and future supply needs beyond the term of this extension.

NOW, THEREFORE, in consideration of these terms, the parties mutually agree as follows:

#### 1. AGREEMENT DOCUMENTS.

The Agreement, dated April 12, 2018, any previous amendments, addendums and / or extensions / renewals thereto, are incorporated by reference into this document as though written in full and shall remain in full force and effect except as provided herein.

#### 2. EFFECTIVE DATE.

This Extension and 1st Amendment shall become effective immediately upon signature of all Parties.

#### 3. AMENDMENT AND ADDITIONAL TERMS.

Paragraph 5.2.1 of the Agreement shall be replaced and superseded to read as follows:

Term. Unless earlier terminated pursuant to the terms of the Agreement, as amended, Spokane shall supply water in the amount not to exceed 1,400 GPM through the Emergency Supplemental Connection through June 15, 2026. on terms and conditions agreed herein.

Paragraph 5.2.2 of the Agreement shall be replaced and superseded to read as follows:

This delivery of up to 1,400 GPM through the Emergency Supplemental Connection shall terminate and be discontinued on or before, but no later than <u>June 15, 2026</u>, unless extended by separate written agreement, executed by both Parties as provided in Paragraph 5.2.4.

Paragraph 5.2.3 of the Agreement shall be deleted and superseded as set forth in the Additional Agreed Terms Section B, set forth below.

Paragraph 5.2.4 of the Agreement shall be replaced and superseded to read as follows:

Notwithstanding the above, any future delivery of water through the Emergency Supplemental Connection beyond the <u>eight (8) years</u> provided for herein will require a separate written agreement, executed by both Parties.

#### Additional Agreed Terms (Capacity Cooperation Efforts) shall be as follows:

- A. Cooperation. To address current and longer-term water supply and service requests, Airway Heights and Spokane agree to and will work together in good faith regarding long-term planning related to Airway Heights' water supply and its requests for increased water supply in both the near and long term. Airway Heights agrees to and will proactively communicate and inform the City of Spokane as to any material changes in their planning related to use of water from Spokane, requested increased or future water demand, or other changes that would impact the use of, amount, and/or delivery of water from Spokane's water system. Spokane agrees to and will proactively communicate and inform Airway Heights as to any material changes in their planning, the status of any capital improvements in the West Plains area, the availability of additional capacity, or other changes that would impact Spokane's ability to deliver water to Airway Heights.
- B. Meetings and Status Updates. To facilitate the cooperative efforts between Spokane and Airway Heights and ensure efficient planning, the Parties agree to keep each other reasonably

informed regarding the water system planning material to this Agreement and current and potential future supply and demand from Spokane to Airway Heights, including:

- Airway Heights and Spokane agree to meet, at least bi-annually, in or around February and August of each calendar year during the term of this extension, or as reasonably soon thereafter as is possible, to discuss planning updates, the status of planned or projected capital improvements, status of water supply needs, and anticipated growth and demand projections, if any. On or about February 1 and August 1 of each calendar year during the term of this extension, Airway Heights agrees to provide Spokane a written status update on its efforts to secure alternative water supply and its projected short-term and long-term supply needs from Spokane, to the extent reasonably feasible.
- Airway Heights and Spokane engineering and operational staff agree to consult with and keep each other informed regarding planning efforts related to water use, system capacity and functionality, projected demand, and associated capital improvements and to engage in quarterly status communications regarding the same.
- 3. Upon failure of either Airway Heights or Spokane, without reasonable just cause, to comply with the communication protocols set forth above, either party may provide written notice of such alleged failure, and the Parties, acting by and through their administrator or director level staff, shall meet and confer within thirty (30) days of receipt of such notice. Failure to meaningfully communicate may result in Spokane's inability to supply any additional water to Airway Heights.
- The Parties further agree to meet and confer to develop a future agreement and/or any amendments to this Agreement at least one year in advance of expiration, or no later than June 15, 2025.
- C. Analysis/Modeling. Airway Heights agrees to fund the cost of developing the flow modelling and associated concept designs and cost estimates associated with Spokane's ability to provide continued and increased water supply to Airway Heights consistent with the proposal provided by GHD, Inc. (the "Contractor") described as "Task 6: City of Airway Heights Water Infrastructure Analysis" (the "Analysis/Modeling Study"), a copy of which is attached as <u>Exhibit</u> <u>A</u>. Airway Heights agrees to pay and contribute an amount not to exceed Eighty-Seven Thousand, Eight Hundred and Eighty-Four Dollars and Seventy-Two Cents (\$87,884,72) to complete the work identified in Task 6 shown in Exhibit A only as provided herein. Any additional analysis to evaluate Airway Heights' additional requests for water service will be funded by Airway Heights.
  - Spokane agrees to request the Contractor invoice all matters pertaining to the Analysis/Modeling Study separate from other tasks being performed by the Contractor for Spokane. Airway Heights agrees to reimburse Spokane for all invoiced amounts pertaining to the Analysis/Modeling Study within thirty (30) days of forwarded receipt of invoice from GHD, Inc. to Spokane, in an amount not to exceed \$87,884.72 in total. Failure to pay may result in Spokane's inability to supply additional water to Airway Heights.
  - Within 30 days of the Effective Date of this Extension and 1st Amendment, Spokane agrees to authorize the commencement of work associated with the aboveidentified "Task 6" and diligently proceed with the work.
  - Spokane shall provide Airway Heights with copies of all status reports associated with the work upon receipt from the Contractor and shall provide advance notice of and invite Airway Heights to participate in any project meetings with the Contractor pertaining to the work that relates to Airway Heights. Spokane will keep

Airway Heights reasonably informed regarding the status of schedule and completion of the work and anticipated and scheduled deliverables and submittal targets.

- 4. Spokane shall provide Airway Heights advance notice of and a reasonable opportunity to review and comment on drafts of any reports, memoranda, summaries, evaluations, conclusions, or recommendations, including without limitation the proposed technical memorandum, prior to finalizing. Airway Heights agrees and shall respond and provide any comments within fourteen (14) calendar days. Spokane agrees to consider comments provided by Airway Heights in good faith. Notwithstanding the above, Spokane has complete autonomy over any decisions affecting Spokane's water system.
- D. Funding Applications for West Plains Booster Station: To address current and longer-term water supply and service requests, Airway Heights agrees to partner with Spokane on efforts pertaining to the design and construction of the West Plains Booster Station and necessary appurtenances as provided herein.
  - Airway Heights agrees to provide support for Spokane's applications for grant and/or loan funds, including formal letters of support.
  - 2. If successful, the Parties further agree to work together in good faith regarding negotiating commitments and potential contributions of proportional match funding, and/or proportional loan repayment, as needed. Spokane shall meet and confer in good faith with Airway Heights regarding the scope of the Plains Booster Station project. For the avoidance of doubt, nothing in this paragraph requires financial commitment by Airway Heights, which commitment, if necessary, shall be addressed through a separate written agreement between Airway Heights and Spokane. Furthermore, should Airway Heights decide not to participate in the West Plains Booster Station, Spokane has sole discretion regarding the availability of providing long-term or additional water beyond the agreed supplemental amount.
  - In the event obtaining sufficient grant funds are unsuccessful, Airway Heights reserves the right to determine, in its sole discretion, whether to provide proportional amount of funding towards the design and construction of the West Plains Booster Station, understanding that lack of participation may impact Spokane's ability and decision to provide additional water to Airway Heights.
- E. Future Funding and Capacity: Based on outcome results of Flow Modeling Study and Fooding Applications, the Parties agree to meet and confer in good faith about the evaluation of the modelled impacts, availability of additional and continued supply, proportional costs, potential available future capacity, and rates.
  - 1. Cost of Service: Spokane Municipal Code sets the wholesale rates for delivery of water to other purveyors (the "Outside City Rate to Other Purveyors") under SMC 13.04.2014 and further provides that such rate may be modified by separate agreement, in Spokane's sole discretion. The Parties acknowledge that Spokane is currently undergoing a cost-of-service analysis for water service rates. Spokane agrees to review with its rate study consultants information pertaining to overall water service to Airway Heights. This may include any proportionate funding or grant funds as applicable. Spokane agrees to share with Airway Heights the results of the cost-of-service analysis within 60 days of finalization by Spokane.
  - Based on the results of the cost-of-service analysis, and with due consideration given to the factors outlined above and other material issues, the Parties may evaluate the possibility of any amendments to the rates charged by Spokane to Airway Heights in any future amendments or agreements. Notwithstanding the above, rate setting is a legislative function of the Spokane Gity Gouncil.

All other terms and conditions contained in Paragraph 1 shall remain in full force and effect, excepted as provided herein, by this Amendment.

IN WITNESS WHEREOF, in consideration of the terms, conditions, and covenants contained, or attached and incorporated and made a part hereof, the Parties have executed this Contract Amendment / Extension by having legally binding representatives affix their signatures below.

10/18/2022

Date

#### CITY OF AIRWAY HEIGHTS

#### CITY OF SPOKANE

By Albert Tripp

Signature

Albert Tripp

Type or Print Name

Albert Tripp

Title

Attest:

City Clerk City of Airway Heights

Approved as to form:

Michael J. Piccolo

Assistant City Attorney

Wtg\_\_\_\_\_

Starley Schwartz City Attorney City of Airway Heights

City of Spokane

Attachments that are part of this Contract Extension:

Exhibit A -GHD Scope of Work Addendum Task 6: City of Airway Heights Water Infrastructure Analysis.

U2022-027f



By Johnnie Perkins 10/20/2022

Date

Nadine Woodard Type or Print Name

Mayor of the City of Spokane Title

Attest:

Signature

Xtota

City Clerk City of Spokane

Approved as to form:



February 22, 2022

## City of Spokane Link Utilities for Water Strategy Scope of Work Addendum (Task 6)

## **Description of Work:**

GHD, Inc. (Contractor) will provide planning and engineering support to the City of Spokane (COS) for the development of Link Utilities for Water Strategy. This project's goal is to develop a plan for their Water System that will meet the demands for the next 20 years and to create a sustainable, resilient, and affordable future that is endorsed by key stakeholders. This will be done by creating resiliency within the water system while balancing levels of service; existing and future planning and development needs; anticipating growth, regulatory changes, foreseen and unforeseen risks (including climatic impacts); addressing aging infrastructure and maintenance requirements, as well as meeting community expectations and maintaining affordability of water services. The project will be delivered through the following six core tasks:

- Task 1: Project Management
- Task 2: Communications and Engagement
- Task 3: Multi-Objective Criteria Analysis
- Task 4: Link Strategy for Water Development
- Task 5: Coordination with Other Efforts and Other As-Needed Services
- Task 6: City of Airway Heights Water Infrastructure Analysis

This addendum to the scope of work focuses on Task 6.

## Addendum to Scope of Work

### Task 6: City of Airway Heights Water Infrastructure Analysis

Task 6 consists of developing concept designs and cost estimates for the City of Spokane (COS) to provide water to the City of Airway Heights (CAH) as described in this scope of work. To accomplish this task, the Contractor will perform the following work.

The COS needs to understand the capital cost to provide the CAH water service for current and future needs. The COS has two interties with the CAH, which were initially developed to provide supplemental water service to CAH's well supply system. When per-and polyfluoroalkyl substances (PFAs) contamination was discovered in the CAH wells, the COS became the sole water provider to CAH as most of the wells are contaminated and no longer available for use. CAH does use uncontaminated well water for supply during the summer to augment COS supplied water. The COS has planned capital facilities to serve growth in their service area but did not plan on providing CAH long-term water service. CAH has requested that the COS provide an estimate for the cost to develop infrastructure to supply long-term water service through 2040.

To develop these cost estimates:

- Up to three (3) Infrastructure scenarios will be identified and reviewed with the COS
- A preferred scenario will be selected using decision science or the MODA developed for the Link Utility for Water Strategy.

- The preferred scenario will be modelled using the COS's existing InfoWater model, which will be updated under a separate contractor to include project future flows.
- Cost estimates for infrastructure improvements will be developed following Association for the Advancement of Cost Engineering (AACE) Level 5 cost estimate guideline classifications. Specifically, the contractor will:
  - Model future demands and requested flow rates from CAH, using the COS's calibrated InfoWater model, to determine what capital facilities are needed. Model analysis will include extended period simulations using the existing model for a >48-hour simulation duration.
  - Propose a phased implementation plan for the capital infrastructure identified from the model results, with phasing in 5-year increments (2025, 2030, 2035, and 2040).
  - Prepare a concept level capital cost estimate based upon Association for the Advancement of Cost Engineering (AACE) Level 5 cost estimate classification for each phase. The proportional cost attributed to CAH and/or the COS also will be provided by phase.

The results of this analysis will be summarized in a short technical memorandum (TM). The TM will provide an overview of the analysis, assumptions, and results including the infrastructure needed (i.e., plan view figures showing the locations of proposed infrastructure) to provide long-term water service to CAH and the capital cost associated with this service. One Draft and one Final TM will be developed and submitted in electronic format. One set of consolidated comments will be incorporated into the final TM. To complete this work up to four (4) project management meetings will be held to gather information, review infrastructure scenarios, select a preferred alternative, review model results, and provide an overview of the proposed infrastructure, cost, and summary TM.

#### Assumptions:

- The two interties between CAH and the COS will continue to be used for water supply. The interties are in the Spokane International Airport (SIA) Pressure Zone and the West Plains Pressure Zone.
- Up to three (3) infrastructure scenarios will be identified and reviewed with the COS. Only one (1) preferred scenario will be selected and modelled.
- CAH's service area will include proposed future Urban Growth Areas (i.e., staged growth patterns into these areas), which will be provided to the Contractor.
- CAH will provide demand rates both the max day and peak hour demand rates in gpm through 2040 in 5year increments. Additional considerations (without analysis) should be noted for years beyond 2040, should be based on the UGA areas, and other known development plans that could impact demand.
- Future flows for CAH are based on current land use and development, which will be provided to Contractor by the COS based upon those developed as part of the Ongoing Future Flows Project (e.g., from HDR's 2022 Future Flows Memorandum).
- No changes to the water model will be made by the Contractor as part of this effort beyond the addition of the proposed infrastructure and adjustment to flow rates for each 5-year planning period from the Future Flow's memorandum.
- COS will provide future water demands for the InfoWater model through 2040. Future demands will be allocated for the planning period (i.e., through 2040). Future demands will be allocated into the model under the Future Flows Project, a separate contract, and the resulting model will be provided to the Contractor.
- Diurnal information for the CAH system will be provided to the Contractor within the model for analysis, including diurnal analysis for each of the desired 5-year increments of the plan.
- Capital facilities will be designed to meet the Washington State Department of Health Water System Design Manual (June 2019 current version).
- The Contractor will review the proposed capital improvements costs and suggest a method to
  proportionally distribute cost between CAH and the COS based on best engineering judgement. The

Contractor will review and discuss the recommended cost distribution with COS and CAH to reach consensus on the distribution of costs.

- AACE Class 5 concept level cost estimates will be prepared (+100% / 50%) for capital infrastructure.
   Estimates will not include evaluation of funding from outside sources. Inflation rates for the planning horizon will be provided by the COS.
- In providing opinions of construction cost, the Contractor has no control over cost or price of labor and materials; unknown or latent conditions of existing equipment or structures that may affect operation or maintenance costs; competitive bidding procedures and market conditions; time or quality of performance by operating personnel or third parties; and other economic and operational factors that may materially affect the ultimate project cost or schedule. Therefore, the Contractor makes no warranty that actual project costs, financial aspects, economic feasibility, or schedules will not vary from our analyses, projections, and/or estimates.
- Project management cost are assumed to cover three months of activity. This project will have a separate invoice that the Contractor will provide status reports and invoices on a monthly (total of three [3]) and submit a task completion package consisting of native and where possible PDF file formats.
- Up to four (4) project management meetings are included as part of this task. An agenda and meeting summary will be developed for each of the 4 project management meetings.

### **Deliverables:**

Deliverables included as part of Task 6 include:

- One draft and one final TM provided in native file format and PDF file format.
- Revised InfoWater model files with proposed infrastructure improvements.



#### **GHD - PROJECT FEE ESTIMATING SHEET**

# Project Name:<br/>Prepared by:Spokane Link Utilities: Task 6 AddendumJob Number:11224400

Client: City of Spokane

Date: August 19, 2022

	LABOR CATEGORY >	Anne Lynch Senior Technical Director 2 PM	Jennifer Price Senior Technical Director 1 PD	Tonya Redfield Senior Technical Director 3 Asst PM	Casey Raines Senior Technical Director 3 QA/QC	Admin.	Total Staff Hours	Other Direct Fees	TOTAL GHD	Santtu Winter PM	Tori Berry Technical Lead	Josh Finley Project Engineer	Brad Phelps QC	Shad Roundy QC	Ben Kampf Cost	Total Sub Hours	Total Sub Staff	Sub Markup (4%)	TOTAL Sub	TOTAL FEE
Task / Item	HOURLY RATE >	\$ 315.00	\$ 340.00	\$ 263.00	\$ 263.00	\$ 90.00				\$211.16	\$188.46	\$136.30	\$301.29	\$234.90	\$235.39					
Phase Task 6 - City of Airwa	y Heights Water Infrastructure Conce	pt Design																	[	
Review Materials/Model							0	\$0	\$0.00		16		4			20	\$4,220.52	\$168.82	\$4,389.34	\$4,389.34
Conduct Baseline Simulation a	and Identify Infrastructure Needs						0	\$0	\$0.00		16		4			20	\$4,220.52	\$168.82	\$4,389.34	\$4,389.34
Develop Infrastructure Options	3	2	1		2		5	\$33	\$1,528.50		24		8	8		40	\$8,812.56	\$352.50	\$9,165.06	\$10,693.56
Screen/Review Infrastructure	Options with the City	6		4			10	\$65	\$3,007.00	4	8	40	4			56	\$9,009.48	\$360.38	\$9,369.86	\$12,376.86
Model Infrastructure Options							0	\$0	\$0.00		40		8	4		52	\$10,888.32	\$435.53	\$11,323.85	\$11,323.85
Review Modeling Results with	the City	1			8		9	\$59	\$2,477.50	4	8		4			16	\$3,557.48	\$142.30	\$3,699.78	\$6,177.28
Prepare Cost Estimates for Inf	frastructure Improvements	1					1	\$7	\$321.50		8		4		40	52	\$12,128.44	\$485.14	\$12,613.58	\$12,935.08
Prepare Technical Memorand	um	4	1		2		7	\$46	\$2,171.50	4	24	20	4			52	\$9,298.84	\$371.95	\$9,670.79	\$11,842.29
Project Management		4	2	4		4	14	\$91	\$3,443.00	32	2	16	2			52	\$9,917.42	\$396.70	\$10,314.12	\$13,757.12
	Hours:	18.0	4.0	8.0	12.0	4.0	46			44	146	76	42	12	40	360				
PROJECT TOTALS	Cost:	\$5,670.00	\$1,360.00	\$2,104.00	\$3,156.00	\$360.00		\$299	\$12,949	\$9,291.04	\$27,515.16	\$10,358.80	\$12,654.18	\$2,818.80	\$9,415.60		\$72,053.58	\$2,882.14	\$74,935.72	\$87,884.72

2.5 Technical Memorandum Spokane Future Flows – Baseline Water Demand Forecast

# **Technical Memorandum**

To: Marcia Davis, City of Spokane From: Dan Graves and Jeff Hansen, HDR CC: Andrew Staples, HDR Date: March 1, 2022 Subject: Spokane Future Flows – Baseline Demands Analysis

# 1.0 Introduction

The City of Spokane (City) will be updating its Water System Plan (WSP) and developing its Link Spokane strategy for integrating transportation and utility infrastructure planning. As a foundational component of these long-range planning efforts, the City is updating its water demand and sewer flow forecasts.

This technical memorandum (TM) describes the baseline demand analysis, with a focus on years 2018 - 2020, which includes:

- Summary of water production volumes and trends
- Summary of water consumption volumes and trends
- Water use factors for the single family, multifamily, and commercial customer categories

The results of the analyses presented in this TM will be used to develop a water demand and sewer flow forecast in a subsequent task. The geographic scope of this task is the City's water retail service area (RSA), displayed in Figure 1.



Figure 1. City of Spokane water retail service area

# 2.0 Water Production Analysis

This section displays and describes water production trends for the City of Spokane.

The City produces water from seven wells. The City does not receive surface water or water from adjacent utilities as primary sources. Figure 2 displays the most recent 10 years of total annual production (2010 - 2020).



Figure 2. Annual water production, 2010 - 2020

There was a slight upward trend in water production from the early 2010s to 2015, and then no net increase through the late 2010s.

The City's most recent WSP update analyzed production trends through 2014. Therefore, detailed analysis of production trends for this TM begins in 2015, the subsequent year. Figure 3 displays total annual production, by source, for 2015 – 2020. The Park Water well provides the largest portion of water to the system, followed by Well Electric. The remaining wells provide water in relatively even proportions, except for Hoffman Avenue, which consistently provides the smallest annual volume of water.



Figure 3. Annual water production by source, 2015 - 2020

Figure 4 displays total monthly production from 2015 – 2020, with a horizontal line indicating the 2015 – 2020 average ADD (63.5 MGD or 1,937 million gallons per month).





Figure 4 displays a typical water use pattern where demands are low and consistent during winter months (approximately November through March). Demand begins to rise in April, with more significant increases through the summer months, peaking in either July or August. Demand then decreases in September and October to return to a winter baseline in November.

Table 1 displays the monthly data depicted in Figure 4 and includes calculations for average day production (i.e., average day demand, or ADD), maximum day production (i.e., maximum day demand, or MDD), and the peaking factor (MDD divided by ADD). MDD values were estimated based on readings taken every two to three days. The average system-wide peaking factor for 2018-2020 was 2.44.

Month	2015	2016	2017	2018	2019	2020
Jan	1,020.8	1,042.2	1,134.6	1,087.3	1,087.8	1,089.5
Feb	882.2	935.8	997.6	978.8	1,015.2	1,029.4
Mar	1,074.3	1,035.8	1,094.0	1,108.6	1,205.4	1,135.2
Apr	1,352.6	1,421.5	1,118.6	1,240.3	1,204.3	1,394.5
Мау	2,566.6	2,363.3	1,737.7	2,401.5	2,450.6	2,110.3
Jun	3,454.8	2,954.8	2,986.4	2,939.1	3,182.6	2,328.8
Jul	3,929.0	3,332.8	4,045.4	4,180.5	3,502.1	3,523.6
Aug	3,731.7	3,409.3	3,988.7	3,714.6	3,555.2	3,970.5
Sep	2,386.9	2,452.9	2,524.5	2,690.0	2,447.1	2,903.9
Oct	1,526.4	1,324.4	1,446.9	1,386.0	1,204.0	1,466.5
Nov	999.5	968.6	1,028.1	1,021.0	996.1	1,034.5
Dec	973.5	1,012.0	1,095.9	1,048.1	1,115.5	1,091.3
Total Annual Production (MG)	23,898.1	22,253.5	23,198.5	23,795.8	22,965.9	23,078.1
Average Day Production (mgd)	65.5	60.8	63.6	65.2	62.9	63.1
Max Day Production (mgd)	149.9	177.4	154.6	164.0	143.2	159.5
Max Day Peaking Factor (PF) <sup>a</sup>	2.29	2.92	2.43	2.51	2.28	2.53

Table 1. Potable Water Production Summary (MG)

Notes:

a. Peaking factors determined by dividing max day production by average day production.

The data displayed in Figure 1, Figure 2, and Table 1 indicate a generally consistent level of annual water production from 2015 – 2020.

# 3.0 Consumption Analysis

This section discusses the consumption trends of the major customer categories and describes the methodology for determining the water use factors that will be used in the water demand forecast and inform sewer flow projections.

## 3.1 Customer Categories

Water consumption is tracked in the City's billing system with 22 customer "codes," which are categorized into broader "code categories" (referred to in the remainder of this TM as "codes" and "categories," respectively). Table 2 lists the customer codes and associated categories.

Code	Abbrev.					
Commercial/Industrial						
Commercial	СО					
Irrigation, not park	IRR					
Government						
City GOVT	CI					
County GOVT	СТ					
Federal GOVT	FG					
GOVT	GV					
Library	LI					
Water Dept ROW Acct	ROW					
Schools	SC					
SEWER ONLY	SO					
Water Department	WTD					
Refuse Only	RO					
Multi Family						
Commercial & multi-f	C&MF					
Multi Family	MF					
Mobile Home Park	MHP					
Private Living Dev	PUD					
Parks Department						
Park	PA					
Single Family						
Residential	RE					
Duplex	DPX					
Misc.						
Vacant Lot	VL					
Resale						
Resale	RS					
Fire Hydrant						
Fire Hydrant	FH					

Table 2. Water consumption codes by code category

Though there are numerous categories utilized for tracking water consumption, the City of Spokane only bills at two rates: residential and commercial. All codes that fit within the single family and multifamily categories are billed at residential rates. All other codes are billed at commercial rates.

## 3.2 Consumption Profile

Figure 5 displays the total volume of metered annual consumption for 2015 – 2020. Consumption has been generally steady with a slight downward trend over the prior 5 years.





Details on annual customer code consumption were available for 2018 – 2020. Figure 6 displays the average proportion of annual water consumption from each customer category for 2018 – 2020. The "Other" category is the aggregated demands of the Misc. and Fire Hydrant customer categories. The relative proportion of consumption in the "Other" category is small enough to round to zero percent, but it is not zero consumption.



Figure 6. Average annual water consumption as a percent of total consumption by customer category, 2018 – 2020

Table 3 displays average day consumption for the customer categories. The table includes average day consumption for 2018 – 2020, as well as 2018 – 2019 to consider potential effects of the COVID-19 pandemic on customer class water consumption patterns. Minor changes are observed that do not have a significant effect on the relative proportions of customer class use on the complete billed consumption profile.

Customer Category	Average Day Consumption (MGD) 2018-2019	Average Day Consumption (MGD) 2018-2020	Difference (MGD)
Single Family	25.1	25.3	0.2
Commercial / Industrial	11.1	10.8	-0.3
Multifamily	7.3	7.3	0.0
Government	2.4	2.3	-0.1
Resale	1.8	1.9	0.1
Other <sup>a</sup>	0.0	0.0	0.0
Parks Department	1.9	1.7	-0.2
TOTAL:	49.5	49.3	-0.2

Table 3	. Average	dav	consumption	bv	customer	category
				~ _		

a. Consumption in the Other category is not 0 but is too low to round up to the tenth's decimal place.

Notes:

# 4.0 Water Use Factors

The following subsections describe the data and methodology used to develop water use factors for the single family, multifamily, and commercial customer categories. Water use factors are a way of expressing water consumption on a "per unit" basis (e.g., by household, by acre, etc.) Water use factors were not developed for the Government, Other, and Parks Department categories because they do not lend themselves to being characterized in that manner.

## 4.1 Single Family Residential

The City conducted a detailed analysis of equivalent residential unit (ERU) factors by pressure zone<sup>1</sup>. The results of the City's analysis yielded the average day demand (ERU<sub>ADD</sub>), maximum day demand (ERU<sub>MDD</sub>), and winter ERU (ERU<sub>Winter</sub>) factors for the single family category. In this context, ADD and MDD refer to the average day consumption and maximum day consumption of one typical single family household, not to be confused with the ADD and MDD production values described in Section 2.

The ERU<sub>ADD</sub> calculation methodology used by the City is as follows:

- 1. Consumption data were extracted from each meter in the single family category in the water system for 2018 to 2020.
- 2. The extracted data were assembled for each pressure zone, including:
  - $\circ$   $\;$  The number of single family residential meters for each of the 3 years.
  - o Annual consumption for residential single family meters for each of the 3 years.
  - Total consumption for all meter types for each of the 3 years.
- 3. The ERU<sub>ADD</sub> in gallons per day per meter was calculated for each pressure zone by summing the total annual consumption for single family residential meters for each year and then dividing this value by the number of single family residential meters for that year, dividing by 365 days, and multiplying by 748 to convert from water billing units in 100 cubic feet to gallons. This provides the value of the average day use for a single family residence in each pressure zone for each of the 3 years (2018, 2019, and 2020). Then the ERU<sub>ADD</sub> for each year was averaged over the 3-year period for each pressure zone.
- 4. The total number of ERUs per pressure zone was calculated by dividing the average annual consumption for all customer types including single family over the 3-year period (2018 to 2020) by 365 days and dividing by the ERU<sub>ADD</sub> (calculated in step 3 above).

To develop a City-wide average, as will ultimately be required by DOH for documentation in the City's Water System Plan, total single family residential consumption for years 2018 through 2020 was divided by the total number of single family connections billed in each respective year. The annual ERU values were averaged together to develop an ERU<sub>ADD</sub> system-wide factor of **370** gallons per household per day.

The ERU<sub>MDD</sub> calculation methodology is described as follows:

- 1. Data were extracted for single family residential meters for each month in units (in 100 cubic feet) used for each pressure zone.
- 2. The month with the maximum water consumption was determined for each pressure zone for each of the 3 years and was selected for the ERU analysis. The maximum month generally

<sup>&</sup>lt;sup>1</sup> ERU Calculation Technical Memorandum, City of Spokane, 2021

varies from July, August, or September depending on the year and the pressure zone. The maximum month may differ by pressure zone and year. Approximately half of the meters are read bi-monthly and therefore skew the maximum monthly values by giving months where fewer meters are read a greater influence on the usage. For those pressure zones, the maximum month was approximated by determining the range of months that would smooth the data to actual single month usage by utilizing a rolling average. Typically, the calculation would include a two-month time period, but some pressure zones had meters read both monthly and bimonthly and therefore had to be calculated using the maximum month averaged over the period of time that the meters were read, to best approximate maximum monthly usage. These pressure zones included Five Mile, High, Kempe, Midbank, and Northwest Terrace.

- 3. The average daily usage for the maximum month (MMADD) for each pressure zone was calculated by multiplying the water consumed by single family residents for the maximum month by 748 to convert to gallons and dividing by the number of days in the month. The MMADD represents the gallons per day (gpd) consumed for each day of the maximum month.
- 4. The maximum day demand (MDD) to MMADD ratio was calculated by using the recommended values of the 2020 DOH Water System Design Manual, Section 3.4.1 based on population. For pressure zones with populations greater than 1,000, a multiplier of 1.35 was used; 1.65 was used for smaller pressure zones. The population was estimated by multiplying the number of single family residential meters of each pressure zone by 2.5, as suggested in the DOH WSDM Section 4.2.3.
- 5. ERU<sub>MDD</sub> in gpd/unit was calculated for each of the 3 years by multiplying MMADD divided by the number of meters times the MDD/MMADD multiplier for that year. The ERU<sub>MDD</sub> of the 3 years will be averaged for the final ERU<sub>MDD</sub> for each pressure zone.
- 6. An ADD-to-MDD multiplier was calculated by dividing the  $ERU_{MDD}$  by the  $ERU_{ADD}$ .

The methodology to calculate the Winter Day Demand ERU (ERU<sub>Winter</sub>) is described as follows:

- 1. Data were extracted for single family residential meters for each month in units (in 100 cubic feet) used for each pressure zone.
- 2. The month with the lowest water consumption was determined for each pressure zone for each of the 3 years used in this analysis (2018-2020). The minimum month generally varies from January, February or March depending on the year and the pressure zone. The minimum month was approximated by calculating a moving average (or rolling average) for each two adjacent months. The minimum of the rolling averages was used as the minimum month.
- 3. The average usage for the minimum month for each pressure zone was calculated by multiplying the water consumed by single family residents for the minimum month by 748 to convert to gallons and dividing by the average number of days in the month. This MinMADD represents the gallons per day (gpd) consumed for each day of the month during the winter, or average indoor water use.
- 4. ERU<sub>Winter</sub> in gpd/unit was calculated for each of the 3 years by multiplying average minimum month divided by the number of meters and averaged for the 3 years of data.
- 5. An ADD-Winter multiplier was calculated by dividing the  $ERU_{Winter}$  by the  $ERU_{ADD}$ .

Table 4 displays the pressure zone results of the single family analyses.

Table **5** displays the multiplier water use factors used to determine the City-wide  $ERU_{MDD}$  and  $ERU_{Winter}$  values. City-wide factors were calculated as the weighted average of all the pressure zone factors, taking into account the size (in terms of demand) of each pressure zone as its "weight".

There exists a wide range of pressure zone-specific ERU values. Zones such as High, North Hill, SIA, and West Plains zones are near the systemwide average (these are also noted as larger pressure zones in the system). Pressure zones with higher-than-average ERU values include Hatch Road, Woolridge, and Southview (between two and three times the systemwide value). The Low and Intermediate zones, as well as consumption that was not allocated to a zone (described as "Uncategorized") have the lowest ERU values (303 gpd/home for both pressure zones, and 141 gpd/home for uncategorized consumption). These are the only zones with ERU values below the systemwide average, suggesting their larger sizes have a significant influence on the systemwide average relative to the other pressure zones. The high multipliers in Table 5 suggest significant increases in single family consumption in the summer compared to winter.

Pressure Zone	Total ERU (Count) ª	ERU <sub>ADD</sub> (gpd/home)	ERU <sub>MDD</sub> (gpd/home)	ERU <sub>Winter</sub> (gpd/home)
Cedar Hills	221	443	1,906	116
Eagle Ridge	459	501	2,157	132
Eagle Ridge 2	915	455	1,821	120
Five Mile	2,047	594	2,138	141
Glennaire	522	571	2,709	139
Hatch Road	198	951	4,460	161
High	9,563	368	1,203	130
Highland	862	442	1,883	126
Indian Hills	56	524	2,150	147
Intermediate	8,757	303	838	107
Kempe	885	529	1,970	123
Low	47,166	303	734	106
Midbank	573	514	1,911	128
North Hill	39,531	347	1,032	120
Northwest Terrace	1,497	487	1,739	120
Shawnee	156	603	2,277	148
SIA	5,840	419	1,661	132
Southview	43	657	3,001	166
Тор	11,811	509	1,718	127
West Plains	4,665	415	1,547	130
Woodland Heights	243	463	1,976	124
Woodridge	64	733	2,895	135
Uncategorized	828	141	754	63
CITY-WIDE FACTORS:		370 <sup>b</sup>	1,139 °	<b>119</b> <sup>d</sup>

Table 4. Single Family ERU values, by pressure zone

Notes:

a. Calculated by dividing the total consumption of the pressure zone by the ERU<sub>ADD</sub> for that same pressure zone.
b. Total single family consumption in the RSA divided by the total single family connections in the RSA, averaged for 2018 - 2020
c. Calculated by multiplying the City-wide ERU<sub>ADD</sub> by the ADD-to-MDD multiplier weighted average for all zones.
d. Calculated by multiplying the City-wide ERU<sub>ADD</sub> by the ADD-Winter multiplier weighted average for all zones.

Pressure Zone	Weight <sup>a</sup>	ADD-to-MDD Multiplier	ADD-to-Winter Multiplier	MDD-to- Winter Multiplier
Cedar Hills	0.2%	4.31	0.262	16.5
Eagle Ridge	0.7%	4.31	0.263	16.4
Eagle Ridge 2	1.5%	4.00	0.263	15.2
Five Mile	3.9%	3.60	0.238	15.1
Glennaire	0.6%	4.74	0.244	19.5
Hatch Road	0.4%	4.69	0.169	27.7
High	10.4%	3.27	0.352	9.3
Highland	0.7%	4.26	0.286	14.9
Indian Hills	0.1%	4.10	0.281	14.6
Intermediate	4.9%	2.76	0.353	7.8
Kempe	1.7%	3.72	0.232	16.0
Low	21.0%	2.42	0.350	6.9
Midbank	0.9%	3.71	0.250	14.9
North Hill	33.8%	2.98	0.347	8.6
Northwest Terrace	2.2%	3.57	0.247	14.5
Shawnee	0.4%	3.78	0.246	15.3
SIA	0.8%	3.97	0.317	12.5
Southview	0.1%	4.57	0.252	18.1
Тор	13.6%	3.37	0.250	13.5
West Plains	1.4%	3.73	0.314	11.9
Woodland Heights	0.3%	4.27	0.268	16.0
Woodridge	0.2%	3.95	0.184	21.5
Uncategorized	0.1%	5.35	0.450	11.9
WEIGHTED AVERAGE <sup>b</sup> :		3.08	0.320	10.0

Table 5. Sing	e Family EF	RU factor	multipliers
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Notes:

a. Calculated by dividing the total annual residential consumption in the pressure zone by total annual systemwide residential consumption, averaged for 2018 – 2020.

b. Calculated by summing the product of each pressure zone's residential consumption weighting by its multipliers.

2,000 1,800 1,600 Monthly Consumption (MG) 1,400 1,200 2018 1,000 2019 800 2020 600 400 200 0 Apr Aug Jan Feb Mar Mav Jun Jul Sep Oct Nov Dec

Figure 7 displays monthly consumption in the single family residential code for 2018 – 2020. There is a large increase of consumption (between 7 to 9 times) in the summer months which results in the high daily demand multipliers.

Figure 7. Monthly single family customer class consumption, 2018 - 2020

## 4.2 Multifamily Residential

This section describes the methodology used to determine the number of multifamily housing units in the RSA and the multifamily household water use factor.

The number of multi-family water service meter connections is known, but there is no definitive count of existing multifamily units in the RSA. Therefore, assumptions from local planning documents were used to estimate the number of multifamily units in the RSA. The assumptions and analytical steps are described below and summarized in Table 6, at the end of this narrative.

## 4.2.2 Step 1: Determine Baseline Multifamily Household Units

Three sets of data were used to determine the number of multifamily units, as described below. Each data set provided estimates of multifamily households, which were then averaged to determine the baseline number of multifamily household units for use in this study.

- **City of Spokane 2020 Housing Needs Analysis**. The 2020 Housing Needs Analysis estimated the number of total housing units in the City and the proportions of unit types as of mid-2020. Using these relatively newly derived values, total units in each housing type were provided, which included a category for multifamily households.
- **Building Count Summary from City GIS Data**. The number of single family dwellings was estimated using a count of single family buildings present in the RSA, using City of Spokane GIS building data (updated in November, 2021). The analysis assumes that one single family building equals one single family housing unit, and this number was then assumed to be 69% of total housing units in the RSA, consistent with the proportions described in the

Housing Needs Analysis. The number of housing units in the other categories was then estimated by applying the same distribution of unit types described in the housing needs analysis.

• **Connections Analysis**. A count of single family dwellings was estimated using the number of single family connections active in the 2020 billing data; the analysis assumes that one single family connection equals one single family housing unit. This analysis assumes 69% of housing units are single family units, consistent with the proportions described in the housing needs report. The number of units in the other categories was estimated by applying the same distribution of unit types described in the housing needs analysis.

These analyses resulted in minor differences between the total number of estimated multifamily housing units. Therefore, the number of multifamily households estimated in the three analyses were averaged together to determine the baseline number of multifamily households in the RSA. This analysis was not downscaled to pressure zones because data were neither available to determine the number of multifamily units per pressure zone, nor multifamily units per multifamily building by pressure zone.

## 4.2.3 Step 2: Determine Number of Duplex Household Units

The "SF Attached" category in the Housing Needs Analysis is described as "middle housing... includes duplexes, triplexes, and quadraplexes." Of these categories, consumption for detached duplexes is tracked in the single family category, while consumption for the remaining housing types is tracked in the multifamily category (Table 2). Therefore, all housing units counted in the SF Attached category, excluding detached duplexes, were added to the baseline multifamily household unit count.

Duplex units were individually metered in the single family category. Therefore, the total number of duplex units was estimated using the number of duplex connections with consumption tracked in the single family category in 2018 - 2020.

## 4.2.4 Step 3: Determine Total Number of Multifamily Household Units

The number of duplex units calculated in step two was subtracted from the total number of units estimated in the SF attached category. The remaining number of units were allocated to the multifamily category to determine total households billed in the multifamily category. **This results in an estimated 26,510 multifamily units, which corresponds to an average of 10.5 units per multifamily connection.** 

Housing Needs Analysis					
Units in City (mid-2020): 92,282	Units	Proportions			
SF proportion	63,675	69%			
SF Attached	8,305	9%			
Apts/Condos	19,379	21%			
Mobile/Manufactured	923	1%			
Building Count Summary in t	he Retail Ser	vice Area			
Single family Dwelling (69%)	67,802				
SF Attached (9%)	8,235				
Multi-Family Dwelling (21%)	20,908				
Mobile Home Park (1%)	1,392				
Connections A	nalysis				
SF Connections (2020) (69%)	66,288				
Mobile/Manufactured (1%)	961				
SF Attached (9%)	8,646				
MF Households (21%)	20,175				
Baseline Multifamily Households (average of three analyses) <sup>a</sup> :	20,154				
	2018	2019	2020		
Single Family Duplex Meters	2,037	2,040	2,041		
Average Number of Duplex Units:	2,039				
Units to add to Baseline Multifamily Households <sup>b</sup> :	6,365				
Total MF Households °:	26,510				
Average HH per connection:	10.5				

Table 6. Methodology and Results of Multifamily Unit Estimation

Notes

a. 20,154 is the average of the number of the Apts/Condos category from the Housing Needs Analysis, the Multi-Family Dwelling category from the Building County Summary in the Retail Service Area analysis, and the MF Households category in the Connections Analysis.

b. Average number of SF Attached households from the three methods minus the Average Number of Duplex Units.

c. Sum of Baseline Multifamily Households and Units to add to Baseline Multifamily Households.

## 4.2.5 Step 4: Determine Multifamily Water Use Factors

To determine the  $MF_{ADD}$  factor for the multifamily category, the average annual multifamily consumption from 2018 – 2020 was divided by the number of multifamily households in the RSA, then divided by the number of days in a year. This results in an average water factor of 172 gallons per day per multifamily household.

The method for determining  $ERU_{MDD}$  for the single family category was used for the multifamily category (MF<sub>MDD</sub>). To estimate number of households billed per month, the average households per connection was applied to the number of connections billed each month. The system wide MDD factor for the multifamily category is **259 gallons per household per day**.

The method for determining ERU<sub>Winter</sub> for the single family category was used for the multifamily category ( $MF_{Winter}$ ). To estimate number of households billed per month, the average households per

connection was applied to the number of connections billed each month. The system wide Winter factor for the multifamily category is **71 gallons per household per day**.

The ADD-to-MDD ratio for multifamily is approximately 1.5 which is significantly lower than the single family ADD-to-MDD ratio. This correlates with smaller parcel size per unit and less summertime irrigation usage, as confirmed in Figure 8.



Figure 8. Monthly multifamily customer class consumption, 2018 - 2020

## 4.3 Commercial

This section describes the methodology for determining commercial water use factors by pressure zone. Commercial water use factors are typically expressed as a volume of water over time per unit of space (e.g., acres or square feet).

Building codes in the RSA, were used to determine the actual parcels and associated total acreage related to commercial buildings in each pressure zones. The count of the parcels assigned to each building code in the RSA is shown in Table 7.

Table 7. R	SA Commercial	Building	Codes	and	Counts
------------	---------------	----------	-------	-----	--------

Building Code	Building Count
Building General	204
College / University	2
Commercial or Retail Facility	4,600
Education Facility	238
Federal Reserve Bank / Branch	1
Gas Station	3
Gold Course	1
Grocery Store	1

Health or Medical Facility	68
Hotel / Motel	17
House of Worship	263
Ice Arena	1
Library	1
Restaurant / Eating Establishment	2
Warehouse (Retail / Wholesale)	2
TOTAL:	5,404

Two types of commercial water use factors were developed:

#### Building Analysis: Factors based on square-footage of commercial buildings.

Buildings were allocated to pressure zones and total commercial square feet each pressure zone were calculated. Average total commercial consumption for each zone for 2018 – 2020 was calculated, excluding the irrigation portion of commercial use (i.e., only consumption used within the footprint of a building). Consumption was divided by the total commercial building square feet, then divided by the number of days in a year, to determine the commercial water use factor based on building square feet.

#### Parcel Analysis: Factors based on area of parcels on which commercial buildings exist.

The number of parcels to include was determined by selecting all parcels which intersected the commercial buildings used in the Building Analysis. The number of parcels and total parcel acreage per pressure zone were calculated. Average total commercial consumption for each zone for 2018 – 2020 was calculated, including the irrigation portion of commercial use. Consumption was divided by the total parcel acreage, then divided by the number of days in a year, to determine the commercial water use factor based on parcel acreage.

The data and results are shown in Table 8.

#### Table 8. Commercial Water Use Data and Factors by Pressure Zone

		Buildin	g Analysis		Parcel Analysis				
Pressure Zone	Building Count	Total Building Square Feet	Commercial Non-Irrigation Consumption (gal; Avg. '18 – '20)	COM <sub>ADD</sub> Factor (gal/ksq ft/day) <sup>a</sup>	Parcel Count	Total Parcel Acres	Commercial Consumption (gal; Avg. '18 – '20)	COM <sub>ADD</sub> Factor (gal/acre /day)	
Eagle Ridge	3	9,028	13,792,123 <b>4,182</b>		3	1.52	24,921,615	44,889	
Eagle Ridge 2	4	10,776	15,101,372	3,837	4	1.14	23,401,180	56,201	
Five Mile	30	79,746	10,437,093	358	34	62.78	10,921,548	476	
High	152	1,538,068	82,738,275	147	201	210.89	84,922,435	1,102	
Highland	19	248,144	36,048,613	398	24	143.85	36,048,613	686	
Intermediate	158	1,593,389	316,752,319	544	214	290.32	316,990,931	2,989	
Kempe	9	74,777	10,262,560	376	9	28.69	10,262,560	979	
Low	3,128	30,211,986	1,730,463,841	157	4,198	10,923.84	1,763,177,372	442	
Midbank	2	25,980	5,509,768	581	2	9.45	5,509,768	1,596	
North Hill	1,369	14,712,965	,712,965 878,437,237		1,658	4,132.19	879,019,181	582	

		Building	g Analysis		Parcel Analysis				
Pressure Zone	Building Count	Total Building Square Feet	Commercial Non-Irrigation Consumption (gal; Avg. '18 – '20)	COM <sub>ADD</sub> Factor (gal/ksq ft/day) <sup>a</sup>	Parcel Count	Total Parcel Acres	Commercial Consumption (gal; Avg. '18 – '20)	COM <sub>ADD</sub> Factor (gal/acre /day)	
Northwest Terrace	12	83,663	13,386,457	438	12	38.94	13,386,457	941	
SIA	268	4,672,813	348,136,404	204	292	40,137.41	348,136,404	24	
Тор	163	2,432,461	245,037,071	276	181	1,068.02	294,026,333	754	
West Plains	76	2,303,227	174,284,748	207	80	2,951.27	174,284,748	162	

Notes:

a. ksqft = 1,000 square feet

As shown, the range of COM<sub>ADD</sub> factors for the commercial category varies widely, both in the building and parcel analyses. Potential reasons for variation include:

- Different types of commercial uses require different volumes of water per unit space
- Commercial uses vary between pressure zones
- A commercial use may apply to several parcels, but only the area of the parcel on which the building resides is counted
- The magnitude of potential irrigation varies based on irrigatable areas and landscaping criteria.

Therefore, when applying water use factors for commercial growth, the type of commercial properties anticipated for development in a pressure zone will influence the COM value utilized (e.g., urban commercial growth vs. suburban commercial growth is likely to have lower and higher values, respectively).

The COM<sub>MDD</sub> was calculated similarly to single family and multifamily. Max month average day demand was determined by averaging the maximum consumption value of either July, August, or September, for years 2018 – 2020, for each pressure zone, then dividing by the number of days in the month. This value was then multiplied by 1.35, per DOH guidance on estimating maximum day demand, and in line with how this was estimated for the other pieces as well. This was divided by the total acres of commercial land in each pressure zone to determine the final COM<sub>MDD</sub>, which is displayed in Table 9. To corroborate the applicability of this method, Figure 9 displays the commercial consumption monthly data from 2018 - 2020. There is a clear peaking pattern during the summer.

	Building	Analysis	Parcel Analysis			
Pressure Zone	MMADD (gal; Avg. '18 - '20)	COM <sub>MDD</sub> (gal/ksqft/day)	MMADD (gal; Avg. '18 - '20)	COM <sub>MDD</sub> (gal/acre/day)		
Eagle Ridge	132,384	19,795.0	142,083	126,192		
Eagle Ridge 2	151,374	18,964.6	157,500	186,513		
Five Mile	113,394	1,919.6	113,783	2,447		
High	481,843	422.9	484,685	3,103		

Table 9. COM<sub>MDD</sub> for the commercial category, by pressure zone

Highland	190,000	1,033.7	190,000	1,783
Intermediate	1,316,423	1,115.3	1,316,556	6,122
Kempe	97,951	1,768.4	97,951	4,609
Low	8,782,493	392.4	8,807,807	1,088
Midbank	63,560	3,302.7	63,560	9,080
North Hill	4,826,194	442.8	4,826,709	1,577
Northwest Terrace	92,221	1,488.1	92,221	3,197
SIA	2,015,398	582.3	2,015,398	68
Тор	1,678,414	931.5	1,723,127	2,178
West Plains	1,189,067	697.0	1,189,067	544



Figure 9. Monthly commercial customer class consumption excluding irrigation, 2018 – 2020

 $COM_{ADD}$ -to- $COM_{MDD}$  multipliers were developed for each pressure zone. The City elected to develop these factors based on the Buildings Analysis because commercial growth is typically characterized by additional building square footage or number of employees, which can be translated into building square footage. Also, pressure zones were weighted by their individual volume of commercial nonirrigation consumption divided by the system total commercial non-irrigation consumption displayed in Table 8. Table 10 displays the  $COM_{ADD}$ -to- $COM_{MDD}$  multipliers for each pressure zone, the associated weighting, and a systemwide  $COM_{MDD}$  multiplier.

Table 10.	COMADD-to-COMMDD	and weighting	for each	pressure zone,	2018 - 2	2020

Pressure Zone	COM <sub>ADD</sub> -to- COM <sub>MDD</sub> Multiplier	Weighting
Eagle Ridge	4.7	0.4%
Eagle Ridge 2	4.9	0.4%
Five Mile	5.4	0.3%
High	2.9	2.1%

Highland	2.6	0.9%
Intermediate	2.0	8.2%
Kempe	4.7	0.3%
Low	2.5	44.6%
Midbank	5.7	0.1%
North Hill	2.7	22.6%
Northwest Terrace	3.4	0.3%
SIA	2.9	9.0%
Тор	3.4	6.3%
West Plains	3.4	4.5%
SYSTEM-WIDE	2.7	100%

# 5.0 Distribution System Leakage

As part of the State's water use efficiency (WUE) rule, water systems must report their volume of distribution system leakage (DSL). DSL represents unauthorized non-revenue water, which is typically calculated by subtracting billed consumption and authorized non-billed consumption from total production. The City provided data for production, metered consumption, estimated non-metered consumption, and estimated authorized non-revenue water (collectively called authorized consumption). The difference between production and the sum of authorized consumption is assumed to equal total DSL, which is expressed as a volume and a percent. Table 11 shows the analysis for the Spokane water system. The analysis is system-wide, as the relevant data were not available on a pressure zone scale.

	2018	2019	2020		
Production (MG)	23,795.81	22,965.94	23,078.05		
Metered Consumption (MG)	18,558.57	17,611.88	17,844.38		
Estimated Consumption (MG) <sup>b</sup>	1,736.97	1,190.59	1,445.36		
Authorized Non-Revenue (MG) <sup>c</sup>	768.09	849.79	721.68		
DSL (MG) <sup>d</sup>	2,732.19	3,313.68	3,066.63		
DSL (%) °	11.5%	14.4%	13.3%		
	13.1%				

Table 11. Spokane Water System DSL Summary, 2018 – 2020 a

Notes:

a. Data source: City of Spokane DSL calculation spreadsheets, 2018 - 2020.

b. Estimated consumption consists of hydrant permits for contractors.

c. Authorized non-revenue water are estimated uses for the City Fire Department, Street Department, Sewer Department, and Water Department.

d. DSL = Production - Metered Consumption - Estimated Consumption - Authorized Non-Revenue

e. % DSL = DSL / Production

# 6.0 Summary of Baseline Demand

Table 12 summarizes the average day, maximum day, and annual demands of the City's water system, average for 2018 – 2020.

	Ba	Baseline (Current) Water Demands								
	ADD (mgd)	MDD (mgd) <sup>a</sup>	Annual (MG)							
Metered	10.3	132.4	17 005 7							
Consumption <sup>b</sup>	49.5	132.4	17,995.7							
Single family	25.3	77 9 (PE = 3.08)	9 253 9							
Residential	20.0	11.5 (11 = 0.00)	5,200.5							
Multifamily	73	11.0 (PE = 1.5)	2 653 6							
Residential	7.0	11.0 (11 - 1.3)	2,000.0							
Commercial	10.8	29.2 (PF = 2.7)	3,933.1							
Government	2.3	5.6 (PF = 2.44)	831.0							
Parks	1 7	11(PE - 211)	63/ 8							
Department	1.7	4.1(11 - 2.44)	034:0							
Resale	1.9	4.5 (PF = 2.44)	679.4							
Other	0.0 °	0.1 (PF = 2.44)	9.9							
Estimated	4.0	4.0	1 457 6							
Consumption <sup>c</sup>	4.0	4.0	1,437.0							
Authorized Non-	21	21	770 0							
Revenue <sup>d</sup>	2.1	2.1	113:5							
DSL <sup>d</sup>	7.4	7.4	2,701.0							
Total System-wide		155.6								
Demand <sup>e</sup>	62.8	(from production data)	22 034 2							
	02.0	145.9	22,304.2							
		(by adding rows above)								

Table 12. City of Spokane baseline water Demand Summary, 2010 - 20	Table 12	2. City	of Spokane	<b>Baseline</b>	Water Demand	Summary,	2018 -	· 202
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Notes:

a. PF = peaking factor

b. Sum of all metered consumption, non-additive to the total consumption volume.

c. The ADD for the "Other" category is not 0 but is too small to round up to 0.1. This is apparent in the non-zero MDD and annual volume.

d. Peaking factors were not applied to these categories as only annual data was available (i.e., estimated consumption and authorized non-revenue) or the use does not have a peaking factor (i.e., DSL).

e. Represents the anticipated maximum day production. Total values for maximum day demand by consumption category do not add to total production because pressure zone-specific MDD values are in part the result of a calculation, recommended by the Department of Health, which estimates MDD based on Max Month ADD. Also, there may be discrepancies in metering and reporting accuracy that lead to differences between consumption-based and production-based approaches to MDD.

# 7.0 Next Steps

The baseline demands and water use factors described in this TM are integral components of the basis of planning needed to develop the range of demands the City may need to serve over the coming decades. Subsequent tasks involve:

- Developing variations of the water use factors to account for climate effects, COVID-19 effects, and conservation effects on demand.
- Developing ranges of future growth scenarios in the RSA, based on prior growth trends, projections, and land uses.
- Determining the methodology for estimating sewer flows relative to the water consumption factors.

These tasks will culminate in the development of a range of water demand and sewer flow forecasts that will serve the City's long range master planning and system capacity and reliability evaluations over the coming years.

# 2.6 Water Rights Self-Assessment Form

# Water Right Self-Assessment Form for Water System Plan

Mouse-over any link for more information. Click on any link for more detailed instructions.

Water Right Permit, Certificate, or Claim # *If water right is	WFI Source # If a source has multiple water rights, list each water right on	Qi= Instar Qa= Ar TI	Existing Wat Itaneous Flow Rat Inual Volume Allo his includes whole	ter Rights te Allowed (GPI owed (Acre-Feet esale water solo	M or CFS) t/Year) d	Current Qi = Max Insta Qa = Anr TI	Source Prod Calence antaneous Flow nual Volume Wi his includes who	luction – Mos lar Year Rate Withdraw thdrawn (Acre- olesale water sc	i <mark>t Recent</mark> in (GPM or CFS) Feet/Year) old	<u>10-Yea</u> Th	ar Forecasted (determined is includes who	Source Pro from WSP) esale water so	duction old	<u>20-Yea</u> Th	ar Forecasted S (determined his includes whole)	Source Prod from WSP) esale water sol	<u>uction</u> .d
interruptible, identify limitation in yellow section below	separate line	<u>Primary</u> <u>Qi</u> Maximum Rate Allowed	Non-Additive Qi Maximum Rate Allowed	<u>Primary</u> <u>Qa</u> Maximum Volume Allowed	Non- Additive Qa Maximum Volume Allowed	<u>Total Qi</u> Maximum Instantaneous Flow Rate Withdrawn	<u>Current</u> <u>Excess or</u> (Deficiency) <u>Qi</u>	<u>Total Qa</u> Maximum Annual Volume Withdrawn	<u>Current</u> <u>Excess or</u> (Deficiency) <u>Qa</u>	<u>Total Qi</u> Maximum Instantaneous Flow Rate in 10 Years	<u>10-Year</u> <u>Forecasted</u> <u>Excess or</u> (Deficiency) <u>Qi</u>	<u>Total Qa</u> Maximum Annual Volume in 10 Years	<u>10-Year</u> <u>Forecasted</u> <u>Excess or</u> (Deficiency) <u>Qa</u>	Total Qi Maximum Instantaneous Flow Rate in 20 Years	<u>20-Year</u> <u>Forecasted</u> <u>Excess or</u> (Deficiency) <u>Qi</u>	<u>Total Qa</u> Maximum Annual Volume in 20 Years	20-Year Forecasted Excess or (Deficiency) Qa
S 01 NEVADA ST	3199-A 504-D* 548-A*	25,000		20,000		23,905	1,095	3,830	16,170	23,730	1,270	10,180	9,820	26,820	(1,820)	11,340	8,660
S 02 WELL ELECTRIC	504-D* 548-A*	54,750		36,000		36,583	18,167	16,949	19,051	29,050	25,700	12,130	23,870	31,710	23,040	13,170	22,830
S 03 PARKWATER	548-A* 504-D*	63,000		51,240		34,198	28,802	33,406	17,834	46,620	16,380	19,580	31,660	51,730	11,270	21,520	29,720
S 04 RAY STREET	505-D 503-D 504-D* 507-D**	14,000 7,000 1,250 2,600		1,870 350 2,000 520		16,001	8,849	5,633	(893)	20,020	4,830	7,900	(3,160)	21,040	3,810	8,310	(3,570)
S 05 HOFFMAN AVE	506-D 504-D* 548-D*	11,600		1,280		5,447	6,153	1,582	(302)	8,570	3,030	3,600	(2,320)	9,280	2,320	3,890	(2,610)
S 06 GRACE AVE	728-A 503-D 504-D* 548-A*	11,000 20,000		4,080 1,000		17,005	13,995	3,866	1,214	13,420	17,580	5,640	(560)	14,530	16,470	6,090	(1,010)
S 08 CENTRAL AVE	3903-A 503-D 4503-A 728-A	7,000 7,000 7,900 9,000		11,480 350 12,640 4,760		8,830	22,070	5,558	23,672	12,960	17,940	5,440	23,790	14,030	16,870	5,880	23,350
S 10 HAVANA ***	504-D* 548-A*	244.400		1 47 570		141.000	00.121	70.004	70740	18,890	(18,890)	7,740	(7,740)	20,500	(20,500)	8,360	(8,360)
	101ALS = 1	241,100		147,570		141,969	99,131	70,824	/6,/46	173,260	67,840	72,210	75,360	189,640	51,460	78,560	69,010

PENDING WATER RIGHT APPLICATIONS: Identify any water right applications that have been submitted to Ecology.											
Application	New or Change			Quantities Requested							
Number	Application?	Date Submitted	Primary Qi	Non-Additive Qi	Primary Qa	Non-Additive Qa					
N/A											

INTERTIES: Systems receiving wholesale water complete this section. Wholesaling systems must include water sold through intertie in the current and forecasted source production columns above.															
Name of Wholesaling	Quantities Allowed		Expiration	Currently Purchased			10-Year Forecasted Purchase				20-Year Forecasted Purchase				
System Providing Water	In Contract		Date of	Current quantity purchased through intertie			Forecasted quantity purchased through intertie				Forecasted quantity purchased through intertie				
	<u>Maximum</u>	<u>Maximum</u>	Contract	<u>Maximum</u>	<b>Current</b>	<u>Maximum</u>	<u>Current</u>	<u>Maximum</u>	<b>Future Excess</b>	<u>Maximum</u>	<u>Future</u>	<u>Maximum</u>	<u>Future</u>	<u>Maximum</u>	<u>Future</u>
	<u>Qi</u>	<u>Qa</u>		Qi	Excess or	<u>Qa</u>	Excess or	Qi	or	<u>Qa</u>	Excess or	Qi	Excess or	<u>Qa</u>	Excess or
	Instantaneous	Annual		Instantaneous	(Deficiency)	Annual	(Deficiency)	10-Year	(Deficiency)	10-Year	(Deficiency)	20-Year	(Deficiency)	20-Year	(Deficiency)
	Flow Rate	Volume		Flow Rate	Qi	Volume	<u>Qa</u>	Forecast	<u>Qi</u>	Forecast	<u>Qa</u>	Forecast	Qi	Forecast	<u>Qa</u>
1 - N/A; City of Spokane															
does not receive wholesale															
water from any other															
entities															
2															
3															
TOTALS =															

<b>INTERRUPTIBLE WATER RIGHTS:</b> Identify limitations on any water rights listed above that are interruptible.								
Water Right #	Conditions of Interruption	Time Period of Interruption						
1 – none								
2								

# 2.7 Technical Memorandum Spokane Future Flows – Planning Data and Demand Forecast
# **Technical Memorandum**

To: Marcia Davis, PE (City of Spokane) From: Dan Graves and Jeff Hansen, PE (HDR) CC: Andrew Staples, PE (HDR) Date: August 22, 2022 Subject: Spokane Future Flows – Baseline Water Demand Forecast (Final)

### 1.0 Introduction

The City of Spokane (City) will be updating its Water System Plan (WSP) and developing its Link Spokane strategy for integrating transportation and utility infrastructure planning. As a foundational component of these long-range planning efforts, the City is updating its water demand and sewer flow forecasts.

This technical memorandum (TM) describes the future growth analysis and baseline water demand forecast, which includes:

- Summary of available data to forecast future growth
- Summary of methodology used to develop future growth forecasts for the customer categories described in the Baseline Demands Analysis TM (March 1, 2022)
- Baseline water demand forecast

The results of the analyses presented in this TM will be used to develop a range of water demand and sewer flow forecasts in a subsequent task.

### 2.0 Planning Data

HDR and City staff in the long-range planning department met on Oct. 28, 2021, to discuss available data and establish future growth assumptions.

The City identified several planning data resources with which to develop the growth forecasts. The sources provided, and a brief description of each, are as follows:

- Spokane Regional Transportation Council (SRTC) 2019 Land Use Update Summary
  - Estimates of single family and multifamily households, and number of employees in various commercial sectors, by Traffic Analysis Zone (TAZ). Base values were provided for 2019 and forecasts provided for 2045.
- Office of Financial Management, County, and Census reported population data
  - County estimates for 2017 and forecasts for 2037, adopted by Resolution 15-0553 in Nov. 2015
  - o Census estimates for 2020, published in August 2021
  - Office of Financial Management population estimates are preliminary numbers for April 1, 2021, which were published in October 2021

- City of Spokane 2015 Land Quantity Analysis Results and Methodology
  - This report provides estimates of the amount of land available in the City of Spokane and the capacity of that land to support residential and non-residential growth. The City used the methodology developed by the State Department of Commerce in preparing this analysis.
- City of Spokane Housing Action Plan, 2021
  - This report intends to "promote greater housing diversity, affordability, and access to opportunity for residents of all income levels in Spokane." It was developed through the guidance of a working group which included "community members, community group representatives, local builders and real estate professionals, local religious groups/faithbased organizations, and local and regional agency partners." The plan includes data about the proportions of housing types, number of housing units, changes in population and housing units during the 2010s decade, and other statistics related to housing demographics and income levels.
- Spokane Regional Transportation Council US 195/I90 Transportation Study, September 2021
  - This study was completed to address existing and future challenges related to safety, traffic operations, multimodal access, increasing traffic levels, and limited pedestrian, bicycle, and transit infrastructure in the study area (approximately 19 square miles bounded by I-90 to the north, S. Grove Road to the west, Hatch Road to the south, and the Division Street interchange to the east). As part of the study, an existing condition report as of March 2021 that included land use and zoning was developed, as well as forecast land uses using the TAZ data. Additional data were developed for employment forecasts based on planned and under-construction projects in the study area.

Additionally, the City provided several planning documents related to the Hillyard redevelopment area.

### 3.0 Growth Forecasts

This section describes the methodology used to determine growth forecasts, utilizing the data noted above.

#### 3.1 TAZ Data Methodology

The water demand forecast is being developed at the pressure zone and TAZ scale. The SRTC TAZ data provides the most granular growth data available which can be allocated to pressure zones. Therefore, the TAZ data were used to develop the baseline growth forecasts, with the remaining sources of information used to corroborate the TAZ-based results.

The demographic data categories reflected in the TAZ data are described in Table 1.

Code	Туре	Unit of Measure	Description
LU1	Population	Housing units	Single-family, duplex, triplex, manufactured or mobile home
LU2	Population	Housing units	Four our more residential units on a single parcel
LU3	Other	Rooms/campsites	Hotel, motel, or campsite
LU4	Employment	Employees	Agriculture, forestry, mining, industrial, manufacturing, wholesale
LU5	Employment	Employees	Retail trade (non-CBD)
LU6	Employment	Employees	Services and offices
LU7	Employment	Employees	Finance, insurance and real estate services (FIRES)
LU8	Employment	Employees	Medical
LU9	Employment	Employees	Retail trade (CBD)
LU10	Other	Students	College and university commuter students
LU11	Employment	Employees	Education employees (K–12)
LU12	Employment	Employees	Education employees (college and university)

#### Table 1. TAZ data categories

LU1 was assumed to measure single family housing units and detached duplex units. As described in the Baseline Demands Analysis TM, detached duplex units are individually metered and are therefore counted alongside single family units in the consumption and demographic data. It is noted that the LU1 category also includes triplex households, which typically would be considered part of the multifamily category. However, there is no way to discern how many of the housing units are triplex versus other, and so for the purposes of this analysis, all households in LU1 are assumed to fall within the single family demand category. LU2 was assumed to measure multifamily housing units. The remaining codes generally measure commercial growth.

#### 3.2 Baseline Demographics

Using GIS spatial data for TAZs, the retail service area (RSA), and the water system pressure zones, TAZs that intersect the RSA were isolated and the pressure zones they intersected were determined. This resulted in two categories of TAZs: those that intersect a single pressure zone (i.e., the TAZ is fully within a pressure zone or intersects a single pressure zone and areas outside the RSA), and those that intersect multiple pressure zones. Of the 310 TAZs that intersect the RSA, 203 TAZs intersected a single pressure zone and 107 TAZs intersected multiple pressure zones. Each category comprised approximately 7.9 square miles of TAZ area (i.e., even proportion of RSA area). Maps of each pressure zone and the TAZs that intersect are displayed in Appendix A

The estimated growth for TAZs fully within a single pressure zone was allocated entirely to that pressure zone. Those TAZs which intersected multiple pressure zones required a method to determine how much of the growth should be allocated to the pressure zones they are associated with. Therefore, they were further separated into two sub-categories: TAZs with 75% or more of its area within a single pressure zone, and TAZs with no portion greater than 75% in a single pressure zone.

Those TAZs with 75% or greater of their area in a single pressure zone had all their growth allocated to that same pressure zone. 75% was chosen as the break point after a visual inspection of multipressure zone TAZs, and 75% was chosen to approximate those TAZs where only relatively small portions were intersecting other pressure zones (sometimes as much as only a few square feet; likely an artifact of minor differences in the spatial dataset). For those TAZs where the area was no greater than 75% in a single pressure zone, a TAZ-by-TAZ inspection was performed to determine how to allocate the growth. Most TAZs in this category were given a proportionate allocation (i.e., growth distributed to pressure zones based on percent of the TAZs area in those zones) except TAZs 105, 184, 216, 344, and 528 which had their growth allocated to a single zone based on the TAZ's development geography.

The allocations described above were applied to the demographics in each TAZ, resulting in base year demographic allocations to each pressure zone. Upon initial review of this technical memorandum, the City's Long Range Planning Department provided comments on the demographic allocations and recommendations for refinement. Key adjustments to base year (2019) values included:

- Shifting LU2 (multifamily) units from Shawnee and Indian Hills zones to the North Hill zone.
- Elimination of LU2 (multifamily) units from Woodridge, Northwest Terrace, Five Mile, Eagle Ridge, Eagle Ridge 2, Cedar Hills, and Southview zones.
- All commercial demographic units from the Hatch Road zone were reallocated to the Low zone.
- LU4 (forestry/industrial) and LU8 (medical) demographic units were transferred from Eagle Ridge and Cedar Hills zones to the Low zone.

HDR conducted additional visual inspection to confirm the planning department's suggestions and updated the demographic allocations accordingly (see Appendix B for additional details).

#### 3.3 Demographic Growth

The City provided GIS data for expanded pressure zones that represent the anticipated extent of the City's water utility pressure zones by year 2045 (the long-range growth horizon associated with the TAZ data). These pressure zones boundaries were further expanded to include the City of Spokane Urban Growth Area (UGA) where consistent with the extent of the City's long-range service area as defined in the Spokane County Coordinated Water System Plan (CWSP). Therefore, some UGA areas were not included in the 2045 water service planning area because they do not overlap with the City's CWSP boundary. Maps of each expanded pressure zone and the TAZs they intersect are displayed in Appendix C. A map of the 2045 water service planning area (i.e., all the expanded pressure zones combined) is displayed in Figure 1.



Figure 1. City of Spokane 2045 water service planning area

The analysis described in Section 3.2 was re-run using the expanded pressure zone boundaries within the 2045 water service planning area to determine the total anticipated demographic allocations in 2045. 103 of the TAZs that intersected the 2045 water service planning area also had portions that did not intersect, suggesting that some growth associated with the TAZ should be excluded from the analysis. Therefore, the growth analysis was run where growth in these TAZs was reduced to the proportion of the land area that intersected the pressure zone(s). A detailed step-by-step description of this analysis is provided in Appendix D, steps 1 through 3.

The results of the analysis were reviewed by the City's Long Range Planning Department. Staff provided several comments to further refine the results to present a more realistic profile of how growth is anticipated. Of the 22 pressure zones, nine had refinements. Some key refinements included reallocation of multifamily unit growth in the Cedar Hill and Eagle Ridge zones into the Low zone. The same reallocation was conducted for multifamily growth from Indian Hills and Shawnee zones into the North Hill zone. Additionally, single family home growth in Indian Hills beyond the three available remaining homesites was reallocated to the North Hill zone (nine total). The Southview zone is considered built out and all growth was eliminated from that zone. Comments from the City Long Range Planning department and specific responses are in Appendix B.

Table 2 displays the demographic allocations by pressure zone for 2019 (base year) and 2045 (final forecast year). The difference between the base year and final forecast year values is the total demographic growth anticipated for each category and pressure zone. The units of measure in each category are described in Table 1.

Pressure Zone	LU1: S Far House	Single nily eholds	LL Multif House	l2: amily eholds	LU3: Ho Motel F Camp	otel and Rooms/ osites	LL Ag./Fo Min Indu Manuf	I4: restry/ ing/ stry/ acture	LU5: Trade CE	Retail (non- 3D)	LU6: S and C	ervices offices	LU7:	FIRES	LU8: N	ledical	LU9: Trade	Retail (CBD)	LU10: ( and Col Stud	College mmuter lents	LU Educ (K·	11: cation 12)	LU Educ (Colleg Unive	12: ation ge and ersity)
	2019	2045	2019	2045	2019	2045	2019	2045	2019	2045	2019	2045	2019	2045	2019	2045	2019	2045	2019	2045	2019	2045	2019	2045
Cedar Hills	172	397	0	0	0	0	0	0	25	31	5	5	1	2	0	2	0	0	0	0	0	12	0	0
Eagle Ridge	954	1,304	0	0	0	0	0	0	49	59	20	20	6	7	0	2	0	0	0	0	0	18	0	0
Eagle Ridge 2	516	978	0	0	0	0	0	0	76	89	14	15	3	5	0	3	0	0	0	0	0	24	0	0
Five Mile	2,686	3,541	0	36	0	0	126	126	181	227	104	149	12	18	4	47	0	0	8	8	126	146	0	0
Glennaire	446	453	7	8	0	0	8	8	6	6	64	66	0	0	2	3	0	0	0	0	0	3	0	0
Hatch Road	75	101	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High	7,294	7,796	1,218	1,333	0	0	233	234	1,226	1,286	403	492	126	161	294	860	0	0	9	12	444	669	10	13
Highland	429	730	325	1,196	261	375	21	28	88	140	41	63	41	41	1	1	0	0	0	0	15	15	0	0
Indian Hills	44	47	0	0	0	0	3	3	2	8	2	10	0	1	0	12	0	0	0	0	1	1	0	0
Intermediate	3,713	3,982	2,583	2,812	251	439	189	190	650	752	1,205	1,318	130	141	10,204	12,775	0	0	1	1	280	368	6	8
Kempe	773	993	27	27	0	0	44	44	38	52	31	36	7	7	3	4	0	0	0	0	48	90	0	0
Low	19,935	21,766	12,406	15,300	3,926	4,385	17,390	18,344	12,268	13,233	20,298	23,435	6,209	6,368	6,863	11,223	7,648	7,718	19,607	24,149	1,950	2,660	4,298	5,653
Midbank	338	338	60	60	0	0	21	21	154	178	106	128	8	10	5	13	0	0	0	0	47	47	0	0
North Hill	28,918	31,374	8,708	9,768	523	667	6,645	6,857	13,276	14,541	3,960	6,487	1,702	2,534	5,526	8,179	0	0	385	517	2,044	2,543	21	30
Northwest Terrace	1,188	1,716	0	385	0	0	9	9	19	19	43	142	26	26	98	98	0	0	0	0	0	0	0	0
Shawnee	60	77	0	0	0	0	5	5	0	8	1	12	0	2	0	17	0	0	0	0	0	0	0	0
SIA	1,602	2,420	1,212	3,052	782	1,062	2,975	7,903	3,734	6,079	2,225	3,285	256	358	27	685	0	0	335	434	168	216	0	0
Southview	67	67	0	0	0	0	0	0	1	1	13	13	0	0	0	0	0	0	0	0	0	0	0	0
Тор	8,316	9,190	4,046	4,906	0	0	500	506	2,272	3,462	665	892	211	246	951	1,776	0	0	22	28	492	646	0	1
West Plains	2,882	4,113	499	822	92	133	1,770	3,488	882	2,116	4,700	4,739	29	29	88	88	0	0	227	227	185	187	7	7
Woodland Heights	92	95	61	87	114	150	10	12	33	73	15	22	13	13	0	14	0	0	0	0	0	0	0	0
Woodridge	98	105	0	0	0	0	16	16	3	4	4	4	1	1	0	0	0	0	0	0	0	9	0	0

 Table 2. Demographics by pressure zone for 2019 (base year) and 2045 (final forecast year)

Note: The units of measure for each demographic category are provided in Table 1.

## 4.0 Baseline Water Demand Forecast

The raw demographic growth forecasts described above were converted to water demands using the water use factors described in the Baseline Demands Analysis TM (March 25, 2022).

### 4.1 Residential Demands

As described in the Baseline Demands Analysis TM, each pressure zone has a unique equivalent residential unit (ERU) value. Single family residential demand growth was forecast by applying the pressure zone-specific ERU factors to the estimated single family growth in that same pressure zone. The multifamily residential water use factor, also described in the Baseline Demands Analysis TM, was developed for the whole system. The multifamily factor was applied to the estimated growth in each pressure zone.

### 4.2 Commercial Demands

The water use factors described in the Baseline Demands Analysis TM characterize commercial water use on a per-acre or per-building square footage basis. As shown in Table 1, the TAZ-based data represented commercial growth by the number of employees. The SRTC US195/I90 Transportation Study identified typical space utilizations per job. A summary of those relevant to the job categories described in the TAZs is shown in Table 3. This information was used to convert the growth in number of employees to equivalent growth in commercial building area, to which water use factors were applied to develop an associated increase in demand.

Job Type	Employees per 1,000 square feet
Industrial	1.00
Office	2.86
Retail	1.67
Medical	4.00
FIRES <sup>a</sup>	5.56
Hotel	0.4
Other/Misc.	1.67

#### Table 3. Typical space utilization per employee by job type

Notes:

a. Finance, Information, and Real Estate Services

### 4.3 Other Demand Categories

Other demand categories that contribute to the forecast are estimated consumption, authorized nonrevenue consumption, and distribution system leakage (DSL). Estimated consumption represents water use for contractors that is not metered but is billed based on estimated quantity used. Authorized non-revenue consumption includes use by the fire department, streets department, sewer department, and water department. DSL is the difference between total production and authorized consumption.

The City used annual data from 2018 - 2020 to determine the proportions of estimated consumption and authorized non-revenue relative to the subtotal volume of metered consumption of the single family, multifamily, and commercial categories. These proportions are 8.1% for estimated consumption and 4.3% for authorized non-revenue. In the Baseline Demands Analysis TM, DSL was defined as 13.1% of production, or 15.0% of consumption. These consumption percentages were multiplied by the subtotal of forecasted demand growth for single family, multifamily, and commercial demands to calculate an average day demand (ADD) value for each component. These components were then added to the subtotals for single family, multifamily, and commercial to determine the total ADD forecast. No peaking factors were applied to estimated consumption, authorized non-revenue, and DSL per the methodology and assumptions in the Baseline Demands Analysis TM (see footnote d of Table 12 in the Baseline Demands Analysis TM [March 25, 2022]). Therefore, the values for these components of the ADD forecast were held constant for the MDD forecast. A detailed step-by-step description of this analysis is in Appendix D, steps 4 through 8.

#### 4.4 Results

Table 4 displays the anticipated growth in demands from 2019 to 2045, on average and maximum day bases.

Zone	Single	Family	Multi	family	Comm	nercial	Estimated C	onsumption	Authorized N	Ion-Revenue	Distribution System Leakage		TOTAL	
	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD
Cedar Hills	0.10	0.43	-	-	-	-	0.01	0.01	0.00	0.00	0.01	0.01	0.13	0.46
Eagle Ridge	0.18	0.75	-	-	0.08	0.36	0.02	0.02	0.01	0.01	0.04	0.04	0.32	1.18
Eagle Ridge 2	0.21	0.84	-	-	0.09	0.45	0.02	0.02	0.01	0.01	0.05	0.05	0.38	1.37
Five Mile	0.51	1.83	0.01	0.01	0.02	0.13	0.04	0.04	0.02	0.02	0.08	0.08	0.69	2.11
Glennaire	0.00	0.02	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
Hatch Road	0.02	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.12
High	0.18	0.60	0.02	0.03	0.05	0.15	0.02	0.02	0.01	0.01	0.04	0.04	0.33	0.85
Highland	0.13	0.57	0.15	0.23	0.02	0.05	0.02	0.02	0.01	0.01	0.05	0.05	0.38	0.92
Indian Hills	0.00	0.01	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Intermediate	0.08	0.23	0.04	0.06	0.44	0.89	0.05	0.05	0.02	0.02	0.08	0.08	0.71	1.33
Kempe	0.12	0.43	-	-	0.01	0.06	0.01	0.01	0.01	0.01	0.02	0.02	0.17	0.53
Low	0.56	1.34	0.50	0.75	0.79	1.97	0.15	0.15	0.08	0.08	0.28	0.28	2.35	4.57
Midbank	-	-	-	-	0.01	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.08
North Hill	0.85	2.53	0.18	0.27	0.49	1.32	0.12	0.12	0.07	0.07	0.23	0.23	1.94	4.54
Northwest Terrace	0.26	0.92	0.07	0.10	0.02	0.05	0.03	0.03	0.01	0.01	0.05	0.05	0.43	1.16
Shawnee	0.01	0.04	-	-	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04
SIA	0.34	1.36	0.32	0.48	1.41	4.03	0.17	0.17	0.09	0.09	0.31	0.31	2.64	6.43
Southview	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Тор	0.45	1.50	0.15	0.22	0.30	1.03	0.07	0.07	0.04	0.04	0.13	0.13	1.14	3.00
West Plains	0.51	1.90	0.06	0.08	0.51	1.72	0.09	0.09	0.05	0.05	0.16	0.16	1.38	4.01
Woodland Heights	0.00	0.01	0.00	0.01	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
Woodridge	0.01	0.02	0.00	0.00	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
TOTAL	4.52	15.45	1.49	2.24	4.24	12.29	0.83	0.83	0.44	0.44	1.54	1.54	13.06	32.79

Table 4. Estimated demand growth (in mgd) by pressure zone and customer category, 2019 (base year) – 2045 (final forecast year)

The water demand growth values in Table 4 were added to baseline year water demands in Table 5 to forecast water demands to 2045, using the average demands of each customer class in each pressure zone in 2018 – 2020 as the baseline year. A compound annual growth rate (CAGR) was developed for each customer class in each pressure zone to forecast annual ADD and MDD demands between 2019 and 2045, to determine forecasts for years between 2019 and 2045. Table 5 displays the ADD and MDD by pressure zone for 2019 (baseline year), 2022 (planning year 0), 2032 (planning year 10), 2042 (planning year 20), and 2045 (final forecast year). Table 6 displays the demand forecasts for the same planning horizons shown in Table 5 for each customer category, aggregated for the whole water system.

Systemwide, ADD is forecast to increase from 62.68 mgd to 75.74 mgd in from 2019 - 2045, representing a 21% increase in demand, assuming current water use characteristics and the forecast demographic growth described in Table 2. MDD is forecast to increase from 145.29 mgd to 178.08 mgd, representing a 23% increase. MDD has a greater overall increase because the zone-specific peaking factors described in Table 5 of the Baseline Demands TM are variable in the single family and commercial categories.

Zone	Baseline Year (2019) ª		Planning Year 0 (2022) <sup>b</sup>		Planning (203	g Year 10 32) <sup>b</sup>	Planning (204	J Year 20 ∔2) <sup>b</sup>	Final Forecast Year (2045) °		
	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD	
Cedar Hills	0.12	0.33	0.13	0.36	0.17	0.50	0.23	0.70	0.25	0.78	
Eagle Ridge	0.29	1.07	0.32	1.17	0.42	1.55	0.56	2.07	0.61	2.25	
Eagle Ridge 2	0.53	1.83	0.56	1.94	0.69	2.40	0.86	2.99	0.91	3.20	
Five Mile	1.55	4.30	1.61	4.50	1.85	5.25	2.14	6.12	2.23	6.42	
Glennaire	0.38	1.05	0.38	1.05	0.38	1.06	0.38	1.06	0.38	1.07	
Hatch Road	0.24	0.62	0.24	0.64	0.25	0.68	0.27	0.73	0.27	0.75	
High	4.48	11.49	4.52	11.59	4.64	11.91	4.77	12.24	4.81	12.35	
Highland	0.49	1.28	0.52	1.36	0.64	1.66	0.81	2.06	0.87	2.20	
Indian Hills	0.04	0.13	0.04	0.13	0.04	0.13	0.04	0.13	0.04	0.13	
Intermediate	3.38	6.88	3.45	7.01	3.71	7.49	4.00	8.03	4.09	8.21	
Kempe	0.60	1.88	0.61	1.93	0.67	2.13	0.74	2.34	0.76	2.41	
Low	18.22	37.05	18.47	37.55	19.35	39.25	20.28	41.06	20.57	41.63	
Midbank	0.38	1.10	0.38	1.11	0.38	1.13	0.39	1.17	0.39	1.18	
North Hill	17.45	40.81	17.66	41.31	18.39	43.02	19.15	44.80	19.39	45.36	
Northwest Terrace	0.93	2.54	0.97	2.65	1.12	3.06	1.30	3.54	1.36	3.70	
Shawnee	0.12	0.37	0.12	0.37	0.13	0.39	0.13	0.40	0.13	0.41	
SIA	3.11	6.97	3.31	7.45	4.14	9.47	5.31	12.33	5.75	13.41	
Southview	0.04	0.12	0.04	0.12	0.04	0.12	0.04	0.12	0.04	0.12	
Тор	7.66	18.76	7.78	19.07	8.21	20.18	8.66	21.38	8.81	21.76	
West Plains	2.47	6.08	2.58	6.39	3.02	7.68	3.62	9.44	3.84	10.08	
Woodland Heights	0.14	0.43	0.14	0.43	0.14	0.44	0.15	0.44	0.15	0.45	
Woodridge	0.06	0.20	0.06	0.20	0.06	0.21	0.07	0.22	0.07	0.22	
TOTAL	62.68	145.29	63.91	148.33	68.47	159.71	73.90	173.41	75.74	178.08	

#### Table 5. Water demand forecast by pressure zone (in mgd)

<sup>a</sup> Baseline year demand is the average annual demand observed for 2018 through 2020 (and is therefore also referred to as 2019 demand). These demand values are based on the analysis presented in the Baseline Demands Analysis TM (March 25, 2022). Slight differences in values depicted in this table and those in the Baseline Demands Analysis TM are a function of rounding during calculation of totals.

<sup>b</sup> Demands interpolated using a compound annual growth rate, by pressure zone, between the baseline year and the final forecast year.

<sup>c</sup> Baseline year demand plus demand growth described in Table 4. Year 2045 was defined as the final forecast year as that aligns with the TAZ-based demographic data used to develop demand growth.

Customer Class	Baseline Year (2019)		Planning Year 0 (2022)		Planning (20	y Year 10 32)	Planning (20	y Year 20 42)	Final Forecast Year (2045)		
	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD	ADD	MDD	
Single Family	25.32	77.66	25.76	79.13	27.36	84.56	29.22	90.96	29.84	93.11	
Multifamily	7.25	10.92	7.40	11.14	7.93	11.94	8.54	12.86	8.74	13.16	
Commercial/ Industrial	10.73	28.88	11.11	29.97	12.56	34.14	14.35	39.35	14.97	41.17	
Government	2.27	5.54	2.27	5.54	2.27	5.54	2.27	5.54	2.27	5.54	
Parks	1.74	4.24	1.74	4.24	1.74	4.24	1.74	4.24	1.74	4.24	
Resale	1.86	4.54	1.86	4.54	1.86	4.54	1.86	4.54	1.86	4.54	
Misc.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Estimated Consumption	3.98	3.98	4.06	4.06	4.35	4.35	4.69	4.69	4.81	4.81	
Authorized Non- Revenue	2.13	2.13	2.17	2.17	2.33	2.33	2.51	2.51	2.57	2.57	
DSL	7.39	7.39	7.54	7.54	8.07	8.07	8.71	8.71	8.93	8.93	
TOTAL	62.68	145.29	63.91	148.33	68.47	159.71	73.90	173.41	75.74	178.08	

Table 6. Water demand forecast by customer class (in mgd)

## 5.0 Results Comparison to Other Sources of Information

The results of the TAZ-based growth analysis were compared to the level of growth depicted in other data sources, to corroborate the validity of the results. This was done for two key elements, as described below.

### 5.1 Household and Demand Growth in Eagle Ridge

In 2021, the City and HDR prepared an analysis of capital improvements necessary to accommodate the rapid growth in the Eagle Ridge area, documented in the Eagle Ridge Water System Phasing Analysis Technical Memorandum (January 2022). The analysis was focused on hydraulic modeling and the types of capital improvements necessary to achieve regulatory compliance, which included an analysis of buildout potential and the associated increase in demands in the Eagle Ridge, Eagle Ridge 2, and Cedar Hills pressure zones. The Eagle Ridge TM included information about the anticipated number of single family houses to be developed in the future, and forecasted demands were provided in the analysis spreadsheets. Table 7 summarizes and compares these two growth forecasts.

Number o	f anticipated sin	gle family	Anticipated Additional Residential Demands					
resid	lential developm	ients	(mgd)					
Eagle Ridge	TAZ	%	Eagle Ridge	TAZ	% Difference			
Analysis ª	Analysis <sup>b</sup>	Difference	Analysis	Analysis °				
1,140	1,037	9%	0.43	0.49	14%			

Notes:

a. Includes proposed and approved but not constructed single family residential developments.

b. Includes anticipated single family residential developments in the Eagle Ridge, Eagle Ridge 2, and Cedar Hills pressure zones between 2019 and 2045.

c. Includes anticipated additional demands in the single family category for Eagle Ridge, Eagle Ridge 2, and Cedar Hills pressure zones between 2019 and 2045.

#### 5.2 Consistency with Anticipated Growth Areas

Staff in the City Planning and Development Department described several areas anticipated to be key commercial growth centers which include Hillyard redevelopment, the US 195/I90 corridor, the West Plains area, and major commercial corridors such as Division St.

The Low pressure zone is one of the largest pressure zones and contains the downtown urban core and some outlying industrial areas (see Table 2 for the baseline demographic profile of this zone). The zone includes multiple medical facilities and Gonzaga University, suggesting a large and diverse profile of commercial uses, which is reflected in Table 2. The forecast in Table 2 displays growth in each of these sectors.

The smaller Intermediate pressure zone is immediately south of the Low zone outside of the downtown core. The most significant commercial use in the Intermediate zone is a hospital, consistent with the significant Medical employee baseline and forecast growth.

The North Hill pressure zone is similar in size to the Low zone and contains a similar amount of commercial demographics but has a larger amount of residential demographics (particularly single family). The Division St. corridor and Hillyard are within the large North Hill pressure zone and the forecast suggests commercial development commensurate with these areas will occur (Table 3).

Significant development is anticipated in the airport/West Plains regions, particularly in industry and retail, which is associated with the SIA and West Plains pressure zones. This forecast new development is displayed in Figure 2, taken from the US 195/I90 Transportation study, which displays forecasted new development in the West Plains area. The data in Table 2 confirm significant commercial development in SIA and West Plains, as well as residential development, particularly in the West Plains pressure zone.





Other pressure zones that display anticipated high commercial growth include High and Top, which are large suburban pressure zones immediately south of the Intermediate zone. The suburban nature and proximity to the Spokane downtown core suggest relatively higher amounts of commercial growth are likely than further outlying pressure zones. This is reflected in the relatively low amounts of anticipated growth compared to the larger and more commercially concentrated pressure zones.

These corroboration analyses suggest that the growth forecast provided in Table 2 is generally consistent with other planning documents prepared by the City and the expectations of the City Long Range Planning Department.

### 6.0 Next Steps

The baseline water demand forecast focused on planned growth and current water use characteristics. These values serve as the basis on which a range of growth scenarios and forecasts can be developed. Subsequent tasks as part of this effort include:

- Analyze key variables that may impact future demand characteristics, including conservation, climate impacts, and changes to wholesale water deliveries
- Extend demand forecast horizon from 20 years to 50 years

- Apply variables to the baseline forecast to develop a range of forecasts
- Translate water demand forecasts into sewer flow forecasts.

## Appendix A Pressure Zone and TAZ Mapping (2019)












































# Appendix B

Long Range Planning Comments and Responses

**TO:** Marcia Davis, Principal Engineer

FROM: Maren Murphy, Assistant Planner

DATE: March 21, 2022

**RE:** Planning Services Feedback on Future Flows Technical Memos

The following is a compilation of feedback from Planning Services on the Future Flows technical memos, which was reviewed by Kevin Freibott, Maren Murphy, Tirrell Black, and Spencer Gardner.

### Responses from HDR in red.

#### **Baseline Demands Technical Memo**

- The estimation of housing units in the technical memo, though not the same as the Census, is a very close comparable. There could be some difference in how multi-unit housing is counted in SFR zones, but overall the number is within an appropriate margin of error.
  - o Good to hear. It's difficult to perfectly match every source of housing data.
- We would like some additional context around baseline demands. In Spokane, 66% of water consumption is from SF and MF. How does this compare to other cities? Is it common for cities to see most of their water use in residential?
  - In a typical large city, yes, residential demands are typically largest, unless there is a significant industrial base that is water-use intensive (e.g., food processing or data centers). For example, in Yakima (2017 WSP), SF and MF together make up approximately 50% of demands. In Pasco (2019 WSP), residential made up approximately 54% of demands.

#### Planning Data and Demand Forecast Technical Memo

- It is very encouraging that the technical memo correlated the growth data in this report with other sources to determine fidelity.
  - Great! We'll keep an eye on this if things change.
- Regarding splitting residential uses into 1-3 units, and 4+ units. We agree with this, as most of our single-, duplex, and triplex units consist of uses similar to 1, 2, or 3 single-family units, respectively.
  - Good to have this confirmed. Given the way the data is organized, it would be challenging to further segregate the housing types.
- Please clarify—which land use category includes institutional housing (i.e. residential treatment centers)? Is it in LU2 or elsewhere?
  - It isn't immediately obvious how those are counted. That is a decent assumption, but I wonder if perhaps those would be included in the "Medical" category. That way, the focus in planning is more about employment rather than the number of residents living at the facility. A few quotes from SRTC that describe LU2:

- "Triplexes, quadplexes, apartment buildings, condominiums, etc."
- LU2 four or more residential units on a single parcel
- "Group quarters, which include college and university dormitories, are not currently included in SRTC's land use data."
- Regarding Table 2, Baseline Demographics, there are several questions, including:

Note: In the first draft TM, some values in this table and Table 3 were inaccurate. There were a few double-counts due to organization errors in the Excel sheets. The following comments assume this error has been adjusted.

- There are a number of units listed in LU2 (4+ units) in the following pressure zones, where such uses don't exist: Shawnee, Woodridge, Northwest Terrace, Five Mile, Indian Hills, Eagle Ridge, Eagle Ridge 2, Cedar Hills, Southview. We understand that the conversion between TAZ and pressure zones is not perfect, however, it might be useful to correct these inherent inaccuracies when possible.
  - Based on TAZ inspection, Shawnee and Indian Hills LU2 baseline will be reallocated to North Hill, and all others will be eliminated.
- The following pressure zones show uses in LU4 through LU8, in areas those uses don't exist: Hatch Road, Eagle Ridge, Eagle Ridge 2, Cedar Hills, Southview.
  - There are, upon closer inspection, several domestic businesses located in these areas. (e.g., several investment companies, a photographer, etc.)
  - Hatch Road will be reallocated to Low; for ER and CH, LU4 (forestry, industrial) and LU8 (medical) will be reallocated to Low and the other uses will remain (retail, services, FIRES).
- The Kempe and Glennaire pressure zones have schools in them, but no other non-residential uses, even though the table lists multiple non-residential uses.
  - Google map examination suggests:
    - Glennaire has a U-Haul and elementary school, and there are several domestic businesses including farms, custom home builders and investment advisors in this area. This is consistent with the baseline demographics.
    - Kempe has several churches, a nursing home, an engineering business and an elementary school in this pressure zone. This is consistent with the baseline demographics.
- The number of uses in LU1 in the Top pressure zone seems low. We suggest further refinement if possible.
  - If this was relative to uses in other categories, the updated baseline numbers should resolve this.

- The number of uses in LU1 in the West Plains pressure zone seems low, but that could simply be a function of the lag between development and our available data. This zone might benefit from further analysis.
  - Looking at Figure 1 suggests the bulk of growth that we know of clearly (at least from the subarea planning perspective) is industrial and retail growth, which are both shown in the table. The western region of the West Plains pressure zone has no distinct development described in Figure 1.
- Regarding Table 3, Growth by Demographic Category, we noted the following:
  - The table expects minor growth in LU2 in the following pressure zones, where we don't anticipate <u>any</u> multi-family development: Shawnee, Woodridge, Indian hills, Eagle Ridge, Eagle Ridge 2, Cedar Hills, Kempe.
    - Based on TAZ inspection, Shawnee and Indian Hills growth will be reallocated to North Hill, ER and CH will be allocated to Low, and Kempe growth will be eliminated.
  - The Indian Hills pressure zone is shown growing by 16 ERUs in LU1, while only 3 home sites remain.
    - This makes sense. The large TAZ extends far beyond the pressure zone (into North Hill and Five Mile). So all the growth beyond those three will be allocated to North Hill (similar to the decision in bullet above).
  - We're not sure what the recent County proposals in SIA entail, but there are discussions about increasing residential development south of I-90. It might be worth reconsidering the LU1 vs. LU2 numbers in this pressure zone. We will continue to share information on this rapidly developing proposal.
    - We will keep our eyes open for information and inspect this pressure zone more. As of now, this will remain the same based on data we have.
  - The High pressure zone is shown growing by 715 ERUs in LU1. However, there may not be sufficient buildable land in the High pressure zone for 715 new single family uses.
    - Some of this could be allocated to the Top zone. If there's a specific buildable limit we should impose, we can allocate the remaining growth to Top.
  - The growth in LU1 and LU 2 in the Top pressure zone should probably be more in the LU2 category, given the high demand for multi-family we've seen in the last couple years. There are multiple Centers in the Top pressure zone to accept such development. We understand that this may not be significant when considering the intent of this study, but if this information is to be applied in other efforts it may become telling.
    - This is a reasonable assumption as numerous planning documents we came across describe incentives and plans to densify using LU2 category housing. However, we don't have a good information suggesting a precise reallocation of these values with the data we have. Also, we make a statement at the end of Section 5.0 that states

"These corroboration analyses suggest that the growth forecast provide in Table 3 is generally consistent with other planning documents prepared by the City and the expectations of the City Long-Term Planning Department." Therefore, for now, no change is made.

- The Southview pressure zone is built out and we wouldn't expect any development in that zone in the future.
  - Southview is in TAZ 570, which is largely shared with Glennaire but also non-RSA areas. The growth values are extremely small, so will be eliminated.
- The report references Hill Yard, which should be Hillyard throughout.
  - We will correct this throughout.
- The City is exploring policies to increase MF in more places throughout the City. Would we expect to see an overall reduction in residential water use by changing from SF to MF, or just a reallocation of water consumption from SF to MF with similar water demand outcomes?
  - Yes, there would likely be a reduction in water use, notably from the reduction of outdoor water use, but only if people currently living in SF homes move to MF homes. The more people living in MF buildings where there aren't individual yards (or if there are, they're smaller than SF), the less outdoor water will be used. This will be particularly notable during summer months during peak lawn irrigation season. But again, demands only would come down if those who have previously lived in SF either reduce lawn watering or move into MF homes.

## Appendix C Extended Pressure Zone and TAZ Mapping (2045)













































### Appendix D Process for Developing TAZ-Level Demand Growth

### **Process for Developing TAZ-Level Demand Growth**

<u>Note:</u> red text indicates a reference to a tab in the "TAZ Demand Growth 2019 – 2045\_WITH DEVELOPMENT (2022-08)" spreadsheet.

Data utilized:

- Spokane County TAZ database with demographic estimates for 2019 and 2045 (TAZrawdata)
- City GIS layer for extended pressure zone boundaries (taken to be the anticipated 2045 water service area)
- Water use factors developed during the baseline demands task (Baseline Demands Analysis Technical Memorandum, March 2022) (Factors)

### Steps:

- 1. Add TAZ and expanded pressure zone boundaries (i.e., anticipated extent of the pressure zones by year 2045) to a GIS database. Determine which TAZs intersect (i.e., overlap) the pressure zones, and the percentage of each TAZ's land area located within specific pressure zones. (TAZ\_PZext\_Intersect)
- **2.** TAZ/Pressure Zone intersections are then segregated into three categories:
  - a. 100% intersection a TAZ is entirely within the borders of a pressure zone. TAZ demographics are allocated entirely to that pressure zone. (TAZ100%intersect) See Figure 1 for an example using TAZ 189.
  - b. Greater than 75% intersect several pressure zones intersect a single TAZ, and one pressure zone overlaps with the TAZ at greater than 75% of the total TAZ area. TAZ demographics are allocated entirely to the pressure zone with greater than 75% overlap. (TAZ>75% intersect) See Figure 2 for an example using TAZ 74.
    - i. Some of these TAZs had portions outside the boundary of the expanded service area. However, because at least 75% of the TAZ land area intersected with a pressure zone, all growth was allocated to that pressure zone and the TAZ was allocated to the TAZ100%intersect category.
  - **c.** Less than 75% intersect no pressure zone intersects greater than 75% of the TAZ area. TAZ demographics were allocated proportionally to all intersecting pressure zones based on the percent of the TAZ land area they intersected. See Figure 3 for an example using TAZ 460.
    - Some of these TAZs had portions outside the boundary of the expanded service area. The proportionate allocation method accounted for this. For example, consider a TAZ intersecting two pressure zones at 50% and 40%, with the remaining 10% of the TAZ lying outside of the expanded service area boundary. The TAZ demographics would be multiplied by those proportions to allocate demographics to the two pressure zones. The remaining 10% of the demographics would not be applied to any pressure zone, effectively removing 10% of that TAZ's demographics from the total analysis.
    - ii. Some of these TAZs intersected a single pressure zone at less than 75% with the remainder of the area outside the 2045 water service planning area. Like the TAZs described in item 2.b.i, these TAZs were allocated to the TAZ100% intersect

category. After inspecting these TAZs, the City's best planning/engineering judgement suggested the full growth profile of the TAZs should be applied to the pressure zone they intersected rather than be reduced proportionally to produce a conservative estimate of demand growth.

- iii. A few exceptions to this methodology were made where spot-checks with an aerial map (i.e., inspection of current development and future developable land) suggested demographics should be allocated separately than the proportions of intersection. TAZ demographics in this category were allocated to a single pressure zone. This approach was used for TAZs 105, 184, 216, 344, 528. (TAZ<75%intersect)</li>
- **3.** Allocated TAZ 2045 demographics to pressure zones based on the intersection criteria described in Step 2.
- 4. Convert demographics into demands using water use factors (Factors):
  - a. single family household ERU values by zone
  - **b.** multifamily ERU value consistent across service area
  - **c.** commercial demands based on number of employees and employment type, consistent across pressure zones
- Water use factors applied to demographics of the three primary consumption categories (i.e., single family, multifamily, and commercial) to determine demand growth between 2019 - 2045. (TAZsinglezone; TAZ multizone)
- **6.** Estimated consumption, authorized non-revenue, and DSL estimated based on factors developed in the baseline demand analysis. (TAZsinglezone; TAZ multizone)
- **7.** TAZ multizone spreadsheet corrected to move the TAZs mentioned in item 2c to a single pressure zone. (TAZmultizone\_corrected)
- **8.** Apply peaking factors to primary consumption categories to determine maximum day demands. Demands estimated in step 6 are held constant between average and max day.
- 9. Results organized into 1. TAZ Demand Growth, 2019-2045 and 2. Multi-zone Allocations tabs.

Figures:



Figure 1: TAZ 189 intersection with High pressure zone. The TAZ is outlined in bright blue.


Figure 2: TAZ 74 intersection with the North Hill and Low zones. The TAZ is outlined in bright blue and the pressure zone boundary is in black.



Figure 3: TAZ 460 intersection with the SIA and West Plains zones. The TAZ is outlined in bright blue. The pressure zone boundaries are outlined in black. The brown/beige color are lands beyond the boundaries of the extended service area.

#### 2.8 Ecology Spokane Water System Plan Letter Final



May 10, 2023

Attn: Marcia Davis City of Spokane Water Department 808 W. Spokane Falls Spokane, WA 99201

#### Re: Spokane, City of Water System, ID # 83100, Spokane County Water System Plan; DOH Project # **23-0306**.

Dear Marcia Davis:

Thank you for the opportunity to review the above referenced Water System Plan (WSP), received on March 14, 2023. Consistent with the Memorandum of Understanding between the Department of Health (DOH) and Department of Ecology (Ecology), regarding joint review and approval of WSPs, this letter is being sent to your office with Ecology's comments. Specific elements of the WSP review included the Water Rights Self-Assessment as well as additional water rights documentation, including Ecology's water right files and previous WSPs and project reports, as applicable.

Ecology did not identify any issues of concern during review of the WSP and/or supplemental documentation.

#### Water Right Summary

- List of water rights and their respective relationships and limitations as understood by Ecology
- Total of water rights including Qi and Qa

#### Table 1. Existing Water Rights

			Instantan	eous Rate	Annual	Quantity
Water Right	Priority Date	Source	(cfs/	ˈgpm)	(ac-	ft/yr)
		vvens	Additive	Non- Additive	Additive	Non- Additive
GW 503-D	1/1/1907	Grace	34,000		1,700	
		Ray Street				
		Central				
GW 504-D	5/1/1926	Well-Electric	56,000		38,000	
		Ray Street				
GW 505-D	7/14/1937	Ray Street	14,000		1,870	
GW 506-D	7/1/1938	Hoffman	11,600		1,280	
GW 507-D	1/12/1945	Ray Street	2,600		520	
GW 548-A	8/24/1946	Parkwater	63,000		51,240	
GW 728-A	1/16/1950	Grace	20,000		8,840	
		Central				
GW 3199-A	7/2/1956	Nevada	25,000		20,000	
GW 3903-A	6/5/1959	Central	7,000		11,480	
GW 4503-A	3/3/1961	Central	7,900		12,640	
		TOTALS:	241,100		147,570	

cfs = Cubic Feet per Second; ac-ft/yr = Acre-feet per Year

#### Future Demand

• Expected Future Demand will meet 20 year growth projections

#### Service Area

If the criteria in RCW 90.03.386(2) are not met and a Water System Plan/Small Water System Management Program was approved after September 9, 2003, the place of use of this water right is the service area described in that document. If the criteria in RCW 90.03.386(2) are not met and no Water System Plan/Small Water System Management Program has been approved after September 9, 2003, the place of use reverts to the last place of use described by the Department of Ecology in a water right authorization.

If you have any questions, please contact me at <u>chad.goodwin@ecy.wa.gov</u> or (509) 342-5584.

Sincerely,

MASa

Chad Goodwin Permit Manger Water Resources Program Eastern Regional Office

CG/mw

CC: DOH EPH DW ERO ADMIN Steve Main Davis, Marcia Smits, Brenda M (DOH) Fitzgerald, Nick (DOH)

EROADMIN@DOH.WA.GOV smain@srhd.org mdavis@spokanecity.org brenda.smits@doh.wa.gov Nick.Fitzgerald@doh.wa.gov lhopkins@srhd.org Imaeder@srhd.org schesney@spokanecounty.org tmjones@spokanecounty.org lsearl@spokanecity.org

#### 3.1 First Inspection Cycle of the Well and Booster Station Assessment

## Station Condition Assessment Findings

APRIL 17, 2018

## Agenda

- Scope Development
- Flow Meter Installation
- Station Assessments
- Potential Maintenance and Capital Projects

Scope Development

### Early Project Milestones

- Project plan drafted March 2015
- Activities, team roles, evaluation criteria, ratings, data collection forms, and site visit priority order defined June September 2015
  - Planning team: Steve Burns, Eric Schaffer, Noel Storm, Jeanne Finger
- Meetings with Trindera and McKinstry held October 2015
- Station assessment "dry run" conducted March 2016
- Workflow finalized May 2016

## Flow Meter Installation

- 2015 Site Visits
- Metering Equipment
  - Water
  - Power

Station	Flow Meter	Flow Meter Functioning	Meter Location Suitable	Functional Vault for Flow Meter
Well Electric	Yes (3)	Yes	X	X
Parkwater	Yes (8)	Yes	×	×.
Hoffman Avenue	Yes ()	Yes	No	No
Ray Street	Yes (3)	Yes	×	$\times$
Grace Avenue	Yes (2)	Yes	×	×
Nevada	4es (4)	Yes	OK check	
Central Avenue	Yes (4)	No (4)	No	No
9 <sup>th</sup> & Pine	No			
Bishop Court	No			
Lincoln Heights	Yes (2)	Yes	X	$\times$
14 <sup>th</sup> & Grand	NO			
Division & Manito	No			
Garden Park	No			
35 <sup>th</sup> & Ray	No			
Glennaire	Yes (1)	Yes	X	X
Belt Street	10			

#### Flow Meter Assessment



#### Flow Meter Procurement

- 1<sup>st</sup> group: August 2015 July 2016
  - Latah, Cedar Hills, Hoffman, Nevada, Five Mile
- 2<sup>nd</sup> group: January 2016 August 2016
  - Thorpe, 9<sup>th</sup> & Pine, Bishop Ct, Division & Manito
- 3<sup>rd</sup> group: March 2016 October 2017
  - 35<sup>th</sup> & Ray, Belt Street, Shawnee, Sunset, Southview
- Final group of four: July 2016 -
  - Central, 14<sup>th</sup> & Grand, NW Terrace (Sundance & Acoma and Regency & Park View)



## **Station Assessments**

#### Assessment Milestones

- First assessment, Hoffman, completed May 2016
- Revised scope after 3 stations worth of experience, July 2016
- Standardized report content and format with Bishop Ct, November 2016
- Revised procedures based on anomalies discovered December 2016
- 28<sup>th</sup> assessment, Southview, completed December 2017

#### Assessment Workflow

- Schedule with Foremen
- Collect station data, prepopulate forms
- Work with Avista to power off (well stations only)

## Planning

## Site Visit

- Conduct field inspections of pumps, motors, and other station equipment, interview staff, review maintenance records
- Run test of each pump
- Document pump test, well drawdown, ratings, and interviews on forms

- Complete consequence of failure evaluations \*
- Calculate pump efficiency, cost, yield calculations, station scores from ratings
- Summarize rankings and recommendations
- Populate list of Potential Capital and Maintenance Needs Projects

Reporting

\* Not completed





## **Power meter faces**



# Pump or structure conditions





## Motor & pump nameplates

# Verify elevations



		/
Pump Station Assessment Project		Condition Rating Sheet
Directions: Conduct visual inspections, Interviews with mechanics, and reviews of records as needed to ex-	slaste equipment condition. Mar	k a rating for each component in all
assessment areas - Usage, Reliability, Maintainability/Repair Time, Physical Condition, Sarety. Describe on Pump Station Name:	neral Building Condition and lenge Date Evalue	rovements. And: 12/08/2016
		- Putter
	1	ty Racing 5
Safety Concern		
Inter locks on medium and low voltage switch gear and transformers $N/A$	All Present	One or More Not Present
Ladder/stairs SWEELE (USt	At Least One Western	Not Present
Crane conditions N/A	Functioning	Not Functioning
Doors where there is medium voltage gear	All Present	One or More Not Present
Clearance on electrical equipment	2 minimum clearance 🗸	< minimum clearance
Ing is growing (noise torensomer cabinet-poble Cast rouple & yours.	blyneed to take	(cad blower to poisson
Fransformer mining power - Kappy	problem, and	will-marked
hot designed like this today. Necessa	uy to have Avis	t <del>e shul</del> take off-line
when need to work on primp	·	

Cont hokup Waldo here

## **Example Field Notes**

Page 5 of 6

## **Example Pump Test Notes**

#### vmp Station Assessment Project

Pump Test Performance Sheet

2

Directions: Give 24 hours' notice to Operations Foreman of station to be tested. Plan to operate each pump individually for at least 4 hours. For stations with only two pumps, also run them together for 4 hours. Record data in form before, during, and after test as directed. Conduct visual inspections of pump and motor during test. Mark a rating for each component in all areas – Leakage, Movement, Temperature, and Noise.

Data to Record	Unit	Before Start	Start Time	After Start	Before Stop	Step Time	After Stop
Avista Meter Reading	kWh	88109					88127
Flow Meter Reading	MG	e 58					0178
Instantaneous Flow Rate	gpm			320	2.82	9:30	
Current	amp		8:27	30,19,33	21, 18, 22	AM	
Voltage between phases	v		100	480,474,4	76 481, 4754	升 (11)	
Power Factor			pun	,99	1.0		
Suction Pressure	psi	17.3		17.3	17.5		17.5
Discharge Pressure	psi	(05		<i>4</i> 5	70		40
Outside temperature	۰F	~		45			50
Ambient temperature	°F		1.1	63			58
			Neales	10n		Wat	worth.
Non-Time-Dependent Data				Megger	Test		
Avista Meter unit conversion	multiplier	NI	A	Station	oltage = 4 80 v; Te	est = V	ΜΩ
Motor Hours		48.	25.3	Phase A	to Ground		3489
Elevation difference, pressure	e gauge to put	mp C/L, ft (	0	Phase B	to Ground		2810
Load (1/2, 3/4, or Full)		Fil	λ	Phase C	to Ground		4081
Pump 1 Carver horizontal clo	se coupled pu	mp, 10 hp @ 230/46	ØV, 150 gpm @	145' TDH			1001
Pump 2 Carver horizontal clo	se coupled pu	mp, 15 hp @ 230/46	iOV, 300 gpm @	145' TDH			
Pump 3 Carver horizontal clo	se coupled pu	mp, 10 hp @ 230/46	OV, 150 gpm @	145' TDH			
Pump 4 Carver horizontal clo	se coupled pu	mp, 15 hp @ 230/46	OV, 300 gpm @	145' TDH			

Furnas System 89 Mrc Brall U

## Calculations

- Wire to Water Efficiency, %
- Operating Cost, \$/1000 gal
- Yield, gal/kW-hr



		Effic	iency Rati	ing	
	1	2	4	5	
Eff > (or <)	>	>	>	>	<
n*ŋ´	0.95	0.9	0.85	0.6	0.6
Pump No. 1					~
Pump No. 2					7
Pump No. 3				v	
Pump No. 4				٧	

(C) - 1	0					W.										. ,																		
Station:	Ray Street	Mech	nanio	:	Brian	Kreu	ich		ŀ	atin	gs: ra	nge f	rom	1 (bes	st) to :	o (wor	st)			Key:		Not e	evalua	ted										
Date.	Iviay 9 - 10, 2010	Cons		nce c	of Fai	lure	nger	Field	Asse	esemi	ent	-	P	umn 1	est P	erforn	ance	-			Safe	etv				Fle	ctrica	1	-	T	otals	-		
		cons				unc	T		1330				Ť				T											_	8	Ť				
Pump	Component	Redundancy	oss of Service	Jepartment Image (PR)	invironmental	Regulatory	hysical Condition	Deterioration	Reliability	Repair Time	Life Consumed	Jsæe Rating	.eakage	vlovement	emperature	fficiency	Operating Cost	Water Yield	AV and LV Interlocks	.adders/ stairs	Chlorine fans at well stations	Crane conditions	Joors where MV gear	Clearance electrical equipment	stator inspection/megger test	Rotor inspection/megger test	<b>MV Cable Insulation Resistance</b>	ransformer Winding Insulation	ransformer Winding Resistan	um of Ratings	din Possible	Max Possible	ndex*	Inspection Notes
140.	Pump station		-	-		-	-	-	-		•	-	-	-				-	2.3	3	1	3	3.7	1			-	1		18	- 8	40	0.31	#1 switch gear and transformers have no interlocks/no protection #2 & #3 have disconnects
	Remote Telemetry Uni	t					1			-	-		-			Ì			2.0		-		0.1	-				-		1	1	5	0.00	and fuses: ladder is rusty - needs to be inspected at end of season: crane is original and
	Piping						1			-						+												-		1	1	5	0.00	has numerous problems based on 3rd party inspection: room in front of cabinet ~ 10 ft; #3 is
	Valves						1																							1	1	5	0.00	
	Heaters						2																							2	1	5	0.25	1950's original
																																		Old school, original steel; old vent exhaust in southwest corner needs to be removed;
	Air handling units						2																							2	1	5	0.25	in both wells; replaced south side cooling fan and motor Sep 2014
																																		Recently repaired; replaced chlorine piping w/ PVC; just replaced louvers; chlorine lines hard
																																-		plumbed from chlorine room to pump suction (no collapsible lines anywhere) and
	Chlorine feed system				_		3			-	_				-			<u> </u>		_	_	_	_				_	-		3	1	5	0.50	separated from pump (remove pump without removing chlorine)
1	Pump						2		2	2							L													7	4	20	0.19	Pump original and close to end of life; will have to repack packing
	Motor Control Center						4																					1		5	2	10	0.38	MCC1 has no disconnect, no fuses, can't turn off in station; have trouble getting MCC1 to disconnect in switchvard sometimes
							-						T																	-	_			Coil on upper bearing 2 different leaks twice in 6 years, plate over to weld shop for repairs;
	Motor						2		2	2		4	3	3	3	2									1		1			23	10	50	0.33	will have to repack packing; replaced oil cooler July 2012
2	Pump						2		2	1	_						3													8	4	20	0.25	Pump original and close to end of life
	Motor Control Center						2																					1		3	2	10	0.13	MCC2 is reliable, has what we want, but it is getting older
	Motor						2		2	1	_	2	3	2	4	1		-							1	_	1	_	_	19	10	50	0.23	Lousy performance last 20 years (ES, 5/9/16); current motor replaced Apr 2016 (was motor #3)
																Ι.														-		-		Pump needs to be lowered - suction is too far (about 12 ft) from bottom of gravel bed
3	Pump			_	_		-1	_	1	5	_	_	-		_	-		<u> </u>		_	_	_		_	-	_		_	_	6	4	20	0.13	(should be 4 to 6 $\pi$ ). Two 10- $\pi$ pipes and couplings were never installed and are laying in
	Motor Control Center						1																					1		2	2	10	0.00	Installed new MCC May 2010
	inotor control center						-					T	T															-		-	-	10	0.00	Removed motor for repair Aug 2008, replaced motor Feb 2009, removed pump & motor Oct
							- 1			- 1															- 1									2009, installed new pump and motor May 2010, removed motor for bearing replacement
	Motor						1		1	3		2	3	1	2	1									1		1			16	10	50	0.15	under warranty June 2010, installed motor Jul 2010; once bearing replaced, has run great
	Totals																													117	62	310		
Pump sta	tion index (ranges from	0.0,	excel	lent o	ondi:	tion,	to 1.	0, co	mple	te fai	ilure)																						0.22	
General B	uilding Condition Notes (St	ation	Actio	n Cod	es: RE	D = 1	neede	d now	v on o	ne or	more	comp	oner	its or 1	the bu	lding;	YELLO	)W = 1	ecomi	mend	ed in	near	future	; GRE	EN =	No a	ctions	s nee	ded o	r reco	omme	ended	l at thi	time)
	Switchyard disconnects	stick,	nee	d mai	inten burg	ance	; swit	tchya tch.v=	rd tra	nsfe Aaw 2	rswit	ch ha	ard w	ired f	from e	arlie	prob	lems	(tran:	sforn	ner si	witch	i); not	able	to tr	ransf	er lik	e we	e use	d to;	; swit	tchyar	rd dise	pnnect locks need replaced/maintenance; one transformer hums extremely loud/runs hotter;
	Two largest numps are	i, iep in on	e hol	e sm	alles	st nu	nn is	tin ei	ingle	well	by ite	eniov self -	sho	ild be	the	ther	Nav	UII #3																
	Both wells' steel catwa	lks ar	e rus	tv an	d in d	aues	tiona	bleo	ondit	tion -	requ	ires f	fall n	rotec	tion -	neve	beer	n mai	ntain	ed														
	All station wiring, fuses	, bre	aker.	pane	els an	e ori	ginal						P																					
	Roof and walls leak - ca	in't d	etect	prob	lems	with	flas	hing;	ceili	ng ar	nd wa	lls hi	ave f	lakin	g, pee	ling p	aint;	wind	ows n	eed	repla	ced												
	Installed mag flow met	ers M	ar 20	14; ir	stall	ed ro	oll-up	dool	r May	2014	1																							
			_						_																									

#### Urgency of Actions Needed to Address Deficiencies



Findings

## Findings

Class	Overall Station Score o = excellent 1.o = complete failure	Operating Cost Per Pump (\$/1000 gal)	Yield Per Pump (gal/kWh)
Best	o.o2 (Lincoln Heights)	0.03 (35 <sup>th</sup> & Ray)	3,367 (Latah)
Average	0.13 (15 <sup>th</sup> & Milton)	o.og (Southview)	1,015 (Eagle Ridge 2)
Worst	0.42 (Parkwater)	o.56 (Sunset)	391 (Sunset)

## Findings

#### PUMP 1 | 68 YEARS OF SERVICE



#### PUMP 2 | 16 YEARS OF SERVICE



# Stations whose Older Pumps Performed better than their Newer Pumps During Test

- 15<sup>th</sup> & Milton
- Thorpe Road
- Eagle Ridge 1
- 35<sup>th</sup> & Ray
- Belt Street
- Parkwater
- Well Electric

Findings



## Suggestions

#### ADD

- Replace motor and stator temperature measurement with current
- Pump installation date or age rating
- Weights to ratings valued by mechanics as more impactful
- Photos

#### REMOVE

- Repair Time rating
- Physical Condition rating of the well pumps
- Motor Hours

Potential Maintenance and Capital Projects

## Mechanics Identified Needs and Wants

- Repair and replacements for equipment in imminent failure
- Nice to have equipment upgrades and building / structural improvements
- Maintenance needs above and beyond the routine maintenance the mechanics are already performing

## Stations with Urgent & Important Deficiencies

	Date Assessed	Capital Projects Identified	Actions Taken
Hoffman	Mar - Apr 2016	Well 1 pump replacement	Well evaluation study underway; station update in CIP (design 2020, construction 2021)
Ray Street	May 2016	Pump replacement, well casing adjustment	Well evaluation study underway; station update in CIP (design 2021, construction 2022)
Glennaire	Sep 2016	Pump #3 and roof replacement	Completed November 2016
Five Mile	Oct 2016	Inspect pump #1, motor #2	Five Mile booster twin in CIP (design 2019, construction 2020)
Thorpe Rd	Dec 2016	Pump #1, #2, and all MCCs replacement	Pump 1 replacment bid 2017
Well Electric	Sep 2017	Pump #1	Well evaluation underway
Parkwater	Sep 2017	Pump & motor replacement	Pumps & motors #s 5 - 8 in CIP (2018 - 2020 purchases)

## Stations with Important Deficiencies

	Maintenance Needs	Capital Projects Identified	Actions Taken						
9 <sup>th</sup> & Pine	Nuisance debris and ivy removal	Pump #2 replacement, electrical service reconfiguration, building replacement	Pump & electrical panel in CIP (2018 purchase)						
Division & Manito	Painting, garbage can, LED lighting	New driveway Stairs replacement							
Grace	Service fan	Building re-design or envelope re-seal							
Shawnee	Move air cooler, check electrical clearance	Station re-design or relocation							
<b>-</b>									

For more details and more stations, see Potential Projects list...

#### Next Steps

- Conduct meeting(s) with mechanics, Upriver foremen, and superintendent
- Complete remaining two station assessments
- Complete Consequence of Failure ratings for all stations
- Take Hydraulic Institute training and/or conduct technical literature review on pump systems assessments to inform and improve our program
- Plan for next cycle of assessments

#### Station Assessment Score Sheet and Potential Project List

• H:\Common\Upriver\2015 Station Condition Assessment Project

#### Station Assessment Data, Calculations, and Reports

H:\Common\Upriver\2015 Station Condition Assessment Project\Station Assessment Data

#### Flow Meter Inventory and Tracking

H:\Common\Upriver\2015 Station Condition Assessment Project\Flow Meter Installation Program

#### Scope, Workflow, and Assessment Completion Tracking

• H:\Common\Upriver\2015 Station Condition Assessment Project\Scope and Station Assessment Priority Order

### **File Locations**

# Looking forward to the next assessment cycle!

THANK YOU!

#### 3.2 Reservoir Turnover of Water
#### **Technical Memorandum**

DATE: September 9, 2021

**TO:** Marcia Davis, P.E., Principle Engineer – Integrated Capital Management

**FROM:** Beryl Fredrickson P.E., Senior Engineer – Integrated Capital Management

SUBJ: 2021 Water System Plan Update - Tank Turnover Analysis

This memorandum analyzes water turnover within the water system. Storage turnover was reviewed initially based on average daily demand per pressure zone and compared to the overall storage volume per pressure zone. The average daily demand was calculated based on 2018 through 2020 metered data only. The overall storage per pressure zone was divided by average usage to confirm which storages may have a larger storage per usage ratio, implying that these storages may become stagnant during cooler times of the year. Department of Health (DOH) Water System Design Manual (WSDM 2019) recommends that storage cycling should be no more than three to five days normally. Table 1 identifies pressure zones with possible stagnation issues.

Pressure Zone	ADD Metered Demand Gallons Per Day per PZ	Total Stored Water Volume Gallons per Pressure Zone	# of Days for Total Storage Cycle Times on Average
Cedar Hills	98,000	324,000	3.3
Eagle Ridge	230,000	525,000	2.3
Eagle Ridge 2	417,000	1,222,000	2.9
Five Mile and Indian Hills	1,244,000	2,241,000	1.8
Glennaire	298,000	990,000	3.3
High	3,519,000	4,352,000	1.2
Highland	381,000	1,026,000	2.7
Intermediate	2,656,000	20,838,000	7.8
Kempe	469,000	1,137,000	2.4
Low+1/2 NW Terrace	14,670,000	29,329,000	2.0
Midbank	295,000	583,000	2.0
North Hill+1/2 NW Terrace	14,067,000	25,868,000	1.9
Shawnee	94,000	74,000	0.8
SIA	2,444,000	4,520,000	1.9
Southview	28,000	48,000	1.7
Top+Hatch Road	6,205,000	10,400,000	1.7
West Plains	1,937,000	3,910,000	2.0
Woodland Heights	113,000	347,000	3.1
Woodridge	47,000	223,000	4.7

#### Table 1. Average Tank Turnover

Six pressure zones were highlighted for further investigation: Cedar Hills, Glennaire, Highland, Intermediate, Woodland Heights, and Woodridge. These pressure zones required further investigation to confirm the tank turnover times each tank actually experienced.

The longest tank turnover times generated are in the fall to winter when summer Supervisory Control and Data Acquisition (SCADA) operational controls are still active, while irrigation and other outdoor high-water use drops off for the season. Water System Operators further analyzed 2021 SCADA data and selected January 17, 2021 to January 24, 2021 as the "worst-case" storage turnover. The difference in water levels over time was converted to gallons entering and exiting the storage tank. This analysis only referenced flow into the tank. The analysis identifies that several pressure zones may have stagnation issues if summer operational pump controls are not converted to winter SCADA operational controls quickly enough when outdoor water use stops.

Pressure Zone	Total Storage Volume (gal)	Volume into Tank (gal over 7 days)	% Storage Volume into Storage/day	Does this storage meet turnover time requirements?
Cedar	324,062	238,281	11%	No
Glennaire	989,717	690,642	10%	No
Highland	1,025,501	1,291,506	18%	No
Intermediate	20,837,569	16,218,049	32%	No
Woodland Heights	347,199	1,167,605	48%	Yes
Woodridge	222,807	140,942	9%	No

#### Table 2. SCADA Data Turnover

The City addresses stagnation issues with chlorine residuals in the system. Areas of the City's water system are randomly tested as staffing is available. Additionally, there are existing SCADA data analyzers that record chlorine residuals which are located throughout the City's water system. A few analyzers are located near the pressure zones listed in Table 2 above. The SCADA data near these pressure zones show that the chlorine residual remains above 0.2 parts per million and below 0.4 parts per million in Figure 1 in 10 different locations.. The recommended minimum 0.2 milligrams per liter or parts per million according to WAC 246-290-451 regulation and ruling.

The City also tracks water service complaints from residents. Complaints range in nature but are usually regarding sulfur smell, brown coloring, and increased chlorine taste. From 2017 to 2021, complaints were located in Intermediate, Low, North Hill, Top, High, Northwest Terrace, Kempe, West Plains, and Five Mile pressure zones. Chlorine residual, conductivity, pH, temperature, total coliform, and E. Coli are tested at each location of the complaint. Many of the solutions required flushing out private plumbing. Less than 5% of the complaints required hydrant flushing near the properties and are usually related to long service lines.



Figure 1. Chlorine Residual SCADA data

Operators increase chlorine doses at the well source during the winter periods. Cooler temperatures correlate with reduced demand because the volume of water requires more time to travel from the well to the farthest extents of the water system. However, the chlorine residual reduces over time, and sometimes the Operators will over pump water into a pressure zone and back-feed into the lower pressure zone to mix in more chlorine for a higher residual.

## 3.3 Risk and Resiliency Assessment

## RISK AND RESILIENCE ASSESSMENT

City of Spokane

March 24, 2020

#### Purpose

The purpose of this Risk and Resiliency Assessment is for the City of Spokane to objectively review the risk to its water system. The assessment includes:

- The risk to the system from malevolent acts and natural hazards;
- The resilience of the pipes and constructed conveyances, physical barriers, source water, water collection and intake, pretreatment, treatment, storage and distribution facilities, electronic, computer, or other automated systems (including the security of such systems) which are utilized by the system;
- The monitoring practices of the system;
- The financial infrastructure of the system;
- The use, storage, or handling of various chemicals by the system; and
- The operation and maintenance of the system.

#### **Regulatory Requirement**

In 2018, Congress passed the American Water Infrastructure Act. Section 2013 of the act required that all communities with a water system serving greater than 3,300 people must complete an assessment of risk and resilience to natural and man-made hazards. The requirements laid out a two part objective that included the submittal of a certification of completion of a Risk and Resiliency Assessment (RRA) and an Emergency Response plan (ERP). The City of Spokane, being larger than the population cut-off of 100,000 people served, is required to certify their RRA by March 31, 2020 and the ERP 6 months after the certification of the RRA. Aside from the initial submittal requirement, both the RRA and the ERP must be updated every 5 years.

#### Methodology

The Risk Analysis and Management for Critical Asset Protection (RAMCAP) Standard detailed in the AWWA J100 standard was performed in combination with the EPA VSAT Web 2.0 application to address malevolent acts, natural hazards, and dependency/proximity threats to water sector operations. The methodology in RAMCAP and VSAT Web 2.0 is based on assessing the risk to a water system asset from a specific threat or hazard (i.e., Threat-Asset Pair), where risk is defined as follows:

Risk (R) = Threat (T) X Vulnerability (V) X Consequences (C)

- T = Likelihood that the threat will be perpetrated or occur against the asset;
- V = Likelihood that the threat will damage the asset, considering the effectiveness of countermeasures; and
- C = Economic (cost to the utility and region) and public health (injuries and deaths) impacts resulting from damage to the asset.

A monetary value of statistical illness and value of statistical life are assigned to injuries and deaths, respectively, so that risk can be determined as a single monetized value.

AWIA requires community water systems to assess the risks to and resilience of specified assets from both malevolent acts and natural hazards. Accordingly, the analyst determines which assets and threats will undergo a quantitative risk assessment, involving estimates of threat, vulnerability, and consequences. The quantitative risk assessment may include a broad spectrum of assets encompassing the entire water system, or be limited to those assets at highest risk. For threat selection, the analysis includes all the malevolent acts, natural hazards, and dependency/proximity threats listed in the AWWA J100-10 Standard, along with additional threats that are unique to the City of Spokane.

After completing a quantitative risk assessment under the baseline conditions for the water system, the analysis results in a profile of existing risk. These values can be taken forward to the emergency response plan to determine possible mitigation to the risks and the net risk reduction as a result of those mitigations.

#### Threats

To conduct the assessment a list of 22 threats was developed that could have major impact on the water system and cause disruption of service. This list was narrowed down to 14 threats that were seen as more likely to occur, or more likely to have a large impact.

The following table summarizes the threats selected for the City of Spokane and gives values for likelihood, description of the characterization of the threat, and the source of the value.

	Threat or	Likelihood		
	Hazard	(per Year)	Characterization	Likelihood Details/Source
			Includes any physical assault on utility infrastructure	
			or staff with the intent of disabling infrastructure	
	Physical Attack	0.000001	and/or terrorizing staff.	From VSAT threat likelihood
			To estimate the threat likelihood of accidental	
			contamination of the distribution system, the number	
			of waterborne disease outbreak events per year (two)	
			is divided by the estimated number of community	
٩			water systems in the U.S. (53,000) to calculate the	
lad	Product		threat likelihood of an accidental contamination event	
2	Contamination	0.00004	on an annual basis of 0.00004.	From VSAT threat likelihood
Aai			Includes any cyber-attack on utility billing,	
-			communications, data management or other	
			information systems, which may disable affected	
			systems and result in the loss of information	
			resources, including PII and other sensitive data, and	Based on discussion with subject matter
	Cyber Sabotage	1	other economic consequences for the utility.	experts at the City of Spokane.
	Drassa			
	Process		includes any malicious physical act that harms the	
	Sabotage	0.05	operation of a utility process	From VSAT threat likelihood

Table 1: Threat Characterization

			The "500-year flood" corresponds to an AEP of 0.2- percent, which means a flood of that size or greater has a 0.2-percent chance (or 1 in 500 chance) of	
	Flood	0.002	occurring in a given year.	500-year Flood Likelihood
	February de la Calida	0.025		, Den den landen stilten og ditter
	Extended Cold	0.025	Extreme Cold/Wind-chill causes Equipment Failure.	Based on local weather conditions
ural	Landslide	0.0000001	Landslide that is capable of damaging the infrastructure in place in the slide zone or in the deposit area.	From Washington Department of Natural Resources historical occurrences.
Nat				While the aquifer level has never dropped below the pump intake, the level has been getting closer to the intake. A likelihood of 5% was selected to represent
			Extended drought and lack of snowpack that effects aquifer level. Droughts occur 15% of years; however,	the creep towards this scenario occurring. https://www.drought.gov/drought/states
	Drought	0.15	no events have occurred dropping water levels below	/washington?places=Spokane%2C+WA%2
	Diougin	0.15	During seasonal high river levels, surface water can	
			impact the wells. When this occurs the wells must be	
	Ground Water		shut down to prevent water quality issues in the	
	Influence	1	system	Occurs annually
	Disease			
ncy	Outbreak	0.0003	Pandemic/outbreak that causes staff shortage	From VSAT threat likelihood
pr			Employees unable to get to or leave the Upriver Dam	From discussion with employees at
per	Transportation	1	facility due to trains blocking the road.	Upriver Facility
De	Electrical		Power outage from any event that prevents asset	From historical power outage data at City
	Utilities	0.3	from functioning correctly.	of Spokane Water Facilities
			Incident at Yellowstone Pipeline near an asset. Can be	Based on likelihood of pipe explosion by
	Yellowstone		explosion or leak affecting water quality. Built in the	construction year over the length of pipe
iť	Pipeline	0.00005	1950s	running adjacent to asset.
Ę.				Probability of an incident based on
l ô				number of movements in a year
				multiplied by the proportion of area taken
				by assets compared to Inner
1	Airport	0.00012	Airplane crash in close proximity to Felts Field	Approach/Departure Zone

#### Assets

The major components of the water system for the City of Spokane are:

- Pressure Zones
- Well Stations
- Transmission and Distribution Mains
- Booster Pump Stations
- Pressure Reducing Valve Stations

- Storage Reservoirs
- System Control Facilities
- Service Connections
- Interties
- Energy Sources

In the course of conducting this assessment, approximately 170 different assets were identified in the system. In order to make a reasonable list of threat asset pairs, critical assets were identified and further analyzed as part of the Threat-Asset Pair Assessment detailed below. In total, 51 different assets were identified as critical assets.

#### Spokane Valley-Rathdrum Prairie Aquifer

The Spokane Valley-Rathdrum Prairie Aquifer is a sole source aquifer for the City of Spokane. It is a huge asset to the city of Spokane seeing as it is the only source of water. However, in the course of conducting of this risk and resiliency assessment, it was not listed as a critical asset due to its size and the inability of the City to mitigate against specific threats at all locations of the aquifer.

#### Threat-Asset Pair Assessment Summary

The threats and assets, as discussed above, were combined to create critical threat-asset pairs. The selection was made by creating a core team of stakeholders from the City and community to bring in multiple perspectives and subject matter experts. After creating the list of critical threat-asset pairs, each of them was discussed with the core team to determine vulnerability due to the countermeasures against threats already in place.

The tables below show the monetized risk summary for each asset/threat pair:

				I	Risk Metrics	5			Baseline
		Utility	Regional					Threat	
		Financial	Economic			Consequence		Likelihood	Risk
Asset	Threat	Impact	Impact	Fatalities <sup>1</sup>	Injuries <sup>1</sup>	(\$)	Vulnerability	(per year)	(\$/year)
	Product								
Hydrants	Contamination	\$138,591	\$17,835,600	0	20	\$54,974,191	50%	0.0004	\$10,995
Well Electric	Product								
Well Station <sup>2</sup>	Contamination	\$226,391	\$89,178,200	435	4367	\$11,387,354,591	9%	0.00001	\$10,249
Well Electric	Process								
Well Station <sup>2</sup>	Sabotage	\$172,600	\$35,671,300	0	0	\$35,843,900	3%	0.05	\$53,766
Well Electric	Electrical								
Well Station <sup>2</sup>	Utilities	\$21,900	\$17,835,600	0	0	\$17,857,500	3%	0.3	\$160,718 <sup>3</sup>
	Proximity -								
Well Electric	Yellowstone								
Well Station <sup>2</sup>	Pipeline	\$23,409,500	\$6,835,506,600	5	10	\$6,914,416,100	34%	0.00005	\$117,545
Well Electric	Ground Water								
Well Station <sup>2</sup>	Influence	\$658,300	\$535,069,000	0	0	\$535,727,300	3%	1	\$16,071,819
Parkwater	Product								
Well Station <sup>2</sup>	Contamination	\$281,291	\$133,767,300	435	4367	\$11,431,998,591	9%	0.00001	\$10,289
Parkwater	Process								
Well Station <sup>2</sup>	Sabotage	\$198,900	\$57,074,000	0	0	\$57,272,900	3%	0.05	\$85,909
Parkwater	Electrical								
Well Station <sup>2</sup>	Utilities	\$35,100	\$28,537,000	0	0	\$28,572,100	3%	0.3	\$257,149 <sup>3</sup>
	Proximity –								
Parkwater	Yellowstone								
Well Station <sup>2</sup>	Pipeline	\$32,814,500	\$10,416,010,000	5	10	\$10,504,324,500	62%	0.00005	\$325,634
Central Well	Product								
Station <sup>2</sup>	Contamination	\$160,591	\$35,671,300	435	4367	\$11,333,781,891	9%	0.00001	\$10,200
Central Well	Process								
Station <sup>2</sup>	Sabotage	\$146,200	\$14,268,500	0	0	\$14,414,700	3%	0.05	\$21,622

Table 2: Baseline Risk Values

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<sup>&</sup>lt;sup>1</sup> EPA estimated value of a statistical life is \$7.4 million (\$1.85 million for injury)

<sup>&</sup>lt;sup>2</sup> All well station analyses assume service denial equivalent to percent of water well provides to the City

<sup>&</sup>lt;sup>3</sup> Risk value does not account for ability of Upriver Dam to provide power

					Risk Metric	S			Baseline
		Utility	Regional					Threat	
Asset	Threat	Financial Impact	Economic Impact	Fatalities <sup>1</sup>	Iniuries <sup>1</sup>	Consequence (\$)	Vulnerability	Likelihood (per vear)	Risk (\$/vear)
Central Well	Electrical					(+7		(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	(+, , ==, ,
Station <sup>2</sup>	Utilities	\$8 <i>,</i> 800	\$7,134,300	0	0	\$7,143,100	3%	0.8	\$171,434
Ray Well	Product								
Station <sup>2</sup>	Contamination	\$176,991	\$49,048,000	435	4367	\$11,347,174,991	9%	0.00001	\$10,212
Ray Well	Process								
Station <sup>2</sup>	Sabotage	\$152,800	\$19,619,200	0	0	\$19,772,000	3%	0.05	\$29,658
Ray Well	Electrical								
Station <sup>2</sup>	Utilities	\$12,100	\$9,809,600	0	0	\$9,821,700	3%	0.3	\$88,395
Ray Well									
Station <sup>2</sup>	Drought	\$12,172,300	\$1,765,727,700	0	0	\$1,777,900,000	3%	0.05	\$2,666,850
Hoffman Well	Product								
Station <sup>2</sup>	Contamination	\$149,591	\$26,753,500	435	4367	\$11,324,853,091	9%	0.00001	\$10,192
Hoffman Well	Process								
Station <sup>2</sup>	Sabotage	\$141,900	\$10,701,400	0	0	\$10,843,300	3%	0.05	\$16,265
Hoffman Well	Electrical								
Station <sup>2</sup>	Utilities	\$6,600	\$5,350,700	0	0	\$5,357,300	3%	0.3	\$48,216
Nevada Well	Product								
Station <sup>2</sup>	Contamination	\$187,991	\$57,965,800	435	4367	\$11,356,103,791	9%	0.00001	\$10,220
Nevada Well	Process								
Station <sup>2</sup>	Sabotage	\$157,200	\$23,186,300	0	0	\$23,343,500	3%	0.05	\$35,015
Nevada Well	Electrical								
Station <sup>2</sup>	Utilities	\$14,300	\$11,593,200	0	0	\$11,607,500	3%	0.3	\$104,468
Grace Well	Product								
Station <sup>2</sup>	Contamination	\$171,591	\$44,589,100	435	4367	\$11,342,710,691	9%	0.00001	\$10,208
Grace Well	Process								
Station <sup>2</sup>	Sabotage	\$150,600	\$17,835,600	0	0	\$17,986,200	3%	0.05	\$26,979
Grace Well	Electrical								
Station <sup>2</sup>	Utilities	\$11,000	\$8,917,800	0	0	\$8,928,800	3%	0.3	\$80,359
	Process								
Chlorination	Sabotage	\$200,000	\$0	0	0	\$200,000	80%	0.05	\$8,000
	Physical								
Chlorination	Attack	\$200,000	\$0	1	2	\$11,300,000	80%	0.000001	\$9
Utility Billing	Cyber								
System	Sabotage	\$5,000,000	\$0	0	0	\$5,000,000	3%	1	\$150,000
Utility Billing	Process								
System	Sabotage	\$500,000	\$0	0	0	\$500,000	3%	0.05	\$750
OT/IT	Cyber								
Infrastructure	Sabotage	\$500,000	\$0	0	0	\$500,000	3%	1	\$15,000
SCADA	Cyber								
System	Sabotage	\$500,000	\$0	0	0	\$500,000	3%	0.1	\$1,500
	Product								
Reservoirs <sup>4</sup>	Contamination	\$138,591	\$17,835,600	435	4367	\$11,315,924,191	50%	0.00001	\$56,580
Cedar Hills	Extended								
Tank⁵	Cold/Ice	\$2,000,000	\$0	0	0	\$2,000,000	3%	0.025	\$1,500
Eagle Ridge	Extended								
Tank⁵	Cold/Ice	\$3,000,000	\$0	0	0	\$3,000,000	3%	0.025	\$2,250

<sup>&</sup>lt;sup>4</sup> Representative of all reservoirs, values may differ if evaluated at each reservoir independently

<sup>&</sup>lt;sup>5</sup> Reservoir and Extended Cold/Ice values assume that booster stations supplying the pressure zones are able to keep up with all demand due to low winter demand.

					Risk Metrics	5			Baseline
		Utility	Regional					Threat	
	<b>T</b> h	Financial	Economic	<b>F</b> Pat 1	Internet and	Consequence	Mada and Miller	Likelihood	Risk
Asset	I hreat	Impact	Impact	Fatalities*	Injuries	(\$)	Vulnerability	(per year)	(\$/year)
Strong Road		\$5,000,000	ŚŊ	0	0	\$5,000,000	3%	0.025	\$3 750
Indian Hills	Evtended	\$3,000,000	ŞΟ	0	0	\$3,000,000	370	0.025	Ş3,730
Tank <sup>5</sup>		\$350,000	\$0	0	0	\$350,000	3%	0.025	\$263
Glennaire 2	Extended	<i>\$556,666</i>	ΨŪ	ŭ	Ű	<i>\$336,666</i>	370	0.025	
Tank⁵	Cold/Ice	\$3,000,000	\$0	0	0	\$3,000,000	3%	0.025	\$2,250
Southview	Extended	. , ,				. , ,			. ,
Tank⁵	Cold/Ice	\$400,000	\$0	0	0	\$400,000	3%	0.025	\$300
	Extended								
Sunset Tank⁵	Cold/Ice	\$750,000	\$0	0	0	\$750,000	3%	0.025	\$563
Woodridge	Extended								
Tank⁵	Cold/Ice	\$600,000	\$0	0	0	\$600,000	3%	0.025	\$450
	Electrical								
Radio Room	Utilities	\$21,900	\$17,835,600	0	0	\$17,857,500	3%	0.3	\$160,718
	Physical		1.5			4			4
Upriver Dam	Attack	\$100,000,000	\$0 \$0	30	100	\$507,000,000	80%	0.000001	\$406
Upriver Dam	Transportation	Ş0	Ş0	0	0	Ş0	3%	1	Ş0
	Process	¢100.000.000	ćo.			¢4.00.000.000	201	0.05	4450.000
Upriver Dam	Sabotage	\$100,000,000	\$U	0	0	\$100,000,000	3%	0.05	\$150,000
Upriver Dam	Flood	\$100,000,000	ŞU	0	0	\$100,000,000	5%	0.002	\$10,000
Opriver	Physical	¢2 021 000	617 92E 600	0	0	¢10.957.500	20%	0.000001	ćл
Horivor	ALLOCK	\$2,021,900	\$17,855,000	0	0	\$19,857,500	2078	0.000001	ې <del>4</del>
Facility	Transportation	\$0	\$0	0	0	\$0	43%	1	\$0
Unriver	Process	γu	ŲŲ	Ŭ	0	ŶŬ	+370		
Facility	Sabotage	\$105.500	\$4,458,900	0	0	\$4,564,400	9%	0.05	\$20.540
Water	Disease	+/	+ ) )		-	÷ ')= = ') * = =			+==/= ==
Department	Outbreak	\$329,100	\$267,534,500	0	0	\$267,863,600	3%	0.0003	\$2,411
35th and Ray		. ,	. , ,			. , ,			. ,
Booster	Electrical								
Station <sup>6</sup>	Utilities	\$504,400	\$3,567,100	0	0	\$4,071,500	5%	0.3	\$61,073
Belt Street									
Booster	Electrical								
Station <sup>6</sup>	Utilities	\$440	\$356,720	0	0	\$357,160	5%	0.3	\$5,357
Bishop Court									
Booster	Electrical								
Station <sup>6</sup>	Utilities	\$4,400	\$3,567,100	0	0	\$3,571,500	5%	0.3	\$53,573
Division and									
Manito	El estado el								
Booster	Electrical	¢1 100	6901 900	0	0	6902 000	F.0/	0.2	¢12 204
Station <sup>®</sup>	Clastrical	\$1,100	\$891,800	0	0	\$892,900	5%	0.3	\$13,394
Station <sup>6</sup>	Litilitios	\$1 100	\$801 800	0	0	¢802 000	5%	03	¢13 30/
Milton	Otinties	Ş1,100	3891,800	0	0	3892,900	578	0.5	Ş15,594
Booster	Flectrical								
Station <sup>6</sup>	Utilities	\$1.100	\$891.800	0	0	\$892.900	5%	0.3	\$13.394
Shawnee		<i> </i>	<i>2002,000</i>			<i>2002,000</i>	270	0.0	÷ 10,00 T
Booster	Electrical								
Station <sup>6</sup>	Utilities	\$220	\$178,360	0	0	\$178,580	5%	0.3	\$2,679

<sup>6</sup> Booster Station Analyses assume that reservoirs are unable to provide flow during outage

					Risk Metrics	6			Baseline
		Utility	Regional					Threat	
		Financial	Economic			Consequence		Likelihood	Risk
Asset	Threat	Impact	Impact	Fatalities <sup>1</sup>	Injuries <sup>1</sup>	(\$)	Vulnerability	(per year)	(\$/year)
Spotted Road									
Booster	Electrical								
Station <sup>6</sup>	Utilities	\$1,870	\$1,516,060	0	0	\$1,517,930	3%	0.3	\$13,661
Eagle Ridge									
Booster	Electrical								
Station <sup>6</sup>	Utilities	\$1,320	\$1,070,160	0	0	\$1,071,480	5%	0.3	\$16,072
Garden Park									
Booster	Electrical								
Station <sup>6</sup>	Utilities	\$5,500	\$4,458,900	0	0	\$4,464,400	3%	0.3	\$40,180
Southview									
Booster	Electrical								
Station <sup>6</sup>	Utilities	\$44	\$35,672	0	0	\$35,716	3%	0.3	\$321
Glennaire									
Booster	Electrical								
Station <sup>6</sup>	Utilities	\$280	\$227,410	0	0	\$227,690	3%	0.3	\$2,049
Glennaire									
Annex									
Booster	Electrical								
Station <sup>6</sup>	Utilities	\$94	\$7.633	0	0	\$7.727	3%	0.3	<b>\$70</b>
Fagle Ridge II		7 - 1	<i>+</i> · <i>)</i> • • •		-	<i>t</i> · <i>j</i> · <i>=</i> ·			
Booster	Flectrical								
Station <sup>6</sup>	Utilities	\$880	\$713 440	0	0	\$714 320	5%	03	\$10 715
Cedar Road	otintics	<b>Ç000</b>	<i>ç,</i> 10, 110	Ŭ	Ű	<i>\$711,020</i>	370	0.0	<i>\</i>
Booster	Flectrical								
Station <sup>6</sup>	Litilities	\$220	\$178 360	0	0	\$178 580	5%	03	\$2.679
Thorne Road	othities	<i>Ş220</i>	9170,300	Ŭ		9170,500	570	0.5	<i>42,015</i>
Booster	Electrical								
Station <sup>6</sup>		\$2,200	\$1 783 600	0	0	\$1 785 800	3%	03	\$16.072
Wost Drivo	Othitics	92,200	Ş1,705,000		0	Ş1,705,000	570	0.5	Ş10,072
Booster	Flectrical								
Station	Litilitios	\$503 300	\$2,675,300	0	0	\$3 178 600	5%	03	\$17 679
Suncot	Othitles	\$303,300	J2,07J,300	0	0	\$5,178,000	570	0.5	Ş47,079
Boostor	Floctrical								
Station	Litilition	¢220	¢179.200	0	0	¢170 F00	F0/	0.2	¢2.670
	Otilities	\$220	\$178,500	0	0	\$178,580	5%	0.5	şz,079
Five iville Boostor	Floctrical								
Station	Litilition	62.9CO	ĆO 010 E00	0	0	62 224 452	20/	0.2	¢20.902
Station	otilities	\$2,800	\$2,318,593	0	0	\$2,321,453	3%	0.3	\$20,893
Kempe	Electrical.								
Booster	Electrical	¢000	6712 440	0	0	6714 220	50/	0.2	¢10 71 F
Station	Utilities	\$880	\$713,440	0	0	\$714,320	5%	0.3	\$10,715
Woodridge									
Booster	Electrical	6440	400 400			400.000	50/		64,000
Station®	Utilities	\$110	\$89,180	0	0	\$89,290	5%	0.3	\$1,339
Lincoln									
Heights									
Booster	Electrical	4	<b></b>			4	_	_	
Station <sup>6</sup>	Utilities	\$16,500	\$13,376,700	0	0	\$13,393,200	3%	0.3	\$120,539
35th and Ray									
Booster	Physical								
Station <sup>6</sup>	Attack	\$1,289,900	\$642,082,800	0	0	\$643,372,700	100%	0.000001	\$643

					Risk Metric	5			Baseline
Asset	Threat	Utility Financial Impact	Regional Economic Impact	Fatalities <sup>1</sup>	Injuries <sup>1</sup>	Consequence (\$)	Vulnerability	Threat Likelihood (per year)	Risk (\$/year)
West Drive									
Booster	Physical								
Station <sup>6</sup>	Attack	\$1,092,500	\$481,562,100	0	0	\$482,654,600	100%	0.000001	\$483
Parkwater	Proximity -								
Well Station <sup>2</sup>	Airport	\$5,070,200	\$57,074,000	1	2	\$73,244,200	34%	0.00012	\$2,988
Well Electric	Proximity -								
Well Station <sup>2</sup>	Airport	\$5,041,610	\$37,454,800	1	2	\$53,596,410	34%	0.00012	\$2,187
Glennaire									
Assets	Landslide	\$10,059,250	\$48,156,210	20	40	\$280,215,460	81%	1E-07	\$23
Southview									
Assets	Landslide	\$5,007,900	\$6,420,828	10	20	\$122,428,728	81%	1E-07	\$10
Woodridge									
Assets	Landslide	\$4,019,750	\$16,052,070	20	40	\$242,071,820	81%	1E-07	\$20
Shawnee									
Assets	Landslide	\$5,019,750	\$16,052,070	20	40	\$243,071,820	81%	1E-07	\$20

#### Results

The table of risk results shown above gives monetary values of risk in dollars per year. These risks can be ranked to assess the future need for capital and maintenance projects. The next step in the process of evaluating these risks is developing mitigation project/actions/etc. for each of the Threat-Asset pairs that have a risk value greater than what the City considers to be an acceptable level of risk.

# 3.4 Future Water Service Area Build-out Demand Estimate (Varela)

City of Spokane Department of Water & Hydroelectric Services

## Future Water Service Area Build-out Demand Estimate

February 20, 2015 - Final



City of Spokane Department of Water & Hydroelectric Services

## Future Water Service Area Build-out Demand Estimate

February 20, 2015 - Final





## CITY OF SPOKANE FUTURE WATER SERVICE AREA BUILD-OUT DEMAND ESTIMATE

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2.0	MET	THODOLOGY	1
	2.1 2.2 2.3 2.4 2.5	Sources of Information Determine Current and Future Water Use Ratios Estimate Future Water Use within Existing Service Area Estimate New Water Use within the CWSP Service Area Water Sales to Other Jurisdictions and Wholesale Customers	. 2 . 2 . 2 . 2 . 3
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## **1.0 BACKGROUND AND PURPOSE**

The City of Spokane's Department of Water & Hydroelectric Services (Water Dept) has retained Varela & Associates for assistance related to a planned water supply project. The project will consist of development of a new well-field at a new location. The Water Dept has identified several possible locations for the new source of supply. The location of current and future water demand in relation to current and future supply sites dictate the transmission needs of the water distribution system. The Water Dept wants to develop a quantitative basis for evaluating the transmission system impacts of prospective new supply sites.

The Water Dept indicates water supply facilities have service lives of 50-100 or more years and hence believes demand estimates associated with future supply and transmission needs should take into account similar time frames. The Spokane County Coordinated Water System Plan (CWSP) establishes the Water Dept's future service area which is significantly larger than the current service area. This analysis assumes the time frame for build-out of the CWSP service area is similar to the service life of the supply and transmission improvements currently contemplated by the Water Dept.

Spokane's water rights currently are not fully consolidated; that is, the annual volume and instantaneous withdrawal rate at each supply site is limited to a fixed fraction of the City's total water rights portfolio. The Water Dept has applied to the Department of Ecology (Ecology) to consolidate two of its largest water rights and add points of withdrawal at potential new supply sites. Consolidation of Spokane's other water rights may not be necessary if future supply needs for each supply site do not exceed the water rights annual volume and withdrawal rate available at each site.

The Water Dept has tasked Varela & Associates with estimating the build-out water demand for the City of Spokane's future water service area as defined in the Spokane County CWSP. It is our understanding the Water Dept intends to use the build-out water demand estimate developed herein for the following:

- Coordinate siting of new water well fields with conceptual future transmission and distribution system needs.
- Aid in possible future discussions with the Department of Ecology on adequacy of annual water rights.

## 2.0 METHODOLOGY

The build-out water demand estimate for the City's future service area is intended to be used for the specific purposes identified in the preceding section. The assumptions and information used to develop the build-out water demand estimate are intended to be similar to but not identical to those used to develop other local comprehensive land use and water system plans.

The following sections provide a general outline of the methods used to estimate the build-out water demand of the CWSP service area.

1

## 2.1 Sources of Information

The following sources of information were used to estimate the build-out demand of the CWSP service area:

- Recent Water Dept total annual water production figures
- Draft City of Spokane Water System Plan, May 2014
- GIS layers from the City of Spokane and Spokane County including parcel, zoning and land use data (most GIS data acquired November 2014)
- Population projections and 2010 census data from the State Office of Financial Management (OFM)
- Available aerial photography

### 2.2 Determine Current and Future Water Use Ratios

Current per-capita water use within the existing water service area was used as the baseline to estimate future per-capita water use for the entire CWSP service area. Analysis of current population density and estimation of future population density allowed estimation of *current and future water use per acre* ratios. The *future water use per acre* ratio was used to estimate future water use for both vacant parcels within the service area and for water use within the CWSP area when it is fully developed.

#### 2.3 Estimate Future Water Use within Existing Service Area

Vacant parcels within the existing service area were identified using Spokane County parcel data. The parcel data identifies if a parcel is vacant or not. It is assumed vacant parcels will develop and contribute to the build-out water demand.

Spokane's planning department maintains up-to-date GIS layers on preliminary and final land use actions. Parcels identified as final plats are not included in the "vacant" parcels described above and need to be included to estimate future (infill growth) water use within the existing service area.

Redevelopment or additional development of non-vacant lots has potential to increase population density within the water service area; higher density population will result in increased water use within Spokane's water service area. Estimating the future density of population within the service area and using the existing per-capita demand ratio allows calculation of a *future water use per acre* ratio.

Applying the *future water use per acre* ratio to vacant lots and applying *water use per capita* to the population increase for redevelopment provides an estimate of future water use within the existing service area.

## 2.4 Estimate New Water Use within the CWSP Service Area

For the area outside the existing service area but inside the CWSP boundary the water use projections assume that all available land will be converted into higher density land uses except for the Rural

Conservation land designated by the County. It is assumed that when the CWSP area is fully builtout land use within the CWSP boundary will be similar to the future density of the existing service area. To estimate future water use the *future water use per acre* ratio was applied to the portions of the CWSP service area not currently served water by the Water Dept.

#### 2.5 Water Sales to Other Jurisdictions and Wholesale Customers

The Water Dept has common boundaries with roughly 12 water purveyors. Six of these adjoining purveyors have interties with the City of Spokane water system. Spokane expects to connect to additional adjacent purveyors and will likely become an important member in regional wholesale water supply to systems with insufficient source capacity and/or insufficient water rights to support current demand and/or growth in their water systems. A detailed estimate of possible future wholesale connections and growth rates is beyond the scope of this study. This study assumes Spokane will eventually supply up to 10,000 acre-feet to neighboring systems via interties.

## **3.0 EXISTING SERVICE AREA CHARACTERISTICS**

#### 3.1 Area

The existing service area covers approximately 56,500 acres. The service area includes most of the City of Spokane as well as smaller areas outside the City Limits. **Figure 1** shows the existing water service area and the CWSP service area. According to City land use maps approximately 2,500 acres within the existing service areas are designated as Conservation. Most conservation areas do not currently utilize water; it is assumed these areas will not use water in the future.

The area used to determine current and future *water use per acre* was calculated by subtracting conservation areas, vacant lots, and newly platted parcels from the existing service area as shown in **Table 1**.

	Area
Description	(acres)
Total Existing Service Area	56,500
Conservation Areas	2,500
Vacant Lots	10,000
New Plats	1,280
Served Area	42,720
Used for calculations herein	42,700

#### Table 1 Existing Service Area Acreages

## 3.2 Zoning and Land Use

City and County zoning and land use designations were reviewed to see if they could be used to refine the water use estimate. Average water use per zoning designation or land use designation was not readily available. County land use and zoning designations, while similar to the City's are expected to change over time as the CWSP service area approaches build-out. Hence, it was concluded that attempting to refine the water use estimate by using current zoning and land use designations was not appropriate for this evaluation.



## 3.3 Population

The 2010 population was estimated within the service area using the 2010 census block data from the Washington State OFM. The 2010 population within the service area is estimated at 229,200 persons. This estimate is relatively close to Spokane's estimated service area population listed in the 2014 draft Water System Plan of 227,455 persons. The difference between these two population estimates possibly results from the treatment of census blocks that are not fully enclosed within the City's existing water service area. This report utilizes the 229,200 persons as the existing service area population.

### 3.4 Vacant Parcels

The number and area of vacant parcels was estimated using the parcel GIS layer from Spokane County. For the purpose of this analysis any parcel identified as residential and vacant is considered developable. Recreational and parkland identified as vacant parcels were also added to provide a conservative estimate of vacant land that may eventually use water supplied by the Water Dept. The estimated area of vacant lots was further refined by using Exemption Codes (i.e. government, religious, school and NULL). The NULL code is used for nonexempt properties, which includes private taxable property. **Figure 2** shows the location of vacant parcels within the existing service area. **Table 2** provides the vacant lot acreage sorted by Exemption Code.

Exemption Code	Area (Acres)	Number of Parcels
DOR	110	153
GOVT	3,120	831
NULL	6,700	7,129
SCLS	70	57
Totals	10,000	8,170

#### Table 2 Vacant Lots Sorted by Exemption Code

The City provides GIS information on proposed development including Preliminary and Final plat layers. Most of the parcels designated as preliminary plats are included as vacant parcels. There are 1,280 acres of land designated as Final Plats that are within the existing service area but are not designated as vacant lots.

### 3.5 Water Use

The 2014 Draft Water System Plan includes information on Spokane's water use. Water use is calculated from the total water pumped minus distribution system leakage (DSL – which includes unaccounted for water volume) minus water sold to other jurisdictions. For 2010 water use was 56.46 MGD for average daily demand (ADD) and 171.64 MGD for maximum day demand (MDD). In 2010 system water losses were estimated at approximately 18% of the total water pumped and annual water sales to other jurisdictions were 110 MG. Average flow rate of water sales through interties in 2010 is calculated at 0.3 MGD. **Table 3** summarizes the 2010 water demand that is used to calculate the *water use per capita* and *current water use per acre* ratios.



#### Table 32010 Water Use

	A			
Water Use (2010)	ADD (MGD)	Annual (MG)	MDD (MGD)	
Total Water Pumped	56.5	20,609	171.6	
System Losses (1)	10.2	3,740	30.9	
Sales via Interties	0.3	110	0.9	
Served Area	46.0	16,759	139.81	

(1) This table assumes that system losses include unmetered uses that will result in an average ADD:MDD peaking factor similar to the rest of the water system (approximately 3.0).

#### 3.6 Summary and Current Water Use Ratios

Population density within the current water service area (including conservation areas and vacant lots) is calculated as:

229,200 persons  $\div$  56,500 acres = 4.06 persons per acre

Current population density for the current areas served by the water system [Served Area = Total Area – Conservation Area – Vacant Lots – Platted Lots] is calculated as:

229,200 persons  $\div$  (56,500 - 2,500 - 10,000 - 1,280  $\approx$  42,700 acres) = 5.37 persons per acre

This analysis utilizes the 2010 census population figures rather than relying on estimates of growth since the 2010 census took place; hence, the 2010 water system production figures were used for consistency. The water system production figures were adjusted by removing system losses and sales to other jurisdictions in order to calculate *current water use per capita* and *current water use per acre* ratios.

Current water use per capita is calculated as:

ADD = 46,030,000 gpd  $\div$  229,200 persons  $\approx$  200 gpd

MDD = 139,810,000 gpd  $\div$  229,200 persons  $\approx$  610 gpd

Current water use per acre is calculated as:

 $ADD = 46,030,000 \text{ gpd} \div 42,700 \text{ acres} \approx 1,080 \text{ gpd}$ 

 $MDD = 139,810,000 \text{ gpd} \div 42,700 \text{ acres} \approx 3,270 \text{ gpd}$ 

The following table summarizes the calculated water use ratios for the existing water service area.

Description	ADD	MDD		
Water use per capita	200 gpd	610 gpd		
Water use per acre	1,080 gpd	3,270 gpd		
Persons/acre (total area)	4.06 persons/acre			
Persons/acre (non-vacant parcels only)	5.37 persons/acre			

#### Table 4Water Use Ratios from Existing Water Service Area

## 4.0 FUTURE WATER USE WITHIN THE EXISTING SERVICE AREA

Future water use within the existing service area is estimated by assuming that existing non-vacant lots are redeveloped to a higher density and that vacant lots within the service area are developed to that same higher density. It is assumed that future distribution system losses will make up approximately 10% of future water use.

#### 4.1 Infill Growth due to Redevelopment

Future water use due to redevelopment (additional development of non-vacant lots) is estimated assuming existing population density can increase by approximately 25%; this increases current population by 57,300 persons within the existing water service area for a total future population within the existing service area of 286,500 persons. Applying the derived *water use per capita* ratio, future water use due to redevelopment of existing areas inside the current service area is estimated at:

57,300 persons x 200 gpcd = 11,500,000 gpd (11.5 MGD)

Redevelopment at higher density will result in a higher average *future water use per acre*; the future average population density is estimated by dividing estimated future population of the served area by the area currently served [Served Area = Total Area – Conservation Area – Vacant Lots – Platted Lots]. Future population density is calculated as:

$$(229,200 + 57,300 \text{ persons}) \div (56,500 - 2,500 - 10,000 - 1,280 \approx 42,700 \text{ acres}) = 6.71 \text{ persons per acre}$$

Higher population density due to redevelopment will result in the following estimated average water use per acre:

ADD = (6.71 persons per acre) x (200 gpcd)  $\approx$  1,342 gpd/acre

MDD = 1,342 x 3.03 = 4,066 gpd/acre

### 4.2 Infill Growth on Vacant Parcels

Vacant land within the existing service area totals 10,000 acres. It's unclear whether vacant parcels with DOR, GOVT, and SCLS exemption codes will ever be utilized for uses that require water; for the purpose of this analysis it is assumed vacant, exempt parcels will never be utilized in ways that require water service. It is assumed that all non-exempt parcels will develop at the same average

future population density calculated in the preceding section. Future water use of the vacant nonexempt parcels within the existing service area is estimated at:

6,700 acres x 1,342 gpd/acre  $\approx$  8,990,000 gpd (9.0 MGD)

The future demand of final plats not yet connected to the water system is estimated at:

1,280 acres x 1,342 gpd/acre  $\approx$  1,720,000 gpd (1.7 MGD)

#### 4.3 Estimated Distribution System Losses

Existing distribution losses are estimated at about 18% of the total water volume pumped. System losses averaged roughly 10.2 MGD in 2010. The Water Dept hopes to limit future system losses to 10% or less.

#### 4.4 Existing Service Area Future Water Use Summary

Future water use within the existing service area was estimated using the *future water use per acre* ratio calculated in preceding sections.

#### Table 5 Existing Service Area Water Use Increase

	ADD	Annual			
Water Use	(MGD)	MG	acre-feet		
Infill due to Redevelopment	11.5	4,198	12,884		
Infill due to Vacant Parcels	9.0	3,285	10,081		
Final Plats	1.7	621	1,906		
Subtotal	22.2	8,103	24,871		
Distribution System Losses (10%)	2.2	803	2,464		
Total Water Use Increase	24.4	8,906	27,333		

**Figure 3** shows the estimated ADD increased water use for designated neighborhoods expressed in million gallons per day (MGD). The increase in water use allocated to each neighborhood was estimated as follows:

25% increase over estimated existing use due to denser redevelopment Vacant lots area multiplied by *future water use per acre* + (refer to Section 4.1) <u>An estimate of future distribution system losses</u> + Total increase in Water Use

**Table 6** shows this information in table form. **Figure 3** also shows the location of City wells and water transmission mains 24 inch or greater in diameter.

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Table 6	Incroscod	Wator Lle	o por Na	highborhood	in Evictin	a Sonvico A	roa
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Name	Increased water use from Infill due to Redevelopment (MGD)	Increased Water Use from Infill of Vacant Lots (MGD)	Allowance for distribution system losses (MGD)	Total Estimated Increase in Water Demand (MGD)
Balboa\South Indian Trail	0.22	0.11	0.07	0.40
Bemiss	0.38	0.05	0.07	0.50
Browne's Addition	0.11	0.00	0.07	0.18
Chief Garry Park	0.34	0.20	0.07	0.60
Cliff\Cannon	0.43	0.06	0.07	0.56
Comstock	0.33	0.05	0.07	0.44
East Central	0.54	0.34	0.07	0.94
Emerson\Garfield	0.44	0.07	0.07	0.57
Five Mile Prairie	0.18	0.70	0.07	0.94
Grandview\Thorpe	0.03	0.57	0.07	0.67
Hillyard	0.27	0.51	0.07	0.84
Latah/Hangman Valley	0.22	2.07	0.07	2.35
Lincoln Heights	0.59	0.26	0.07	0.91
Logan	0.50	0.14	0.07	0.71
Manito\Cannon Hill	0.22	0.03	0.07	0.32
Minnehaha	0.19	0.04	0.07	0.30
Nevada\Lidgerwood	1.54	0.71	0.07	2.32
North Hill	0.64	0.03	0.07	0.74
North Indian Trail	0.34	0.85	0.07	1.25
Northwest	1.22	0.42	0.07	1.70
Peaceful Valley	0.01	0.03	0.07	0.11
Riverside	0.14	0.04	0.07	0.25
Rockwood	0.15	0.13	0.07	0.35
SA_East (1)	0.03	0.20	0.07	0.29
SA_NE <sup>(1)</sup>	0.01	0.06	0.07	0.14
SA_NW <sup>(1)</sup>	0.04	0.14	0.07	0.25
SA_SE <sup>(1)</sup>	0.27	0.18	0.07	0.52
SA_WPN <sup>(1)</sup>	0.05	0.15	0.07	0.26
SA_WPS <sup>(1)</sup>	0.17	2.09	0.07	2.33
Southgate	0.39	0.17	0.07	0.63
West Central	0.46	0.23	0.07	0.76
West Hills	0.11	0.88	0.07	1.06
Whitman	0.13	0.01	0.07	0.20
Total <sup>(2)</sup>	10.7	11.5	2.2	24.4

<sup>(1)</sup> SA\_ areas have been developed for this document to show regions where future water use will occur. In this particular table, the SA\_ areas are inside the existing water service area, but outside the City Limits and currently do not have a neighborhood designation.

<sup>(2)</sup> Some column totals are slightly off due to justifiable significant figures and truncation of decimal points.

## 5.0 FUTURE WATER USE WITHIN CWSP SERVICE AREA

## 5.1 Area

The unserved portion of the CWSP service area adds approximately 44,790 acres to the City's existing water service area (refer to **Figure 1**). Total future water service area for the City is therefore 44,790 + 56,500 acres = 101,290 acres.

## 5.2 Zoning and Land Use

County Zoning and Land Use designations were reviewed to determine if they could be used to refine the future water use estimate. The County designations could be useful to predict the timing of when water will be needed in the CWSP service area outside the existing service area. An example of this is that land designated as "Urban Reserve" will likely need water before lands designated "Rural Traditional" will. However, the assumption is that the entire CWSP with the exception of the 10,500 acres designated "Rural Conservation" will be developed over time, at the same future density as the rest of the water service area (refer to section following for future density).

## 5.3 Population

The 2010 population inside the CWSP boundary but outside the existing service area was estimated at 21,020 persons using the 2010 census block data from the Washington State OFM. Current population density is estimated at:

21,020 persons  $\div$  44,790 acres = 0.47 persons/acre.

Current population density inside Spokane's existing service area is substantially higher at 4.06 persons per acre. Future density of the CWSP service area is estimated at 6.71 persons/acre (Section 4.1); future population of the CWSP service area outside the existing service area is estimated at:

 $(44,790 - 11,550 \text{ conservation acres}) \ge 6.71 \text{ person/acre} \approx 223,000 \text{ persons}$ 

Total build-out population of CWSP service area (including existing service area) is estimated at:

```
229,200 + 223,000 \text{ persons} \approx 460,000
```

### 5.4 CWSP Area Future Water Use Estimated

Future water use of the area outside the existing service area but within the CWSP boundary is estimated using the *future water use per acre* ratio developed in **Section 4.1**. Estimated water use is calculated by subtracting lands designated as Rural Conservation and Mining from the CWSP area outside the existing service area and multiplying by the future water use per acre ratio. Future water use of the area outside the existing service area but enclosed by the CWSP boundary is therefore estimated at:

(44,790-11,550 acres) x 1,342 gpd per acre = 44.6 MGD

Another method of estimating water use for the same area is to use estimated build-out population in the CWSP service area outside the existing service area based on the 33,240 acres of land available with an estimated future population density of 6.71 persons/acre (Section 4.1); this results in a build-out population of 223,000 persons within the CWSP service area outside the existing service area. Section 3.6 estimates current per-capita water use a 200 gpd/capita. Using this factor water use in the CWSP is estimated at 44.6 MGD; this checks with the 44.6 MGD estimated using the *future water use per acre* ratio.

The calculated water use per acre ratio does not include system losses. System losses are estimated at 10% of total water use.

 $44.6 \ge 10\% = 4.5 \text{ MGD}$ Build-out water use in the CWSP is estimated at 44.6 + 4.5 = 49.1 MGD

Figure 4 and Table 7 show estimated build-out water use in areas of the CWSP service area that are outside the existing service area.

		Water Use	Annual		
Area Name	Acres	(MGD)	MG	acre-feet	
CWSP_NE	1,981	2.93	1,069	3,281	
CWSP_NW	2,959	4.37	1,595	4,895	
CWSP_SE	8,819	13.03	4,756	14,597	
CWSP_WPN	9,211	13.61	4,968	15,247	
CWSP_NPS	10,270	15.17	5,537	16,994	
Totals	33,240	49.10	17,922	55,004	

#### Table 7 Estimated Future Water Use in CWSP

## 6.0 EXISTING AND FUTURE WATER USE AGREEMENTS (INTERTIES)

Spokane has common boundaries with at least 12 water purveyors. Six of these adjoining purveyors have interties with the City of Spokane Water System.

- Spokane County Water District #3 has four interties that provide for both normal water supply and for emergency needs
- Whitworth Water District has one intertie for emergency purposes
- City of Airway Heights has one intertie that is used extensively to supplement demands that the Airway Heights Water System cannot support
- Fairchild Air Force Base has one intertie that is used for emergency needs in their water system
- Vel View Water District has one intertie to receive water on an as-needed basis
- North Spokane Irrigation District has an intertie for emergency purposes

The table and figure following show annual intertie volume sold over the last ten years.



	All Volumes in 1,000 gallons (KG)												
Name	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Mean	High	Low
Airway Heights	53,258	112,686	173,671	25,769	46,002	65,555	118,379	180,014	30,623	2,513	80,847	180,014	2,513
SCWD #3 Carnahan	16,374	16,419	17,249	14,893	10,165	11,751	12,290	13,733	14,377	14,377	14,163	17,249	10,165
SCWD #3 Desmet	39	37	29	36	40	102	112	178	5	2	58	178	2
SCWD #3 Perry	27,378	29,555	25,144	27,634	23,129	30,593	31,364	33,746	33,956	35,259	29,776	35,259	23,129
SCWD #3 Wall	0	0	0	0	0	0	0	0	0	0	0	0	0
SCWD #3 Thierman	15	30	22	81	0	434	142	172	75	75	105	434	0
Vel View Water	2,837	1,814	1,953	1,064	607	412	0	0	0	1,198	989	2,837	0
Whitworth Water Dist	0	0	0	0	0	0	3,441	299	135	2,775	665	3,441	0
Sum	99,901	160,541	218,068	69,477	79,943	108,847	165,728	228,142	79,171	56,199	126,602	239,412	35,809

#### Table 8Annual Intertie Sales Volumes 2005-2014



#### Figure A Annual Intertie Sales Volumes

As shown in the preceding table and figure the volume sold through interties varies significantly from year to year which makes accurate prediction of future needs difficult. In addition, Spokane expects to connect to additional adjacent utilities in regional wholesale partnerships for systems that do not have adequate supply and/or annual water rights to support growth in their systems. A detailed estimate of possible future connections and growth rates is beyond the scope of this study. This study assumes Spokane will eventually supply up to 10,000 acre-feet to neighboring systems via interties.

## 7.0 ESTIMATED BUILD-OUT WATER USE

This evaluation is intended to be moderately conservative in order to provide for the long term future needs of the community and region. The analysis assumes current levels of water use efficiency will remain constant over time.

Estimated future water use includes infill of vacant parcels within the existing service area, increased development density, and expansion into the future service area as defined by the CWSP. **Table 9** provides a summary of estimated build-out water use in Spokane's future water service area allocated to various areas and categories.

Description		Existing	annual	Build-out Annual		
		MG	acre-ft	MG	acre-ft	
	Existing Served Area	16,759	51,435	16,759	51,435	
Existing	System Losses (18% => 10% at ult.)	3,740	11,478	2,224	6,826	
Served Area	City Agreements (Interties)	110	338	3,258	10,000	
	Subtotal (1)	20,609	63,251	22,241	68,261	
Infill and Redevelop Existing Served Area	Redevelopment	-	-	4,198	12,884	
	Vacant Lots	-	-	3,285	10,081	
	Platted Parcels	-	-	621	1,906	
	System Losses (10%)	-	-	803	2,464	
	Subtotal <sup>(1)</sup>	-	-	8,906	27,333	
Expansion to	Development of Un-served Areas	-	-	16,279	49,962	
Un-served CWSP	System Losses (10%)	-	-	1,643	5,043	
	Subtotal <sup>(1)</sup>	-	-	17,922	55,004	
Total Demand <sup>(1)</sup>		20,609	63,251	49,070	150,600	

#### Table 9Estimated Future Water Use

<sup>(1)</sup> Some subtotals and totals are slightly off due to justifiable significant figures and truncation of decimal points in preceding calculations. Refer to calculations in preceding sections for source of results reported in this table.

Currently Spokane's ADD to MDD peaking factor is approximately 3.0. If this peaking factor remains constant over time MDD will be calculated at:

 $ADD = 49,070 \text{ MG} \div 365 \text{ days} \approx 134 \text{ MGD}$  $MDD = 134 \text{ MGD x } 3.0 \approx 400 \text{ MGD} \approx 280,000 \text{ gpm}$ 

# 8.0 EXISTING WATER RIGHTS VS ESTIMATED BUILD-OUT DEMANDS

Spokane's 2014 Draft Water System Plan indicates the City's water rights portfolio includes the following total annual and instantaneous quantities:

Annual ( $Q_A$ ): 147,570 acre-feet Instantaneous ( $Q_I$ ): 241,100 gpm

The estimated build-out demands for Spokane's future service area developed herein slightly exceed the City's annual water rights ( $\approx$  3,000 acre-feet) and more significantly exceed the City's instantaneous water rights ( $\approx$  39,000 gpm). The slight difference in annual water rights and estimated annual build-out demands is likely within the uncertainties associated with the assumptions used herein to estimate the future demands. If Spokane's ADD:MDD peaking factor remains constant the build-out demand estimate developed herein indicates Spokane will need additional instantaneous water rights to meet MDD.

# 3.5 The Report of Examination for Water Right Change (combined)
	STATE OF WASHINGTON						
	DEPARTMENT OF ECOLOGY						
	PROTESTED APPLICATION FOR CHANGE						
	REPORT OF EXAMINATION						
TO	APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON						
Surface Water	fissued in accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the Department of Ecology.)						

RIORITY DATE	APPLICATION NUMBER	TION NUMBER PERMIT NUMBER		CERTIFICATE	NUMBER
1907	50		503D	03D	
CITY OF SPOKANE WATER	DIVISION				
ADDRESS (STREET)	(CITY)		(STATE)		(ZIP CODE)
East 914 Grace	Spoka	ne	Washingt	on	99207
	PUBLIC WATE	RS TO BE APPROPRIAT	ED		
source three (3) wells					
TRIBUTARY OF LIF SURFACE WATERS	)	· · · · · · · · · · · ·			
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS	PER MINUTE	MAXIMUM AC	RE-FEET PER YE	AB
QUANTITY, TYPE OF USE, PERIOD OI	F USE				
34,000 gallons per min	nute, 1700 acre feet	per year, contin	uously, for	municipal	l supply.
	-				
	,				
	· · · · · · · · · · · · · · · · · · ·				
	LOCATION OF D	VERSION/WITHDRAW			
APPROXIMATE LOCATION OF DI	VERSION-WITHDRAWAL				
*See below for location	ons í				
					ii
LOCATED WITHIN (SMALLEST LEGAL	SUBDIVISION) SECTION	TOWNSHIP N. RANG	SE. (5. OR W.) W.M.	W.R.I.A. CO	UNTY
ALL WITHIN		43	E	54/55 St	ookane
	RECORDE	D PLATTED PROPERTY			
OT	BLOCK	OF GIVE NAME OF	PLAT OR ADDIT	ION)	

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

\*Well Locations

#1) Lots 17, 18, 19, and 20, Block 14, Byrnes Addition, being within Sec. 31, T. 26 N., R. 43 E.W.M.;
#2) Lots 8, 9, and 10, Block 37 of Wolverton & Conlans Addition being within Sec. 8, T. 25 N., R. 43 E.W.M.
#3) Block 1, Third Addition to Eureka, being within Sec. 22, T. 25 N., R. 43 E.W.M.

Legal Description:

Area served by the City of Spokane; ALL BEING WITHIN Spokane County, Washington.

Three (3) wells and pressure distribution system.

DEVELOPMENT SCHEDULE						
BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:				
<u>Started</u>	Completed	October 1, 1986				

REPORT

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DESCRIPTION OF PROPOSED WORKS

See attached report.

#### BACKGROUND

On August 30, 1982, ten (10) applications for change of place of use were submitted to the Department of Ecology by the City of Spokane. The applicant proposes to change the place of use under Ground Water Certificates and Declarations Nos. 3903A, 3199A, 728A, 548A, 4503A, 503D, 504D, 505D, 506D and 507D. The present description of the place of use is the "City of Spokane" which would not allow for the proposed service of city water to areas located outside of the incorporated city limits. Therefore, the city has requested that the place of use for the 10 certificates be change to "the area served by the City of Spokane, Spokane County."

A public notice of the applicants intent was published in the Spokesman Review, Spokane Washington, in accordance with RCW 90.03.280; eighteen (18) protests to this application were received.

The City of Spokane issued a Final Declaration of Non-Significance on June 14, 1982, stating that this proposal has been determined not to have a significant adverse impact upon the environment and that the Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). These changes are exempt from the Family Farm Water Act of 1977, Chapter 90.66 RCW.

### PROTESTS

All eighteen (18) protestants had common concerns about the extension of city water service to their area. They all have individual domestic water supplies from drilled wells. They are concerned that the excavation and associated rock blasting, where required, could damage their domestic wells. Many of the protestants were concerned that they would be required to hook up to the city water system, believing the expense would not be justified, as their present private wells provide more than sufficient water for their domestic needs.

The protestants were also concerned that they would be required to hook up to the city sever line which is being installed concurrently with the water service distribution system.

This application for change of the place of use of the city water service area is a separate issue from the city sever service and the protestants concerns about sever hookups will not be discussed.

Jim Lyerla and Dannie Weis of the Department of Ecology discussed the city's proposal with each of the protestants. As a result of these discussions the following information on the protestants' wells was obtained:

1) Alvin A. Kruckenberg, 6512 W. Thorpe Road, Spokane, WA 99204 - Mr. Kruckenberg's well is 70 feet in depth with a static water level of 10 feet below land surface. It is equipped with a 1½ H.P. Jet pump and produces 35 gallons per minute. Mr. Kruckenberg states that this well has been very reliable to date and is used for domestic supply and stockwater.

2) Terry Munro, Route 14, Box 672, Spokane, WA 99204 - The Munro well is 114 feet in depth and equipped with a 1 H.P. pump. The well has been very reliable and is capable of running 2 to 3 sprinklers. Mrs. Munro feels that the city should monitor the static water level in selected wells in this area during the construction and blasting phase of development. This well is used for a continuous domestic supply and stockwater.

3) Alfred C. & Joanne D. Williams, West 4210 Thorpe Road, Spokane, WA 99204 - Mr. Williams' well is approximately 100 feet north of the presently installed sever and water line. They have not experienced any problems with their well as a result of this construction. No information was available on this well. This well is used for a continuous domestic supply.

4) Cheryl Ebenhard Derrick, West 4020 Thorpe Road, Spokane, WA 99204 - Mrs. Derrick's well is approximately 100 feet north of the presently installed sewer and water line. She has not experienced any problems as a result of this construction. No information was available for her well. The well is used for a continuous domestic supply.

5) Mr. & Mrs. Robert N. Gibson, 56109 Assembly Road, Spokane, WA 99204 - Mr. Gibson's well is 77 feet in depth and is equipped with a submersible pump. Mr. Gibson uses this well for a domestic water supply and has experienced no problems with the well to date.

6) Ruth Wunderlick, W. 5306 Thorpe Road, Spokane, WA 99204 - Mrs. Wunderlick's well is near the presently installed sewer and water line. This well is 55 feet in depth and produces 21 gallons per minute for a continuous domestic water supply. She has had no problems with the well before or after the water line installation. CITY OF SPOKANE

7) Verna Motyca, S. 5424<sup>1</sup> Dorset Road, Spokane, WA 99204 - Mrs. Motyca's well is 115 feet in depth and produces adequate water for her domestic needs. She has not experienced any problems with the well in the past.

6) Mr. & Mrs. G.M. Van Ausdle, 6309 S. Assembly Road, Spokane, WA 99204 - The Van Ausdle's well is 109 feet deep and equipped with a  $\frac{1}{2}$  H.P. submersible pump. This well is used for a continuous domestic supply and has been very reliable.

9) Mr. & Mrs. Ing H. Hansen, 6620 S. Assembly, Spokane, WA 99204 - The Hansen's have moved since they filed their protest. The residence is now owned by Hike Lascuola. Mr. Lascuola drilled a new well in 1982 to a depth of 125 feet. The static water level is 20 feet below land surface and the well is equipped with a 1 H.P. submersible pump. The old well was not a good well and was replaced by Mr. Lascuola. This new well is used for a continuous domestic supply.

10) Margaret Braun, 6820 S. Assembly Road, Spokane, WA 99204 - Mrs. Braun's well is 115 feet in depth with a static water level of 11 feet below land surface. This well was drilled 8 years ago and will produce 20 gallons per minute for a continuous domestic supply. She has had no problems with this well since it was drilled.

11) Mr. & Mrs. Harry Teagle, S. 7121 Assembly Road, Spokane, WA 99204 - Mr. Teagle's well is 70 feet deep and is 10 years old. They have not had any problems with the well which is used for a continuous domestic supply.

12) Charles W. Ort, Route 4, Box 277, Cheney, WA 99004 - The Orts have two domestic wells. The original well, under their house, has been abandoned due to access problems. The second well is 160 feet deep and is equipped with a 5 H.P. submersible pump. The Orts state that the well has a shallow water level and that they have had no problems with this well.

13) Edith Baker, S. 4908 Assembly Road, Spokane, WA 99204 - Mrs. Baker has a domestic well 135 feet in depth. The well is equipped with a ½ H.P. submersible pump and has a 70 foot static water level. Mr. Baker states that they have had no problems with this well.

14) Ralph & Grace Hagel, Route 14, Box 688, Spokane, WA 99204 - Mrs. Hagel's domestic well is 110 to 115 feet deep. She has not had any well problems to date.

15) Mark & Kathleen Skeman, Route 14, Box 680, Spokane, WA 99204 - Mr. Skeman's domestic well is 220 feet in depth, being cased to 90 feet, with a static water level of 20 feet below land surface. It is equipped with a  $\frac{1}{2}$  H.P. submersible pump at present. In the past, it was used for military purposes and 80 acres of orchard. The well has been a good producer even during drought years.

16 & 17) David L. Shapel & Phonacelle Wheeler, West 4521 Hallett Road, Spokane, WA 99204 -This residence was sold 2½ years ago to Karen Miller. Mrs. Miller has no information on the well, but states that she has not experienced any problems since she has been the owner.

18) Mr. & Mrs. Lawrence Shepherd, West 4511 Thorpe Road, Spokane, WA 99204 - The department contacted Mrs. Shepherd by telephone and also sent a questionnaire requesting specific well information. To date, no response has been received. However, it should be noted that the city system is presently installed with no reported effects on the Shepherd well.

# INVESTIGATION

During the month of February, 1985, Jim Lyerla and Dannie Weis of the Department of Ecology contacted each of the protestants to discuss the granting of this change of place of use for the City of Spokane,

Each protestant was advised to collect any data available for their well and keep these records in a secure place. We also collected as much data on each of the wells as was available. Many of the protestants did not know the well depth, static water level and in some cases the pump size. However, the available data is outlined under the <u>Protests</u> section in this report.

The departments intent in gathering this information is to partially document the present water supply systems in the area. It appears from our discussions that well depths vary throughout the area, but generally are less than 150 feet in depth. All of the wells visited produce ground water from the interflow zones of the Columbia River Basalt Group. These wells all produce sufficient ground water for domestic and stockwater uses. There does not appear to be any large scale irrigation development within this immediate area and therefore no well interference problems commonly associated with these large production wells.

The City of Spokane has installed the sewer and water line along Thorpe Road to its intersection with Spotted Road. The main truck line will continue along Thorpe Road then south along Flint Road 21 miles to its terminus. A number of the protestants contacted own wells very near the presently installed sewer and water line and have reported that they have not experienced any well problems as a result of the construction.

#### CONSIDERATION OF PROTESTS

The existing construction and associated blasting has not affected any existing wells along the proposed sewer and water line route based upon our interviews with the protestants. If any damage were to occur to private wells as a result of this construction, the City of Spokane could be held liable.

The department has tried to document the depth and production capabilities of each of the protestants wells. We have also advised that each individual well owner collect any pertinent data concerning their wells in the unlikely event that damages do occur.

The city is not proposing to drill any new wells within this area. They have only applied to serve water from their existing municipal water system under these applications for change. The city water supply is presently being withdrawn from the Spokane aquifer system which is not related to the protestants basalt aquifer aystem and therefore will have no effect on their existing water supplies.

# CONCLUSIONS AND RECOMPLENDATIONS

It is the conclusion of this examiner that granting this change in place of use will not impair other existing rights or result in the withdrawal of any additional quantities of water beyond those amounts the City of Spokane has authorized under existing Ground Water Certificates and Declarations.

It is recommended that these ten (10) applications for change of place of use be approved subject to the following advisory:

It is recommended that the City of Spokane monitor selected wells within this area during the construction phases of this project. This monitoring would be especially critical in wells near areas of proposed blasting.

Signed at Spokane, Washington this 30th day of May, 1985

JAMES M. LYERLA, DISTRICT SUPERVISOR Resource Management Division Department of Ecology

#### BEFORE THE DEPARTMENT OF ECOLOGY STATE OF WASHINGTON

IN THE MATTER OF APPLICATION	)	FINDINGS OF FACT
FOR CHANGE UNDER GROUND WATER	)	AND
CERTIFICATE NUMBER 503D	)	ORDER

Upon review of the Examiner's report, I find that all facts relevant and material to the subject application have been thoroughly investigated. Furthermore, in accordance with the Examiner's conclusions and recommendations, I find that said change will not impair existing rights or be detrimental to the public welfare.

IT IS ORDERED that a change of place of use be made under the aforesaid application authorizing appropriation of public waters in the amount, and for the use, and aubject to the provisions set forth in the Examiner's report.

Chapter 43.21B RCW provides that any person who feels aggrieved by such an order may appeal to the Pollution Control Hearings Board of Washington, with a copy to the director of the Department of Ecology, within thirty (30) days of receipt of this order. Procedures for requesting a hearing may be obtained from this department.

Signed at Spokane, Washington this 30th day of May, 1985.

ANDREA BEATTY RINIKER, Director Department of Ecology

ARNOUIST, Regional Manager

CERTIFIED MAIL





# RECEIVED

JUL 2 9 1982

DEPARTMENT OF ECOLOGY BEFORE THE BOARD OF SPOKANE COUNTY COMMISSIONERSPOKANE REGIONAL OFFICE SPOKANE COUNTY, WASHINGTON

IN THE MATTER OF AMENDING THE	)
SPOKANE COUNTY GENERALIZED COMPRE-	í
HENSIVE PLAN THE CENEDAL WATED	<
PLAN AND MODE ODEOTET ALTER	<u>}</u>
THE AND NORE SPECIFICALLY THE	)
COMPREHENSIVE WATER PLAN FOR THE	Ì
SPOKANE PLAINS	< .
	J.

FINDINGS OF FACT/DECISION

WHEREAS, pursuant to Chapter 36.94 RCW, the Board of Spokane County Commissioners by Resolution #75-313, dated May 1, 1975, did adopt the Water Supply Facilities Plan for the Spokane Plains Water General Plan as a portion of the Comprehensive Plan for Spokane County; and

WHEREAS, pursuant to Chapter 36.94.050 RCW, the Spokane Plains General Water Plan Review Committee, by Resolution dated March 17, 1982, did recommend to the Board regarding amending the Comprehensive Water Plan for the Spokane Plains to reflect the January 13, 1982 letter request by the City of Spokane to allow the City to provide water to certain areas of the West Plains within the City's proposed Critical Water Supply Service Area (CWSSA); and

WHEREAS, such recommendation of the Committee did include the two following provisions:

- 1) The City of Spokane Water Service Area boundary shall be the mutually agreed boundary and on record with the County under the Coordinated Water System Plan; and
- 2) The City of Spokane should agree to extend their water lines to provide water to any or all of the service areas of Airway Heights, Medical Lake, Cheney and Four Lakes in the event any of these areas should request such service; and

WHEREAS, the Board, by Resolution #82-0317 dated April 6, 1982, did direct the Planning Agency to review and report back to the Board pursuant to Chapter 36.70.430 RCW, including adequate consideration and attention to the public hearing requirements of Chapter 36.70.380 RCW and the environmental review requirements of Chapter 43.21C RCW; and

WHEREAS, pursuant to the public hearing provisions of Chapter 36.70.380 RCW and the Notice of Hearing requirements of Chapter 36.70.390 RCW, the Spokane County Planning Commission held a public hearing at 10:30 a.m. on May 13, 1982 in the Public Hearing Room of the Spokane County Planning Department at North 721 Jefferson, Spokane, Washington, to consider a proposed amendment to the Spokane County Generalized Comprehensive Plan, the General Water Plan and more specifically the Comprehensive Water Plan for the Spokane Plains; and

WHEREAS, pursuant to Chapter 36.70.420 RCW, the Board of County Commissioners of Spokane County after the receipt from the Planning Agency of a Planning Commission motion regarding a recommendation to amend the Comprehensive Plan may approve by motion and certify said proposed amendment; and

WHEREAS, the Planning Department did forward to the Board (1) a Planning Commission Resolution dated May 13, 1982, Exhibit I, recommending adoption of the amendment, and (2) correspondence dated April 22, 1982 and April 26, 1982 from William Dobratz, Spokane County Utilities Director, acting in the capacity of the County's Responsible Official pursuant to Chapter 43.21C RCW and Chapter 197-10 WAC, hereto attached as Exhibits II and III and as evidenced that the legal requirements of the State Environmental Policy Act have been examined and satisfied; and

WHEREAS, after reviewing the Planning Commission's Findings of Fact/ Decision dated May 13, 1982, the Board of County Commissioners of Spokane LRI-I

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County feels that the best interest of the public, the orderly physical development and the best management of growth and the natural resources of Spokane County will be met by amending the Comprehensive Plan, the General Water Plan and the Comprehensive Water Plan for the Spokane Plains to reflect the May 13, 1982 recommendation of the Planning Commission.

NOW, THEREFORE, pursuant to the provisions of Chapter 36.70.420 RCW, the Board of County Commissioners of Spokane County does hereby amend the Generalized Comprehensive Plan adopted December 22, 1980, as said amendment is set forth in Exhibit I attached hereto and incorporated here by reference.

BE IT FURTHER RESOLVED, that the Board of County Commissioners of Spokane County, in amending the 1981 Generalized Comprehensive Plan as referred to herein above, hereby additionally finds that the provisions of the State Environmental Policy Act, Chapter 43.21C RCW, have been adequately and properly dealt with as evidenced by attached Exhibits II and III, attached hereto and incorporated here by reference.

BE IT FURTHER RESOLVED, that the Planning Department is directed to comply on behalf of the Board with the Notice of Action requirements of Chapter 43.21C.080 RCW with regard to this action taken by the Board.

BE IT FURTHER RESOLVED by the Board of County Commissioners of Spokane County in that after carefully studying and reviewing those Findings of Fact/ Decision of the Spokane County Planning Commission dated the 13th day of May, 1982, the Board does hereby adopt the findings and information as set forth within the Findings of Fact/Decision dated the 13th day of May, 1982, with respect to the proposed amendment to the Generalized Comprehensive Plan for Spokane County.

PASSED AND ADOPTED THIS 23 DAY OF VOTE OF THE COMMISSIONERS AS FOLLOWS:

, 1982, BY

COMMISSIONER MC BRIDE
COMMISSIONER SHEPARD
COMMISSIONER PETERSON
BOARD OF COUNTY COMMISSIONERS OF SPOKANE COUNTY, WASHINGTON
Ang. morie

ATTEST:

VERNON W. OHLAND, Clark of the Board By:	Gate
Dephty Clerk	

BEFORE THE PLANNING COMMISSION OF SPOKANE COUNTY, WASHINGTON

JUL 2 9 1982

DEPARIMENT OF ECOLOGY SPOKANE REGIONAL OFFICE

IN THE MATTER OF RECOMMENDING AN ) AMENDMENT TO THE SPOKANE COUNTY ) GENERALIZED COMPREHENSIVE PLAN; THE) GENERAL WATER PLAN AND THE COMPRE- ) HENSIVE WATER PLAN FOR THE SPOKANE ) PLAINS )

FINDINGS OF FACT/DECISION

WHEREAS, the Board of County Commissioners of Spokane County did by Resolution 82-0317, dated April 6, 1982, forward to the Planning Agency of the County an amendment to the Spokane Plains General Water Plan as recommended by the Spokane County General Water Plan Review Committee, such action being pursuant to RCW Chapter 36.70.430, and attached hereto as Exhibit "A"; and

WHEREAS, pursuant to the provisions of RCW Chapter 36.70.430, notice of the time, place and purpose of the public hearing to consider such an amendment to the Comprehensive Plan was given by publication in a newspaper of general circulation in the County, the Valley Herald, on April 28, 1982; and

WHEREAS, pursuant to the provisions of RCW Chapter 36.70.380 the Spokane County Planning Commission held a public hearing at 10:30 a.m. on May 13, 1982 in the Public Hearing Room of the Spokane County Planning Department at North 721 Jefferson, Spokane, Washington, to consider the recommendation of the Board of Spokane County Commissioners to amend the Generalized Comprehensive Plan for Spokane County, more-particularly the General Water Plan and the Comprehensive Water Plan for the Spokane Plains; and

WHEREAS, after considering all public testimony given at said hearing with regard to amending the General Water Plan, reviewing the proposed amendment with the Director of the Spokane County Utilities Department and reviewing the resolution of the Spokane Plains General Water Plan Review Committee with regard to accepting and approving the Comprehensive Water Plan for the Spokane Plains area, attached hereto and adopted hereby as Exhibit "B"; and

WHEREAS, the Spokane County Planning Commission feels that the best interest of the public as well as the orderly physical development of Spokane County will be met by recommending to the Board of County Commissioners of Spokane County that the General Water Plan and the Generalized Comprehensive Plan with Spokane County be amended as indicated on Exhibit "B"; and

WHEREAS, the text of the Generalized Comprehensive Plan, Section 20, page 6, DECISION GUIDELINE 20.5.2 states the policy of the County to be that the first phase of utilities (in the Airport general area) should be located along I-90 to serve the Spokane International Airport Industrial Park and industrial and residential developments south and east of the Spokane International Airport; and

WHEREAS, the Spokane County Planning Commission has been advised by the Director of the Utilities Department, the responsible official for Spokane County for this proposal that, pursuant to WAC 197-10-600, the proposed amendment will not have an impact on the environment that is substantially different from the impacts addressed in (1) Environmental Impact Statement, Spokane Plains Water Supply Project; January 1976, Black and Veatch, Consulting Engineers and (2) Draft and Final Environmental Impact Statements, 1980 Generalized Comprehensive Plan for Spokane County; August 20, 1980, and undated (respectively); Spokane County Planning Department.

NOW, THEREFORE, be it resolved by the Spokane County Planning Commission that, pursuant to the provisions of RCW Chapter 36.70.430, the Commission does hereby recommend that the Board of County Commis-

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sioners amend the Generalized Comprehensive Plan for Spokane County. adopted December 22, 1980 and the General Water Plan and the Comprehensive Plan for the Spokane Plains, adopted Nay 1, 1975, from its present status as the "Black and Veatch Report" to the present plan requested by the City of Spokane and as detailed in the study entitled "West Plains Area Water and Sewer Plan", prepared by the Boyle Engineering Corportation, attached hereto as Exhibit "A".

BE IT FURTHER RESOLVED, that the Commission recommends that the implementation of the Plan would address transmission pipelines indicated as W-2, 3 and 6 (Revised), and that subsequent phases of implementation will be substantially in the order suggested by the phasing indicated in the map legend of Exhibit "A" attached hereto.

BE IT FURTHER RESOLVED, that the Commission is advised of the proper procedure to be followed with regard to the Washington State Environmental Folicy Act, RCW Chapter 43.21C and the SEPA GUIDELINES, WAC 197-10, and notes that the documents have been circulated with respect to the requirements of WAC 197-10-660 (3) and 197-10-600, and the Commission does concur with the recommendations of the Utilities Department and Planning Department staffs that the provisions of the Environmental Policy Act have been met, and therefore advises the Board of Spokane County Commissioners to sign and issue a final declaration of non-significance.

BE IT FURTHER RESOLVED, that the Commission has been advised by the Spokane Plains General Water Plan Review Committee that the following provisions as stated below are to be a portion of the amended Comprehensive Water Plan for the Spokane Plains Area:

- 1. The City of Spokane Water Service Area boundary shall be the mutually agreed boundary as on record with the County under the Coordinated Water Supply System Plan.
- 2. The City of Spokane should agree to extend their water lines to provide water to any or all of the service areas of Airway Heights; Hedical Lake, Cheney and Four Lakes in the event any of these areas should request such service.

BE IT FURTHER RESOLVED, by the Spokane County Planning Commission, pursuant to RCW Chapter 36.70.400, that information presented to the Commission has adequately shown that the amendment to the Plans' as described above is needed and the Commission hereby makes the following Findings of Fact:

- 1. The Black and Veatch Engineering Report, adopted as the General. Water Plan and the Comprehensive Water Plan for the Spokane Plains, on May I, 1975, as a part of the Comprehensive Plan for Spokane County provided a means to supply the West Plains area of Spokane County and several incorporated communities with water drawn from wells which tapped into the Spokane Aquifer on its westerly edge; and
- 2. That with the adoption of the Critical Water Supply Service Area Plan for Spokane County, which includes the foregoing area described in the Black and Veatch Engineering Report, the area of the previously adopted General Water Plan and Comprehensive Water Plan for the Spokane Plains was divided into several water supply service areas for the incorporated jurisdictions of Medical Lake, Chency, Airway Heights, the City of Spokane, the Four Lakes Water District and Fairchild Air Force Base; and
- 3. That the City of Spokane did by letter dated January 13, 1982 request the Board of County Commissioners to amend the General Water Plan for the Spokane Plains to allow the City of Spokane to serve water to the area; and
- 4. That the City of Spokane has submitted the amended Water Plan as prepared by the Boyle Engineering Corporation, which water

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system design will provide water within the City of Spokane's Critical Water Supply Service Area in substantially the same quantities and locations as provided by the adopted plan; and

- 5. That the system design allows the system to be expanded so that the various other water purveyors in the West Plains area may construct water lines in cooperation with the City of Spokane, to supply their own communities with adequate quantities of safe drinking water in the event such water is needed; and
- 6. That the indicated phasing of the project is consistent with the phasing priority stated in the text of the Comprehensive Plan, Section 20, page 6, DECISION GUIDELINE 20.52; and
- 7. That after considering all testimony and information as reported in the public hearing of Nay 13, 1982, the Commission believes the best interest of the public as well as the orderly development of the County will best be met by recommending the amendment to the Board; and
- 8. That the Spokane County Planning Commission held a public f hearing as required by RCW Chapter 36.70.380 and 390 on the proposed amendment; and
- 9. That the Planning Commission rendered an oral decision on May 13, 1982 wherein it recommended that the Comprehensive Plan of Spokane County, and more particularly the General Water Plan and the Comprehensive Water Plan for the Spokane Plains, be amended by the Board of Spokane County Commissioners to reflect the City of Spokane's request to provide its, critical water supply service area with water as detailed in the Boyle Engineering Report and as supported by the City of Spokane's letter of Janaury 13, 1982 to the Board of Spokane County Commissioners.

PASSED AND ADOPTED THIS	5 <u>/3</u> DAY OF	may		
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		Jane E	Muses-	-
		Rennelly	Kenn	-dy
	•	Katter	Cartin	J
ATTESTED:				
P				

вд: -

Exhibits "A" and "B" attached

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INE BUARD 0F LOUNTY COMMISSIONERS OF SPOKANE COUNTY, WASHINGTON 7:59

RESOLUTION NO. 82 0317

IN THE MATTER OF ACCEPTING THE SPOKANE PLAINS GENERAL WATER . PLAN REVIEW COMMITTEE RESOLUTION AND COMPREHENSIVE WATER AMENDING , THE PLAN FOR THE SPOKANE PLAINS

EXHIBIT RESOLUTION

# RECEIVED

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WHEREAS, pursuant to the provisions of the Revised Code of Washington Section 36.32.120(6) the Board of County Commissioners of Spokane County JUL 2 9 1982 has the care of County property and the management of County funds and business; and DEPARTMENT OF ECOLOGY SPOKANE REGIONAL OFFICE

WHEREAS, pursuant to the provisions of RCW Chapter 36.70 the Board of County Commissioners of Spokane County must adopt a comprehensive plan for the orderly physical development of all the unincorporated areas of Spokane County or portions of the same; and

WHEREAS, pursuant to the provisions of RCN Chapter 36.70.350, a comprehensive plan may contain a comprehensive water management element; and

WHEREAS, pursuant to the provisions of RCW Chapter 36.94 the Board of County Commissioners of Spokane County when they deem it advisable and necessary for the public health and welfare of the inhabitants of the County to establish, purchase, acquire and construct a system of sewage and/or water or make any additions or betterments thereto, the Board shall adopt as an element of the comprehensive plan a sewage and/or water general plan for a system of sewage and/or water for all or portions of the County; and

WHEREAS, pursuant to the provisions of RCW Chapter 36.94.050, prior to the adoption of or amendment of the sewage and/or water general plan, the Board of County Commissioners shall submit the plan or amendment to a review committee having a certain complexion; and

WHEREAS, pursuant to the above cited statutory sections, the Spokane Plains General Water Plan Review Committee has recommended to the Board of County Commissioners of Spokane County their acceptance of a certain amendment to the Comprehensive Water Plan for the Spokane Plains; and

WHEREAS, after reviewing the documentation submitted by the Spokane Plains General Water Plan Review Committee, the Board of County Commissioners of Spokane County is desirous of accepting the Review Committee's recommendation to accept the proposed Amendment to the Spokane Plains General Water Plan, and in so doing forward the same pursuant to RCW Chapter 36.70 to the Spokane County Planning Commission for public hearing and the Spokane County Planning Department for preparation of appropirate environmental documents;

NOW, THEREFORE, BE IT RESOLVED by the Board of County Commissioners of Spokane County that the Board hereby accepts the Amendment to the Spokane. Plains General Water Plan as recommended by the Spokane Plains General Water Plan Review Committee and in so doing forwards the plan to the Spokane County Planning Commission for processing pursuant to the provisions of RCW Chapter 36.70 and additionally forward the plan to the Spokane County Planning Department for the preparation of appropriate environmental documents pursuant to RCW Chapter 43.210.

Dated this 6th day of April, 1982

BOARD OF COUNTY COMMISSIONERS OF SPOKANE COUNTY, WASHINGTON

ATTEST: -VERNON W. OHLAND CLERK OF THE BOARD IDEPUTY

# SPOKANE PLAINS GENERAL WATER PLAN REVIEW CONMITTEE

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# RESQLUTION

DEPARTMENT OF ECOLOGY SPOKANE REGIONAL OFFICE . -WHEREAS, pursuant to Chapter 72, Laws of 1967 of the State of Washington, the Spokane Plains General Water Plan, Review Committee was organized for the purpose of studying the General Water Plan and making recommendations to the Spokane County Board of Commissioners, and

WHEREAS, the Review Committee did approve the Comprehensive Water Plan for the Spokane Plains and did submit recommendations to the Board of County Commissioners on January 6, 1975, and

WHEREAS, the General Water Plan for the Spokane Plains was approved and, adopted by the Board of County Commissioners on May 1, 1975, and

WHEREAS, the City of Spokane by letter dated January 13, 1982, requested to Board of County Commissioners to amend the General Water Plan for the Spokane Plains to allow the City of Spokane to serve water to the area, and

WHEREAS, the Review Committee was reconvened to consider the request of the City of Spokane to amend the General Water Plan, and

WHEREAS, the Review Committee has reviewed and considered the amended plan as submitted by the City of Spokane.

NOW, THEREFORE, BE IT RESOLVED by the Spokane Plains General Water Plan Review Committee that the attached General Water Plan is hereby accepted and approved as the amended Comprehensive Water Plan for the Spokane Plains area with the provisions as stated below:

- The City of Spokane Mater Service Area Boundary shall be the 1. mitually agreed boundaries as on record with the County under the Coordinated Water System Plan.
- The City of Spokane should agree to extend their waterlines to £. . provide water to any or all of the service areas of Airway Heights Medical Lake, Cheney and Four Lakes in the event any of these areas should request such service.

ADOPTED by the Spokane Plains General Water Plan Review Committee at a special meeting held on the 17th day of March, 1982.

and and



# State of Washington REPORT OF EXAMINATION FOR WATER RIGHT CHANGE

PRIORITY DATE May 1, 1926 WATER RIGHT NUMBER 504-D

ADDRESS City of Spokane 914 E. North Foothills Drive Spokane, WA 99207

Total Quantity Auth	orized for Withdrawal	and the second s	no-the second	100
WITHDRAWAL RATE 56,000	UNITS GPM	ANNUAL QUANTITY (AF/YR) 38,000		
Purpose				
PURPOSE	WITHDRAWAL RATE (GPM)	ANNUAL QUANTITY (AF/YR)	PERIOD OF USE	
Municipal	56,000	38,000	01/01 - 12/31	

Source - Spokane Valley/Rathdrum Prairie Water System					
SOURCE	COUNTY	WATERBODY	WATER RESOURCE INVENTORY AREAS		
Nineteen (19) wells	SPOKANE	GROUNDWATER	54, 55, 57		

Source Locations - Spokane Valley/Rathdrum Prairie Water System							
Source Name	Parcel #	Twp	Rng	Sec	QQ	Latitude	Longitude
Well Electric (2 wells)	35111.0001	25N	43E	11	SW%NE%	47.68147°N	-117.33214*W
Parkwater (4 wells)	35114.2501	25N	43E	11	NE%SE%	47.67754*N	-117.33002*W
Ray Street (2 wells)	35222.0001	25N	43E	22	SE%NW%	47.65051°N	-117.36282*W
Central (2 wells)	36311.1406	26N	43E	31	NE%NE%	47.71185*N	-117.41408°W
Hoffman (2 wells)	35041.0419	25N	43E	04	NW%NE%	47.69993*N	-117.37852*W
Grace (1 well)	35081.2802	25N	43E	08	NE%NE%	47.68335°N	-117.39397*W
Nevada (1 well)	35081.2802	25N	43E	08	NE%NE%	47.68325°N	-117.39485*W
Corbin Park 1 (new)	35071.1901	25N	43E	07	NW%NE%	47.68475°N	-117.41793°W
Corbin Park 2 (new)	35071.1901	25N	43E	07	NE%NE%	47.68478"N	-117.41497"W
Faith Bible Church (new)	35064.3611	25N	43E	06	SW1/4SE1/4	47.68751°N	-117.41727°W
Audubon Park (new)	25013.0004	25N	42E	01	SW¼SW¼	47.68872"N	-117.45236"W
6 <sup>th</sup> & Havana (new)	35232.4108	25N	43E	23	5W¼NW¼	47.65180°N	-117.34657"W

Datum: WGS84

REPORT OF EXAMINATION FOR WATER RIGHT CHANGE

#### Place of Use (See Attached Map)

The place of use (POU) of this water right is the service area described in the most recent Water System Plan/Small Water System Management Program approved by the Washington State Department of Health, so long as the water system is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

## **Proposed Works**

Nineteen (19) wells, pumps, reservoirs, distribution system

Development Schedule	and the second		
BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE	_
January 1, 2020	January 1, 2035	January 1, 2065	

# Measurement of Water Use

How often must water use be measured? How often must data be reported to Ecology? What volume should be reported? What rate should be reported? Weekly Upon request by Ecology Total Annual Volume Annual Peak Rate of Withdrawal (gpm)

#### Provisions

This change to Ground Water Certificate No. 504-D supersedes previous Certificate of Change recorded as Vol. 1-3, PP. 435 issued September 9, 1985 and Certificate of Change recorded as Vol. 1-3, PP. 52 issued September 21, 1973.

The total amount authorized for withdrawal under Ground Water Certificate Nos. 504-D and 548-A is limited to 119,000 gallons per minute and 89,240 acre-feet per year, continuously, for municipal supply.

This authorization to make use of public waters of the State is subject to existing rights, including any existing rights that may be held by the United States for the benefit of Indians under treaty or otherwise.

Nothing in this authorization shall be construed as satisfying other applicable federal, state, or local statutes, ordinances, or regulations.

#### Wells, Well Logs and Well Construction Standards

All wells constructed in the state must meet the construction requirements of WAC 173-160 titled "Minimum Standards for the Construction and Maintenance of Wells" and RCW 18.104 titled "Water Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard must be decommissioned.

All wells must be tagged with a Department of Ecology unique well identification number. If you have an existing well and it does not have a tag, please contact the well-drilling coordinator at the regional Department of Ecology office issuing this decision. This tag must remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

CHANGE REPORT OF EXAMINATION

Installation and maintenance of an access port as described in WAC 173-160- 291(3) is required.

## Measurements, Monitoring, Metering and Reporting

An approved measuring device must be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173, which describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

#### Water Use Efficiency

The water right holder is required to maintain efficient water delivery systems and use of up-to-date water conservation practices consistent with RCW 90.03.005.

## Proof of Appropriation

The water right holder must file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The certificate will reflect the extent of the project perfected within the limitations of the water right. Elements of a proof inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions.

## Schedule and Inspections

Department of Ecology personnel, upon presentation of proper credentials, will have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

#### Real Estate Excise Tax

This decision may indicate a Real Estate Excise Tax liability for the seller of water rights. The Department of Revenue has requested notification of potentially taxable water right related actions, and therefore will be given notice of this decision, including document copies. Please contact the state Department of Revenue to obtain specific requirements for your project. Phone: (360) 570-3265. The mailing address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia WA 98504-7477 Internet: http://dor.wa.gov/. E-mail: REETSP@DOR.WA.GOV.

#### **Findings of Facts**

Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I concur with the investigator that a valid right exists; that there will be no impairment of existing rights; that the purpose(s) of use are beneficial; and that there will be no detriment to the public interest.

Therefore, I ORDER approval of Application No. CG3-\*00373S@1, subject to existing rights and the provisions specified above.

#### Your Right To Appeal

You have a right to appeal this Order to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of the Order.

File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this Order on Ecology in paper form by mail or in person. (See addresses below.) E-mail is not accepted.
- You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Street Addresses	Mailing Addresses	
Department of Ecology	Department of Ecology	
Attn: Appeals Processing Desk	Attn: Appeals Processing Desk	
300 Desmond Drive SE	PO Box 47608	
Lacey, WA 98503	Olympia, WA 98504-7608	
Pollution Control Hearings Board	Pollution Control Hearings Board	
1111 Israel Road SW Ste 301	PO Box 40903	
Tumwater, WA 98501	Olympia, WA 98504-0903	

Signed at Spokane, Washington, this 24th day of February, 2015.

Keith L. Stoffel, Section Manager

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov. To find laws and agency rules visit the Washington State Legislature Website: http://www1.leg.wa.gov/CodeReviser.

#### CHANGE REPORT OF EXAMINATION

INVESTIGATOR'S REPORT Gene Drury, Department of Ecology Water Right Control Number CG3-\*00373S@1 Ground Water Certificate Number 504-D (together w/C.Chg 1-3-435 and 1-3-52)

# BACKGROUND

This report serves as the written findings of fact concerning Water Right Change Application Number CG3-\*00373S@1.

## Application and Proposed Changes

An application for change/transfer was submitted by the City of Spokane, to the Department of Ecology, Water Resources Program on August 7, 2014. The City of Spokane proposes to add existing municipal supply wells and five new well sites as additional points of withdrawal authorized under Ground Water Certificate No. 504-D. Future reference in this report to Certificate "504-D" includes the previously issued changes under Certificate of Change Vol. 1-3, PP. 435 and Vol. 1-3, PP. 52). A total of nineteen (19) wells at twelve (12) locations are proposed. This application requests the authorization of a total of fifteen (10) well locations in addition to the two (2) well locations (Well Electric, Ray Street) that are already authorized under this water right.

EXISTING Water	Right Attributes
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CADING WALLIN	Bur Artinout	6.0									
Number	504-D (1	1-3-435,	1-3-52	2)							
Recorded Name	City of S	City of Spokane									
Priority Date	May 1, 1	May 1, 1926									
Source	Well Ele	Well Electric (2 wells) and Ray Street (2 wells)									
GPM	56,000 (	56,000 (54,750 gpm - Well Electric; 1,250 gpm - Ray Street)									
AF/YR	38,000 (	38,000 (36,000 af - Well Electric; 2,000 af - Ray Street)									
Purpose of use	Municip	Municipal supply									
Place of Use	Area ser	ved by	the City	y of Sp	okane						
County	Spokane	2									
WRIA	57 - Mic	ddle Spo	kane								
Source Name	Parcel #	Twp	Rng	Sec	QQ	Latitude	Longitude				
Well Electric (2 wells)	35111.0001	25 N.	43 E.	11	SW%NE%	47.68147°N	-117.33214*W				
Ray Street (2 wells)	35222.0001	25 N.	43 E.	22	SE%NW%	47.65051°N	-117.36282°W				

GPM = Gallons per minute; AF/YR = Acre-feet per year; Sec. = Section; QQ Q = Quarter-quarter of a section; WRIA = Water Resource Inventory Area; E.W.M. = East of the Willamette Meridian

5

REQUESTED Water	Right Attri	Jures							
Application Number	CG3-*0	03735@	1						
Applicant Name	City of S	City of Spokane							
Date of Application	August	August 7, 2014							
Source	Ninetee	Nineteen (19) wells							
GPM	56,000	56,000							
AF/YR	38,000								
Purpose of use	Municip	val suppl	y .						
Place of Use	Area se	rved by	city of s	spokan	e (RCW 90.03.3	(86)			
WRIA	Spokan SA EE	57							
Source Name	Parcel #	Twp	Rng	Sec	QQ	Latitude	Longitude		
Well Electric (2 wells)	35111.0001	25N	43E	11	SW%NE%	47.68147*N	-117.33214°W		
Parkwater (4 wells)	35114.2501	25N	43E	11	NE%SE%	47.67754°N	-117.33002°W		
Ray Street (2 wells)	35222.0001	25N	43E	22	SE¼NW%	47.65051*N	-117.36282*W		
Central (2 wells)	36311.1406	26N	43E	31	NE%NE%	47.71185"N	-117.41408*W		
Hoffman (2 wells)	35041.0419	25N	43E	04	NW%NE%	47.69993*N	-117.37852*W		
Grace (1 well)	35081.2802	25N	43E	08	NE%NE%	47.68335°N	-117.39397*W		
Nevada (1 well)	35081.2802	25N	43E	08	NE%NE%	47.68325°N	-117.39485°W		
Corbin Park 1 (new)	35071.1901	25N	43E	07	NW%NE%	47.68475°N	-117.41793"W		
Corbin Park 2 (new)	35071.1901	25N	43E	07	NE%NE%	47.68478°N	-117.41497°W		
Faith Bible Church (new)	35064.3611	25N	43E	06	SW1/4SE1/4	47.68751°N	-117.41727°W		
Audubon Park (new)	25013.0004	25N	42E	01	SW1/4SW1/4	47.68872°N	-117.45236°W		
6 <sup>th</sup> & Havana (new)	35232.4108	25N	43E	23	SW1/4NW1/4	47.65180"N	-117.34657"W		

# **REQUESTED Water Right Attributes**

GPM = Gallons per minute; AF/YR = Acre-feet per year; Sec. = Section; QQ Q = Quarter-quarter of a section; WRIA = Water Resource Inventory Area; E.W.M. = East of the Willamette Meridian

# Legal Requirements for Proposed Change

The following is a list of requirements that must be met prior to authorizing the proposed change.

#### Public Notice

RCW 90.03.280 requires that notice of a water right application be published once a week, for two consecutive weeks, in a newspaper of general circulation in the county or counties where the water is to be stored, diverted and used. Notice of this application was published in the Spokesman Review on October 8 and 15, 2014. No protests were received.

A letter of concern was received from Rachael Osborn on behalf of The Center for Environmental Law & Policy (CELP) on January 22, 2015 after a first draft Report of Examination was posted on the internet. The issues raised in the letter are addressed below in this report.

# State Environmental Policy Act (SEPA)

This application is not exempt from the provisions of the State Environmental Policy Act (SEPA) of 1971, Chapter 43.21 RCW, due to the fact that the cumulative quantities of water for this project and those under existing water rights constitute a withdrawal of more than 2,250 gallons per minute. A final Determination of Non-Significance was issued by the City of Spokane on December 1, 2014, stating that

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the proposed change will not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) will not be required. The Water Resources Program has reviewed the SEPA checklist and concurs with the City's determination.

#### Water Resources Statutes and Case Law

RCW 90.03.386(2) states that a municipal water supplier may change its service area through the water system plan approval process administered by the Washington Department of Health. As long as the municipal water supplier is in compliance with the approved plan, and other requirements prescribed under RCW 90.03.386(2), the place of use for the water right is the service area authorized under the plan. Since the subject water right is for municipal supply purposes, the applicant is not requesting any change of place of use through this application.

RCW 90.44.100 allows Ecology to amend a groundwater right to (1) allow the user to construct a replacement or additional well at a new location outside of the location of the original well, if:

- (a) The additional or replacement well taps the same body of public ground water as the original well. RCW 90.44.100(2)(a),
- (b) Where a replacement well is approved, the user must discontinue use of the original well and properly decommission the original well. RCW 90.44.100(2)(b),
- (c) Where an additional well is constructed, the user may continue to use the original well, but the combined total withdrawal from all wells shall not enlarge the right conveyed by the original permit or certificate. RCW 90.44.100(2)(c),
- (d) Other existing rights shall not be impaired. RCW 90.44.100(2)(d),
- (e) The change will not be detrimental to the public welfare (RCW 90.44.100(2) ("findings as prescribed in the case of an original application" are required).

When changing or adding points of withdrawal to groundwater rights, the wells must draw from the same body of public groundwater. Indicators that wells tap the same body of public groundwater include:

- (a) Hydraulic connectivity.
- (b) Common recharge (catchment) area.
- (c) Common flow regime.
- (d) Geologic materials that allow for storage and flow, with recognizable boundaries or effective barriers to flow.

Under RCW 90.44.100, the point of withdrawal of an inchoate groundwater right documented by a certificate may be changed. *Cornelius v. Department of Ecology*, Washington Supreme Court No. 88317-3 (February 12, 2015).

The Washington Supreme Court has held that Ecology, when processing an application for change to a water right, is required to make a tentative determination of the extent and validity of the right. This is necessary to establish whether the right is eligible for change. *R.D. Merrill Co. v. Pollution Control Hearings Bd.*, 137 Wn.2d 118, 969 P.2d 458 (1999); *Okanogan Wilderness League v. Town of Twisp*, 133 Wn.2d 769, 947 P.2d 732 (1997). Thus, in reviewing the subject water right change application, Ecology must first determine the extent and validity of the water right that is eligible for change. Then, Ecology must determine whether the requested change would cause impairment of other existing water rights or be detrimental to the public welfare.

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# INVESTIGATION

In considering the proposed change, the investigation included, but was not limited to the following:

- Appropriate Washington State RCW's and WAC's
- Ground Water Certificate No. 504-D (together w/C. Chg 1-3-435 and 1-3-52)
- Ground Water Certificate No. 548-A (together w/C. Chg 1-3-439)
- City of Spokane DRAFT Water System Plan dated May of 2014
- Information submitted by the City of Spokane in support of this application
- Meetings/discussions with Jesse Cowger -Varela & Associates, Dan Kegley City of Spokane; Bill Rickard - City of Spokane
- Ecology's Water Rights Tracking System (WRTS) and Well Log Database
- USGS topographic maps and aerial photography
- State Environmental Policy Act (SEPA) Checklist dated November 17, 2014
- Department of Health, Office of Drinking Water letter dated November 21, 2014
- Ralston Hydrologic Services SVRP Aquifer Pumping Effects Spreadsheet tool, Nov-2014 version
- GSI Water Solutions letter dated December 5, 2014
- Review by Department of Ecology regional program staff and hydrogeologists

A field investigation was conducted by Gene Drury and John Covert on December 3, 2014 with Dan Kegley, Director of Water & Hydroelectric Services for the City of Spokane and Jesse Cowger of Varela & Associates. The City of Spokane proposes to change Ground Water Certificate Nos. 504-D and 548-A by adding up to five new wells under these water rights and integrating its existing wells. No other changes are proposed.

The proposed locations of the new wells are: 1) Corbin Park-1: within the NW¼NE¼ of Sec. 7, T. 25 N., R.43 E.W.M.; 2) Corbin Park-2: within the NE¼NE¼ of Sec. 7, T. 25 N., R.43 E.W.M.; 3) Faith Bible Church: within the SW¼SE¼ of Sec. 6, T. 25 N., R. 43 E.W.M.; 4) Audubon Park: within the SW¼SW¼ of Sec. 1, T. 25 N., R. 42 E.W.M.; 5) 6<sup>th</sup> and Havana: within the SW¼NW¼ of Sec. 23, T. 25 N., R.43 E.W.M. Each of these sites was visited on the day of the field investigation.

# Tentative Determination of Extent and Validity of Certificate No. 504-D

The City of Spokane is the second largest city in the State of Washington. The City provides municipal water through a total of 7 well pumping stations, 14 existing wells, 27 well pumps, 25 booster pumping stations, 72 booster pumps; 22 pressure zones with 34 reservoirs, 16 pressure reducing valve stations and over 1,000 miles of water pipe.

The 14 existing wells are located at the following pumping stations: 1) <u>Well Electric</u> (S02) - Two wells within the SW¼NE¼ of Sec. 11, T. 25 N., R. 43 E.W.M.; 2) <u>Parkwater</u> (S03) - Four Wells within the NE¼SE¼ of Sec. 11, T. 25 N., R. 43 E.W.M.; 3) <u>Nevada Street</u> (S01) - One well within the NE¼NE¼ of Sec. 8, T. 25 N., R.43 E.W.M.; 4) <u>Grace Avenue</u> (S06) - One well within the NE¼NE¼ of Sec. 8, T. 25 N., R.43 E.W.M.; 5) <u>Ray Street</u> (S04) - Two wells within the SE¼NW¼ of Sec. 22, T. 25 N., R. 43 E.W.M.; 6) <u>Hoffman Avenue</u> (S05) - Two wells within the NW¼NE¼ of Sec. 4, T. 25 N., R. 43 E.W.M.; 7) <u>Central</u> <u>Avenue</u> (S08) - Two wells within the NE¼NE¼ of Sec. 31, T. 26 N., R. 43 E.W.M. All of the City's wells pump water from the Spokane Valley-Rathdrum Prairie Aquifer, which was designated a "sole source" aquifer in 1978. The City also has interties with five other nearby water purveyors. They are Spokane County Water District #3, Whitworth Water District #2, City of Airway Heights, Fairchild Air Force Base, Vel View Water District and North Spokane Irrigation District #8 (emergency use only).

Ground Water Certificate No. 504-D was issued to the City of Spokane based on the installed system capacity at the time ("pumps and pipes") and has been exercised to provide water for municipal use as the population of the area has increased. At the time Certificate No. 504-D was issued, it was a common practice of the State of Washington to issue certificates to public water purveyors that were quantified based on system capacity rather than actual beneficial use of water. In Department of Ecology v. Theodoratus, 135 Wn.2d 582, 957 P.2d 1241(1998), the Washington Supreme Court held that state statutory and common law did not allow the State to issue a vested water right certificate based on water system capacity. However, although the Theodoratus decision did not involve a municipality, the Court recognized that under Washington's statutes there are significant differences between municipal water use and other water uses. The Court stated in this decision that municipal water rights often receive separate treatment under water law. Notwithstanding this distinction, the Theodoratus decision cast uncertainty over the status of water right certificates that were issued to public water suppliers based on the "pumps and pipes" standard. In response to the Theodoratus decision, the legislature enacted Washington's Municipal Water Law (MWL), which became effective on September 9, 2003. In 2010, the Supreme Court upheld the constitutionality of the MWL in Lummi Indian Nation v. State of Washington, 170 Wn.2d 247, 241 P.3d 1220 (2010).

Under the MWL, the City of Spokane qualifies as a "municipal water supplier" as defined under RCW 90.03.015(3), and Certificate No. 504-D qualifies as a water right for municipal supply purposes under RCW 90.03.015(4) because it has been continuously exercised to provide municipal water service.

RCW 90.03.330(3) provides that water rights for municipal water supply purposes documented by "pumps and pipes" certificates issued prior to September 9, 2003 are "rights in good standing." These water rights may include inchoate quantities that have not yet been exercised. Such rights may continue to be exercised to serve the municipal water supplier's reasonably anticipated future needs.

RCW 90.03.330(2) provides that Ecology cannot revoke or diminish certificated water rights for municipal water supply purposes, except under certain limited circumstances. One such circumstance is "for the issuance of certificates following the approval of a change, transfer, or amendment under RCW 90.03.380 or 90.44.100." Thus, Ecology may revoke or diminish a water right during the process of evaluating a groundwater right change application under RCW 90.44.100, based on the tentative determination of extent and validity of the water right, or to prevent impairment of other water rights or detriment to the public welfare.

Accordingly, in reviewing the City's application, Ecology must perform a tentative determination of the extent and validity of Certificate No. 504-D and, first, determine, what quantity of water has been perfected through actual beneficial use. Then, Ecology must determine how much of the remaining inchoate quantity remains "in good standing" through the City's reasonable diligence in perfecting the water right. *Cornelius v. Department of Ecology*, Washington Supreme Court No. 88317-3 (February 12, 2015).

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# Analysis of Historical Beneficial Use of Water Under Certificate No. 504-D

Ground Water Certificate 504-D currently authorizes withdrawal from the Well Electric and Ray Street wells. This certificate, with a priority date of May 1, 1926, was originally issued to the City of Spokane on April 19, 1948. Ground Water Certificate 504-D was issued pursuant to RCW 90.44.090 based on Ground Water Declaration Nos. 372 and 373, both dated February 19, 1947. RCW 90.44.090 authorized the filing of declarations to support claims to groundwater rights established prior to the enactment of the Groundwater Code, RCW 90.44, in 1945, and the issuance of groundwater right certificates based on such declarations. The certificate authorizes withdrawal of 56,000 gallons per minute and 38,000 acrefeet per year, continuously, for municipal supply from two pump wells (aka "Well Electric") located within the SW¼NE¼ of Sec. 11, Township 25 N., Range 43 E.W.M. in Spokane County, Washington. At the time, the population of Spokane was around 142,000 and this quantity of water would provide for future growth of the area. In 1973, Certificate of Change Vol. 1-3, PP. 52 authorized two new points of withdrawal to be added to this certificate. The two "Ray Street" wells were added and 1,250 gallons per minute and 2,000 acre-feet per year was authorized at this location. The Ray Street wells are located within the SE<sup>1</sup>/ANW<sup>1</sup>/<sub>4</sub> of Sec. 22, Township 25 N., Range 43 E.W.M. Another change was filed by the City in 1985 to change the place of use to the area served by the City of Spokane. This change is recorded under Vol. 1-3, PP. 435.

The following table shows the City of Spokane's annual water use during the period from 2007 through 2013. In 2010, the City used 24,227 acre-feet per year of the authorized 38,000 acre-feet per year under Ground Water Certificate No. 504-D from the Well Electric and Ray Street pumping stations. Water use has varied and has been reduced slightly due to ongoing conservation efforts. Water rights for municipal supply purposes are specifically exempt from relinquishment under RCW 90.14.140(2)(d) if there has been reduced water use or nonuse of all or a portion of a municipal supply water right for a period of five or more consecutive years. Accordingly, 24,227 acre-feet per year has been perfected under Certificate No. 504-D through the actual beneficial use of water.

	T	1				
2007	2008	2009	2010	2011	2012	2013
22,739	17,976	19,251	24,227	22,143	21,951	23,241

## CERTIFICATE NO. 504-D (1-3-52, 1-3-435) - Annual Water Use in Acre-feet per year (AF):

Since 24,227 acre-feet per year has been perfected though actual use, Certificate No. 504-D documents a remaining inchoate annual quantity of 13,773 acre-feet per year. A determination of whether the inchoate quantity remaining under Certificate No. 504-D is in good standing requires appraisal of the City of Spokane's use of water for municipal supply purposes under its portfolio of water rights. The following table summarizes the City of Spokane's primary municipal supply water rights.

Water Right	Priority Date	Station(s) Well Name	GPM (Qi)	AC-FT (Qa)
GW 503-D (Cert. Chg. #592)	1907	GRACE	20,000	1,000
GW 503-D (Cert. Chg. #593)	1907	RAY STREET	7,000	350
GW 503-D (Cert. Chg. #594)	1907	CENTRAL	7,000	350
GW 503-D (SEE Cert. Chgs. #1-3-434, 1-3- 434, 592, 593, 594)	1907	-	34,000	1,700
GW 504-D (Cert. Chg. #1-3-52)	5/01/26	WELL- ELECTRIC	54,750	36,000
GW 504-D (Cert. Chg. #1-3-52)	5/01/26	RAY STREET	1,250	2,000
GW 504-D (Cert. Chg. #1-3-435 & 1-3-52)	5/01/26	-	56,000	38,000
GW 505-D (Cert. Chg. #1-3-436)	7/14/37	RAY STREET	14,000	1,870
GW 506-D (Cert. Chg. #1-3-437)	7/01/38	HOFFMAN	11,600	1,280
GW 507-D (Cert. Chg. #1-3-438)	1/12/45	RAY STREET	2,600	520
GW 548-A (Cert. Chg. #1-3-439)	8/24/46	PARKWATER	63,000	51,240
GW 728-A (Cert. Chg. #658)	1/16/50	GRACE	11,000	4,080
GW 728-A (Cert. Chg. #658)	1/16/50	CENTRAL	9,000	4,760
GW 728-A (Cert. Chg. #1-3-440)	1/16/50		20,000	8,840
GW 3199-A (Cert. Chg. #1-3-441)	7/02/56	NEVADA	25,000	20,000
GW 3903-A (Cert. Chg. #1-3-442)	6/05/59	CENTRAL	7,000	11,480
GW 4503-A (Cert. Chg. #1-3-443)	3/03/61	CENTRAL	7,900	12,640
***	***	TOTAL:	241,100	147,570

# CITY OF SPOKANE - EXISTING WATER RIGHTS FOR MUNICIPAL SUPPLY

# **CITY OF SPOKANE – OTHER WATER RIGHTS**

Water Right	Priority Date	Well Name	GPM (Qi)	AC-FT (Qa)
G3-27181C	11/30/81	Spokane International Airport	200*	526*
Water Right	Priority Date	Source	Q	
SW Cert. No. 1014	6/12/45	Spokane River	400 CFS	
SW Cert. No. S3-26064C	9/11/78	Spokane River	7,600 CFS	
R3-28402P	10/09/87	Spokane River	4,000 AF	

\*Portion transferred to Goodrich Corporation on February 16, 2005 (Goodrich = 250 gpm, 89 af/yr) Note: The City may hold additional water rights not listed above.

In considering whether a municipal water supplier like the City of Spokane has exercised reasonable diligence in developing into its water rights, the Department recognizes that cities often grow at uneven rates, and need to be able to serve their growing populations. The actual use of water over time fluctuates due to many factors, which include but are not limited to year-to-year weather patterns, conservation measures, water price and general changes in water use practices. Over time, the population within the City of Spokane service area has grown, often times at considerable rates. In addition, the City's wholesale supply role has increased recently and the City intends to increase wholesale supply agreements to respond to regional needs and growth management planning.

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Significant work has been conducted to upgrade the infrastructure of the City's system and promote conservation by their water users. The City has implemented a Water Use Efficiency Program, which meets the requirements of WAC 246-290-800. In April 2014, the City also adopted new water conservation goals to reduce indoor residential water use, outdoor residential water use, outdoor irrigation for commercial/industrial use and outdoor governmental water use.

As stated earlier, the City's present pumping capacity from all well stations is 187,300 gallons per minute (based on current operational pumps) of the authorized 241,100 gallons per minute. The City has used just under 70,000 acre-feet per year of the authorized 147,570 acre-feet per year for municipal supply purposes. The City of Spokane serves water to an estimated 208,916 people (2011 U.S. Census) within its city limits and current service area which is about 56,500 acres in size. The existing service area is not yet fully developed. Additional infill growth will occur within the existing service area. The larger "retail service area" has a total population of around 227,455 people. The Spokane County Coordinated Water System Plan (CWSP) defines a future service area for the City of Spokane's water system of approximately 101,290 acres. When the City reaches build-out of its future service area the City's water system will serve approximately 44,790 acres (80%) more area than it currently serves.

The City of Spokane has been a growing community for decades. The figure below documents the size of the land area of the City's boundary over the decades. As the size of the City has grown, so has its water distribution system and its customer base.



Spokane County's Water Resources Program has done extensive water demand modeling. Their most recent water demand model was released in 2013. It calculates that public water supply water demand growth from wells tapping the Spokane Valley Rathdrum Prairie Aquifer will increase by 33% between 2010 and 2040 (see their Table 5, Spokane County water Demand Forecast Model, Model 3.0 & 2013 Forecast Update). The City of Spokane is the largest water purveyor in the region and supplies all of its

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customers with water from the SVRP. Increasing the City's recent average annual pumpage of 65,000 AF by 33% suggests they will be pumping 86,450 AF per year by 2040.

The City anticipates the need to increase regional wholesale supply relationships, interties with other purveyors, and to respond to changes in urban growth areas and population. The City does have has existing and planned future wholesale agreements with neighboring water systems. Future demand for wholesale water is expected to increase throughout the County, particularly with existing and future wholesale customers on the West Plains of Spokane, where the basalt aquifer is in serious decline. There are other water short areas in Spokane County that may need water to be delivered by the City in the future. The unused (or inchoate) water under Certificate Nos. 504-D and 548-A will help the City cover expected growth in these areas. The City has and will continue to update its service area description as needed and as allowed under RCW 90.03.386.

The City's 20 year forecasted water right status (with conservation) is that it will use an estimated 211, 450 gallons per minute and 80,500 acre-feet pear year for municipal supply purposes. Based on this estimate, it's very likely that the City will need additional water well beyond the 20 year planning horizon. Future growth and additional water beyond 20 years will have to come from the available inchoate portions under Certificates Nos. 504-D and 548-A. The remaining inchoate annual quantities under Certificate 504-D are 13,773 acre-feet per year and under Certificate 548-A they are 21,456 acre-feet per year. These two certificates combined total 119,000 gallons per minute and 89,240 acre-feet per year for municipal supply. In 50 years, it is very likely that the City will need the full 89,240 acre-feet per year authorized under these two water rights to cover future growth.

2007	2008	2009	2010	2011	2012	2013			
66,005	65,178	68,915	63,250	63,533	64,520	65,078			

City of Spokane - Annual Water Use in Acre-feet per year (AF) - All Well Stations:

In sum, the remaining inchoate portion of water authorized under Certificate No. 504-D (13,773 AF) is in good standing and eligible for change because the City has demonstrated reasonable diligence in perfecting the water right by continuing to upgrade its infrastructure and supply water for new customers in a service area with a growing population.

# Existing Wells - City of Spokane:

The source name, current capacity and location of the City of Spokane pumping stations are as follows:

1) Well Electric (S02) - 39,300 GPM

Two wells within the SW¼NE¼ of Sec. 11, T. 25 N., R. 43 E.W.M.

Parkwater (\$03) – 62,000 GPM

Four Wells in Lots 1, 2, 3 & 4, Block 33 of Parkwater Addition, within the NE¼SE¼ of Sec. 11, T. 25 N., R. 43 E.W.M.

 Nevada Street (S01) – 31,000 GPM
One well in Lot 7, Block 37 of Wolverton and Conlan Addition, within the NE¼NE¼ of Sec. 8, T. 25 N., R.43 E.W.M.

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4) Grace Avenue (506) - 19,000 GPM

One well in Lot 8, Block 37 of Wolverton and Conlan Addition, within the NE¼NE¼ of Sec. 8, T. 25 N., R.43 E.W.M.

- 5) <u>Ray Street (S04) 18,700 GPM</u> Two wells located in Block 1, 3<sup>rd</sup> Addition to Eureka, in the SE%NW% of Sec. 22, T. 25 N., R. 43 E.W.M.
- 6) Hoffman Avenue (S05) 5,400 GPM Two wells located in Lots 27, 28, 29 & 30, Block 4 of Arlington Heights, within the NW¼NE¼ of Sec. 4, T. 25 N., R. 43 E.W.M.
- 7) <u>Central Avenue (\$08) 11,900 GPM</u> Two wells in Lot 17 and Lot 20, both in Block 14 of Byrne Addition, within the NE¼NE¼ of Sec. 31, T. 26 N., R. 43 E.W.M.

# EXISTING WELL DATA

SOURCE	ECY ID#	Year	Depths	Diam.	Elevation2	Static Water Elevation 3		Pump Capacity (gpm)	Pump HP	Pump Type
Well Electric	AHC996	1927	33.3'	48'	1895.7	1889.2'		8400	900	CFP
Well Electric	AHC995	1927	33.3'	48'	1895.7			7500	900	CFP
	AHC995				1895.7			8400	900	VT
	AHC995				1895.7			15000	1000	VT
		-		-			TOTAL:	39,300		1
Parkwater	AHC722	1949	126.1'	18'	1964.1			8000	600	VT
	AHC722							8000	600	VT
Parkwater	AHC999	1949	126.1'	18'	1964.1	1		8000	600	VT
	AHC999							8000	600	VT
Parkwater	N/A	1949	126.1'	18'	1964.1			8000	600	VT
	N/A							8000	600	VT
Parkwater	AHC998	1949	125.1'	18'	1964.1	1891.8'	-	7000	1000	VT
	AHC998							7000	900	VT
						TOTAL:	62,000			
Nevada	AHC725	1958	120'		1954.0	1867.7		5700	400	SUB
	AHC725							5700	400	SUB
	AHC725							9800	800	VT
	AHC725		1					9800	800	VT
							TOTAL:	31,000		
Grace	AHC724	1950	124.0'	18'	1963.0	1871.4		9500	900	VT
	AHC724		124.0'	18'				9500	900	VT
	1010010101						TOTAL:	19,000		
Ray Street	ABR602	1935	71.75'	24'	1922.75	4		7150	900	VT
	ABR602							7200	900	VT
Ray Street	AHC723	1935	71.75'	24'	1922.75			4350	900	VT
							TOTAL:	18,700		
Hoffman	ABR551	1935	204.2'	16'	2055.75	1872.6	10011000010	5400	600	VT
Hoffman	AHC728	1935	218.75'	16'	2055.75			n/a s	n/a	n/a
							TOTAL:	5,400		
Central	N/A	1960	265.0'	7	2074.00	1860.6		n/a s	n/a	n/a
	N/A							3500	450	SUB
Central	AHC726	1960	265.0'	7'	2074.00			4200	450	SUB
	AHC726	-	-			1		4200	450	SUB
							TOTAL:	11,900		

TOTAL Present pumping capacity: 187,300 gpm

CFP= centrifugal pump; VT= vertical lineshaft turbine; SUB = submersible pump

J Depth - distance between Pump Floor to Well Bottom (some Pump Floors are below grade)

2 Elevation of Pump Floor - City Datum

J One hour average on 3/24/14 at 0954. All production pumps were off.

4 Ray St. Water Elevation instrument was out-of-service for an extended period during the time.

5 Hoffman Pump #2 is removed. Replacement timeframe is unknown.

6 Central Pump #1 is removed. Replacement timeframe is unknown.

# EXISTING WELLS - DESCRIPTION AND CONDITION

The following information was provided by the City of Spokane and was taken from the updated Water System Plan (Section 3.3) for the City of Spokane dated May, 2014. The information was updated on December 16, 2014 based on recent data provided by the City. It provides a detailed description and condition for each water source:

# Well Electric Well Station (DOH Source #S02)

The oldest operating Well Station in the water system, Well Electric Well Station is located adjacent to the Spokane River within the Upriver Complex. The Well Station consists of two large 48 foot diameter wells. The wells are adjacent to each other in a north-south orientation. The City identifies the north well as Well No. 4 and the south well as Well No. 5

Well No. 4 contains a single 900 horsepower (hp) horizontal centrifugal pump that provides water to the North Hill Pressure Zone. Well No. 5 supplies water to three pumps. One pump, another 900 hp horizontal centrifugal, also pumps water to the North Hill Pressure Zone. The second pump, a 900 hp vertical turbine pump lifts water to the Intermediate Pressure Zone. The third pump is a 1,000 hp vertical turbine pump that lifts water to the Low Pressure Zone. In 2005, the Well Electric station provided 26.7 percent of the entire water system supply. Typical outlet pressures for the station are 180, 140, and 80 psi for the Intermediate, North Hill, and Low systems, respectively. Pump inlet suction elevations at this station are approximately elevation 1865.7 feet. The minimum recorded water level in the well during pumping is 1887.5 feet, which leaves sufficient submergence of the pump intakes. The two vertical turbines, high efficiency pumps were installed in 1996 as replacements for two less efficient horizontal centrifugal pumps.

The maximum total instantaneous withdrawal rate for the well station is 39,300 gpm, which is the total nameplate capacity of the pumps. The total capacity of the wells exceeds the pumping capacity, but the actual potential yield of the well station is unknown to the City. The water right allows 54,750 gpm.

Due to its close proximity to the Spokane River, from 1998 through 2001 Well Electric was intensively studied to determine if it was ground water under the influence of surface river water. The study concluded with monthly samples taken throughout 2001 for Microscopic Particulate Analysis. The conclusion is there is no river influence during normal operation. However, during certain flood stages in the river the well is flooded by the river at which times the well is shut down until normal operations can again resume.

As mentioned above, this is the oldest well in the system. However, it is in good condition. Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are in good condition, showing no signs of diminished performance. The well station piping also shows no signs of deterioration and is in good condition.

#### Parkwater Well Station (DOH Source #S03)

The Parkwater Well Station is located 1/2 mile south and east of the Well Electric Well Station. Completed in 1949, the Parkwater Well Station houses eight pumps in four 18 foot diameter hand dug wells. The wells are adjacent to each other in an east-west orientation. The City identifies the east well as Well No. 1 and continues the numbering scheme westward with the west well being Well No. 4. All of the pumps are vertical lineshaft turbine pumps. Six pumps are 600 hp and supply water to the Low Pressure Zone with typical outlet pressures of 68 psi. The two remaining pumps include a 900 hp unit, and a 1,000 hp unit that supply water to the Intermediate Pressure Zone at an outlet pressure of 145

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psi. The 1,000 hp pump was installed in 2003 replacing a less efficient low system (600 hp) pump to improve energy efficiency and pumping redundancy to the Intermediate Pressure Zone. Pump inlet suction elevations at this station are approximately elevation 1870.0 feet. The minimum recorded water level in the well during pumping is 1887.5 feet, which leaves sufficient submergence of the pump intakes. The Parkwater Well Station in 2005 supplied 33.1 percent of the entire water system demand.

The maximum total instantaneous withdrawal rate of the well station is 62,000 gpm, which is the total nameplate capacity of the pumps and also the maximum allowed according to the water right. The total yield of the wells exceeds the pumping capacity, but the actual potential yield of the well station is unknown to the City.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are in good condition, showing no signs of diminished performance. The well station piping also shows no signs of deterioration and is in good condition.

#### Nevada Well Station (DOH Source #S01)

At the intersection of Nevada Street and North Foothills Drive is the Nevada Well Station. The Nevada Well Station supplies water to the Low Pressure Zone. The Well Station has two 400 hp submersible pumps that were installed in 1956 and two 800 hp vertical turbine pumps that were installed in 2003 to replace two older less efficient pumps and to improve station redundancy. Typical outlet pressures at this station are 68 psi. Pump inlet suction elevations at this station are approximately elevation 1,846 feet. The minimum recorded water level in the well during pumping is 1,855.37 feet, which leaves sufficient submergence of the pump intakes. In 2005, the Nevada Well Station supplied 15.7 percent of the total water system demand.

The maximum instantaneous withdrawal rate of the well station is 25,000 gpm which is the amount allowed according to the water right. The actual pumping capacity is 31,000 gpm, which equates to the total capacity of the pumps. The total yield of the well exceeds the water right, but the actual potential yield of the well station is unknown to the City.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are in good condition, showing no signs of diminished performance. The well station piping also shows no signs of deterioration and is in good condition.

#### Grace Avenue Well Station (DOH Source #S06)

Located directly East of the Nevada Well Station is the Grace Avenue Well Station. It houses two identical 900 hp vertical line shaft turbine pumps that occupy a single 18 foot diameter well. This Well Station supplies water to the North Hill Pressure Zone, at a discharge pressure of 110 psi. The suction bells of the pumps are at elevation 1,849.87 feet, whereas the lowest observed low water level in the well was 1,859.37 feet, which leaves sufficient submergence of the pump intakes. The Grace Avenue Well Station in 2005 supplied 4.0 percent of the total water system demand.

The maximum instantaneous withdrawal rate of the well station is 19,000 gpm, which is the total nameplate capacity of the pumps. The total yield of the well exceeds the pumping capacity, but the actual potential yield of the well station is unknown to the City. The water right allows 31,000 gpm.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are in good condition, showing no signs of diminished performance. The well station piping also shows no signs of deterioration and is in good condition.

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## Ray Street Well Station (DOH Source #S04)

The Ray Street Well Station is located at the intersection of Ray Street and Hartson Avenue at the base of the South Hill. The Ray Street Well Station pumps water to the Intermediate Pressure Zone. The Well Station houses two 24 foot diameter wells. The wells are adjacent to each other in a north-south orientation. The City identifies the north well as Well No. 1 and the south well as Well No. 2. The Station contains three 900 hp vertical turbine pumps, two pumps in Well No. 1 and a single pump in Well No. 2. The suction bells of the pumps are positioned at approximate elevation 1,858 feet. Maximum observed drawdown has been to elevation 1,868.37 feet, which leaves sufficient submergence of the pump intakes. The pressure normally observed at the outlet of the Ray Street well is 157 psi. This well station in 2005 supplied 7.2 percent of the total water system demand.

The maximum instantaneous withdrawal rate of the well station is 18,000 gpm, which is the total nameplate capacity of the pumps. The total yield of the wells exceeds the pumping capacity, but the actual potential yield of the well station is unknown to the City. The water right allows 24,850 gpm.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are in good condition, showing no signs of diminished performance. The well station piping also shows no signs of deterioration and is in good condition.

## Hoffman Well Station (DOH Source #S05)

Hoffman Well Station is located on Hoffman Avenue at the intersection of Crestline Street on the north side of the City. The Well Station houses two 16 foot diameter wells, 40 feet apart, in an east-west orientation. The City identifies the west well as Well No. 1 and the east well as Well No. 2. Hoffman #1 well contains a 600 hp vertical line shaft turbine pump. Pump suctions are at elevation 1,843.37 feet. The maximum observed drawdown pumping level has been to elevation 1,859.37 feet, which leaves sufficient submergence of the pump intakes. Normal outlet pressure for the pumps is 55 psi. Hoffman Well Station in 2005 supplied 1.0 percent of the total water system demand. The maximum instantaneous withdrawal rate of the well station is 5,400 gpm, which is the total nameplate capacity of the pumps. The total yield of the wells exceeds the pumping capacity, but the actual potential yield of the well station is unknown to the City. The water right allows 11,600 gpm.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The pumps and west well are in good condition. The well station piping also shows no signs of deterioration and is in good condition. Currently, one pump has been removed from service for well lining repairs on the east well and is listed in the capital improvement plan.

### Central Avenue Well Station (DOH Source #S08)

Pump inlet suction elevations at this station are approximately elevation 1,846 feet. The minimum recorded water level in the well during pumping is 1,855.37 feet, which leaves sufficient submergence of the pump intakes.

The Central Avenue Well Station is the most northerly Well Station in the system, being located on Central Avenue two blocks west of Division Street. The Well Station has two 7 foot diameter wells. The wells are approximately 130 feet apart in a southwest-northeast orientation. The City identifies the

southwest well as Well No. 1 and the northeast well as Well No. 2. Each well contains two 450 hp submersible pumps. Normal outlet pressure is 55 psi. In 2005 Central Avenue Well Station provided 12.3 percent of the total annual water system demand.

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The maximum instantaneous withdrawal rate of the well station is 11,900 gpm, which is the total nameplate capacity of the pumps. The total yield of the wells exceeds the pumping capacity but the actual potential yield is unknown to the City. The water right allows 30,900 gpm.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are included on the capital improvement plan for future rehabilitation.

# Proposed New Well Locations

The City has proposed five locations for new source wells. They are Corbin Park (2 sites), Faith Bible Church, Audubon Park and at 6th and Havana. The City will probably not be drilling at all of these sites and is currently evaluating which one is best. At the time of this investigation, the City was leaning toward construction at either the Corbin Park or Faith Bible Church locations in Northwest Spokane. The City owns the property at the Corbin Park and Audubon sites. Faith Bible Church owns the Faith Bible Church site and Glad Tidings Assembly of God owns the 6th and Havana site. The City plans on drilling 24-48 inch diameter wells and will need about five years to begin construction.

The City has received support from the Washington State Department of Health (DOH), Drinking Water Division for a new well field. On November 21, 2014, Dorothy Tibbetts, Regional Manager for DOH stated that, "The proposed well field will provide the City with increased capacity to respond to emergencies and protect public health. The new well field can be used to serve customers, if other well sites, especially two of the City's largest well sites located near an oil pipeline, should become unusable because of a pipeline break. In addition, the new well field will provide options for replacing groundwater that's under the influence of surface water with lower groundwater sources in northwest Spokane, further protecting public health."

The Yellowstone Pipeline, owned and operated by Conoco Philips, conveys petroleum products and is located within 75 feet of the City's Parkwater Well Station and within 1,000 feet of the Well Electric Well Station. The Parkwater and Well Electric Stations provide almost 60% of the drinking water for the City of Spokane water system. According to the City, a leak from the Yellowstone Pipeline would have devastating consequences for the Parkwater and Well Electric wells and Spokane's drinking water supply. The proposed new well sites will help mitigate these contamination risks by dispersing the pumped volume over a larger geographical area. The pumping from the new well sites would help optimize system performance, use less energy to produce the same volume of water, and provide a more reliable service to its citizens.

# PROPOSED NEW WELL SITES (CORBIN PARK, FAITH BIBLE CHURCH, AUDUBON PARK)

Corbin Park -1: NW¼NE¼ of Sec. 7, T. 25 N., R.43 E.W.M.

Corbin Park -2: NE¼NE¼ of Sec. 7, T. 25 N., R.43 E.W.M.

Faith Bible Church: SW¼SE¼ of Sec. 6, T. 25 N., R. 43 E.W.M.

Audubon Park: SW¼SW¼ of Sec. 1, T. 25 N., R. 42 E.W.M.



# PROPOSED NEW WELL SITE (6<sup>™</sup> and HAVANA)





# Hydrogeologic and Impairment Analysis

John Covert, Hydrogeologist with Ecology, provided the following analysis for the proposed change: Applications for change of water right permits and certificates are governed by RCW 90.44.100, which states in part that the holder of a valid right to withdraw public ground waters may, without losing his priority of right, construct wells at a new location in substitution for, or in addition to, those at the original location, or he may change the manner or the place of use of the water. Any amendment shall be issued by the Department of Ecology (Ecology) only under the conditions that (1) an additional or substitute well or wells shall tap the same body of public ground water as the original well or wells; (2) use of the original well or wells shall be discontinued upon construction of the substitute well or wells; (3) the construction of an additional well or wells shall not enlarge the right conveyed by the original permit or certificate; and (4) all existing water rights shall not be impaired. Ecology may specify an approved manner of well construction and shall require a showing of compliance with the provisions of the amendment. In conducting impairment analysis for an application to change a water right that

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includes remaining inchoate water, Ecology compares the effects that would occur if the water right is exercised under its existing specifications to the effects that would occur if the water right is exercised under the proposed changed specifications. Accordingly, impairment analysis for this application does not involve comparing the effects that are presently occurring as a result of the City's current exercise of this water right to the effects that would occur under the changes as inchoate water becomes perfected by actual use. Rather, this impairment analysis involves comparing the effects that would occur as a result of increased pumping if the water right is exercised by pumping the existing wells to the effects that would occur from increased water use if the water right is exercised by pumping wells at the proposed additional points of withdrawal. The USGS, Bi-state, Spokane Valley Rathdrum Prairie (SVRP) Aquifer Study publications from 2005 and 2007 identify the footprint of the SVRP aquifer. From the USGS publications, we can see that the City of Spokane's well fields are all completed within the Spokane Valley Rathdrum Prairie aquifer. All of their wells are producing water from this prolific, unconfined, alluvial aquifer. Their wells are completed in unconsolidated sand and gravels. The proposed locations identified within this change application will also be completed within the SVRP aquifer. As such, all the wells authorized under this change application will tap the same body of public groundwater.

The applicant hired a consultant to conduct groundwater modeling analyses to evaluate the extent to which adding additional points of withdrawal to the original certificates might increase the amount of groundwater discharge to the Spokane River during the summer peak season from the SVRP aquifer. The results from this proprietary modeling effort indicates that developing additional points of withdrawal (adding new wells to the City's water system at either Corbin Park or at the Faith Bible Church area and relocating pumping from the City's existing Parkwater and/or Well Electric well fields would result in additional flows in the Spokane River during the summer months. The modeling results tell us this would happen because the existing well fields are located much closer to the Spokane River than the new, proposed sites. Moving pumping stresses downgradient and away from the Spokane River (relative to the existing points of withdrawal on the certificates associated with this change) will allow more SVRP aquifer to discharge to the Spokane River (these additional flows would not be captured by the original points of withdrawal). Changing the stress locations for withdrawing the equivalent volume of water to these more down gradient and distal wells, results in better flow conditions in the Spokane River. The consultant's report states: "the proposed relocation is likely to provide a notable benefit to flows in the Spokane River, particularly during the months of highest water demands and groundwater production rates."

The department does not have access to run this proprietary model to verify these results. The department does have access to spreadsheet tools developed by Ralston Hydrologic Services that are based on the 2007 Bi-state, USGS model for the SVRP aquifer. These tools allow us to evaluate changes to the hydrologic regime of the Spokane River by adjusting and evaluating pumping stresses in the aquifer. They provide a means of evaluating the same types of changes to the system as modeled by the applicant's consultant with their proprietary model. The department does have an MOU with the state of Idaho that says we both agree to maintain and use the same version of the USGS model when evaluating respective water rights for water right decision making. Using the spreadsheet tools that honor our commitment to the MOU, I was able to verify the conclusions of the applicant's consultant. Approving this change application's request to add additional points of withdrawal to the existing certificates will not impair flows in the Spokane River during the summer, low flow months. It would in fact improve flows in the Spokane River if the City utilized these new points of withdrawal to pump an

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equivalent volume of water out of the aquifer that would normally be withdrawn from just the original points of withdrawal.

The SVRP aquifer is one of the most prolific and productive aquifers on the planet. It is difficult to conduct an aquifer test and measure drawdown in a nearby observation well because the aquifer's hydraulic characteristics are so favorable that cones of depression are extremely shallow. The aquifer's high permeability eliminates the risk of impairment to any nearby, existing, wells from pumping of any of the City's wells. Approving these change applications will not impair any existing groundwater rights nor impair the flows in the Spokane River.

# Impairment Considerations

A review of Ecology records was conducted for existing water rights, permits, and claims within the areas of the proposed new well sites. The review of Ecology WRTS database found the following: <u>Corbin Park Area</u>: 1 certificate and 1 claim. This search area included one certificate for Orchard Avenue Irrigation District No. 6 <u>Faith Bible Church Area</u>: No other recorded rights <u>Audubon Park Area</u>: No other recorded rights <u>6<sup>th</sup> and Havana Area</u>: 9 certificates and 7 claims The search area included rights for Spokane County Water District #3 (six certificates), Carnhope Irrigation District #7 (two certificates) and Spokane Sand & Gravel (one certificate).

As indicated in the Hydrogeologic analysis, it has been determined that moving some of the pumping from the Well Electric and Parkwater well sites and spreading that over the other locations and/or proposed new sites will likely increase flows in the Spokane River, particularly during the months of highest water demands. The search found no existing water rights in the area which would be impaired through issuance of this application for change. It is not anticipated that the proposed changes by the City will cause any impairment.

# Letter of Concern

A letter of concern was received from Rachael Osborn on behalf of the Center for Environmental Law & Policy (CELP) on January 22, 2015. The letter included seven comments about the two draft Report of Examinations which were posted online. The following are each comment from the letter, followed by Ecology's response to the comment:

<u>CELP comment (1)</u> "The intent of the change application is, in part, to facilitate increased groundwater pumping by the City of Spokane to provide water to areas not currently served by the City, thus increasing the City's use of its inchoate (unused) water rights. Granting this water right change will also have the effect of evading protections for the Spokane River that will come with adoption of the instream flow rule (see draft WAC 173-557, presumably to be adopted on or before March 17, 2015)."

Ecology Response: The intent of this application to change an existing water right is to authorize groundwater pumping from new wells located downstream and at greater distances from the Spokane River than the existing authorized wells. Without the proposed new wells, the City would be able to continue to increase water use and perfect the inchoate portion of this water right. The City will continue to grow and will need to serve future water for municipal supply purposes as previously authorized by this water right. RCW 90.03.386 states in part, "The effect of the department of health's

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approval of a planning or engineering document that describes a municipal water supplier's service area under chapter 43.20 RCW, or the local legislative authority's approval of service area boundaries in accordance with procedures adopted pursuant to chapter 70.116 RCW, is that the place of use of a surface water right or groundwater right used by the supplier includes any portion of the approved service area that was not previously within the place of use for the water right if the supplier is in compliance with the terms of the water system plan." Pumping from the new wells will have less direct impact on the flow of the river than pumping from the existing wells. In addition, the existing wells are all located in close proximity to the Yellowstone pipeline. In the event a pipeline leak renders the existing wells unusable, the new wells will provide sources of uncontaminated groundwater for municipal uses served by the City.

The priority dates of Ground Water Certificate No. 504-D (May 1, 1926) and Ground Water Certificate No. 548-A (August 24, 1946) pre-date the effective date of the new Spokane Instream Flow Rule, WAC 173-557 (February 27, 2015). Because this change authorization pre-dates the effective date of the rule, the rule is not applicable. Notwithstanding, even if the instream flow requirements in WAC 173-557 were applicable to this application, pumping water from the suite of wells proposed under this application will cause less impact on instream flows than pumping from the wells that are currently authorized.

CELP comment (2) "The draft ROEs are inadequate for failure to discuss the increase in pumping that will occur and the consequent adverse impacts to the Spokane River."

## Ecology Response:

The affects of the groundwater pumping on the Spokane River are addressed under the "Hydrogeologic Analysis" section of this report. Analysis of this change application involves comparing the effects that would occur if the water right is exercised by pumping the existing wells to the effects that would occur if the water right is exercised by pumping wells at the proposed additional points of withdrawal. As the primary regional water purveyor, the City of Spokane continues to provide municipal water supply under these two water rights to a growing population. Moving the groundwater pumping further from the Spokane River than is currently authorized by this water right will reduce impacts on the river.

CELP comment (3) "The draft ROEs are inadequate for failure to discuss and address the City of Spokane's lack of diligence in putting its rights to use, and/or the excessive quantities of water that have been granted to the City in excess of its reasonable future needs."

## Ecology Response:

The City has continued to grow and continues to provide water under its existing water rights for municipal supply purposes to a growing population. The City's existing service area is not yet fully developed and additional infill growth will occur within this area. The City of Spokane is also the largest water purveyor in the area and anticipates the need to increase regional wholesale supply relationships, interties with other purveyors, and to respond to changes in urban growth areas and population. The City has existing and planned future wholesale agreements with neighboring water systems. Future demand for wholesale water is expected to increase, particularly with existing and future wholesale customers on the West Plains of Spokane, where the basalt aquifer is in serious decline and will not be able to supply future water needs. Other water short areas in the County may need water to be served by the City in the future. Neither the City nor Ecology can predict future population growth or where water may be needed in the future. The City has exercised reasonable diligence to perfect its water CHANGE REPORT OF EXAMINATION 24 CG3-\*00373S@1

rights through beneficial use, and has reasonable future need for the remaining quantity of inchoate water (13,773 AF) authorized under this water right.

<u>CELP comment (4)</u> "The draft ROEs are flawed for failure to conduct a tentative determination of the extent and validity of the two water rights, pursuant to RCW 90.03.330(2), and to relinquish or rescind or declare abandoned the unperfected portions of the City's water rights."

#### Ecology Response:

A determination of the extent and validity of this water right is addressed in the "Tentative Determination of Extent and Validity of Certificate No. 504-D" section of this report. Under RCW 90.44.100, the point of withdrawal of an inchoate groundwater right documented by a certificate may be changed. *Cornelius v. Department of Ecology*, Washington Supreme Court No. 88317-3 (February 12, 2015). The subject water right includes an inchoate quantity that has not yet been exercised and is therefore not subject to relinquishment.

<u>CELP comment (5)</u> "The ROEs is inadequate for its failure to discuss and address the City of Spokane's lack of reasonable efficiency, including the City's failure to meet its water system plan conservation goals."

## Ecology Response:

The City has established conservation goals to reduce its water use. The City has implemented a Water Use Efficiency Program, which meets the requirements of WAC 246-290-800. In April of 2014, the City also adopted new water conservation goals to reduce indoor residential water use, outdoor residential water use, outdoor irrigation for commercial/industrial use and outdoor governmental water use. The City met 3 of these 4 goals in 2014. A summary of this conservation goal attainment was provided by the City and can be made available upon request.

<u>CELP comment (6)</u> "The SEPA documents fail to discuss the impact of increased pumping on surface flows in the Spokane River. Ecology cannot rely on these incomplete environmental documents as a substitute for its own analysis of the impacts of the proposed change."

#### Ecology Response:

Ecology reviewed the SEPA documents provided by the City and concurs with the City's determination. Analysis of the environmental impacts that would result from approval of this change application involves comparing the effects that would occur if the water right is exercised by pumping the existing wells to the effects that would occur if the water right is exercised by pumping wells at the proposed additional points of withdrawal. The intent of this application is to add new wells located downstream and further away from the Spokane River than the wells currently authorized under this water right. Pumping from the new wells should reduce impacts to the river from pumping authorized by this water right.

<u>CELP comment (7)</u> "It is improper to issue a permanent water right to the City when it has not yet determined where the new point of withdrawal (POW) will be located. Under these circumstances, the appropriate process it to issue a preliminary permit to allow the City to undertake whatever investigations are necessary to determine where the new POW will be located." <u>Ecology Response:</u>

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In their application, the City proposed five locations for new wells. Each site is located over the Spokane Valley Rathdrum Aquifer, so the new wells will all be constructed in and withdraw water from that aquifer. The new wells will all withdraw water from the same body of public ground water as the original authorized wells. Therefore, there is no need for issuance of a preliminary permit under these applications.

## CONCLUSIONS

There is a water right available for change under Ground Water Certificate No. 504-D(together w/C.Chg 1-3-435 and 1-3-52).

When considering an application for change to a water right, Ecology must determine that the proposed change can be made without detriment or injury to existing water rights. Factors considered when determining potential impact include the following:

No Impairment to Existing Rights:

It is not anticipated that the proposed change would cause impairment to existing water rights.

No Detriment to the Public Welfare:

There have been no findings through this investigation indicating that there would be any detrimental impact to the public welfare through issuance of the proposed change.

No Enhancement of the Original Right:

No withdrawal of water over and above what has been authorized for beneficial use would be authorized through approval of this change.

## Same Source of Water:

All of the ground water to be withdrawn is supplied by the same body of public water, the Spokane Valley Rathdrum Prairie Aquifer.

## RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that this request be approved in the amounts and within the limitations listed below and subject to the provisions listed above.

This change to Ground Water Certificate No. 504-D supersedes previous Certificate of Change recorded as Vol. 1-3, PP. 435 issued September 9, 1985 and Certificate of Change recorded as Vol. 1-3, PP. 52 issued September 21, 1973.

## Authorized Quantities and Purpose of Use

The amount of water recommended is a maximum limit and the water user may only use that amount of water within the specified limit that is reasonable and beneficial:

Quantities:

56,000 gallons per minute and 38,000 acre-feet per year

Purpose of Use: Municipal Supply purposes

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## Points of Withdrawal:

Nineteen (19) Wells located as follows:

Source Name	Parcel #	Well Tag	Twp	Rng	Sec	QQ	Latitude	Longitude
Well Electric 1	35111.0001	AHC996	25N	43E	11	SW%NE%	47.68147*N	-117.33214*W
Well Electric 2	35111.0001	AHC995	25N	43E	11	SW%NE%	47.68147*N	-117.33214"W
Parkwater 1	35114.2501	AHC722	25N	43E	11	NE%SE%	47.67754°N	-117.33002*W
Parkwater 2	35114.2501	AHC999	25N	43E	11	NE%SE%	47.67754°N	-117.33002*W
Parkwater 3	35114.2501	N/A	25N	43E	11	NE%SE%	47.67754*N	-117.33002*W
Parkwater 4	35114.2501	AHC998	25N	43E	11	NE%SE%	47.67754"N	-117.33002*W
Ray Street 1	35222.0001	ABR602	25N	43E	22	SE%NW%	47.65051"N	-117.36282*W
Ray Street 2	35222.0001	AHC723	25N	43E	22	SE%NW%	47.65051°N	-117.36282°W
Central 1	36311.1406	N/A	26N	43E	31	NE%NE%	47.71185*N	-117.41408"W
Central 2	36311.1406	AHC726	26N	43E	31	NE%NE%	47.71185°N	-117.41408°W
Hoffman 1	35041.0419	ABR551	25N	43E	04	NW%NE%	47.69993*N	-117.37852*W
Hoffman 2	35041.0419	AHC728	25N	43E	04	NW%NE%	47.69993°N	-117.37852*W
Grace 1	35081.2802	AHC724	25N	43E	08	NE%NE%	47.68335"N	-117.39397*W
Nevada 1	35081.2802	AHC725	25N	43E	08	NE%NE%	47.68325°N	-117.39485*W
NEW SITES:							-	
Corbin Park 1 (new)	35071.1901	N/A	25N	43E	07	NW%NE%	47.68475"N	-117.41793°W
Corbin Park 2 (new)	35071.1901	N/A	25N	43E	07	NE%NE%	47.68478"N	-117.41497°W
Faith Bible Church (new)	35064.3611	N/A	25N	43E	06	SW1/4SE1/4	47.68751"N	-117.41727*W
Audubon Park (new)	25013.0004	N/A	25N	42E	01	SW1/4SW1/4	47.68872"N	-117.45236°W
6 <sup>th</sup> and Havana (new)	35232.4108	N/A	25N	43E	23	SW%NW%	47.65180"N	-117.34657°W

#### Place of Use:

The place of use (POU) of this water right is the service area described in the most recent Water System Plan/Small Water System Management Program approved by the Washington State Department of Health, so long as the water system is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

Gene Drury, Report Writer

24 Date

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ATTACHMENT 1



## State of Washington REPORT OF EXAMINATION FOR WATER RIGHT CHANGE

PRIORITY DATE August 24, 1946 WATER RIGHT NUMBER 548-A

ADDRESS City of Spokane 914 E. North Foothills Drive Spokane, WA 99207

<b>Total Quantity Auth</b>	orized for Withdraw	al construction of the second se
WITHDRAWAL RATE 63,000	UNITS GPM	ANNUAL QUANTITY (AF/YR) 51,240
Purpose		

Purpose				
PURPOSE	WITHDRAWAL RATE (GPM)	ANNUAL QUANTITY (AF/YR)	PERIOD OF USE	
Municipal	63,000	51,240	01/01 - 12/31	

Source - Spokane Val	ley/Rathdrum Prairie	Water System	
SOURCE	COUNTY	WATERBODY	WATER RESOURCE INVENTORY AREAS
Nineteen (19) wells	SPOKANE	GROUNDWATER	54, 55, 57

Source Name	Parcel #	Twp	Rng	Sec	QQ	Latitude	Longitude
Well Electric (2 wells)	35111.0001	25N	43E	11	SW%NE%	47.68147°N	-117.33214°W
Parkwater (4 wells)	35114.2501	25N	43E	11	NE%SE%	47.67754°N	-117.33002"W
Ray Street (2 wells)	35222.0001	25N	43E	22	SE%NW%	47.65051*N	-117.36282*W
Central (2 wells)	36311.1406	26N	43E	31	NE%NE%	47.71185*N	-117.41408*W
Hoffman (2 wells)	35041.0419	25N	43E	04	NW%NE%	47.69993*N	-117.37852*W
Grace (1 well)	35081.2802	25N	43E	08	NE%NE%	47.68335*N	-117.39397*W
Nevada (1 well)	35081.2802	25N	43E	08	NE%NE%	47.68325*N	-117.39485*W
Corbin Park 1 (new)	35071.1901	25N	43E	07	NW%NE%	47.68475*N	-117.41793"W
Corbin Park 2 (new)	35071.1901	25N	43E	07	NE%NE%	47.68478*N	-117.41497°W
Faith Bible Church (new)	35064.3611	25N	43E	06	SW¼SE¼	47.68751°N	-117.41727°W
Audubon Park (new)	25013.0004	25N	42E	01	SW1/4SW1/4	47.68872*N	-117.45236*W
6 <sup>th</sup> & Havana (new)	35232.4108	25N	43E	23	SW¼NW¼	47.65180°N	-117.34657°W

Datum: WGS84

REPORT OF EXAMINATION FOR WATER RIGHT CHANGE

## Place of Use (See Attached Map)

The place of use (POU) of this water right is the service area described in the most recent Water System Plan/Small Water System Management Program approved by the Washington State Department of Health, so long as the water system is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

## Proposed Works

Nineteen (19) wells, pumps, reservoirs, distribution system

Development Schedule			
BEGIN PROJECT	COMPLETE PROJECT	PUT WATER TO FULL USE	
January 1, 2020	January 1, 2035	January 1, 2065	
Measurement of Water	Use		
How often must water us	se be measured?	Weekly	

How often must data be reported to Ecology? What volume should be reported? What rate should be reported? Weekly Upon request Total Annual Volume Annual Peak Rate of Withdrawal (gpm)

#### Provisions

This change to Ground Water Certificate No. 548-A supersedes previous Certificate of Change recorded as Vol. 1-3, PP. 439 issued September 9, 1985.

The total amount authorized for withdrawal under Ground Water Certificate Nos. 548-A and 504-D is limited to 119,000 gallons per minute and 89,240 acre-feet per year, continuously, for municipal supply.

This authorization to make use of public waters of the State is subject to existing rights, including any existing rights that may be held by the United States for the benefit of Indians under treaty or otherwise.

Nothing in this authorization shall be construed as satisfying other applicable federal, state, or local statutes, ordinances, or regulations.

#### Wells, Well Logs and Well Construction Standards

All wells constructed in the state must meet the construction requirements of WAC 173-160 titled "Minimum Standards for the Construction and Maintenance of Wells" and RCW 18.104 titled "Water Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard must be decommissioned.

All wells must be tagged with a Department of Ecology unique well identification number. If you have an existing well and it does not have a tag, please contact the well-drilling coordinator at the regional Department of Ecology office issuing this decision. This tag must remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

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Installation and maintenance of an access port as described in WAC 173-160-291(3) is required.

#### Measurements, Monitoring, Metering and Reporting

An approved measuring device must be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use", WAC 173-173, which describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

## Water Use Efficiency

The water right holder is required to maintain efficient water delivery systems and use of up-to-date water conservation practices consistent with RCW 90.03.005.

#### Proof of Appropriation

The water right holder must file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The certificate will reflect the extent of the project perfected within the limitations of the water right. Elements of a proof inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions.

#### Schedule and Inspections

Department of Ecology personnel, upon presentation of proper credentials, will have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

## **Real Estate Excise Tax**

This decision may indicate a Real Estate Excise Tax liability for the seller of water rights. The Department of Revenue has requested notification of potentially taxable water right related actions, and therefore will be given notice of this decision, including document copies. Please contact the state Department of Revenue to obtain specific requirements for your project. Phone: (360) 570-3265. The mailing address is: Department of Revenue, Real Estate Excise Tax, PO Box 47477, Olympia WA 98504-7477 Internet: http://dor.wa.gov/. E-mail: REETSP@DOR.WA.GOV.

#### **Findings of Facts**

Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I concur with the investigator that a valid right exists; that there will be no impairment of existing rights; that the purpose(s) of use are beneficial; and that there will be no detriment to the public interest.

Therefore, I ORDER approval of Application No. CG3-\*00352C@1, subject to existing rights and the provisions specified above.

#### Your Right To Appeal

You have a right to appeal this Order to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of the Order.

File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this Order on Ecology in paper form by mail or in person. (See addresses below.) E-mail is not accepted.
- You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Street Addresses	Mailing Addresses
Department of Ecology	Department of Ecology
Attn: Appeals Processing Desk	Attn: Appeals Processing Desk
300 Desmond Drive SE	PO Box 47608
Lacey, WA 98503	Olympia, WA 98504-7608
Pollution Control Hearings Board	Pollution Control Hearings Board
1111 Israel Road SW Ste 301	PO Box 40903
Tumwater, WA 98501	Olympia, WA 98504-0903

Signed at Spokane, Washington, this 24th day of February, 2015.

Keith L. Stoffel, Section Manager

For additional information visit the Environmental Hearings Office Website: http://www.eho.wa.gov. To find laws and agency rules visit the Washington State Legislature Website: http://www1.leg.wa.gov/CodeReviser.

## INVESTIGATOR'S REPORT

Gene Drury, Department of Ecology Water Right Control Number CG3-\*00352C@1 Ground Water Certificate Number 548-A (together w/C. Chg 1-3-439)

## BACKGROUND

This report serves as the written findings of fact concerning Water Right Change Application Number CG3-\*00352C@1.

## Application and Proposed Changes

An application for change/transfer was submitted by the City of Spokane, to the Department of Ecology, Water Resources Program on August 7, 2014. The City of Spokane proposes to add existing municipal supply wells and five new well sites as additional points of withdrawal authorized under Ground Water Certificate No. 548-A (together w/C. Chg 1-3-439). Future reference in this report to Certificate "548-A" includes the previously issued change under Certificate of Change Vol. 1-3, PP. 439. A total of nineteen (19) wells at twelve (12) locations are proposed. This application requests the authorization of a total of eleven (11) well locations in addition to the one well location (Parkwater) that is already authorized under this water right.

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Number		548-A (	1-3-439)		-			
Recorded Name		City of S	pokane					
Priority Date		August	24, 1946	6				
Source		Parkwat	ter (4 we	ells)				
GPM		63,000						
AF/YR		51,240						
Purpose of use		Municip	al suppl	y				
Place of Use		Area sei	rved by t	the City	of Spo	kane		
County		Spokane	8					
WRIA		57 - Mi	ddle Spo	kane				
Source Name	Parcel #		Twp	Rng	Sec	QQ	Latitude	Longitude
Parkwater (4 wells)	35114.2	501	25 N.	43 E.	11	NE%SE%	47.67754*N	-117.33002*W
								I BORD CARLON AND ADDRESS OF ADDRESS

## **EXISTING Water Right Attributes**

GPM = Gallons per minute; AF/YR = Acre-feet per year; Sec. = Section; QQ Q = Quarter-quarter of a section; WRIA = Water Resource Inventory Area; E.W.M. = East of the Willamette Meridian

REQUESTED Water	Right Attrib	utes					
Application Number	CG3-*00	0352C@	1				
Applicant Name	City of S	pokane					
Date of Application	August	7, 2014					
Source	Ninetee	n (19) w	ells				
GPM	63,000						
AF/YR	51,240						
Purpose of use	Municip	al suppl	Y	210120101			
Place of Use	Area ser	ved by	City of S	Spokan	e (RCW 90.03.3	386)	
County	Spokane	E					
WRIA	54, 55, 5	57	2.001	1000 N	N2.250		10101020720
Source Name	Parcel #	Twp	Rng	Sec	QQ	Latitude	Longitude
Well Electric (2 wells)	35111.0001	25 N	43 E	11	SW%NE%	47.68147"N	-117.33214°W
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**REQUESTED Water Right Attributes** 

GPM = Gallons per minute; AF/YR = Acre-feet per year; Sec. = Section; QQ Q = Quarter-quarter of a section; WRIA = Water Resource Inventory Area; E.W.M. = East of the Willamette Meridian

## Legal Requirements for Proposed Change

The following is a list of requirements that must be met prior to authorizing the proposed change.

## Public Notice

RCW 90.03.280 requires that notice of a water right application be published once a week, for two consecutive weeks, in a newspaper of general circulation in the county or counties where the water is to be stored, diverted and used. Notice of this application was published in the Spokesman Review on October 8 and 15, 2014. No protests were received.

A letter of concern was received from Rachael Osborn on behalf of The Center for Environmental Law & Policy (CELP) on January 22, 2015 after a first draft Report of Examination was posted on the internet. The issues raised in the letter are addressed below in this report.

## State Environmental Policy Act (SEPA)

This application is not exempt from the provisions of the State Environmental Policy Act (SEPA) of 1971, Chapter 43.21 RCW, due to the fact that the cumulative quantities of water for this project and those under existing water rights constitute a withdrawal of more than 2,250 gallons per minute. A final Determination of Non-Significance was issued by the City of Spokane on December 1, 2014, stating that

CHANGE REPORT OF EXAMINATION

the proposed change will not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) will not be required. The Water Resources Program has reviewed the SEPA checklist and concurs with the City's determination.

#### Water Resources Statutes and Case Law

RCW 90.03.386(2) states that a municipal water supplier may change its service area through the water system plan approval process administered by the Washington Department of Health. As long as the municipal water supplier is in compliance with the approved plan, and other requirements prescribed under RCW 90.03.386(2), the place of use for the water right is the service area authorized under the plan. Since the subject water right is for municipal supply purposes, the applicant is not requesting any change of place of use through this application.

RCW 90.44.100 allows Ecology to amend a groundwater right to (1) allow the user to construct a replacement or additional well at a new location outside of the location of the original well , if:

- (a) The additional or replacement well taps the same body of public ground water as the original well. RCW 90.44.100(2)(a),
- (b) Where a replacement well is approved, the user must discontinue use of the original well and properly decommission the original well. RCW 90.44.100(2)(b),
- (c) Where an additional well is constructed, the user may continue to use the original well, but the combined total withdrawal from all wells shall not enlarge the right conveyed by the original permit or certificate. RCW 90.44.100(2)(c),
- (d) Other existing rights shall not be impaired. RCW 90.44.100(2)(d),
- (e) The change will not be detrimental to the public welfare (RCW 90.44.100(2) ("findings as prescribed in the case of an original application" are required).

When changing or adding points of withdrawal to groundwater rights, the wells must draw from the same body of public groundwater. Indicators that wells tap the same body of public groundwater include:

- (a) Hydraulic connectivity.
- (b) Common recharge (catchment) area.
- (c) Common flow regime.
- (d) Geologic materials that allow for storage and flow, with recognizable boundaries or effective barriers to flow.

Under RCW 90.44.100, the point of withdrawal of an inchoate groundwater right documented by a certificate may be changed. *Cornelius v. Department of Ecology*, Washington Supreme Court No. 88317-3 (February 12, 2015).

The Washington Supreme Court has held that Ecology, when processing an application for change to a water right, is required to make a tentative determination of the extent and validity of the right. This is necessary to establish whether the right is eligible for change. R.D. Merrill Co. v. Pollution Control Hearings Bd., 137 Wn.2d 118, 969 P.2d 458 (1999); Okanogan Wilderness League v. Town of Twisp, 133 Wn.2d 769, 947 P.2d 732 (1997). Thus, in reviewing the subject water right change application, Ecology must first determine the extent and validity of the water right that is eligible for change. Then, Ecology must determine whether the requested change would cause impairment of other existing water rights or be detrimental to the public welfare.

CHANGE REPORT OF EXAMINATION

## INVESTIGATION

In considering the proposed change, the investigation included, but was not limited to the following:

- Appropriate Washington State RCW's and WAC's
- Ground Water Certificate No. 504-D (together w/C. Chg 1-3-435 and 1-3-52)
- Ground Water Certificate No. 548-A (together w/C. Chg 1-3-439)
- City of Spokane DRAFT Water System Plan dated May of 2014
- Information submitted by the City of Spokane in support of this application
- Meetings/discussions with Jesse Cowger -Varela & Associates, Dan Kegley City of Spokane; Bill Rickard - City of Spokane
- Ecology's Water Rights Tracking System (WRTS) and Well Log Database
- USGS topographic maps and aerial photography
- State Environmental Policy Act (SEPA) Checklist dated November 17, 2014
- Department of Health, Office of Drinking Water letter dated November 21, 2014
- Ralston Hydrologic Services SVRP Aquifer Pumping Effects Spreadsheet tool, Nov-2014 version
- GSI Water Solutions letter dated December 5, 2014
- Review by Department of Ecology regional program staff and hydrogeologists

A field investigation was conducted by Gene Drury and John Covert on December 3, 2014 with Dan Kegley, Director of Water & Hydroelectric Services for the City of Spokane and Jesse Cowger of Varela & Associates. The City of Spokane proposes to change Ground Water Certificate Nos. 504-D and 548-A by adding up to five new wells under these water rights and integrating its existing wells. No other changes are proposed.

The proposed locations of the new wells are: 1) Corbin Park-1: within the NW¼NE¼ of Sec. 7, T. 25 N., R.43 E.W.M.; 2) Corbin Park-2: within the NE¼NE¼ of Sec. 7, T. 25 N., R.43 E.W.M.; 3) Faith Bible Church: within the SW¼SE¼ of Sec. 6, T. 25 N., R. 43 E.W.M.; 4) Audubon Park: within the SW¼SW¼ of Sec. 1, T. 25 N., R. 42 E.W.M.; 5) 6<sup>th</sup> and Havana: within the SW¼NW¼ of Sec. 23, T. 25 N., R.43 E.W.M. Each of these sites was visited on the day of the field investigation.

## Tentative Determination of Extent and Validity of Certificate No. 548-A

The City of Spokane is the second largest city in the State of Washington. The City provides municipal water through a total of 7 well pumping stations, 14 existing wells, 27 well pumps, 25 booster pumping stations, 72 booster pumps; 22 pressure zones with 34 reservoirs, 16 pressure reducing valve stations and over 1,000 miles of water pipe.

The 14 existing wells are located at the following pumping stations: 1) <u>Well Electric</u> (S02) - Two wells within the SW¼NE¼ of Sec. 11, T. 25 N., R. 43 E.W.M.; 2) <u>Parkwater</u> (S03) - Four Wells within the NE¼SE¼ of Sec. 11, T. 25 N., R. 43 E.W.M.; 3) <u>Nevada Street</u> (S01) - One well within the NE¼NE¼ of Sec. 8, T. 25 N., R.43 E.W.M.; 4) <u>Grace Avenue</u> (S06) - One well within the NE¼NE¼ of Sec. 8, T. 25 N., R.43 E.W.M.; 5) <u>Ray Street</u> (S04) - Two wells within the SE¼NW¼ of Sec. 22, T. 25 N., R. 43 E.W.M.; 6) <u>Hoffman Avenue</u> (S05) - Two wells within the NW¼NE¼ of Sec. 4, T. 25 N., R. 43 E.W.M.; 7) <u>Central</u> <u>Avenue</u> (S08) - Two wells within the NE¼NE¼ of Sec. 31, T. 26 N., R. 43 E.W.M.</u> All of the City's wells pump water from the Spokane Valley-Rathdrum Prairie Aquifer, which was designated a "sole source" aquifer in 1978. The City also has interties with five other nearby water purveyors. They are Spokane County Water District #3, Whitworth Water District #2, City of Airway Heights, Fairchild Air Force Base, Vel View Water District and North Spokane Irrigation District #8 (emergency use only).

Ground Water Certificate No. 548-A was issued to the City of Spokane based on the installed system capacity at the time ("pumps and pipes") and has been exercised to provide water for municipal use as the population of the area has increased. At the time Certificate No. 548-A was issued, it was a common practice of the State of Washington to issue certificates to public water purveyors that were quantified based on system capacity rather than actual beneficial use of water . In Department of Ecology v. Theodoratus, 135 Wn.2d 582, 957 P.2d 1241(1998), the Washington Supreme Court held that state statutory and common law did not allow the State to issue a vested water right certificate based on water system capacity. However, although the Theodoratus decision did not involve a municipality, the Court recognized that under Washington's statutes there are significant differences between municipal water use and other water uses. The Court stated in this decision that municipal water rights often receive separate treatment under water law. Notwithstanding this distinction, the Theodoratus decision cast uncertainty over the status of water right certificates that were issued to public water suppliers based on the "pumps and pipes" standard. In response to the Theodoratus decision, the legislature enacted Washington's Municipal Water Law (MWL), which became effective on September 9, 2003. In 2010, the Supreme Court upheld the constitutionality of the MWL in Lummi Indian Nation v. State of Washington, 170 Wn.2d 247, 241 P.3d 1220 (2010).

Under the MWL, the City of Spokane qualifies as a "municipal water supplier" as defined under RCW 90.03.015(3), and Certificate No. 548-A qualifies as a water right for municipal supply purposes under RCW 90.03.015(4) because it has been continuously exercised to provide municipal water service.

RCW 90.03.330(3) provides that water rights for municipal water supply purposes documented by "pumps and pipes" certificates issued prior to September 9, 2003 are "rights in good standing." These water rights may include inchoate quantities that have not yet been exercised. Such rights may continue to be exercised to serve the municipal water supplier's reasonably anticipated future needs.

RCW 90.03.330(2) provides that Ecology cannot revoke or diminish certificated water rights for municipal water supply purposes, except under certain limited circumstances. One such circumstance is "for the issuance of certificates following the approval of a change, transfer, or amendment under RCW 90.03.380 or 90.44.100." Thus, Ecology may revoke or diminish a water right during the process of evaluating a groundwater right change application under RCW 90.44.100, based on the tentative determination of extent and validity of the water right, or to prevent impairment of other water rights or detriment to the public welfare.

Accordingly, in reviewing the City's application, Ecology must perform a tentative determination of the extent and validity of Certificate No. 548-A and first, determine, what quantity of water has been perfected through actual beneficial use. Then, Ecology must determine how much of the remaining inchoate quantity remains "in good standing" through the City's reasonable diligence in perfecting the water right. *Cornelius v. Department of Ecology*, Washington Supreme Court No. 88317-3 (February 12, 2015).

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## Analysis of Historical Beneficial Use of Water Under Certificate No. 548-A

Ground Water Certificate 548-A, with a priority date of August 24, 1946, was issued to the City of Spokane on February 5, 1951. The certificate authorized withdrawal of 63,000 gallons per minute and 51,240 acre-feet per year, continuously, for municipal supply from four wells (aka "Parkwater" wells). The certificate authorized the Parkwater wells located within the NW%NE%SE% of Sec. 11, Township 25 N., Range 43 E.W.M. in Spokane County, Washington. In 1985, an application was made and approved to change the place of use to "The area served by the City of Spokane". This change is recorded under Certificate of Change Vol. 1-3, PP. 439.

The following table shows the City of Spokane's annual water use during the period from 2007 though 2013. In 2009, the City used 29,784 acre-feet per year of the authorized 51,240 acre-feet per year under Ground Water Certificate No. 548-A from the Parkwater pumping station. Water use has varied and has been reduced slightly due to ongoing conservation efforts. Water rights for municipal supply purposes are specifically exempt from relinquishment under RCW 90.14.140(2)(d) if there has been reduced water use or nonuse of all or a portion of a municipal supply water right for a period of five or more consecutive years. Accordingly, 29,784 acre-feet per year has been perfected under Certificate No. 548-A through the actual beneficial use of water.

CENTIFICATE	NO. 340-A [1	-3-439] - Annu	al water use	in Acre-reet p	er year (AF):	
2007	2008	2009	2010	2011	2012	2013
21,500	28,172	29,784	19,968	17,349	24,363	21,590

## CERTIFICATE NO. 548-A (1-3-439) - Annual Water Use in Acre-feet per year (AF):

Since 29,784 acre-feet per year has been perfected though actual use, Certificate No. 548-A documents a remaining inchoate annual quantity of 21,456 acre-feet per year. A determination of whether the inchoate quantity remaining under Certificate No. 548-A is in good standing requires appraisal of the City of Spokane's use of water for municipal supply purposes under its portfolio of water rights. The following table summarizes the City of Spokane's primary municipal supply water rights.

Water Right	Priority Date	Station(s) Well Name	GPM (Qi)	AC-FT (Qa)
GW 503-D (Cert. Chg. #592)	1907	GRACE	20,000	1,000
GW 503-D (Cert. Chg. #593)	1907	RAY STREET	7,000	350
GW 503-D (Cert. Chg. #594)	1907	CENTRAL	7,000	350
GW 503-D (SEE Cert. Chgs. #1-3-434, 1-3- 434, 592, 593, 594)	1907		34,000	1,700
GW 504-D (Cert. Chg. #1-3-52)	5/01/26	WELL- ELECTRIC	54,750	36,000
GW 504-D (Cert. Chg. #1-3-52)	5/01/26	RAY STREET	1,250	2,000
GW 504-D (Cert. Chg. #1-3-435 & 1-3-52)	5/01/26	-	56,000	38,000
GW 505-D (Cert. Chg. #1-3-436)	7/14/37	RAY STREET	14,000	1,870
GW 506-D (Cert. Chg. #1-3-437)	7/01/38	HOFFMAN	11,600	1,280
GW 507-D (Cert. Chg. #1-3-438)	1/12/45	RAY STREET	2,600	520
GW 548-A (Cert. Chg. #1-3-439)	8/24/46	PARKWATER	63,000	51,240
GW 728-A (Cert. Chg. #658)	1/16/50	GRACE	11,000	4,080
GW 728-A (Cert. Chg. #658)	1/16/50	CENTRAL	9,000	4,760
GW 728-A (Cert. Chg. #1-3-440)	1/16/50		20,000	8,840
GW 3199-A (Cert. Chg. #1-3-441)	7/02/56	NEVADA	25,000	20,000
GW 3903-A (Cert. Chg. #1-3-442)	6/05/59	CENTRAL	7,000	11,480
GW 4503-A (Cert. Chg. #1-3-443)	3/03/61	CENTRAL	7,900	12,640
***	***	TOTAL:	241,100	147,570

## CITY OF SPOKANE - EXISTING WATER RIGHTS FOR MUNICIPAL SUPPLY

## CITY OF SPOKANE - OTHER WATER RIGHTS

Water Right	Priority Date	Well Name	GPM (Qi)	AC-FT (Qa)
G3-27181C	11/30/81	Spokane International Airport	200*	526*
Water Right	Priority Date	Source	Q	
SW Cert. No. 1014	6/12/45	Spokane River	400 CFS	
SW Cert. No. S3-26064C	9/11/78	Spokane River	7,600 CFS	
R3-28402P	10/09/87	Spokane River	4,000 AF	

\*Portion transferred to Goodrich Corporation on February 16, 2005 (Goodrich = 250 gpm, 89 af/yr) Note: The City may hold additional water rights not listed above.

In considering whether a municipal water supplier like the City of Spokane has exercised reasonable diligence in developing into its water rights, the Department recognizes that cities often grow at uneven rates, and need to be able to serve their growing populations. The actual use of water over time fluctuates due to many factors, which include but are not limited to year-to-year weather patterns, conservation measures, water price and general changes in water use practices. Over time, the population within the City of Spokane service area has grown, often times at considerable rates. In addition, the City's wholesale supply role has increased recently and the City intends to increase wholesale supply agreements to respond to regional needs and growth management planning.

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Significant work has been conducted to upgrade the infrastructure of the City's system and promote conservation by their water users. The City has implemented a Water Use Efficiency Program, which meets the requirements of WAC 246-290-800. In April 2014, the City also adopted new water conservation goals to reduce indoor residential water use, outdoor residential water use, outdoor irrigation for commercial/industrial use and outdoor governmental water use.

As stated earlier, the City's present pumping capacity from all well stations is 187,300 gallons per minute (based on current operational pumps) of the authorized 241,100 gallons per minute. The City has used just under 70,000 acre-feet per year of the authorized 147,570 acre-feet per year for municipal supply purposes. The City of Spokane serves water to an estimated 208,916 people (2011 U.S. Census) within its city limits and current service area which is about 56,500 acres in size. The existing service area is not yet fully developed. Additional infill growth will occur within the existing service area. The larger "retail service area" has a total population of around 227,455 people. The Spokane County Coordinated Water System Plan (CWSP) defines a future service area for the City of Spokane's water system of approximately 101,290 acres. When the City reaches build-out of its future service area the City's water system will serve approximately 44,790 acres (80%) more area than it currently serves.



The City of Spokane has been a growing community for decades. The figure below documents the size of the land area of the City's boundary over the decades. As the size of the City has grown, so has its water distribution system and its customer base.

Spokane County's Water Resources Program has done extensive water demand modeling. Their most recent water demand model was released in 2013. It calculates that public water supply water demand growth from wells tapping the Spokane Valley Rathdrum Prairie Aquifer will increase by 33% between 2010 and 2040 (see their Table 5, Spokane County water Demand Forecast Model, Model 3.0 & 2013 Forecast Update). The City of Spokane is the largest water purveyor in the region and supplies all of its

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customers with water from the SVRP. Increasing the City's recent average annual pumpage of 65,000 AF by 33% suggests they will be pumping 86,450 AF per year by 2040.

The City anticipates the need to increase regional wholesale supply relationships, interties with other purveyors, and to respond to changes in urban growth areas and population. The City does have has existing and planned future wholesale agreements with neighboring water systems. Future demand for wholesale water is expected to increase throughout the County, particularly with existing and future wholesale customers on the West Plains of Spokane, where the basalt aquifer is in serious decline. There are other water short areas in Spokane County that may need water to be delivered by the City in the future. The unused (or inchoate) water under Certificate Nos. 504-D and 548-A will help the City cover expected growth in these areas. The City has and will continue to update its service area description as needed and as allowed under RCW 90.03.386.

The City's 20 year forecasted water right status (with conservation) is that it will use an estimated 211, 450 gallons per minute and 80,500 acre-feet pear year for municipal supply purposes. Based on this estimate, it's very likely that the City will need additional water well beyond the 20 year planning horizon. Future growth and additional water beyond 20 years will have to come from the available inchoate portions under of Certificates Nos. 504-D and 548-A. The remaining inchoate annual quantities under Certificate 504-D is 13,773 acre-feet per year and under Certificate 548-A it is 21,456 acre-feet per year. These two certificates combined total 119,000 gallons per minute and 89,240 acre-feet per year for municipal supply. In 50 years, it is very likely that the City will need the full 89,240 acre-feet per year under these two water rights to cover future growth.

City of Spokane - Annual Water Use in Acre-feet per year (AF) - All Well Stations:									
	2007	2008	2009	2010	2011	2012	201		

City of Cashana Annual Mishar Har is Anna fact annual (AF) All Mall Charles

2007	2008	2009	2010	2011	2012	2013
66,005	65,178	68,915	63,250	63,533	64,520	65,078

In sum, the remaining inchoate portion of water authorized Certificate No. 548-A (21,456 AF) is in good standing and eligible for change because the City has demonstrated reasonable diligence in perfecting the water right by continuing to upgrade its infrastructure and supply water for new customers in a service area with a growing population.

## Existing Wells – City of Spokane:

The source name, current capacity and location of the City of Spokane pumping stations are as follows:

1) Well Electric (S02) - 39,300 GPM

Two wells within the SW1/4NE¼ of Sec. 11, T. 25 N., R. 43 E.W.M.

Parkwater (S03) – 62,000 GPM

Four Wells in Lots 1, 2, 3 & 4, Block 33 of Parkwater Addition, within the NE¼SE¼ of Sec. 11, T. 25 N., R. 43 E.W.M.

Nevada Street (S01) – 31,000 GPM

One well in Lot 7, Block 37 of Wolverton and Conlan Addition, within the NE¼NE¼ of Sec. 8, T. 25 N., R.43 E.W.M.

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4) Grace Avenue (\$06) - 19,000 GPM

One well in Lot 8, Block 37 of Wolverton and Conlan Addition, within the NE¼NE¼ of Sec. 8, T. 25 N., R.43 E.W.M.

- Ray Street (S04) 18,700 GPM Two wells located in Block 1, 3<sup>rd</sup> Addition to Eureka, in the SE¼NW¼ of Sec. 22, T. 25 N., R. 43 E.W.M.
- 6) Hoffman Avenue (S05) 5,400 GPM Two wells located in Lots 27, 28, 29 & 30, Block 4 of Arlington Heights, within the NW¼NE¼ of Sec. 4, T. 25 N., R. 43 E.W.M.
- 7) <u>Central Avenue (S08) 11,900 GPM</u> Two wells in Lot 17 and Lot 20, both in Block 14 of Byrne Addition, within the NE¼NE¼ of Sec. 31, T. 26 N., R. 43 E.W.M.

## **EXISTING WELL DATA**

SOURCE	ECY ID#	Year	Deptha	Diam.	Elevation2	Static Water Elevation 3		Pump Capacity (gpm)	Pump HP	Pump Type
Well Electric	AHC996	1927	33.3'	48'	1895.7	1889.2'		8400	900	CFP
Well Electric	AHC995	1927	33.3'	48'	1895.7			7500	900	CFP
	AHC995				1895.7			8400	900	VT
	AHC995				1895.7			15000	1000	VT
							TOTAL:	39,300		
Parkwater	AHC722	1949	126.1'	18'	1964.1			8000	600	VT
	AHC722							8000	600	VT
Parkwater	AHC999	1949	126.1'	18'	1964.1			8000	600	VT
	AHC999							8000	600	VT
Parkwater	N/A	1949	126.1'	18'	1964.1	-		8000	600	VT
	N/A							8000	600	VT
Parkwater	AHC998	1949	126.1'	18'	1964.1	1891.8'	-	7000	1000	VT
	AHC998							7000	900	VT
						1	TOTAL:	62,000		
Nevada	AHC725	1958	120'		1954.0	1867.7		5700	400	SUB
	AHC725			1	/			5700	400	SUB
	AHC725							9800	800	VT
1000	AHC725			-			1.1.1.1	9800	800	VT
			1				TOTAL:	31,000		
Grace	AHC724	1950	124.0'	18'	1963.0	1871.4		9500	900	VT
	AHC724		124.0'	18'			1.1.1	9500	900	VT
							TOTAL:	19,000		
Ray Street	ABR602	1935	71.75'	24'	1922.75	4		7150	900	VT
	ABR602							7200	900	VT
Ray Street	AHC723	1935	71.75'	24'	1922.75			4350	900	VT
							TOTAL:	18,700		
Hoffman	ABR551	1935	204.2'	16'	2055.75	1872.6		5400	600	VT
Hoffman	AHC728	1935	218.75'	16'	2055.75	-		n/a s	n/a	n/a
							TOTAL:	5,400		
Central	N/A	1960	265.0'	7'	2074.00	1860.6		n/a e	n/a	n/a
	N/A					1 million and 1		3500	450	SUB
Central	AHC726	1960	265.0'	7'	2074.00			4200	450	SUB
	AHC726		-					4200	450	SUB
			1				TOTAL:	11,900		

TOTAL Present pumping capacity: 187,300 gpm

CFP= centrifugal pump; VT= vertical lineshaft turbine; SUB = submersible pump

J Depth - distance between Pump Floor to Well Bottom (some Pump Floors are below grade)

2 Elevation of Pump Floor - City Datum

3 One hour average on 3/24/14 at 0954. All production pumps were off.

4 Ray St. Water Elevation instrument was out-of-service for an extended period during the time.

5 Hoffman Pump #2 is removed. Replacement timeframe is unknown. 6 Central Pump #1 is removed. Replacement timeframe is unknown.

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## EXISTING WELLS - DESCRIPTION AND CONDITION

The following information was provided by the City of Spokane and was taken from the updated Water System Plan (Section 3.3) for the City of Spokane dated May, 2014. The information was updated on December 16, 2014 based on recent data provided by the City. It provides a detailed description and condition for each water source:

## Well Electric Well Station (DOH Source #S02)

The oldest operating Well Station in the water system, Well Electric Well Station is located adjacent to the Spokane River within the Upriver Complex. The Well Station consists of two large 48 foot diameter wells. The wells are adjacent to each other in a north-south orientation. The City identifies the north well as Well No. 4 and the south well as Well No. 5

Well No. 4 contains a single 900 horsepower (hp) horizontal centrifugal pump that provides water to the North Hill Pressure Zone. Well No. 5 supplies water to three pumps. One pump, another 900 hp horizontal centrifugal, also pumps water to the North Hill Pressure Zone. The second pump, a 900 hp vertical turbine pump lifts water to the Intermediate Pressure Zone. The third pump is a 1,000 hp vertical turbine pump that lifts water to the Low Pressure Zone. In 2005, the Well Electric station provided 26.7 percent of the entire water system supply. Typical outlet pressures for the station are 180, 140, and 80 psi for the Intermediate, North Hill, and Low systems, respectively. Pump inlet suction elevations at this station are approximately elevation 1865.7 feet. The minimum recorded water level in the well during pumping is 1887.5 feet, which leaves sufficient submergence of the pump intakes. The two vertical turbines, high efficiency pumps were installed in 1996 as replacements for two less efficient horizontal centrifugal pumps.

The maximum total instantaneous withdrawal rate for the well station is 39,300 gpm, which is the total nameplate capacity of the pumps. The total capacity of the wells exceeds the pumping capacity, but the actual potential yield of the well station is unknown to the City. The water right allows 54,750 gpm.

Due to its close proximity to the Spokane River, from 1998 through 2001 Well Electric was intensively studied to determine if it was ground water under the influence of surface river water. The study concluded with monthly samples taken throughout 2001 for Microscopic Particulate Analysis. The conclusion is there is no river influence during normal operation. However, during certain flood stages in the river the well is flooded by the river at which times the well is shut down until normal operations can again resume.

As mentioned above, this is the oldest well in the system. However, it is in good condition. Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are in good condition, showing no signs of diminished performance. The well station piping also shows no signs of deterioration and is in good condition.

## Parkwater Well Station (DOH Source #503)

The Parkwater Well Station is located 1/2 mile south and east of the Well Electric Well Station. Completed in 1949, the Parkwater Well Station houses eight pumps in four 18 foot diameter hand dug wells. The wells are adjacent to each other in an east-west orientation. The City identifies the east well as Well No. 1 and continues the numbering scheme westward with the west well being Well No. 4. All of the pumps are vertical lineshaft turbine pumps. Six pumps are 600 hp and supply water to the Low Pressure Zone with typical outlet pressures of 68 psi. The two remaining pumps include a 900 hp unit, and a 1,000 hp unit that supply water to the Intermediate Pressure Zone at an outlet pressure of 145

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psi. The 1,000 hp pump was installed in 2003 replacing a less efficient low system (600 hp) pump to improve energy efficiency and pumping redundancy to the Intermediate Pressure Zone. Pump inlet suction elevations at this station are approximately elevation 1870.0 feet. The minimum recorded water level in the well during pumping is 1887.5 feet, which leaves sufficient submergence of the pump intakes. The Parkwater Well Station in 2005 supplied 33.1 percent of the entire water system demand.

The maximum total instantaneous withdrawal rate of the well station is 62,000 gpm, which is the total nameplate capacity of the pumps and also the maximum allowed according to the water right. The total yield of the wells exceeds the pumping capacity, but the actual potential yield of the well station is unknown to the City.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are in good condition, showing no signs of diminished performance. The well station piping also shows no signs of deterioration and is in good condition.

## Nevada Well Station (DOH Source #S01)

At the intersection of Nevada Street and North Foothills Drive is the Nevada Well Station. The Nevada Well Station supplies water to the Low Pressure Zone. The Well Station has two 400 hp submersible pumps that were installed in 1956 and two 800 hp vertical turbine pumps that were installed in 2003 to replace two older less efficient pumps and to improve station redundancy. Typical outlet pressures at this station are 68 psi. Pump inlet suction elevations at this station are approximately elevation 1,846 feet. The minimum recorded water level in the well during pumping is 1,855.37 feet, which leaves sufficient submergence of the pump intakes. In 2005, the Nevada Well Station supplied 15.7 percent of the total water system demand.

The maximum instantaneous withdrawal rate of the well station is 25,000 gpm which is the amount allowed according to the water right. The actual pumping capacity is 31,000 gpm, which equates to the total capacity of the pumps. The total yield of the well exceeds the water right, but the actual potential yield of the well station is unknown to the City.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are in good condition, showing no signs of diminished performance. The well station piping also shows no signs of deterioration and is in good condition.

#### Grace Avenue Well Station (DOH Source #S06)

Located directly East of the Nevada Well Station is the Grace Avenue Well Station. It houses two identical 900 hp vertical line shaft turbine pumps that occupy a single 18 foot diameter well. This Well Station supplies water to the North Hill Pressure Zone, at a discharge pressure of 110 psi. The suction bells of the pumps are at elevation 1,849.87 feet, whereas the lowest observed low water level in the well was 1,859.37 feet, which leaves sufficient submergence of the pump intakes. The Grace Avenue Well Station in 2005 supplied 4.0 percent of the total water system demand.

The maximum instantaneous withdrawal rate of the well station is 19,000 gpm, which is the total nameplate capacity of the pumps. The total yield of the well exceeds the pumping capacity, but the actual potential yield of the well station is unknown to the City. The water right allows 31,000 gpm.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are in good condition, showing no signs of diminished performance. The well station piping also shows no signs of deterioration and is in good condition.

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## Ray Street Well Station (DOH Source #504)

The Ray Street Well Station is located at the intersection of Ray Street and Hartson Avenue at the base of the South Hill. The Ray Street Well Station pumps water to the Intermediate Pressure Zone. The Well Station houses two 24 foot diameter wells. The wells are adjacent to each other in a north-south orientation. The City identifies the north well as Well No. 1 and the south well as Well No. 2. The Station contains three 900 hp vertical turbine pumps, two pumps in Well No. 1 and a single pump in Well No. 2. The suction bells of the pumps are positioned at approximate elevation 1,858 feet. Maximum observed drawdown has been to elevation 1,868.37 feet, which leaves sufficient submergence of the pump intakes. The pressure normally observed at the outlet of the Ray Street well is 157 psi. This well station in 2005 supplied 7.2 percent of the total water system demand.

The maximum instantaneous withdrawal rate of the well station is 18,000 gpm, which is the total nameplate capacity of the pumps. The total yield of the wells exceeds the pumping capacity, but the actual potential yield of the well station is unknown to the City. The water right allows 24,850 gpm.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are in good condition, showing no signs of diminished performance. The well station piping also shows no signs of deterioration and is in good condition.

#### Hoffman Well Station (DOH Source #S05)

Hoffman Well Station is located on Hoffman Avenue at the intersection of Crestline Street on the north side of the City. The Well Station houses two 16 foot diameter wells, 40 feet apart, in an east-west orientation. The City identifies the west well as Well No. 1 and the east well as Well No. 2. Hoffman #1 well contains a 600 hp vertical line shaft turbine pump. Pump suctions are at elevation 1,843.37 feet. The maximum observed drawdown pumping level has been to elevation 1,859.37 feet, which leaves sufficient submergence of the pump intakes. Normal outlet pressure for the pumps is 55 psi. Hoffman Well Station in 2005 supplied 1.0 percent of the total water system demand. The maximum instantaneous withdrawal rate of the well station is 5,400 gpm, which is the total nameplate capacity of the pumps. The total yield of the wells exceeds the pumping capacity, but the actual potential yield of the well station is unknown to the City. The water right allows 11,600 gpm.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The pumps and west well are in good condition. The well station piping also shows no signs of deterioration and is in good condition. Currently, one pump has been removed from service for well lining repairs on the east well and is listed in the capital improvement plan.

#### Central Avenue Well Station (DOH Source #S08)

Pump inlet suction elevations at this station are approximately elevation 1,846 feet. The minimum recorded water level in the well during pumping is 1,855.37 feet, which leaves sufficient submergence of the pump intakes.

The Central Avenue Well Station is the most northerly Well Station in the system, being located on Central Avenue two blocks west of Division Street. The Well Station has two 7 foot diameter wells. The wells are approximately 130 feet apart in a southwest-northeast orientation. The City identifies the southwest well as Well No. 1 and the northeast well as Well No. 2. Each well contains two 450 hp submersible pumps. Normal outlet pressure is 55 psi. In 2005 Central Avenue Well Station provided 12.3 percent of the total annual water system demand.

The maximum instantaneous withdrawal rate of the well station is 11,900 gpm, which is the total nameplate capacity of the pumps. The total yield of the wells exceeds the pumping capacity but the actual potential yield is unknown to the City. The water right allows 30,900 gpm.

Historically, there have been no significant variations in source capacity or water table levels at or near this site. The well and pumps are included on the capital improvement plan for future rehabilitation.

## Proposed New Well Locations

The City has proposed five locations for new source wells. They are Corbin Park (2 sites), Faith Bible Church, Audubon Park and at 6th and Havana. The City will probably not be drilling at all of these sites and is currently evaluating which one is best. At the time of this investigation, the City was leaning toward construction at either the Corbin Park or Faith Bible Church locations in Northwest Spokane. The City owns the property at the Corbin Park and Audubon sites. Faith Bible Church owns the Faith Bible Church site and Glad Tidings Assembly of God owns the 6th and Havana site. The City plans on drilling 24-48 inch diameter wells and will need about five years to begin construction.

The City has received support from the Washington State Department of Health (DOH), Drinking Water Division for a new well field. On November 21, 2014, Dorothy Tibbetts, Regional Manager for DOH stated that, "The proposed well field will provide the City with increased capacity to respond to emergencies and protect public health. The new well field can be used to serve customers, if other well sites, especially two of the City's largest well sites located near an oil pipeline, should become unusable because of a pipeline break. In addition, the new well field will provide options for replacing groundwater that's under the influence of surface water with lower groundwater sources in northwest Spokane, further protecting public health."

The Yellowstone Pipeline, owned and operated by Conoco Philips, conveys petroleum products and is located within 75 feet of the City's Parkwater Well Station and within 1,000 feet of the Well Electric Well Station. The Parkwater and Well Electric Stations provide almost 60% of the drinking water for the City of Spokane water system. According to the City, a leak from the Yellowstone Pipeline would have devastating consequences for the Parkwater and Well Electric wells and Spokane's drinking water supply. The proposed new well sites will help mitigate these contamination risks by dispersing the pumped volume over a larger geographical area. The pumping from the new well sites would help optimize system performance, use less energy to produce the same volume of water, and provide a more reliable service to its citizens.

## PROPOSED NEW WELL SITES (CORBIN PARK, FAITH BIBLE CHURCH, AUDUBON PARK)

Corbin Park -1: NW1/4NE1/4 of Sec. 7, T. 25 N., R.43 E.W.M.

Corbin Park -2: NE¼NE¼ of Sec. 7, T. 25 N., R.43 E.W.M.

Faith Bible Church: SW¼SE¼ of Sec. 6, T. 25 N., R. 43 E.W.M.

Audubon Park: SW1/SW1/ of Sec. 1, T. 25 N., R. 42 E.W.M.



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## PROPOSED NEW WELL SITE (6TH and HAVANA)





## Hydrogeologic and Impairment Analysis

John Covert, Hydrogeologist with Ecology, provided the following analysis for the proposed change: Applications for change of water right permits and certificates are governed by RCW 90.44.100, which states in part that the holder of a valid right to withdraw public ground waters may, without losing his priority of right, construct wells at a new location in substitution for, or in addition to, those at the original location, or he may change the manner or the place of use of the water. Any amendment shall be issued by the Department of Ecology (Ecology) only under the conditions that (1) an additional or substitute well or wells shall tap the same body of public ground water as the original well or wells; (2) use of the original well or wells shall be discontinued upon construction of the substitute well or wells; (3) the construction of an additional well or wells shall not enlarge the right conveyed by the original permit or certificate; and (4) all existing water rights shall not be impaired. Ecology may specify an approved manner of well construction and shall require a showing of compliance with the provisions of the amendment. In conducting impairment analysis for an application to change a water right that

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includes remaining inchoate water, Ecology compares the effects that would occur if the water right is exercised under its existing specifications to the effects that would occur if the water right is exercised under the proposed changed specifications. Accordingly, impairment analysis for this application does not involve comparing the effects that are presently occurring as a result of the City's current exercise of this water right to the effects that would occur under the changes as inchoate water becomes perfected by actual use. Rather, this impairment analysis involves comparing the effects that would occur as a result of increased pumping if the water right is exercised by pumping the existing wells to the effects that would occur from increased water use if the water right is exercised by pumping wells at the proposed additional points of withdrawal. The USGS, Bi-state, Spokane Valley Rathdrum Prairie (SVRP) Aquifer Study publications from 2005 and 2007 identify the footprint of the SVRP aquifer. From the USGS publications, we can see that the City of Spokane's well fields are all completed within the Spokane Valley Rathdrum Prairie aquifer. All of their wells are producing water from this prolific, unconfined, alluvial aquifer. Their wells are completed in unconsolidated sand and gravels. The proposed locations identified within this change application will also be completed within the SVRP aquifer. As such, all the wells authorized under this change application will tap the same body of public groundwater.

The applicant hired a consultant to conduct groundwater modeling analyses to evaluate the extent to which adding additional points of withdrawal to the original certificates might increase the amount of groundwater discharge to the Spokane River during the summer peak season from the SVRP aquifer. The results from this proprietary modeling effort indicates that developing additional points of withdrawal (adding new wells to the City's water system at either Corbin Park or at the Faith Bible Church area and relocating pumping from the City's existing Parkwater and/or Well Electric well fields would result in additional flows in the Spokane River during the summer months. The modeling results tell us this would happen because the existing well fields are located much closer to the Spokane River than the new, proposed sites. Moving pumping stresses downgradient and away from the Spokane River (relative to the existing points of withdrawal on the certificates associated with this change) will allow more SVRP aquifer to discharge to the Spokane River (these additional flows would not be captured by the original points of withdrawal). Changing the stress locations for withdrawing the equivalent volume of water to these more down gradient and distal wells, results in better flow conditions in the Spokane River. The consultant's report states: "the proposed relocation is likely to provide a notable benefit to flows in the Spokane River, particularly during the months of highest water demands and groundwater production rates."

The department does not have access to run this proprietary model to verify these results. The department does have access to spreadsheet tools developed by Ralston Hydrologic Services that are based on the 2007 Bi-state, USGS model for the SVRP aquifer. These tools allow us to evaluate changes to the hydrologic regime of the Spokane River by adjusting and evaluating pumping stresses in the aquifer. They provide a means of evaluating the same types of changes to the system as modeled by the applicant's consultant with their proprietary model. The department does have an MOU with the state of Idaho that says we both agree to maintain and use the same version of the USGS model when evaluating respective water rights for water right decision making. Using the spreadsheet tools that honor our commitment to the MOU, I was able to verify the conclusions of the applicant's consultant. Approving this change application's request to add additional points of withdrawal to the existing certificates will not impair flows in the Spokane River during the summer, low flow months. It would in fact improve flows in the Spokane River if the City utilized these new points of withdrawal to pump an

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equivalent volume of water out of the aquifer that would normally be withdrawn from just the original points of withdrawal.

The SVRP aquifer is one of the most prolific and productive aquifers on the planet. It is difficult to conduct an aquifer test and measure drawdown in a nearby observation well because the aquifer's hydraulic characteristics are so favorable that cones of depression are extremely shallow. The aquifer's high permeability eliminates the risk of impairment to any nearby, existing, wells from pumping of any of the City's wells. Approving these change applications will not impair any existing groundwater rights nor impair the flows in the Spokane River.

## Impairment Considerations

A review of Ecology records was conducted for existing water rights, permits, and claims within the areas of the proposed new well sites. The review of Ecology WRTS database found the following: <u>Corbin Park Area</u>: 1 certificate and 1 claim. This search area included one certificate for Orchard Avenue Irrigation District No. 6 <u>Faith Bible Church Area</u>: No other recorded rights <u>Audubon Park Area</u>: No other recorded rights <u>6<sup>th</sup> and Havana Area</u>: 9 certificates and 7 claims The search area included rights for Spokane County Water District #3 (six certificates), Carnhope Irrigation District #7 (two certificates) and Spokane Sand & Gravel (one certificate).

As indicated in the Hydrogeologic analysis, it has been determined that moving some of the pumping from the Well Electric and Parkwater well sites and spreading that over the other locations and/or proposed new sites will likely increase flows in the Spokane River, particularly during the months of highest water demands. The search found no existing water rights in the area which would be impaired through issuance of this application for change. It is not anticipated that the proposed changes by the City will cause any impairment.

## Letter of Concern

A letter of concern was received from Rachael Osborn on behalf of the Center for Environmental Law & Policy (CELP) on January 22, 2015. The letter included seven comments about the two draft Reports of Examination which were posted online. The following are each comment from the letter, followed by Ecology's response to the comment:

<u>CELP comment (1)</u> "The intent of the change application is, in part, to facilitate increased groundwater pumping by the City of Spokane to provide water to areas not currently served by the City, thus increasing the City's use of its inchoate (unused) water rights. Granting this water right change will also have the effect of evading protections for the Spokane River that will come with adoption of the instream flow rule (see draft WAC 173-557, presumably to be adopted on or before March 17, 2015)."

Ecology Response: The intent of this application to change an existing water right is to authorize groundwater pumping from new wells located downstream and at greater distances from the Spokane River than the existing authorized wells. Without the proposed new wells, the City would be able to continue to increase water use and perfect the inchoate portion of this water right. The City will continue to grow and will need to serve future water for municipal supply purposes as previously authorized by this water right. RCW 90.03.386 states in part, "The effect of the department of health's

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approval of a planning or engineering document that describes a municipal water supplier's service area under chapter 43.20 RCW, or the local legislative authority's approval of service area boundaries in accordance with procedures adopted pursuant to chapter 70.116 RCW, is that the place of use of a surface water right or groundwater right used by the supplier includes any portion of the approved service area that was not previously within the place of use for the water right if the supplier is in compliance with the terms of the water system plan." Pumping from the new wells will have less direct impact on the flow of the river than pumping from the existing wells. In addition, the existing wells are all located in close proximity to the Yellowstone pipeline. In the event a pipeline leak renders the existing wells unusable, the new wells will provide sources of uncontaminated groundwater for municipal uses served by the City.

The priority dates of Ground Water Certificate No. 504-D (May 1, 1926) and Ground Water Certificate No. 548-A (August 24, 1946) pre-date the effective date of the new Spokane Instream Flow Rule, WAC 173-557 (February 27, 2015). Because this change authorization pre-dates the effective date of the rule, the rule is not applicable. Notwithstanding, even if the instream flow requirements in WAC 173-557 were applicable to this application, pumping water from the suite of wells proposed under this application will cause less impact on instream flows than pumping from the wells that are currently authorized.

<u>CELP comment (2)</u> "The draft ROEs are inadequate for failure to discuss the increase in pumping that will occur and the consequent adverse impacts to the Spokane River."

## Ecology Response:

The affects of the groundwater pumping on the Spokane River are addressed under the "Hydrogeologic Analysis" section of this report. Analysis of this change application involves comparing the effects that would occur if the water right is exercised by pumping the existing wells to the effects that would occur if the water right is exercised by pumping wells at the proposed additional points of withdrawal. As the primary regional water purveyor, the City of Spokane continues to provide municipal water supply under these two water rights to a growing population. Moving the groundwater pumping further from the Spokane River than is currently authorized by this water right will reduce impacts on the river.

<u>CELP comment (3)</u> "The draft ROEs are inadequate for failure to discuss and address the City of Spokane's lack of diligence in putting its rights to use, and/or the excessive quantities of water that have been granted to the City in excess of its reasonable future needs."

#### Ecology Response:

The City has continued to grow and continues to provide water under its existing water rights for municipal supply purposes to a growing population. The City's existing service area is not yet fully developed and additional infill growth will occur within this area. The City of Spokane is also the largest water purveyor in the area and anticipates the need to increase regional wholesale supply relationships, interties with other purveyors, and to respond to changes in urban growth areas and population. The City has existing and planned future wholesale agreements with neighboring water systems. Future demand for wholesale water is expected to increase, particularly with existing and future wholesale customers on the West Plains of Spokane, where the basalt aquifer is in serious decline and will not be able to supply future water needs. Other water short areas in the County may need water to be served by the City in the future. Neither the City nor Ecology can predict future population growth or where water may be needed in the future. The City has exercised reasonable diligence to perfect its water

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rights through beneficial use, and has reasonable future need for the remaining quantity of inchoate water (13,773 AF) authorized under this water right.

<u>CELP comment (4)</u> "The draft ROEs are flawed for failure to conduct a tentative determination of the extent and validity of the two water rights, pursuant to RCW 90.03.330(2), and to relinquish or rescind or declare abandoned the unperfected portions of the City's water rights."

#### Ecology Response:

A determination of the extent and validity of this water right is addressed in the "Tentative Determination of Extent and Validity of Certificate No. 548-A" section of this report. Under RCW 90.44.100, the point of withdrawal of an inchoate groundwater right documented by a certificate may be changed. *Cornelius v. Department of Ecology*, Washington Supreme Court No. 88317-3 (February 12, 2015). The subject water right includes an inchoate quantity that has not yet been exercised and is therefore not subject to relinquishment.

<u>CELP comment (5)</u> "The ROEs is inadequate for its failure to discuss and address the City of Spokane's lack of reasonable efficiency, including the City's failure to meet its water system plan conservation goals."

#### Ecology Response:

The City has established conservation goals to reduce its water use. The City has implemented a Water Use Efficiency Program, which meets the requirements of WAC 246-290-800. In April of 2014, the City also adopted new water conservation goals to reduce indoor residential water use, outdoor residential water use, outdoor irrigation for commercial/industrial use and outdoor governmental water use. The City met 3 of these 4 goals in 2014. A summary of this conservation goal attainment was provided by the City and can be made available upon request.

<u>CELP comment (6)</u> "The SEPA documents fail to discuss the impact of increased pumping on surface flows in the Spokane River. Ecology cannot rely on these incomplete environmental documents as a substitute for its own analysis of the impacts of the proposed change."

#### Ecology Response:

Ecology reviewed the SEPA documents provided by the City and concurs with the City's determination. Analysis of the environmental impacts that would result from approval of this change application involves comparing the effects that would occur if the water right is exercised by pumping the existing wells to the effects that would occur if the water right is exercised by pumping wells at the proposed additional points of withdrawal. The intent of this application is to add new wells located downstream and further away from the Spokane River than the wells currently authorized under this water right. Pumping from the new wells should reduce impacts to the river from pumping authorized by this water right.

<u>CELP comment (7)</u> "It is improper to issue a permanent water right to the City when it has not yet determined where the new point of withdrawal (POW) will be located. Under these circumstances, the appropriate process it to issue a preliminary permit to allow the City to undertake whatever investigations are necessary to determine where the new POW will be located."

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## Ecology Response:

In their application, the City proposed five locations for new wells. Each site is located over the Spokane Valley Rathdrum Aquifer, so the new wells will all be constructed in and withdraw water from that aquifer. The new wells will all withdraw water from the same body of public ground water as the original authorized wells. Therefore, there is no need for issuance of a preliminary permit under these applications.

## CONCLUSIONS

There is a water right available for change under Ground Water Certificate No. 548-A(together w/C. Chg 1-3-439).

When considering an application for change to a water right, Ecology must determine that the proposed change can be made without detriment or injury to existing water rights. Factors considered when determining potential impact include the following:

No Impairment to Existing Rights:

It is not anticipated that the proposed change would cause impairment to existing water rights.

No Detriment to the Public Welfare:

There have been no findings through this investigation indicating that there would be any detrimental impact to the public welfare through issuance of the proposed change.

No Enhancement of the Original Right:

No withdrawal of water over and above what has been authorized for beneficial use would be authorized through approval of this change.

Same Source of Water:

The ground water to be withdrawn is supplied by the same body of public water.

## RECOMMENDATIONS

Based on the above investigation and conclusions, I recommend that this request be approved in the amounts and within the limitations listed below and subject to the provisions listed above.

This change to Ground Water Certificate No. 548-A supersedes previous Certificate of Change recorded as Vol. 1-3, PP. 439 issued September 9, 1985.

## Authorized Quantities and Purpose of Use

The amount of water recommended is a maximum limit and the water user may only use that amount of water within the specified limit that is reasonable and beneficial:

Quantities:

63,000 gallons per minute and 51,240 acre-feet per year

Purpose of Use:

Municipal Supply purposes

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#### Points of Withdrawal:

Nineteen (19) Wells located as follows:

Source Name	Parcel #	Well Tag	Twp	Rng	Sec	QQ	Latitude	Longitude
Well Electric 1	35111.0001	AHC996	25N	43E	11	SW%NE%	47.68147*N	-117.33214*W
Well Electric 2	35111.0001	AHC995	25N	43E	11	SW%NE%	47.68147*N	-117.33214*W
Parkwater 1	35114.2501	AHC722	25N	43E	11	NE%SE%	47.67754*N	-117.33002*W
Parkwater 2	35114.2501	AHC999	25N	43E	11	NE%SE%	47.67754°N	-117.33002*W
Parkwater 3	35114.2501	N/A	25N	43E	11	NE%SE%	47.67754*N	-117.33002"W
Parkwater 4	35114.2501	AHC998	25N	43E	11	NE%SE%	47.67754*N	-117.33002*W
Ray Street 1	35222.0001	ABR602	25N	43E	22	SE%NW%	47.65051°N	-117.36282"W
Ray Street 2	35222.0001	AHC723	25N	43E	22	SE%NW%	47.65051°N	-117.36282"W
Central 1	36311.1406	N/A	26N	43E	31	NE%NE%	47.71185*N	-117.41408"W
Central 2	36311.1406	AHC726	26N	43E	31	NE%NE%	47.71185°N	-117.41408°W
Hoffman 1	35041.0419	ABR551	25N	43E	04	NW%NE%	47.69993*N	-117.37852*W
Hoffman 2	35041.0419	AHC728	25N	43E	04	NW%NE%	47.69993"N	-117.37852°W
Grace 1	35081.2802	AHC724	25N	43E	08	NE%NE%	47.68335"N	-117.39397*W
Nevada 1	35081.2802	AHC725	25N	43E	08	NE%NE%	47.68325*N	-117.39485*W
NEW SITES:				-		-		
Corbin Park 1 (new)	35071.1901	N/A	25N	43E	07	NW%NE%	47.68475°N	-117.41793*W
Corbin Park 2 (new)	35071.1901	N/A	25N	43E	07	NE%NE%	47.68478°N	-117.41497*W
Faith Bible Church (new)	35064.3611	N/A	25N	43E	06	SW1/4SE1/4	47.68751"N	-117.41727*W
Audubon Park (new)	25013.0004	N/A	25N	42E	01	SW%SW%	47.68872*N	-117.45236*W
6 <sup>th</sup> and Havana (new)	35232.4108	N/A	25N	43E	23	SW%NW%	47.65180"N	-117.34657*W

## Place of Use:

The place of use (POU) of this water right is the service area described in the most recent Water System Plan/Small Water System Management Program approved by the Washington State Department of Health, so long as the water system is and remains in compliance with the criteria in RCW 90.03.386(2). RCW 90.03.386 may have the effect of revising the place of use of this water right.

2-24-201 Date Gene Drury, Report Writer

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# 3.6 Water Model Calibration Memo (Murraysmith 2021)



# **Technical Memorandum**

Date: March 23, 2022

Project: Hydraulic Water Model Calibration

To: City of Spokane

From: Murraysmith, Inc.



# Background

The City of Spokane's (City) hydraulic water model is used for a number of purposes including capital planning, evaluating existing fire flow availability, determining level of service impacts during operational activities, and development reviews. The model is periodically updated to capture both system growth and advances in water utility data. Regular model calibrations have been conducted to improve the model's accuracy to predict system performance with each model update. The last full model calibration was completed in 2015, and since that time numerous flow monitors have been installed, providing additional information for calibration. The City contracted with Murraysmith, Inc. (Murraysmith) to calibrate the hydraulic model in 2021 to help prepare the model for the City's use in system planning.

The 2021 calibrated model is intended to establish representative scenarios ("scenario" denotes a setup of system facilities and demand) that reflect typical operational conditions during both winter and summer. These can be adapted into scenarios that meet regulatory water system requirements for regulatory planning analysis, or into "what-if" scenarios that simulate a special condition in the system, such as taking a large water main offline during a construction project, changing the system's supply configuration during an emergency, optimizing or evaluating system controls, or evaluating the impact of future conditions such as proposed capital improvements, City growth, climate change/drought, or new wholesale connections.

Since the last calibration effort, the City has expanded its Supervisory Control and Data Acquisition (SCADA) system, thus additional information is available to improve the extent and accuracy of the model calibration. Facilities that have been added or changed since 2015 (e.g. Five Mile Pump Station or the new Central Avenue Well), and new piping or zone boundary modifications, alter the system's behavior as a whole, which is why periodic updates and calibration are important to increase the accuracy of the model.

The City updated the model network using their geographic information system (GIS) mapping before passing the model to Murraysmith for a connectivity review and calibration. After adjusting the model network and controls to match SCADA flow and tank level records, steady state and an

extended period simulation (EPS) calibrations were completed. This technical memo documents the model review procedure and the calibration process and results.

# System Overview

The City is supplied by a groundwater well system serving three main pressure zones: the North Hill Zone, the Low Zone, and the Intermediate Zone. Delivery of flow to other pressure zones is through booster pump stations or pressure reducing valves (PRVs) depending on the location. The City is built around the Spokane River, which is the reason for its varied topography and large number of pressure zones. Flow records are typically only available for wells and booster stations, so zones supplied by PRVs were grouped with a "parent" supply group for purposes of the calibration as summarized in **Table 1** and **Figure 1**. These groupings were used throughout the calibration process for allocating unmetered use, establishing diurnal patterns, and evaluating SCADA trends.

Zone Group	Zone IDs	Well or Booster Supply Source
Cedar Hills	wPZ23	Cedar Hills
Eagle Ridge	wPZ17, wPZ31, wPZ32, wPZ33, wPZ34	Eagle Ridge
Eagle Ridge 2	wPZ16	Eagle Ridge 2
Five Mile & Indian Hills	wPZ13, wPZ43, wPZ4, Barnes RD, Barnes RD Low	Five Mile Five Mile New
Glennaire	wPZ20, wPZ39	Glennaire
High	wPZ22, wPZ36	14th & Grand, Lincoln Heights
Highland	wPZ12, wPZ38	Milton
Intermediate	wPZ19	Parkwater Wells 1-2, Well Electric Well 1, Ray Wells 1-3, 9th & Pine, Bishop Court
Kempe	wPZ14	Kempe
Low & 1/2 Northwest Terrace <sup>1</sup>	wPZ24, wPZ37, wPZ46	Parkwater Wells 3-8, Nevada Wells 1-4, Well Electric Well 3
Midbank	wPZ11	Belt
North Hill and 1/2 Northwest Terrace <sup>1</sup>	wPZ18, PZ15, wPZ35, wPZ431, wPZ47	Central Avenue Wells 1-2, Grace Wells 1-2, Hoffman Well, Well Electric Wells 2 & 4
Shawnee	wPZ6	Shawnee
SIA	wPZ8	Thorpe, West Drive SIA
Southview	wPZ1	Southview
Top & Hatch Road	wPZ21, wPZ3, wPZ40, wPZ41, wPZ42	35th & Ray, Manito, Garden Park
West Plains	wPZ9	Spotted
Woodland Heights	wPZ2	West Drive
Woodridge	wPZ5	Woodridge

# Table 1 | Zone Groupings

1. The Northwest Terrace Pressure Zone is served by PRVs from both the North Hill and Low Zones. Based on field records, half of the Northwest Terrace flow was assumed to come from the North Hill Zone and half from the Low Zone. SCADA flow records were not available for the PRVs to determine the exact split of supply between the two parent zones.
Figure 1 | North Steady State Test Locations



## Figure 1 Entire System Zone Grouping Boundaries

WPZ21

WPZ22



## Model Update

### Network Review

Before the start of the calibration effort, the City updated all network elements and their attributes to match the GIS. Model network analysis tools were used to check and confirm the connectivity of pipelines and facilities in the network. Objects such as pipelines and junctions were analyzed for several potential types of network connectivity errors such as duplicate junctions at the same location or pipelines that do not connect to each other. The hydraulic grade line (HGL) across each zone boundary was analyzed for discrepancies and updates were suggested for zone boundary attributes, closed pipe locations, elevation values, and PRV setting adjustments. The results of the network review were provided to the City and the final model network decisions were made by the City.

### Demand Update

In preparation for the model calibration, the City allocated demand throughout the model based on 2020 billing data. Murraysmith reviewed 2020 pumping records by pressure zone groups and compared water pumping data to the water use allocated in the model. Where supply data was not available for a particular pressure zone (such as for a zone served by PRVs), it was grouped with an upstream pressure zone for the analysis using the groupings shown in **Table 1**.

To capture unmetered water use (such as system leakage or water used for flushing), the difference between water pumping and billing was calculated for each pressure zone group and distributed evenly across each pressure zone's demand nodes. This established a base demand loading for the calibration effort which could be increased or decreased by an overall factor depending on SCADA production values during the calibration data collection period. **Table 2** shows the production adjustment factors used to peak the allocated billing demand to capture unmetered use in the model.

Zone Group	2020 Billing Allocation (gpm)	2018-2020 Average Pumping (gpm)	Peaking Factor
Cedar Hills	67	75	1.12
Eagle Ridge	147	165	1.12
Eagle Ridge 2	314	320	1.02
Five Mile & Indian Hills	876	923	1.05
Glennaire	211	222	1.05
High	2,410	2,902	1.20
Highland	260	373	1.43
Intermediate	1,808	2,467	1.36
Kempe	366	391	1.07
Low + 1/2 NW Terrace <sup>1</sup>	9,970	15,912	1.60
Midbank	200	220	1.10

#### Table 2 | Production Adjustment Factors

Zone Group	2020 Billing Allocation (gpm)	2018-2020 Average Pumping (gpm)	Peaking Factor
North Hill & 1/2 Northwest Terrace <sup>1</sup>	9,575	11,108	1.16
Shawnee	74	80	1.08
SIA	1,201	1,408	1.17
Southview	17	21	1.24
Top and Hatch Road	4,288	5,582	1.30
West Plains	620	737	1.19
Woodland Heights <sup>2</sup>	75	175	2.33
Woodridge	37	41	1.11
INTERTIES			
Airway Heights (West Plains)	934	934	1.00
Airway Heights (SIA)	324	324	1.00
Spokane County (High)	44	44	1.00
SYSTEM-WIDE	33,818	44,424	1.31

1. The Northwest Terrace Pressure Zone is served by PRVs from both the North Hill and Low Zones. Based on field records, half of the Northwest Terrace flow was assumed to come from the North Hill Zone and half from the Low Zone. SCADA flow records were not available for the PRVs to determine the exact split of supply between the two parent zones.

2. Large unmetered use multiplier may be due to pumping operations adjustments made in the Highland Pressure Zone that were constantly adjusted for several months during the Sunset Tank painting effort, or possibly due to meter reading errors. The discrepancy was not investigated during this calibration effort but could be reviewed during future demand allocation efforts. The discrepancy is not anticipated to largely impact the accuracy of the calibration since all demands were adjusted to match SCADA production records during each calibration period.

## Steady State Calibration

The steady state calibration process is designed to compare system field conditions to the same model simulated conditions for a single condition, or "snapshot" in time and compare the accuracy of the model to field measurements when set up with the field data to simulate the same system conditions. Steady state calibration involves collecting pressure data at hydrants to compare to model results. The data collected in the field includes static and residual pressures taken at a hydrant along with system boundary conditions during the testing, such as tank levels, system demands, and pump status and/or flow. This data is used to simulate field conditions in the model and compare the measured pressure results in the model with those obtained in the field. The absolute difference between the results is compared and evaluated using the Key Performance Indicators (KPIs) described below. Where the model does not calibrate with field data within the defined KPI thresholds, potential explanations and considerations are noted and additional data collection for future calibrations is recommended.

### Static Pressure and Flow Testing

Figure 2 illustrates the hydrant test setup for collecting field data for steady state calibration.

Each field test includes the following:

- An initial static pressure measurement at the selected pressure hydrant.
- Installation of flow measurement equipment on the adjacent flow hydrant. Where the
  pressure hydrant is not located on a dead end, sometimes two flow hydrants are used (one
  on each side of the pressure hydrant).
- When the pressure stabilizes at the pressure hydrant, the residual pressure is measured at the pressure hydrant with the nearby hydrant flowing at a relatively steady rate.
- The static pressure, flow rate, and residual pressure are recorded along with the date and time of the test and system boundary conditions (tank levels, pump status, etc.).



### Figure 2 | Hydrant Test Setup

Field testing was conducted during August 2021 for all pressure zones in the distribution system that have City owned hydrants. Subzones in the Hatch Road and Northwest Terrace area (wPZ40, wPZ41, wPZ42, and wPZ47) do not have City hydrants so no testing was done. Static pressure readings and flow measurements were taken at 98 locations across the system in August. The test locations are shown in **Figure 3a** and **Figure 3b**.

The test locations were intended to be a representative sample of the entire system, so there is at least one test located in each pressure zone (where possible) and multiple tests evenly distributed across larger pressure zones. Locations with small mains on dead ends were favored because they typically experience the greatest headloss effects during high flow. Where flow testing was determined to be infeasible due to issues such as broken hydrants or inadequate drainage, the test location was moved to a nearby main. After the initial calibration effort, additional flow tests were performed in October 2021 at locations where the calibration confidence was low to provide further data for calibration refinement.

### Boundary Conditions and Operational Status

The model is set up to represent the system's facility and demand conditions during hydrant testing since these conditions influence system pressures. Boundary conditions refer to the operational status of the system during the testing including pump station flows/status, tank levels, intertie flows, well flows, system demands, and PRV settings. Pump flow and tank level information was provided through extraction of SCADA data for the testing period. Model average demands were adjusted for each flow test to match the overall system production during the test. The model was set up with a series of "snapshot" simulations to represent each of the test boundary conditions and pressure results. Facility patterns in the model were used to change the boundary conditions for each test. These patterns were used only to toggle quickly between boundary conditions using one model run for all tests. The patterns are not applicable to any future analysis use of the model and were only used set boundary conditions to that of each specific flow test.

Figure 3a |North Steady State Test Locations



February 2022



Figure 3b |South Steady State Test Locations



### Steady State Calibration Adjustments

Pressure and flow results obtained from a well-calibrated model will closely match field data. During calibration, various model elements may be adjusted to achieve the best calibration possible. Calibration may help to identify areas where operational settings (see list of examples below) need adjustment within the model to match the actual system operations, or where specific field conditions (such as a closed valve) are not represented in the model. Modifications made to the model during the steady state calibration include the following:

- PRV setup and PRV settings, ("setting" refers to downstream pressure)
- Pump settings, ("setting" refers to pump speed)
- Network updates such as investigation around a missing pipe or an incorrect pressure boundary
- Pipe roughness for 6-inch cast iron

To prevent forcing the model to match field data by incorrectly modifying model parameters that will decrease accuracy for other scenarios, changes made to the model are compared to actual field conditions, verified with City knowledge of the system, and maintained within reasonable industry standards. For example, pipe roughness for 6-inch cast iron pipe was uniformly modified to decrease the roughness from 110 to 100 for pipes with a listed install year prior to 1965. Roughness was increased from 110 to 120 for 6-inch cast iron pipe built in 1965 or later. These changes were based on multiple field tests where these modifications resulted in better calibration. The intent of the calibration is to adjust the model so that it matches the field as much as possible, so care was taken not to "force" the model to match the calibration but rather to utilize the calibration results to identify ways to help the model accurately imitate field conditions. Where several possible explanations existed for a poor calibration, each explanation was either field-verified or tested in other areas of the model to ensure its reasonableness. Specific discussion of other substantial changes made to key facilities is included below.

After the initial steady state calibration, tests with questionable results were retested at their respective hydrants. Some tests showed significantly improved results for the retests; in these cases, it is likely that a data recording error occurred during initial testing. Retests that did not show improved results were reviewed in the model to determine any additional model changes that would improve the calibration. Where no insight on the calibration could be extrapolated from the retest data, recommendations for additional data collection and validation were included in this memo, below.

#### PRV Curves

One major change to the model that occurred during this calibration effort was the development of PRV flow curves to simulate multiple valves in a single PRV vault. While the hydraulic model does allow the modeler to use multiple valves of different sizes to supply one pressure zone, it does not modulate to the larger valve during a high flow condition as a true PRV station would in the field. A PRV flow curve adjusts the pressure setting of the PRV based on flow increments, simulating the transition in the field between main and bypass valves in a single vault. This is intended to mimic a real PRV station closing a smaller valve so that a larger valve, which typically has a lower pressure setting, can operate during high flows. A curve was developed for each PRV station in the system based on typical flow specifications for PRV diameters, and one valve per station was assigned the curve in the model. Each valve that is simulated using the flow curve represents two or more valves in a single PRV station (large valve opens during high flow, small valve opens during low flow). It is recommended that the PRV curves be used for analyses involving high-flow scenarios such as fire flow simulations or unidirectional flushing studies. The PRV curves can be "turned on" via the database control set for any scenario. The control set must include an entry for each PRV ID and the corresponding PRV curve for "Control ID". The quickest way to set up PRV curves for any new scenario would be to copy the PRV ID rows from the calibration control set and copy them into the new scenario's control set, then ensure they are enabled.

#### PRV Settings

PRV settings (downstream pressures) and intertie flows were modified based on the calibration results, to match zone pressure to the field pressures. The original PRV settings and any modifications are in **Table 3**.

Location	ID	Elevation (ft)	Diameter (ft)	Original Setting (psi)	New Setting (psi)
	WPR27		3	74	66
16th & Milton	WPR26	2,000	6	69	61
	WPR25		10	64	56
33rd and Division (Closed)	WPR6466	2,327	6	NA	45
Burchwood & Nine Mile	WPR8	1 670	2	58	44
Road	WPR39	1,072	8	53	39
Craig & McEarlane	WPR5257	2 3 8 1	2	50	50
	WPR5255	2,501	8	45	35
Hatch Road #1	WPR13	2 291	4	30	30
	WPR12	2,231	10	25	25
Hatch Road #2	WPR50	2 087	4	40	50
	WPR51	2,007	10	35	47
Latah Hills Court &	WPR46	2 117	3	55	55
Shelby Ridge	WPR47	2,117	6	50	45
Lincoln & West Osprey	WPR856	2 247	4	60	Unknown*
Heights	WPR855	2,247	10	55	Unknown*
Moran View &	WPR49	2 087	3	75	55
Woodland Ct	WPR48	2,007	6	70	50
Northern Barnes Rd	WPR6056	2 170	2	50	48
	WPR6055	2,170	6	45	40
Panorama & Walnut	WPR19	2 281	2	63	50
Court	WPR20	2,201	6	58	40

### Table 3 | PRV Setting Modifications

Location	ID	Elevation (ft)	Diameter (ft)	Original Setting (psi)	New Setting (psi)
Prairie Drive & Fleetwood Court	WPR22 WPR23	2,142	3 8	58 53	50 35
River Ridge & N Inland St	WPR42 WPR41	1,847	3 6 10	55 50 45	67 50 45
River Ridge & Sand Ridge	WPR44 WPR24 WPR43	1,822	3 6 10	58 53 48	70 53 48
S Abbot Rd and Garden Springs Rd	Abbot_PRV1 Abbot_PRV2	2,260	2 4	NA NA	50 45
S F St	WPR4455 WPR38	2,001	2 6	33 28	33 28
Shoshone & Lincoln	WPR14 WPR15	2,170	1.5 6	75 70	75 70
Southern Barnes Rd	WPR6058 WPR6057	2,290	2 6	50 45	60 45
Summerwood & Shelby Ridge	WPR16 WPR21	2,117	3 8	50 45	60 45
Sundance Drive & Acoma Drive	WPR10 WPR9	1,952	4 10	27 25	27 25
W Electric Ave	WPR3255 WPR455	2,376	2 6	42 37	42 37
W Mason Ln & N Maximilian Ln	WPR17 WPR18	1,686	4 10	108 103	103 90
W Regency Ln & N Park View Ln	WPR6 WPR3 WPR4855	1,891	3 8 8	10 19 NA	32 29 16
Walnut Street & Cedar Road	WPR2 WPR1	2,197	2 6	67 62	67 62
Westwood Ln -118' W Hyd & 50' S Hyd	WPR1655 WPR45	2,100	4 10	40 35	32 24

\*As explained below, the Lincoln & West Osprey Heights PRV station could not be calibrated for the selected calibration periods. The flow test pressure data pointed to PRV settings that are not physically feasible for the PRV configuration (according to PRV manufacturer input), so further investigation is required to verify the elevations and operation of this station.

### Pump Settings

Based on pump test data collected in 2017, many of the City's pumps are operating at efficiencies well below their design efficiencies and produce lower flow than the pump curves in the model. The efficiency of the pumps can vary based on whether it is pumping alone or with other pumps at the same station. Generally, pump speed modifications were relatively minimal, between 93 to 98 percent of their full operation (i.e. 93-98% of full operating flow). Notably, the Woodridge pump station showed significant enough variation between the model and field results to justify updating the pump curves based on the City's pump test data. Modifications to pump speeds

updating the pump curves based on the City's pump test data. Modifications to pump speeds and/or curves were estimated via trial-and-error (iteratively modifying the pumps until the calibration improved). Neighboring pressure zones were evaluated for the impacts of these changes to verify them. Changes to pump speeds and/or curves were used as a "last resort" for improving the calibration after evaluating changes to other model elements. These modifications were compared to the City's pump test records to determine if they were reasonable. Where the pump test did not indicate that a drop in pump efficiency is justified, the change was not made. The pumps with modified settings are in **Table 4**. These pump speed settings are based on the EPS calibration period and steady state flow tests, but if operators indicate that a pump's flow will be throttled for a particular scenario, the modeler may decrease pump speed further to match field conditions.

Pump	Setting
WPU102_EAGLE_RIDGE2_1&2	0.68
WPU15_THORPE_4	0.96
WPU17_BELT_ST_3&4	0.94
WPU1708_SPOTTED_3&4	0.96
WPU1712_FIVE_MILE_4	0.98
WPU24_RAY_1&2	0.96
WPU25_RAY_3	0.98
WPU30_DIVISION_MANITO_1&2	0.96
WPU31_DIVISION_MANITO_1&2	0.96
WPU33_BELT_ST_1&2	0.95
WPU43_CENTRAL_AVE_1_NEW	0.99
WPU49_WELL_ELECTRIC_2	0.985
WPU55_PARKWATER_1	0.98
WPU56_35TH_RAY_1&3	0.93
WPU57_35TH_RAY_1&3	0.93
WPU58_SHAWNEE_1&2	0.95
WPU59_SHAWNEE_1&2	0.96
WPU64_9TH_PINE_1	0.96
WPU65_SPOTTED_1&2	0.96
WPU67_FIVE_MILE_2	0.88
WPU68_FIVE_MILE_1	0.98
WPU70_WEST_DRIVE_1&2	0.95
WPU71_WEST_DRIVE_1&2	0.95
WPU74_KEMPE_2	0.98
WPU75_KEMPE_3	0.98
WPU76_LATAH	0.3-0.6
WPU93_SOUTHVIEW_1	0.99
WPU90_SOUTHVIEW_2	0.97
WPU99_CEDAR_RD_1-3	0.95

### Table 4 | Pump Setting Modifications

### Steady State Key Performance Indicators

As noted in the Washington Department of Health (DOH) Water System Design Manual, there are no standard national or industry-adopted criteria for calibrating a model; however, the DOH manual does provide guidance and reference literature. There is variation across the industry in how steady state models are evaluated, depending on the use of the model and the quality of the calibration data. Representative industry recommendations are shown in **Table 5**. The City's steady state calibration results were evaluated based on three KPIs, shown in **Table 6**, which were developed based on the industry recommendations. Most of the industry criteria refer to target calibration KPIs for models used in localized design but specify that a greater margin of error is acceptable for planning-level analyses. Since the City's system-wide model will primarily be used for planning purposes, the KPIs used for this calibration reference industry planning-level criteria where available. Further localized calibration could be done during model use for specific design analyses.

Reference	Accuracy of Pressures	Flows or Water Level
AWWA 2017 M32 Manual	<ul> <li>Less than ±4 psi difference</li> <li>Present results graphically</li> </ul>	<ul> <li>3 to 6 feet difference in water level fluctuations</li> <li>Present results graphically</li> </ul>
WRc 1989	<ul> <li>± 5% or 0.7 psi difference for 85% of tests</li> <li>± 7.5% or 1.0 psi difference for 90% of tests</li> <li>± 15% or 2.7 psi difference for all tests</li> </ul>	<ul> <li>±5% difference, where flow &gt; 10% of total demand or</li> <li>±10% difference, where flow &lt; 10% of total demand</li> </ul>
Walski , et al. 2003	<ul> <li>Less than ±4 psi difference</li> </ul>	<ul> <li>No criteria</li> </ul>

### Table 5 | Industry Steady State Calibration KPIs

### Table 6 | City Model Steady State Calibration KPIs

Criteria	KPI
Static Pressure	<ul> <li>Less than ±4 psi absolute difference from field measurement</li> <li>Evaluate Root Mean Squared Error from field measurements</li> </ul>
Residual Pressure	<ul> <li>Less than ±10 psi absolute difference from field measurement</li> <li>Evaluate Root Mean Squared Error from field measurements</li> </ul>
Pump Flows	<ul> <li>Less than ±10% from field measurement</li> </ul>

### 1. Absolute pressure difference (error)

Pressure difference is calculated for the static pressure hydrant for both the static pressure and the drop in pressure during flow at the flow hydrant. For models used for design purposes, industry literature recommends that the pressures match with an error of less than 10 feet of head, or approximately 4 pounds per square inch (psi). There is no specific recommendation regarding this KPI for planning-level analysis, although the literature does note that a higher margin of error is satisfactory for planning work. More variables impact the model during a high headloss, high flow condition, so it is more difficult to calibrate. A higher margin of error is expected for the residual pressure drop, and acceptable for planning-level analysis.

2. Pressure root mean squared error

To compare the relative error between model and field pressure values, the difference between the field and model data was evaluated as a squared root mean. The squared mean helps eliminate negative and positive differences from canceling each other. This value illustrates the average difference of each model value from the field or predicted value. A larger value indicates greater error in the model from the expected field values.

3. Pump flow percent error

Relative pump flow in the model by flow test was compared to field flows as a percentage. The lower the percentage, the more accurate the model results. Industry literature recommends a 10% difference in pump flows for planning-level models. Pump flow was evaluated both on a pressure zone basis (for pumps serving each zone) and on a system-wide basis (all pump flows evaluated for each steady state test).

### Steady State Results

**Table 7** shows the steady state KPI results by pressure zone grouping (see **Table 1** for groupings). KPI results above the 4 psi static, 10 psi residual drop, or 10 percent pump average are bolded. The values for each test are in Appendix A. Table 7 shows the average and maximum pressure differences and root mean squared error by pressure zone, taken from Appendix A. Figure 4 and Figure 5 show graphs of the model and field data relationship for static and residual drop data respectively (system-wide). If the model and field data matched exactly, they would fall on a straight line with a slope of exactly 1. Lines are plotted on each graph to show the boundaries of the KPIs and illustrate which tests fall outside of the KPIs. Similar graphs for each zone are in Appendix B. Overall, the model calibrated at a high level of confidence for both static and residual pressures and pump flows. Only 12 of the 98 static individual tests are outside of the 4 psi range and 14 tests outside of the 10 psi residual drop range. Only one zone (Eagle Ridge 2) showed an average static error of more than 4 psi. Two zones, Cedar Hills (which had only 1 test) and Northwest Terrace, showed zone average residual drop errors over 10 psi. Additionally, all but one zone, Midbank, calibrated within an average of 10-percent of pump flows for the pumps serving the zone being tested and all zones calibrated within an average of 10-percent of pump flows across the entire system during the testing. ("Zone Pumps" refers to all pumps serving a particular pressure zone. "All Pumps" refers to all pumps in the system.) Table 7 also notes the distribution of system demand by zone, which helps the modeler judge the significance of each KPI, since KPIs for larger zones will have a larger impact on the overall calibration level of the model compared to smaller pressure zones. A summary of some of the considerations observed during the calibration that impact overall zones and localized test areas are noted below.

Zone Group	Zone Percent of Total System Demand	# of Tests	Average Static Error (psi)	Max Static Error (psi)	Static Root Mean Squared Error	Average Residual Drop Error (psi)	Max Residual Drop Error (psi)	Residual Root Mean Squared Error	Zone Pumps Average Percent Error	Zone Pumps Max Percent Error	All Pumps Average Percent Error	All Pumps Max Percent Error
Cedar Hills	0.2%	1	2.2	2.2	2.2	14.2	14.2	14.2	0%	0%	2%	8%
Eagle Ridge	0.4%	6	3.5	10.5	4.9	5.9	9.3	6.2	1%	5%	3%	13%
Eagle Ridge 2	0.7%	3	6.3	16.7	9.7	4.0	6.0	4.6	4%	9%	3%	10%
Five Mile	2.0%	4	3.3	8.7	4.7	5.6	8.6	6.2	0%	0%	1%	7%
Glennaire	0.5%	2	2.9	3.3	2.9	1.6	2.6	1.9	5%	14%	2%	14%
Hatch Road	0.3%	1	1.5	1.5	1.5	4.7	4.7	4.7	4%	4%	2%	8%
High	6.6%	6	2.3	3.8	2.4	7.4	25.0	11.5	2%	2%	2%	10%
Highland	0.7%	3	0.3	0.4	0.3	5.4	6.9	5.6	0%	0%	2%	9%
Indian Hills	0.1%	2	1.5	1.5	1.5	3.8	4.9	3.9	7%	9%	2%	9%
Intermediate	5.6%	6	1.6	3.6	2.0	9.8	30.8	13.8	3%	6%	2%	20%
Kempe	0.9%	3	3.0	4.9	3.5	1.5	1.9	1.6	4%	12%	4%	13%
Low	35.8%	17	3.3	23.1	6.1	8.2	30.2	11.4	7%	8%	2%	9%
Midbank	0.5%	2	3.9	4.5	3.9	2.3	3.9	2.8	<b>12%</b>	26%	3%	26%
North Hill	23.7%	12	2.1	5.8	5.2	3.6	9.6	7.9	3%	3%	3%	13%
Northwest Terrace	1.3%	4	2.8	6.8	3.7	10.6	18.2	12.0	2%	3%	4%	1 <b>2</b> %
Shawnee	0.2%	2	1.7	3.3	2.3	2.4	2.6	2.4	0%	0%	1%	10%
SIA	4.1%	5	3.2	6.9	4.0	4.9	8.5	5.7	4%	5%	3%	10%
Southview	0.0%	1	1.9	1.9	1.9	6.0	6.0	6.0	0%	0%	3%	9%
Тор	12.3%	12	2.7	7.1	3.3	6.5	13.7	7.7	3%	5%	3%	14%
West Plains	3.8%	3	1.3	2.9	1.7	5.6	13.4	7.9	2%	4%	2%	9%
Woodland Heights	0.4%	1	3.0	3.0	3.0	3.9	3.9	3.9	2%	4%	2%	8%
Woodridge	0.1%	2	0.7	1.1	0.8	4.6	5.0	4.6	0%	0%	2%	10%
System-wide <sup>1</sup>	100.0%	98	2.7	23.1	4.5	6.1	30.8	8.7	3%	26%	3%	26%

## Table 7 | Steady State KPIs by Pressure Zone Grouping

1. Averages weighted by number of tests

Note: Bold values indicate a KPI that falls outside of the defined criteria







### Figure 5 | Steady State Residual Drop Graph

### Zone or Broader Calibration Areas of Note

**Craig Road FCV and Airway Heights Demand, West Plains/SIA Zones.** Flow tests located near the Craig Road FCV (which is adjacent to the Airway Heights wholesale demand intertie) showed a lower level of calibration (SIA and West Plains pressure zones). The pressure discrepancies between the field and the model may have multiple explanations but are likely related to the operation of the Craig Road FCV and the quantity of demand at the Airway Heights intertie. Also, review of 2021 flow data to Airway Heights indicates a higher base demand than what was used in the model. Because flow meter data was unavailable for either facility, the boundary conditions for the calibration were adjusted within reasonable ranges until the calibration was optimized. However, the calibration in this area could be improved via review of flow data for these facilities. If retests are done in these zones, it is recommended that a City staff member measure flow and record valve flow and pressure setting status at both facilities for the duration of the tests. This data should be used to adjust the Airway Heights intertie demand and patterns to match estimated use at the time of the flow test and to match flow control valve operation at the Craig Road FCV.

Northwest Terrace and North Hill Zones. The Northwest Terrace pressure zone is a large zone supplied by PRVs from the North Hill and Low Zones. A retest was performed in this zone as part of the calibration effort which demonstrated a similar model-field discrepancy as the first test and did not shed light on the reason for the discrepancy. Because flow meter data is not available for system PRVs, boundary conditions for zone demand and PRV operation were estimated in the model and adjusted within reasonable ranges for an optimal calibration. Flow and pressure data at the Northwest Terrace PRVs during future retests performed in the zone would be useful for fine-tuning the calibration for this zone, since the poor calibration in this area is likely related to the PRVs.

North Hill flow tests located near the Northwest Terrace PRVs (which flow out of the North Hill Zone) showed calibration results that did not fall within the pressure criteria noted above. Further testing and data collection for the Northwest Terrace PRVs will be useful for improving calibration in the North Hill pressure zone, since the Northwest Terrace is a large area, and its demands have a significant impact on North Hill pressures.

**Eagle Ridge 2 and Cedar Hill Zones.** The lack of flow data for the PRV (Lincoln & West Osprey Heights) connecting the Eagle Ridge 2 and Cedar Hills Zones made two tests nearest the PRV, one in Cedar Hills, and one in Eagle Ridge 2 potentially less accurate. Although the current City understanding is that PRV is isolated from the main Cedar Hills Zone with an isolation valve, the calibration results seem to indicate there could be flow through the PRV between Eagle Ridge 2 and Cedar Hills. Furthermore, there does not appear to be a feasible setting that would allow this PRV station to serve downstream customers at reasonable pressures, based on the elevation of the PRV station in the model. Additional, field-verified information about the PRV including flow, typical operations, and elevation data would be beneficial.

**Top Zone.** Numerous flow tests performed in the Top pressure zone showed great residual drops in the model, indicating less headloss in the field compared to what was simulated in the model. The significant development and large amount of private water mains in this pressure zone may

be a clue that the model is not accounting for looping or changing connectivity that is occurring in the field. It may be useful to confirm that valves isolating private mains from creating looping with the system are truly closed. Continued model network updates as new pipes are added to the area is critical to continue to maintain high confidence level in the model.

6-inch Pipe. In general, the calibration indicated a lower confidence level for test locations on 6inch model pipe, particularly for the residual pressure drop. The model residual pressure drop was not consistently higher or lower than field results which may indicate that the reason for the error is localized. The system-wide modification to the 6-inch cast iron pipe (previously discussed) did improve the overall calibration, but in general the high potential for headloss and impact of pipe roughness on 6-inch pipe appears to impact calibration in these areas. As the City continues to collect pipe condition and field test data, further refinement of the roughness assumptions, particularly for 6-inch pipe, could improve the model accuracy.

### Localized Calibration Areas of Note

6th Avenue, Intermediate Zone. One flow test located on 6th Avenue near Sacred Heart Children's Hospital located near the Intermediate and Low Zone boundary showed a lower model residual pressure drop. Though this test is located near a high water user, high demand is likely not the explanation for the pressure drop discrepancy since a demand discrepancy would probably be reflected in the static pressure results. The explanation could be a network connectivity issue and should be investigated before analysis is performed on this area of the system. The low model pressure drop predicted in this zone means that the model will likely underestimate system headloss in this area during analysis.

**East Big Springs Road, High Zone.** A low pressure drop calibration for the flow test on East Big Springs Road could be attributable to the 6-inch dead-end main roughness value since this difference was observed in other 6-inch pipe locations. The low model pressure drop predicted in this zone means that the model will likely underestimate system headloss in this area during analysis.

Morrill Street, High Zone. The flow test located west of Chase Middle School on Morrill Street is located at a zone boundary and is on a 6-inch dead-end pipe, so the pressure drop discrepancy shown in the calibration results is likely due to pipe roughness or a network connectivity discrepancy between the field and the model, with the model predicting too high of a pressure drop (i.e. during analysis, the model will likely overestimate system headloss in this area).

## Extended Period Simulation Calibration

Extended Period Simulation (EPS) modeling (unlike steady-state modeling) predicts the behavior of the water distribution system over time. During calibration, EPS models are evaluated over one or more days to determine the model's ability to simulate system demand, tank levels, well and pump production, and system HGL as they change over time.

Before calibration, two specific time periods were selected from a recent summer and a recent winter season. The summer calibration period represents a high demand scenario, and the winter calibration represents a low demand scenario. Calibrating the model for these two scenarios is important because the system's behavior changes significantly throughout the year depending on demand and operation decisions, which are influenced by the local climate and water use patterns. Before selecting the calibration periods, operations data from a two-month period was reviewed for winter 2021 and summer 2020. It is important to calibrate to a time period where system operations were typical and there was minimal human intervention, since the model cannot make human decisions. Though human intervention likely occurred across the entire time period, two-day calibration periods were chosen for winter and summer that showed the least amount of human intervention and appeared to match typical operational trends. July 22-23, 2020, was the calibration period used for the summer EPS scenario, and February 10-11, 2021 was used for the winter scenario.

Facility boundary conditions were added to the model so that the operational status of the system would match field conditions during the calibration period. These boundary conditions include initial values for tank levels, supply and pump operational status, supply and pump control settings, and the pattern of system demand over the course of a day, all obtained from SCADA records. The model simulations predict system performance over time, so the model results were compared to SCADA trends to determine how well the model matches the actual behavior of the system.

### Diurnal Demand Pattern Development

Just as demand changes throughout the year depending on the weather, it also fluctuates over the course of a day, depending on customer schedules, type of use, and customer demographics. This fluctuation is referred to as a diurnal demand pattern or curve. Summer and winter diurnal curves were developed for each pressure zone group in the system using SCADA production data for the selected calibration periods. Zones were grouped by supply source as shown in **Table 2**, and hourly usage was calculated for each zone using a mass balance between the zone supply from SCADA and the average day demand allocated in the model. The hourly totals for each zone group were converted to hourly peaking factors, and these were applied to the base ADD in the model for each timestep.

The diurnal curves for small zones (such as Southview or Cedar Hills) may appear extreme compared to curves for larger zones; this is because the demand multiplier is extremely sensitive to small changes in demand or tank levels. The development of smaller zone diurnals, therefore, must happen iteratively. An initial curve is estimated using an average mass balance of flow in and out of the zone for each hour, and adjusted as necessary when compared to SCADA trends until the calibration match is satisfactory. Small pressure zones have a low impact on the overall accuracy of the model and their diurnal use fluctuates significantly from day to day, so there is little value in developing "perfect" diurnal curves for them.

An example of a diurnal curve (High Pressure Zone) is shown in **Figure 6.** All diurnal curves used for the calibration are included in **Appendix C.** 



### Figure 6 | High Pressure Zone Diurnal Pattern Example

### Controls

The system wells and pumps are modulated by typical on and off controls based on tank levels. These levels change between summer and winter scenarios and the number of pumps operating is significantly higher during summer demand conditions. Initial controls used in the City's model were updated to reflect the calibration period. Where a pump did not operate or continuously ran during the selected calibration period (and therefore cannot be calibrated), the controls that were previously in the City's model were preserved but disabled to allow for use in scenarios adapted from the calibration scenarios. The calibration controls configuration for the model pumps is shown in **Appendix D**.

### EPS Calibration Adjustments

During EPS calibration, various model elements may be adjusted to achieve the best calibration possible. EPS calibration may help to identify areas where operational settings need adjustment within the model to match the actual system operations. Modifications made to the model during the EPS calibration include the following:

- Facility Configurations and Setup
- Diurnal Patterns
- Controls

### Facility Configurations

Major changes to or special-case facility configurations that came out of the EPS calibration effort are detailed below.

#### Combined Tanks

Sometimes, tanks located at the same site or close together in the hydraulic model will cause "chatter" where the tanks fill and drain each other in an effort to synchronize their hydraulic grade lines (HGLs) and solve the hydraulic simulation instead of responding to system demand as a system tank truly would. To resolve this model instability, most tanks located at the same site were combined as one tank with a modified diameter to represent a volume equivalent to the two tanks. The tank used in pump controls was changed to the combined tank. The second tank inlet/outlet pipe was closed to prevent flow during the simulations. This improved the calibration KPIs significantly for the corresponding pressure zones. Combined tanks and their equivalent combined diameters are shown in **Table 8.** The SIA tanks were not combined given their significant elevation differences and the model did not appear to exhibit significant instability between the two tanks.

### Table 8 | Combined Tanks

Tank	Actual Diameter (ft)	Simulated Diameter to Represent Both Tanks (ft)	Pipe ID Closed at Second Tank
WNS22_SHAWNEE_1	15	29.73	WMN39076
WNS26_BROWNE_PARK_2	160	226.55	WMN142750
WNS27_LINCOLN_HEIGHTS_1	240	316.55	WMN141948

#### Tank Control/Altitude Valves

Three of the system tanks' SCADA trends indicated that the tanks do not necessarily float with the hydraulics of the zone and other tanks in the zone. Control valves were added at these tanks to approximate the flow restrictions in or out of the tanks. The specific model configurations for each tank are as follows:

- Indian Hills Tank. Per City information, this tank is filled via an altimeter that opens and closes based on the tank level. This altimeter was modeled as a pressure sustaining valve which opens at the specified tank levels but limits flow as to not drop pressures in the upstream Five Mile zone. The City indicated that this sustaining feature was a satisfactory representation of true field operations, which is verified by the calibration results.
- Rockwood Vista Tank. This tank is an underground tank, and according to City staff, experiences high headloss during its fill cycle. To simulate this headloss, Murraysmith added a float valve to the fill line in the model which increases headloss as flow increases. The headloss values were adjusted on a trial-and-error basis until the calibration matched.

North Hill Tank. The City noted that the North Hill Tank experiences a slow fill rate for an unknown reason. Murraysmith added a float valve to throttle flow to the tank via headloss. The headloss values were adjusted iteratively for the best calibration match. Continued investigation of the reason for the slow fill rate is recommended, though the current model setup appears to be satisfactory based on the calibration level in this area.

The tank control valves should continue to be reviewed and modified during model use. Facility setup and/or headloss could vary based on the conditions being modeled.

#### Pump Settings

Once system demand, controls, and facility configurations have been refined, SCADA trends may reveal discrepancies in pump flows between the field and the model. When a pump flow discrepancy is combined with a discrepancy in tank fill or drain rates, this could indicate that a pump's curve has changed since its original installation (which often occurs as pumps age and their efficiency decreases). Similar to the steady state calibration, the pump speed was adjusted for numerous pumps where the SCADA shows flows below the pump's original design point and efficiency.

#### Diurnal Patterns

No diurnal flow data was available for the Airway Heights master meter, one of the City's large wholesale customers, so the diurnal curve for the Airway Heights node was adjusted as necessary to match SCADA trends for the West Plains and SIA Zones. Some of the smaller zones, including Eagle Ridge, Eagle Ridge 2, and Shawnee, required modifications to the diurnal patterns where negative or zero production was measured. Iterative adjustment of the diurnals was necessary because the SCADA tank levels of accuracy did not capture small level changes during certain hours in the mass balance used to develop the original curves. In some cases, there appeared to be a lag in the tank and pump SCADA where a tank would begin filling prior to its supply pump turning on. As a result, the mass balance did not accurately reflect the demand pattern for facilities with an apparent SCADA pump-tank data lag. Though most of the system's diurnal curves were preserved according to the original mass balance calculation as described above, patterns for these smaller zones were modified on a trial-and-error basis until the calibration matched. Specific changes to the diurnal curves originally calculated using a mass balance are as follows:

- The winter Eagle Ridge 2 mass balanced diurnal curve was reduced by 80-85% to increase calibration match.
- The winter Eagle Ridge mass balanced diurnal curve was reduced by 80-85% to increase calibration match, in addition to a curve-wide mass balance reduction of 10 gpm to match the SCADA Eagle Ridge tank drain rate.
- The winter Shawnee mass balanced diurnal curve was reduced by 50% to increase the calibration match.

 The summer Cedar Hills mass balanced diurnal curve was increased by 15-100% to match SCADA tank fill/drain rates.

### Operator Controls & Latah Booster Pump

The City maintains written booster station control strategies for each pump, but the City operators frequently make decisions to "pre-start" or manually turn on a pump in advance of its automated control "on" setting. These manual overrides are based on complex human decisions which are not feasible to simulate in a computerized model. As a result, operator discretion was not incorporated into the model controls with two exceptions. The Latah Booster Station is manually operated with variable speed settings spanning a large range, so a pump speed pattern over the calibration period was added for the EPS summer scenario (the pattern is specific to the calibration period). For the winter scenario, Latah Booster was not operated during the calibration period. For any condition, flow can go through the bypass pipe when the pump is off, so a pipe flow control was established to allow flow to bypass the pump only when it is not operating. The only other manual control built into the model was at the Central Avenue Well 2 in the winter EPS scenario, which was operating during the calibration period but did not follow a consistent trend in operation levels. Otherwise, no manual override controls were used in the EPS calibration scenarios.

### EPS Key Performance Indicators

Using the calibration recommendations in the WA DOH Design manual and supporting literature, four different KPIs were used to evaluate the EPS calibration results (results after calibration adjustments were made to the model). Representative industry literature recommendations for EPS calibrations are shown in **Table 9**. There is wide range of methods used to evaluate EPS calibrations and limited guidance on specific KPIs. Graphing the results to visually show the accuracy and differences is recommended. The four specific criteria used for this calibration are described below and summarized in **Table 10**.

Reference	Tanks	Pumps
WRc 1989	<ul> <li>Average difference in volume or tank level less than 5%</li> </ul>	<ul> <li>±5% difference in flow, where flow &gt; 10% of total demand or</li> <li>±10% where flow &lt; 10% of total demand</li> </ul>
AWWA 2017 M32 Manual	<ul> <li>Difference in tank level is less than 6 feet</li> <li>Compare frequency and rate of tank fill-drain cycles</li> <li>Compare results graphically</li> </ul>	<ul><li>Compare average flow difference</li><li>Compare results graphically</li></ul>

### Table 9 | Industry EPS Calibration KPIs

### Table 10 | City Model EPS Calibration KPIs

Facility	Volume or Flow	Cycle
Tank	<ul> <li>Average percent error in volume or tank level less than 5%</li> </ul>	<ul> <li>Fill-drain cycles match within ½ of one cycle</li> </ul>
Pump	<ul> <li>Average percent error in pump flow is less than 10%</li> </ul>	<ul> <li>Pump on/off cycles match within ½ of one cycle</li> </ul>

1. Average percent error in tank levels/volume for each 15-minute increment in the model simulation

For every 15-minute increment in the model simulation (i.e. timestep), the absolute difference was taken between model and SCADA tank levels and converted to a percentage of the SCADA tank level at that timestep. The average of all timestep percentages for each tank was reported as the facility KPI. A lower KPI indicates a higher level of confidence in the model.

Industry literature notes that, for a high-confidence model used for design purposes, tank levels should fall within 3 to 6 feet of the actual tank levels at any given timestep. However, larger margins of error are acceptable for planning-level analyses in the model. Tank level comparisons can be viewed in the **Appendix E** graphs.

2. Average percent error in pump flows by 15-minute model simulation increment

For every 15-minute increment in the model simulation (i.e. timestep), the absolute difference was taken between model and SCADA pump flows and converted to a percentage of the SCADA pump flow at that timestep. The average of all timestep percentages for each pump was reported as the facility KPI. A lower KPI indicates a higher level of confidence in the model.

Industry literature recommends that hydraulic models used for design purposes output pump flow that matches the field with an error of less than 5 or 10%, depending on the size of the pressure zone. Larger errors, however, are acceptable for models used for planning-level analysis.

3. Difference between number of tank fill/drain cycles

The number of times a tank fills and drains were counted in both the model and in SCADA for the duration of the calibration period. The closer these values are (i.e. a lower KPI), indicates a higher level of confidence in the model calibration. The KPI is evaluated as the difference in the number of cycles between the model and the field.

4. Difference between number of pump on/off cycles

The number of times a pump turns on and back off was counted in the model and the SCADA during the calibration period. The closer these values are (i.e. a lower KPI) indicates a higher level of confidence in the model calibration. This KPI does not appear

in any of the industry literature noted above but was chosen because it is a similar approach to the recommended evaluation of tank fill/drain cycles. The KPI is evaluated as the difference in the number of cycles between the model and the field.

### EPS Results

Although AWWA guidelines indicate a 24-hour EPS calibration is adequate, a representative 48-hour EPS calibration period was used to calibrate the City's model to confirm the consistency of controls and trends. This amount of time was long enough for most tanks to complete at least one fill drain cycle, but not so long that operator interventions (non-typical operating conditions) would significantly offset the SCADA trends from the model and skew the KPI results unreasonably. The KPI results are summarized for 24-hour and 48-hour simulations to illustrate the accuracy impacts of longer simulations.

**Table 11** and **Table 12** show winter and summer EPS tank KPI results, respectively, and pump KPI results are in **Table 13** and **Table 14**. The KPIs generally show good agreement between the model and SCADA. The 24-hour results and winter period generally show better calibration and less variation in factors such as manual overrides or daily diurnal pattern variations. For example, as previously noted, the City operators manually override automated controls as needed. These overrides were not built into the model controls since they are not consistent or necessarily representative for planning scenarios. However, they do impact the overall calibration and KPI results and are more likely to occur over the longer comparison period.

Key locations and zones where tank level differences between the model and SCADA are more significant are discussed below. There are generally only a few zones that exceed the KPI criteria. And where specific facilities exceed the criteria, additional data such as pump tests, PRV flow information, or localized demand review could potentially improve the results. **Appendix E** includes the graphs for all zones for winter and summer that were used to visually represent the calibration and to calculate the KPIs. An example of one EPS calibration graph is shown in **Figure 7**.





## Table 11 | Winter EPS Tank KPIs

	48-Hour KPI's		24-Hour KPI's																																																				
Zone	Tank Name	Model-SCADA Tank Cycle Difference (# Cycles)	Tank Volume KPI (%)	Zone Average Cycle Difference (# Cycles)	Zone Average Height KPI (%)	Model-SCADA Tank Cycle Difference (# Cycles)	Tank Volume KPI (%)	Zone Average Cycle Difference (# Cycles)	Zone Average Height KPI (%)																																														
Cedar Hills	Cedar Hills	0.0	0.9	0.0	0.9	0.0	0.9	0.0	0.9																																														
Eagle Ridge	Eagle Ridge	0.0	0.8	0.0	0.8	0.0	3.0	0.0	3.0																																														
Eagle Ridge 2	Eagle Ridge 2	0.0	0.2	0.0	0.2	0.0	1.3	0.0	1.3																																														
Five Mile & Indian	Indian Hills <sup>1</sup>	N/A	0.8	0.0	20	N/A	0.7	0.0	1 /																																														
Hills	Strong Road	0.0	4.7	0.0	2.0	0.0	2.1	0.0	1.4																																														
Glennaire	Glennaire	0.0	0.4	0.0	0.4	0.0	0.4	0.0	0.4																																														
High	Lamonte	0.0	6.7	0.0	4.0	0.0	8.1	0.0	60																																														
півіт	Garden Park	0.0	3.1	0.0	4.9	0.0	3.8	0.0	0.0																																														
Highland	Highland	0.0	0.6	0.0	0.6	0.0	1.0	0.0	1.0																																														
Intermediate	14th & Grand	0.0	3.4	0.2	20	0.0	3.6	0.0	3.6																																														
	Lincoln Heights 1	0.5	4.1	0.5	5.0	0.0	3.6																																																
Kempe	Kempe	0.0	0.8	0.0	0.8	0.0	0.3	0.0	0.3																																														
	9th & Pine	0.0	3.8			0.0	1.9																																																
	Qualchan	0.0	1.3	0.0		0.0	2.2																																																
Low	Rockwood Vista	0.0	5.5		0.0	0.0	25	0.0	1.9	0.0	1 /																																												
LOW	Shadle Park	0.0	0.8		2.5	0.0	0.3	0.0	1.4																																														
	Thorpe Rd	0.0	1.4																																									-		-	_						0.0	1.0	
	West Drive	0.0	2.4			0.0	1.0																																																
Midbank	Midbank	0.0	2.2	0.0	2.2	0.0	1.9	0.0	1.9																																														
	Five Mile	0.0	3.7			0.0	1.8																																																
North Hill & North	Indian Trail	0.0	1.0	0.0	1.9	0.0	0.8	0.0	1.3																																														
West refrace	North Hill	0.0	1.1			0.0	1.2																																																
Shawnee	Shawnee 1	0.0	4.4	0.0	4.4	0.0	3.7	0.0	3.7																																														
CLA	SIA 1	0.0	1.8	0.0	1.2	0.0	1.5	0.0	1.0																																														
SIA	SIA2	0.0	0.5	0.0	1.2	0.0	0.4	0.0	1.0																																														
Southview	Southview	0.0	3.2	0.0	3.2	0.0	1.3	0.0	1.3																																														
Top & Hatch Road	Brown Park 2	0.0	3.0	0.0	3.0	0.0	1.9	0.0	1.9																																														
West Plains	Mallen	0.0	1.9	0.0	1.9	0.0	0.6	0.0	0.6																																														
Woodland Heights	Sunset	0.0	5.0	0.0	5.0	0.0	3.7	0.0	3.7																																														
Woodridge	Woodridge	0.0	0.8	0.0	0.8	0.0	0.6	0.0	0.6																																														
	System Wide KPI	0.0	2.3	0.0	2.2	0.0	1.9	0.0	1.9																																														

Notes:

**Bold** values do not meet desirable KPI

1. The Indian Hills tank is controlled by a valve which causes significant variation in tank levels, so there was no benefit to evaluating this tank using a fill/drain cycle count.

### Table 12 | Summer EPS Tank KPIs

			48-Hc	our KPI's		24-Hour KPI's				
Zone	Tank Name	Model-SCADA Tank Cycle Difference (# Cycles)	Tank Volume KPI (%)	Zone Average Cycle Difference (# Cycles)	Zone Average Height KPI (%)	Model-SCADA Tank Cycle Difference (# Cycles)	Tank Volume KPI (%)	Zone Average Cycle Difference (# Cycles)	Zone Average Height KPI (%)	
Cedar Hills	Cedar Hills	0.0	4.8	0.0	4.8	0.0	2.4	0.0	2.4	
Eagle Ridge	Eagle Ridge	0.0	3.9	0.0	3.9	0.0	2.9	0.0	2.9	
Eagle Ridge 2	Eagle Ridge 2	0.0	2.3	0.0	2.3	0.0	1.4	0.0	1.4	
Five Mile & Indian	Indian Hills	N/A	3.6	0.0	2 /	N/A	3.7	0.0	25	
Hills	Strong Road	0.0	3.1	0.0	5.4	0.0	3.3	0.0	5.5	
Glennaire	Glennaire	0.0	3.8	0.0	3.8	0.0	2.4	0.0	2.4	
High	Lamonte	0.5	10.2	0.3	7.5	0.5	11.0	0.3	8.2	
	Garden Park	0.0	4.8			0.0	5.3		0.2	
Highland	Highland	0.0	1.8	0.0	1.8	0.0	4.5	0.0	4.5	
Intermodiate	14th & Grand	0.0	2.6	0.0	27	0.0	2.2	0.0	26	
	Lincoln Heights 1	0.0	4.7	0.0	5.7	0.0	2.9		2.0	
Kempe	Kempe	0.0	3.1	0.0	3.1	0.0	3.1	0.0	3.1	
	9th & Pine	1.5	10.6	0.5	6.5	0.5	10.0	0.2	5.9	
	Qualchan	0.0	5.6			0.0	4.5			
low	Rockwood Vista	0.0	7.1			0.0	4.7			
LOW	Shadle Park	1.0	4.2			0.5	4.2			
	Thorpe Rd	0.5	4.6			0.0	4.5			
	West Drive	0.0	6.9			0.0	7.2			
Midbank	Midbank	0.0	4.0	0.0	4.0	0.0	3.7	0.0	3.7	
North Hill Q North	Five Mile	0.0	13.7			0.0	8.7			
West Terrace	Indian Trail	0.0	12.3	0.2	9.3	0.0	6.9	0.2	5.9	
	North Hill	0.5	2.0			0.5	2.0			
Shawnee	Shawnee 1	0.0	27.0	0.0	27.0	0.0	10.6	0.0	10.6	
SIA	SIA 1	0.0	7.1	0.0	ЛЛ	0.0	6.1	0.0	3.8	
51A	SIA2	0.0	1.7	0.0	4.4	0.0	1.5	0.0	3.8	
Southview	Southview	0.5	8.9	0.5	8.9	0.0	7.7	0.0	7.7	
Top & Hatch Road	Brown Park 2	0.0	5.6	0.0	5.6	0.0	3.6	0.0	3.6	
West Plains	Mallen	0.0	1.4	0.0	1.4	0.0	1.1	0.0	1.1	
Woodland Heights	Sunset	0.0	4.0	0.0	4.0	0.0	3.2	0.0	3.2	
Woodridge	Woodridge	0.0	5.7	0.0	5.7	0.0	4.4	0.0	4.4	
	System Wide KPI's	0.2	6.0	0.1	5.8	0.1	4.7	0.0	4.2	

Notes:

**Bold** values do not meet desirable KPI

1. The Indian Hills tank is controlled by a valve which causes significant variation in tank levels, so there was no benefit to evaluating this tank using a fill/drain cycle count.

# Table 13 | Winter EPS Pump KPIs

	Pump Name	48-Hour KPI's				24-Hour KPI's				
Zone		Model-SCADA Pump Cycle	Pump Flow KPI	Zone Average Cycle	Zone Average Height	Model-SCADA Pump Cycle	Pump Flow KPI	Zone Average Cycle	Zone Average Height	
		Difference (# Cycles)	(%)	Difference (# Cycles)	KPI (%)	Difference (# Cycles)	(%)	Difference (# Cycles)	KPI (%)	
Cedar Hills	Cedar Hills	1.0	2.0	1.0	2.0	1.0	4.0	1.0	4.0	
Eagle Ridge	Eagle Ridge	0.0	4.5	0.0	4.5	0.5	1.0	0.5	1.0	
Eagle Ridge 2	Eagle Ridge 2	0.0	0.1	0.0	0.1	0.5	1.0	0.5	1.0	
Five Mile & Indian Hills	Five Mile	0.0	12.8	0.0	12.8	0.0	4.9	0.0	4.9	
Glennaire	Glennaire	0.0	0.6	0.0	0.6	0.0	1.1	0.0	1.1	
High	14th & Grand	0.0	14.7	0.0	12.0	0.0	14.8	0.0	15.9	
	Lincoln Heights	0.0	9.3			0.0	16.9			
Highland	Milton	0.0	2.7	0.0	2.7	0.0	9.4	0.0	9.4	
	9th & Pine	0.0	0.0		-	0.0	0.0			
	Bishop Court	0.0	0.0			0.0	0.0			
	Parkwater Pump 2	0.0	0.0			0.0	0.0			
Intermediate	Parkwater Pump 1	3.5	8.8	0.4	11 -	1.0	0.4	0.1	0.1	
internediate	Ray Pump 1	0.0	0.0	0.4		0.0	0.0		0.1	
	Ray Pump 2	0.0	0.0			0.0	0.0			
	Ray Pump 3	0.0	0.0			0.0	0.0			
	Well Electric Pump 1	0.0	0.0			0.0	0.0			
Kempe	Kempe	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	Latah	0.0	26.4		2.0	0.0	29.6		26	
	Nevada Pump 3	0.0	0.0			0.0	0.0			
	Nevada Pump 1	0.0	0.0			0.0	0.0			
	Nevada Pump 2	0.0	0.0			0.0	0.0			
	Nevada Pump 4	0.0	0.0			0.0	0.0			
Low.	Parkwater Pump 4	0.0	0.7			0.0	0.8			
LOW	Parkwater Pump 3	0.0	0.0	0.0	2.9	0.0	0.0	0.0	2.0	
	Parkwater Pump 5	0.0	0.0			0.0	0.0			
	Parkwater Pump 6	0.0	0.0			0.0	0.0			
	Parkwater Pump 7	0.0	8.0			0.0	1.3			
	Parkwater Pump 8	0.0	0.0			0.0	0.0			
	Well Electric Pump 3	0.0	0.0			0.0	0.0			
Midbank	Belt	0.0	10.1	0.0	10.1	0.0	9.3	0.0	9.3	
	Grace Pump 1	0.0	0.0			0.0	0.0	0.0		
	Grace Pump 2	0.0	0.0			0.0	0.0		0.1	
	Central Pump 1	1.0	1.0	1		0.0	0.0			
North Hill & Northwest	Central Pump 2	0.0	0.5	0.3	0.4	0.0	0.0			
TETTALE	Hoffman Pump 1	1.0	0.5			0.0	0.0			
	Well Electric Pump 2	0.0	0.8			0.0	0.5			
	Well Electric Pump 4	0.0	0.0			0.0	0.0			
Shawnee	Shawnee	0.0	1.0	0.0	1.0	0.0	0.2	0.0	0.2	

		48-Hour KPI's				24-Hour KPI's				
Zone	Pump Name	Model-SCADA Pump Cycle Difference (# Cycles)	Pump Flow KPI (%)	Zone Average Cycle Difference (# Cycles)	Zone Average Height KPI (%)	Model-SCADA Pump Cycle Difference (# Cycles)	Pump Flow KPI (%)	Zone Average Cycle Difference (# Cycles)	Zone Average Height KPI (%)	
CLA	Thorpe	0.0	3.7	0.2	4.1	0.0	2.6	0.0	1.5	
SIA	Western Drive & SIA	0.5	4.4	0.5	4.1	0.0	0.3	0.0		
Southview	South View	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	35th & Ray	0.0	4.7	0.0	2.2	0.0	5.9	KPI's Zone Average Cycle Difference (# Cycles) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	2.7	
Top & Hatch Road	Garden Park	0.0	0.0			0.0	0.0			
	Manito	0.0	2.0			0.0	2.2			
West Plains	Spotted Road	0.5	2.4	0.5	2.4	0.0	3.8	0.0	3.8	
Woodland Heights	Western Drive & Sunset	0.0	11.0	0.0	11.0	0.0	8.3	0.0	8.3	
Woodridge	Woodridge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
	System Wide KPI's	0.2	2.8	0.1	3.7	0.1	2.5	0.1	3.5	

Note:

Bold values do not meet desirable KPI

## Table 14| Summer EPS Pump KPIs

			48-Hc	our KPI's		24-Hour KPI's				
Zone	Pump Name	Model-SCADA Pump Cycle Difference (# Cycles)	Pump Flow KPI (%)	Zone Average Cycle Difference (# Cycles)	Zone Average Height KPI (%)	Model-SCADA Pump Cycle Difference (# Cycles)	Pump Flow KPI (%)	Zone Average Cycle Difference (# Cycles)	Zone Average Height KPI (%)	
Cedar Hills	Cedar Hills	0.0	19.1	0.0	19.1	0.0	2.5	0.0	2.5	
Eagle Ridge	Eagle Ridge	0.0	12.5	0.0	12.5	0.0	10.8	0.0	10.8	
Eagle Ridge 2	Eagle Ridge 2	0.0	6.2	0.0	6.2	0.0	2.9	0.0	2.9	
Five Mile & Indian Hills	Five Mile	1.0	23.7	1.0	23.7	0.0	22.9	0.0	22.9	
Glennaire	Glennaire	0.0	16.8	0.0	16.8	0.0	10.3	0.0	10.3	
Lligh	14th & Grand	0.0	8.5	0.0	17.6	0.0	7.1	- 0.0	15.9	
півп	Lincoln Heights	0.0	26.7			0.0	24.7			
Highland	Milton	0.0	7.9	0.0	7.9	1.0	30.4	1.0	30.4	
	9th & Pine	0.0	14.0	_		0.0	18.1	_		
	Bishop Court	0.0	0.0			0.0	0.0			
	Parkwater Pump 2	0.0	0.0			0.0	0.0			
Intermediate	Parkwater Pump 1	2.0	0.6	0.2	2.4	0.0	0.3	0.0	2.9	
Intermediate	Ray Pump 1	0.0	1.5	0.3	2.4	0.0	1.7			
	Ray Pump 2	0.0	2.5			0.0	2.7			
	Ray Pump 3	0.0	0.4	-		0.0	0.3			
	Well Electric Pump 1	0.0	0.0			0.0	0.0			
Kempe	Kempe	0.0	11.9	0.0	11.9	0.0	9.6	0.0	9.6	

			48-Hc	our KPI's		24-Hour KPI's				
Zone	Pump Name	Model-SCADA Pump Cycle	Pump Flow KPI	Zone Average Cycle	Zone Average Height KPI	Model-SCADA Pump Cycle	Pump Flow KPI (%)	Zone Average Cycle	Zone Average Height KPI	
	Latab		(%)	Difference (# Cycles)	(%)		22.0	Difference (# Cycles)	(%)	
	Lalali Novada Dump 2	0.0	1.7			1.0	1.9			
	Nevada Pump 1	0.5	1.7	-		1.0	1.8	-		
	Nevada Pump 2	0.0	0.0	-		0.0	0.0			
	Nevada Pump 2	0.0	0.0	-		0.0	0.0			
	Nevada Pump 4	0.0	0.0			0.0	0.0			
Low	Parkwater Pump 4	0.0	0.0	0.3	2.9	0.0	0.0	0.2	4.5	
	Parkwater Pump 3	1.0	4.5	-		0.0	3.6	Zone Average Cycle Difference (# Cycles)         Zo           0.11         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00		
	Parkwater Pump 5	1.0	20.4	-		1.5	21.4			
	Parkwater Pump 6	1.0	4.1	-		0.0	0.0			
	Parkwater Pump 7	0.0	1.9			0.0	1.5			
	Parkwater Pump 8	0.0	0.0			0.0	0.0			
	Well Electric Pump 3	0.0	2.3			0.0	2.4			
Midbank	Belt	1.0	11.9	1.0	11.9	0.0	7.0	0.0	7.0	
	Grace Pump 1	0.0	0.0	0.0	1.3	0.0	0.0	Zone Average Cycle Difference (# Cycles)         0.2         0.2         0.2         0.0         0.2	1.0	
	Grace Pump 2	0.0	1.6			0.0	1.3			
North Hill &	Central Pump 1	0.0	3.8			0.0	3.1			
North Hill & Northwest Terrace	Central Pump 2	0.0	0.0			0.0	0.0			
	Hoffman Pump 1	0.0	1.4			0.0	1.3			
	Well Electric Pump 2	0.0	2.2			0.0	1.5			
	Well Electric Pump 4	0.0	0.0			0.0	0.0			
Shawnee	Shawnee	0.0	49.9	0.0	49.9	0.0	10.5	0.0	10.5	
SIΔ	Thorpe	3.0	35.4	15	20.9	1.0	7.7	0.2 0.2 0.0 0.0 0.0 0.0 0.5 0.0 0.0 0.0 0.0 0.0	57	
	Western Drive & SIA	0.0	6.4	1.5	20.5	0.0	3.6		5.7	
Southview	South View	0.0	4.6	0.0	4.6	0.0	5.2	0.0	5.2	
	35th & Ray	0.0	14.0	_		0.0	8.7	0.0		
Top & Hatch Road	Garden Park	1.0	12.4	0.3	10.7	0.0	11.2		8.1	
	Manito	0.0	5.6			0.0	4.3			
West Plains	Spotted Road	0.0	4.3	0.0	4.3	0.0	5.6	0.0	5.6	
Woodland Heights	Western Drive & Sunset	0.0	13.4	0.0	13.4	0.0	11.9	0.0	11.9	
Woodridge	Woodridge	2.0	8.3	2.0	8.3	2.0	8.2	2.0	8.2	
	System Wide KPI	0.3	7.7	0.3	13.0	0.1	6.2	0.2	9.3	

Note:

Bold values do not meet desirable KPI

### Zone Calibration Areas of Note

**High Zone.** The High Zone showed a lower confidence level in tank and pump KPIs for summer and winter conditions. The tanks displayed a significant amount of variability under both conditions that result in more complicated patterns. Additionally, the size of the Lincoln Heights Booster Station results in significant model response to relatively small tank variation and subsequent pump control response.

Shawnee and Southview Zones. The Shawnee and Southview Zones are very small and sensitive to capturing accurate demands and facility conditions. As a result, the calibration is not as high in these areas and generally gets less accurate over the 48-hour period compared to the 24-hour period as small differences in the demand pattern usually result in compounding changes in the tank and pump interactions.

Low Zone. Many of the Low Zone controls utilize the Rockwood Vista Tank levels, so having additional information about the operation of the control valve at Rockwood Vista could improve the overall zone calibration. Given the size of the zone and the distance between the tanks, the calibration is generally high, but the tank KPIs will likely improve with further refinement of the Rockwood controls and settings.

### Facility Calibration Areas of Note

**Craig Road Flow Control Valve.** The calibration KPIs of the SIA and West Plains Pressure Zones were extremely sensitive to the flow through the Craig Road FCV and the Airway Heights wholesale diurnal pattern. The final calibrated scenario assumed a flow control of 500 gpm on the FCV during the summer and no flow through the valve during the winter. These control settings produced the best calibration match between SCADA and the model. However, these controls and the diurnal curve for the Airway Heights intertie should be confirmed via flow meters at both locations to validate the model's setup.

Latah Booster Station. The variation in flows and operator input settings at the facility makes EPS calibration more complicated. In general, the flows through the facility are calibrating relatively well when the pump is turned off and flow is measure through the bypass. In general, the model measured more flow through the bypass (when the pump is off) than the SCADA indicated, so additional verification of whether flow can move through the facility without going through the flow meter would be beneficial.

**Five Mile Pump Station**. The City has constructed a new Five Mile Pump Station. During the summer calibration period (2020), the new Five Mile Pump Station was operating. During the winter calibration period (2021), the old Five Mile Pump Station was operating. As a result, the calibration captures both facilities. Updated pump curve information should be verified for the new pump station and additional verification of the interaction between the pump stations should be done to confirm the correct setup of the facilities for analysis purposes.

### Steady State and EPS Conclusions

The overall agreement between model and SCADA facility trends indicates that facilities and operational controls are accurately represented within the model and can be used to predict system conditions during typical winter and summer periods for planning-level purposes. Generally, the EPS calibration is higher in the winter when there is less manual operation and demand variability in the system.

As with any system, there are localized areas and a few specific facilities where additional data collection and evaluation could help resolve a lower agreement between the model and the field. Whenever data is collected about the system as part of routine or special maintenance/improvements, (e.g. data such as tank floor and overflow elevations or pump test data), this information should be updated in the model. Additional flow tests may need to be conducted if a detailed analysis is performed in areas with low calibration confidence levels. Where the model is used for very localized design analysis, additional data and calibration may be beneficial.

The City's network is changing rapidly as Spokane grows and the water system expands. Frequent network and facility updates are critical if the model is to be used for ongoing analysis. Given the dynamic nature of the system and the extent of the details impacting the model and system operations, model maintenance and calibration are an ongoing process. Continued maintenance and ongoing calibration of the model will maintain the level of confidence required for the model to be useful for water system planning. Ongoing maintenance of the model will also strengthen institutional confidence in model results.

Because the City's operational strategy relies on the operators' judgement of the system needs on a particular day and not on a standard control scheme, it is essential that model controls are coordinated closely with actual operations strategies in the field for specific analyses. Controls will need to be modified for each modeling scenario based on the actual or anticipated conditions to reflect the intended operations.

The City should continue to collect long-term data that will be used to improve the accuracy of the model by adding flow meters at major PRV stations. This will allow for better demand allocation and patterns throughout each zone in the system.

In summary, the following recommendations apply to ongoing model maintenance and improvement:

- Frequent network updates as system expands
- Ongoing facility updates when facilities are built or modified, or when new data is available
- Customization of model controls in coordination with operations staff for specific analyses
- Flow testing in low-confidence areas when analysis is performed in those areas
- Add flow and pressure data collection at key valve stations (Northwest Terrace Zone PRVs and Craig Road FCV)
- Additional data on losses at North Hill, Rockwood Vista, Indian Hills, and Eagle Ridge 2 Tanks
- Additional refinement of pump settings under a variety of conditions, including the impact of multiple pumps operating simultaneously at a station

Appendix List

Appendix A: Steady State Calibration Individual Test Results

Appendix B: Steady State Calibration Zone Graphs

Appendix C: Zone Diurnal Demand Patterns

Appendix D: Winter and Summer Pump Controls Summary

Appendix E: Winter and Summer EPS Calibration Graphs

## Appendix A – Steady State Calibration Test Results

Test #	Pressure Zone	Zone ID	Date of Test	Time of Test	Flow Hydrant 1	Flow Hydrant 2	Total Flow	Static Hydrant ID	Field Static Pressure (psi)	Model Static Pressure	Static Pressure Difference	Field Residual Pressure	Field Residual Drop	Model Residual Pressure	Model Residual Drop	Residual Drop Difference
							(6911)		(001)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)	(psi)
1.2	Southview	wPZ1	8/6/2021	8:18 AM	WHY2658	NA	1626	WHY2657	109	111	2	58	51	54	57	6
2.1	Woodland Heights	wPZ2	8/6/2021	8:52 AM	WHY7734	NA	1033	WHY7733	132	135	3	40	92	39	96	4
3.1	Hatch Road	wPZ3	8/6/2021	9:23 AM	WHY8163	NA	1423	WHY8164	92	91	-1	41	51	35	56	5
4.1	Indian Hills	wPZ4	8/6/2021	9:58 AM	WHY504	NA	1341	WHY131271	104	105	1	62	42	59	47	5
4.2	Indian Hills	wPZ4	8/6/2021	10:13 AM	WHY586	NA	1788	WHY6240	78	80	2	62	16	61	19	3
5.1	Woodridge	wPZ5	8/6/2021	10:40 AM	WHY6202	WHY6204	3013	WHY6201	79	79	0	29	50	24	55	5
5.2	Woodridge	wPZ5	8/6/2021	12:48 PM	WHY134208	NA	1299	WHY134207	59	58	-1	32	27	27	31	4
6.1	Shawnee	wPZ6	8/6/2021	1:05 PM	WHY6200	NA	1513	WHY6203	66	66	0	41	25	44	22	-3
6.2	Shawnee	wPZ6	8/6/2021	1:21 PM	WHY471	NA	1383	WHY7769	56	59	3	40	16	45	14	-2
9.1	West Plains	wPZ9	8/6/2021	2:01 PM	WHY7530	NA	2263	WHY7529	90	90	0	82	8	84	6	-2
9.2	West Plains	wPZ9	8/6/2021	3:10 PM	WHY14860	NA	2372	WHY15255	108*	111	3	78*	30	67	43	13
9.3	West Plains	wPZ9	8/6/2021	3:28 PM	WHY121670	NA	2127	WHY121669	98	99	1	88	10	87	12	2
10.1	SIA	wPZ8	8/10/2021	7:55 AM	WHY4394	NA	2312	WHY4393	86	79	-7	70	16	72	8	-8
10.2	SIA	wPZ8	8/10/2021	8:15 AM	WHY4422	NA	1111	WHY65269	62	64	2	52	10	58	7	-3
10.3	SIA	wPZ8	8/10/2021	8:32 AM	WHY130471	NA	1710	WHY8125	58	59	1	51	7	59	0	-7
10.4	SIA	wPZ8	8/10/2021	9:05 AM	WHY6608	NA	1625	WHY8099	68	69	1	52	16	58	11	-5
10.5	SIA	wPZ8	8/10/2021	9:38 AM	WHY4586	NA	1500	WHY4585	48*	53	5	38*	10	43	10	0
11.1	Midbank	wPZ11	8/10/2021	10:15 AM	WHY263	NA	1111	WHY262	49	53	4	28	21	33	20	-1
11.2	Midbank	wPZ11	8/10/2021	10:21 AM	WHY5649	NA	1111	WHY2787	89	92	3	78	11	85	7	-4
12.1	Highland	wPZ12	8/10/2021	11:01 AM	WHY360	NA	1758	WHY296	73	73	0	49	24	53	20	-4
12.2	Highland	wPZ12	8/10/2021	11:15 AM	WHY6492	NA	750	WHY4480	65	65	0	38	27	44	21	-6
12.3	Highland	wPZ38	8/10/2021	12:36 PM	WHY4471	WHY4472	3853	WHY201	78	78	0	52	26	59	19	-7
13.2	Five Mile	wPZ13	8/10/2021	1:21 PM	WHY7793	WHY7795	2035	WHY7794	68	64	-4	16	52	19	45	-7
13.3	Five Mile	wPZ13	8/10/2021	1:46 PM	WHY7405	NA	1550	WHY7880	69	60	-9	55	14	38	23	9
13.4	Five Mile	wPZ43	8/10/2021	2:09 PM	WHY7320	NA	1162	WHY7321	50	50	0	22	28	28	22	-6
13.5	Five Mile	wPZ13	8/10/2021	2:26 PM	WHY511	NA	1025	WHY7307	55	54	-1	46	9	47	8	-1
14.1	Kempe	wPZ14	8/11/2021	7:37 AM	WHY6075	NA	1296	WHY6074	52	57	5	35	17	41	16	-1
14.2	Kempe	wPZ14	8/11/2021	8:00 AM	WHY58869	WHY6082	2241	WHY58870	65	69	4	23	42	29	40	-2
14.3	Kempe	wPZ14	8/11/2021	8:15 AM	WHY2158	NA	1231	WHY2159	60	60	0	28	32	26	33	1
15.1	Northwest Terrace	wPZ35	8/11/2021	8:45 AM	WHY581	NA	458	WHY583	49	49	0	25	24	21	27	3
15.2	Northwest Terrace	wPZ15	8/11/2021	9:14 AM	WHY440	NA	1609	WHY2841	94	97	3	76	18	61	36	18
15.3	Northwest Terrace	wPZ15	8/11/2021	9:41 AM	WHY575	NA	1381	WHY6238	115	116	1	92	23	86	31	8
15.4	Northwest Terrace	wPZ15	8/11/2021	9:55 AM	WHY68069	NA	1296	WHY63669	125	118	-7	40	85	46	72	-13
16.1	Eagle Ridge 2	wPZ16	8/11/2021	10:59 AM	WHY6442	NA	1186	WHY6443	69	68	-1	61	8	66	2	-6
16.2	Eagle Ridge 2	wPZ16	8/18/2021	9:33 AM	WHY1025	WHY1024	1790	WHY1026	60	77	17	55	5	71	6	1
16.3	Eagle Ridge 2	wPZ16	8/11/2021	11:19 AM	WHY97670	WHY113269	2658	WHY97673	60	57	-3	55	5	32	25	20
17.1	Eagle Ridge	wPZ17	8/11/2021	11:47 AM	WHY291	NA	1956	WHY7707	82	83	1	62	20	59	24	4
17.2	Eagle Ridge	wPZ31	8/11/2021	12:53 PM	WHY6642	NA	1135	WHY6645	82	83	1	49	33	56	28	-5

Test	Pressure Zone	Zone ID		Time of Test	Flow Hydrant 1 ID	Flow Hydrant 2 ID	Total Flow (gpm)	Static Hydrant ID	Field Static	Model	Static	Field	Field	Model	Model	Residual
			Date of Test						Pressure	Static	Pressure	Residual	Residual	Residual	Residual	Drop
#									(psi)	Pressure	Difference	Pressure	Drop	Pressure	Drop	Difference
172	Eagle Pidge	WD720	<u> </u>			ΝΙΔ	1460		Q1	(psi) 02	(psi)	(psi)	(psi) //1	(psi) 46	(psi) 20	(psi)
17.5		WPZ52	8/11/2021	1.04 PIVI	WH165209	NA	2040	WH165270	80	05 85	5	40	41	40	20	-5
17.4	Eagle Ridge	WFZ34	8/12/2021			NA	1837	WII10032	99	109	10	80	14	83	25	7
17.5	Eagle Ridge	WFZ17	8/11/2021	1.50 PM	WHY6650	NA	1710	W/HV7713	79	78	-1	48	31	53	20	-6
18.1	North Hill	WP718	8/12/2021	8.09 AM	WHY6131	WA W/HV6125	2806	WHY6128	89	95	6	32	57	35	60	-0 3
18.2	North Hill	wP718	8/12/2021	8.34 AM	WHV5793	NIA	1641	WHY5792	83	88	5	61	22	64	24	2
18.3	North Hill	wP718	8/12/2021	8:59 AM	WHY3376	NA	1299	WHY3375	78	78	0	59	19	58	20	1
18.4	North Hill	wP718	8/12/2021	9.24 AM	WHY2812	WHY2810	4016	WHY2811	105	106	1	72	33	63	43	10
18.5	North Hill	wP718	8/12/2021	9.59 AM	WHY5878	WHY5886	1915	WHY5885	62	64	2	21	41	17	47	6
18.6	North Hill	wP718	8/12/2021	10:40 AM	WHY508	NA	1726	WHY7776	82	82	0	70	12	69	14	2
18.7	North Hill	wP718	8/12/2021	11:13 AM	WHY6022	NA	2213	WHY6023	95	94	-1	80	15	85	9	-6
18.8	North Hill	wPZ18	8/12/2021	11:34 AM	WHY4804	NA	1209	WHY4803	55	56	1	50	5	55	1	-4
18.9	North Hill	Barnes RD Low	8/12/2021	12:58 PM	WHY100069	NA	2237	WHY100070	49	65	16	62	-13	55	10	23
18.10	North Hill	wP718	8/12/2021	8:09 AM	WHY134230	NA	1758	WHY7561	89	95	6	32	57	35	60	3
18.10	North Hill	wPZ18	8/12/2021	8:09 AM	WHY100071	NA	2187	WHY100072	89	95	6	32	57	35	60	3
18.12	North Hill	Barnes RD	8/12/2021	12:36 PM	WHY5646	NA	671	WHY7179	78	79	1	58	20	61	18	-2
19.1	Intermediate	wPZ19	8/12/2021	1:40 PM	WHY4598	NA	1299	WHY4597	141	138	-3	45	96	50	88	-8
19.2	Intermediate	wPZ19	8/12/2021	1:58 PM	WHY2752	NA	1005	WHY8298	80	76	-4	61	19	63	13	-6
19.3	Intermediate	wPZ19	8/13/2021	7:18 AM	WHY8322	WHY7845	3853	WHY7844	111	112	1	39	72	9	103	31
19.4	Intermediate	wPZ19	8/18/2021	7:59 AM	WHY5322	NA	1442	WHY816	58	59	1	45	13	47	13	0
19.5	Intermediate	wPZ19	8/12/2021	2:33 PM	WHY4286	NA	1837	WHY4214	88	89	1	70	18	66	23	5
19.6	Intermediate	wPZ19	8/12/2021	2:59 PM	WHY4257	NA	918	WHY4256	102	102	0	40	62	49	53	-9
20.1	Glennaire	wPZ20	8/18/2021	8:24 AM	WHY2656	NA	1985	WHY100869	59	62	3	47	12	53	9	-3
20.2	Glennaire	wPZ20	8/12/2021	3:38 PM	WHY129673	NA	1498	WHY129672	89	91	2	65	24	68	24	0
21.1	Тор	wPZ21	8/13/2021	10:06 AM	WHY8360	NA	1111	WHY8359	93	86	-7	80	13	82	4	-9
21.2	Тор	wPZ21	8/13/2021	7:58 AM	WHY934	NA	2148	WHY933	79	79	0	69	10	67	13	3
21.3	Тор	wPZ21	8/13/2021	8:12 AM	WHY846	NA	1111	WHY4991	76	77	1	59	17	64	13	-4
21.4	Тор	wPZ21	8/13/2021	8:24 AM	WHY5209	NA	1985	WHY5208	82	86	4	64	18	68	18	0
21.5	Тор	wPZ21	8/13/2021	8:52 AM	WHY2674	NA	1299	WHY2673	50	53	3	21	29	12	41	12
21.6	Тор	wPZ21	8/13/2021	9:17 AM	WHY906	NA	1400	WHY4637	75	76	1	50	25	49	28	3
21.7	Тор	wPZ21	8/13/2021	9:27 AM	WHY2610	NA	1500	WHY2609	84	87	3	61	23	60	27	4
21.8	Тор	wPZ21	8/13/2021	9:37 AM	WHY104074	NA	2148	WHY104073	99	103	4	73	26	65	37	11
21.9	Тор	wPZ21	8/13/2021	9:55 AM	WHY4953	WHY8015	2530	WHY4952	76	77	1	22	54	32	46	-8
21.10	Тор	wPZ21	8/13/2021	10:06 AM	WHY4962	NA	1625	WHY8274	93	86	-7	80	13	82	4	-9
21.11	Тор	wPZ21	8/13/2021	10:20 AM	WHY8270	NA	1758	WHY8271	70	71	1	46	24	55	16	-8
21.12	Тор	wPZ21	8/13/2021	10:31 AM	WHY952	NA	1442	WHY838	108	109	1	71	37	58	51	14
22.1	High	wPZ22	8/13/2021	10:59 AM	WHY5068	WHY5116	3516	WHY8361	49	52	3	41	8	43	8	0
22.2	High	wPZ36	8/13/2021	11:31 AM	WHY6479	NA	1299	WHY779	71	72	1	40	31	40	32	1
22.3	High	wPZ22	8/13/2021	11:48 AM	WHY5216	NA	1111	WHY5217	76	78	2	42	34	42	37	3
22.4	High	wPZ22	8/18/2021	9:59 AM	WHY5285	NA	1400	WHY59281	130	132	2	50	80	40	93	13
22.5	High	wPZ22	8/13/2021	1:03 PM	WHY5165	NA	1790	WHY5164	70	74	4	41	29	48	26	-3

Test #	Pressure Zone	Zone ID	Date of Test	Time of Test	Flow Hydrant 1 ID	Flow Hydrant 2 ID	Total Flow (gpm)	Static Hydrant ID	Field Static Pressure (psi)	Model Static Pressure (psi)	Static Pressure Difference (psi)	Field Residual Pressure (psi)	Field Residual Drop (psi)	Model Residual Pressure (psi)	Model Residual Drop (psi)	Residual Drop Difference (psi)
22.7	High	wPZ22	8/13/2021	1:33 PM	WHY4624	NA	1231	WHY4625	81	83	2	34	47	11	72	25
23.1	Low	wPZ24	8/13/2021	2:07 PM	WHY6632	NA	2186	WHY6631	122	125	3	99	23	101	24	1
23.2	Cedar Hills	wPZ23	8/13/2021	2:23 PM	WHY6622	NA	2430	WHY6624	99	101	2	87	12	75	26	14
24.1	Low	wPZ24	8/17/2021	1:31 PM	WHY5568	WHY2801	3268	WHY2802	119	117	-2	108	11	113	4	-7
24.2	Low	wPZ24	8/17/2021	9:31 AM	WHY3209	WHY2379	1789	WHY2376	95	93	-2	68	27	39	54	27
24.3	Low	wPZ37	8/18/2021	9:03 AM	WHY6530	NA	1209	WHY6531	88	65	-23	60	28	67	-2	-30
24.4	Low	wPZ24	8/17/2021	10:14 AM	WHY6641	WHY6640	3643	WHY6638	78	77	-1	40	38	44	33	-5
24.5	Low	wPZ24	8/17/2021	11:14 AM	WHY3300	NA	750	WHY3299	58	57	-1	31	27	22	35	8
24.6	Low	wPZ24	8/5/2021	10:21 AM	WHY7460	NA	1180	WHY7461	145	141	-4	60	85	62	79	-6
24.8	Low	wPZ24	8/5/2021	1:04 AM	WHY714	NA	1383	WHY2522	91	91	0	60	31	59	32	1
24.9	Low	wPZ24	8/10/2021	7:31 AM	WHY2509	WHY128072	3468	WHY2510	71	73	2	29	42	21	52	10
24.10	Low	wPZ24	8/17/2021	1:31 PM	WHY4189	NA	2080	WHY8181	119	117	-2	108	11	113	4	-7
24.11	Low	wPZ24	8/17/2021	1:46 PM	WHY121270	WHY4558	1640	WHY4564	58	59	1	20	38	17	41	3
24.12	Low	wPZ24	8/5/2021	11:15 AM	WHY6923	NA	1706	WHY7661	143	145	2	110	33	125	20	-13
24.13	Low	wPZ24	8/17/2021	2:20 PM	WHY4229	WHY56071	2744	WHY8220	70	71	1	32	38	35	36	-2
24.14	Low	wPZ24	8/5/2021	9:01 AM	WHY5451	NA	1743	WHY5453	80	83	3	75	5	78	5	0
24.15	Low	wPZ24	8/17/2021	2:57 PM	WHY351	WHY6636	5143	WHY6635	90	91	1	81	9	87	4	-5
24.16	Low	wPZ24	8/5/2021	8:45 AM	WHY6418	NA	1229	WHY6417	66	70	4	38	28	48	22	-6
24.17	Low	wPZ24	8/5/2021	9:55 AM	WHY7852	WHY4110	3848	WHY4109	82	88	6	66	16	68	20	4

\*Value from flow retest data collection. For test 16.2, the original test showed a low static calibration KPI and a high residual calibration KPI, but the retest showed the opposite. The original test is shown. Bolded cells indicate values outside of KPI criteria

































































































































































#### **Diurnal Patterns: North Hill & Northwest Terrace** 5 Ratio of Average Daily Demand 4.5 4 3.5 3 2.5 2 1.5 1 0.5 0 2 1 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 Hour Summer Winter














## Appendix C – Diurnal Pattern Demands



### Appendix C – Diurnal Pattern Demands

# Appendix D—Pump Controls Summary

Levels are in feet.

#### WINTER CONTROLS

Pressure Zone	Facility	Control Tank	Winter On Level	Winter Off Level	Setting
	WPU100_CEDAR_RD_1-3		13.5	18.6	1
Cedar Hills	WPU98_CEDAR_RD_1-3	WNS2_CEDAR_HILLS	12.0	19.6	1
	WPU99_CEDAR_RD_1-3		13.4	18.6	0.95
	WPU84_EAGLE_RIDGE_1-3		12.7	19.1	1
Eagle Pidge	WPU85_EAGLE_RIDGE_1-3		12.7	19.2	1
Lagie Riuge	WPU86_EAGLE_RIDGE_1-3	WINS33_EAGLE_RIDGE	12.7	19.2	1
	WPU87_EAGLE_RIDGE_4		12.9	19.2	1
Engle Pidge 2	WPU101_EAGLE_RIDGE2_1&2	WINEST EACLE PIDGE II	95.5	110.5	1
Eagle Ridge 2	WPU102_EAGLE_RIDGE2_1&2	WINSSI_EAGLE_RIDGE_II	104.4	123.0	1
	WPU1712_FIVE_MILE_4	WNS4_STRONG_RD	103.1	121.8	1
	WPU67_FIVE_MILE_2		103.0	121.8	1
	WPU68_FIVE_MILE_1		104.9	121.8	1
	WPU69_FIVE_MILE_3		101.9	119.7	1
Eivo Milo &	FIVEMILEPUMP_1 <sup>1</sup>		113.2	122.7	1
Indian Hills	FIVEMILEPUMP_2 <sup>1</sup>		110.7	119.7	1
Indian mis	FIVEMILEPUMP_3 <sup>1</sup>		None	None	1
	FIVEMILEPUMP_4 <sup>1</sup>		112.2	121.7	1
	FIVEMILEPUMP_5 <sup>1</sup>		None	None	1
	INDIANHILLS_ALTIMET	WNS9_INDIAN_HILLS	17.3	17.8	Flow Step Increments
	WPU94_GLENNAIRE_1-3		18.5	26.1	1
Glappaire	WPU95_GLENNAIRE_1-3	WINS25 GLENNAIRE 2	17.5	26.1	1
Glefinalie	WPU96_GLENNAIRE_1-3	WINSZS_GLEININAIRE_Z	19.5	27.1	1
	WPU97_GLENNAIRE_4		16.5	26.1	1

Pressure Zone	Facility	Control Tank	Winter On Level	Winter Off Level	Setting
	WPU103_14TH_GRAND_1&2		24.7	32.4	0.97
	WPU104_14TH_GRAND_1&2	WINS18_LAWIONTE	20.8	30.6	1
11:-1-	WPU2507_LINCOLN_H_2014_ 5		53.0	70.1	1
	WPU2508_LINCOLN_H_2014_ 4		52.0	69.1	1
T light	WPU2509_LINCOLN_H_2014_ 3	WNS3_GARDEN_PARK	53.0	70.1	1
	WPU2510_LINCOLN_H_2014_ 2		58.0	67.1	1
	WPU2511_LINCOLN_H_2014_ 1		55.0	71.1	1
	WPU60_SUNSET_2	WNS19_HIGHLAND	86.3	106.9	1
	WPU61_SUNSET_2		88.3	106.9	1
Highland	WPU62_SUNSET_3		87.3	106.9	1
Inginana	WPU79_MILTON_2		91.3	106.9	1
	WPU80_MILTON_3		93.3	106.9	1
	WPU81_MILTON_1		95.3	106.9	1
	WPU23_RAY_1&2		12.0	26.0	1
	WPU24_RAY_1&2		12.0	29.1	1
	WPU25_RAY_3	WNS27_LINCOLN_HEIGHTS_	10.0	21.0	1
	WPU50_WELL_ELECTRIC_11	1	13.0	15.0	1
Intermediate	WPU54_PARKWATER_2 <sup>1</sup>		8.0	16.1	1
	WPU55_PARKWATER_1 <sup>1</sup>		18.8	22.5	0.98
	WPU18_BISHOP_CT_1&2		54.1	73.4	1
	WPU19_BISHOP_CT_1&2	WNS34_14TH&GRAND	54.1	73.4	1
	WPU64_9TH_PINE_1		54.1	73.4	1
	WPU73_KEMPE_1		81.9	121.9	1
Kempe	WPU74_KEMPE_2	WNS35_KEMPE_TANK	71.9	121.9	1
	WPU75_KEMPE_3		79.9	120.9	1

Pressure Zone	Facility	Control Tank	Winter On Level	Winter Off Level	Setting
	WPU48_WELL_ELECTRIC_3	WNS11_9TH&PINE	6.2	16.2	1
	WPU26_PARKWATER_3-8		7.0	16.0	0.97
	WPU27_PARKWATER_3-8		9.0	14.5	0.97
	WPU28_PARKWATER_3-8		16.1	16.1	1
	WPU29_PARKWATER_3-8		8.0	12.0	1
Low	WPU36_NEVADA_2&3 <sup>2</sup>		8.0	16.0	1
LOW	WPU37_NEVADA_2&3	VVINSIZ_ROCKVVOOD_VISTA	7.0	16.0	1
	WPU38_NEVADA_1&4		8.0	15.0	1
	WPU52_PARKWATER_3-8 <sup>1,</sup>		4.0	6.0	0.97
	WPU53_PARKWATER_3-8		7.0	14.0	1
	WPU6_NEVADA_1&4		5.0	16.1	1
	WPU76_LATAH3 <sup>2</sup>	NA, Setting Controlled.	NA	NA	NA
	WPU17_BELT_ST_3&4		46.1	57.1	0.94
Midbank	WPU32_BELT_ST_3&4	MINISOO MAIDRANIK	48.1	59.0	0.94
IVIIUDAIIK	WPU33_BELT_ST_1&2	VVINSZU_IVIIDBAINK	47.1	58.1	1
	WPU34_BELT_ST_1&2		45.1	56.1	1
	WPU43_CENTRAL_AVE_1_NE W		8.0	17.3	0.99
	WPU45_CENTRAL2_3&4	-	12.8	23.6	1.98
	WPU49_WELL_ELECTRIC_2		9.8	27.6	0.985
North Hill	WPU51_WELL_ELECTRIC_4	VVINS14_FIVE_IVIILE	9.8	27.6	1
	WPU72_HOFFMAN_1		10.3	28.0	1
	WPU77_GRACE_1&2		21.3	28.0	1
	WPU78_GRACE_1&2		9.0	25.0	1
Shawnaa	WPU58_SHAWNEE_1&2		4.1	12.3	0.96
Shawnee	WPU59_SHAWNEE_1&2	VVINSZZ_SHAVVINEE_I	4.0	11.5	0.96

Pressure Zone	Facility	Control Tank	Winter On	Winter Off	Setting
	WPU12 THORPE 1		110.4	121.9	1
	WPU13_THORPE_2		106.4	118.4	1
	WPU14_THORPE_3		112.2	123.2	1
SIA	WPU15_THORPE_4	WNS17_SIA_2	107.5	119.4	1
	WPU1709_WEST_DRIVE_3&4		110.5	122.3	1
	WPU1710_WEST_DRIVE_3&4		108.5	121.2	1
	WPU1711_WEST_DRIVE_5		105.5	120.2	1
	WPU90_SOUTHVIEW_2		7.6	27.4	0.98
Southview	WPU91_SOUTHVIEW_4	WNS24_SOUTHVIEW	7.6	27.4	1
Southview	WPU92_SOUTHVIEW_3		8.6	26.6	0.98
	WPU93_SOUTHVIEW_1		7.6	27.4	1
	WPU22_35TH_RAY_2	WNS26_BROWNE_PARK_2	23.8	26.0	1
	WPU30_DIVISION_MANITO_1&2		20.0	28.5	0.96
	WPU31_DIVISION_MANITO_1&2		21.0	28.5	0.96
Top	WPU3327_GARDEN_PARK_2014_1		19.5	27.0	1
iop	WPU3328_GARDEN_PARK_2014_2		19.5	28.0	1
	WPU3329_GARDEN_PARK_2014_3		18.5	27.0	1
	WPU56_35TH_RAY_1&3		19.3	21.7	0.93
	WPU57_35TH_RAY_1&3		24.3	29.5	0.93
	WPU1707_SPOTTED_3&4		19.8	39.8	0.96
Most Plains	WPU1708_SPOTTED_3&4		39.8	52.9	0.96
west Plains	WPU65_SPOTTED_1&2	WIN352_WALLEN_HILL	31.8	52.8	1
	WPU66_SPOTTED_1&2		29.8	50.8	1
Woodland	WPU70_WEST_DRIVE_1&2	WINEL SUINEET	16.7	20.7	0.95
Heights	WPU71_WEST_DRIVE_1&2	VVINST_SOUSEI	12.7	19.8	0.95
Moodridge	WPU88_WOODRIDGE_1&2	WNS13_WOODRIDGE	8.1	14.6	1
woodridge	WPU89_WOODRIDGE_1&2		8.0	14.6	1

Notes:

1. Facility did not undergo an on/off cycle during calibration period, so controls were not calibrated.

2. Latah Pump was off during the winter calibration. Flows measured in SCADA reflect flow through the bypass pipe.

### SUMMER CONTROLS

Pressure Zone	Facility	Control Tank	Summer On Level	Summer Off Level	Setting
	WPU100_CEDAR_RD_1-3		13.0	18.5	1
Cedar Hills	WPU98_CEDAR_RD_1-3	WNS2_CEDAR_HILLS	12.6	18.5	1
	WPU99_CEDAR_RD_1-3		13.6	18.5	0.95
	WPU84_EAGLE_RIDGE_1-3		13.7	17.5	1
Eagle Bidge	WPU85_EAGLE_RIDGE_1-3		8.8	18.2	1
Lagie Niuge	WPU86_EAGLE_RIDGE_1-3	WIN355_EAGLE_RIDGE	14.3	19.1	1
	WPU87_EAGLE_RIDGE_4		14.3	19.1	1
Eagle Ridge 2	WPU101_EAGLE_RIDGE2_1&2	MINS21 EAGLE BIDGE II	99.2	123.7	0.68
Eagle Riuge 2	WPU102_EAGLE_RIDGE2_1&2	WINSSI_EAGLE_RIDGE_II	105.7	123.5	0.68
	WPU1712_FIVE_MILE_4		100.3	116.8	1
	WPU67_FIVE_MILE_2		103.5	116.8	1
	WPU68_FIVE_MILE_1	WNS4_STRONG_RD	100.3	116.8	1
	WPU69_FIVE_MILE_3		104.9	121.5	1
Five Mile &	FIVEMILEPUMP_1 <sup>1</sup>		100.7	117.7	1
Indian Hills	FIVEMILEPUMP_2 <sup>1</sup>		101.7	118.7	1
	FIVEMILEPUMP_3 <sup>1</sup>		103.5	121.6	1
	FIVEMILEPUMP_4 <sup>1</sup>		101.7	121.6	1
	FIVEMILEPUMP_5 <sup>1</sup>		104.7	121.7	1
	INDIANHILLS_ALTIMET	WNS9_INDIAN_HILLS	17.6	19.2	83
	WPU94_GLENNAIRE_1-3		18.1	24.9	1
Clannaira	WPU95_GLENNAIRE_1-3	WINS2E CLENNAIDE 2	21.8	27.5	1
Glermane	WPU96_GLENNAIRE_1-3	WINSZS_GLEININAIRE_Z	19.1	26.3	1
	WPU97_GLENNAIRE_4		16.9	27.6	1
	WPU103_14TH_GRAND_1&2		18.5	32.3	0.97
	WPU104_14TH_GRAND_1&2	WINSTO_LAWIONTE	11.3	31.6	1
	WPU2507_LINCOLN_H_2014_5		53.1	63.1	1
High	WPU2508_LINCOLN_H_2014_4		54.1	64.1	1
	WPU2509_LINCOLN_H_2014_3	WNS3_GARDEN_PARK	55.1	65.1	1
	WPU2510_LINCOLN_H_2014_2		58.1	57.1	1
	WPU2511_LINCOLN_H_2014_1		57.1	66.1	1

Pressure Zone	Facility	Control Tank	Summer On Level	Summer Off Level	Setting
	WPU60_SUNSET_2		86.3	107.0	1
	WPU61_SUNSET_2		88.3	107.0	1
Highland	WPU62_SUNSET_3		87.3	107.0	1
Ingilialiu	WPU79_MILTON_2	WINSI9_HIGHLAND	95.3	106.9	0.99
	WPU80_MILTON_3		89.3	99.3	0.99
	WPU81_MILTON_1		91.3	101.3	0.99
	WPU23_RAY_1&2		10.4	30.0	1
	WPU24_RAY_1&2		10.4	29.8	1
	WPU25_RAY_3		10.4	29.8	1
	WPU50_WELL_ELECTRIC_1 <sup>1</sup>		10.4	29.8	1
Intermediate	WPU54_PARKWATER_2 <sup>1</sup>		8.0	16.1	1
	WPU55_PARKWATER_1 <sup>1</sup>		10.4	29.8	1
	WPU18_BISHOP_CT_1&2		55.6	74.5	1
	WPU19_BISHOP_CT_1&2	WNS34_14TH&GRAND	55.6	74.5	1
	WPU64_9TH_PINE_1 <sup>1</sup>		65.0	71.8	0.95
	WPU73_KEMPE_1		91.6	126.4	0.98
Kempe	WPU74_KEMPE_2	WNS35_KEMPE_TANK	90.6	126.4	0.98
	WPU75_KEMPE_3		89.6	122.6	0.98
	WPU48_WELL_ELECTRIC_3	WNS11_9TH&PINE	5.4	16.1	1
	WPU26_PARKWATER_3-8		12.0	16.0	1
	WPU27_PARKWATER_3-8	_	12.0	15.0	0.97
	WPU28_PARKWATER_3-8		8.0	10.0	1
	WPU29_PARKWATER_3-8	_	13.9	15.9	0.94
	WPU36_NEVADA_2&3		15.0	16.0	1
LUW	WPU37_NEVADA_2&3	VINSIZ_ROCKVOOD_VISTA	60.3	68.6	1
	WPU38_NEVADA_1&4		13.2	15.0	1
	WPU52_PARKWATER_3-8 <sup>1</sup>		4.0	6.0	1
	WPU53_PARKWATER_3-8		12.0	14.8	0.96
	WPU6_NEVADA_1&4		5.0	16.1	1
	WPU76_LATAH <sup>2</sup>	NA, Setting Controlled.	NA	NA	0.3 to 0.8

Pressure Zone	Facility	Control Tank	Summer On Level	Summer Off Level	Setting
	WPU17_BELT_ST_3&4		49.2	59.3	0.94
Midbank	WPU32_BELT_ST_3&4		44.8	58.0	1
WIIUDAIIK	WPU33_BELT_ST_1&2	WINSZO_IVIIDBAINK	46.7	58.0	0.95
	WPU34_BELT_ST_1&2		46.7	58.2	0.95
	WPU43_CENTRAL_AVE_1_NEW		5.5	31.5	0.99
	WPU45_CENTRAL2_3&4		5.5	28.3	0.99
	WPU49_WELL_ELECTRIC_2		5.5	30.0	0.99
North Hill	WPU51_WELL_ELECTRIC_4	WNS14_FIVE_MILE	5.5	30.0	1
	WPU72_HOFFMAN_1		5.5	31.0	0.98
	WPU77_GRACE_1&2		5.5	29.8	1
	WPU78_GRACE_1&2		4.0	28.0	1
Chaussian	WPU58_SHAWNEE_1&2		4.2	11.4	0.9
Slidwilee	WPU59_SHAWNEE_1&2	VVINSZZ_SHAVVINEE_I	5.2	12.2	0.96
	WPU12_THORPE_1		108.5	122.0	1
	WPU13_THORPE_2		109.3	120.9	1
	WPU14_THORPE_3		108.5	122.2	1
SIA	WPU15_THORPE_4	WNS17_SIA_2	113.8	121.5	0.96
	WPU1709_WEST_DRIVE_3&4		108.4	120.5	1
	WPU1710_WEST_DRIVE_3&4		109.5	121.5	1
	WPU1711_WEST_DRIVE_5		73.0	122.5	1
	WPU90_SOUTHVIEW_2		17.6	37.7	0.97
Southview	WPU91_SOUTHVIEW_4		16.6	36.6	1
Southview	WPU92_SOUTHVIEW_3	VVIN524_500THVIEVV	15.6	38.6	1
	WPU93_SOUTHVIEW_1		11.6	35.6	1

Pressure Zone	Facility	Control Tank	Summer On Level	Summer Off Level	Setting
	WPU22_35TH_RAY_2		19.3	28.3	1
	WPU30_DIVISION_MANITO_1&2		21.8	31.3	0.96
	WPU31_DIVISION_MANITO_1&2		21.8	31.3	0.96
Top	WPU3327_GARDEN_PARK_2014_1		26.3	33.2	1
iop	WPU3328_GARDEN_PARK_2014_2	WINSZO_BROWINE_PARK_Z	26.2	31.3	1
	WPU3329_GARDEN_PARK_2014_3		28.6	32.8	1
	WPU56_35TH_RAY_1&3		22.3	31.3	0.93
	WPU57_35TH_RAY_1&3		20.8	30.3	0.93
	WPU1707_SPOTTED_3&4		47.2	51.9	0.96
Most Plains	WPU1708_SPOTTED_3&4		19.8	52.8	0.96
VVESt FIdilis	WPU65_SPOTTED_1&2	WINSSZ_WALLEN_HILL	31.8	52.8	1
	WPU66_SPOTTED_1&2		29.8	52.8	1
Woodland Hoights	WPU70_WEST_DRIVE_1&2	WINEL SUNCET	14.8	20.7	0.95
	WPU71_WEST_DRIVE_1&2	WINST_SOUSEI	16.8	20.6	0.95
Moodridge	WPU88_WOODRIDGE_1&2		8.2	19.0	1
vvoodridge	WPU89_WOODRIDGE_1&2	WINSTS_WOODRIDGE	9.7	19.6	1

Note:

1. Facility did not undergo an on/off cycle during calibration period, so controls were not calibrated.

2. Latah Pump is controlled by a setting to mimic VSP controls set by operators.

Appendix E: Winter EPS Calibration Graphs





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#### Five Mile and Indian Hills



#### Glennaire

























Low

Legen	d		WNS11_9TH&PINE Model Tank		WNS30_QUALCHAN Model Tank
	WNS12_ROCKWOOD_VISTA Model Tank		WNS8_SHADLE_PARK Model Tank		WNS6_THORPE_RD Model Tank
	WNS16_WEST_DRIVE Model Tank		9th&Pine_LEVEL_Ft SCADA Tank	-	Qualchan_LEVEL_Ft SCADA Tank
	Rockwood_LEVEL_Ft SCADA Tank		Shadle_LEVEL_Ft SCADA Tank	_	Thorpe_LEVEL_Ft SCADA Tank
	WestDrive_LEVEL_Ft SCADA Tank		Nevada Well 3 Model Combined Flow	_	Nevada_PMP3_FLOW_GPM SCADA Pump
	Nevada Well 1 Model Combined Flow		Nevada_PMP1_FLOW_GPM SCADA Pump		Nevada Well 2 Model Combined Flow
	NevadaPMP2_FLOW_GPM SCADA Pump		Nevada Well 4 Model Combined Flow	_	NevadaPMP4_FLOW_GPM SCADA Pump
	Parkwater Well 4 Model Combined Flow	_	Parkwater_PMP4_FLOW_GPM SCADA Pump		Parkwater Well 3 Model Combined Flow
	Parkwater_PMP3_FLOW_GPM SCADA Pump		Parkwater Well 5 Model Combined Flow		Parkwater_PMP5_FLOW_GPM SCADA Pump
	Parkwater Well 6 Model Combined Flow		Parkwater_PMP6_FLOW_GPM SCADA Pump		Parkwater Well 8 Model Combined Flow
	Parkwater_PMP7_FLOW_GPM SCADA Pump		Parkwater Well 7 Model Combined Flow	_	Parkwater_PMP8_FLOW_GPM SCADA Pump
	Well Electric 3		WE_PMP3_FLOW_GPM		





#### North Hill and NW Terrace



#### Shawnee





SIA





Note: A complete tank fill/drain cycle was not completed by this tank since the tank was draining for the duration of the calibration period.



Тор







#### Woodland Heights





Note: A complete tank fill/drain cycle was not completed by this tank since the tank was draining for the duration of the calibration period.

Appendix E: Summer EPS Calibration Graphs












# Five Mile and Indian Hills



# Glennaire







# Highland



## Intermediate









Low

Legend			WNS11_9TH&PINE Model Tank		WNS30_QUALCHAN Model Tank
WNS Mod	12_ROCKWOOD_VISTA		WNS8_SHADLE_PARK Model Tank	•••••	WNS6_THORPE_RD Model Tank
WNS Mod	16_WEST_DRIVE	_	9th&Pine_LEVEL_Ft SCADA Tank	-	Qualchan_LEVEL_Ft SCADA Tank
Rock	wood_LEVEL_Ft DA Tank	-	Shadle_LEVEL_Ft SCADA Tank		Thorpe_LEVEL_Ft SCADA Tank
West SCA	Drive_LEVEL_Ft DA Tank		Nevada Well 3 Model Combined Flow		Nevada_PMP3_FLOW_GPM SCADA Pump
Neva Mod	da Well 1 Iel Combined Flow		Nevada_PMP1_FLOW_GPM SCADA Pump		Nevada Well 2 Model Combined Flow
Neva SCA	daPMP2_FLOW_GPM DA Pump		Nevada Well 4 Model Combined Flow		NevadaPMP4_FLOW_GPM SCADA Pump
Parky Mod	vater Well 4 lel Combined Flow	_	Parkwater_PMP4_FLOW_GPM SCADA Pump		Parkwater Well 3 Model Combined Flow
Parky SCA	vater_PMP3_FLOW_GPM DA Pump		Parkwater Well 5 Model Combined Flow		Parkwater_PMP5_FLOW_GPM SCADA Pump
Parky Mod	vater Well 6 lel Combined Flow		Parkwater_PMP6_FLOW_GPM SCADA Pump		Parkwater Well 8 Model Combined Flow
Parky SCA	vater_PMP7_FLOW_GPM DA Pump		Parkwater Well 7 Model Combined Flow		Parkwater_PMP8_FLOW_GPM SCADA Pump
Well	Electric 3		WE_PMP3_FLOW_GPM		









## North Hill and NW Terrace









SIA







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# 3.7 Model Capacity Analysis Report - Draft

#### Appendix \_\_\_\_

#### Model Analysis Review

The City's water system was created in InfoWater, a modeling software program from the Innovyze Inc., a subsidiary of the AutoDesk Company. Water system GIS data was imported into the model along with pump curves and controls, storage data, demands, aquifer levels, and more. The model was calibrated referencing different operating seasons to confirm the components of the model were correctly represented. Critical scenarios, built from the calibration model, were then reviewed for the systems physical capacity to serve water while meeting minimum pressures during peak or minimal seasonal usages for now and into the future.

#### Data Collection

Utility billing records, GIS data, water operational records, and SCADA data were collected reviewed and analyzed before incorporating the data into the water model. Billing records from 2015 to 2021 were reviewed for existing system demand estimates. 2020 was selected based on the most representative year. Pumping records were also reviewed from 2015 to 2021 but 2018 through 2020 was selected based on available full data sets, recent surge in growth, weather conditions, and higher peak usages but does not include the most extreme years of 2015 or 2021. The 2018 through 2020 was also the set of demand data used to create the ERU values for each pressure zone.

The Water Department continuously updates GIS data as field changes or new development occurs. Valves, fittings, hydrants, storages, pumps, PRVs, transmission and distribution mains, etc. were components added to the water model. Physical descriptions are added to the GIS data such as pipe diameter, valve type, valve position, type of material, length, etc. These GIS components were allocated to the respective model components of reservoirs, pumps, tanks, pipes, valves and junctions identified as simple valves, fittings, caps, ect. Tools in the water modeling software were used to refine the GIS data by reviewing the hydraulic interconnection or connectivity. The InfoWater software tools found disconnections, duplicate data entries, connected cross pipes, orphaned junctions or pipes, etc.

Elevations and roughness coefficients are not included as a part of the GIS data set. All GIS point data imported into the model required an elevation reference. 2017 LIDAR data was used to reference an elevation at the point's location. It was assumed that all water system components except for tanks and pumps are buried 5 ft below LIDAR ground elevation. Record drawings for tanks and pumps were referenced for facility layout and elevation. The roughness coefficients for the pipe network were selected based on pipe material type and are identified as shown in the table below:

GIS Material Types	C Factor
Asbestos Concrete	115
Cast Iron	110
Ductile Iron	125
Galvanized Pipe	110
High Density Polyethylene	135

Kalamain	110
Polyvinyl Chloride	135
Riveted Steel	110
Steel	130
Unknown	120

Water production reports, pump log-books, monthly PRV pressure readings, operational control decision documents, 2017 pump station condition assessments which included the original and updated pump curves, max day pumpage records and SCADA data readings were all collected for setting input into the water model. SCADA data and other operational log sources were cross referenced to confirm operational control rules. The operation controls are often modified on a regular basis by Upriver Dam Operators and seasonal "normal" operational settings are updated every year. PRVs or altitude valve settings are updated monthly. 2020 Operational tank ranges can be reviewed in \_\_\_\_\_\_ or appendix\_\_\_\_\_\_. The PRV and altitude valves pressure settings can be reviewed in the Water Model Calibration Memo (Murraysmith 2021) in Appendix\_\_\_\_\_\_. SCADA data was reviewed to find the least human modification to the pump controls to select "typical operational trend periods." July 22-23, 2020 was the selected calibration period used for the summer EPS scenario and February 10-11, 2021 was used for the winter scenario.

#### Model Development and Calibration

Monthly billing records for 2020 were collected and averaged for each meter on an annual basis. The average 2020 billing data was geolocated based on meter address location. The average billing data associated to a geolocated meter were allocated nearest the closest junction on a distribution pipe. This included intertie 2020 billing data. The 2020 average pumping records by pressure zone groups was compared average water billing demand to capture unmetered water use (such as system leakage or water used for flushing). The difference between the pumped quantities and billing was calculated for each pressure zone group. The difference was distributed evenly across each pressure zone's demand nodes. This established a base demand loading representative of an "average year" for the calibration effort. The table below shows the production demands allocated to each pressure zone in the model. This work is further detailed in the Water Model Calibration Memo (Murraysmith 2021) in Appendix\_\_\_\_.

These demands were used to create a steady state scenario in the model. The steady state scenario is used to compare system field conditions to the model simulated conditions for a single condition period of time. The field data and the model results are compared to review the accuracy of the model. Field static and residual pressure measurement data was collected at 98 hydrants spread throughout the City's system. SCADA system boundary conditions during the testing, such as tank levels, system demands, and pump status and flow are also collected and compared to the model simulations. The absolute difference between the results is compared and evaluated using the Key Performance Indicators (KPIs) as detailed in the Water Model Calibration Memo (Murraysmith 2021) in Appendix

The results of the KPIs were improved by adjusting PRV settings, adding network updates or developed areas such as missing pipe interconnection, pump efficiency settings were reduced while referencing 2017 pump station condition assessment analysis and adjusting pipe roughness of 6-inch cast iron distribution mains. The KPIs compared the static pressures, residual pressures and pump flow error. The system wide KPI results are as shown in the table below:

Stea	ady Stat	e	
			Results
Systen	n Wide	KPIs	
static	root	mean	15 nsi
squared e	error		4.5 psi
residual	root	mean	9 7 pci
squared e	error		0.7 µsi
Average	Pump	Flow	20/
Differenc	e		5%

The refined and calibrated steady state model scenario data sets were used to generate an extended period simulation (EPS) scenario for winter and summer. The calibration process developed new diurnal demand patterns for summer and winter. The demand pattern multipliers were developed from hourly SCADA data for each pressure zone and were applied to the average total demand set. Pump and PRV controls were modified to represent the summer and winter calibration period selected.

The results of the Summer and Winter Scenario KPIs were improved by adjusting diurnal patterns, facility configurations, pump and valve controls, and reducing pump efficiency settings while referencing 2017 pump station condition assessment analysis. The KPIs compared the tank level or volume difference, tank fill and drain cycles and pump flow error. The resultant KPIs are included in the table below:

	24 Hour Winter	24 Hour Summer	
System Wide KPI	Simulation Period	Simulation Period	
	Results	Results	
Tank Volume Difference	1.9%	4.7%	
Tank Cycle Time Difference	0%	0.1%	
Pumped Volume Difference	0.2%	6.2%	

#### Developing Demands for Capacity Analysis Scenarios

The average model demand scenario created was used to develop MDD, PHD and Winter scenarios with or without fire flow demands. Demands were increased or decreased by multiplying each allocated demand by the calculated ERU ADD, MDD and Winter multipliers per pressure zone (see Appendix \_\_\_\_\_\_ for ERU values). PHD demands per pressure zone were calculated based on WSDOH DM June 2019 Table 3-1 calculation methodology. The calculated system wide winter and MDD values which included intertie demands were compared to actual pumped data from the average pumping logs of 2018 through 2020 and 2021 pumping logs. The 2021 pumping log data (trapline daily data) was the only pumping data that represented a true system wide MDD value because this was the first year that actual daily data was recorded. Where the 2018 through 2020 pump data was recorded every other day or every third day, making it difficult to extract a "true" max demand within a system with oscillating pumping peaks and multiple pressure zones within multiple days. Also, the year 2021 was designated a drought year for Washington State but not as extreme of a drought as 2015.

Using the above-mentioned method of applying multipliers directly to the individual demands over predicted the system wide MDD value by about 17%. The calculated MDD demands were reduced by an overall ratio by matching the 2021 MDD pumped per pressure zone. The summed MDD system wide demand is now no larger than the system wide total pumping MDD experienced in 2021 or in the estimated values of 2018 and 2020. The calculated Winter demand was reviewed and compared but the ERU multiplier calculation only slightly overpredicted the system wide winter demands. The overall winter and peaking demands were applied to each respective model scenario for the model capacity analysis. Demands were adjusted during the calibration process and additional separate sub-calculations that can cause differences in the summed per pressure zone demand from the ERU demand calculations. Demands used for modeling analysis are listed in the table below:

Zone Group	Total Model Allocated Demand based on 2018- 2020 Average Production	MDD	PHD	Winter
	(gpm)	(gpm)	(gpm)	(gpm)
Cedar Hills	75	239	571	20
Eagle Ridge	<mark>165</mark>	616	1,291	43
Eagle Ridge 2	320	1,050	1,947	84
Five Mile & Indian Hills	<mark>923</mark>	3,080	5,448	223
Glennaire	222	832	1,699	54
High	2,902	7,547	12,258	1,022
Highland	373	812	1,505	107
Intermediate	2,467	6,213	10,102	871
Kempe	<mark>391</mark>	1,324	2,251	91
Low & 1/2 Northwest 15,912 Terrace 15,912		32,068	49,981	5,336

**Commented [DM2R1]:** Yes. And explained why it is different. It is ok to be different, but we need a rationale

Midbank	bank 220		1,641	55
North Hill & 1/2 Northwest Terrace	<mark>11,108</mark>	31,748	50,652	3,798
Shawnee	80	218	549	20
SIA	1,732	3,637	5,969	548
Southview	21	86	276	5
Top and Hatch Road	5,582	14,546	23,844	1,378
West Plains	1,524	3,754	6,193	479
Woodland Heights	175	748	1,674	47
Woodridge	41	162	507	8
System-wide	44,233	109,496	178,358	14,187

**Commented [FB1]:** This data should be compared to the rest of the data in the report. It will likely be different.

#### Future Flow Demand Creation

As discussed in Chapter 2.7 and in the Spokane Future Flows – Baseline Water Demand Forecast memo (HDR-2022) attached in Appendix\_\_\_\_, only the 20-year water demand growth projections for ADD, MDD and PHD were estimated on a pressure zone basis and applied to the existing water model demands for future modeling analysis. See chapter 2.7 for 20-year growth estimates for ADD, MDD and PHD allocated to the water model on a pressure zone basis. The 20-year EPS Summer scenario was created by adding the ADD growth to the demand set on a pressure zone basis. The same pressure zone specific diurnal curves were applied to the ADD growth in addition to the existing ADD demands.

#### Scenario Creation for Existing Capacity Analysis

Winter, ADD, MDD, PHD demand steady scenarios were developed within the model for existing and future scenarios as mentioned above. The tank water levels selected were based on reported average operational ranges for that season. The Winter steady state scenarios selected the average between the max and min winter operational water levels for the selected stead state tank water level. The operational ranges for the winter and summer tank operations were averaged and selected for the ADD scenarios. The MDD scenarios tank levels selected were based on an average of the low summer operational level and the average summer operation level. The PHD scenarios tank levels selected are based on the low summer operational level. If any of the tank level were calculated below the minimum fire flow elevation, then the top of the fire flow storage was selected for the ADD, MDD, and PHD scenarios. Two fire flow sub-scenarios were created from the MDD and PHD scenario set. Tank elevations were set to the top-level of the fire flow storage for the fire flow scenarios. Pumps are activated on an as needed basis to meet demands in the upgradient pressure zone within each steady state scenario, and initially based on the steady state calibration scenario and known operational preference. For two fire flow sub-scenarios, all pumps are activated except for the largest pressure zone pump.

Winter and Summer EPS scenarios were developed from the calibrated Winter and Summer EPS scenarios. During the calibration process, some pumps were inoperable due to construction projects and/or were pulled for maintenance. The pumps that were inactive during the calibration process but were reactivated for future analysis because of completed construction projects or continued maintenance.



### Existing Modeled System Capacity

Existing ADD, MDD and PHD Scenarios Pressures:

The lowest pressures are located identified near storage tank piping or suction side of booster stations or wells. They are also identified in transmission or distribution mains that are located on the highest elevation edge or in a higher-pressure zone but feed the down gradient pressure zone. PRV's on transmission mains will also reduce pressure below the PRV feed to a lower pressure. High pressures exist within transmission mains that are in a lower gradient pressure zone that feed an upper gradient pressure zone. Northwest Terrace pressure zone is supplied by Low and North Hill pressure zones does not have SCADA data or monitoring data available. Northwest Terrace pressure zone was calibrated based on calibration adjustments that were made generally to the Low and North Hill pressure zones. Higher pressures in Northwest Terrace are likely but modeling confidence is lacking in this pressure zone. Past efforts proved that monitoring flow into Northwest Terrace is challenging but the city plans to monitor again in the future once better technology becomes available. In areas like Latah Hangman Valley or in the lower elevation areas in Five Mile Pressure zone, there haven't been complaints of high-pressure concerns and typically building structures have individual pressure reducing systems.

**Results Pressures** 

Pressures range greatly across all pressure zones. Generally, pressures range from 45 to 80 pounds per square inch. Pressure complaints are tracked and meters with higher pressures have pressure reducing valves within the property. Pressures can over 120 pounds per square inch in transmission mains and pressures below 30 pounds per square inch are typically experienced at the base of the water storage location but not typically at the service location. See Table XX below for ranges per pressure zone during the Current MDD Scenario and see Table XX below for ranges per pressure zone during the Current PHD Scenario. A few areas to note that operationally should be investigated on a regular basis regularly. Glennaire Pressure Zone for high pressures at the lower elevations of the pressure zone and lower pressures within service locations but near the storage. Also, Indian Trail Tank surrounding area can experience pressures just less than 30 pounds per square inch. Barns Road PRVs help supply this area with flow and pressure but the Indian Trail Storage should remain around 1/3 full at all times, operationally. As this North Hill/Indian Trail area develops, pressures at the higher service elevations should be validated. Other areas of high pressure are experienced are around Latah Booster station, generally in Intermediate Pressure Zone near the hospitals, Peaceful Valley area, Copper River Housing area near Spokane Falls Community College and at the lower service elevations on the south area of Highland Pressure Zone.

**Commented [DM3]:** This should be a summary or conclusion of the result for pressure. Guidebook only refers to distribution, but could included transmission mains.

Pressure 2	Zone I	Ranges	for	MDD	at	Serv	ice	Locat	ions

Pressure Zone	Highest Pressure in Distribution (psi)	Lowest Pressure in Distribution (psi)
Cedar Hills	133	35
Eagle Ridge	159	39
Eagle Ridge 2	87	49
Five Mile	155	40
Glennaire	178	60
Hatch Road	120	30
High	141	35
Highland	211	42
Indian Hills	122	67
Intermediate	151	32
Kempe	71	41
Low	157	29
Midbank	112	52
North Hill	121	30
Northwest Terrace	118	30
Shawnee	101	53
SIA	161	41
South View	109	56
Тор	108	32
West Plains	114	35
Woodland Heights	139	83
Woodridge	116	43

Pressure Zone	Highest Pressure in Distribution (psi)	Lowest Pressure in Distribution (psi)
Cedar Hills	131	34
Eagle Ridge	152	33
Eagle Ridge 2	111	51
Five Mile	148	33
Glennaire	170	56
Hatch Road	116	30
High	132	33
Highland	202	40
Indian Hills	122	67
Intermediate	147	29
Kempe	65	35
Low	147	22
Midbank	108	47
North Hill	108	30
Northwest Terrace	116	30
Shawnee	97	52
SIA	147	35
South View	105	52
Тор	104	28
West Plains	109	33
Woodland Heights	123	57
Woodridge	114	42

Pressure Zone Ranges for PHD at Service Locations

Existing ADD, MDD and PHD Scenarios Velocities:

The ADD or MDD scenarios do now highlight major velocity concerns. High velocities (above 5 feet per second) are located near booster stations. The PHD scenario has higher velocities in transmission mains to serve demands. According to current City Design Standards, velocities can be up to 15 feet per second during fireflow conditions but does not specify acceptable velocities for PHD. AWWA standards recommend velocities to remain below 8 feet per second or provide water hammer analysis. There are only a few locations that have high velocities that are mostly located on the suction and discharge side of booster stations or in known concerning areas. The known locations of high velocities to note: feed to Indian Hills tank from Five Mile pressure zone has a high velocity, Eagle Ridge area transmission mains, 35<sup>th</sup> and Ray booster station, 14<sup>th</sup> and Grand pipes reduce in size on the suction and discharge side, and Nevada Well station pipes are undersized for pumping capacities

#### **Results-Velocities**

According to current City Design Standards, velocities can be up to 5 feet per second for MDD and 15 feet per second during fire flow conditions but does not specify acceptable velocities for PHD. AWWA standards recommend velocities to remain below 8 feet per second or provide water hammer analysis. There are only a few locations that have high velocities that are mostly located on the suction and discharge side of booster stations or in known concerning areas. The known locations of high pipe velocities to note are the feed to PRV from Low to Northwest Terrace, the transmission that feeds Indian Hill tank from Five Mile Pressure Zone, Eagle Ridge area transmission mains, Milton Booster Station and south Highland area, Latah Booster Station, 35<sup>th</sup> and Ray Booster Station, Garden Park Booster Station, shorter sections around Well Electric and Parkwater, Grace and Nevada Well station pipes are undersized for pumping capacities. Northwest Terrace PRV's were modeled in 2018-2019 and monitoring results showed that during summer periods, the PRVs could experience 12 feet per second. Selected capital projects are selected based on model results, but additionally other capital projects planned. See Figure XX for locations that should be considered for increasing pipe capacity.

#### Existing ADD, MDD and PHD Scenarios Headloss:

High head loss areas in the water system network are located mostly in 6-inch distribution mains or smaller. Downtown area also has higher headlosses due to the age and material type located in the Downtown area. Other locations are again located along the suction and discharge side of booster stations.

#### Result-- Headloss

High head loss areas in the water system network are located mostly in 6-inch distribution mains or smaller. Downtown area also has higher headlosses due to the age and material type located in the Downtown area. Additionally, much of the West Central and Emerson Garfield Neighborhoods area near Monroe Street, much of Highland and Woodland Heights, Eagle Ridge 2, Freya and Ray Street area from 18<sup>th</sup> Avenue to 37<sup>th</sup> Avenue. Headloss was not consider when selecting capital projects because often times higher headlosses are associated with high velocities in larger diameter pipes. Otherwise, many of the pipes are older or made with a "rougher" material and should be replaced with the pipe replacement program.

**Commented [DM4]:** These should be section 3.3 Design Standards

**Commented [FB5]:** Is there some sort of program to replace 6-inch pipe?
















#### Summer Extended Period Simulation Scenario

Extended simulations scenarios for Winter and Summer demands reveal whether or not the system can keep up with demands as they increase or decrease throughout the day. There are a couple of scenarios set up within the EPS Summer Scenario model run. Intertie demands are represented in the model and have a diurnal curve applied to the 2020 monitored billing intertie data. North Hill tank float valve was included in model while Thorpe tank electronic control valve was not. Eagle Ridge electronic altermiter valve at Eagle Ridge 2 tank was not included. Shawnee twin tanks were modeled as one to reduce model noise results. Kempe to Woodridge transmission main connection was not modeled because it was not constructed during calibration and this connection is expected to be used in winter seasons to reduce stagnation in the Kempe tank and only in emergency conditions.

Around hour 32 of the 48-hour simulation, the system starts to strain to keep up with demands. This is the second morning represented in the model when people are getting ready for work and irrigation systems have turned on. The tanks drain and filling cycles can be seen in the graphs in Appendix \_\_\_\_\_.





South Area Tanks Summer EPS Scenario





The filling and drainage of tanks follows the patterns that are associated with the pump controls. The maximum total system pumped flow during the simulation is 199,000 gpm at the 7th hour. The averaged total system pumped is 148,000 gpm. The lowest total system pumped flow during the simulation is 98,000 gpm at the 18th hour. The average pump runtime across the system is 38% over the 48-hour period. The pressure zones that operate more that 38% of the time are as shown in the table below:

Pressure Zone	Percent of Time that Pumps are Activated
High	42%
Intermediate	54%
Low	40%
North Hill	57%
Тор	59%
West Plains	51%

#### Minimum Pressures and Maximum Velocities

The minimum pressures and max velocities experienced during the EPS Summer Scenario are in the same locations as identified in the steady state scenarios.

## Results-Velocities

High velocities experienced int the existing EPS Summer Scenario highlight already known capacity concerns.



**Commented [FB6]:** Need to add to the capital project lists the transmission mains here showing greater than 8 ft per second velocities

### Winter Extended Period Simulation Scenario

This scenario confirms whether the system will experience stagnation. As a system wide total during the Winter scenario, the overall storages experience flow in and out of the facility, reducing the possibility for stagnation. Each individual tank also experiences flow in and out of the storages cycling water all throughout the components of the water system.



System Wide Winter Scenario Flow Stored

### Future Modeled System Capacity (20 Year Projection)

Future demand projections were added to the MDD and PHD and the EPS Summer Scenarios. The existing 2020 intertie usage remained in the water system.

Future Future MDD and PHD Scenarios Pressures:

In general, pressures reduced in general when comparing the existing and future MDD and PHD scenarios. Pressures further reduce slightly from MDD to PHD scenarios. Since pressures are based on tank elevations in the steady state elevation scenario, the pressures did not change significantly. The intertie demands were increased to agreement level for the pressure review. The majority of the pressures are due to the operational choice of tank fullness or one off location where headlosses are extremely high in a small diameter and short section main. Kempe Pressure Zone experienced lower pressures due to Vel View's intertie demands. Low Pressure Zone experienced lower pressure zone is the oldest pressure zone with a small operational head range. North Hill Pressure Zone had a few distribution mains with extremely high headlosses which resulted in lower pressures. SIA Pressure Zone experienced low pressures due to the high intertie demands. No capital projects are recommended specifically from the pressure analysis review alone but is reference to support capital infrastructure projects recommended from other sections.

Pressure 2	Zone Range	es for MDD	) at Service	Locations

Pressure Zone	Highest Pressure in Distribution (psi)	Lowest Pressure in Distribution (psi)				
Cedar Hills	134	35				
Eagle Ridge	158	39				
Eagle Ridge 2	86	49				
Five Mile	156	47				
Glennaire	178	60				
Hatch Road	120	30				
High	138	33				
Highland	197	42				
Indian Hills	122	67				
Intermediate	151	31				
Kempe	71	41				
Low	156	28				
Midbank	112	52				
North Hill	121	30				
Northwest Terrace	119	30				
Shawnee	102	53				
SIA	160	40				
South View	109	56				
Тор	117	38				
West Plains	113	35				

Woodland Heights	138	83
Woodridge	116	43

Pressure Zone Ranges for PHD at Service Locations

Pressure Zone	Highest Pressure in Distribution (psi)	Lowest Pressure in Distribution (psi)				
Cedar Hills	132	34				
Eagle Ridge	154	35				
Eagle Ridge 2	107	51				
Five Mile	146	34				
Glennaire	170	55				
Hatch Road	118	30				
High	137	32				
Highland	192	40				
Indian Hills	122	67				
Intermediate	148	29				
Kempe	36	18				
Low	150	25				
Midbank	109	48				
North Hill	109	17				
Northwest Terrace	117	30				
Shawnee	97	52				
SIA	134	23				
South View	105	52				
Тор	114	36				
West Plains	107	33				
Woodland Heights	136	84				
Woodridge	115	43				









Future MDD and PHD Scenarios Velocities:

The MDD and PHD future scenarios show an increase in velocities and expanding lengths of pipes. Critical areas to note are Lincoln, 35<sup>th</sup> and Ray, Milton booster station upgradient and down gradient transmission mains, Low and North Hill to Northwest Terrace PRV area, Northwest area of Spokane, Nevada, Parkwater, Well Electric and Grace Well transmissions, Five Mile Booster Station discharge and suction transmission expansion, Latah Inline Booster Station suction and discharge transmission main and Eagle Ridge area.

The MDD and PHD future scenarios show a slight increase in velocities. Critical areas to note are the same as in the existing scenario but they extend out. Parkwater and Well Electric and Latah Booster Station transmissions' velocities increased, significantly.





**Commented [FB7]:** North Hill valve was accidently left open in model. Marshall Road transmission need didn't come up in the model results after calibration. Wondering if Qualchan Golf course meter usage changed results but still recommend Marshall Road Also found random valve closed at the blue bridge so Division Transmission downtown shouldn't have high velocities

velocities

Future MDD and PHD Scenarios Headloss:

High head loss areas in the water system network are located mostly in 6-inch distribution mains or smaller or older cast iron pipe. In similar areas where there is high velocity is also where there is high headloss. Downtown or Milton area also has higher headlosses due to the age and material type located in those areas. Other locations are again located along the suction and discharge side of booster stations or PRV areas. The transmission main from Five Mile storage to the Indian Trail transmission main and to the furthest northwest extent of Spokane service area.

Future MDD and PHD Scenarios-Headloss:

During future conditions, head loss results did increase the areas affected from the current conditions. The quantity of higher head loss pipes increased. High head loss areas in the water system network are located mostly in 6-inch distribution mains or smaller or older cast iron pipe. In similar areas where there is high velocity is also where there is high headloss. Downtown, Midwest Spokane neighborhoods or Milton area also has higher headlosses due to the age and material type located in those areas. Other locations are again located along the suction and discharge side of booster stations or PRV areas. The transmission main from Five Mile storage to the Indian Trail transmission main and to the furthest northwest extent of Spokane service area. The capital program to replace water main pipes will slowly address this issue.

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**Commented [FB8]:** Is there some sort of program to replace 6-inch pipe?





#### **Future Flow EPS Scenario**

I

Extended simulations scenarios for future summer demands reveal whether or notwhether the system can keep up with summer demands as they increase or decrease throughout the future condition summer day. There are a couple of scenarios set up within the EPS Summer Scenario model run. Intertie agreement level demands are represented in the model and have a diurnal curve applied to the 2020 monitored billing intertie data. North Hill tank float valve was included in model while Thorpe tank electronic control valve was not. Eagle Ridge electronic altiermeiter valve at Eagle Ridge 2 tank was not included. Shawnee twin tanks were modeled as one to reduce model noise results. Kempe to Woodridge transmission main connection was opened because Woodridge would drain completely otherwise. There is also some modeling instability with the future demands and no additional 6-year capital program infrastructure implemented. The model results further validated that an SIA #3 tank is required because tank levels empty. The model results further validate that West Plains Pressure Zone requires additional storage as well as pumping and Woodridge maintains fullness only due to the Kempt to Woodridge interconnection. The model further validates the need for the improvements needed in the Northwest area of Spokane per the Northwest Capacity Analysis Memo Attached in Appendix XX.





Future Summer EPS Scenario Minimum Pressures and Maximum Velocities

The minimum pressures and max velocities experienced during the Existing EPS Summer Scenario are in the same locations as identified in the steady state scenarios. Interties were set to agreement levels. Five Mile Booster station increased pumping and velocities increase to keep supply of Indian Hills tank and to supply the upgradient pressure zones. Additionally, Central Well Station was activated to support the additional draw from Five Mile. Northwest Terrace and both the PRV area transmission mains within Low and North Hill Pressure Zones conditions worsen. Latah Booster Station transmission condition worsens on both the suction and discharge transmission mains. The transmissions between Lincoln Booster Station

and 35<sup>th</sup> and Ray and Garden Park also worsen. Eagle Ridge Booster station transmission mains worsen as well.

#### Future Fireflow Scenarios:

An extreme fire\_flow scenario was created in the model where 59 hydrants were activated with selected fire\_flow rates based on critical buildings throughout all pressure zones. These 59 hydrants are all activated during the scenario. The model scenario created had future 20-year flow demands without the planned 6-year capital projects and tank water levels were all set to the top of the fire flow storage and the booster station pumps were all activated except for the largest pump. These hydrants all simultaneously operate during the fire\_flow scenario. Hydrant fire\_flow rate was selected based on the type of structure that the hydrants were nearby and the required fire\_flow rate for the entire pressure zone. These fireflowfire flow rates and locations are described in the table XX below. The model was tested with many of the pressure zones' summed hydrant fire flow demand rate per pressure zone was larger than the required fire\_flow rate for that pressure zone. The model was solved and the selected hydrants, tested flow, residual pressure, and actual flow available for each hydrant is shown in the Figure XX below. Not every hydrant could meet the fire flow demands required but the combination of hydrants within the looping water system network were able to meet the required demands. In the Figure XX below show the hydrant locations tested.



Table Hydrant ID and Hydrant Capacity During Fire Flow Event:

ID	Base Dema nd (gpm)	Base Pressu re (psi)	Fire Dema nd (gpm)	Combin ed Deman d (gpm)	Residu al Pressur e (psi)	Availa ble Flow (gpm)	Availa ble Pressur e (psi)	Pressure Zone	Location Descripti on
WHY662 9	_	108	1,750	1,750	97	5,307	20	Cedar Hills	Residenti al area with 12- inch distributio n
WHY664	_	81	1 750	1 750	60	2 972	20	Eagle Ridge 1	Residenti al area with 12- inch distributio
WHY644 2	-	51	1,750	1,750	32	2,415	20	Eagle Ridge 2	Cul-de- sac with dead end 8-inch
WHY732 2	_	75	1.750	1.750	68	6.221	20	Five Mile	Residenti al area with 12- inch distributio n
WHY265 4	-	60	1,750	1,750	18	1,693	20	Glennaire	Cul-de- sac with dead end 8-inch
WHY527 1		103	3 750	3 750	(726)	1 026	20	High	Cataldo Catholic School with 6- inch distributio
WHY700		105	3,750	2,750	(720)	1,020	20	High	Cataldo Catholic School with 6- inch distributio
WHY767 3	-	93	3,750	3,750	(617)	1,221	20	High	Cataldo Catholic School with 6- inch distributio n

			Total Ava	ilable Flow	per Block=	3,307			
WHY798									St. John Cathedral Epis with 8-inch distributio
4	-	108	4,000	4,000	(1,283)	1,521	20	High	n
WHY537 6	-	102	4,000	4,000	(1,525)	(431)	20	High	St. John Cathedral Epis 6- inch distributio n dead end line
									St. John
WHY715									Cathedral Epis 6- inch distributio n dead
0	-	114	4,000	4,000	(1,382)	1,088	20	High	end line
		T	Total Ava	ilable Flow	per Block=	2,178			T
									Motel & 2 large apartmen t complexe s with 12- inch
WHY803									distributio
2	-	108	6,000	6,000	(59)	5,497	20	Highland	n
									Motel & 2 large apartmen t complexe s with 12- inch
WHY803	_	100	6 000	6.000	(71)	3 170	20	Highland	distributio
4	-	100	6,000	0,000	(/1)	2,1/2	20	mgmanu	Motel & 2 large apartmen t complexe s with 8- inch
WHY803									distributio
5	-	98	6,000	6,000	(110)	1,539	20	Highland	n
		1	Total Ava	ilable Flow	per Block=	10,214			
WHY624 2	-	71	1,750	1,750	62	4,606	20	Indian Hills	Residenti al area

									with 8- inch distributio n
WHY425 2	_	107	4,000	4,000	(70)	2,640	20	Intermedi ate	Green House served with 6- inch distributio n
WHY665	_	104	4 000	4 000	84	10 572	20	Intermedi	Sacred Heart Hospital served with 12- inch transmissi on main
8	-	104	4,000	4,000	84	10,572	20	ale	Sacred Heart Hospital served with 12- inch
WHV768	_	76	4 000	4 000	27	3 455	20	Intermedi	transmissi on main
	1		Total Ava	ilable Flow	per Block=	14.028	- 20	uic	Jinnun
					ber block	14,020			Residenti
M/UVC07									al area with 10- inch
6	_	46	1 750	1 750	37	3 169	20	Kemne	n
		- 10	1,750	1,750		5,105		Kempe	Downtow n area with 12- inch distributio
WHY5	-	89	6,000	6,000	60	10,568	20	Low	n
wHY1344 28	_	79	6.000	6.000	(404)	1.865	20	Low	Havermal e High School with 6- inch
			0,000	2,200	(	2,000	20		Havermal
WHY370									School with 6-
WHY370 7	-	77	6,000	6,000	(1,747)	914	20	Low	School with 6- inch

1	1	I	I	1	I	I	I	1	School
									with 6-
									inch
			Total Ava	ulable Flow	ner Block=	3 568			
					DEI DIOCK-	3,300			Residenti
									al area
									near
WHY377									Parkwater
0	-	72	8,000	8,000	(119)	3,502	20	Low	Well
									Residenti
									al area
									near
WHY828									Parkwater
0	-	72	8,000	8,000	(65)	5,097	20	Low	Well
			Total Ava	ilable Flow	per Block=	8,599			
									Residenti
									al area
									with 8-
									inch
	27	67	4 750	4 707	65	0.000	20		distributio
WF12362	3/	67	1,750	1,787	65	8,833	20	Midbank	n Northcost
									Commorci
									al area
									with 12-
									inch
WHY303									distributio
9	-	62	6,000	6,000	16	5,654	20	North Hill	n
									Central
									Commerci
									al area
									with 12-
									inch
									distributio
WHY542	-	56	6,000	6,000	0	4,679	20	North Hill	n
									Central
									commerci
									ai area
									inch
WHY826									distributio
6	_	56	6 000	6 000	(197)	1 900	20	North Hill	n
-	1	50	Total Ava	ailable Flow	ner Block-	6 5 80			1
					DUCK-	0,500			Park area
									with 12-
									inch
WHY242									distributio
3	-	64	6,000	6,000	35	8,009	20	North Hill	n
									Residenti
									al area
WHY287									with 6-
1	-	106	3,750	3,750	25	3,875	20	North Hill	inch

									distributio
									n Desidenti
									al area
									with 12-
									inch
WHY619									distributio
6	-	65	1,750	1,750	55	3,576	20	Shawnee	n
									Commerci
									with 12-
									inch
WHY841									distributio
4	-	83	6,000	6,000	7	6,813	20	SIA	n
									Rural area
									inch
WHY797									transmissi
2	-	71	1,750	1,750	43	3,219	20	SIA	on main
									Commerci
									al area
									with 12-
WHY836								South	distributio
3	-	67	1,750	1,750	63	6,178	20	View	n
									Apartmen
									t .
									complexe
									with 12-
									inch
WHY502									distributio
7	-	52	4,000	4,000	(36)	2,077	20	Тор	n
									Apartmen
									ι complexe
									s area
									with 12-
									inch
WHY502		50	1 000	4 000	(20)	2 700	20	Terr	distributio
0	-	50	4,000	4,000	(28)	2,799	20	тор	11 Anartmen
									t
									complexe
									s area
									with 12-
									inch distributio
6	-	51	4,000	4.000	(31)	2.326	20	Τορ	n
-	1		Total Ava	ilable Flow	per Block=	7.202		P	1. *
WHY828						.,_0_			Residenti
4	-	83	1,750	1,750	50	2,555	20	Тор	al area

									with 6- inch distributio n
WHY520 8	_	53	4,000	4,000	(164)	1,275	20	Тор	Spokane Methodis t Homes with 10- inch distributio n
WHY520									Spokane Methodis t Homes with 10- inch distributio
9	-	54	4,000	4,000	(190)	808	20	Тор	n
			Total Ava	ilable Flow	per Block=	2,082			Desident
									Residenti al area with 8- inch
WHY453								West	distributio
7	-	82	6,000	6,000	(0)	4,811	20	Plains	n Desidenti
WHYAES								West	al area with 8- inch
9	-	83	6.000	6.000	(3)	4.631	20	Plains	n
-			Total Ava	ilable Flow I	ner Block=	9.442			
						5)2			Rural area with 12- inch
WHY454		87	6.000	6,000	42	8 734	20	West Plains	distributio n
WHY773	-	133	1,750	1,750	(840)	1,622	20	Woodland Heights	Residenti al area with 6- inch distributio n
-				2,	(0.0)	2,022			Residenti al area with 6- inch
WHY773						()		Woodland	distributio
2	-	129	1,750	1,750	(1,114)	(358)	20	Heights	n Recidenti
WHY773 3	-	133	1,750	1,750	(1,107)	244	20	Woodland Heights	al area with 6-

									inch distributio n
			Total Ava	per Block=	1,508				
WHY619								Woodridg	Residenti al area with 8- inch distributio
7	-	104	1,750	1,750	38	906	20	е	n

#### Additional Fireflow Review

There were additional few areas of concern that required additional investigation. There is an older hotel without sprinklers on the edge of the service area in the North Hill pressure zone on the east side of Division Street. This hotel will require a fire flow of 6,000 gpm for 4 hours. There are only two city hydrants with 600 feet and the hydrants are on the other side of the Division Street, a City's major arterial and otherwise known as Highway 395. Each hydrant will produce about 4,000 gpm at 20 psi.





Hydrant Curve for Junction WHY7365 at 00:00 hrs



The City annexed an area called Sunset Area. The existing water system does not meet the current City design requirement of 500 feet of between hydrants. The actual spacing between hydrants is over 1,000 feet. One of the hydrants within the Highland pressure zone that has a similar spacing is WHY7201 near Garden Springs and Rustle. Highland pressure zone's required maximum fireflow demand is 3,750 gpm for 3 hours. This hydrant just meets the requirement.



Hydrant Curve for Junction WHY7201 at 00:00 hrs



Another location for concern is High Drive where High pressure zone and Top are adjacent. Pressures at the south edge of High pressure zone are about 40 psi during the MDD scenario. The area is residential, but the homes can have a larger square footage. At 20 psi the hydrant is able to supply 4,000 gpm.



Hydrant Curve for Junction WHY8361 at 00:00 hrs



# 3.8 Latah Hangman Sub-Analysis

# Latah/Hangman Subarea – Utility Analysis

# Purpose

The purpose of this document is to evaluate and determine necessary future capital facilities for City of Spokane utilities (water, sewer, and stormwater) needed in order to efficiently serve full development of the Latah/Hangman Neighborhood area based on the City's Land Use Plan. The identified capital projects which are listed in this analysis were selected for minimal maintenance and efficient operation and lower life cycle costs.

Additionally, the purpose of this document is to provide direction for Developers with a possible phasing plan. The phasing plan would include a rate of development per year and identify trigger points in which Development capital investment will be required. The difficultly of identifying a rate of development is there are too many variables involved in making phased decisions. Some of those variables include funding availability either within the City or by the Developer, changes in design requirements, development growth rates and locations, climate change, and the impacts of one pressure zone to another and all pressure zones above that gradient. The greatest factor is that water capital cannot be cost effectively phased. It is financially unjustifiable to build a half-sized tank that is undersized for future conditions and then demolish it to rebuild the correct size later. There are other factors such as financially or system capacity risks. This document provides recommendations on where development can occur in conjunction with 6-year capital investments. Lastly, the understanding that infrastructure investment will come after a portion of a phased development is constructed in good faith, but the development typically stops just short of the infrastructure investment and creates a situation where the last development funds the infrastructure required and necessary.

This memo moves forward with the approach to create an overall future layout that meets the end Development goals, reduces risk, provides resiliency and needed redundancy in the water system; least cost in capital improvements required; and lowest quantity of capital infrastructure investments required for full buildout. These criteria were evaluated and developed with the understanding that this area is hydraulically complicated with characteristics specific to the area.

This document should provide Developers clear direction of the City's utility system design expectations, and indicates to Developers that they may have to create a late comers agreement or other financial agreements to support the development investment required.

# Other Resources:

During the completion of this memo, the City retained external support to identify the appropriate phasing process for the water system that would better guide developers and maintain the system integrity. This analysis is documented in the *Eagle Ridge Phasing Analysis Technical Memorandum* (HDR, Inc., 2021).

# Background

The Latah-Hangman Neighborhood is located in the southwestern portion of the City of Spokane covering approximately 5.6 square miles or 3,584 acres. The neighborhood is bisected by Highway 195. On the east side is the Hangman Conservation Area, Qualchan Golf Course, and the High Drive Park, all of which are owned and operated by the City's Park and Recreation Department. Burlington Northern
Railroad and Fish Lake Trail traverse parallel to and west of Highway 195. The entire area is within the City of Spokane's designated Retail Water Service Area.

The water system in the Latah-Hangman Neighborhood is supplied with flow from the Low Pressure zone through the 24-inch transmission main located in Inland Empire Way. In the summer during high demands, Latah Inline Booster Station pushes more flow to the Latah-Hangman areas to keep up with high demands. The Inland Empire transmission flow supplies the surrounding area in the Low Zone and fills the Qualchan Tank. The Qualchan Tank and the Low pressure zone water transmission system also support the draw for Cedar Hills and Eagle Ridge I pressure zones. The new Cedar Hills booster proposed and the Eagle Ridge I pressure zone also further supply Eagle Ridge II, the highest gradient pressure zone in the Latah/Hangman area. See Figure 5 below for theoretical schematic layout of the system.

The Latah-Hangman area as discussed herein has experienced water system inefficiencies and difficulties with its water service. Development of the area has been by individual subdivisions one at a time without any larger goal to ensure a cohesive water system design. Other factors such as State and Local Level design parameters change over the years, actual water usage has been higher than estimated and yet the City continued to accept development which overallocated the existing system. This document aims to provide a cohesive and efficient vision for water system design going into the future. For the purposes of this discussion, Hatch Pressure Zone is not discussed; while it is part of the neighborhood, it is not hydraulically connected to this area.



#### Figure 1: Latah/Hangman Neighborhood

## Abbreviations

- DOH Washington State Department of Health
- WSP City of Spokane Comprehensive Water System Plan
- ERU Equivalent Residential Units
- ADD Average Day Demand
- MDD Maximum Day Demand
- PHD Peak Hour Demand
- DSL Distribution System Loss
- ICM Integrated Capital Management Department (City of Spokane)
- WSDM Water System Design Manual
- InfoWater Innovyze Software: InfoWater Suite 12.4 Update #13
- InfoSWMM Innovyze Software: InfoSWMM 14.7 Update #4

### Assumptions

- Even though there has been some discussion about increasing density in this area, existing development will remain at the same density. An area designated as Agricultural land use, containing greenhouses appears to be fully developed and is located in the northeast portion of the neighborhood. However, it is possible for further and more dense development to occur, which will require future review, based on any proposal. Additionally, designations of Residential Retail and Mini Center are also located in this area, but these have not been fully developed. No increased water demands are anticipated at this point unless the land use type identification changes. This report will be updated as development occurs to reflect changes in density and usage.
- Buildout conditions are based on the City's 2020 Comprehensive Plan Land Use. The majority of the area is designated as Residential 4-10, with a few areas designated open space and one location designated General Commercial/Mini Center located along the Cheney-Spokane Road and State Highway 195. Areas that are not platted are assumed for purposes of this analysis to develop at 4 units per acre. Open space or conservation land is assumed for purposes of this analysis to develop at 1 unit per 4 acres.



Figure 2. Land Use Boundaries

- Existing pump capacity was based on 2016 Booster station condition assessment values and is not based on the name plate values.
- Fire flow demand requirements used in this analysis are identified in the 2016 WSP.
- Operational Storage is based on June 2018 SCADA Data control settings from the Water Department. Full Buildout Operational Storage was calculated based on existing operational volume - gallons divided by the existing ERU count and multiplied by the future buildout ERU.
- Standby storage volume has been calculated at 200 gallons per day per ERU count. This is the
  minimum value suggested by DOH in the WSDM. The standby storage volume recommended by
  DOH is MDD demands for one day. Fire flow storage volume is based on 2016 WSP flow rate per
  total hours. The larger volume of the standby and the fire flow is selected as the required
  emergency storage. The smaller volume requirement is considered "nested" per DOH WSDM.
  DOH also recommends that standby storage volume be sized. It is the City's standard
  operational practice that fire flow be met by storage rather than by pump station capacity.
- Pump stations are sized for sufficient capacity to meet peak hour demands for all pumps in operation. Pump stations which provide fire flow must be sized for fire flow plus MDD with the largest pump of the pressure zone out of service (firm capacity).

- The existing infrastructure will remain in place with operations similar to current conditions. Current deficiencies have been determined based the Innovyze models (InfoWater and InfoSWMM) and operational experience.
- Water demand Equivalent Residential Units (ERU) values used in this memo are based on metered single family home usages per pressure zone and averaged from 2018 through 2020 (See 2021 ERU Calculation – Technical Memorandum, ICM May 2021). Peak hour demands are calculated by multiplying MDD by 1.7.
- Sewer demand flows are based on the City of Spokane's Design Standards.
- Capacity calculation for the water system follows the Washington State Department of Health Water System Design Manual requirements and recommendations.
- Recommended water system capital facilities are based on analysis using InfoWater modeling information, capacity analysis, SCADA information, and operation experiences in recent years.
- Sewer capacity is based on the City of Spokane's Design Standards and the InfoSWMM model.
- Distribution System Loss (DSL) of 10 percent has been used for calculations in this area based on DOH DSL calculation recommendations.
- Pipe sizes are based on headloss less than or equal to 6 feet per 1,000 feet in distribution mains.

## Wastewater

## Sewer

The Latah/Hangman area of the city sewer flows are conveyed primarily from the south area of the zone to the north via Interceptor 11. There are several small pump stations that convey from low lying areas of the service area. Currently, there are no known interceptor conveyance issues with the sewage conveyance system that would prohibit future development.



Figure 3. Sewer Interceptor

However, there are sewer trunk systems in the area that currently experience extreme hydraulic gradient changes along hillsides. Hydraulic energy grade lines should be reviewed as development occurs to confirm locations of hydraulic jumps and their ability to plug the inlet of a sewer main.

## Stormwater

The stormwater in the Latah/Hangman Area is primarily managed locally. There are several locations where stormwater is conveyed for treatment and infiltration onto City-Park owned property or to Latah Creek. Currently there is no anticipated hindrance for future development from a stormwater perspective as future development will be required to manage stormwater locally (on-site).

## Water Pressure Zones

The Latah-Hangman Neighborhood consists of four water pressure zones: Low, Cedar Hills, Eagle Ridge, and Eagle Ridge 2. The Low Pressure Zone is the largest in the City system, both by ERU count and geographical area, but only a small portion is located within this neighborhood. Wells to supply this area are located in Low Pressure Zone and water is pumped up to the other 3 relatively small pressure zones: Cedar Hills, Eagle Ridge and Eagle Ridge 2. Eagle Ridge 2 Pressure Zone is the largest of the three currently serving 914 ERUs.



### Low Pressure Zone

The Latah/Hangman area of the Low Pressure Zone is a long narrow corridor at the southwest edge. Latah Booster Station is an in-line booster that supplies the Low Pressure Zone west of Inland Empire Way and south of Interstate 90. Transmission mains from the Latah Inline Booster Station connect to Thorpe Reservoir, Qualchan Reservoir, and the areas south of Qualchan Drive and east of the Highway 195. The area south of Thorpe Road is served from a single the 24-inch pipe.



Figure 5: Latah/Hangman Schematic

## Capacity Concerns and Planned Capital Projects for the Low Pressure Zone

The Low Pressure Zone supplies the other pressure zones in the Latah Hangman area. Analysis indicates the storage is insufficient to provide standby and fire suppression storage during and for the summer months. This area is supplied by a single 24-inch pipeline that has adequate capacity for most of the year (cooler winter months with mostly indoor water usage), but it is not large enough to keep up with the summer demands without high velocities or headloss. The resulting high headloss from increased outdoor water use during the summer reduces the lifespan of the transmission mains and pump facilities. The capital projects which are planned for this area should resolve these capacity concerns and should increase redundancy and resiliency of the system. The projects as contained in the Six Year Water Capital Program include:

- Second Storage at Thorpe Reservoir.
  - o Provides standby storage for the current ERUs in Low Pressure Zone;

- Provides a storage for high flows from Latah Inline Booster Station reducing the potential overflows;
- Provide more water accessibility in the west area of Spokane which is furthest from the well site locations;
- Marshall Road Transmission main.
  - This second transmission main in order to serve the area south of Thorpe Road will provide a redundant supply to the area;
  - Two supply lines to Qualchan would increase the flow to the tank and would increase the ability to maintain higher water elevation operating levels, and keep the tank fuller;
  - Allows Eagle Ridge Booster station to operate all pumps for longer periods of time;
  - The Marshall Road Transmission with the addition of a Thorpe Reservoir will support water flow from the Latah Booster area to the Qualchan storage.

Addition capital facilities are required for growth in this area in the Low Pressure Zone over the next 20 years.

- Additional backup pumps and emergency power at Latah Booster Station.
- Additional storage reservoir for Qualchan Reservoir is needed to provide supply for both Low Pressure Zone and for the booster pump stations to the higher elevation pressure zones.

## Cedar Hills Pressure Zone

Cedar Hills Pressure Zone is a small pressure zone which is supplied from Low Pressure Zone through the Cedar Hills Booster Facility and served by the Cedar Hills Storage. Figure 6 shows the Cedar Hills Pressure Zone area, the existing water system, and areas yet to be developed.



The two tables below show the results of the analyses. Table 1 shows the existing and future ERUs. Table 2 shows the demands calculated based on the ERUs from Table 1. The highest elevation that can be served in this pressure zone is 2135 ft.

## Table 1: Cedar Hills ERUs

Current #ERUs (2020)	#ERUs approved but not constructed	Potential undeveloped land, acres	Potential #ERU	Future ERUs (current + approved +potential)	Estimated % DSL	DSL ERUs	Total Buildout ERUs
221	83	0	0	304	10	30	334

TOTAL ERUs (with DSL)	ERU <sub>ADD</sub> , gal/unit	ADD, gpm	ADD, gallons/ day	ERUMDD, gal/unit	MDD, gpm	MDD, gallons/ day	PHD, gpm	PHD, gallons/ day
334	443	110	148,140	1,906	450	637,370	770	1,083,530

#### **Table 2: Cedar Hills Future Conditions Demands**

The existing storage and booster station capacity in the Cedar Hill Pressure Zone are sufficient to supply ADD and MDD. However, additional capacity is needed to maintain fire flow and for operational storage. Fire flow needs could be met by adding an electric control valve to connect to Eagle Ridge 2 Pressure Zone (see table 9 for capacity of Eagle Ridge 2 Pressure Zone). Table 3 shows the required capacity needed to be met by both storage and pumping, but only one is necessary. The DOH Recommended Standby storage calculation is a volume calculation that is equal to the MDD for one day as recommended by DOH; however, when this value cannot be accommodated then minimum requirements can be met via a combination of storage and pumping. The current Six Year Water Capital Program includes a Fire Flow Improvement Study to determine the most cost-effective way to provide adequate capacity.

This analysis does not include the proposed Cedar Tangle Booster Station. The Cedar Tangle Booster Station has not been constructed yet. This booster station is expected to pump from Cedar Hills Pressure Zone to Eagle Ridge 2 Pressure Zone with 2-350 gpm pumps. With the addition of the new Cedar Tangle Booster Station, additional pumping capacity is expected to be needed for Cedar Hills Booster Station and is estimated to be 200 to 500 gpm. Additional storage will be necessary at Qualchan Reservoir to supply the proposed booster station. This booster station will mostly provide resiliency operationally to the Cedar and Eagle Ridge II pressure zones.

STORAGE	Full Buildout Conditions, gallons	Existing, gallons	Capacity Needed, gallons
Storage-Standby and Fire Suppression	210,000	190,150	19,850
Operational Storage	144,220	95,310	48,910
PUMPING	Full Buildout Conditions, gpm	Existing Capacity, gpm	Capacity Needed, gpm
Pumping, PHD using full capacity	770	1,125	0
Pumping MDD + FIRE FLOW (1,750 gpm) using firm capacity	2,200	730	1,470

#### Table 3: Cedar Hills Capacity Deficiencies

## Eagle Ridge Pressure Zone

Eagle Ridge Pressure Zone is supplied from the Low Pressure Zone through Eagle Booster Station and is served by Eagle Ridge Reservoir. This pressure zone also supplies the Eagle Ridge 2 Pressure Zone. The highest elevation that can be served in this pressure zone is 2185 feet.



Figure 7: Eagle Ridge Area of Future Development

The two tables below show the results of the analyses. Table 4 allocates the existing and future ERUs for full buildout conditions. Table 5 shows the demands calculated based on the ERUs from Table 4.

## Table 4: Eagle Ridge ERUs

Current #ERUs (2020)	#ERUs approved but not constructed	Potential undeveloped land, acres	Potential #ERU	Future ERUs (current + approved +potential)	Estimate d % DSL	DSL ERUs	Total Buildout ERUs
459	16	4,649	1,256	1,731	10	173	1,904

TOTAL ERUs (with DSL)	ERUADD, gal/unit	ADD, gpm	ADD, gallons/ day	ERUMDD, gal/unit	MDD, gpm	MDD, gallons/ day	PHD, gpm	PHD, gallons/ day
1,904	501	670	953,960	2,157	2,860	4,107,150	4,870	6,982,160

### Table 5: Eagle Ridge Future Conditions

The existing pumping capacity in Eagle Ridge Pressure Zone is sufficient to supply ADD, MDD, and PHD. However, additional storage capacity is required for standby storage and for operational storage which totals 624,000 gallons for full buildout. Table 6 shows the required additional capacity requirements for both storage and boosting capacity. The DOH Recommended Standby storage calculation is a volume calculation that is equal to the MDD for one day, as recommended by DOH. However, when this value cannot be accommodated, minimum requirements could be met via a combination of storage and pumping.

The water system in Eagle Ridge Pressure Zone was designed to serve the area developed within this pressure zone; it was not designed to serve the area of Eagle Ridge 2 Pressure Zone. However, it is served by Eagle Ridge Booster Station through a 12-inch pipeline located in Eagle Ridge Blvd. With the construction of additional developments in the Eagle Ridge 2 Pressure Zone, this transmission line is now undersized to serve both pressure zones. Current headloss and velocity in the pipe exceeds design standards which results in the system struggling to meet system demands during the summer. The current Six Year Water Capital Program does not include any projects for this pressure zone. Future development proposals will need to construct an additional 18-inch pipeline in order to connect to the Eagle Ridge Reservoir.

<u>STORAGE</u>	Full Buildout Conditions, gallons	Existing Capacity, gallons	Capacity Needed, gallons
Storage-Standby and Fire Suppression	380,820	247,160	133,660
Operational Storage	822,190	198,200	623,990
<u>PUMPING</u>	Full Buildout Conditions, gpm	Existing Capacity, gpm	Capacity Needed, gpm
Pumping, PHD with full capacity	4,870	5,672	0
Pumping MDD + FIRE FLOW (1,750 gpm) using	4,610	3,956	1,062

### Table 6: Eagle Ridge Capacity Requirements

Capacity Requirements for Supplying Eagle Ridge 2 Pressure Zone from Eagle Ridge Pressure Zone

PUMPING	Full Buildout Conditions, gpm	Existing Capacity, gpm	Capacity Needed, gpm	
Pumping, PHD with full capacity	7,360	5,672	1,688	

Pumping MDD + FIRE	6,070	3,952	2,112
FLOW (1,750 gpm) using			
fire capacity			

## Eagle Ridge 2 Pressure Zone

Eagle Ridge 2 Pressure Zone is supplied from the Eagle Ridge Pressure Zone through the Eagle Ridge Booster Station and is served by Eagle Ridge 2 Reservoir. The table below shows the existing and future ERUs. The associated demands are shown in Table 8. The highest property elevation served in this pressure zone is 2335 feet.



Figure 8: Eagle Ridge 2 Area of Future Development

### Table 7: Eagle Ridge 2 ERUs

Current #ERUs (2020)	#ERUs approved but not constructed	Potential undeveloped land, acres	Potential #ERU	Future ERUs (current + approved +potential)	Estimated % DSL	DSL ERUs	Total Buildout ERUs
914	87	192	48	1,049	10	105	1,154

## Table 8: Eagle Ridge 2 Future Conditions

TOTAL ERUs (with DSL)	ERUADD , gal/unit	ADD, gpm	ADD, gallons/ day	ERUMD D, gal/unit	MDD, gpm	MDD, gallons/ day	PHD, gpm	PHD, gallons/ day
1,154	455	370	525,030	1,821	1,460	2,101,260	2,490	3,572,150

The existing pumping capacity in Eagle Ridge 2 Pressure Zone is sufficient to supply ADD, MDD, and PHD. Additionally, there is enough storage available to adjust controls within the storage. Table 9 shows the required storage capacity requirements. The DOH Recommended Standby storage is a volume calculation that is equal to the MDD for one day as recommended by DOH. However, when this value cannot be accommodated then minimum requirements can be met via a combination of storage and pumping.

The water system in Eagle Ridge 2 Pressure Zone will need an additional 18 to 24-inch pipeline to supply the pressure zone and to provide a redundant supply. Table 9 shows the required capacity requirements for pumping in the event storage did not have enough standby storage or operational storage. The current Six Year Water Capital Program does not include any projects for this pressure zone. Table 9 does not include the proposed Cedar Tangle Booster Station because it has not been constructed yet.

### Table 9: Eagle Ridge 2 Capacity Requirements

STORAGE	Full Buildout Conditions, gallons	Existing Capacity, gallons	Capacity Needed, gallons
Storage-Standby and Fire Suppression	230,780	533,900	0
Operational Storage	284,810	225,590	59,220
PUMPING	Full Buildout Conditions, gpm	Existing Capacity, gpm	Capacity Needed, gpm
Pumping, PHD with total capacity	2,490	7,033	0
Pumping MDD + FIRE FLOW (1,750 gpm) with firm capacity	3,210	3,473	0

Note with the addition of the new Cedar Tangle Booster Station, additional pumping capacity of 300 to 700 gpm would be added to the Eagle Ridge Pressure Zone.

A future booster station is assumed to be constructed on the west side of Eagle Ridge near Qualchan Reservoir and Cedar Road because this is the largest area of undeveloped land in the vicinity. Qualchan Reservoir currently has insufficient capacity to supply another booster station and additional storage in this area is recommended.

## Summary

To address deficiencies, improve redundancy, and for system operations, the below improvements are recommended. Figure 9 illustrates the potential system needed for further development in the area.

Planned Capital Projects:

The Six Year Water Capital Program includes two projects needed to supply sufficient capacity for the currently constructed homes. The projects are planned to be constructed with sufficient size to serve full development. Development in the Low Pressure Zone can then be fully developed after these improvements are constructed and operational.

- Marshall Road transmission main
- Second Storage at Thorpe Reservoir

### Future Capital Projects:

The following deficiencies in the current system have been identified as part of this analysis. These projects are not currently included in the Six Year Water Program.

- Additional pump and emergency power at Latah Booster Station;
- Install on-site backup power at the existing Cedar Road Booster Station to meet fire flow requirements; <u>or</u> install an electric valve system to supply needed water from Eagle Ridge 2 Pressure Zone.

Facilities Required for Full Buildout Development:

- Additional storage at Qualchan storage site is required in order to provide water volume for the future booster station's draw for new development.
- A second reservoir in Eagle Ridge Pressure Zone with approximately 760,000 gallons additional effective storage capacity with a pipe connection to the existing water system is needed for future development. Approximately 624,000 gallons need to be above 2320 feet of elevation in the storage. This storage could be placed in the west area of the Eagle Ridge Area for resiliency and the pipe connecting the 12-inch transmission main to Eagle Ridge Boulevard.
- A booster station will be needed to serve the west side of the Eagle Ridge area near Qualchan Drive. The station should be sized for a minimum of 1,700 gpm firm capacity to serve this area with a minimum of 3 pumps and a maximum of 5 pumps. The booster station with this pumping capacity would be capable of supplying ADD for both Eagle Ridge and for Eagle Ridge 2 Pressure Zone. The total Eagle Ridge Booster Station firm capacity needs to be at least 7,400 gpm.
- An 18-inch transmission connection will be needed from new Eagle Ridge Booster Station to the Eagle Ridge Pressure Zone reservoir and the existing water system piping in Eagle Ridge Boulevard. The new Eagle Ridge Booster Station is expected to be located near the Qualchan Storage Reservoir in order to have adequate supply and suction pressure.
- In addition to the major capital facilities described above, pressure reducing valves will be necessary to serve the areas lower than the Eagle Ridge Pressure Zone which cannot practically be served by the Low Pressure Zone. Pressure reducing valves and system valving between pressure zones is recommended in order to improve redundancy and resiliency for this area.

• Developers have planned to provide another pumping source from Cedar Hills to Eagle Ridge 2 noted in the analysis as Cedar Tangle Booster Station with a projected pumping capacity of 350 to 700 gpm. Some development investment has been made, but the station is not yet fully constructed. Additional pumps or changes in operations in Cedar Hills Pressure Zone will likely be necessary.



## Facilities for Phased Development:

Based upon the recommendations in the HDR report, *Eagle Ridge Phasing Analysis Technical Memorandum* (HDR, Inc. 2021), the projects required for development have been split into 2 phases. Phase 1 consists of projects that are needed to support immediate development, and Phase 2 consists of projects that are required for full build-out of the pressure zones.

Phase 1 projects include: Marshall Road Transmission, Thorpe Twin Reservoir, and Latah Booster Pump Upsize. Phase 2 consists of: Cedar Road Transmission, Qualchan Twin Reservoir, Eagle Ridge Tank, Qualchan Booster Upgrade, and Cedar Road Booster Upgrade. The total cost for these projects is approximately \$65 million dollars according to the HDR report. The estimated costs per ERU was \$13,700 per the HDR report. This spreads the burden of cost equally across all ERUs.

The City provided a separate costs analysis. The total cost for all capital investments required was \$64 million dollars. Cost shares were calculated 2 ways. The first method was to split out shares of both phases based on existing city ERUs and proposed development ERUs. The second was to split costs by assigning Phase 1 projects to the City and Phase 2 costs to development shares. These two methods came up with similar cost shares of \$36, 917,286 and \$26,982,714 for Phase 1 City and Developer shares, respectively and \$37,200,000 and 26,700,000 for Phase 2 City and Developer shares, respectively. The second method was selected for the simplicity of breaking down cost shares to projects rather than splitting every project.

Finally, the cost shares were broken down to an ERU per pressure zone value to delineate what the cost shares of specific pressure zone development should be as depicted in the table below.

	Actual Cost Per ERU in Each Pressure Zone
Pressure Zone	Cost for Phase II/Pressure Zone ERU
Low	\$2,648
Cedar	
Eagle Ridge 1	\$12,547
Eagle Ridge 2	\$12,547

### Table 10. Water Capital Cost per ERU

# 3.9 Eagle Ridge Development Memo

## **Technical Memorandum**

Date:	July 5, 2022
To:	Beryl Fredrickson, Senior Engineer, City of Spokane
From:	Lisa Tamura, HDR
Project:	Water Modeling On-Call
Subject:	Marshall Creek/Qualchan Analysis - FINAL

## 1.0 Background

This technical memorandum summarizes an evaluation of the water supply plans created by Whipple Consulting Engineers for the City of Spokane's (City's) Marshall Creek Development. The analysis includes:

- Confirming system development plat approved demands in the hydraulic model.
- Evaluation of the Marshall Creek Development report by Whipple Consulting Engineers.
- Evaluation of storage capacities necessary for the Marshall Creek Development.

The following reports and technical memorandums are referenced:

- Marshall Creek A Proposed Residential Subdivision Preliminary Booster Pump Station and Reservoir Analysis (Marshall Creek Development report) dated August 27, 2021, by Whipple Consulting Engineers
- Eagle Ridge Water System Phasing Analysis Technical Memorandum (Eagle Ridge TM) dated January 27, 2022, by HDR
- Latah-Hangman Utility Development Plan (Latah-Hangman Plan) dated January 5, 2022, by the City of Spokane
- *Dead Storage Analysis Summary* (Dead Storage Analysis) dated July 14, 2021, by the City of Spokane

## 2.0 Analysis Assumptions

The InfoWater model developed as part of the Eagle Ridge Analysis (Eagle Ridge TM) was used as a starting point for this analysis.

Existing and approved maximum day demands (MDD) for the Eagle Ridge area were assumed for the analysis (Figure 1). For the Marshall Creek Development, an MDD of 668.2 gallons per minute (gpm) was assumed per the estimate provided in the Marshall Creek Development report by Whipple Consulting Engineers. This is about 12 percent less than the estimated demand for the area noted in the Eagle Ridge TM.



#### Figure 1. Eagle Ridge Approved Demands

The Marshall Creek Development shown in Figure 2 consists of three pressure zones covering elevations from approximately 1,950 to 2,260 feet (Table 1).

Figure 2. Proposed Marshall Creek Development



Zone	HGL	Service Elevation @ 45 psi	Minimum Service Elevation @ 100 psi
Eagle Ridge 1 Zone	2,332	2,228	2,123
Marshall Creek Mid-Zone		2,123	1,997
City Low Zone	2,101	1,997	1,870

HGL = hydraulic grade line

psi = pounds per square inch

Source: Marshall Creek Development Report Table 5

A new Marshall Creek Pump Station, consisting of three booster pumps, with two pumps active at a time, is proposed to boost water from the City's Low Pressure Zone to the Eagle Ridge 1 Pressure Zone. Each pump is assumed to have a design point of 350 gpm at 231 feet. Pump controls were added in the model (Table 2) that are consistent with those modeled at the Eagle Ridge 1 Booster Pump Station. Actual operational strategy at the Eagle Ridge 1 Booster Pump Station may be different than that presented in Table 2. These values should be confirmed prior to the Marshall Creek Pump Station being put into service.

#### Table 2. Marshall Creek Pump Station Controls

Pump	Control Location	ON Level Setting (ft)	OFF Level Setting (ft)
Marshall Creek Pump 1	Eagle Ridge	19	21
Marshall Creek Pump 2	1 Reservoir	17	19

Water will be delivered to the Eagle Ridge 1 Pressure Zone via a new pipeline along Cedar Road. The developer has proposed a 12-inch pipeline. However, as noted in the Eagle Ridge TM, an 18-inch pipeline is needed at this location to satisfy future growth in the area and is included for this analysis.

A new 760,000 gallon storage tank is proposed to be located in the Eagle Ridge 1 Pressure Zone next to the existing Eagle Ridge 1 storage facility (bringing total Eagle Ridge 1 storage to 1.3 million gallons [MG]), and a new 1.25 MG storage tank is proposed to be located in the Low Pressure Zone next to the existing Qualchan storage facility. These volumes are predicated on previous analyses of infrastructure needed to support full build-out conditions (see Eagle Ridge TM and Latah-Hangman Plan), and assume enough space is available at each storage site. (Note that by contrast, the Marshall Creek Development report by Whipple Consulting Engineering stated that a 665,000 gallon storage tank was required at Eagle Ridge 1 Pressure Zone for Marshall Creek Development).

Whipple Engineering has also proposed an alternative that involves a new, single additional 1.3 MG storage reservoir in the Eagle Ridge 1 Pressure Zone (bringing total Eagle Ridge 1 storage to 1.7 MG), in lieu of building a 665,000 gallon storage in Eagle Ridge 1 and the 1.25 MG Qualchan "twin".

Based on information presented in the City's Dead Storage Analysis, existing storage volumes pertaining to dead and emergency storage were calculated for the Eagle Ridge 1 and Qualchan storage sites (assuming MDD conditions) based on elevations that relate to dead and emergency storage pressure requirements. For the Eagle Ridge Pressure Zone emergency storage is 210,000

gallons, and standby storage required is nested in the fire flow volume. For the Low Pressure Zone emergency storage is based on 200 gallons per equivalent residential unit which is larger than the fire flow storage required. The Qualchan emergency storage is calculated based on its volumetric proportional storage capacity in the Low Pressure Zone storage system. Table 3 summarizes this information. The "minimum storage volume" represents the amount of storage that should be maintained at these storage locations to account for dead storage and to meet emergency (standby and fire suppression) needs.

Parameter	Qualchan Reservoir	Eagle Ridge 1 Reservoir
Tank Diameter (ft)	71	63
Ground Elevation (ft)	2057.9	2309.4
Dead Storage Elevation (ft)	2071.0	2309.4
Emergency Storage Top Elevation (ft)	2081.5*	2318.4
Dead Storage Volume (MG)	0.39	0.00
Emergency Storage Volume (MG)	0.31	0.21
Minimum Storage Volume (MG)	0.70	0.21

#### Table 3. Existing Dead and Emergency Storage Volumes

ft = feet

MG = million gallons

\* Includes a portion of the standby storage required for the Low Pressure Zone Source: Dead Storage Analysis Summary

## 3.0 System Analysis

Facilities needed to serve the Marshall Creek Development were added into the hydraulic model. For this analysis, it was assumed that the Marshall Road transmission pipeline is in place. New facilities evaluated in the model include the proposed Marshall Creek pump station, Cedar Road pipeline, and new storage at the Eagle Ridge 1 reservoir site. The modeled system is shown in Figure 3.

## Figure 3. Modeled System



For the analysis, MDD associated with the Marshall Creek Development (668.2 gpm) was evenly split and applied at two locations in the model – 334.1 gpm applied at model junctions J1900 and

MARSHALLJ. These two locations correspond with the development distribution piping connections planned for the new Cedar Road pipeline.

Two scenarios were evaluated:

- Scenario 1: System with additional storage of 760,000 gallons (diameter of 75.8 feet and a maximum depth of 22.5 feet) at the Eagle Ridge 1 site and an additional 1.25 MG storage reservoir (diameter of 71.0 feet and a maximum depth of 43.0 feet) at the Qualchan site.
- Scenario 2: System with additional storage of 1.3 MG (diameter of 99.2 feet and a maximum depth of 22.5 feet) at the Eagle Ridge 1 site. This scenario maintains the single storage reservoir at the Qualchan site.

System performance for each scenario was compared against the base system (existing facilities plus the Marshall Road transmission pipeline) under MDD, which includes approved demands for the Eagle Ridge area. For both scenarios, the hydraulic model was run to analyze the proposed infrastructure using an extended period simulation (EPS) analysis, which was conducted over a 48-hour period. The analysis included daily demand variation to identify minimum pressure and evaluate reservoir performance for the new development as well as documenting impacts to the existing Eagle Ridge 1 Pressure Zone.

Infrastructure improvements were evaluated in the model given the following criteria and assumptions:

- City design standards criteria is 45 psi to 100 psi during maximum day demand. The Water System Plan adopted in 2016 states that a minimum static pressure required for new development is 45 psi. This is not always achievable throughout an entire pressure zone, due to the varying topography of the system and previously established pressure zone boundaries.
- It is understood that the actual means by which water flow is regulated from the Eagle Ridge 2 Pressure Zone down to the Eagle Ridge 1 Pressure Zone is not included in the model. This flow of water from the higher pressure zone to the lower zone is regulated via an altitude valve in the Eagle Ridge 2 Booster Pump Station that operates based on the Eagle Ridge 1 tank level. When the Eagle Ridge 1 tank level drops below 11 feet, the altitude valve opens to allow reverse flow through the system from the Eagle Ridge 2 tank down to the Eagle Ridge 1 tank. When the Eagle Ridge 1 tank level rises above 19 feet, the valve closes. Because this detail is not represented in the model, the actual transfer of water between the two tanks is likely not as efficient in the model as in reality.

## **Scenario 1 Analysis Results**

Under base system conditions, including approved demands and the Marshall Road pipeline but without the Marshall Creek development, the model indicates that during MDD levels in the Eagle Ridge 1 Reservoir drop to low levels (i.e., below the level of minimum storage described previously). While this modeled result does not necessarily represent actual field/SCADA responses<sup>1</sup> due to the model limitations mentioned above, the results do serve as a baseline for comparison of system

<sup>&</sup>lt;sup>1</sup> The lowest tank water level in 2021 was 2321.8 feet, above the Emergency Storage Top Elevation. 2021 was the hottest summer on record and resulted in 31% more June-July pumpage to the Eagle Ridge 1 Pressure Zone than in 2020.

performance. With the addition of Marshall Creek demands and an additional storage facility at the Eagle Ridge 1 site, reservoir levels improve. Figure 4 shows the variation in total volume for the existing Eagle Ridge 1 storage site before and after the addition of the Marshall Creek Development facilities. The model results indicate that with the proposed improvements, a minimum volume of about 0.24 million gallons (MG) is retained between the two reservoirs once the Marshall Creek Development is in place. This is more than the emergency volume required (0.21 MG) for the Eagle Ridge 1 Pressure Zone.





Impacts on Qualchan Reservoir performance from adding the Marshall Creek Development were also evaluated. For both the Base System and the Marshall Creek System it was assumed that the Marshall Road transmission pipeline was in place. For the purposes of this analysis a new storage facility of the same volume was added at the Qualchan site. Figure 5 shows the model predicted variation in total volume in the Qualchan Reservoir(s). Model results indicate that minimum volume retained at the Qualchan site improved from about 0.58 MG to about 1.18 MG, meeting the minimum (dead and emergency) storage requirement of 0.70 MG.





Table 4 shows the model predicted minimum pressure within the Eagle Ridge 1 Pressure Zone. A representative high point in the Eagle Ridge 1 Pressure Zone along Eagle Ridge Boulevard (model junction WHY6432) was selected to compare pressures before and after the Marshall Creek facilities are put in place. Model results indicate that pressure within the Eagle Ridge 1 Pressure Zone improves with the new connection from the Marshall Creek Development primarily due to improved performance at the Eagle Ridge 1 storage facilities as previously discussed. Table 5 shows the count of modeled locations where pressure improved with the addition of the Marshall Creek facilities. Because the model indicates that the minimum pressure at the higher Cedar Road location is low, between 20 and 26 psi (Figure 6), caution should be exercised for any service locations within the Marshall Creek Development near this point of connection.

Figure 7 shows the differences in minimum pressure before and after the Marshall Creek Development facilities are in place.

		Minimum Pressure (psi)	
Location	Elevation (ft)	Existing System	Including Marshall Creek Development
Eagle Ridge 1 Location (WHY6432)	2,230	20	41
Cedar Road Location 1 (J1900)	2,185	n/a	57
Cedar Road Location 2 (MARSHALLJ)	2,270	n/a	20

#### Table 4. Eagle Ridge 1 Pressure Zone Minimum Pressure

#### Table 5. Eagle Ridge 1 Modeled Pressure Increase

	Count of Locations
No Pressure Increase	81
Pressure Increase 0-5 psi	125
Pressure Increase 5-10 psi	4
Pressure Increase > 10 psi	18
TOTAL LOCATIONS	228

#### Figure 6. Modeled Pressure at Junction MARSHALLJ

## Pressure at Junction MARSHALLJ



## Figure 7. Eagle Ridge Minimum Pressure - Existing System and with Marshall Creek Development



With Marshall Creek Development



## **Scenario 2 Analysis Results**

For this scenario, the system was evaluated assuming additional storage intended for the Qualchan site was moved to the Eagle Ridge 1 site. An additional storage reservoir of 1.3 MG (diameter of 99.2 feet and a maximum depth of 22.5 feet) was added at the Eagle Ridge 1 site. While the current Eagle Ridge 1 Reservoir site appears large enough to accommodate a new 99.2 ft diameter storage tank (Figure 8), further evaluation will be required to determine suitability of the site for construction and meeting permitting requirements.



Figure 8. Eagle Ridge 1 Storage Site

This analysis evaluated the impact of the Marshall Creek development, expanded storage at the Eagle Ridge 1 site, and maintaining the existing storage volume at the Qualchan site.

With expanded storage at the Eagle Ridge 1 Reservoir site, the model indicates that minimum volume available is more than sufficient to serve the Eagle Ridge area including the Marshall Creek development (Figure 9). The model predicts that a minimum volume of 0.67 MG will be available. This exceeds the storage required to meet emergency needs (0.21 MG) for the Eagle Ridge 1 Pressure Zone. It should be noted, however, that as a result of the excess volume, water quality may become a concern, particularly prior to full build-out of the entire area.





Impacts to the performance of the Qualchan Reservoir as a result of the addition of the Marshall Creek development and expanded storage at the Eagle Ridge 1 Reservoir site were also evaluated. As in Scenario 1, it was assumed that the Marshall Road transmission pipeline was in place for both the Base and Marshall Creek Systems. Figure 10 shows that with the addition of the Marshall Creek development, the model predicted minimum volume in the Qualchan Reservoir is reduced from about 0.58 MG to 0.51 MG. This volume continues to be below the minimum (dead and emergency) volume required (0.70 MG).

Additional infrastructure incorporated at the Marshall Creek Pump Station, such as an electronically actuated valve to enable flow from the Eagle Ridge 1 Pressure Zone back to the Low Pressure Zone, would increase available volume to meet emergency (standby and fire suppression) needs in the Low Pressure Zone, as water stored in the Eagle Ridge 1 storage facilities would now be available to the Low Zone under emergency conditions. This would have the effect of reducing the minimum required storage volume in the Qualchan Reservoir and may result in reservoir fluctuations then becoming acceptable to overall system operation. Further evaluation of this storage configuration is recommended to identify design features or operational procedures that may need to be implemented to address any water quality issues and provide operational flexibility.





<sup>&</sup>lt;sup>2</sup> The Marshall Road transmission pipeline provides additional water to the Qualchan Reservoir and improves storage performance for the Base System over what may be currently operationally available.

## 4.0 Conclusion

Model analysis of the Eagle Ridge area to include the Marshall Creek Development shows that with additional storage of 0.76 MG at the Eagle Ridge 1 Reservoir site (bringing the total storage volume available to 1.3 MG) and the addition of the second Qualchan Reservoir (Scenario 1), reservoir cycling at the Eagle Ridge 1 storage facility is improved and slight improvements in zone pressure are achieved. The model indicates that with the new storage configuration, the storage volume retained for the Eagle Ridge 1 Pressure Zone during peak demand periods (0.24 MG) is above the requirement to meet emergency (standby and fire suppression) needs of 0.21 MG (Figure 4). In addition, the model indicates that low pressure is possible for the Marshall Creek Development at the highest point of connection along Cedar Road.

The model also shows under this scenario that the proposed additional storage added at the Qualchan Reservoir site (Figure 5) provides sufficient storage to meet existing minimum (dead and emergency) storage requirements for the Low Pressure Zone (0.70 MG).

If storage is expanded further at the Eagle Ridge 1 Reservoir site in lieu of additional Qualchan storage (Scenario 2), the model analysis shows that the existing Qualchan Reservoir continues to show a minimum storage deficit, not able to maintain the minimum volume to meet existing minimum (dead and emergency) storage requirements (Figure 10). Additional infrastructure incorporated at the Marshall Creek Pump Station, such as an electronically actuated valve to enable flow from the Eagle Ridge 1 Pressure Zone back to the Low Pressure Zone, would increase available volume to meet emergency (standby and fire suppression) needs in the Low Pressure Zone, as water stored in the Eagle Ridge 1 storage facilities would now be available to the Low Zone under emergency conditions. This would have the effect of reducing the minimum required storage volume in the Qualchan Reservoir and may result in reservoir fluctuations then becoming acceptable to overall system operation.

While the model is not able to adequately represent actual field operations for the flow transfer between the Eagle Ridge 1 and Eagle Ridge 2 pressure zones, the modeling analysis shows that an improvement in overall system performance with increased storage at the Eagle Ridge 1 Reservoir site is achieved under both scenarios evaluated.

It should be noted that this analysis does not take into consideration any future needs in the City's Low Pressure Zone. To fully understand the implications of Scenario 2 (i.e., expanded storage in the Eagle Ridge 1 Pressure Zone and no additional storage at the Qualchan Reservoir site) under full buildout conditions, more analysis is needed to evaluate overall system performance and identify any operational changes needed to address water quality issues that may arise.

3.10 Fire Marshall Memo





BRIAN SCHAEFFER FIRE CHIEF

February 15, 2022

Marcia Davis Integrated Capital Management City of Spokane 808 W. Spokane Falls Blvd. Spokane, WA 99201

Marcia Davis,

I understand that our Fire Protection Engineer, Dave Kokot, has discussed with the Water Department & Integrated Capital Management over the years the practice of "nesting" Standby Storage (SB) and Fire Suppression Storage (FSS). This conversation has helped determine an adequate water supply system capacity for the City of Spokane.

The Spokane Fire Department understands the practice of "nesting" and does not prohibit the City of Spokane Water Department's method of Consolidation of Standby Storage and Fire Suppression Storage in the design and operation of the City's water storage facilities, as long as adequate fire suppression water supply is available.

Don't hesitate to contact me if further information is required.

Kind regards,

Lai ce Dahl

Division Chief, Fire Marshal Spokane Fire Department (509) 625-7040

## 4.1 Source Meters
Location	Туре	Manufacturer	Model	Serial Number	Pipe Size	Differential	GPM Max Reading	Installed	HART SN
Parkwater P1	Electromagnetic	Siemens	7ME658	010801U142	20		10000	May 2012	N1K9030028
Parkwater P2	Differential	Smar	LD 301	41152	20	0-124.33 in H2O	10000		
Parkwater P3	Differential	Smar	LD 301	131643	20	0-124.33 in H2O	10000		
Parkwater P4	Differential	Smar	LD 301	131666	20	0-124.33 in H2O	10000		
Parkwater P5	Differential	Smar	LD 301	137309	20	0-124.33 in H2O	10000		
Parkwater P6	Differential	Smar	LD 301	131661	20	0-124.33 in H2O	10000		
Parkwater P7	Differential	Smar	LD 301	122155	20	0-124.33 in H2O	10000		
Parkwater P8	Differential	Smar	LD 301	137307	20	0-124.33 in H2O	10000		
Hoffman P1	Electromagnetic	Siemens	7ME658	857703U535	18		8800	March 2016	Х
Ray P1	Electromagnetic	Siemens	7ME658	483501U393	20		8000	March 2014	Х
Ray P2	Electromagnetic	Siemens	7ME658	483601U393	20		8000	March 2014	Х
Ray P3	Electromagnetic	Siemens	7ME658	483701U393	20		8000	March 2014	Х
Central West	Electromagnetic	Siemens	7ME658	632803U035	30		16000	June 2015	Х
Central East	Electromagnetic	Siemens	7ME658	632903U035	30		16000	June 2015	
Central P1	Electromagnetic	Siemens	7ME658	598103U025	24		16000	June 2015	
Central P2	Insertion Mag	McCrometer	395LS	MI18-0272					
Grace P1	Electromagnetic	Siemens	7ME652	401602U220	24		10000	April 2011	Х
Grace P2	Electromagnetic	Siemens	7ME652	408502U230	24		10000	April 2011	Х
NEVADA PUMP 1	Electromagnetic	Krohne	AQUAFLUX F	A00 1904	16		7000		
NEVADA PUMP 2	Electromagnetic	Krohne	AQUAFLUX F	A00 1905	16		12000		
NEVADA PUMP 3	Electromagnetic	Krohne	AQUAFLUX F	A00 1907	16		12000		
NEVADA PUMP 4	Electromagnetic	Krohne	AQUAFLUX Mod	A03 17041	16		7000		
WELL ELECTRIC PUMP 1	Electromagnetic	Krohne	IFS4000 KC /18	2254/04	24		14000		
WELL ELECTRIC PUMP 3	Electromagnetic	Krohne	IFS4000 KC /18	0273/05	24		14000		
WELL ELECTRIC PUMP 2 and 4	Electromagnetic	Endress+Houser	Promag 50 L 36"	H41B4F19000	36		24000	2014	<u> </u>

# 4.2 Water Use Efficiency and Distribution System Loss (2019-2021)

Date Submitted: 6/3/2020



# Water Use Efficiency Annual Performance Report - 2019

WS Name: SPOKANE CITY OF

Water System ID# : 83100

WS County: SPOKANE

Report submitted by: Doug Greenlund

#### Meter Installation Information:

Estimate the percentage of metered connections: 100%

If not fully metered - Current status of meter installation:

### Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: 01/01/2019 To 12/31/2019 Incomplete or missing data for the year? No If yes, explain:

### Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	22,965,941,000 gallons
Authorized Consumption (AC) – Annual Volume	19,644,224,000 gallons
Distribution System Leakage – Annual Volume TP – AC	3,321,717,000 gallons
Distribution System Leakage – Percent DSL = [(TP – AC) / TP] x 100	14.5 %
3-year annual average	12.9 %

### **Goal-Setting Information:**

Date of Most Recent Public Forum: 04/21/2014 Has goal been changed since last performance report? No

Note: Customer goal must be re-established every 6 years through a public process

#### WUE Goals:

Customer Goal (Demand Side):

Adopted 4/21/2014: 1. Continue the reduction of indoor residential use by 0.5% on average for residential connections annually, over the next six years. 2. Reduce outdoor residential use by 2% on average for residential connections annually, over the next six years. 3. Reduce metered outdoor irrigation commercial/industrial use by 2% for Commercial, Industrial connections annually, over the next six years. 4. Reduce outdoor metered governmental use by 2% for governmental connection annually, over the next six years.

### Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

Indoor Residential The 2019 indoor conservation goal is 119 gallons per meter per day. The measured use is 113 gallons per meter per day. This goal was met.

Outdoor Residential The outdoor residential goal for 2019 is 455 gallons per meter per day. The pan evaporation corrected measured use is 553 gallons per day. This goal was not attained.

Outdoor Commercial/Industrial The conservation goal for the commercial/industrial sector is 3904 gallons per meter per day. The pan evaporation corrected measured use is 3,947 gallons per meter per day. The conservation goal was not attained.

Outdoor Government The outdoor government goal for 2019 is 4,448 gallons per meter per day. The pan evaporation corrected measured use is 5,189 gallons per day. The conservation goal was not attained.

#### Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

• We continued to offer a turf replacement rebate program to the City's water customers. The SpokaneScape rebate program allows for up to a \$500 credit on a resident's City utility bill for removing lawn and replacing it with water-smart plants and mulch. SpokaneScape is water–efficient landscaping that has been designed specifically for the Spokane area. A well designed SpokaneScape beautifies the property, protects natural resources and reduces maintenance- saving customers time, money, and water.

• 2019 stats:

o 56 COMPLETED PROJECTS /142 APPLICANTS

o 71,513 square feet of turf removed

o \$24,898 residential credits awarded

• We extended the program to Commercial customers, offering up to a \$2,500 credit for replacing turf with drought tolerant plantings. We've had two customers take advantage of this offer.

The City of Spokane successfully reaches youth and adults via classroom activities and public participation projects each year.

Presented 37 workshops of one hour each about water conservation in area grade schools.

• Participated in 9 community events, distributing educational materials and facilitating activities on water wise practices.

• Hosted 11 SpokaneScape 101 classes to provide an introduction to the rebate program.

• Provided over 400 water saving kits to customers. Kits were distributed at community events, through partnership with SNAP, and by request at City Hall.

Do not mail, fax, or email this report to DOH

Date Submitted: 6/11/2021



# Water Use Efficiency Annual Performance Report - 2020

WS Name:	SPOKANE	CITY	OF
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Water System ID# : 83100 WS County: SPOKANE

Report submitted by: Doug Greenlund

Meter Installation Information:

Estimate the percentage of metered connections: 100%

If not 100% metered – Did you submit a meter installation plan to DOH? No

Within your meter installation plan, what date did you commit to completing meter installation?

Current status of meter installation:

#### Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period01/01/2020To12/31/2020Incomplete or missing data for the year?NoIf yes, explain:

Total Water Produced & Purchased (TP) – Annual volume gallons	23,078,053,000 gallons
Authorized Consumption (AC) – Annual Volume in gallons	19,973,077,000 gallons
Distribution System Leakage – Annual Volume TP – AC	<i>3,104,976,000</i> gallons
Distribution System Leakage – DSL = $[(TP - AC) / TP] \times 100 \%$	13.5 %
3-year annual average - %	13.2 % 2018, 2019, 2020

### **Goal-Setting Information:**

Enter the date of most recent public forum to establish WUE goal: 07/27/2020

Has goal been changed since last performance report? Yes

Note: Customer goal must be re-established every 6 years through a public process.

#### **Customer WUE Goal (Demand Side):**

service area growth without additional pumping(total overall base consumption) Annual consumption decreases from 2018 levels despite population growth. Annual: 10 million gallons conserved for all participants Annual Residential (SF?MF) 5000 gallons per participating connection Annual City: 2 million gallon reduction for all city-owned properties Annual Commercial: 200,000 gallon reduction per participating connection Long Term: Conserved 500 million gallons by 2030 Long Term: 5% reduction in per capita consumption by 2030 Reduction in Seasonal Demand Peak(outdoor consumption) Annual: Reduction in MDD(maximum daily demand) during active growing season Long Term: 15% reduction in season peak demand by 2030

#### Customer (Demand Side) Goal Progress:

The City of Spokane addresses water efficiency through both the supply and demand sides of the water system. Water loss control programs (supply) fall under the umbrella of evaluation and reduction of Distribution System Loss (DSL). Components of this strategy include: pipe condition assessment, leak detection, system water audits, meter replacement program, and measurement of water consumption through authorized and unauthorized use from hydrants.

Our current conservation program addresses consumer water demand in the following ways: education, facility efficiency improvements, rebate programs, operational standards, a wastewater conservation credit for the lowest 20% of indoor water users and an inclined block water consumption rate structure.

#### Additional Information Regarding Supply and Demand Side WUE Efforts

#### **Describe Progress in Reaching Goals:**

- · Estimate how much water you saved.
- Report progress toward meeting goals within your established timeframe.
- · Identify any WUE measures you are currently implementing.
- If you established a goal to maintain a historic level (such as maintaining daily consumption at 65 gallons per person per day for the next two years) you must explain why you are unable to reduce water use below that level.

The following questions will help DOH better understand water usage, water resources management and drought response. The data will be used to provide technical assistance, not for regulatory purposes.

### All questions are voluntary

Month	Date of Measurement	Static Water Level (feet below measuring point)	Dynamic Water Level (feet below measuring point)
January	01/21/2020		1881.9
February	02/24/2020		1884.1
March	03/23/2020		1883.1
April	04/21/2020		1883.1
Мау	05/18/2020		1886.6
June	06/23/2020		1880.0
July	07/28/2020		1876.1
August	08/24/2020		1874.0
September	09/28/2020		1876.0
October	10/27/2020		1882.4
November	11/16/2020		1879.5
December	12/14/2020		1882.3

#### Water level data:

Please provide the following information (if known) to help us better utilize the water level data.

	Well tag Id number:	AHC 722	
	Well depth:	126.0	
	Water level accuracy (wit	thin 0.01 ft < 1 ft ~ 1 ft)	0.1 feet
	Completion type (e.g., ca cased open-ended with p	sed open interval, cased open-ended, perforations, etc)	Hand dug brick lined with open bottom
Location coordinates (latitude, longitude) and accuracy of the coordinates (< 1ft, ~1ft, >1000ft)			47.67790, -117.32986
Water level parameter name (e.g. depth below measuring point, depth below top of casing, depth below ground surface)		level is water surface elevation in NAV88 level measured by transducer	
	Elevation of top of casing different than top of casir	g OR elevation of measuring point if ng (as specified in question 7)	1954.53

#### Monthly/Seasonal Water Usage:

What was your maximum daily water demand for the previous year (in gallons per day)? 199,000,000

Month	Volume of Water Produced in gallons	
January	1,089,543,000	
February	1,029,408,000	
March	1,135,201,000	
April	1,394,455,000	
Мау	2,110,342,000	
June	2,328,793,000	
July	3,523,639,000	
August	3,970,513,000	
September	2,903,858,000	
October	1,466,498,000	
November	1,034,548,000	
December	1,091,255,000	

### Water shortage response:

Did you activate any level of water shortage response plan the previous year?

If you activated a water shortage response plan the previous year, what level did you activate? (Check all that apply)

	Advisory Conservation		Voluntary Conservation			
	Mandatory Conservation		Rationing	Conter Difference		
What fac	What factors caused your water shortage the previous year?					
	Drought	<b>Fire</b>	Landslides	Earthquakes		
	Flooding	Water Supply Lin	nitations	C Other		

# Do not mail, fax, or email this report to DOH

Date Submitted: 6/10/2022



# Water Use Efficiency Annual Performance Report - 2021

Water System ID# : 83100 WS County: SPOKANE

Report submitted by: Doug Greenlund

Meter Installation Information:

Estimate the percentage of metered connections: 100%

If not 100% metered – Did you submit a meter installation plan to DOH? No

Within your meter installation plan, what date did you commit to completing meter installation?

Current status of meter installation:

#### Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period 01/01/2021 To 12/31/2021 Incomplete or missing data for the year? No If yes, explain:

Total Water Produced & Purchased (TP) – Annual volume gallons	24,467,671,000 gallo	ns
Authorized Consumption (AC) – Annual Volume in gallons	21,382,980,000 gallo	ns
Distribution System Leakage – Annual Volume TP – AC	3,084,691,000 gallo	ns
Distribution System Leakage – DSL = $[(TP - AC) / TP] \times 100 \%$	12.6 %	
3-year annual average - %	13.5 %	2019, 2020, 2021

### **Goal-Setting Information:**

Enter the date of most recent public forum to establish WUE goal: 07/27/2020

Has goal been changed since last performance report? No

Note: Customer goal must be re-established every 6 years through a public process.

#### **Customer WUE Goal (Demand Side):**

service area growth without additional pumping(total overall base consumption) Annual consumption decreases from 2018 levels despite population growth. Annual: 10 million gallons conserved for all participants Annual Residential (SF?MF) 5000 gallons per participating connection Annual City: 2 million gallon reduction for all city-owned properties Annual Commercial: 200,000 gallon reduction per participating connection Long Term: Conserved 500 million gallons by 2030 Long Term: 5% reduction in per capita consumption by 2030 Reduction in Seasonal Demand Peak(outdoor consumption) Annual: Reduction in MDD(maximum daily demand) during active growing season Long Term: 15% reduction in season peak demand by 2030

#### Customer (Demand Side) Goal Progress:

Commercial Audit Program for Cooling and Irrigation Systems SpokaneScape water efficient landscaping and irrigation with incentives Rebates for high efficiency toilets, smart irrigation controllers and irrigation nozzles Commercial Program saved 1.5 million gallons annually Rebate Program saved 6.4 million gallons annually Programs with City Parks department for golf course irrigation projects and park irrigation projects

Parks projects save over 40 million gallons annually

#### Additional Information Regarding Supply and Demand Side WUE Efforts

#### **Describe Progress in Reaching Goals:**

- Estimate how much water you saved.
- · Report progress toward meeting goals within your established timeframe.
- Identify any WUE measures you are currently implementing.
- If you established a goal to maintain a historic level (such as maintaining daily consumption at 65 gallons per person per day for the next two years) you must explain why you are unable to reduce water use below that level.

The following questions will help DOH better understand water usage, water resources management and drought response. The data will be used to provide technical assistance, not for regulatory purposes.

#### All questions are voluntary

Month	Date of Measurement	Static Water Level (feet below measuring point)	Dynamic Water Level (feet below measuring point)
January	01/26/2021		69.8
February	02/23/2021		71.9
March	03/22/2021		75.1
April	04/27/2021		68.5
Мау	05/24/2021		59.0
June	06/22/2021		78.1
July	07/27/2021		80.6
August	08/23/2021		81.4
September	09/28/2021		80.1
October	10/26/2021		76.9
November	11/15/2021		75.8
December	12/13/2021		76.4

### Water level data:

Please provide the following information (if known) to help us better utilize the water level data.

Well tag Id number:	AHC 722	
Well depth:	126.0	
Water level accuracy (wit	hin 0.01 ft < 1 ft ~ 1 ft)	0.1 feet
Completion type (e.g., cas cased open-ended with p	sed open interval, cased open-ended, erforations, etc)	Hand dug brick lined with open bottom
Location coordinates (lati coordinates (< 1ft, ~1ft,	tude, longitude) and accuracy of the >1000ft)	47.67790, -117.32986
Water level parameter na depth below top of casing	me (e.g. depth below measuring point, J, depth below ground surface)	level is water surface elevation in NAV88 level measured by transducer
Elevation of top of casing different than top of casin	OR elevation of measuring point if g (as specified in question 7)	1954.53

### Monthly/Seasonal Water Usage:

What was your maximum daily water demand for the previous year (in gallons per day)? 149,700,000

Month	Volume of Water Produced in gallons		
January	1,057,783,000		
February	990,850,000		
March	1,090,892,000		
April	1,502,658,000		
Мау	2,923,608,000		
June	3,448,240,000		
July	4,154,433,000		
August	3,634,380,000		
September	2,470,257,000		
October	1,200,814,000		
November	1,304,619,000		
December	1,059,642,000		

Water s	Nater shortage response:					
Did you	activate any level o	f water shortage resp	oonse plan the previous year?			
	Yes	☑ No	There was no need to			
lf you a	ctivated a water sho □ Advisory Conser	rtage response plan vation	the previous year, what level did	you activate? (Check all that apply)		
Mandatory Conservation		Rationing	☐ Other			
What factors caused your water shortage the previous year?						
	Drought	E Fire	Landslides	Earthquakes		
	Flooding	Water Supply Lin	nitations	C Other		

# Do not mail, fax, or email this report to DOH

#### DSL Spreadsheet 2019 (13)

DOH DSL Leakage Summary	Category	Actual/Estimated	Classification	Owner	Annual Totals
	Produced	Actual (metered)	See 'Master Detailed' tab	Steve Burns	22,965,941
Total Water Produced				TOTAL	22,965,941
(minus)					
	Auth, Purchased	Actual (metered)	See 'Master Detailed' tab	Mark Olson	17,603,843
	Auth, Purchased	Estimated	See 'Master Detailed' tab	D. Kegley	1,190,592
$\checkmark$	Auth, non-revenue	Estimated	See 'Master Detailed' tab	Kegley/Burns	849,789
Total Authorized Consumption				TOTAL	19,644,224
(equals)					
	Loss (DSL)	Estimated	See 'Master Detailed' tab	Sakamoto/Kegley/Burns	
Distribution System Loss	This number i	s currently a result of sub	tracting the two numbers above. In a per	fect world, it would match the Loss worksheet. >>	3,321,717
				2019 Percentage DSI	0 144636682

#### DSL = TP - AC

**TP** = Total Produced **AC** = Authorized Consumption

Percent DSL = ((TP-AC)/TP)\*100

2018	0.114783972
2017	0.130657209
2016	0.116726745

0.130025954

Percentage DSL (3-year average)

#### DSL Spreadsheet 2020 (14)

DOH DSL Leakage Summary	Category	Actual/Estimated	Classification	Owner	Annual Totals
	Produced	Actual (metered)	See 'Master Detailed' tab	Steve Burns	23,078,053
Total Water Produced				TOTAL	23,078,053
(minus)					
	Auth, Purchased	Actual (metered)	See 'Master Detailed' tab	Mark Olson	17,806,035
	Auth, Purchased	Estimated	See 'Master Detailed' tab	D. Kegley	1,445,360
$\checkmark$	Auth, non-revenue	Estimated	See 'Master Detailed' tab	Kegley/Burns	721,681
Total Authorized Consumption				TOTAL	19,973,077
(equals)					
	Loss (DSL)	Estimated	See 'Master Detailed' tab	Sakamoto/Kegley/Burns	
Distribution System Loss	This number i	s currently a result of sub	tracting the two numbers above. In a per	fect world, it would match the Loss worksheet. >>	3,104,976
				2020 Percentage DSL	0.134542383

#### DSL = TP - AC

**TP** = Total Produced **AC** = Authorized Consumption

Percent DSL = ((TP-AC)/TP)\*100

2019	0.144636682
2018	0.114783972
2017	0.130657209

0.131321012

Percentage DSL (3-year average)

#### DSL Spreadsheet 2021 (16)

DOH DSL Leakage Summary	Category	Actual/Estimated	Classification	Owner	Annual Totals
	Produced	Actual (metered)	See 'Master Detailed' tab	Upriver	24,467,671
Total Water Produced				TOTAL	24,467,671
(minus)					
	Auth, Purchased	Actual (metered)	See 'Master Detailed' tab	IT	19,427,117
	Auth, Purchased	Estimated	See 'Master Detailed' tab	IT	1,255,181
$\checkmark$	Auth, non-revenue	Estimated	See 'Master Detailed' tab	IT/Clerks/Various	700,681
Total Authorized Consumption				TOTAL	21,382,980
(equals)					
$\checkmark$	Loss (DSL)	Estimated	See 'Master Detailed' tab		
Distribution System Loss	This number i	s currently a result of sub	tracting the two numbers above. In a pe	rfect world, it would match the Loss worksheet. >>	3,084,691
				2021 Percentage DSL	0.126072104

#### DSL = TP - AC

**TP** = Total Produced **AC** = Authorized Consumption

Percent DSL = ((TP-AC)/TP)\*100

2020	0.134542383
2019	0.144636682

0.135083723

Percentage DSL (3-year average)

# 4.3 City Ordinances C35630 and C36209



# ORDINANCE APPROVAL/VETO TRANSMITTAL FORM

DATE: July 12, 2018

TO: Mayor David A. Condon

FROM: Jacki Faught, City Clerk's Office

RE: July 9, 2018 CITY COUNCIL MEETING ORDINANCE

The following Ordinance, passed 6 - 1 (Council Member Fagan voting no) by City Council, is attached for your approval/veto.

**ORD C35530:** Relating to future and renewed water intertie agreements; enacting a new chapter 13.045 to the Spokane Municipal Code.

City Charter Section 16 gives you the following options for approving/vetoing this ordinance:

- Sign the ordinance approved as passed by City Council and return to the City Clerk's Office.
- Veto the ordinance and return to the City Clerk's Office. A written and signed statement of the reasons for the veto must accompany the vetoed ordinance.
- Sign and partially veto the ordinance (only applicable to appropriations ordinances) and return it to the City Clerk's Office. A written and signed statement of the reasons for the partial veto must accompany the partially vetoed ordinance.

If this ordinance is not returned to the City Clerk's Office by <u>5:00 p.m., July 23, 2018</u>, with a Mayoral approval or veto, the ordinance shall be deemed enacted without Mayoral signature.

SPOKANE Agenda Sheet	for City Council Meeting of:	Date Rec'd	5/16/2018
06/04/2018		Clerk's File #	ORD C35630
		Renews #	
Submitting Dept	CITY COUNCIL	Cross Ref #	
<b>Contact Name/Phone</b>	BREEAN BEGGS 6714	Project #	
Contact E-Mail	BBEGGS@SPOKANECITY.ORG	Bid #	
Agenda Item Type	First Reading Ordinance	Requisition #	
Agenda Item Name	0320 WATER INTERTIE ORDINANCE		

### Agenda Wording

An ordinance relating to future and renewed water intertie agreements; enacting a new Chapter 13.045 to the Spokane Municipal Code.

### Summary (Background)

Discussions around upcoming new and renewal intertie agreements brought up concerns from the public regarding sustainable water access for the people of Spokane as well as for our natural resources (river, fish, etc.). This ordinance will codify guidelines for intertie agreements with a focus on sustainable water usage and emergency water access for people in surrounding communities.

Fiscal In	mpact	Grant related?	NO	<b>Budget Account</b>	
		Public Works?	YES		
Neutral	\$			#	
Select	\$			#	
Select	\$			#	
Select	\$			#	
Approva	ls			<b>Council Notifica</b>	tions
Dept Hea	d	MCCLAT	CHEY, BRIAN	Study Session	
Division	Director			Other	Urban Dev 5/14/18
Finance		BUSTOS,	KIM	<b>Distribution List</b>	
Legal		SCHOED	EL, ELIZABETH		
For the M	layor	DUNIVA	NT, TIMOTHY		
Addition	al App	rovals			
Purchasi	ng				
CITY COL	JNCIL	MCCLAT	CHEY, BRIAN		
					PASSED BY

FIRST READING OF THE ABOVE ORDINANCE HELD ON une 4, 2018

AND FURTHER ACTION WAS DEFERRED

CITY CLERK

An ordinance relating to future and renewed water intertie agreements; enacting a new chapter 13.045 to the Spokane Municipal Code.

WHEREAS, the City of Spokane is a regional water purveyor pursuant to the Spokane County Coordinated Water System, Washington State Department of Health, the City of Spokane Comprehensive planning documents and state law; and

WHEREAS, wholesale water supply exchanges between local water purveyors are anticipated by the Washington State Department of Health's Office of Drinking Water, the Spokane County Coordinated Water System, the City of Spokane Comprehensive Plan, and the City of Spokane Comprehensive Water System Plan; and

WHEREAS, state law provides that such wholesale water supply where appropriate can be used for: long-term water supply, to supplement a limited supply of water, to provide water when there is limited capacity, to provide water to meet a peak, or to assist during an emergency situation; and

WHEREAS, state law requires that a coordinated water resource and system plan for an area "shall provide for maximum integration and coordination of public water system facilities consistent with the protection and enhancement of the public health and well-being;" and

WHEREAS, neighboring water purveyors can protect the public by establishing intertie agreements to help ensure the continuous availability of a safe and reliable drinking water supply to all customers; and

WHEREAS, the City currently has intertie agreements with six water purveyors identified within the County Coordinated Water System; these agreements will need to be updated over time, and the potential for other interties exists; and

WHEREAS, the City of Spokane is the largest water purveyor with the most complex system in the region and, as such, has the ability to efficiently and effectively provide water to adjoining purveyors that is safe, reliable, and protects the national resource and environment, allowing the City to assist its smaller water system neighbors; and

WHEREAS, the City is committed to good stewardship practices for its water resources to protect not only the quantity but the quality of water in our region; the City also has identified a strategy and goal around "Smart Use of Water Resources for Economic Growth" as part of its City Council adopted Joint Administration-Council 6-Year Strategic Plan; and

WHEREAS, the City also is committed to enhancing resiliency, and through its Comprehensive Plan, encourages working with adjacent jurisdictions and other water purveyors to facilitate consistent provision of water services and coordinated responses to emergencies; and

**WHEREAS**, the City recognizes that it derives 100% of its water from the Spokane Valley Rathdrum Prairie Aquifer ("SVRPA"); and

WHEREAS, pumping from the SVRPA may, at certain low flow times of the year, reduce water in the form of ground (aquifer) water inputs to the Spokane River in gaining reaches; and

**WHEREAS**, aquifer inflow into the Spokane River is important for maintaining the health, wellbeing and viability of the Spokane River and the overall water resource; and,

**WHEREAS**, an increasing population and climate variability creates competition for scarce water resources that would normally flow through the Spokane River; and

WHEREAS, the Spokane River has experienced decreased flows in late Summer and early Fall months; and

WHEREAS, reducing or limiting new well development that taps into the Aquifer will preserve ground water and prevent contamination of the water supply which is a benefit of providing wholesale water supply to neighboring purveyors; and

WHEREAS, the City recognizes the importance of encouraging and implementing long term conservation measures to support and protect the water resource as well as the health of the Spokane River; where such flows support related wildlife, recreational, and economic activity associated with the River; and

WHEREAS, in order to meet these goals, the City of Spokane intends to be a leader of efforts by all SVRPA pumpers in reducing water use and preserving River flows; and

WHEREAS, the City is pursuing its goal to support sufficient flows in the Spokane River during certain low flow times of the year and encourages prudent conservation measures that will provide resiliency to all water supplies in the greater Spokane region; and

**WHEREAS**, the City also strives to have consistent and understandable policies when dealing with neighboring jurisdictions and water purveyors.

NOW, THEREFORE, the City of Spokane does ordain:

Section 1. That there is adopted a new chapter 13.045 of the Spokane Municipal Code to read as follows:

### Chapter 13.045 Intertie Agreements and Water Rights

### Section 13.045.010 Purpose

The purpose of this Chapter is to codify a consistent and predictable approach to renewed, revised, or new water intertie agreements to ensure ongoing conservation and

protection of water resources, especially in the Spokane Valley and Rathdrum Prairie Aquifer.

# Section 13.045.020 Definitions

- A. Emergency Water Supply means unanticipated or unexpected and sudden event requiring additional short term supply of water from the City of Spokane under terms and conditions as specified in the Agreement between the parties as to duration and volume.
- B. In-stream Flow Rule means the Instream Flow rule for the Spokane River as established by Washington State Department of Ecology in Chapter 173- 557 WAC.
- C. Supplemental Water Supply means long term supply of water which is an addition to a wholesale water purveyor's existing water supply to provide additional water on a routine basis.

# Section 13.045.030 Intertie Contract Components

All renewed, revised or new water intertie agreements shall include the following provisions:

- A. A maximum term no longer than twenty years for supplemental supply and five years for emergency supply, inclusive of renewal options;
- B. Required five year agreement reviews within any term for supplemental supply and two years for any emergency supply, including the right of the City to cancel agreements after such review if the water purveyor is not in compliance with the terms of the agreement, including contractually required conservation measures;
- C. Definition of maximum water flow rates and maximum annual water volumes for supplemental and emergency water supply;
- D. A description of the historical and current water supply situation that forms the basis of the terms of the agreement and the proposed future water supply planning. ;
- E. Water provided under the contract is for the use in the water purveyor's designated service area and the water purveyor shall not wheel or wholesale any water received from Spokane beyond what is set out in their water system plan or an agreement existing at the time the contract is signed without first obtaining written permission from the City of Spokane.
- F. Provisions regarding collaboration on system loss and efficiency measures within the wholesale water purveyor's infrastructure that meets state standards;
- G. All Parties must have an existing written water conservation plan with specific reasonable goals and are required to implement and maintain annual water conservation, reduction of system loss in accordance with Chapter 246-290

WAC and efficiency measures with a measurable goal of reducing the annual amount of water consumed per capita year over year especially during Summer and early Fall consistent with state law. The plan will include program effectiveness consultations at least every three years, including documentation of changes in total gallons used and per capita use on an annual and seasonal basis by customer class;

- H. All Parties shall participate in any drought response water conservation measures triggered by weather conditions and/or Spokane River flows as may be developed and adopted by the City for all retail and wholesale customers with a methodology for reasonable notice included in the contract; and
- I. A written acknowledgement in the contract that the wholesale water supply may be curtailed or interrupted due to drought, low flows in the Spokane River, or shortage pursuant to such reasonable rules and measures adopted by the water department that are consistent with city code, adopted plans, and state law.

# Section 13.045.040 Water Charges

- A. Charges for water will be as established by the wholesale purveyor rate set out in SMC 13.04.2014.
- B. Intertie agreements shall include clear delineation of costs that are the responsibility of the water purveyor, including capital and construction costs, and those that are the responsibility of the City of Spokane.

# Section 13.045.050 Water Rights and Seasonal Flow Goals

- A. The City of Spokane shall not sell or transfer any water rights without the approving vote of City Council. The City upon approval of City Council may acquire available water rights if it would be prudent to do so for the purpose of protecting the resource for system resiliency purposes, and/or operational efficiency as provided by Chapter 35.21 RCW.
- B. The City Council will use the best available evidence and science to set written appropriate minimum seasonal river flow goals for the portion of the Spokane River flowing through the City of Spokane in respect to City operations only. Appropriate minimum flow goals set by the City Council may exceed the minimum standard as established by Washington State Department of Ecology in Chapter 173- 557 WAC. Such goals are not intended to overlap the legal jurisdiction of the State of Washington.
- C. The City is committed through its policies and environmental sustainability plan to substantially conserve water and reduce per capita consumption across the City's water distribution system as set out in the City's Water System Plan and water use efficiency goals that are established by City Council Resolution. In

order to achieve the City's water use efficiency goals, the City will provide budget support for the following operational and maintenance efforts and policy framework that will improve and protect the regional delivery system's natural water resources, efficiency and effectiveness, including flows in the Spokane River:

- Conservation educational programming and technical advice;
- 2. Implementation of conservation measures on city owned property;
- Programs supporting water conservation equipment and irrigation reduction for all customers;
- Water re-use programs;
- 5. Seasonal irrigation efficiency and reduction measures; and
- Other innovations that will support water conservation goals and increased flows in the Spokane River.
- D. The City's policy is to adhere to its river flow goals by following its conservation measures and efficiency plans developed by the water department, which may include implementing seasonal irrigation measures in accordance with the City's policies and procedures. Within twenty months of the adoption of this chapter, the City shall develop and periodically update a comprehensive plan and clear policies and procedures applicable to all customers and classes to achieve its water conservation goals.

### Section 13.045.060 Reporting

The Water Department shall provide a written report each February to the City Council that provides for the previous five years, the total number of gallons pumped by the City to each class of customer, including but not limited to residential, commercial and intertie agreements; the revenue from each class of customer and associated costs; the amount of money spent on conservation; the estimated number of gallons of water saved on an annual basis from new City of Spokane conservation efforts; the percentage and number of gallons lost by the water distribution system; the per capita consumption for all customers of the City's water service; and other information that will assist the Council in evaluating the goals of increasing river flows and decreasing the amount of water consumed per capita each year across the City of Spokane's water distribution system.

Section 2: Effective Date.

This ordinance shall take effect and	, 2018.	
PASSED by the City Council on	Qulu 9, 2018	
	K. S.A.	
	Council President	

Approved as to form:

Attest:

As Amended and Passed - 7/9/2018

City Clerk

Mayor

Assistant City Attorney

Date

Effective Date

As Amended and Passed - 7/9/2018

### ORDINANCE NO. C - 35630

An ordinance relating to future and renewed water intertie agreements; enacting a new chapter 13.045 to the Spokane Municipal Code.

WHEREAS, the City of Spokane is a regional water purveyor pursuant to the Spokane County Coordinated Water System, Washington State Department of Health, the City of Spokane Comprehensive planning documents and state law; and

WHEREAS, wholesale water supply exchanges between local water purveyors are anticipated by the Washington State Department of Health's Office of Drinking Water, the Spokane County Coordinated Water System, the City of Spokane Comprehensive Plan, and the City of Spokane Comprehensive Water System Plan; and

WHEREAS, state law provides that such wholesale water supply where appropriate can be used for: long-term water supply, to supplement a limited supply of water, to provide water when there is limited capacity, to provide water to meet a peak, or to assist during an emergency situation; and

WHEREAS, state law requires that a coordinated water resource and system plan for an area "shall provide for maximum integration and coordination of public water system facilities consistent with the protection and enhancement of the public health and well-being;" and

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WHEREAS, the City of Spokane is the largest water purveyor with the most complex system in the region and, as such, has the ability to efficiently and effectively provide water to adjoining purveyors that is safe, reliable, and protects the national resource and environment, allowing the City to assist its smaller water system neighbors; and

WHEREAS, the City is committed to good stewardship practices for its water resources to protect not only the quantity but the quality of water in our region; the City also has identified a strategy and goal around "Smart Use of Water Resources for Economic Growth" as part of its City Council adopted Joint Administration-Council 6-Year Strategic Plan; and

WHEREAS, the City also is committed to enhancing resiliency, and through its Comprehensive Plan, encourages working with adjacent jurisdictions and other water purveyors to facilitate consistent provision of water services and coordinated responses to emergencies; and

Revised -submitted by CM Beggs - Reid 7/9/18

WHEREAS, the City recognizes that it derives 100% of its water from the Spokane Valley Rathdrum Prairie Aquifer ("SVRPA"); and

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Section 2: Effective Date.

This ordinance shall take effect and be in force on \_\_\_\_\_, 2018.

PASSED by the City Council on \_\_\_\_\_

Council President

Approved as to form:

Attest:

City Clerk

Assistant City Attorney

. . . .

Mayor

Date

Effective Date

# ORDINANCE NO. C - 35630

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WHEREAS, the City of Spokane is a regional water purveyor pursuant to the Spokane County Coordinated Water System, Washington State Department of Health, the City of Spokane Comprehensive planning documents and state law; and

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WHEREAS, the City also is committed to enhancing resiliency, and through its Comprehensive Plan, encourages working with adjacent jurisdictions and other water purveyors to facilitate consistent provision of water services and coordinated responses to emergencies; and

track changes -Reid 7/9/18

WHEREAS, the City recognizes that it derives 100% of its water from the Spokane Valley Rathdrum Prairie Aquifer ("SVRPA"); and

WHEREAS, pumping from the SVRPA may, at certain low flow times of the year, reduce water in the form of ground (aquifer) water inputs to the Spokane River in gaining reaches; and

WHEREAS, aquifer inflow into the Spokane River is important for maintaining the health, wellbeing and viability of the Spokane River and the overall water resource; and,

**WHEREAS**, an increasing population and climate variability creates competition for scarce water resources that would normally flow through the Spokane River; and

WHEREAS, the Spokane River has experienced decreased flows in late Summer and early Fail months, and

WHEREAS, reducing or limiting new well development that taps into the Aquifer will preserve ground water and prevent contamination of the water supply which is a benefit of providing wholesale water supply to neighboring purveyors; and

WHEREAS, the City recognizes the importance of encouraging and implementing long term conservation measures to support and protect the water resource as well as the health of the Spokane River; where such flows support related wildlife, recreational, and economic activity associated with the River; and

WHEREAS, in order to meet these goals, the City of Spokane intends to be a leader of efforts by all SVRPA pumpers in reducing water use and preserving River flows; and

WHEREAS, the City is pursuing its goal to support sufficient flows in the Spokane River during certain low flow times of the year and encourages prudent conservation measures that will provide resiliency to all water supplies in the greater Spokane region; and

**WHEREAS**, the City also strives to have consistent and understandable policies when dealing with neighboring jurisdictions and water purveyors.

NOW, THEREFORE, the City of Spokane does ordain:

Section 1. That there is adopted a new chapter 13.045 of the Spokane Municipal Code to read as follows:

# Chapter 13.045 Intertie Agreements and Water Rights

# Section 13.045.010 Purpose

The purpose of this Chapter is to codify a consistent and predictable approach to renewed, revised, or new water intertie agreements to ensure ongoing conservation and

protection of water resources, especially in the Spokane Valley and Rathdrum Prairie Aquifer.

# Section 13.045.020 Definitions

- A. Emergency Water Supply means unanticipated or unexpected and sudden event requiring additional short term supply of water from the City of Spokane under terms and conditions as specified in the Agreement between the parties as to duration and volume.
- B. In-stream Flow Rule means the Instream Flow rule for the Spokane River as established by Washington State Department of Ecology in Chapter 173- 557 WAC.
- C. Supplemental Water Supply means long term supply of water which is an addition to a wholesale water purveyor's existing water supply to provide additional water on a routine basis.

# Section 13.045.030 Intertie Guidelines Provisions Contract Components

All renewed, revised or new water intertie agreements shall include the following provisions:

- A. A maximum term no longer than twenty years for supplemental supply and five years for emergency supply, inclusive of renewal options;
- B. Required five year agreement reviews within any term for supplemental supply and two years for any emergency supply, including the right of the City net-to renewcancel agreements upon after such review if the water purveyor is not in compliance with the terms of the agreement, including contractually required conservation measures,
- <u>C.</u> Definition of maximum water flow rates and maximum annual water volumes for supplemental and emergency water supply;
- Demonstrated need for the requested waterA description of the why the instance and parent water supply situation that forms the basis of the terms of the agreement and the processed fature water supply planning, is needed;
- Water provided under the contract is for the use in the water purveyor's designated service area and the water purveyor shall not wheel or wholesale any water received from Spokane beyond what is set out in their water system plan existing at the time the contract is signed without first obtaining written permission from the City of Spokane. Notwithstanding the foregoing, the water purveyor may request a waiver by the Spokane City Council for compelling circumstances and as may be provided by state and local law. In-regards to supplemental contract exceptions regarding the imitation of sales of wholesale water that increase and exception exception proved for municipal purposes vitein an urbal council prese, as applicable and approved by the Spokane City (location).

Provisions regarding collaboration on system loss and efficiency measures within the wholesale <u>water purveyoreustomer's</u> infrastructure that meets state standards;

- <u>G.</u> All Parties will-must have an existing written water conservation plan with specific reasonable goals and are required to implement and maintain annual water conservation, reduction of system loss in accordance with Chapter 246-290 WAC and efficiency measures with a measurable goal of reducing the annual amount of water consumed per capita year over year especially during Summer and early Fall consistent with state law. The plan will include program effectiveness consultations at least every three years, including documentation of changes in total gallons used and per capita use on an annual and seasonal basis by customer class;
- All Parties shall participate in any drought response water conservation measures triggered by weather conditions and/or Spokane River flows as may be developed and adopted by the City for all retail and wholesale customers with a methodology for reasonable notice included in the contract; and
- An written acknowledgement in the contract by customers that the wholesale water supply may be curtailed or interrupted due to drought, low flows in the Spokane River, or shortage <u>pursuant to consistent with city code or adopted plans, and such reasonable rules or and measures adopted by the water department that are consistent with city code, and adopted plans, and state raw.</u>

# Section 13.045.040 Wate: Charges

- A. Charges for water will be as established by the wholesale purveyor rate set out in SMC 13.04.2014.
- B. Intertie agreements shall include clear delineation of costs that are the responsibility of the <u>solar analysic analysic</u> statemer, including capital and construction costs, and those that are the responsibility of the City of Spokane.

# Section 13.045.050 Water Rights and Seasonal Flow Goals

- A. The City of Spokane shall not sell or transfer any water rights without the approving vote of City Council. The City upon approval of City Council may purchase acquire available water rights if it would be prudent to do so for the purpose of protecting the resource for system resiliency purposes, and/or operational efficiency as provided by Chapter 33.21 RCVV.
- B. The City Council will use the best available evidence and science to set written appropriate minimum seasonal river flow goals for the portion of the Spokane River flowing through the City of Spokane in respect to City operations only.

Appropriate minimum flow goals set by the City Council may exceed the minimum standard as established by Washington State Department of Ecology in Chapter 173- 557 WAC. Such goals are not intended to overlap the legal jurisdiction of the State of Washington.

- C. The City is committed through its policies and environmental sustainability plan to substantially conserve water and reduce per capita consumption across the City's water distribution system as set out in the City's Water System Plan and water use efficiency goals that are established by City Council Resolution. In order to achieve the City's water use efficiency goals, the City will provide budget support for the following operational and maintenance efforts and policy framework that will improve and protect the regional delivery system's natural water resources, efficiency and effectiveness, including flows in the Spokane River:
  - 1. Conservation educational programming and technical advice;
  - 2. Implementation of conservation measures on city owned property;
  - Programs supporting water conservation equipment and irrigation reduction for all customers;
  - 4. Water re-use programs;
  - 5. Seasonal irrigation efficiency and reduction measures; and
  - Other innovations that will support water conservation goals and increased flows in the Spokane River.
- D. The City's policy is to adhere to its river flow goals by following its conservation measures and efficiency plans developed by the water department, which may include implementing seasonal impation measures in accordance with the City's policies and procedures. <u>Villhin twentylve months of the adoption of this chapter</u>, The City shall develop and periodically update a comprehensive plan and clear policies and procedures applicable to all customers and classes to achieve its water conservation goals.

# Section 13.045.060 Reporting

The Water Department shall provide a written report each February to the City Council that provides for the previous five years, the total number of gallons pumped by the City to each didated characterization but non-previded to residential, commercial and intertie autopriciple, energies embor-of gallons provided <u>pursuant to each</u> by intertie agreements, the revenue from each didas of <u>costomer-miertie-agreements</u> collected and associated costs in the amount of money spent on conservation – the estimated number of gallons of water saved on an annual basis from new City of Spokane conservation efforts, the percentage and number of gallons lost by the water distribution system, information that will assist the Council in evaluating the goals of increasing river flows and decreasing the amount of water consumed per capita each year across the City of Spokane's water distribution system.

Section 2: Effective Date.

This ordinance shall take effect and be in force on	
Attest:	Approved as to form:
City Clerk	Assistant City Attorney
Mayor	Date
	Effective Date
An ordinance relating to future and renewed water intertie agreements; enacting a new Chapter 13.045 to the Spokane Municipal Code.

WHEREAS, the City of Spokane is a regional water purveyor pursuant to the Spokane County Coordinated Water System, Washington State Department of Health, the City of Spokane Comprehensive planning documents and state law; and

WHEREAS, wholesale water supply exchanges between local water purveyors are anticipated by the Washington State Department of Health's Office of Drinking Water, the Spokane County Coordinated Water System, the City of Spokane Comprehensive Plan, and the City of Spokane Comprehensive Water System Plan; and

WHEREAS, state law provides that such wholesale water supply where appropriate can be used for: long-term water supply, to supplement a limited supply of water, to provide water when there is limited capacity, to provide water to meet a peak, or to assist during an emergency situation; and

WHEREAS, state law requires that a coordinated/water resource and system plan for an area "shall provide for maximum integration/and coordination of public water system facilities consistent with the protection and enhancement of the public health and well-being;" and

WHEREAS, neighboring water purveyors can protect the public by establishing intertie agreements to help ensure the continuous availability of a safe and reliable drinking water supply to all customers; and

WHEREAS, the City currently has intertie agreements with six water purveyors identified within the County Coordinated Water System; these agreements will need to be updated over time, and the potential for other interties exists; and

WHEREAS, the City of Spokane is the largest water purveyor with the most complex system in the region and, as such, has the ability to efficiently and effectively provide water to adjoining purveyors that is safe, reliable, and protects the national resource and environment, allowing the City to assist its smaller water system neighbors; and

WHEREAS, the City is committed to good stewardship practices for its water resources to protect not only the quantity but the quality of water in our region; the City also has identified a strategy and goal around "Smart Use of Water Resources for Economic Growth" as part of its City Council adopted Joint Administration-Council 6-Year Strategic Plan; and

WHEREAS, the City also is committed to enhancing resiliency, and through its Comprehensive Plan, encourages working with adjacent jurisdictions and other water purveyors to facilitate consistent provision of water services and coordinated responses to emergencies; and

WHEREAS, the City recognizes that it derives 100% of its water from the Spokane Valley Rathdrum Prairie Aquifer ("SVRPA"); and

WHEREAS, pumping from the SVRPA may, at certain low flow times of the year, reduce water in the form of ground (aquifer) water inputs to the Spokane River in gaining reaches; and

WHEREAS, aquifer inflow into the Spokane River is important for maintaining the health, wellbeing and viability of the Spokane River and the overall water resource; and,

WHEREAS, an increasing population and climate variability creates competition for scarce water resources that would normally flow through the Spokane River; and

WHEREAS, reducing or limiting new well development that taps into the Aquifer will preserve ground water and prevent contamination of the water supply which is a benefit of providing wholesale water supply to neighboring purveyors; and

WHEREAS, the City recognizes the importance of encouraging and implementing long term conservation measures to support and protect the water resource as well as the health of the Spokane River; where such flows support related wildlife, recreational, and economic activity associated with the River; and

WHEREAS, the City is pursuing its goal to support sufficient flows in the Spokane River during certain low flow times of the year and encourages prudent conservation measures that will provide resiliency to all water supplies in the greater Spokane region; and

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#### Section 13.045.020 Definitions

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- B. "In-stream Flow Rule" means the Instream Flow rule for the Spokane River as established by Washington State Department of Ecology in Chapter 173- 557 WAC.
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#### Section 13.045.030 Intertie Guidelines

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- B. Required five year agreement reviews within any term for supplemental supply and two years for any emergency supply;
- C. Definition of maximum water flow rates and maximum/annual water volumes for supplemental and emergency water supply;
- D. Provisions regarding sale of wholesale water to other water purveyors for municipal purposes, as applicable.
- E. Provisions regarding collaboration on system loss and efficiency measures within the wholesale customer's infrastructure that meets state standards;
- F. All Parties will have a written water conservation plan with specific reasonable goals and are required to implement and maintain annual water conservation, reduction of system loss in accordance with Chapter 246-290 WAC and efficiency measures with a goal of reducing the annual amount of water consumed per capita year over year especially during Summer and early Fall. The plan will include program effectiveness consultations at least every three years, including documentation of changes in total gallons and per capita use on an annual and seasonal basis;
- G. All Parties shall participate in any drought response water conservation measures triggered by weather conditions and/or Spokane River flows as may be developed and adopted by the City for all retail and wholesale customers with a methodology for reasonable notice included in the contract; and
- H. An acknowledgement by customers that the wholesale water supply may be curtailed or interrupted due to drought, low flows in the Spokane River, or shortage consistent with city code or adopted plans, and such reasonable rules or measures adopted by the water department.

#### Section 13.045.040 Water Charges

- A. Charges for water will be as established by the wholesale purveyor rate set out in SMC 13.04.2014.
- B. Intertie agreements shall include clear delineation of costs that are the responsibility of the customer, including capital and construction costs, and those that are the responsibility of the City of Spokane.

#### Section 13.045.050 Water Rights and Seasonal Flow Goals

- A. The City of Spokane shall not sell or transfer any water rights without the approving vote of City Council. The City upon approval of City Council may purchase available water rights if it would be prudent to do so for the purpose of protecting the resource for system resiliency purposes, and/or operational efficiency as provided by Chapter 35.21 RCW.
- B. The City Council will use the best available evidence and science to set written appropriate minimum seasonal river flow goals for the portion of the Spokane River flowing through the City of Spokane in respect to City operations only. Appropriate minimum flow goals set by the City Council may exceed the minimum standard as established by Washington State Department of Ecology in Chapter 173- 557 WAC. Such goals are not intended to overlap the legal jurisdiction of the State of Washington.
- C. The City is committed through its policies and environmental sustainability plan to substantially conserve water and reduce per capita consumption across the City's water distribution system as set out in the City's Water System Plan and water use efficiency goals that are established by City Council Resolution. In order to achieve the City's water use efficiency goals, the City will provide budget support for the following operational and maintenance efforts and policy framework that will improve and protect the regional delivery system's natural water resources, efficiency and effectiveness, including flows in the Spokane River:
  - 1. Conservation educational programming and technical advice;
  - 2. Implementation of conservation measures on city owned property;
  - 3. Programs supporting water conservation equipment and irrigation reduction for all customers;
  - 4. Water re-use programs;
  - 5. Seasonal irrigation efficiency and reduction measures; and
  - 6. Other innovations that will support water conservation goals and increased flows in the Spokane River.
- D. The City's policy is to adhere to its river flow goals by following its conservation measures and efficiency plans developed by the water department, which may include implementing seasonal irrigation measures in accordance with the City's policies and procedures. The City shall develop and periodically update a

comprehensive plan and clear policies and procedures applicable to all customers and classes to achieve its water conservation goals.

#### Section 13.045.060 Reporting

The Water Department shall provide a written report each February to the City Council that provides for the previous five years, the total number of gallons pumped by the City, the total number of gallons provided by intertie agreements, the revenue from intertie agreements collected and associated costs, the amount of money spent on conservation, the estimated number of gallons of water saved on an annual basis from new City of Spokane conservation efforts, the percentage and number of gallons lost by the water distribution system, the per capita consumption for all customers of the City's water service, and other information that will assist the Council in evaluating the goals of increasing river flows and decreasing the amount of water consumed per capita each year across the City of Spokane's water distribution system.

PASSED by the City Council on	
	Council President
Attest:	Approved as to form:
City Clork	Assistant City Attorney
City Clerk	Assistant City Attorney
Mayor /	Date
	Effective Date



					Search
Home	Title 13	Chapter 13.04	Section 13.04.1925		
		Highlight Word			
Title 13	B Public Utilit	ies and Services			
Chapte	er 13.04 Wat	er			
Article	I. General P	rovisions			
Section	n 13.04.1925	Water Conservatio	n Measures		
A. L	evel I:				
	1. Every y measur	ear between June 1 es:	- October 1 the City of	Spokane shall implement the following cons	ervation
	a. A	prohibition on water	ing outdoor vegetation d	uring the hours of 10 am to 6 pm;	
	b. A	limitation on waterin	ng outdoor vegetation on	each parcel to four days per week;	
	c. A	suggested limitatior	n of a total of 2 hours dail	y outdoor watering on each parcel; and	
	d. A sio	suggested prohibiti dewalks, driveways,	ion on the use of water decks, and patios.	for washing outdoor hardscape features,	such as
B. L	evel II:				
	1. When th Lower C or a ma conserv	he flow in the Spok Crossing) is predicte ajority of the City C ation measures:	ane River, as measured d to fall below 1,000 cfs ouncil declares a drough	at USGS monitoring location 12422500 (lo any time between June 1 – October 1 and th nt emergency the City shall implement the f	cated at e Mayor ollowing
	a. A	prohibition on water	ing outdoor vegetation d	uring the hours of 10 am to 6 pm;	
	b. A	limitation on waterin	ng outdoor vegetation on	each parcel to two days per week;	
	c. A	limitation of a total of	of 2 hours outdoor waterir	ng daily on each parcel; and	
	d. A dr	prohibition on the iveways, decks, and	use of water for washir patios.	ig outdoor hardscape features, such as sic	lewalks,
	2. Paragra	aph (B) shall take eff	ect on June 1, 2023.		
C. E	exemptions:				
	1. The Pa availabl from th necessa systems interface facilities	rks Department sh e to comply with the ese measures whe ary for the purposes s, allowing for the es e areas, operating s.	all continue its efforts to a above mandatory and v in the Parks Director in of watering trees, wateri stablishment of newly-pla pools and splashpads,	o upgrade park infrastructure as funding b oluntary measures. The department shall be forms City Council in writing that an exem ng the remaining parks with non-automated i anted landscape, mitigating fire risk in wildlar and operating public golf courses/sports	ecomes exempt iption is rrigation id-urban program

2. The Public Works and Utilities Department may grant to city residents reasonable exemptions from these measures for the purposes of watering community/personal vegetable gardens, trees located either within the public right-of-way or on private property, to allow for the establishment of newly-planted landscape, or in wildland-urban interface areas to mitigate wildfire risk.

- 3. The Public Works and Utilities Department and Park Department shall, no later than 180 days after the effective date of this section, publish standards and requirements specifying the process for seeking additional exemptions under this paragraph and the process and timelines for approval, rejection, and, if necessary, appeals from rejections of applications for exemptions under this paragraph.
- D. Upon enactment of this chapter, the Water Department shall provide education and community engagement to all water rate payers within the city's retail water delivery area on the importance of complying with the new legal standards for watering outside vegetation and the financial and other benefits to the community.

Date Passed: Monday, June 6, 2022

Effective Date: Wednesday, July 6, 2022

ORD C36209 Section 1

# 4.4 2020 Water Conservation Master Plan with Approved Resolutions

# CITY OF SPOKANE WATER CONSERVATION MASTER PLAN



# **Executive Summary**

#### **Plan Overview**

The Water Conservation Master Plan presents goals, targets, strategies and actions to conserve our water supply and to sustainably manage it for future generations. The variety of water conservation activities provides an opportunity to reduce demand while minimizing customer sacrifice and have been selected based on their pumping reduction potential for a reasonable cost.

Water system operation improvements to reduce distribution system loss, to improve meter accuracy, and to utilize tiered rate structuring are included in the Spokane Water System Plan. The Water Conservation Master Plan builds on those strategies, focusing on utility sponsored programs that help customers reduce their water use (programmatic conservation). The savings that occur due to plumbing codes/standards when customers replace older, less-efficient fixtures are considered within the strategies of this plan.

Activities that reduce indoor water use primarily impact the year-round base water use, while efforts that reduce outdoor water use target the peak season increased use. Both indoor and outdoor efforts will impact the peak season water use by lowering the base and assisting in shaving the peak. Figure 1 shows how the peak season water use can be impacted by either "shaving the peak" or "shaving the base".



#### **Overarching Goals and Targets**

The Water Conservation Master Plan centers on the achievement of the following overarching goals:

- 1. Growth without Additional Pumping: balance increasing number of connections system-wide with reductions in consumption to ultimately eliminate or defer potential capital expense.
- 2. Reduction in Seasonal Demand Peaks: peak seasonal demand relies on the distribution capacity of our system and in some areas, requires justin-time water service. Keeping demand within the storage capacity of our system is safer, more reliable, and more cost-effective.

As our community's priorities shift, technologies change, and new knowledge is revealed, the plan will undergo a continual process of monitoring, evaluation, and evolution to keep pace with changing needs.

#### Water Use Efficiency

The City of Spokane addresses water efficiency through both the supply and demand sides of the water system. Water loss control programs (supply) fall under the umbrella of evaluation and reduction of Distribution System Loss (DSL). Components of this strategy include: pipe condition assessment, leak detection, system water audits, meter replacement program, and measurement of water consumption through authorized and unauthorized use from hydrants.

Our current conservation program addresses consumer water demand in the following ways: education, facility efficiency improvements, rebate programs, operational standards, a wastewater conservation credit for the lowest 20% of indoor water users and an inclined block water consumption rate structure.

In order to ensure a reliable, sustainable, resilient water supply while our economy and population grow, new policy will be needed. Regulations, ordinances and permitting policies have proven to significantly reduce water use throughout the nation. An overview of successful municipal irrigation restrictions has been provided in the appendix. To significantly address current and future water consumption, implementing water wise policies will effectively protect and sustain our water supply.

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CITY OF SPOKANE WATER CONSERVATION PLAN

# Introduction





# A River Runs Through It

Living in the Inland Northwest provides us with four beautiful seasons, year-round recreational opportunities and a stunning backdrop of low-slung mountains, coniferous forest and, during certain times of the year, a fierce and roaring river.

The Spokane River supported the early life of tribes and settlers with food, commerce and drinking water. As our small town grew and many others around it, our supply became degraded by human contamination.

Discovery of a prolific aquifer beneath our feet changed our source of water in 1907. It wasn't until recently that we began to understand the aquifer and its interdependent relationship with the river. Substantial studies from the USGS and the region's public water providers show us that the Spokane River is the largest recharge source of the aquifer and it is also its largest point of outflow.

For many years, our water supply was thought of as "infinite" and the quality "too pure".



Figure 2: Water flows into the river through the bottom or through springs on the banks of the river.



Figure 3: In these areas the water seeps out of the bottom of the river and recharges the SVRP aquifer.

Our water system has grown to accommodate population growth and the community's love of green landscapes. We now recognize that we don't have an endless supply of water, and we and we are not the same community that we first served when the Water Department was created more than 135 years ago. Spokane is characterized as a highdesert climate, and during the summer months of the year, we can experience long periods without precipitation with high temperatures. The year 2015 brought us our worst case example: a significantly decreased snow-pack, abnormally warm spring temperatures, and an early runoff meant that we saw our river at its lowest level during the summer critical demand period. We also experienced difficulty pumping water from some of our more shallow wells.

Let us use 2015 as the impetus to use our natural resources more wisely and recognize their value. Each time we use water is an opportunity to make a deliberate choice to use this precious resource responsibly.

The availability of this resource ensures we will have clean and sufficient water to drink, trees to shade our streets, gardens to grow, and parks to play in. The water that flows from our taps makes our life in Spokane bountiful.

# Spokane Water Today

#### **Our Water Source:**

The Spokane Valley Rathdrum Prairie (SVRP) aquifer is the sole source of water to more than 600,000 residents in the Inland Northwest. It underlies the eastern, central, and northern portions of the City and primarily flows from the east to the west and north, following the general topographic surface of the Spokane valley. Recharge of the SVRP aquifer is primarily from the Spokane River, area lakes and infiltration of rainfall. Given that the City of Spokane is directly dependent upon supply from the aquifer, it is critical for the City to understand and plan for the risks associated with potential changes in aquifer levels and water quality.

Although the SVRP aquifer is highly productive and highly transmissive, it is not inexhaustible. The Spokane River and SVRP aquifer are hydraulically connected. The gaining reaches of the Spokane River are the largest outflow source of the aquifer, while the losing reaches of the Spokane River remains the largest source of water to the SVRP aquifer. This gain in flow is vital for the ecological function of the river, supports recreation and tourism, and protects historic and cultural resources. Pumping less water from the aquifer, especially during summer months, could potentially mean more water available for the gaining reaches of the river.

#### Spokane Water System

The water system has seven well stations with 14 wells and 27 well pumps, 25 booster pump stations with 72 booster pumps, 22 pressure zones with 34 reservoirs, and more than 1,000 miles of water main. Well stations draw drinking water directly from the aquifer. The water is pure enough to be pumped directly from the ground without any treatment. Chlorine is added to the water to ensure that quality is maintained throughout the distribution system. To pump water up to storage tanks and reservoirs, booster stations are used to help move the well water from lower elevations. To meet customer needs, the system has more than 100 million gallons of water storage capacity. The amount of water stored in a given tank depends both on the demand for the area as well as the fire protection requirements.

The wide variety of geographical features and substantial elevation changes found in and around the City, create the need for numerous water system pressure zones.

Within the City's service area, the south side of the City (South Hill) rises from the Spokane River to Moran Prairie and the western slopes of Browne's Mountain. Elevations range from the valley floor at 1,870 feet above sea level to about 3,000 feet. To the West, elevations vary from a low of 1,735 feet in the Latah (Hangman) Creek-Vinegar Flats area to 2,580 feet on the West Plains. The North side of the City (generally north of the Spokane River) experience elevations that range from 1,683 feet to 2,145 feet. Also on the North side is a plateau known as the Five Mile Prairie, a prominent geographical feature. Elevations of the prairie range from 2,145 feet at its base, to 2,400 feet on the plateau.

#### **Aquifer Levels Impact on Pumping**

Water supply is reliant upon the aquifer levels at our wells, which are at a fixed depth - based on well construction. Low aquifer levels impact our ability to distribute water efficiently throughout the system. These system characteristics make water conservation an even more critical component of the City of Spokane's longterm goals of sustainability, social responsibility, and affordability (Triple Bottom Line).



# **Customer Profile**

# Water Use Characteristics

Water use characteristics and customer sectors are important in designing a water conservation program that fits our customer base and consumption patterns. Water consumption for the City of Spokane Water Service Area is 53% single family, 14% multi-family, 24% commercial, 5% institutional, and 4% City parks and recreation facilities.

- The single family sector includes residential detached homes, duplexes, planned developments and mobile home parks.
- Multi-family consists of residential buildings with 3 units or more.
- Commercial sector includes a wide variety of buildings and water use from small restaurants to large industrial complexes and private golf courses.
- Institutional accounts include city/county/state/federal governmental buildings and grounds, public and private educational facilities, non-city owned private parks and play-fields.
- Park accounts include all city-owned parks and golf courses.

#### Table 1: Customer Sector Accounts & Consumption

Sector	Number of Accounts	2018 Annual Consumption (mg)
Single Family (SF)	66,482	9,553
Multi-Family (MF)	2,504	2,564
Commercial/Industrial	5,848	4,410
Institutional	643	988
Parks	277	716
Total	75,754	18,105







## **Characteristics Analysis**

- The single family sector is a great target for the conservation program because it represents the largest portion of consumption (53%) and the vast majority of accounts (88%) and has a large savings potential.
- The multi-family sector has a much smaller percent of accounts (3%) compared to its consumption (14%) and could provide a good return on investment of resources.
- The commercial/industrial sector is a good target for the conservation program because of its sizable portion of consumption (24%).
- Together, the institutional and parks accounts make up 9% of the consumption and just over 1% of customer accounts. However small, conservation activities in this sector have the ability to visibly demonstrate government's commitment to natural resource conservation and influence decision making.

# **Customer Profile**

## **Housing Stock Characteristics**

The type and age of housing in the Spokane service area is important to choosing appropriate water conservation hardware and identifying behavior changes to promote throughout the program. National toilet and showerhead standards first took effect in 1994, and buildings constructed before this period could have pre-code hardware. Information on housing type and age was provided from the U.S. Census Bureau 2013-2017 American Community Survey 5-year estimates. Note that due to the complexity of our entire service area, only data reported for the City of Spokane have been reviewed.





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# **Customer Profile**

# **Customer Demographics**

The demographics of our customers is paramount to designing a water conservation program and activities that fit those characteristics. Data was obtained from the U.S. Census Bureau 2013-2017 American Community Survey 5-year estimates.

#### Figure 9: Age Distribution





Age: The 25-54 age groups each represented a higher percentage of the population than youth and senior groups.

Education: Customers that have a high-school diploma and/or attended but did not complete college represent the majority of our adult population.

# Figure 10: Educational Attainment of Population $\geq$ 25yrs old



#### Figure 11: Household Income



Income: The average household income in Spokane is \$62,092 compared to the United States' average of \$77,713. Income plays a significant role in an individual's motivation or ability to participate in conservation activities. Providing financial and technical assistance will help customers at all income levels participate.

18%

# **Historic Conservation Efforts**

#### **Original Conservation Driver**

Since 2003, State municipal water laws have asked public water systems in Washington to maintain or create a water use efficiency program in order to demonstrate to the State that the purveyor is being a responsible steward of their inherent water rights. The City of Spokane has complied with the law by publicly establishing water savings goals, striving to meet a standard of no more than 10% system water loss, metering all connections, performing leak detection, establishing conservation rate structures and implementing customer education. In 2006, the City adopted the Water Stewardship Strategic Plan, which set goals as a per capita (per person) seasonal reduction in pumping. The goals were based on total pumpage for all uses including residential, commercial, industrial, and government, and are expressed on a per capita basis. Goals were specified for seasonal periods of October through March, April through June, and July through September.

# **Current Goals and Program**

In 2014, the City of Spokane updated the annual water use efficiency goals based on metered consumption instead of measured pumping and are associated with a specific customer segment (RES 2014-0043). The indoor residential goal has been consistently met since 2014, and in most years the outdoor goals have not been met.

Table 2: 2014 Water Use Efficiency Goals

	Reduction Goal	Time Measured
1	0.5% Reduction in SF Residential Indoor	Dec 15 – February 14
2	2% Reduction in SF Residential Outdoor	July 15 – September 14
3	2% Reduction in Commercial /Industrial Outdoor	July 15 – September 14
4	2% Reduction in Governmental Outdoor	July 15 – September 14

Table 3: Water Use Efficiency Goal Results 2014-2019. Goal is measured as daily gallons consumed per connection.

Use		1	2	3	4
)19.	Year	Goal / Actual (gal/day)	Goal / Actual (gal/day)	Goal / Actual (gal/day)	Goal / Actual (gal/day)
ed	2014	122 / 122	516 / 513	4,318 / 4,325	4,921 / 4,759
	2015	121 / 120	516 / 562	4,232 / 3,837	4,822 / 4772
	2016	121 / 119	492 / 564	4,147 / 3,975	4,726 / 5,822
	2017	120 / 118	479 / 638	4,064 / 4,602	4,631 / 5,410
	2018	119.6 / 115	467 / 617	3,983 / 4,088	4,539 / 5,745
	2019	119 / 113	455 / 553	3,904 / 3,947	4,448 / 5,189

#### City of Spokane Water Department's current conservation efforts include:

Water System: Leak detection, distribution system loss (reduction 1.75 bg/year from 2012-2018), water audits, improved meter accuracy, tiered rate structure.

*City Owned Parks:* Indian Canyon (16.8 mg saved in 2019) and Esmeralda golf course irrigation improvements, Manito Park turf reduction and irrigation system, converting Manito Koi Pond to recirculating system, controls for splash pads that limit the run time, irrigation design standards.

*Customer Program:* the City offers education and technical assistance, giveaways in the form of efficient showerheads (limiting flow to 2 gpm), kitchen sink aerators (1 gpm), bathroom sink aerators (1 gpm), and toilet dye tabs to test for leaks. Outdoor water saving tools include: SpokaneScape Turf Replacement Rebate Program, soil moisture meters, hose timers, rain barrels, and garden hose nozzles with repair parts.

# **Conservation Master Plan Development Strategy**

Water conservation is important to the Spokane community for many reasons:

- Conservation programming could delay or eliminate the need for system expansion and capital costs.
- Conservation measures have potential to impact river flows during dry months.
- Conservation provides us with sustainability and resiliency planning given anticipated climate variability.
- Conservation planning efforts and activities meet the City's legal obligations to conserve and also provide us with better guidance to meet our goals (WAC 246-290-830).
- The development of a Water Conservation Master Plan is a joint Mayor/Council initiative supported both by state requirement and Council Ordinance (C35630).

The Conservation Master Plan has been developed with the support of two internal committees and the Sustainability Action Subcommittee (SAS).

- Advisory Committee: The advisory committee is comprised of crossdepartmental leadership engaged to provide guidance and strategic oversight of the program's direction, attainability, and financial sustainability.
- Technical Committee: The technical committee has been engaged to provide cross-departmental review of cost and operations inputs.
- SAS: Sustainability Action Sub-Committee is a council-appointed advisory group comprised of volunteer stakeholders around the Spokane community.
- Table 4 shows the additional stakeholders/influencers and variables that were considered in creating the Water Conservation Master Plan.

#### Table 4: Plan Development Considerations

Stakeholder	Interest in Conservation Plan
Customers/ Rate Payers	*Assistance with utility bills *Increases in population *Desire to keep bills low
Spokane City Council	*Desire for sustainability and affordability throughout the City of Spokane *Positive customer feedback
State Department of Health	*Requirements for compliance *Can change requirements
Tribes	*Water for aquatic life and habitat protection
Environmental Groups	*Sustainable water supply, water conservation
Influence	Consideration in Conservation Plan
Plumbing Code	*Continuously improving officiancy standards for fixtures, as
r lumbing code	homes are updated, efficiency improves over time
Avista's conservation programming	*Partnering on showerhead distribution and education outreach
Avista's conservation programming MySpokane Customer Service	<ul> <li>*Partnering on showerhead distribution and education outreach</li> <li>*Tools to help promote conservation through billing, website, and customer interactions</li> </ul>
Avista's conservation programming MySpokane Customer Service Climate Variability	<ul> <li>*Partnering on showerhead distribution and education outreach</li> <li>*Tools to help promote conservation through billing, website, and customer interactions</li> <li>*Has the potential to affect water supply and demand</li> </ul>
Avista's conservation programming MySpokane Customer Service Climate Variability Large areas in Spokane County for development	<ul> <li>*Partnering on showerhead distribution and education outreach</li> <li>*Tools to help promote conservation through billing, website, and customer interactions</li> <li>*Has the potential to affect water supply and demand</li> <li>*Newer homes will have more efficient plumbing</li> <li>*Opportunities to install low-water use landscaping</li> <li>*Population growth could support more commercial growth</li> <li>*West Plains PDA - if developed without conservation in mind could cause costly capital improvements</li> </ul>

The program has been designed under the following criteria:

- SAVES WATER: Each element is reasonably expected to contribute to water savings in the near-term or longer-term.
- ALL CUSTOMERS: The program will have offerings for all customer classes to participate.
- FIXTURE UPGRADES & BEHAVIOR: The program should maximize efficiency by promoting new technology and behavior changes.
- INDOOR & OUTDOOR: The program will have offerings to achieve both indoor and outdoor efficiencies.
- CUSTOMER COST SHARE: Financial incentives can provide the motivation for individuals to participate in efficiency measures and reward positive behavior.
- BEYOND-CODE: Move customers to levels that are more efficient than current plumbing code to maximize water savings.
- PARTNERSHIPS: The program will work to leverage partnerships that help increase participation and reduce costs. Potential partners include other water and energy utilities, home-improvement stores, and community-based organizations.
- See Appendix for a list of all considered incentivized conservation activities.

# **Conservation Master Plan**

The variety of water conservation activities provides an opportunity to reduce demand while minimizing customer sacrifice and have been selected based on their pumping reduction potential for a reasonable cost.

#### VISION: Reliable, Sustainable, Resilient Water Supply

Spokane water customers and City facilities are using water efficiently, new development construction is designed to minimize water use, and fixtures in existing developments have been upgraded to maximize water efficiency.

Goals	Key Performance Indicators	Strategies
Service Area Growth without Additional	Annual: 10 million gallons conserved for all participants	S2-S5
Pumping (total overall base consumption).	Annual Residential (SF/MF): 5,000 gallon reduction per participating connection	S3-S4
decreases from 2018 levels	Annual City: 2 million gallon reduction for all city-owned properties	S5
despite population and economic growth.	Annual Commercial: 200,000 gallon reduction per participating connection	S4
	Annual: 30 education events	S8
	Annual: 1,400 rebates issued	S2-S4, S8
	Long-Term: Conserved 500 million gallons by 2030	S1-S8
	Long-Term: 5% reduction in per capita consumption by 2030	S1-S8
Reduction in Seasonal Demand Peaks (outdoor	Annual: Reduction in MDD (maximum day demand) during active growing season	S1-S3, S5-S8
consumption)	Long-Term: 15% reduction in seasonal peak demand by 2030	S1-S8

MDD: Maximum day demand is the quantity of water supplied during the highest-use day of the year

	CORRESPONDING STRATEGIES
<b>S</b> 1	Target pressure zones with highest impact (could be due to cost of distribution, risk exposure, system capacity, redundancy, etc)
<b>S2</b>	Work with high water users within all customer classes to maximize results
<b>S</b> 3	Financial Incentives for Outdoor Conservation
<b>S4</b>	Financial Incentives for Indoor Conservation
<b>S</b> 5	City-Owned Facility Program
<b>S</b> 6	Development Policies Targeting Responsible and Consistent Growth
<b>S7</b>	Technological Advancements: Enhanced data accuracy and monitoring
<b>S</b> 8	Education and Technical Assistance

CITY OF SPOKANE WATER CONSERVATION PLAN

# **Conservation Master Plan**

#### S1: Target pressure zones with highest impact.

Outlying pressure zones have the highest peaking factors and the highest cost to the City to provide water service. As demand or connection accounts increase within the pressure zone over time, more existing storage must be dedicated to emergency storage. Outreach activities will be focused in the high cost/high risk pressure zones identified below.

**Priority Actions** 

S1-A	Target high risk pressure zones (just in time delivery and/or extremely high per capita consumption) with educational outreach, technical assistance, incentive opportunities.
S1-B	Target high cost pressure zones (determined by pumping): Southview, Eagle Ridge 1 & 2, Woodridge, Glennaire, West Plains, Kempe.
S1-C	Landscaping and irrigation standards for new development.

#### S2: Work with high water users within all customer classes to maximize water use efficiency.

High water users present substantial opportunities for water conservation; identify impediments and barriers for customers to use water wisely.

#### **Priority Actions**

S2-A	Evaluate the top 50 users per customer sector on a biannual basis, comparing lot size and water use to determine if efficiency improvements could be made.
S2-B	Make contact with top 50 users annually with technical assistance and incentive opportunities.
S2-C	Implement water use efficiency incentives (See S3 and S4) with a minimum of 5 customers per sector annually.

#### S3: Residential, Multi-Family, Commercial Financial Incentives for Outdoor Conservation

The Alliance for Water Efficiency (AWE) Water Conservation Tracking Tool version 3.0 (Tracking Tool) was used to evaluate the benefit and costs for utilities in implementing water conservation activities. The Tracking Tool has a library of 30 defined water conservation activities. These activities have 21 parameters. These parameters have predefined values that can be supplemented with utility specific data if they are available. The following activities have been selected for water customers based on cost effectiveness, staff availability and impact on peak demand:

#### **Priority Actions**

<b>S3-A</b>	Implement financial incentive program using utility inserts, press releases, outreach events and social media avenues to advertise. (Cross-cutting strategy: S2-B)
S3-B	Irrigation Controller Rebate (Single Family): Residential customers who purchase a WaterSense approved irrigation controller can submit a receipt and receive a \$100 credit on their utility bill post verification of installation.
S3-C	Irrigation Controller Rebate (Multi-Family): Customers who purchase a WaterSense approved irrigation controller can submit a receipt and receive a \$500 credit on their utility bill post verification of installation.
S3-D	SpokaneScape Turf Replacement Program: Residential customers who remove turf and replace with drought tolerant plants, low-volume irrigation and mulch are eligible for a credit of \$0.50/sq ft, up to \$500.
S3-Е	SpokaneScape Turf Replacement for Commercial Properties: customers who remove turf and replace with drought tolerant plants, low-volume irrigation and mulch are eligible for a credit of \$0.50/sq ft, up to \$2,500.
S3-F	Efficient Nozzle Replacement: Single Family customers that swap out sprinkler heads for rotary nozzles with built in pressure regulation are eligible for a \$4/nozzle credit.

#### Table 5: Outdoor Conservation Financial Incentives

ACTIVITY	ANNUAL WATER SAVINGS PER UNIT (gallons)	ANNUAL NUMBER OF UNITS	REBATE AMOUNT	ANNUAL PROGRAM COST	TOTAL ANNUAL GALLONS SAVED	WATER SAVINGS/ INVESTED DOLLAR (gallons)
Irrigation Controller -SF	10,805	100	\$100	\$10,000	1,080,500	108
Irrigation Controller- MF	43,221	10	\$500	\$5,000	432,210	86
SpokaneScape - SF	11,440	100	\$500	\$50,000	1,144,000	23
SpokaneScape- MF/ COM	28,600	10	\$2,500	\$25,000	286,000	29
Efficient Nozzles -SF	300	1,000	\$4	\$4,000	300,000	75
TOTALS	94,366	1,220	-	\$94,000	3,242,710	

SF: Single Family Customers; MF: Multi-Family Customers; COM: Commercial

# **Conservation Master Plan**

#### S4: Residential, Multi-Family, Commercial Financial Incentives for Indoor Conservation

Both indoor and outdoor efforts will impact the peak season water use, by effectively lowering the base and assisting in shaving the peak. Indoor conservation will reduce flow to the wastewater collection systems and provide interceptor relief, allowing for more capacity at the treatment plant and at critical points in the collection system. The following activities have been selected using the AWE Water Conservation Tracking Tool based on cost effectiveness, staff availability and impact on year-round consumption:

#### Priority Actions

S4-A	Implement financial incentive program using utility inserts, press releases, outreach events and social media avenues to advertise. (Cross-cutting strategy: S2-B, S3-A)
S4-B	Low-Flow Showerheads (SF/MF): WaterSense labeled showerheads (1.5 gpm) will be purchased and available for customers at the customer service counter in City Hall, community events, and other locations.
S4-C	High-Efficiency Toilets (SF/MF): Customers who purchase a WaterSense approved toilet (1.28 gpf or less) can submit their receipt and receive a \$100 credit on their utility bill post verification of installation.
S4-D	High-Efficiency Toilets (COM): Customers who purchase a WaterSense approved toilet or urinal (1.28 gpf or less) can submit their receipt and receive a \$100 credit on their utility bill post verification of installation.
S4-E	Cooling Tower Conductivity Controller: Customers who purchase and install a conductivity controller (increases the amount of times water will re-circulate through cooling tower) are eligible for a \$695 credit.

#### Table 6: Indoor Conservation Financial Incentives

ACTIVITY	ANNUAL WATER SAVINGS PER UNIT (gallons)	ANNUAL NUMBER OF UNITS	REBATE AMOUNT	ANNUAL PROGRAM COST	TOTAL ANNUAL GALLONS SAVED	WATER SAVINGS/ INVESTED DOLLAR (gallons)
Low-Flow Showerhead- SF/MF	2,062	500	\$6	\$3,000	1,031,000	344
High Efficiency Toilets- SF	9,541	500	\$100	\$50,000	4,770,500	95
High Efficiency Toilets- MF	13,644	500	\$100	\$50,000	6,822,000	136
High Efficiency Toilets- COM	13,020	100	\$100	\$10,000	1,302,000	130
Cooling Tower Conductivity Controller - COM	209,880	10	\$695	\$6,950	2,098,800	302
TOTALS:	248,147	1,610	-	\$119,950	16,024,300	

SF: Single Family Customers; MF: Multi-Family Customers; COM: Commercial Customers

#### **S5: City-Owned Facility Program**

Establish the City of Spokane as a model within our community and to other communities by implementing, practicing, and demonstrating water efficiency on all City properties. This will demonstrate our commitment to conservation and to a sustainable future.

#### **Priority Actions**

S5-A	Develop landscape and irrigation standards for City properties and projects.
S5-B	Conduct facility water audits - inventory existing equipment to identify and plan efficiency upgrades.
S5-C	Offer financial incentives for efficiency upgrades.
\$5-D	Continue to build relationships with Parks and Grounds maintenance crews to foster a positive attitude toward conservation.
S5-E	Offer educational courses and irrigation efficiency trainings/certifications for appropriate City staff.
S5-F	Nozzles: Irrigated City properties will swap out sprinkler heads for rotary nozzles with built in pressure regulation. Ordered in bulk can cost \$3.50/ nozzle, labor costs of installation are not included
S5-G	Irrigation Controllers for Parks: Large landscape controllers that use technologies to improve efficiency (ie: centralized computer control, moisture sensor, rain shut-off switches).
S5-H	High Efficiency Toilets: Replacement of 3.5 gpf toilets with WaterSense approved toilet or urinal (1.28 gpf or less). Cost includes installation.
S5-I	Sink Aerators: City facilities will be inventoried and existing aerator that is >1.5 gpm will be replaced.
S5-J	SpokaneScape Demo Gardens: Turf replacement at existing, high traffic landscaped areas with drought tolerant plants, low-volume irrigation and mulch.
S5-K	Facility Audit: Private contractor will analyze 5-8 city facilities, provide minute reads on water consumption and identify resolutions to eliminate water waste.

See next page for table of activities.

# **Conservation Master Plan**

Currently the full program is in development and the intention of the conservation team is to dedicate resources annually to this body of work. The first year's slate of activities are listed below:

#### Table 7: City-Owned Facility Activities

ACTIVITY	ANNUAL WATER SAVINGS / UNIT (gallons)	ANNUAL NUMBER OF UNITS	INCENTIVE	ANNUAL PROGRAM COST	TOTAL ANNUAL GALLONS SAVED	WATER SAVINGS/ INVESTED DOLLAR
Nozzles	300	500	-	\$2,000	150,000	75
Irrigation Controllers	43,221	2	\$10,000	\$20,000	86,442	4
Ioilet-Replace & Install	13,020 100 250			\$25,000	1,302,000	52
Sink Aerators	Data co	ollection in p	rocess	\$3,000	-	-
SpokaneScape Demo Gardens	Varies/sf	1	-	\$30,000	-	-
Facility Audit	-	-	-	\$50,000	-	-
TOTALS:	-	-	-	\$130,000	-	-

#### S6: Development Policies Targeting Responsible and Consistent Growth

Adopting cost-effective water use efficiency codes and standards are a critical component of the City of Spokane's long-term goals of sustainability, social responsibility, and affordability.

#### **Priority Actions**

S6-A	Evaluate, update or establish building, planning, landscape, irrigation, and stormwater codes for water efficiency.
S6-B	Evaluate options and viability for water conservation and reuse through stormwater management or advanced wastewater treatment.
S6-C	Engage SAS in water use policy review and potential regulation development.

#### **S7: Technological Advancements**

Enhanced data accuracy and monitoring is a valuable tool for all customers to help manage their water consumption.

#### **Priority Actions**

S7-A	Conduct a forensic billing analysis annually. Identify billing system anomalies and systematic data handling errors to target high users and to reduce unauthorized consumption.
S7-B	Evaluate options for smart meter technology to improve customer self monitoring and leak detection.

#### **S8: Education and Technical Assistance**

Education is key to changing societal norms and behaviors toward conservation, and technical assistance can provide customers the tools needed to accomplish conservation activities.

**Priority Actions** 

<b>S8-A</b>	Partner with high water users in all customer sectors to maximize water efficiency.
S8-B	Facilitate public education of all ages on water conservation at community events, neighborhood meetings, classrooms and city-hosted classes.
S8-C	Utilize social media platforms to facilitate communication about water conservation per capita goals and strategies. Recognize and promote leaders in conservation and showcase businesses, schools and individuals that are taking action.
\$8-D	Implement education campaign related to water conservation and utilize it to grow participation and awareness of City financial incentive programs.
S8-E	Encourage voluntary drought response measures to the public through social media platforms and campaign activities by communicating low river flows and strategies to reduce consumption and improve river health.
<b>S8-F</b>	Research low or no-cost leak detection and repair for low-income customers.
S8-G	Update the City's "Slow the Flow" conservation webpage to provide pertinent information on rebate incentives and other program components.
S8-H	Develop and update the City's "SpokaneScape" turf-removal rebate webpage to encourage water-wise landscaping in the community.
S8-I	Collaborate with existing community groups to effectively implement strategies and spread awareness. Potential partners include other water utilities, energy utilities, home-improvement stores, community- based organizations and professional organizations.
S8-J	Expand upon the City's Environmental Programs dashboard to track internal water use and increase efficiency awareness across all City departments.
S8-K	Develop and facilitate water conservation courses for City staff and host annually.
S8-L	Develop and implement a water-wise or SpokaneScape commercial and industrial certification program.
S8-M	Design and construct SpokaneScape demonstration gardens throughout service area.
<b>S8-N</b>	Develop and distribute a guide for enhancing water-use efficiencies on landscapes and irrigation systems.
<b>S8-O</b>	Develop and distribute a water-wise plant list specific to Spokane's climate and soil conditions.
S8-P	Develop and distribute landscape template guide for commercial, residential and institutional properties.
<b>S8-Q</b>	Utilize utility billing software to show the relationship between water consumption and entire utility bill.

# Conservation Budget, Staffing, Evaluation & Reporting



# **Budget:**

The annual budgets for a 6-year program are shown below. It is divided into FOUR categories: Rebates, O&M (conservation staff), City Facility Program conservation activities and Contractual Services. The budget is all inclusive and pays for City conservation staff time, rebates to customers, contractors, marketing, and all other expenses.

YEAR	REBATES	O&M	CITY FACILITY PROGRAM	CONTRACTUAL SERVICES	TOTAL
2020	\$213,950	\$125,000	\$130,000	\$50,000	\$518,950
2021	\$213,950	\$125,000	\$130,000	\$50,000	\$518,950
2022	\$213,950	\$125,000	\$130,000	\$50,000	\$518,950
2023	\$213,950	\$125,000	\$130,000	\$50,000	\$518,950
2024	\$213,950	\$125,000	\$130,000	\$50,000	\$518,950
2025	\$213,950	\$225,000	\$130,000	\$50,000	\$618,950

# Staffing:

The City of Spokane currently has two full-time staff members assigned to the conservation program. Moving forward, Utility Billing Staff will play a large supporting role facilitating residential rebate processing and reporting. Existing Conservation Staff positions are shown below.

#	TITLE	POSITION DESCRIPTION
1	Water Conservation Coordinator	Overall program planning and management, commercial rebates and education/ technical assistance, evaluation, marketing, research, data analytics
2	Water Efficiency Specialist	Landscape rebates, education/technical assistance, landscape program evaluation and planning

# **Evaluation:**

The Water Conservation Team will monitor the progress of the Water Conservation Master Plan implementation on an ongoing basis, evaluating and tracking the progress of key performance indicators.

# **Progress Reporting:**

In accordance with State (WAC 246-290-810) and Council requirements (ORD C35630), the Water Department will provide an annual written report each February that provides for the previous 5 years the following information:

• Total number of gallons pumped to each customer sector with its associated revenue and costs. Sectors include: Single family, multi-family,

commercial, institutional, government, permitted hydrant use, and intertie accounts.

- Total budget dollars used in the Conservation Program and estimated water savings
- Percentage and number of gallons lost by the water distribution system
- Per capita consumption for all customers in the water service area

# **Plan Updates:**

Within one year of adoption, each defined strategy will be further developed following a SMART logic model (Specific, Measurable, Achievable, Realistic, Timebound) and actions will be assigned City of Spokane staff ownership.

# **Implementation Plan**

Within 20 months of adoption of the Water Conservation Master Plan, a council appointed Water Conservation Taskforce will develop community drought response measures which will be presented to council for its inclusion to the plan.

The Water Department will work with internal staff and community members to update the plan every 5 years. This five-year update schedule will ensure that the plan can respond to environmental changes and reflect actual results. Any updates to the Water Conservation Master Plan will go through the City Council approval process before taking effect.

## 2020 Implementation Plan:

The 2020 Water Conservation Master Plan was developed and reviewed by City of Spokane staff, in conjunction with the Sustainability Action Sub-Committee (SAS). Once the plan has been adopted by Spokane City Council with a public hearing, a press-release will be issued to inform the public. Following Council adoption, water conservation staff will attend neighborhood community council meetings to share the content of the plan, and continue to educate the community on the goals and associated activities established by the plan.

### 2020 Pilot Program Timeline:

	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
CONTENT DEVELOPMENT							
Create Rebate Platform/ Update Website							
Research Target Customers							
Build Partnerships							
MARKETING & ADVERTISING							
Press Release							
Blog Posts							
Social Media Platforms							
Water Wise Spokane Ad Campaign							
OUTREACH							
Neighborhood Council Meetings							
Community Events							
City-Hosted Online Landscaping Classes							
CITY-OWNED FACILITY PROGRAM							
Facility Inventory Audits							
Identify Irrigation Projects							
REPORTING							
3rd Quarter KPI's							
Report to Council (Feb 2021)							

# Appendix



ACTIVITY	ANNUAL WATER SAVINGS PER UNIT (gallons)	ANNUAL NUMBER OF UNITS	REBATE AMOUNT	ANNUAL PROGRAM COST	TOTAL ANNUAL GALLONS SAVED	WATER SAVINGS/ INVESTED DOLLAR (gallons)	ANNUAL WASTE- WATER IMPACT (gallons)
Low-Flow Showerhead- SF/MF	2,062	500	\$6	\$3,000	1,031,000	344	1,031,000
High Efficiency Toilets- SF	9,541	500	\$100	\$50,000	4,770,500	95	4,770,500
High Efficiency Toilets- MF	13,644	500	\$100	\$50,000	6,822,000	136	6,822,000
High Efficiency Toilets- COM	13,020	100	\$100	\$10,000	1,302,000	130	1,302,000
Cooling Tower Conductivity Controller - COM	209,880	10	\$695	\$6,950	2,098,800	302	2,098,800
Irrigation Controller -SF	10,805	100	\$100	\$10,000	1,080,500	108	-
Irrigation Controller- MF	43,221	10	\$500	\$5,000	432,210	86	-
SpokaneScape- SF	11,440	100	\$500	\$50,000	1,144,000	23	-
SpokaneScape- MF/ COM	28,600	10	\$2,500	\$25,000	286,000	11	-
Efficient Nozzles -SF	300	1,000	\$4	\$4,000	300,000	75	-
CITY OWNED PROPERT	Y PROGRAM	Л					
Efficient Nozzles	300	500		\$2,000	150,000	75	-
Irrigation Controllers	43,221	2	\$10,000	\$20,000	86,442	4	-
Toilet-Replace & Install	13,020	100	250	\$25,000	1,302,000	52	1,302,000
Sink Aerators	Data co	ollection in p	rocess	\$3,000	-	-	
SpokaneScape Demo Gardens	Varies by sq footage	TBD		\$30,000	-	-	-
Facility Audit	-	-	-	\$50,000	-	-	-
SUBTOTAL OF KNOWN VALUES:	399,054	3,433	-	\$343,950	20,805,452	_	17,326,300

SF: Single Family Customers; MF: Multi-Family Customers; COM: Commercial Customers

#### Activities Considered:

The Alliance for Water Efficiency (AWE) Water Conservation Tracking Tool version 3.0 (Tracking Tool) was used to evaluate the benefit and costs for the utilities in implementing water conservation activities. The Tracking Tool has a library of 30 defined water conservation activities. These activities have 21 parameters. These parameters have predefined values that can be supplemented with utility specific data if it is available.

The following 12 activities were considered, using the model, for inclusion in the new conservation program:

#### Table 9: Conservation Activities Considered

ACTIVITY	ANNUAL WATER SAVINGS PER UNIT (gallons)	ANNUAL NUMBER OF UNITS PROGRAMMED	ANNUAL PROGRAM COST	ANNUAL TOTAL GALLONS SAVED	ANNUAL WASTEWATER IMPACT
LF Showerhead- SF	2,062	500	\$3,000	1,031,000	1,031,000
LF Showerhead -MF	1,898	250	\$1500	474,500	474,500
HE Toilets- SF	9,541	500	\$50,000	4,770,500	4,770,500
HE Toilets- MF	13,644	500	\$50,000	6,822,000	6,822,000
HE Toilets- CII	13,020	100	\$10,000	1,302,000	1,302,000
Clothes Washers -SF	5,000	50	\$12,500	250,000	250,000
Cooling Tower Conductivity Controller - COM	209,880	10	\$6,950	2,098,800	2,098,800
Irrigation Controller -SF	10,805	100	\$10,000	1,080,500	-
Irrigation Controller- MF	43,221	10	\$5,000	432,210	-
Irrigation Controller- Parks	43,221	2	\$20,000	86,442	-
Turf Replacement- SF	11,440	100	\$50,000	1,144,000	-
Efficient Nozzles -SF	300	1000	\$4,000	300,000	-

SF: Single Family Customers; MF: Multi-Family Customers; COM: Commercial Customers

# Appendix



The table below summarizes the research from the Alliance for Water Efficiency's study, *Use and Effectiveness of Municipal Irrigation Restrictions During Drought*. Within this study, voluntary conservation did not generate statistically significant savings and messaging and enforcement were found to be best practices and essential components to achieving a significant reduction in seasonal water demand. Case study participants successfully reduced annual demand by 18%-30% and peak monthly demand by 20%-42% through a combination of mandatory demand management measures. In two case studies, demand reductions achieved during the drought were maintained with little rebound through the on-going implementation of restrictions.

This study recommends that the design of irrigation restrictions be specific to the local region; in Texas 2 days/week restrictions are only mildly constraining because they receive more, evenly distributed frequent rainfall and most customers were already watering at that frequency. In parts of California 3 days/week restrictions are considered mildly constraining and 2 days/week restrictions saw large reductions in demand.

An executive summary of the study can be found here: <a href="http://www.allianceforwaterefficiency.org/sites/www.allianceforwaterefficiency.org/files/assets/AWE\_Drought\_Restrictions\_Study\_Executive\_Summary\_Final.pdf">http://www.allianceforwaterefficiency.org/sites/www.allianceforwaterefficiency.org/sites/www.allianceforwaterefficiency.org/files/assets/AWE\_Drought\_Restrictions\_Study\_Executive\_Summary\_Final.pdf</a>

City/State	Mandatory Watering Restrictions	Intensity of Restrictions & Demand Reduction Average Spring/Fall	Intensity of Restrictions & Demand Reduction Average Summer
Austin, TX Annual Precip: 32-34" Population: 1 million	Seasonal irrigation restrictions with enforcement; restrictions limit the number of days/week irrigation is allowed.	2008-2016: 2 days/week: 10% reduction 1 day/week: 14% reduction	2008-2016: 2 days/week: 11% reduction 1 day/week: 21% reduction
Plano, TX Annual precip: 22-40" Population: 1.7 million	Seasonal irrigation restrictions with enforcement; restrictions limit the number of days/week irrigation is allowed.	2011-2015: 2 days/week: Did not produce savings 1 day/week: 17% reduction 1 day/ 2 weeks: 18% reduction	2011-2015: 2 days/week: Did not produce savings 1 day/week: 17% reduction 1 day/ 2 weeks: 32% reduction
Hayward, CA Annual precip: 18" Population: 160,000	Seasonal irrigation restrictions with enforcement; restrictions limit the number of days/week irrigation is allowed. Water Waste Prohibition (non-essential uses: irrigation runoff, washing of outdoor hardscapes, hoses w/o shut-off nozzle, etc)	2014-2017: 2 days/week:15% reduction	2014-2017: 2 days/week: 21% reduction Mandatory Prohibition of Water Waste: 15% reduction
Los Angeles, CA Annual precip: 15" Population: 4 million	Seasonal irrigation restrictions with enforcement; restrictions limit the number of days/week irrigation is allowed.	2014-2017: 3 days/week: 13% reduction	2014-2017: 3 days/week: 15% reduction
Sacramento, CA Annual precip: 20" Population: 500,000	Seasonal irrigation restrictions with enforcement; restrictions limit the number of days/week irrigation is allowed.	2014-2017: 2 days/week: 25% reduction	2014-2017: 2 days/week: 29% reduction
Visalia, CA Annual precip: 11″ Population: 145,000	Seasonal irrigation restrictions with enforcement; restrictions limit the number of days/week irrigation is allowed.	2014-2017: 3 days/week: 9% reduction 2 days/week: 16% reduction	2014-2017: 3 days/week: 18% reduction 2 days/week: 22% reduction

Appendix

#### ORD C35630

#### ORDINANCE NO. C35630

An ordinance relating to future and renewed water intertie agreements; enacting a new chapter 13.045 to the Spokane Municipal Code.

WHEREAS, the City of Spokane is a regional water purveyor pursuant to the Spokane County Coordinated Water System, Washington State Department of Health, the City of Spokane Comprehensive planning documents and state law; and

**WHEREAS**, wholesale water supply exchanges between local water purveyors are anticipated by the Washington State Department of Health's Office of Drinking Water, the Spokane County Coordinated Water System, the City of Spokane Comprehensive Plan, and the City of Spokane Comprehensive Water System Plan; and

WHEREAS, state law provides that such wholesale water supply where appropriate can be used for: long-term water supply, to supplement a limited supply of water, to provide water when there is limited capacity, to provide water to meet a peak, or to assist during an emergency situation; and

WHEREAS, state law requires that a coordinated water resource and system plan for an area "shall provide for maximum integration and coordination of public water system facilities consistent with the protection and enhancement of the public health and well-being;" and

WHEREAS, neighboring water purveyors can protect the public by establishing intertie agreements to help ensure the continuous availability of a safe and reliable drinking water supply to all customers; and

WHEREAS, the City currently has intertie agreements with six water purveyors identified within the County Coordinated Water System; these agreements will need to be updated over time, and the potential for other interties exists; and

**WHEREAS**, the City of Spokane is the largest water purveyor with the most complex system in the region and, as such, has the ability to efficiently and effectively provide water to adjoining purveyors that is safe, reliable, and protects the national resource and environment, allowing the City to assist its smaller water system neighbors; and

WHEREAS, the City is committed to good stewardship practices for its water resources to protect not only the quantity but the quality of water in our region; the City also has identified a strategy and goal around "Smart Use of Water Resources for Economic Growth" as part of its City Council adopted Joint Administration-Council 6-Year Strategic Plan; and

WHEREAS, the City also is committed to enhancing resiliency, and through its Comprehensive Plan, encourages working with adjacent jurisdictions and other water purveyors to facilitate consistent provision of water services and coordinated responses to emergencies; and

WHEREAS, the City recognizes that it derives 100% of its water from the Spokane Valley Rathdrum Prairie Aquifer ("SVRPA"); and

WHEREAS, pumping from the SVRPA may, at certain low flow times of the year, reduce water in the form of ground (aquifer) water inputs to the Spokane River in gaining reaches; and

**WHEREAS**, aquifer inflow into the Spokane River is important for maintaining the health, wellbeing and viability of the Spokane River and the overall water resource; and,

WHEREAS, an increasing population and climate variability creates competition for scarce water resources that would normally flow through the Spokane River; and

WHEREAS, the Spokane River has experienced decreased flows in late Summer and early Fall months; and

WHEREAS, reducing or limiting new well development that taps into the Aquifer will preserve ground water and prevent contamination of the water supply which is a benefit of providing wholesale water supply to neighboring purveyors; and

WHEREAS, the City recognizes the importance of encouraging and implementing long term conservation measures to support and protect the water resource as well as the health of the Spokane River; where such flows support related wildlife, recreational, and economic activity associated with the River; and

WHEREAS, in order to meet these goals, the City of Spokane intends to be a leader of efforts by all SVRPA pumpers in reducing water use and preserving River flows; and



WHEREAS, the City is pursuing its goal to support sufficient flows in the Spokane River during certain low flow times of the year and encourages prudent conservation measures that will provide resiliency to all water supplies in the greater Spokane region; and

WHEREAS, the City also strives to have consistent and understandable policies when dealing with neighboring jurisdictions and water purveyors.

NOW, THEREFORE, the City of Spokane does ordain:

Section 1. That there is adopted a new chapter 13.045 of the Spokane Municipal Code to read as follows:

#### Chapter 13.045 Intertie Agreements and Water Rights

#### Section 13.045.010 Purpose

The purpose of this Chapter is to codify a consistent and predictable approach to renewed, revised, or new water intertie agreements to ensure ongoing conservation and protection of water resources, especially in the Spokane Valley and Rathdrum Prairie Aquifer.

#### Section 13.045.020 Definitions

- A. Emergency Water Supply means unanticipated or unexpected and sudden event requiring additional short term supply of water from the City of Spokane under terms and conditions as specified in the Agreement between the parties as to duration and volume.
- B. In-stream Flow Rule means the Instream Flow rule for the Spokane River as established by Washington State Department of Ecology in Chapter 173- 557 WAC.
- C. Supplemental Water Supply means long term supply of water which is an addition to a wholesale water purveyor's existing water supply to provide additional water on a routine basis.

#### Section 13.045.030 Intertie Contract Components

All renewed, revised or new water intertie agreements shall include the following provisions:

- A. A maximum term no longer than twenty years for supplemental supply and five years for emergency supply, inclusive of renewal options;
- B. Required five year agreement reviews within any term for supplemental supply and two years for any emergency supply, including the right of the City to cancel agreements after such review if the water purveyor is not in compliance with the terms of the agreement, including contractually required conservation measures;
- C. Definition of maximum water flow rates and maximum annual water volumes for supplemental and emergency water supply;
- D. A description of the historical and current water supply situation that forms the basis of the terms of the agreement and the proposed future water supply planning. ;
- E. Water provided under the contract is for the use in the water purveyor's designated service area and the water purveyor shall not wheel or wholesale any water received from Spokane beyond what is set out in their water system plan or an agreement existing at the time the contract is signed without first obtaining written permission from the City of Spokane.
- F. Provisions regarding collaboration on system loss and efficiency measures within the wholesale water purveyor's infrastructure that meets state standards;
- G. All Parties must have an existing written water conservation plan with specific reasonable goals and are required to implement and maintain annual water conservation, reduction of system loss in accordance with Chapter 246-290 WAC and efficiency measures with a measurable goal of reducing the annual amount of water consumed per capita year over year especially during Summer and early Fall consistent with state law. The plan will include program effectiveness consultations at least every three years, including documentation of changes in total gallons used and per capita use on an annual and seasonal basis by customer class;
- H. All Parties shall participate in any drought response water conservation measures triggered by weather conditions and/or Spokane River flows as may be developed and adopted by the City for all retail and wholesale customers with a methodology for reasonable notice included in the contract; and

- Appendix
- I. A written acknowledgement in the contract that the wholesale water supply may be curtailed or interrupted due to drought, low flows in the Spokane River, or shortage pursuant to such reasonable rules and measures adopted by the water department that are consistent with city code, adopted plans, and state law.

#### Section 13.045.040 Water Charges

- A. Charges for water will be as established by the wholesale purveyor rate set out in SMC 13.04.2014.
- B. Intertie agreements shall include clear delineation of costs that are the responsibility of the water purveyor, including capital and construction costs, and those that are the responsibility of the City of Spokane.

#### Section 13.045.050 Water Rights and Seasonal Flow Goals

- A. The City of Spokane shall not sell or transfer any water rights without the approving vote of City Council. The City upon approval of City Council may acquire available water rights if it would be prudent to do so for the purpose of protecting the resource for system resiliency purposes, and/or operational efficiency as provided by Chapter 35.21 RCW.
- B. The City Council will use the best available evidence and science to set written appropriate minimum seasonal river flow goals for the portion of the Spokane River flowing through the City of Spokane in respect to City operations only. Appropriate minimum flow goals set by the City Council may exceed the minimum standard as established by Washington State Department of Ecology in Chapter 173- 557 WAC. Such goals are not intended to overlap the legal jurisdiction of the State of Washington.
- C. The City is committed through its policies and environmental sustainability plan to substantially conserve water and reduce per capita consumption across the City's water distribution system as set out in the City's Water System Plan and water use efficiency goals that are established by City Council Resolution. In order to achieve the City's water use efficiency goals, the City will provide budget support for the following operational and maintenance efforts and policy framework that will improve and protect the regional delivery system's natural water resources, efficiency and effectiveness, including flows in the Spokane River:
  - 1. Conservation educational programming and technical advice;
  - 2. Implementation of conservation measures on city owned property;
  - 3. Programs supporting water conservation equipment and irrigation reduction for all customers;
  - 4. Water re-use programs;
  - 5. Seasonal irrigation efficiency and reduction measures; and
  - 6. Other innovations that will support water conservation goals and increased flows in the Spokane River.
- D. The City's policy is to adhere to its river flow goals by following its conservation measures and efficiency plans developed by the water department, which may include implementing seasonal irrigation measures in accordance with the City's policies and procedures. Within twenty months of the adoption of this chapter, the City shall develop and periodically update a comprehensive plan and clear policies and procedures applicable to all customers and classes to achieve its water conservation goals.

#### Section 13.045.060 Reporting

The Water Department shall provide a written report each February to the City Council that provides for the previous five years, the total number of gallons pumped by the City to each class of customer, including but not limited to residential, commercial and intertie agreements; the revenue from each class of customer and associated costs; the amount of money spent on conservation; the estimated number of gallons of water saved on an annual basis from new City of Spokane conservation efforts; the percentage and number of gallons lost by the water distribution system; the per capita consumption for all customers of the City's water service; and other information that will assist the Council in evaluating the goals of increasing river flows and decreasing the amount of water consumed per capita each year across the City of Spokane's water distribution system.

Passed by City Council July 9, 2018 Delivered to Mayor July 12, 2018

# Appendix



#### WAC 246-290-810

WAC 246-290-810 Water use efficiency program. (1) Water system plans and small water system management programs submitted for approval for the first year after the effective date of this rule, must describe the municipal water supplier's existing water use efficiency program. The municipal water supplier must continue existing levels of water use efficiency.

(2) Subsections (3) and (4) of this section apply to:

(a) Water system plans submitted to the department for approval under WAC 246-290-100 one year after the effective date of this rule.

(b) Small water system management programs developed and implemented or submitted to the department for approval one year after the effective date of this rule.

(3) Municipal water suppliers shall develop and implement a water use efficiency program which includes sufficient cost-effective water use efficiency measures to meet the water use efficiency goals developed under WAC 246-290-830.

(4) Municipal water suppliers shall complete the following items in the water use efficiency program:

(a) Describe the current water use efficiency program;

(b) For systems serving one thousand or more total connections, estimate the amount of water saved through implementation of the water use efficiency program over the prior six or more years; the estimate may include the entire approval period of the most recent water system plan required under WAC 246-290-100;

(c) Describe the chosen water use efficiency goals and document the goals were established in accordance with WAC 246-290-830;

(d) Evaluate water use efficiency measures to determine if they are cost-effective as follows:

(i) Evaluate or implement, at a minimum, the number of water use efficiency measures specified in Table 13 based on the system's total number of connections.

(ii) Evaluate or implement water use efficiency measures from the following categories of measures if they are applicable: Indoor residential, outdoor, and industrial/commercial/institutional.

(iii) For systems serving less than one thousand total connections, describe the evaluation process used to select water use efficiency measures.

(iv) For systems serving one thousand or more total connections, include the following criteria when evaluating water use efficiency measures:

(A) Quantitatively evaluate water use efficiency measures to determine if they are cost-effective from the system's perspective including the marginal costs of producing water.

(B) Address whether the water use efficiency measures are costeffective if the costs are shared with other entities.

(C) Quantitatively or qualitatively evaluate water use efficiency measures to determine if they are cost-effective from the societal perspective.

Number of connections	Less than 500	500-999	1,000-2,499	2,500-9,999	10,000-49,999	50,000 or more
Water use efficiency measures	1	4	5	6	9	12

Table 13

(e) Describe all water use efficiency measures to be implemented over the next six or more years, including a schedule and a budget that demonstrates how the water use efficiency measures will be funded. Purveyors may submit a schedule and budget for the entire water

Appendix

system plan approval period, if the approval period is longer than six years;

(f) Describe how consumers will be educated on water use efficiency practices;

(g) Estimate projected water savings from selected water use efficiency measures;

(h) Describe how the water use efficiency program will be evaluated for effectiveness;

(i) Evaluate water distribution system leakage as follows:

(i) Include distribution system leakage annual totals in accordance with WAC 246-290-820 for each of the past six or more years. Purveyors shall submit distribution system leakage annual totals for the entire water system plan approval period if the approval period was longer than six years.

(ii) If necessary, include a copy of the water loss control action plan in accordance with WAC 246-290-820(4).

(iii) If all or portions of transmission lines are excluded when determining distribution system leakage, estimate the amount of leakage from the excluded portion of the transmission mains and describe how it is maintained to minimize leakage.

[Statutory Authority: RCW 43.20.050 and 70.119A.080. WSR 17-01-062, § 246-290-810, filed 12/14/16, effective 1/14/17. Statutory Authority: RCW 70.119A.180. WSR 07-02-025B, § 246-290-810, filed 12/22/06, effective 1/22/07.]

#### **RESOLUTION NO. 2020-0051**

A Resolution to adopt the 2020 Water Conservation Master Plan.

WHEREAS, the state of Washington, under the authority of RCW 43.20.050, has adopted a regulation (WAC 246-290-830), which requires municipalities to design and adopt water conservation plans to increase water use efficiency; and

WHEREAS, in response, the City of Spokane enacted SMC 13.045.030(G), which requires the City to adopt a Water Conservation Master Plan in compliance with state law; and

WHEREAS, Spokane's per capita water use is 202 gallons per day compared to the national median of 79 gallons per person per day; and

WHEREAS, the City aims to avoid future water infrastructure investment as the population grows by reducing per capita water consumption; and

WHEREAS, by reducing water consumption, the City of Spokane will help protect our city's most precious natural resource, the Spokane River, and mitigate negative impacts climate change will and is already having on the ecosystem of the River, including impacts to the Spokane Valley-Rathdrum Prairie Aquifer which has many hydrologic connections with the Spokane River.

NOW, THEREFORE, BE IT RESOLVED that the Spokane City Council adopts the 2020 Water Conservation Master Plan; and

BE IT ALSO RESOLVED that the Council establishes a Water Resource Conservation Group, comprised of local stakeholders, to provide recommendations on the following:

- 1. Conservation targets & key strategies for the 2021 version of the Water Conservation Master Plan to be made available for public comment by February 2021, and adoption in April 2021;
- 2. Drought response measures; and
- 3. River Vision Plan.

ADOPTED by the City Council this 27 day of \_\_\_\_ 2020.

City Clerk

Approved as to form:





1
4.5 Technical Memorandum for City of Spokane Water Conservation Savings

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# **1** INTRODUCTION

The purpose of this Water Conservation Savings Technical Memorandum (TM) is to document the results and information gathered from the conservation analysis conducted for the City of Spokane (City), Washington. The TM describes: (1) the conservation analysis methodology, and (2) the analysis results, including an economic evaluation.

# **1.1 Project Background**

Considering the City's on-going population growth, City staff needed to pursue a detailed demand forecasting effort that would inform the City's future long-range planning. This effort is to identify the impact of conservation on demand as well as to develop a cost-effective and quantifiable conservation program that will maximize the City's water savings. This conservation analysis builds upon the analysis contained within the City's 2020 Water Conservation Master Plan to analyze the effectiveness of water conservation measures for future program planning efforts. Maddaus Water Management Inc. (MWM), working together with HDR, was hired to conduct this technical analysis to accomplish the following objectives:



Figure 1-1. Objectives

### **1.1.1** Purpose and Scope of Conservation Analysis

The purpose of this analysis is to systematically evaluate and quantify a long-term water conservation program for the City's service area. Through the identification and prioritization of conservation measures, the analysis enables the City to project long-range demands, identify attainable conservation goals, and develop strategies for conservation program implementation. By combining new initiatives with existing actions, this comprehensive slate of conservation activities will contribute to a more sustainable management of water supplies for the community. In addition, the analysis will assist the City with future planning efforts regarding water conservation investments and activities.

# **1.2** Overview of the City's Water System

The City's Water Department delivers up to 180 million gallons of clean, safe drinking water every day to more than 200,000 people<sup>1</sup>. The City's water system is the third largest water system in the state of Washington,

<sup>&</sup>lt;sup>1</sup> Reference: City of Spokane Public Works Webpage: <u>Water Management - City of Spokane, Washington (spokanecity.org)</u>

behind Seattle and Tacoma. The water system includes pumps, reservoirs, source wells, more than 1,000 miles of water mains, and smaller water lines that bring water from wells to homes and businesses.

Figure 1-2 shows the areas served by the City Water Department.



Figure 1-2. City Water Retail Service Area

#### 1.2.1 Climate

Located approximately 20 miles west of the Idaho state border and 100 miles south of the Canadian border, the City is characterized by foothills, plains, and coniferous forest.

The City's climate is impacted by its location between the Cascade Mountain Range to the west and the Rocky Mountains to the east and north. The City experiences four distinguishable seasons with an average of 16.7 inches of annual precipitation, 48 inches of snow during the winter, and 80–90-degree temperatures during the

hottest summer months.<sup>2</sup> Temperatures vary primarily between 27 and 81 degrees Fahrenheit but can reach extremes of over 100 degrees Fahrenheit in the summer and below 0 degrees in the winter.

Figure 1-3 depicts the City's temperature and precipitation statistics, and Figure 1-4 illustrates the City's drought and climate history.



#### Figure 1-3. Service Area Climate



# A BRIEF HISTORY OF RECENT DROUGHT IN CITY OF SPOKANE

#### AUG-DEC 2015

City endures extreme drought and historic wildfire season.

#### JUNE 2021

City enters extreme drought.

#### **JULY 2021**

City enters exceptional drought.

#### JULY 14, 2021

Washington Governor Jay Inslee declares a statewide emergency drought declaration.



Spokane River

MAY 24, 2022 Spokane City Council approves water conservation and drought response ordinance to restrict outdoor water use during summer months.

#### JULY 19, 2022

Drought declaration lifted for Eastern Washington.

<sup>2</sup> Information provided by the City of Spokane website: <u>https://my.spokanecity.org/about/geography</u>

#### **1.2.2** Demographics

The City of Spokane is the second largest city in the state of Washington, after Seattle. Figure 1-5 displays demographic features for the City.





### **1.3 Modeling Future Water Conservation Program Scenarios using the DSS Model**

MWM's Demand Side Management Least Cost Planning Decision Support System (DSS Model) prepares nearterm and long-range water demand and conservation savings projections. First developed in 1999 and continuously updated, the DSS Model is an end-use model that breaks down total water production (i.e., water demand in the service area) into specific water end uses (toilets, faucets, irrigation etc.). This "bottom-up" approach allows for detailed criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. The purpose of using end-use data is to enable a more accurate assessment of the impact of water efficiency programs on demand and to provide a rigorous and defensible modeling approach necessary for projects subject to regulatory or environmental review. For this project, the DSS Model was used to quantify savings from passive conservation (e.g., plumbing codes) and active conservation (conservation measures) components.

In the DSS Model, a conservation measure is defined as an individual activity conducted by the agency or the customer to improve water use efficiency, whereas a conservation program is a group of conservation measures.

<sup>&</sup>lt;sup>3</sup> Source: Demographic data based on ACS 1-year values for 2018, as noted in the Spokane Housing Action Plan adopted July 2021. Median income by household assumes four people per household and includes both owner and renter households.

The City's DSS Model results in three conservation programs for evaluation, spanning the entire forecast period of 2022-2045, further detailed in section 2.

The DSS Model can use one of the following: a statistical approach to forecast demands (e.g., an econometric model), a forecasted increase in population and employment, or a demand projection input into the model from an outside source. For the City's model, the demand growth is based on the baseline demand and forecasts determined by HDR in an earlier phase of this project. The forecast methodology is detailed in the Spokane Future Flows Planning Data and Demand Forecast TM, completed by HDR on August 22, 2022.

More background information on the DSS Model and Plumbing Code assumptions, including a description of the analysis and methodology used, can be found in Appendices A and B, respectively.

# 2 ANALYSIS OF WATER DEMAND

This section presents information about the data collection process as well as a summary of the City's current conservation efforts. The City's current water use patterns were analyzed based on City-provided data.

# 2.1 Analysis Development

The first step in the analysis was a review of past documentation, such as the City's Water Conservation Master Plan and HDR's Planning Data and Demand Forecast TM. The second step was to collect the necessary data from City staff. The City and its consultant, HDR, provided a data request per a list of requirements. The information requested and received included:

- Prior year(s) monthly water use data for the different classes of water users.
- Descriptions of past, present, and proposed future conservation programs including historical annual participation rates, when available.
- Historical and projected water system service area population, employment, and growth projections through the year 2045, along with maps of the study area.
- Operational costs for water treatment and energy use.



Figure 2-1. Evaluation Process

MWM staff input the collected data into the DSS Model to run water demand analysis through the year 2045.

### 2.1.1 City Staff Input and Review

As part of this project's collaborative approach, MWM facilitated four meetings with City staff to develop the conservation measure screening, make program selections, and review preliminary results. These meetings were held to foster City staff understanding of, and involvement in, the development of the conservation analysis.

- Water Conservation Measure Screening Workshops MWM hosted two meetings with key City staff in late January 2022 to begin evaluating the City's current and anticipated conservation measures. City staff then worked on finalizing the measure designs for inclusion in the DSS Model.
- Water Conservation Program Selections On July 8, 2022, a meeting was held for City staff to review the methodology used to evaluate the conservation measures in the DSS Model and to confirm the conservation programs to be analyzed.
- **Preliminary Model Results** On July 12, 2022, MWM met again with City staff to review the initial results of the conservation programs previously selected.

# 2.2 Historical Demand Patterns

The City's historical water demand trend, based on total monthly production and estimated annual population, is displayed in Figure 2-2<sup>4</sup>. Figure 2-3 displays the City's historical population as it relates to annual water production and rainfall. These figures demonstrate that demand increased from 2010 to 2018 but has decreased slightly since 2018 despite continued population growth. The decreased demand could be due to several contributing factors such as increased uptake of water conservation measures and the milder weather during summer months in 2019-2020<sup>5</sup>.





<sup>&</sup>lt;sup>4</sup> Estimated historical annual population is based on the US Census's City population. Actual service area population, for which we do not have historical values, is higher, and thus the GPCD may be inflated.

<sup>&</sup>lt;sup>5</sup> Spokane's historical climate data can be accessed at <u>https://www.drought.gov/states/washington/county/spokane</u>



Figure 2-3. Annual Population, Water Production, and Rainfall, 2010-2020

# 2.3 Information Review and Data Collection Methods

Available information was collected, reviewed, entered, and tracked in a robust worksheet kept by MWM and the City known as the Data Collection Workbook. To help streamline the process, MWM initially entered data from readily available sources prior to sending the file to City staff for updating and review. Using the provided consumption and account values from HDR, MWM confirmed the number and types of customers within the service area. Several follow-up rounds of data review were conducted to compile all necessary information.

With HDR and City staff assistance, MWM compiled as much recent data as possible on water production, consumption, water loss, the water service area, conservation measures, weather, unique customer categories, and various census data points. Together, these formed the foundation for MWM's DSS Model. As the DSS Model was developed, the MWM team verified and calibrated data against available historical records to ensure accuracy and logic. Historical water use patterns were based on water production and consumption data only. Ten years of monthly historical water production data was analyzed (2010–2020).

Data Type	Data Source(s)
Water Purchase and Consumption Data	<ul> <li>Data collection workbook with monthly production data</li> <li>Monthly metered consumption by customer class</li> <li>Customer classifications and number of connections (meters)</li> </ul>

#### Table 2-1. Data Inventory for City

Non-Revenue Water	Authorized non-revenue consumption
Historical and Projected Demographics	<ul> <li>Historical and projected population and employment provided by HDR in Planning Data and Demand Forecast TM</li> </ul>
Climate and Weather Data	<ul> <li>National Oceanic and Atmospheric Administration (NOAA) data</li> <li>History of droughts/wet years/abnormal years from City staff</li> </ul>
Cost Data	<ul><li>Avoided O&amp;M and Capital Costs</li><li>Water Loss Control Program Costs</li></ul>
Conservation Activity	<ul> <li>Records of historical conservation measures such as rebate uptake and device giveaways</li> </ul>
Existing Demand Models and Future Projections	<ul><li>Existing strategic and master planning documents</li><li>TM describing current demand projection methodology</li></ul>

# 2.4 Consumption by User Category

Data from each customer category was analyzed separately. Based on the City's water billing system, residential water use was broken down into single family and multifamily categories. Historical data was segregated into indoor and outdoor water use by customer type using the monthly billing data. Non-residential categories of use were analyzed separately. Average daily commercial, industrial, and institutional water use (CII or non-residential) was expressed on a gallons-per-account basis.

The City has a variety of customer categories utilized in its billing system. This analysis followed HDR's customer category breakdown which consisted of seven categories that make up the City's potable water use. Appendix B details the base water use profile for all categories and includes abbreviations used when referring to each category. Figure 2-4 illustrates the breakdown of projected water use by category in 2022<sup>6</sup>. Residential is the largest category of water users, representing 61% of the water consumed.





<sup>&</sup>lt;sup>6</sup> Customer category water use is based on 2022 forecasted data provided by HDR.

Figure 2-5 shows the breakdown of 2022 indoor and outdoor water use across all customer categories, based on the assumption that indoor use is approximately equal to the minimum use in the winter. While there may be landscape watering or leakage from irrigation systems in the winter, it is assumed this is minor, no more than 5-10% of the average winter water use. This analysis helped determine historical use patterns and allows water conservation planning to focus on the area with the highest overall category of use. In the City's case, outdoor water use represents about 63% of the City's projected annual water use, on average, indicating outdoor water conservation measures should be a focus area for the City's conservation program.





# **3 CONSERVATION MEASURE EVALUATION**

This section presents the City's conservation measure evaluation process. Supported by this process, the City's goals were to develop a conservation program that would result in the greatest ease and efficiency of program administration, the lowest cost of implementation, the shortest time to implement, and the greatest water savings. The program would also be designed to address water conservation across all relevant customer categories.

### 3.1 Conservation Measure Screening

Experience by many utilities shows there is a reasonable limit to the number of conservation measures that can be feasibly implemented at one time. This is because, historically, programs that consist of too many measures are difficult to implement successfully, due to staffing and other resource constraints. Therefore, prioritization of measures is important, both as an outcome of this planning effort and as the program is implemented. Figure 3-1 displays the criteria considered in the measure screening evaluation process to narrow down the conservation measures menu to a short-list of high priority measures.

#### Figure 3-1. Measure Screening Criteria



A thorough screening process is necessary to scale down a list of measures to a short list that would best achieve the City's goals. This included identification of new potential measures which were included for evaluation in the DSS Model. This evaluation was based on water use characteristics, economies of scale, and demographics. The initial list of more than 100 potential water conservation measures was compiled from MWM experience and a review of what other water agencies with innovative and effective conservation programs are implementing. This screening process yielded 22 measures for further evaluation with City's staff support.

### 3.2 Conservation Measures Evaluated

Table 3-1 and Figure 3-2 describe the 22 measures selected for further analysis in the City's DSS Model. The list includes devices or programs used to achieve water conservation, methods through which the device or program will be implemented, and what distribution method, or mechanisms can be used to activate the device or program. Table 3-1 also includes the five-year cost to the water utility for implementing each measure, consisting of the sum of annual utility costs for 2022-2027. Utility costs include administrative costs and staff labor. Note that some measures do not begin until after 2022.

Information about the DSS Model analysis' approach to measure unit costs, water savings, and market penetrations is in Appendix C.



#### Figure 3-2. Measures for Evaluation

#### Table 3-1. Measure Descriptions

Measure Name	Description	Five Years of Water Utility Costs 2022-2027
Utility Water Loss	Complete water audits bi-annually that identify and quantify known uses of non-revenue water to determine remaining non-revenue water losses. The goal is to lower the Infrastructure Leakage Index (ILI) and non-revenue water every year by a pre-determined amount based on cost-effectiveness. These programs typically pay for themselves based on savings in operational costs (and saved rate revenue can be directed to system repairs/replacement and other costs).	\$5,555,556
AMI	Retrofit system with AMI meters and associated network capable of providing continuous consumption data to the City. This improves the ability to identify system and customer leaks and is a major conservation benefit. Some costs are offset by operational efficiencies and reduced staffing, as regular meter reading and those for opening and closing accounts are accomplished without the need for physical or drive-by meter reading. Also enables enhanced billing options and ability to monitor unauthorized usage (such as use/tampering with closed accounts or irrigation if time of day or days per week are regulated). Customer service is improved as staff can quickly access continuous usage records to address customer inquiries. Optional features include online customer access to their usage, which has been shown to improve accountability and reduce water use. Goal is to complete AMI retrofit by 2040.	\$6,188,701
Landscape Conversion (SpokaneScape)	Provide an incentive for replacing lawns with drought tolerant plant material and low-volume irrigation. Provide credit based on dollars per square foot removed capped with an upper limit.	\$811,000
Online Conservation Education	Provide a variety of online conservation educational storylines, interactive games, videos and reading material for customers, including information on the City website and social media platforms.	\$411,095
Residential Irrigation Consultations	Outdoor water use assessments (consultations) are designed to provide important information about customers' landscapes and irrigation systems. Key to the consultations is correlating meter data with actual water use, providing watering schedules, and offering short-term and long-term recommendations for improved water efficiency. Consider providing a water consultation free upon request.	\$744,000
Water Waste Ordinance	Adopt or modify ordinances that prohibit the waste of water such as gutter flooding and failure to repair leaks in a timely manner. This ordinance will be enforced reactively during droughts and will rely upon the community to call in water waste reports.	\$101,594

Measure Name	Description	Five Years of Water Utility Costs 2022-2027
Tiered Water Rate Structure	The City has a multi-tier inclining block rate structure (tiered pricing). Tiered rate structures are the most popular form of conservation and can be effective provided 1) there are sufficient tiers (3 to 4 is recommended), 2) price difference between tiers is sufficient and 3) tiers are placed at usage levels that appropriately reflect low, medium, and high usage levels for the City Five-year costs reflect cost to conduct a rate study to inform the water rate structure.	\$75,000
Weather Based Irrigation Controller Rebates	The City provides a \$100 per station rebate for weather-based irrigation controllers. These controllers have on-site weather sensors or rely on a signal from a central weather station that modifies irrigation times at least weekly. Requires local irrigation contractors who are competent with these products, so may require sponsoring a training program in association with this measure.	\$80,500
Financial Incentives for Irrigation Upgrades	For SF, MF, CII, and IRR customers with landscape, provide a Smart Landscape Rebate Program with rebates for installation of water efficient technology/irrigation equipment upgrades. The City offers sprinkler nozzles. Consider giving away efficient hose nozzles, rain sensors, drip irrigation conversion kits, etc.	\$164,400
Leak Detection Technology	Leak detection technology system that allows for remote shutoff with a smart phone. Target vacant second homes that could leak for extensive periods. Required for new homes. For example, the City could elect to work with conservation device vendors, such as Flume, to provide discounted devices for customers.	\$308,000
Outdoor Efficiency Professional Training	City organizes and sponsor a series of educational workshops or other means for educating homeowners and landscaping professionals in efficient landscaping and irrigation principals. Utilize guest speakers, native demonstration gardens, and incentives, such as a nursery plant coupon. Classes could include certification such as Irrigation Association classes/certifications, Qualified Water Efficient Landscaper Training (QWEL), etc.	\$22,357
Partnerships with Energy Utilities	Partner with local energy utilities to offer incentives to residential and non-residential customers to save both water and energy, focusing on education and outreach. This includes both booth/fair opportunities and cross-promotion of rebates with the energy provider. Look into doing co-funded rebates.	\$34,042
Outdoor Water Budgets	Require water budgets for new development. Might tie to weather and/or rates.	\$58,874
Landscape and Irrigation Codes	Develop Water Efficient Landscape Design Standards. Standards specify development projects subject to design review be landscaped according to climate appropriate principles, with appropriate turf ratios, plant selection, efficient irrigation systems and smart irrigation controllers. Many examples have demonstrated significant water savings. The ordinance could require certification	\$78,276

Measure Name	Description	Five Years of Water Utility Costs 2022-2027
	of landscape professionals. Inspector must sign off on landscape to receive Certificate of Occupancy.	
Indoor Water Use Assessments	Indoor water surveys for existing single family and multifamily residential customers. Target those with high water use and provide a customized report to the owner. May include free efficient showerheads, aerators, toilet devices. Usually combined with outdoor surveys (see Irrigation Measures). The City plans to start this as a pilot program in 2022.	\$196,019
In-Person Public Education	Conduct presentations at various venues, from radio and TV to service organizations and focused groups. Have booths at relevant community events. Work with local school districts to develop classroom programs that they would embrace. Some programs would require dedicated utility staff to assist and present. Run an annual contest for residents who significantly reduce water use. Residents would receive a plaque/recognition. Sponsor an annual awards program for businesses that significantly reduce water use. Businesses would receive a plaque/recognition.	\$28,798
CII Water Use Assessments Provide free water assessments to CII Customers. Standardize the types of services offered to reduce costs. The City is beginning a pilot program targeting top water users focused on cooling towers and irrigation. Depending on customer interest, could offer assessment of full facility.		\$280,683
Incentives for Rainwater Catchment Systems	The City sponsors a DIY rain barrel workshop and purchases 55- gallon upcycled rain barrels for City residents. The City likely will not choose to implement this measure in the future.	\$6,829
Direct Installation of Indoor Fixtures Replacements would include high efficiency toilets, high efficiency faucets, and waterless or high efficiency urinals.		\$682,599
Rebates to Replace Inefficient Equipment	Provide rebates for a standard list of water efficient CII equipment. Toilets, urinals, and cooling tower conductivity controllers are currently included. Assume 10% market saturation.	\$109,267
Require Efficient Indoor Plumbing Fixtures	Pass an ordinance requiring homeowners and businesses to bring fixtures up to an efficiency standard by a fixed date at their own expense. The efficiency standard would go beyond the plumbing code. Random inspections by utility staff would ensure process is valid and yields fixture replacements.	\$0 (program starts after 5 years)
Large Landscape Irrigation Consultations	Outdoor water use assessments (consultations) provide important information about large landscape customers' landscapes and irrigation systems. Key to the consultations is correlating meter data	\$0 (program starts after 5 years)

Measure Name	Description	Five Years of Water Utility Costs 2022-2027
	with actual water use, providing watering schedules, and offering short-term and long-term recommendations for improved water efficiency. Consider providing water consultations free upon request. Target large CII landscape customers.	

### 3.3 Conservation Measure Analysis

MWM conducted an evaluation of each selected water conservation measure using the DSS Model. The results of the measure evaluation include how much water each measure will save, how much each will cost, and the cost of saved water per unit volume if the measure were to be implemented on a stand-alone basis (i.e., without interaction or overlap from other measures that might address the same end use/uses).

Water savings for each measure were calculated based on data from available studies, calculations on fixture replacement rates, and current industry forecasts, while also considering past water efficient equipment replacements within the City. Further detail on the measure costs and savings assumptions are provided in Appendices B and C.

While each measure was analyzed independently, it is important to note that few measures operate independently. For example, higher efficiency indoor fixtures measures correlate with education through print and electronic outreach because they address the same end use. Savings from measures that address the same end use(s) are not additive; rather, the model uses impact factors to avoid double counting in estimating the water savings from programs of measures.<sup>7</sup> This is why a measure like Public Education may show a distorted cost in comparison to water saved. Most, if not all, measures rely on public awareness. However, it is important to note that water savings are more directly attributable to an "active" measure, like a toilet rebate, than the less "active" public education/awareness measure that informs the community of the active measure.

Figure 3-3 presents the estimated five-year water utility costs to run each measure and the estimated water savings in million gallons for each measure, organized from low to high savings. Note that each measure's water savings are if the measure were to be implemented on a stand-alone basis, thus actual savings may differ when combined with other measures in a program.

<sup>&</sup>lt;sup>7</sup> For example, if two measures are planned to address the same end use and both save 10% of the prior water use, then the net effect is not the simple sum of 20%. Rather, it is the cumulative impact of the first measure reducing the use to 90% of what it was originally, without the first measure in place. Then, the revised use of 90% is reduced by another 10% (10% x 90% = 9%) to result in the use being 81% (90% - 9% = 81%). In this example, the net savings is 19%, not 20%. Using impact factors, the model computes the reduction as follows,  $0.9 \times 0.9 = 0.81$  or 19% water savings.



Figure 3-3. Estimated Costs and Savings of Analyzed Conservation Measures<sup>8</sup>

<sup>&</sup>lt;sup>8</sup>Requiring efficient indoor plumbing fixtures is a state code, and therefore there are no costs to the utility to implement this measure.

# 4 CONSERVATION PROGRAM EVALUATION

After the measures were analyzed, the next step was to group measures into conservation programs. City staff with MWM support chose to group the measures into three conservation programs to be evaluated in the DSS model. This section provides a summary of which measures were included in each of the three program scenarios and reviews the program selected by the City. The three programs illustrate a range of various measure combinations and resulting water savings.

The following key items were considered during measure selection for Programs A, B, and C:

- Existing conservation measures
- Conservation measures recommended by the American Water Works Association (AWWA)
- New and innovative measures
- Measure equitability among customer categories
- Customer demographics

In addition, this section identifies and prioritizes the conservation programs and projects by quantifiable water savings and compliance with the AWWA G480 Water Conservation Program Operation and Management Standard (G480 Standard). The G480 Standard is defined on the AWWA web page as follows:

The G480-20 Water Conservation and Efficiency Program Operation and Management Standard (G480 Standard) is a voluntary standard that can be adopted by water providers at their own discretion. The G480-20 Standard describes the critical elements of an effective water conservation and efficiency program. This standard encompasses activities undertaken by a utility within its own operations to improve water use on the supply side upstream of customer meters through distribution system management, and on the demand side through customer billing and education practices. A conservation program meeting this standard has the potential to impact all water users.<sup>9</sup>

### 4.1 Measure Selection for Conservation Program Alternatives

Using the data gathered, MWM created a list of potential program concepts appropriate for the City to meet future regulatory and conservation mandates. The list included existing program elements and traditional conservation measures as well as concepts that had yet to be implemented or considered by the City. Factors for determining which measure should be in each program included budgeting, feasibility, and the time at which each measure would need to be introduced to promote conservation efforts. Programs also needed to address water conservation across customer categories.

Once the results of the program analysis were reviewed, the City adjusted which measures would be in each of the program scenarios. MWM then compiled descriptions and parameters of the programs, which were not intended to be rigid, to demonstrate the range in savings that could be generated if selected measures were run at the same time. When programs were analyzed, any overlap in water savings (and benefits) from individual measures were considered to provide a total combined water savings (and benefits).

Following are brief descriptions of the resulting programs and an outline of options (Figure 4-1):

• **<u>Program A: Current Measures</u>** – Current conservation program, consisting of 11 measures.

<sup>&</sup>lt;sup>9</sup> American Water Works Association. G480 Standard and AWE Leaderboard web page:

https://www.allianceforwaterefficiency.org/resources/topic/g480-standard-and-awe-leaderboard

- Program B: Optimized Program Measures –Program B includes measures selected by the City to represent the ideal suite of programs based on City staff knowledge and projected savings. This program consists of 14 measures, including most measures in Program A but adds the following: Residential Irrigation Consultations, Leak Detection Technology, Partnerships with Energy Utilities, Direct Installation of Indoor Fixtures, and Large Landscape Irrigation Consultations. A few measures from Program A were not included in Program B; these are: water waste ordinance, financial incentives for irrigation upgrades, outdoor efficiency professional training, outdoor water budgets, landscape and irrigation codes, indoor water use assessments, incentives for rainwater catchment, and requiring efficient indoor plumbing fixtures.
- Program C: All Modeled Measures This program includes the full suite of conservation measures as listed in Figure 4-1, totaling 22 measures.



#### Figure 4-1. Conservation Program Options

### 4.2 Conservation Program Analysis

The results of the conservation program analysis are listed in Table 4-1, which shows:

- Estimated annual demand for all three programs.
- Baseline demands with and without plumbing code.
- Present value of water savings and utility costs.

Demand is calculated in gallons per capita (person) per day (GPCD), compared for each of the three programs.

	Year	Demands with No Plumbing Codes	Demands WITH Plumbing Code Savings	Demands with Program A and Plumbing Code Savings	Demands with Program B and Plumbing Code Savings	Demands with Program C and Plumbing Code Savings	
	2022	250	250	247	247	247	
	2025	250	248	240	240	239	
Demand	2030	250	245	227	227	223	
(GPCD) <sup>1</sup>	2035	252	244	224	223	215	
	2040	253	243	222	221	209	
	2045	255	242	222	220	205	
Present Value of Water Savings <sup>2</sup>		\$6,999,000 \$7,431,000		\$10,122,000			
Present Value of Utility Costs <sup>2,3</sup>		\$48,168,000	\$56,628,000	\$64,588,000			
Water Utility Cost of Water Saved (\$/MG) <sup>3,4</sup>			\$1,240	\$1,370	\$1,120		
2022–2027 Average Annual Cost <sup>3,5</sup>			\$2,745,000	0 \$3,102,000 \$3,24			

#### Table 4-1. Comparison of Program Results

<sup>1</sup> Demands are rounded to the nearest 1 GPCD.

<sup>2</sup> Present value savings and costs are rounded to the nearest \$1,000.

<sup>3</sup> Costs presented in this table are directly attributable to the utility conservation budget only.

<sup>4</sup> Water Utility Cost of Water Saved is rounded to the nearest \$10.

<sup>5</sup> 2022–2027 Average Annual Cost is rounded to the nearest \$1,000.

The results show that Program C has the lowest demand of the three programs, but the highest average annual cost. Program B has the highest cost of water savings per unit volume (\$/MG), indicating that the utility's avoided cost of water is highest for Program B. For a description of how present value is calculated, see Appendix C.

Figure 4-2 presents historical and projected water demand with and without passive savings (plumbing code). Plumbing code elements include current local, state, and federal plumbing code standards for retrofits of items such as toilets, urinals, showerheads, faucets, and clothes washers. Demand without passive savings is the demand that is estimated if no conservation activities were taking place, neither passive nor active. Projected demand is based on the forecasts presented in HDR's Planning Data and Demand Forecast TM.





Figure 4-3 illustrates how marginal returns change in million gallons per year (MGY), through 2045, as more money is spent to achieve water savings. A cost-effectiveness curve displays the results of the present value of each program's costs versus the cumulative water savings at the end of the planning period. This curve is helpful in determining how far to push the "conservation envelope" as the point of diminishing economic returns is evident. Note that Figure 4-3 shows a slight increase in savings from Program A to Program B.





Figure 4-4 builds upon Figure 4-3 to present historical and projected water demand with both passive and active savings, compared among the three conservation programs. Program B has a slight increase in savings compared to program A, while program C has the most savings.



Figure 4-4. Historical and Projected Demand with Plumbing Code and Recommended Measures

All line types shown in the legend are presented in the graph. Program A and Program B demand scenarios are close in value and therefore may be somewhat indistinguishable in the figure.

### 4.3 Selected Program

The City has evaluated and prepared three program options for increased water savings that can be implemented to meet future water use reduction needs. Program A is the current program, representing all current measures (11 total measures). Program B includes some of the current measures plus additional measures that could reasonably be accomplished with existing staff or consulting assistance (14 total measures). Program C includes all measures evaluated (22 total measures). Programs B and C systematically offer increased savings for increased costs, from \$3,102,000 annually with approximately 3,740 mg of water savings expected by 2045 to \$3,242,000 annually with approximately 5,318 mg of water savings expected by 2045. While the water savings of Program C are higher than Program B, they come at a higher cost and would require additional staff to run the added measures.

Program B, the optimized program, was selected. This program balances water savings and staffing and appears to be a feasible option for the City at this time. The City may choose to add in additional measures from Program C, as funding allows. Future drought conditions may prompt the City to prioritize implementing additional conservation measures from Program C. For example, Landscape and Irrigation Codes could be implemented but would require policy change and additional staff for enforcement to achieve the water savings.

# 5 IMPLEMENTATION STRATEGY

This section presents an overview of the conservation planning options for the service area, including budgeting and data monitoring strategies.

## 5.1 Monitoring Progress

Each year City staff will conduct a progress update to analyze the steps being taken to meet the recommended conservation program for targeted water savings. It is imperative to track activities and water demand in order to best understand the level of progress in meeting overall program goals. Costs, participation rates and water use will be tracked to ensure the program is being implemented effectively and is on target to meet goals. As new promising technologies and methodologies emerge, they will be researched and tested, and could replace measures that are underachieving. Summary reports will be issued citing progress and recommending changes in program content.

A tracking database in an Excel spreadsheet could store monthly data from each conservation measure and program. Program participation by individual accounts, related to each measure, will be evaluated by tracking the following:

- Customer information such as name, address, account number, type of business (CII customers)
- Conservation measure or device information such as type (including make and model), quantity, unit water savings, life expectancy
- Cost information such as rebate amount
- Number and type of rebates or other incentives issued (including water savings details for rebates such as efficiency level of washing machines installed through the incentive program)
- Number and square footage of turf removal rebates
- Collaboration with Planning Department to quantify and verify compliance with water efficiency codes and AMI installation
- Water use before and after documented replacement of fixtures or other program implementation

# 5.2 Track and Update for New Codes and Emerging Technologies

It is challenging to track changes in the consumer marketplace for the vast array of water-using appliances and plumbing fixtures in both the residential and commercial sectors. The following are options for tracking the latest in national standards and building codes as well as technologies and emerging trends in customer preferences:

- Have staff member(s) participate on the AWWA Water Conservation Division committees with attendance at the Annual Conference Committee meetings and quarterly conference calls, in particular the Water Efficiency Programs and Technology Committee.
- Monitor the Alliance for Water Efficiency (AWE) for updates on changes in National Standards and Codes as well as opportunities to comment on future national changes to codes and regulations.
   Frequently, AWE has performance testing results posted on their website that provide particularly useful information to consumers.
- Continue utility partnership with the WaterSense Program. Track the U.S. Environmental Protection Agency (EPA) WaterSense posts on new technologies and updated equipment lists.
- Monitor performance information that may also be available through Consumer Reports or the Consortium for Energy Efficiency (http://www.cee1.org).

- Investigate potential partnerships with the Idaho Washington Aquifer Collaborative (IWAC) and Spokane Aquifer Joint Board (SAJB) for conservation activities
- Attend the AWWA WaterSmart Innovations Conference for exposure to the vendors participating in the exhibition and to gather information on emerging trends in water conservation programs.
- Leverage state and county processes for adopting new building codes and regulations, especially building codes, to implement proactive changes in the future development of the City's service area.
- Maintain and use a network of 10–20 key contacts at progressive utilities to inquire about new technologies (e.g., through known contacts or new contacts made at conferences).
- Host events with partner utilities and stakeholders on related water loss control programs or conservation measures.
- Conduct surveys every three years with other utilities to gain insight on programs and product testing.

Staying on, or ahead of the curve, by tracking new technologies could lead to water savings without City investment for later upgrades through incentive programs. Emerging products may be worthy of pilot programs and could be attractive for grant funding projects through the U.S. EPA or U.S. Bureau of Reclamation. However, use caution when adopting new technologies that have yet to be adequately researched or tested.

# 5.3 Five-Year Implementation Recommendations

Recommendations to assist with implementation over the next five years:

- Track state regulations regarding residential, CII, landscape, and water loss management, including participation in public workshops and stakeholder groups.
- Consider launching pilot studies for new measures.
- Consider soliciting and tracking community input and feedback via an online or phone survey or at outreach and education events.
- Prioritize measures that contribute the most to meeting per capita water use targets and are relatively easy to operate with limited staff.
- Target working with the largest 100 water using customers to reduce water use. The City currently offers support to highest commercial and residential users but not all are addressed.
- Develop an annual work plan for each year as soon as the budget is adopted (or in concert with the budget planning process).
- Form partnerships and apply for grants where appropriate.
- Review program staff needs and hire staff to adequately support the program.
- Outsource to gain enough staff support to administer the expanded programs (as needed).
- Develop analytical tools to track water use by customer class and overall per capita water use, adjusted for the weather and external factors.
- Set up a database to store and manage measure participation, cost, and other data to gauge successes and areas that need improvement/added attention.
- Annually update the plan, including actual measure participation, projected water savings, and expected per capita water use reductions, to ensure the City is on track to meet conservation goals.
- Consider an additional measure to assess and manage distribution system water loss (see more below).

- Develop Implementation Plans that describe how each conservation measure will be implemented.
- Review goals in the DSS Model annually and update measure participation.

#### 5.3.1 Assess and Manage Distribution System Water Loss

The City's operations, conservation, and the finance departments have made efforts to maintain a thorough annual accounting of water production, sales by customer class and volume of water produced but not sold (non-revenue water). Some efforts were successful while others were not, so the City is increasing its focus to assess and manage system water loss. In conjunction with system accounting, the assessment should include audits that identify and quantify known legitimate uses of non-revenue water to determine remaining potential for reducing water losses (bleeders, tank overflows, system testing, etc.).

Other strategies to manage system water loss include continuously analyzing billing data for system errors and under-registering meters and addressing meter testing and repair/replacement to ensure more accurate meter reads and revenue collection. Additional actions could include meter calibration and accelerated meter replacement.

Implementation of a water loss measure is a critical strategy in meeting the City's goals for 2045 and beyond. The City does not have an active leak detection and repair program. Additional actions could include installation of data loggers, accelerated main and service line replacement, and proactive full-system leak detection and repair. Specific goals and methods are to be developed by City staff.

# 5.4 Suggestions for Future DSS Model Updates

City staff should be ready with an answer to the question: "How much water has been saved and at what cost?" In addition, due to the need for ongoing water conservation efforts to attain and maintain more water savings, the City will need to track program water savings, costs, and benefits (i.e., cost savings).

The following two types of updates are envisioned for the DSS Model:

- Annual or more frequent model updates for monitoring costs and water savings The conservation
  measure worksheets can be used to track actual activities and compare them to the planned activities
  defined as part of the model development for this program. This update is recommended in
  conjunction with an annual work plan and budget. At minimum, it should happen every 3–5 years, but
  more frequent updates are recommended as the City expands and improves its data.
- **Recalibration of the model** The DSS Model has a base year of 2019. Depending on water demand and account growth rates, it is advisable to update the base year as soon as a complete year of comprehensive data is available, and on a five-year basis thereafter. This update requires reviewing historical demand trends, future population and demand forecasts, calibration of fixture models, new or updated conservation measures, and cost and water savings assumptions.

Specific triggers for updates may include:

- Significant change in the cost of water pumped (more than 10-20% energy or chemical cost increase or decrease would modify the "savings worksheet" and change the benefit-cost ratios).
- Significant change in population or accounts for one of the billing categories (more than a 5% shift).
- Significant changes to water system balance (e.g., more than 10% change in water losses or other parameter on the Demands Section of the DSS Model).
- New codes or regulations that affect natural replacement rates of fixtures.
- Alternatives for staffing versus outsource contracting or other changes to the cost of implementation of a conservation measure (change to conservation measure worksheet only).

• Any other change in conservation measures (i.e., updates to the measure worksheets can be changed or modified at any time without altering the water system balance worksheets or affecting fixture model calibration; new technologies can change or add a new conservation measure worksheet ).

# 6 NEXT STEPS AND CONCLUSIONS

The City plans to implement Program B and pursue the additional measures in Program C as appropriate. However, water use in a service area is dynamic and responds to changes in population, economy, weather, efficiency of devices, and types of industry. In the future, as the City's community evolves and water use patterns and weather changes, there remains the possibility City staff will elect to adjust measure implementation targets and schedules. This may include expanding upon, or scaling back, various program components and measures to increase efficiency, improve benefit-cost ratios, adopt better technology or methods, or to meet budget and staffing limitations.

Whether additional measures become necessary would be dependent on several factors including potential future drought conditions and the City's ability to support new and more innovative programs. With individual measures clearly defined and water savings objectives and customer target goals measured, the City has quantifiable performance goals to track on both a measure and overall program level basis.

# 6.1 Selected Program Estimated Water Savings and Budget

The estimated average annual cost to the City to implement Program B as described in this TM is \$3,102,000 for the years 2022–2027, including staff labor and other administration costs. The budget includes expenses (materials, rebates, giveaways, etc.) and was developed while working closely with City staff.

Approximately 61% of the City's service area water usage is associated with residential water use, followed by approximately 20.5% of use for commercial and industrial accounts. Consequently, residential and CII conservation programs will produce the most savings.

#### **Overall Conclusions**

- The total range of conservation program savings between Program A (which includes all existing measures) and Program C (which also includes all new evaluated and selected measures) is 8-14% of projected demand with passive savings.
- From the utility standpoint, the cost of water saved for the selected Program B is \$1,370 per MG.
- Programs A, B, and C each have the potential to reduce per capita water use

### 6.2 Recommended Funding Sources and Partnerships

It is recommended that the City seek additional funding and partnership opportunities both nationally and regionally to expand the conservation programs and pilot programs that have high potential for water savings within the City's service area.

Partnership opportunities and funding sources may include the following:

- County partnerships
- State and federal grants
- Local schools/university students or student organizations
- Local community organizations with an interest in water efficiency (e.g., gardening groups)
- Partnerships with energy utilities

### 6.3 Conclusions

The following is a summary of the water conservation analysis findings:

- Conservation is the least expensive means of meeting future water supply needs. Implementation of conservation measures should reduce per capita water use and has the potential to extend the lifespan of infrastructure thereby delaying additional infrastructure needs. While the conservation actions identified can have a significant cost, the costs to address increased demands through engineering solutions are even higher. Furthermore, with climate change, long-term drought, and environmental restrictions, additional water supplies may not be available to meet future increases in demands without conservation.
- Invest in water conservation efforts that are a feasible and cost-effective means of:
  - Being more sustainable within existing water supplies.
  - Addressing reduction in water use as required based on reductions in supply.
- Through the DSS Model analysis, the City identified fixture costs, applicable customer classes, time period of implementation, measure life, administrative costs, end uses, end-use savings per replacement, and a target number or percentage of accounts per program year. This thorough analysis may be used in a rate case or additional planning documents.
- Based on the analysis, the City has selected to implement Program B. Program B has 14 measures, an average five-year annual cost of \$3,102,000 and a cost of water saved of \$1,370 per MG.

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# APPENDIX A - DSS MODEL OVERVIEW

Demand

Projection Breakdown by Development End Use **Data Collection** <u>Hide</u> Edit Agency Info **Model Setup** Edit Û Production  $\checkmark$ Edit ĮĻ Consumption Data  $\checkmark$ Edit Edit  $\checkmark$ **Historical Demographics** Edit **Growth Projections** Ţ **Demand Analysis** <u>Hide</u>  $\checkmark$ Edit  $\mathcal{T}$ Edit Ń Л Regressio Edit End Uses Edit  $\overline{\mathbf{v}}$ Codes and Standards Edit J Water Demand Scenario Edit Service Area Calibration Edit Л **Demand Projections** Edit ĮĻ **Conservation Analysis** <u>Hide</u> Edit  $\checkmark$ Settings and Targets Ū Edit Avoided Costs Л **Conservation Measures**  $\checkmark$ Edit **Program Scenarios** Edit  $\checkmark$ **Final Check** Edit ĮĻ **Results** <u>Hide</u> Edit **Tables and Figures** 

Demand

Figure A-1. DSS Model Main Page

Impact of Water Efficiency Measures on Each End Use Cost-Benefit Analysis and Conservation Program Selection

Total Demand Reductions from Conservation

**DSS Model Overview:** The Demand Side Management Least Cost Planning Decision Support System (DSS Model) as shown in left figure is used to prepare long-range, detailed demand projections. The purpose of the extra detail is to enable a more accurate assessment of the impact of water efficiency programs on demand and to provide a rigorous and defensible modeling approach necessary for projects subject to regulatory or environmental review.

Originally developed in 1999 and continuously updated, the DSS Model is an "end-use" model that breaks down total water production (water demand in the service area) to specific water end uses, such as plumbing fixtures and appliance uses. The model uses a bottom-up approach that allows for multiple criteria to be considered when estimating future demands, such as the effects of natural fixture replacement, plumbing codes, and conservation efforts. The DSS Model may also use a top-down approach with a utility-prepared water demand forecast.

Demand Forecast Development and Model Calibration: To forecast urban water demands using the DSS Model, customer demand data are obtained from the water agency being modeled. Demand data are reconciled with available demographic data to characterize water usage for each customer category in terms of number of users per account and per capita water use. Data are further analyzed to approximate the split of indoor and outdoor water usage in each customer category. The indoor/outdoor water usage is further divided into typical end uses for each customer category. Published data on average per capita indoor water use and average per capita end use is combined with the number of water users to calibrate the volume of water allocated to specific end uses in each customer category. In other words, the DSS Model checks that social norms from end studies on water use behavior (e.g., flushes per person per day) are not exceeded or drop below reasonable use limits.

**<u>Passive Water Savings Calculations:</u>** The DSS Model is used to forecast service area water fixture use. Specific end-use type, average

water use, and lifetime are compiled for each fixture. Additionally, state and national plumbing codes, and appliance standards are modeled by customer category. These fixtures and plumbing codes can be added to, edited, or deleted by the user. This process yields two demand forecasts, one with plumbing codes and one without plumbing codes.

Active Conservation Measure Analysis Using Benefit-Cost Analysis: The DSS Model evaluates active conservation measures using benefit-cost analysis with the present value of the cost of water saved (\$/Million Gallons or \$/Acre-Feet). Benefits are based on savings in water and wastewater facility operations and maintenance (O&M) and any deferred capital expenditures. The figures on the previous page illustrate the processes for forecasting conservation water savings, including the impacts of fixture replacement due to existing plumbing codes and standards.

Figure A-2. Benefit-Cost Analysis Summary Examp
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MIDNUS IMTER MINAGEMENT INC.	NUMBER OF THE CONSErvation Measures New Joint Proc. Benefit Cost Analysis									
Prev	rio Conser AMI RES WC IRR CIIR NO MU	LDS PRV I	LEA UHE UH	e >toi >ho >	rai rai si	PR Lan SCH	GEN DIP	B/C Next	$\geq$	$\odot$
Review Data										
			Benefit Co	st Analysis						
	Util Cost Five Year Start Year	-		Water Savings Ye	ar 💼		Units 📕			
Benefit Cost	Measure	Present Value of Water Utility Benefits	Present Value of Community Benefits	Present Value of Water Utility Costs	Present Value of Community Costs	Water Utility Benefit to Cost Ratio	Community Benefit to Cost Ratio	Five Years of Water Utility Costs 2020- 2025	Water Savings in 2030 (afv)	Cost of Savings per Unit Volume (\$/af)
Analysis	AMI Full AMI Implementation	\$3,976,434	\$16,635,194	\$1,566,069	\$5,893,340	2.54	2.82	\$320,000	133.764878	\$324
	RESH Residential Rebates for HECW	\$139,312	\$365,447	\$95,879	\$200,665	1.45	1.82	\$50,325	5.124572	\$824
	WC Water Checkup	\$7,648,165	\$30,288,419	\$6,005,949	\$7,665,564	1.27	3.95	\$1,382,995	239.652915	\$877
	IRRE Irrigation Evaluations	\$1,589,488	\$1,589,488	\$1,918,184	\$4,332,779	0.83	0.37	\$443,824	98.051821	\$646
	CIIReICII Water Survey Level 2 and Customized Rebate	\$910,720	\$3,313,109	\$915,904	\$2,581,185	0.99	1.28	\$193,725	18.753753	\$1,055
	NOZZ Free Sprinkler Nozzle Program	\$277,886	\$277,886	\$329,386	\$455,933	0.84	0.61	\$103,145	23.005687	\$680
	MULCMulch Program	\$80,739	\$80,739	\$287,676	\$287,676	0.28	0.28	\$66,932	4.554625	\$2,000
	LDS Water Conserving Landscape and Irrigation Codes	\$1,055,819	\$1,055,819	\$350,316	\$7,979,608	3.01	0.13	\$78,568	46.098525	\$161
	PRV Pressure Reduction Valve Rebate	\$102,170	\$193,972	\$49,161	\$132,223	2.08	1.47	\$37,818	8.503521	\$425
	LEAK Leak Detection Device Rebate UHET Ultra-High Efficiency Toilet Rebate	\$174,130 \$538,624	\$847,416 \$538,624	\$306,843 \$405,529	\$1,288,743 \$761,556	0.57	0.66	\$80,053 \$362,736	6.065394 16.287780	\$1,895 \$921

<u>Model Use and Validation</u>: The DSS Model has been used for over 20 years for practical applications of conservation planning in over 300 service areas representing 60 million people, including extensive efforts nationally and internationally in Australia, New Zealand, and Canada.

#### Figure A-3. DSS Model Analysis Locations in the U.S.



The DSS Model can use one of the following: 1) a statistical approach to forecast demands (e.g., an econometric model); 2) a forecasted increase in population and employment; 3) predicted future demands; or 4) a demand projection entered into the model from an outside source. The following figure presents the flow of information in the DSS Model Analysis.



Figure A-4. DSS Model Analysis Flow

# APPENDIX B – DSS MODEL PLUMBING CODE ASSUMPTIONS

This section presents details regarding the national and state plumbing codes and key inputs and assumptions used in the DSS Model, which is used to prepare long-range, detailed demand projections. This rigorous modeling approach is especially important if the project will be subject to regulatory or environmental review.

### **B.1** National Plumbing Code

The Federal Energy Policy Act of 1992, as amended in 2005, mandates that only fixtures meeting the following standards can be installed in new buildings:

- Toilet 1.6 gal/flush maximum
- Urinals 1.0 gal/flush maximum
- Showerhead 2.5 gal/min at 80 pounds per square inch (psi)
- Residential faucets 2.2 gal/min at 60 psi
- Public restroom faucets 0.5 gal/min at 60 psi
- Dishwashing pre-rinse spray valves 1.6 gal/min at 60 psi



Replacement of fixtures in existing buildings is also governed by the Federal Energy Policy Act, which mandates that only devices with the specified level of efficiency

(as shown above) can be sold as of 2006. The net result of the plumbing code is that new buildings will have more efficient fixtures and old inefficient fixtures will slowly be replaced with new, more efficient models. The national plumbing code is an important piece of legislation and must be carefully taken into consideration when analyzing the overall water efficiency of a service area.

In addition to the plumbing code, the U.S. Department of Energy regulates appliances, such as residential clothes washers, further reducing indoor water demands. Regulations to make these appliances more energy efficient have driven manufactures to dramatically reduce the amount of water these machines use. Generally, front-loading washing machines use 30-50% less water than conventional models (which are still available).

In this analysis, the DSS Model forecasts a gradual transition to high efficiency clothes washers (using 12 gallons or less) so that by the year 2025 that will be the only type of machine available for purchase. In addition to the industry becoming more efficient, rebate programs for washers have been successful in encouraging customers

to buy more water efficient models. Given that machines last about 10 years, eventually all machines on the market will be the more water efficient models. Energy Star washing machines have a water factor of 6.0 or less – the equivalent of using 3.1 cubic feet (or 23.2 gallons) of water per load. The maximum water factor for residential clothes washers under current federal standards is 6.5. The water factor equals the number of gallons used per cycle per cubic foot of capacity.

Prior to the year 2000, the water factor for a typical new residential clothes washer was around 12. In March 2015, the federal standard reduced the maximum water factor for



top- and front-loading machines to 8.4 and 4.7, respectively. In 2018, the maximum water factor for top-loading machines was further reduced to 6.5. For commercial washers, the maximum water factors were reduced in 2010 to 8.5 and 5.5 for top- and front-loading machines, respectively. Beginning in 2015, the maximum water factor for Energy Star certified washers was 3.7 for front-loading and 4.3 for top-loading machines. In 2011, the U.S. Environmental Protection Agency estimated Energy Star washers comprised more than 60% of the
residential market and 30% of the commercial market (Energy Star, 2011). A new Energy Star compliant washer uses about two-thirds less water per cycle than washers manufactured in the 1990s.

## **B.2** State Plumbing Code

Plumbing codes for toilets, urinals, showerheads, and faucets are prescribed by the 2021 Washington State Plumbing Code (WAC 51-56-0200) and exceeds federal standards.

# **B.3** Key Baseline Potable Demand Inputs, Passive Savings Assumptions, and Resources

The following tables present the key assumptions and references used in the DSS Model in determining projected demands. The assumptions having the most dramatic effect on future demands are the natural replacement rate of fixtures, how residential or commercial future use is projected, and the percentage of estimated real water losses.

Parameter	Model Input Value, Assumptions, and Key References				
Model Start Year for Analysis	2022				
Water Demand Basis	Customer category water use is based on 2019 base year data provided by City				
Population Projection Source	Population projections in 2045 provided in Table 3 of "Spokane Future Flows- Planning Data and Demand Forecast TM (2022-08- 22)," years 2022-2044 interpolated.				
Potable Water System Base Year Water Use Profile					
Customer Categories	Start Year Accounts	Total Water Use Distribution	Demand Factors (gpd/acct)	Indoor Use %	
Single Family (SF)	44,971	48%	573	37%	
Multifamily (MF)	3,362	14%	2,201	58%	
Commercial & Industrial (CI)	6,826	20%	1,628	48%	
Government (GOVT)	793	4%	2,864	34%	
Parks (PA)	331	3%	5,257	0%	
Resale	1	3%	1,860,000	0%	
(Hydrant Permits) Estimated Consumption (HYD)	1	7%	4,060,000	0%	
Total/Avg	56,285	100%	847,503	37%	

#### Table B-1. List of Key Assumptions

### Table B-2. Key Assumptions Resources

Parameter	Resource
Residential End Uses	Key References: AWWA Research Foundation (AWWARF) Report <i>Residential End</i> <i>Uses of Water, Version 2 – 4309</i> (DeOreo, 2016). Table 2-A. Water Consumption by Water-Using Plumbing Products and Appliances – 1980-2012. PERC Phase 1 Report. Plumbing Efficiency Research Coalition. 2013. http://www.map-testing.com/content/info/menu/perc.html Model Input Values are found in the "End Uses" section of the DSS Model on the "Breakdown" worksheet.
Non-Residential End Uses, percent	Key Reference: AWWARF Report <i>Commercial and Institutional End Uses of Water</i> (Dziegielewski, 2000 – Appendix D: Details of Commercial and Industrial Assumptions, by End Use). Model Input Values are found in the "End Uses" section of the DSS Model on the "Breakdown" worksheet.
Efficiency Residential Fixture Current Installation Rates	<ul> <li>U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any).</li> <li>Key Reference: GMP Research, Inc. (2019). 2019 U.S. WaterSense Market Penetration Industry Report.</li> <li>Key Reference: Consortium for Efficient Energy (www.cee1.org).</li> <li>Model Input Values are found in the "Codes and Standards" green section of the DSS Model by customer category fixtures.</li> </ul>
Water Savings for Fixtures, gal/capita/day	Key Reference: AWWARF Report <i>Residential End Uses of Water, Version 2 – 4309</i> (DeOreo, 2016). The City supplied data on costs and savings; professional judgment was made where no published data was available. Key Reference: California Energy Commission, <i>Staff Analysis of Toilets, Urinals</i> <i>and Faucets, Report # CEC-400-2014-007-SD</i> , 2014. Model Input Values are found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model.
Non-Residential Fixture Efficiency Current Installation Rates	Key Reference: 2010 U.S. Census, Housing age by type of dwelling plus natural replacement plus rebate program (if any). Assume commercial establishments built at same rate as housing, plus natural replacement. California Energy Commission, <i>Staff Analysis of Toilets, Urinals and Faucets,</i> <i>Report # CEC-400-2014-007-SD</i> , 2014. Model Input Values are found in the "Codes and Standards" green section of the DSS Model by customer category fixtures.

Parameter	Resource	
Residential Frequency of Use Data, Toilets, Showers, Faucets, Washing Machines, uses/user/day	<ul> <li>Key Reference: AWWARF Report <i>Residential End Uses of Water, Version 2 – 4309</i> (DeOreo, 2016). Summary values can be found in the full report: http://www.waterrf.org/Pages/Projects.aspx?PID=4309</li> <li>Key Reference: California Energy Commission, <i>Staff Analysis of Toilets, Urinals and Faucets, Report # CEC-400-2014-007-SD</i>, 2014.</li> <li>Key Reference: Alliance for Water Efficiency, <i>The Status of Legislation, Regulation, Codes &amp; Standards on Indoor Plumbing Water Efficiency</i>, January 2016.</li> <li>Model Input Values are found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model and confirmed in each "Service Area Calibration End Use" worksheet by customer category.</li> </ul>	
Non-Residential Frequency of Use Data, Toilets, Urinals, and Faucets, uses/user/day	Key References: Estimated based on AWWARF Report <i>Commercial and</i> <i>Institutional End Uses of Water</i> (Dziegielewski, 2000 – Appendix D: Details of Commercial and Industrial Assumptions, by End Use). Key Reference: California Energy Commission, <i>Staff Analysis of Toilets, Urinals</i> <i>and Faucets, Report # CEC-400-2014-007-SD</i> , 2014. Fixture uses over a 5-day work week are prorated to 7 days. Non-residential 0.5 gallons per minute (gpm) faucet standards per Table 2-A. Water Consumption by Water-Using Plumbing Products and Appliances – 1980- 2012. PERC Phase 1 Report. Plumbing Efficiency Research Coalition, 2012. http://www.map-testing.com/content/info/menu/perc.html Model Input Values are found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model and confirmed in each "Service Area Calibration End Use" worksheet by customer category.	
	Residential Toilets 2-4%	
	Non-Residential Toilets 2-3%	
	Residential Showers 4% (corresponds to 25-year life of a new fixture)	
Natural Replacement Rate of Fixtures (percent per year)	Residential Clothes Washers 10% (based on 10-year washer life). Key References: <i>Residential End Uses of Water</i> (DeOreo, 2016) and <i>Bern Clothes</i> <i>Washer Study, Final Report</i> (Oak Ridge National Laboratory, 1998).	
	Residential Faucets 10% and Non-Residential Faucets 6.7% (every 15 years). CEC uses an average life of 10 years for faucet accessories (aerators). A similar assumption can be made for public lavatories, though no hard data exists and since CII fixtures are typically replaced less frequently than residential, 15 years is assumed. CEC, <i>Analysis of Standards Proposal for Residential Faucets and Faucet Accessories</i> , a report prepared under CEC's Codes and Standards Enhancement Initiative, Docket #12-AAER-2C, August 2013.	
	Model Input Value is found in the "Codes and Standards" green section on the "Fixtures" worksheet of the DSS Model.	
Residential Future Water Use	Increases Based on Population Growth and Demographic Forecast	
Non-Residential Future Water Use	Increases Based on Employment Growth and Demographic Forecast	

#### **B.3.1** Fixture Estimates

Determining the current level of efficient fixtures in a service area while evaluating the passive savings in the DSS Model is part of the standard process and is called "initial fixture proportions." As described earlier, MWM reconciled water efficient fixtures and devices installed within the City's service area and estimated the number of outstanding inefficient fixtures.

MWM used the DSS Model to perform a saturation analysis for toilets, urinals, showerheads, faucets, and clothes washing machines. The process included a review of the age of buildings from census data, number of rebates per device, and assumed natural replacement rates. MWM presumed the fixtures nearing saturation and worth analysis would include residential toilets and residential clothes washing machines, as both have been included in recommended conservation practices for over two decades.

In 2014, the Water Research Foundation updated its 1999 Residential End Uses of Water Study (REUWS). Water utilities, industry regulators, and government planning agencies consider it the industry benchmark for single family home indoor water use. This TM incorporates recent study results that reflect the change to the water use profile in residential homes including adoption of more water efficient fixtures over the 15 years from 1999 to 2014. REUWS results were combined with the City's historical rebate and billing data to enhance and verify assumptions made for all customer accounts, including saturation levels on the above-mentioned plumbing fixtures. The DSS Model presents the estimated current and projected proportions of these fixtures by efficiency level within the service area. These proportions were calculated by:

- Using standards in place at the time of building construction.
- Taking the initial proportions of homes by age (corresponding to fixture efficiency levels).
- Adding the net change due to natural replacement.
- Adding the change due to rebate measure minus the "free rider effect."10

Further adjustments were made to initial proportions to account for the reduction in fixture use due to lower occupancy and based on field observations. More information about the development of initial and projected fixture proportions can be found in the DSS Model "Codes and Standards" section.

The model is capable of modeling multiple types of fixtures, including ones with different designs. For example, currently toilets can be purchased that flush at a rate of 0.8 gpf, 1.0 gpf, 1.28 gpf and 1.6 gpf. So, the DSS Model utilizes fixture replacement rates to determine what type of fixture should be used for a new construction installation or replacement. The replacement of fixtures is listed as a percentage within the DSS Model. A value of 100% would indicate all toilets installed would be of one flush volume. A value of 75% means three out of every four toilets installed would be of that particular flush volume.

The DSS Model provides inputs and analysis of the number, type, and replacement rates of fixtures for each customer category (e.g., single family toilets, commercial toilets, residential clothes washing machines.). For example, the DSS Model incorporates the effects of the 1992 Federal Energy Policy Act with a feature that determines the "saturation" of 1.6 gpf toilets from 1992-2014 while the 1992 Federal Energy Policy Act was in effect for 1.6 gpf toilet replacements. Further consideration and adjustments were made to replacement rates to account for the reduction in fixture use and wear, due to lower occupancy and based on field observations.

<sup>10</sup> It is important to note in water conservation program management the "free rider effect" occurs when a customer applies for and receives a rebate on a targeted high efficiency fixture they would have purchased even without a rebate. In this case, the rebate was not the incentive for their purchase but a "bonus." Rebate measures are designed to target those customers needing financial incentive to install the more efficient fixture.

## APPENDIX C – DSS MODEL MEASURE ASSUMPTIONS

This appendix presents an overview of the water reduction methodology, benefit-cost perspectives, present value analysis, and costs and savings assumptions for the measure analysis.

## C.1 Water Reduction Methodology

Each conservation measure targets a particular water use, such as indoor single family water use. Targeted water uses are categorized by water user group and by end use. Targeted water user groups include single family residential; multifamily residential; commercial, industrial, and institutional; and so forth. Measures may apply to more than one water user group. Targeted end uses include indoor and outdoor use. The targeted water use is important to identify because the water savings are generated from reductions in water use for the targeted end use. For example, a residential retrofit conservation measure targets single family and multifamily residential indoor use, and in some cases, specifically shower use. When considering the water savings potential generated by a residential retrofit, one considers the water saved by installing low-flow showerheads in single family and multifamily homes.

The market penetration goal for a measure is the extent to which the product or service related to the conservation measure occupies the potential market. Essentially, the market penetration goal identifies how many fixtures, rebates, surveys, and so forth the wholesale customer would have to offer or conduct over time to reach its water savings goal for that conservation measure. This is often expressed in terms of the number of fixtures, rebates, or surveys offered or conducted per year.

The potential for error in market penetration goal estimates for each measure can be significant because the estimates are based on previous experience, chosen implementation methods, projected utility effort, and funds allocated to implement the measure. The potential error can be corrected through reevaluation of the measure as the implementation of the measure progresses. For example, if the market penetration required to achieve specific water savings turns out to be different than predicted, adjustments to the implementation efforts can be made. Larger rebates or additional promotions are often used to increase traction in the market. The process is iterative to reflect actual conditions and helps to ensure market penetration and needed savings are achieved regardless of future variances between estimates and actual conditions.

In contrast, market penetration for mandatory ordinances can be more predictable with the greatest potential for error occurring in implementing the ordinance change. For example, requiring dedicated irrigation meters for new accounts through an ordinance can assure an almost 100% market penetration for affected properties.

## C.2 Present Value Analysis and Perspectives on Benefits and Costs

The determination of the economic feasibility of water conservation programs involves comparing the costs of the programs to the benefits provided using the DSS Model. The Model calculates the cost-effectiveness of conservation measure savings at the end-use level. For example, the model determines the amount of water a toilet rebate program saves in daily toilet use for each single-family account.

Present value analysis, using present day dollars and a real discount rate of 3%, is used to discount costs and benefits to the base year. From this analysis, benefit-cost ratios of each measure are computed. When measures are put together in programs, the model is set up to avoid double counting savings from multiple measures that act on the same end use of water. For example, multiple measures in a program may target toilet replacements. The model includes assumptions to apportion water savings between the multiple measures.

Economic analysis can be performed from several different perspectives, based on which party is affected. For planning water use efficiency programs for utilities, perspectives most used for benefit-cost analyses are the "utility" perspective and the "community" perspective. The "utility" benefit-cost analysis is based on the benefits and costs to the water provider. The "community" benefit-cost analysis includes the utility benefit and costs,

together with account owner/customer benefits and costs. These include customer energy and other capital or operating cost benefits, plus the costs of implementing the measure beyond what the utility pays.

The utility perspective offers two advantages. First, it considers only the program costs that will be directly borne by the utility. This enables the utility to fairly compare potential investments for saving versus supplying increased quantities of water. Second, revenue shifts are treated as transfer payments, which means program participants will have lower water bills and non-participants will have slightly higher water bills, so the utility's revenue needs continue to be met. Therefore, the analysis is not complicated with uncertainties associated with long-term rate projections and retail rate design assumptions. It should be noted there is a significant difference between the utility's savings, from the avoided cost of procurement and delivery of water, and the reduction in retail revenue that results from reduced water sales due to water use efficiency. This budget impact occurs slowly and can be accounted for in water rate planning. Because it is the water provider's role in developing a water use efficiency plan that is vital in this study, the utility perspective was primarily used to evaluate elements of this report.

The community perspective is defined to include the utility and the customer costs and benefits. Costs incurred by customers striving to save water while participating in water use efficiency programs are considered, as well as benefits received in terms of reduced energy bills (from water heating costs) and wastewater savings, among others. Water bill savings are not a customer benefit in aggregate for reasons described previously. Other factors external to the utility, such as environmental effects, are often difficult to quantify or are not under the control of the utility. They are therefore frequently excluded from economic analyses, including this one.

The time value of money is explicitly considered. Typically, the costs to save water occur early in the planning period whereas the benefits usually extend to the end of the planning period. For this reason, a planning period of 10 years or longer is used because costs and benefits that occur beyond 10 years have very little influence on the total present value of costs and benefits. The value of all future costs and benefits is discounted to the first year in the DSS Model (the base year) at the real interest rate of 3.01%. The DSS Model calculates this real interest rate, adjusting the current nominal interest rate (assumed to be approximately 6.1%) by the assumed rate of inflation (3.0%).

The formula to calculate the real interest rate is:

#### (Nominal interest rate – assumed rate of inflation) / (1 + assumed rate of inflation)

Cash flows discounted in this manner are herein referred to as "Present Value" sums.

### C.3 Measure Cost and Water Savings Assumptions

Assumptions regarding the following variables were made for each measure:

- **Targeted Water User Group End Use** Water user group (e.g., single family residential) and end use (e.g., indoor, or outdoor water use).
- Utility Unit Cost Cost of rebates, incentives, and contractors hired to implement measures. The assumed dollar values for the measure unit costs were closely reviewed by staff and are found to be adequate for each individual measure. The values in most cases are in the range of what is offered by other water utilities in the region, excluding the landscape conversion/turf removal program.
- **Retail Customer Unit Cost** Cost for implementing measures paid by retail customers (i.e., the remainder of a measure's cost not covered by a utility rebate or incentive).
- Utility Administration and Marketing Cost The cost to the utility for administering the measure, including consultant contract administration, marketing, and participant tracking. The mark-up is sufficient (in total) to cover conservation staff time, general expenses, and overhead.

Costs are determined for each of the measures based on industry knowledge, experience, and data provided by the City. Costs may include incentive costs, usually determined on a per-participant basis; fixed costs, such as marketing; variable costs, such as the cost to staff the measures and to obtain and maintain equipment; and a one-time set-up cost. The set-up cost is for measure design by staff or consultants, any required pilot testing, and preparation of materials used in marketing the measure. Measure costs are estimated each year through 2045. Costs are spread over the period depending on the length of the implementation period for the measure and estimated voluntary customer participation levels.

Lost revenue due to reduced water sales is not included as a cost because the water conservation measures evaluated herein generally take effect over a long span of time. This span is sufficient to enable timely rate adjustments, if necessary, to meet fixed cost obligations and savings on variable costs such as energy and chemicals.

The unit costs vary according to the type of customer account and implementation method being addressed. For example, a measure might cost a different amount for a single-family residential account than for a multifamily residential account, and for a rebate versus an ordinance requirement or a direct installation implementation method. Typically, water utilities have found there are increased costs associated with achieving higher market saturation, such as more surveys per year. The DSS Model calculates the annual costs based on the number of participants each year. The general formula for calculating annual utility costs is:

- Annual Utility Cost = annual market penetration rate x total accounts in category x unit cost per account x (1+administration and marketing markup percentage)
- Annual Customer Cost = annual number of participants x unit customer cost
- Annual Community Cost = annual utility cost + annual customer cost

Data necessary to forecast water savings of measures include specifics on water use, demographics, market penetration, and unit water savings. Savings normally develop at a measured and predetermined pace, reaching full maturity after full market penetration is achieved. This may occur 3 to 10 years after the start of implementation, depending upon the implementation schedule.

For every water use efficiency activity, or replacement with more efficient devices, there is a useful life. The useful life is called the "Measure Life" and is defined to be how long water conservation measures stay in place and continue to save water. It is assumed measures implemented because of codes, standards, or ordinances (e.g., toilets) would be "permanent" and not revert to an old inefficient level of water use if the device needed to be replaced. However, some measures that are primarily behavior-based, such as residential surveys, are assumed to need to be repeated on an ongoing basis to retain the water savings (e.g., homeowners move away, and the new homeowners may have less efficient water using practices). Surveys typically have a measure life of about five years.

Figure C-1 depicts the cost of water savings for the City of Spokane's measures modeled during this effort. This is the cost of saved water per unit volume if the measure were to be implemented on a stand-alone basis (i.e., without interaction or overlap from other measures that might address the same end use/uses).



#### Figure C-1. Comparison of Cost of City Measures and Water Savings

## 5.1 Sanitary Control Areas by Well













## 5.2 2022 City of Spokane Potential Contaminant Source Inventory (PCSI)

StndAddress 1001 E North Foothills Dr **1001 E WELLESLEY** 1001 N HAVANA 1003 E 3RD **1003 E TRENT 1003 E TRENT** 1004 N FREYA ST **101 E MONTGOMERY** 101 N STONE 1010 N Dyer 1010 N NELSON **10100 N NEWPORT HWY** 1011 E EUCLID 1013 W KNOX 1015 E CATALDO **1015 N THIERMAN 1019 E FRANCIS** 1020 E CATALDO **10200 N NEWPORT HWY 1022 E HAWTHORNE 1023 W WELLESLEY** 1024 E North Foothills Dr 1024 N RALPH **1026 N HAVEN** 1035 E CATALDO **104 N MADELIA 104 S FREYA** 104 S FREYA STE 314A **105 E MISSION STE D 106 E FRANCIS** 107 E Baldwin **108 E WALTON 110 N NAPA 1100 N HOWE 1100 N PEARL** 1103 N FANCHER 1105 W BOONE **1107 N FREYA 111 E LINCOLN 111 N ERIE** 1112 N NELSON 1114 N Fancher 1114 N RALPH 1114 N RUBY 1115 N HAVANA 1118 N HOWE

Site Name Spokane City Fire Department Fire Station 2 **MIDCITY GAS & GO** Fast Way Freight Systems **OFFICE DEPOT CROSSDOCK 6971** Lincare Incorporated Northern Lights Brewing Co SPOKANE COUNTY REGIONAL WATER RECLAMATION FACILITY Lithia Camp Automotive PACIFIC METAL BLDGS INC CENEX HARVEST STATES SPOKANE **ROLLED STEEL PRODUCTS INC -**SAFEWAY STORE QWEST COMMUNICATIONS **Bellwether Brewing** Lamar Advertising **Rhodes Crane and Rigging** Maverik 570 Centurylink QC SAFEWAY FUEL CENTER NEWPORT HWY Northwest Pipeline Corp Spo Dist Office NOMNOM GRACE AVE PUMP S (WATER DEPARTMENT) **JetSeal** Motor Works Inc DUPREE BUILDING SPECIALTIES Comp U Charge Inc **D & M REFRIGERATION INC** Eden Advanced Pest Technologies Spokane Providence Express Care at Logan Square - Suite D **RODDA PAINT STORE - NORTH SIDE** Superior Auto Repair & Brake S NEW LINE COMMUNICATIONS BECKS RADIATOR SHOP LKQ FOSTER AUTO PARTS SPOKANE MAINTENANCE SHOP UST 6019 Bureau of Land Management Spokane Valley STA Fuel Facility EPIC ELECTRICAL ENTERPRISE AMERICAN TRADITION HOMES LTD Avista Corp **STURM HEATING & AIR CONDITIONING** 1114 N Fancher LLC Pacific Hide Fur Depot Inc Market Equipment Co Inc Atlas Mine & Mill Supply Inc Wheeler Industries

**1118 W WELLESLEY** 111B N ERIE **112 E WELLESLEY** 112 N HAVEN 112 N HAVEN 1120 E 1ST 1120 W FRANCIS **115 N SYCAMORE 115 N SYCAMORE 115 N SYCAMORE 118 N DIVISION 118 N NAPA** 12 E ROWAN 12 N GRANT **12 N SHERIDAN** 120 N RALPH 1209 E FRANCIS **1211 E FRANCIS** 122 N HELENA **122 N NAPA** 1220 N HAVANA 1224 E EUCLID **1224 N CEDAR** 1234 E FRONT 124 E ROWAN 125 N STONE STE A 126 N MADELIA 128 E DESMET 130 N Lee **130 N NAPA** 130 N STONE 1300 E MISSION **1303 N WASHINGTON** 1312 W 1ST **1318 N FANCHER TERMINAL ANNEX** 1321 N THIERMAN **1330 W FRANCIS 1401 E TRENT** 1401 E TRENT STE 100 1402 N THIERMAN 1403 E Mission 1404 N FISKE 1408 N ELM 1408 N ELM 1408 N ELM 1409 E WELLESLEY **1410 N NORMANDIE** 

SPOKANE FIRE DISTRICT STATION 13 **BNSF RAILWAY SPOKANE Empire Strength DEVRIES MOVING-PACKING-STORAGE** SHERWIN-WILLIAMS COMPANY #1753 **Designer Decal Inc** LES SCHWAB TIRE CENTER COEUR D'ALENE WINDOW COMPANY LLC JELD-WEN MCVAY BROTHERS CONTRACTORS INC **Division Gateway Project PROCOLLISION CENTER** Dr. Cho AVISTA DEVELOPMENT, INC AVISTA EDGE MAX J. KUNEY COMPANY **Chaneys Automotive** Swedish Motorcar Service **BANNER FURNACE & FUEL INC SPOKANE HELENA** DAN AUTO PARTS OAK HARBOR FREIGHT LINES SPOKANE Gonzaga Preparatory School STA Boone NW Garage Second Harvest Food Bank GGL **RENOVATION BY DESIGN, LLC BANNER 24 HR FUEL STOP** GONZAGA UNIVERSITY **Brunette Printing** JJ'S AUTO COLLISION INC Michlitch SPOKANE CITY WITTER POOL Hidden Mother Brewery LITTLE ENTERPRISES, INC Meauxmike LLC ABC Supply Co. Inc., Building #2 AVISTA UTILITIES Spokane Urology LP Tank Vera Whole Health Clinic **BRENNTAG PACIFIC INC** Avista - Mission Avenue Tank **Ballistic Distillery** 873598 Elm - Dish Wireless AT&T SP4271 Spokane Maple and Broadway T-MobileSP01150A West Central - New Collocation SPO Nevada New Cell Site City of Spokane FLEET SERVICES

**1410 N NORMANDIE** 1411 E MISSION 1411 E MISSION MACHINE SHOP 1414 N FANCHER 1430 N Division **144 E JACKSON 15 N PERRY** 1500 W 4TH 1501 E ROSEWOOD **1501 E TRENT 1502 E TRENT** 1503 E ILLINOIS 1503 E Riverside **1503 E RIVERSIDE** 1503 E ROSEWOOD **1504 E SPRAGUE** 1504 N GREENE **1504 N GREENE 1507 N THIERMAN** 1508 E FRANCIS **1513 E FRANCIS** 1515 E HOLYOKE **1519 E TRENT 152 S LINCOLN 1521 E HOUSTON 1528 E BOONE** 1529 E DECATUR 1607 E HOUSTON **1611 E SPRAGUE** 1614 N REBECCA 1616 S RUSTLE **1620 E HOLYOKE** 1620 E HOUSTON 1621 E DALKE 1631 E Francis **17 S FISKE 17 S FISKE** 17 S Haven 1703 E FRANCIS 1712 N Division **1718 W SINTO 1720 E FAIRVIEW** 1721 E HOUSTON 1723 E HOUSTON 1725 N HAMILTON 1747 N COOK 18 N FISKE

Spokane City Normandie AVISTA CORP Avista Corp Spokane Service Center MERCER TRUCKING COMPANY INC JIFFY LUBE 2325 **BANNER KARD LOCK 2** Edge Construction Warehouse Verizon Wireless Site SPO Browne Antenna Mod CASCADE CULTURED MARBLE AND GRANITE **Empire Bolt & Screw Inc** SPOKANE TIRE CENTER PAR PETROLEUM **Edge Construction Supply** SAFWAY SUPPLY **GEORGE W JULIEN UST 7955** KODIAK ROOFING CO INC SPOKANE FIRE DISTRICT STATION 8 COMMUNITY COLLEGES OF SPOKANE MOTION INDUSTRIES **ENTERPRISE RENT-A-CAR TIGER AUTO SALES** WESTERN STATES STEEL & FAB INC Spokane Metal Finishing Verizon Wireless Site SPO Wall Antenna Mod **BJ AUTO REPAIR** WOODLAND INSTALLATION STYLE TILE HARVEYS AUTO **Ross Printing Co** SPOKANE FIRE DEPT TRAINING FAC U-Haul Propane Island TOMS PROFESSIONAL AUTOBODY Humble Abode T L C WHOLESALE BAIT CYLINDER HEAD SERVICE Peerzo's Quality Repair and Install STREET PRO AUTOMOTIVE INC Accountable Auto Ink ZIN FOOD MART NomNom The Ugly Duck Storage DURHAM SCHOOL SERVICES, L.P. **Budget Cars** VST Performance Auto Repair Clark's Cleaners **M B MASONRY** WA DOT

**1800 E TRENT** 1800 N DICKEY **1801 E UPRIVER DR** 1801 W BROADWAY **1802 E TRENT** 1803 E GRACE **1803 E SPRINGFIELD 1804 E SPRINGFIELD 1805 E TRENT** 1810 N Greene **1810 N GREENE** 1810 N GREENE BLDG 18 **1815 E TRENT 1817 E SPRINGFIELD STE C** 1819 N Dollar 1820 N LANGLEY **1822 E FAIRVIEW 1824 E SPRINGFIELD 1827 W NORTHWEST BLVD** 1901 E 1ST **1904 E BROADWAY** 1905 E MISSION 1905 N MONROE 1910 W Francis **1911 E SPRINGFIELD 1915 N DIVISION** 1915 W 5TH **1918 N HAMILTON 1923 N WATERWORKS 1925 E FRANCIS** 1ST SUB MP 67.6 20 N Napa 20 N Napa **20 N NAPA** 20 S GREENE 2001 E TRENT 2002 E SPRAGUE **2003 E BOONE** 2005 N HAMILTON 2005 W WELLESLEY 2008 E RIVERSIDE 201 W 2ND 2012 E 3RD 2014 W 6TH CT 202 E NORTH FOOTHILLS DR 202 N Altamont 202 N LEE

Walker Construction, Inc **Burlington Northern Railroad RIVERVIEW TERRACE** Integrative Health Bldg. **BAKER BUILDERS** 880662 - SEGEG0007A - Dish YOST GALLAGHER CONSTRUCTION, LLC SPECIALTY LIGHTING & ELECTRIC Habitat Office SPOKANE COMMUNITY COLLEGE TECH ED WA Community Colleges of Spokane SCC SCC Automotive Bldg ABRA AUTO BODY DEZDA FINN CONTRACTING LLC WHECO Fleet Services SPO NORA - Verizon Wireless WM WINKLER COMPANY **NW Equipment Rentals** 2-Way Auto Sales **SPOKANE FIRE DISTRICT STATION 7** EARTHWORKS RECYCLING INC MISSION FOOD MART AT&T-SP22 Cell Tower T-Mobile **KEN HAINSWORTH CO** Golden Dental Lab JOHN BALL CONSTRUCTION INC **DIVINE CORP** AMERICAN LINEN SPOKANE SPOKANE POWERSPORTS **BN PARKWATER RAILYARD** A-1 Automotive Sales & Service AT&T WA 3388 Liberty Park LTE 5C/6C SPO Hamilton 850 Mod WHOLESALE MOTORS Spokane Hardware Supply Sprague & Napa Auto Doctors NOMNOM Shadle Aquatics Center 880658 Redlight - Sprint Verizon SPO Lewis- Commercial Remodel/TI CENTURY LINK COMMUNICATIONS 75779 W Spokane AT&T Mod FOOTHILLS LINCOLN MERCURY MAZDA PLAYFAIR RACE TRACK Oil Tycoon

202 N NAPA 2020 E SPRINGFIELD 2020 E WELLESLEY 2020 N Dickey 2020 W FRANCIS **2025 E TRENT** 2025 N HAMILTON 203 E DALKE 203 N STONE 203 W 3RD 205 E SPOKANE FALLS BLVD 206 W RIVERSIDE 207 N CRESTLINE 207 N FREYA **21 E LINCOLN 21 E LINCOLN** 21 W 3rd **2102 E RIVERSIDE AVE** 2109 E HOFFMAN 2110 E BROADWAY **2110 E RIVERSIDE** 2110 N FANCHER 2110 N FANCHER 2117 N HOWARD 212 E CENTRAL 2120 E WELLESLEY 2121 E Riverside 2121 N DIVISION **215 E MONTGOMERY** 220 E JACKSON 220 E JACKSON 220 E ROWAN 220 E WELLESLEY STE 110B 220 N HAVEN 220 W FRANCIS 2202 E BROADWAY 2206 N DOLLAR 2210 N DOLLAR 2211 E HARTSON 2211 E MISSION 2212 N HAVANA 2214 E MALLON 2215 E BROOKLYN 2215 E BROOKLYN 222 N HAVANA 222 S WALL 2222 E MALLON

**Yadon Construction Specialties** RC IMPORTS LLC DBA UNITIME WHOLESALE A PRO AUTOMOTIVE USPS SPOKANE Parkwater 548050038 NOMNOM WESCO DISTRIBUTING INC **MIKES GROCERY 2 CHAS North Dental Clinic Greencastle Soap & Supply DIVINE CORP 3RD 23** WSU Biomedical Building 206 AND 214 W RIVERSIDE AVE INSIGHT DISTRIBUTING **RYERSON STEEL** AT&T Cell Tower Upgrade Verizon SPO Shasta **U-HAUL** CSO 34 1 107 HOFFMAN PUMP ST. (WATER DEPARTMENT) VECTOR ELECTRIC CORP City of Spokane CSO 34-1 **Community Colleges of Spokane Apprentice** INLAND NORTHWEST AGC APPRENTIONSHIPS Miller Dental Lab **Providence Family Medicine North SPOKANE FIRE DISTRICT STATION 15 Oil Analysis Lab Inc** Apple Valley Dental **BMW of Spokane** SUGARLEAF ATC VZW PNW 410182 SponeSpokane WA Interpath Laboratory LAKE HILLS AUTO WILSON OIL, INC SUMMIT FAMILY & COSMETIC DENTISTRY SPOKANE WATERKNIFE INC PACIFIC METAL CO INC **Griffin Publishing** Spokane Dental Clinic at ECCC THE BOAT DR AVISTA BEACON 230KV SUBSTATION SPECIALTY HOME PRODUCTS WASTE MANAGEMENT OF SPOKANE WILBERT PRECAST SPOKANE CO INTER FAIRGROUNDS Avista Metro Substation SHAMROCK INVESTMENTS PACK OIL

2225 N DOLLAR 223 S HATCH 228 S Thor **2301 E TRENT** 2302 E TRENT 2303 W NORTHWEST 2304 N DOLLAR 2304 N DOLLAR 231 E FRANCIS 2325 E RIVERSIDE 235 E ROWAN 2401 E FERRY 2401 E FERRY 2401 N EASTERN 2401 W WELLESLEY 103 2402 N ADDISON 2403 N CINCINNATI 2405 N DIVISION **2406 E TRENT** 2406 N DOLLAR 2416 N PERRY 2417 N ASTOR **2420 E TRENT** 2423 E Sprague 2425 E MAGNESIUM 2425 E MAGNESIUM BLDG 2 2425 E Magnesium Bldg 3 2425 E SPRINGFIELD **2428 N DENVER** 25 E 3RD 2502 E Sprague **2502 E TRENT** 2512 N PITTSBURG **2524 N DAKOTA** 2539 E SPRAGUE 2601 E SPRAGUE 2605 N HAMILTON 2607 N DIVISION 2615 N CINCINNATI 2615 N CINCINNATI 2616 E BROADWAY 2617 W NORTHWEST BLVD **2626 E TRENT 2626 E TRENT 2626 E TRENT 2627 E TRENT** 2630 E Sprague

ANTIQUE AUTO RANCH INC SCOLLARDS CLEANERS HATCH ST Tesoro CENTENNIAL MILLS DIV ADM MILLING **RESTORATION PLATING** ATC 421060 - Verizon Upgrade - 13705365 FERGUSON #3031 SONOCO INTERIOR MOTOR PRODUCTS VINTAGE VOLKSWAGON WERKS HOLY FAMILY MEDICAL CENTER Dish Wireless - 826753 Playfair Racetrack **TMobile Cell Tower Modifications** Inland Empire Plating Eastern Rd Multicare Indigo - Spokane Shadle **CROSWHITE CONSTRUCTION R N L T TRUCKIN** NEF'S AUTO REPAIR PETE'S GARAGE Avista Corp Dollar Rd MORNINGSTAR MECHANICAL FLASHS AUTO BODY FIREARM FINISHING WILSONS SMALL ENGINE Factory Company International Inc The NORTHWEST TOOL & DIE Highwood Global LP New Storage Building **R Y'S CUSTOM TILE & FLOORS** Lumber Beard Brewing Jacobs Java Roasting Mitchell Lewis & Staver Co SPOKANE CLEANING UNLIMITED Fred's Appliance Warehouse **G & N SELECT AUTO** MENDOZA AUTO SALES INC. SAVE MORE AUTOMOTIVE Cals Cars **EXCHANGE LUMBER & MFG CO** Foothills mini storage **CITY OF SPOKANE** For Love of God Brewery All Thermal Insulation **Bogans Auto Sales** Specialty Environmental **MACKIN & LITTLE Mechanical** PETES INDEPENDENT HONDA REPAIR

2651 E FERRY 270 N ALTAMONT 2701 E FERRY 2702 E Sprague 2703 N MADELIA 2704 N HOGAN 2704 N HOGAN STE 8 2704 N MADELIA 2710 E FERRY 2711 E SPRAGUE 2712 N RUBY 2714 N MAYFAIR 2717 N MAYFAIR **2717 N PERRY 2718 N PERRY** 2721 N PITTSBURG **2727 E TRENT** 2727 N MADELIA 2727 N MADELIA STE 8 2730 E FERRY 2733 E PROVIDENCE 2733 N Pittsburg 2736 N DIVISION 28 E Montgomery 28 E Spokane Falls Blvd 2801 E FERRY 2801 N PITTSBURG **2803 N MARTIN 2808 E BOONE** 2810 N HOGAN 2812 N PITTSBURG 2815 E GARLAND 2820 N MAYFAIR 2821 N HOGAN 2828 N NEVADA 2828 N NEVADA 2830 N HOGAN 2832 N RUBY 2833 N PITTSBURG **2834 N PERRY** 290 N ALTAMONT 2901 E Trent 2903 N MADELIA 2903 N MADELIA 2906 N CRESTLINE 2907 N HOGAN 2910 E Main

**SCP** Distributors Keller Supply Stoneway Electric **River City Auto Sales** CRAFTSMAN CELLARS PREFERRED LABOR SIGN ASSOCIATION **BIG JIM'S TOWING** PLUS MANUFACTURING INC LENNOX INDUSTRIES **BAKER CONSTRUCTION & DEVELOPMENT INC** AUTO CREDIT WA DOT Eastern Region Mayfair Legendary Laboratories SUMMIT ASSEMBLY SERVICE TIPKE MANUFACTURING MACHN SHOP **ROLLIN-ON REPAIR** Metal Sales Manufacturing Corp DEAN DAVIS PHOTOGRAPHY Andrews Mechanical Whites Boots Racking **Professional Piping** Whitley Fuel SPOKANE QUICK LUBE Maverik Inc Store 28 E Montgomery Avenue 24-28 E Spokane Falls Boulevard Motion Industries Inc SUPERIOR TOWING **Dicks Painting Inc** PRAXAIR DISTRIBUTION ANGUS MEATS INC ALLIED BUILDING PRODUCTS CORP SPOKANE Spokane Public School Dist 81 WSDOT MAINTENANCE SHOP COLUMBIA FURNITURE **BOB'S SEAMLESS RAINGUTTERS RENEGADE TOWING** FIRE CONTROL SPRINKLER INC SPOKANE FUNERAL HOME+CREMATORY SPOKANE POWERTROKE SERVICE CONSTRUCTION ASSOCIATES OF SPOKANE INC Copper State Nut & Bolt Pacific Steel & Recycling Spokane Hollands Auto Sales LLC SPECIALTY TRUCK REPAIR Sonderen Packaging EXTREME LAWN CARE Playfair Commerce Park, LLC

2910 N DIVISION 2911 N HAMILTON 2911 N HAMILTON 2914 E BOONE UNIT 1 & 2 2915 E SPRAGUE 2917 N MAYFAIR **2925 N MARTIN** 2929 E SPRAGUE 2930 E GARLAND 301 E WALTON **301 N FANCHER 3010 N CINCINNATI** 3011 E SPRAGUE 3012 N NEVADA 3012 N NEVADA 3018 N Nevada 3019 E WABASH **3021 E WELLESLEY 3023 E SHARP 3028 E CENTRAL 303 N FANCHER** 3030 E Euclid **3038 E TRENT** 3038 E TRENT STE B 3038 E TRENT STE D **304 N FANCHER 304 N FANCHER 306 N LAKE 309 N SYCAMORE 310 N RIVERPOINT BLVD** 3100 N DIVISION **3102 E TRENT** 3104 E Sprague 3105 E ALKI 3105 N NEVADA **3107 E TRENT 3108 E FERRY** 3110 N DIVISION 3117 E EVERETT 3117 E FERRY 3125 E Mission **3129 E TRENT** 3131 E SPRAGUE 3131 N DIVISION 3131 N DIVISION **315 E MONTGOMERY** 319 E Montgomery

**BLUE WHALE FOODMART** AIMEE M BARNES GRAPHIC DESIGN PHOTO-GRAPHICS Galaxy Compound Semiconductors Inc AUTO PALACE TJ'S CRITTERS N SUCH Ibex Flooring ADVANCED DIESEL SUPPLY CO INC A-Pro Auto Body FINISHING TOUCH PAINTING & WOODWORKING BEARING INC **EVANS CONSTRUCTION & REMODEL INC** PM AUTO SALES CARPET REMNANT OUTLET INC LOCAL INLAND NORTHWEST COOP FOODS Hopkins Automotive **Jim Hedley Collector Cars Qwik-Stop Stations** Verizon Upgrade - ATC 83308 - 13705515 Cell Tower Conoco N Market Fuel - 36342.1312 parent parcel CONVOY COMPANY NOMNOM CONCEPT FABRICATION A.B.E.S DISCOUNT SALES LOCAL MOTION HYDRAULICS AND ACCESSORIES FEDEX NATIONAL LTL SPOKANE MIDWEST MOTOR EXPRESS BLACK DIAMOND ASPHALT PAVING KNL WOODWORKS LTD **EWU River Point Dental Hygiene D&L AUTOMOTIVE** ECLIPSE TOOLS NORTH AMERICA SPENCERS ANTIQUES AND COLLECTIBLES FLEET PAINTING INC DANS PIT STOP WESTERN GLOVE PANTROL INC. AJ HEATING & AIR CONDITIONING Special Asphalt Products Strip Rite Sharp Line **DIVINE CORP** UNITED TRANSPORT JAMMIN AUTO AND RV POUNDERS CONSTRUCTION QUICKSILVER STUDIOS **NIOSH Spokane Research Lab** VANDERVERT AUTOMOTIVE SERVICES

3200 E TRENT BLDG 2 3200 E TRENT STE C 3202 E WELLESLEY 3203 E MAIN 3204 N COOK **3205 E OUEEN** 3206 N Division 3210 E SPRAGUE 3219 N NEVADA 322 N FREYA 3224 E MARIETTA 324 W FRANCIS 3253 E 1st 327 W 3RD 328 N FANCHER 329 N Erie **33 E FRANCIS** 330 S OAK 3301 N NEVADA 3304 E FERRY 331 N FANCHER **3311 E FERRY 3320 E SPRINGFIELD** 3324 E SPRAGUE **3324 E TRENT** 3327 E OLIVE 3330 E RIVERSIDE 34 E 8TH 34 E Main 3402 E Sprague 3405 E BISMARK CT 3405 E SPRAGUE **3410 E TRENT** 3417 E SPRINGFIELD **3420 E FERRY** 3420 E RIVERSIDE 3421 N Haven 3427 E 5th 3430 N COOK 3500 E WELLESLEY 3500 E WELLESLEY 3500 E WELLESLEY 3511 E RIVERSIDE 3525 N REGAL 3525 N REGAL 3527 E Sprague 3528 E DESMET

**SHERWIN WILLIAMS STORE 8258** SUNBELT RENTALS **BNSF Railway Black Tank Property** Washington DOT **Custom Painting Inc** BURLINGTON NORTHERN HILLYD LOVESTONE MOTORS SHERWIN-WILLIAMS CO #1734 FOOD MART 1 Jon Henry's Auto Sales WA DOT SR 395 NSC CITY EMBANKMENT INSIDE N OUT CAR WASH LIBERTY TIRE & AUTO SERVICE INC Walgreens Pharmacy HERTZ CORP SPOKANE VALLEY Union Gospel Mission Maintenance DARIGOLD INC. SPOKANE PLANT 827013 Riverside West DT - Dish LEE'S KEYS FREEBORN TOOL COMPANY Graham Construction INC **BILLET FABRICATION** SPECIALIZED DIESEL NW HARDIN AUTO SALES AMERIGAS SPOKANE TRENT POWER CITY ELECTRIC INC BETTS ENTERPRISES **Emilie Court Generator River City Body & Paint** Hardin Auto Sales PHILADELPHIA MACARONI COMPANY Appliance Recycling SRS DISTRIBUTION INC **OXARC SPOKANE VPI Quality Windows** T R RIZZUTO PIZZA CRUST INC HD PRO LOCATION 3440 Fred Meyer Fuel 657 ASPHALT PROTECTIVE T-Mobile Upgrades - SP01115B Verizon Upgrades - ATC 410184 SPO Market WA Spomarket WA 410184 Fluid Design Products Inc HOLLISTER STIER LABORATORIES Hollister Stier Laboratories LLC CARPET BARN American West Chrome Inc

**3530 E FERRY** 3601 N NEVADA 3602 E SPRAGUE 3603 E BROADWAY 3603 E SPRINGFIELD 3604 E Trent **3609 E SPRINGFIELD** 3611 E Sprague 3613 E MAIN **3614 E SYNDICATE BLVD 3615 E FRONT** 3621 E Broadway 3621 E FRONT 3623 E PRINCETON 3623 E SPRAGUE 3625 E SPRINGFIELD 3630 E Rowan 3633 E NEBRASKA **3700 E FRANCIS** 3704 E DALKE 3704 E EVERETT 3708 E CENTRAL **3711 E TRENT** 3715 E DALKE **3718 N ATLANTIC** 3721 E Central 3721 N Division **3726 E BOONE** 3727 E Ferry **3730 E TRENT** 3807 E BISMARK 3807 E FERRY 3807 E OLYMPIC BLDG A 3808 E Nora 3812 E BROADWAY STE 100 3817 E FRANCIS 3820 E Main **3825 E TRENT 3828 E QUEEN** 3857 E OLIVE 3900 E BROADWAY 3900 E MAIN 3900 E Sprague 3900-4100 FREYA 3901 E BROADWAY 3901 E WELLESLEY 3902 E FERRY

SPOKANE PRODUCE TERMINAL **RECYCLE TECHS** DIVINE FAST MART CARLSON SHEET METAL WORKS INC **BEYOND FLOORS INC** Complete Heating & Sheet Metal, Inc AQUATIC DREAMS AND BEYOND **AARON'S SALES & LEASE** AMERICAN METALS CORPORATION T-Mobile - 817996 WA Hanson SUNDANCE MARINE CENTER CARLSON SHEET METAL WORKS INC SUREWOOD CUSTOM CABINETS **GROWING LIKE A WEED** L & Y HEATING & AIR CONDITIONING Sherwin Williams Automotive INLAND METALWORKS, INC Aluminum Products Company FAMILY AUTO CARE Atchley's Hauling Inc ALWAYS TOWING AND ROAD SERVICE S&M AUTO BODYS&M AUTO BODY TRUCKPRO, LLC 880683 Hillyard - Tmobile PACIFIC POOL AND SPA **OK Electric Inc** Commercial Property, 3721 N Division St Granite Petroleum Storage Shop Nimri Truck Repair Valley Equipment Company Inc. **BULLDOG WEED** SPOKANE TIN AND SHEET IRON WORKS INC FRONTIER INVESTMENT GROUPS Spokane City Training Maintnenance Burn Building A & J AUTO WHOLESALES ELJAY OIL PRODUCTS UST 349374 PROSOURCE OF SPOKANE HD Supply Construction Supply Ltd WC0047 TALISMAN CONST SERVICES INC EMPIRE COLD STORAGE OLIVE ST CD'A METALS Sytech Spokane **MSC Premera Blue Cross** ESMERALDA COMMERCE PARK LLC USF REDDAWAY INC ACCENT BODY SHOP **Prudential Builders Center** 

**3908 E FERRY** 3909 N Market **3911 E TRENT** 3915 E FRANCIS 3915 E FRANCIS Bldg A 2 3915 E FRANCIS STE A5 3919 N Market 3920 E ALKI **3920 E BOONE 3920 E BOONE** 3928 N Madison **3939 N FREYA** 400 N HAVANA **400 N SYCAMORE** 400 S THOR 4000 E BROADWAY 4001 E BROADWAY **4002 E FERRY** 4002 E FERRY 4003 E Broadway 4003 E Sprague 4005 E Rowan **401 N HELENA 4011 E FERRY** 4011 E NEBRASKA 4014 E SPRAGUE 4014 E SPRAGUE 4020 E MAIN 4022 E BROADWAY **4030 E TRENT 4031 E TRENT** 405 E PACIFIC 406 W FRANCIS 407 N MADELIA 408 N MADELIA **409 N DYER** 410 E SPOKANE FALLS BLVD 232 **410 N FANCHER** 4101 E BROADWAY 4102 E Boone 4102 E Boone **4104 E BOONE** 4105 E BROADWAY 411 E PACIFIC **411 E SPRAGUE** 411 N DYER STE A 411 N HAVANA

Keebler Co SAFEWAY FUELING CENTER YIELD FARMS CARLSON'S IMPORT REPAIR AND SERVICE **ONeils Custom Engines E Francis** DAVE'S MUFFLER SHOP SAFEWAY STORE 1799 PLATT ELECTRIC SUPPLY COAST CRANE COMPANY COMMERCIAL TIRE INC SPOKANE SMALL ENGINE SPOKANE COMMUNITY COLLEGE Comcast#302329 AERIAL MAKE READY FOR VERIZON ABF FREIGHT SYSTEM, INC FRED MEYERS STORES AMERICA OLEAN SPOKANE DISCOUNT AND BRASS COMPANY WHITE BOOT CO. AT&T WIRELESS E SPOKANE **OXARC INC SPOKANE** RENT A CENTER #03778 **SWANS AUTO BODY & PAINT Blacks Industrial** WINDSOR PLYWD WAREHOUSE N & N CORPORATION INC Axabra LLC NEW BERN TRANSPORT **REHISTORIC WOOD PRODUCTS, LLC BROADWAY INDUSTRIAL PARK CENTRAL MACHINERY SALES** SUMMIT HYDRAULICS INC **Dynamic Bracing** SPOKANE QUICK LUBE AAA HEATING & AIR BANNER FURNACE and FUEL INC MADELIA Les Schwab Tire Center WSU Center for Clinical Research **Tire Distribution Systems Spokane R C WORST & COMPANY** BENCHMARK INDUSTRIAL SERVICES **BIG B'S TRUCK REPAIR** L & R FABRICATION INC POWER MACHINE SERVICES INC PELLA INLAND NORTHWEST INC Belladonna Inc A AUCTION CENTER AMERIGAS SPOKANE TERMINAL

411 S Thor 4110 E CENTRAL 4110 E SPRAGUE **4110 E TRENT** 4111 E FRANCIS 4111 E MISSION 4111 E MISSION 4114 E BROADWAY 4114 E FERRY 4114 E MAIN 412 E Spokane Falls Blvd 412 N Haven **414 N SYCAMORE** 4141 N REGAL **415 N FANCHER** 417 E PACIFIC **417 S THOR** 420 W BOONE 4201 E SPRAGUE 4207 E MAIN 4208 N DIVISION 421 N FREYA 4210 E SPRAGUE 4214 E JOSEPH 4215 E QUEEN 4216 E MAIN 4218 N DIVISION **422 E FRANCIS** 4220 E BROADWAY 4223 E Queen 4225 E JOSEPH **423 E MONTGOMERY** 423 W 3RD **4230 E TRENT** 4240 E ALKI 425 W 2ND 427 E RICH 427 S BERNARD 428 E JOSEPH **4305 E TRENT** 4306 E ROWAN 4315 E SPRAGUE 4323 E UPRIVER DR 4327 N THOR 4327 N THOR 4327 N THOR 4330 E FRANCIS

Oil Can Henry's Starleaf LLC **U-HAUL OF WASHINGTON INLAND PACIFIC HOSE & FITTINGS INC** PARR LUMBER CO FILE-EZ FOLDER INC Lawton Printing Garco Construction Inc M & L SUPPLY OFFICE+WAREHOUSE PANOPTIC NORTHWEST CANNABIS Washington State University Spokane Mondelez Global LLC Valleyford Metal Crafters SPOKANE AREA PROFESSIONAL-TECHNICAL SKILLS CENTER **K & N ELECTRIC MOTORS INC** PATTERSON DENTAL SUPPLY CAR WASH PLAZA THOR ST SHERWIN WILLIAMS SPOKANE Metro Express Car Wash STONEWAY ROOFING SUPPLY Storage Bldg THE MUFFLER MART INC ELKAY SSP Grocery Outlet SPOKANE DENT REPAIR Carbase NORTH COAST ELECTRIC COMPANY ODAY AUTO Maaco Auto Painting & Body Fed Ex Freight. Tak Petroleum Building LRH LLC DUNN AND SONS LAWN CARE Subaru of Spokane A-L COMPRESSED GASES BURLINGAME STEEL INC Allied Lock and Safe ARTISTIC CONCRETE SURFACES LLC Spokane Eye Clinic RTS Spokane Treatment Solutions AT&T WIRELESS HILLYARD UNION PACIFIC RAILROAD YARD Avista Corp Beacon Storage Yard **ERGON ASPHALT & EMULSIONS- Hillyard** SemMaterials LP Spokane WESTERN STATES ASPHALT INC Whiteys Wrecking

4401 N Freva 4407 N DIVISION 4407 N DIVISION 4407 N DIVISION 4409 E Sprague STE A 4410 N WALL 4412 E Trent **4415 N MARKET** 4417 W Wellesley 4423 E HUTTON **4428 E TRENT** 4444 N FREYA 4502 E BUCKEYE 4502 E BUCKEYE 4504 N Division 4507 W Wellesley 4510 E Wisconsin 4511 N FREYA 4511 N FREYA **4515 E WISCONSIN 4515 E WISCONSIN** 4520 N FERRALL 4614 N Freya 4615 N DIVISION 4617 N NEVADA **4620 E TRENT** 4621 E UPRIVER DR **4625 E TRENT** 4696 W Wellesley 4700 N DIVISION **4714 E TRENT 4715 E TRENT** 4723 N Rebecca 4728 N POST 4750 N DIVISION 4802 N FLORIDA **4808 N NORMANDIE** 4817 N FREYA UNIT 3 **4817 N MARKET 4817 N MARKET** 4828 N STEVENS 4904 N MARKET 4911 N FLORIDA **5005 E SPRAGUE** 501 N FREYA **501 N RIVERPOINT BLVD** 501 W 2ND

USPS SPOKANE Hillyard 548050004 **PNW CREMATION** AT&T Northtown LTE 5C: 6C: RF Mod T-Mobile Cell Tower - SP01006A Washington Trust ARROW AUTO REPAIR North Hill Auto Repair Modern Machinery Market St Self Storage Full Stop SPOKANE RENDERING DIV BAKER COMMODITIE Modern Machinery Co **Energized Electric Addition** ARBOR CREST PRODUCTION FACILITY SQUARE WHEEL BREWING Alton's Tire Rama NIRVANA BUDS **BNSF Auto Facility** FREYA PROPERTY, LLC METAL ROOFING AND SIDING SUPPLY INC - WA317938069 Univar USA Inc Spokane UNIVAR USA INC SPOKANE METAL ROLL FORMING SYSTEMS **Advanced Fire Systems** NORTHTOWN GAS & DELI **JK GAS & GROCERY** COBALT TRUCK EQUIPMENT Avista Western States Equipment Co Spokane Main Verizon Upgrade - 83091 Veteran's Hospital / SP011 Sears Roebuck & Co 1029 PURINA MILLS INC UST 2918 NORTHWEST RADIATOR ROADWISE, INC L S ENTERPRISE NORTHTOWN MALL Helena Chemical Co Spokane BRICO GENERAL CONTRACTING Petroleum Sciences Inc ADVANCED TOXICOLOGY SERVICES, L.L.C Hillvard Dental D-MAC CONSTRUCTION, LLC HOWES AUTO SERVICE **RCM SERVICE** AUTO ZONE NAPA SPOKANE DISTRIBUTION CTR SPOKANE **US WEST SPOKANE QWEST CORPORATION W00345** 

5016 N MARKET **502 E BOONE** 502 N FREYA **5025 E SPRAGUE** 503 E DAVE CT **505 E NORTH FOOTHILLS DR 507 S WASHINGTON** 508 N FISKE **510 S THOR** 5111 E BROADWAY **512 N FANCHER** 515 N HAVANA **516 N SYCAMORE 520 N DYER 520 S COWLEY** 5201 N FERRALL **5204 E BROADWAY** 521 E Sprague **521 N EASTERN** 522 N FISKE # 2 5220 E Broadway **5220 N MARKET 5220 N STEVENS** 524 E SANSON 525 E Riverside 5301 E BROADWAY **5302 E TRENT** 5303 E DESMET 5308 N Myrtle 5314 N STEVENS **5315 E UNION** 5316 E BROADWAY 5316 E DESMET 5317 E RUTTER 533 S RAY 5400 E BROADWAY **5404 N MARKET** 5417 E BROADWAY **5417 E TRENT 5423 E UNION** 545 S COWLEY 5507 E BROADWAY 5511 E BROADWAY 5518 E BROADWAY 5520 E SPRAGUE 5521 E RAILROAD 5521 E RAILROAD

**BLACK SHEEP CIDER WORKS** Gonzaga University Boone Ave E STOP N SHOP Walmart Supercenter No 5883 00 PEONE INDUSTRIES Frontier Behavioral Health LABORATORY CORPORATION OF AMERICA STATE OF WASHINGTON DOT Unocal BP 0952 DOMINO'S PIZZA CENTRAL PRE MIX Norlift Inc FEDERAL EXPRESS **McCLINTOCK & TURK** Western States Equip Co Spokane Truck Sh **Evergreen Prosthetics & Othotics BNSF Hillyard Lead Soil Site** POWER PRODUCTS UNLIMITED Centurylink QC Class 8 Truck SPOKANE MILK FASTENAL COMPANY Greenboro Spokane **JEWSBURY SIDING & WINDOWS** JAN-PRO CLEANING SYSTEM Avista 525 E Riverside Ave **FABRICATION & TRUCK EQUIPMENT INC BNSF Railway Company Spokane** Alliance Machine Systems International Able Cleanup Tech Myrtle St ARROW COATINGS Service Paper Fruehauf Trailer Services Inc SELECT FARMS LTD PAINT BOOTH **Community Colleges of Spokane Felts Field** RAY ST. PUMP ST. (WATER DEPARTMENT) SCAFCO GRAIN SYSTEMS HILLYARD TIRE CENTER KAMAN FLUID POWER **TOBY'S BATTERY & AUTO ELECTRIC** BARTON ROOFING St Luke's Spokane Pharmacy Hydraulics Plus Inc Everhart Painting [TurboWaste.Net] PAPE' MATERIAL HANDLING HOUSE OF HOSE FRANK GURNEY INC Standard Traffic Control Inc

5521 E SHARP 5524 N JULIA 5526 N MARKET 555 E FRANCIS 5600 E ALKI 5610 E BROADWAY 5619 E Sharp 5633 N LIDGERWOOD 5634 E COMMERCE 5701 E Rutter 5701 E SPRAGUE 5706 E BROADWAY 5707 E BROADWAY 5707 E BROADWAY 5707 N FREYA 5715 N LIDGERWOOD **5718 N HAVEN** 5723 E ALKI **5803 N MARKET** 5805 E SHARP STE A1 5805 E SHARP STE A5 5805 E SHARP STE C5 5805 E SHARP STE C8 5820 E ALKI 5821 E BROADWAY 5829 E RUTTER 5829 E Rutter 5840 N DIVISION 5901 N LIDGERWOOD 5901 N LIDGERWOOD 124 5901 N LIDGERWOOD STE 126 5903 N POST 5905 E RUTTER 5908 E KNOX 5916 E BALDWIN **5920 E BROADWAY** 5924 N DIVISION 5959 N FREYA 6001 N Mayfair 6002 E ALKI # 3 6003 N WALL 6005 E RUTTER 6005 E RUTTER 6009 N JULIA 601 N FREYA 601 N NAPA 601 W RIVERSIDE

H & S Services, Grain Elevators-Equip & Supplies **ARC ELECTRIC & LIGHTING** HOLZ FUEL COMPANY **R'nR RV-North** SIERRA MOUNTAIN EXPRESS SECO CONST EQUIP INC UST 6121 Gold Seal Mechanical Maintenance Shop HOLY FAMILY HOSPITAL KNIPPRATH CELLARS INC Felts Field Bulk Hangar Pool World **Grainger Industrial Supply BANNERS FUEL STOP 3** BANNER FUEL COMPANY SAFEWAY DISTRIBUTION CENTER Inland Imaging NEIGHBORHOOD POOLS HILLYARD KIM HOTSTART MFG CO HILLYARD GROCERY Crane Overhead Door INLAND HOME IMPROVEMENTS INC Hi-Lyfe LLC Forty to Five Farms Inc **ROYAL EXPRESS MART BLUE DRAGON FOODMART** Spokane Felt's Field Bulk Storage Hangar FELTS FIELD AVIATION INC Rite Aid 5307 N SPOKANE PRO BLDG EAGLE REHAB LABORATORY CORPORATION OF AMERICA **CHAS Clinic North** HANCOCK DISTRIBUTERS Felts Field Hangar 6 Anytime Towing & Recovery Company (AIRPORT ZONING: Northwest Sandblast & Paint JA-LO WAREHOUSE SNOW'S AUTO Proto MFG Summit Cancer Center Spokane EMPIRE CONCRETE CUTTING PHIL'S MOBILE REPAIR AIRCRAFT PARTS & SUPPLY FELTS FIELD AVIATION INC UST 101070 BULLDOG WEED **KELLER SUPPLY CO-WHOLESALER BATTERY SYSTEMS** Avista 601 E Riverside

6010 E ALKI STE 1 6014 E KNOX 6015 E ALKI 6015 E VALLEYWAY 6015 N DIVISION **6016 E TRENT** 6017 E MISSION 6017 N JULIA 602 N HAVANA 6021 E MANSFIELD 6021 E MANSFIELD STE 100 6021 E Trent 6021 E VALLEYWAY 603 W GARLAND 604 E 2ND 605 E HOLLAND STE 201 606 N FISKE 6095 E Rutter Ste 1 610 S SHERMAN 101 6105 E RUTTER 6105 E RUTTER 6105 E RUTTER 31 6109 E DESMET 611 E KIERNAN 611 E SPRAGUE 611 N IRON BRIDGE WAY 6116 N FREYA 6117 N DIVISION 6120 E SHARP STE 201 6125 N DIVISION 6133 E Rutter 616 N LAKE 620 E NORTH FOOTHILLS DR 620 E Pacific 6202 N MARKET 6203 E MISSION 6205 E RUTTER 6207 E BROADWAY 6207 E DESMET 621 S FREYA 6214 E BROADWAY **6219 E TRENT** 6222 E DESMET 6223 E MALLON 623 E LIBERTY 624 E FRONT 627 E FRANCIS

AXIS MFG Intermountain Fabricators Inc SPOKANE SEED COMPANY NORTHWEST PUMP & EQUIPMENT CO NORTH DIVISION MUFFLER CLINIC INC **B&B TOWING & AUTO SALES** MELCHER MANUFACTURING COMPANY Green Zombie AVISTA STADIUM Mountain Gear Inc Redbird **MOBIL 62138** DIAMOND FREIGHT SYSTEMS GARLAND BREW WERKS Perfection Tire Multicare Neuroscience Institute **UPS Freight Spokane** Western Aviation Spokane **FKS-Spokane** FELTS FIELD-BLDG #17 **FELTS FIELD-HANGER 16 Buck N Brown Hangars** NORTHWEST PEA & BEAN **NW REMODEL & LANDSCAPE** K & N Electric Motors Inc **CHAS Health Iron Bridge** Hi Rel Laboratories Inc AT&T Exterior Branding **190 EXPRESS FINISHING SPOKANE VALLEY** COST PLUS PLAZA Felts Field Hangar 14 LELAND TRAILER & EQUIP CO. INC C & H FOREIGN AUTO REPAIR INC **Becker Buick Storage Lots** MAYFIELDS TRANSMISSION AMERICAN RECYCLING HANGAR 15, LLC FERRELLGAS SPOKANE BROADWAY FABRAL A B PRODUCTS WESTERN TRAILER SALES CO WHITE BLOCK COMPANY INC MIKE'S MOBILE TANK SERVICE Penske Truck Leasing Co LP Mallon MILLER'S PLUMBING WASHINGTON STATE UNIVERSITY - GREEN 6 PARKING LOT Nelson's Auto

627 N HOGAN 627 N NAPA 6302 N DIVISION 6305 E MALLON 6308 E SHARP 6310 E Trent 6311 E SHARP 6315 E SHARP 6317 E SHARP 6317 E TRENT BLDG 1 6320 E ALKI 6320 N HELENA 6321 N CINCINNATI 6321 N HELENA 6328 E UTAH 633 N HELENA 633 N Madelia 638 N HELENA **6404 N PERRY** 6405 N ADDISON 6409 E SHARP **6409 N PERRY** 6409 N Pittsburg 6420 E BROADWAY 6427 E RUTTER 6430 N LIDGERWOOD 6502 N PITTSBURG 6505 N ASH 6511 N Perry 6520 N NEVADA 6521 N HELENA 6606 E BROADWAY 6606 E BROADWAY 6606 N DIVISION 6610 E UTAH 6614 E Trent 6615 E MALLON 6625 E SHARP 6627 E MISSION 668 N RIVERPOINT BLVD 6706 E MISSION 6710 N Division 6719 E RUTTER #68 6804 N NEVADA **6824 N MARKET** 7005 N DIVISION **704 N STONE** 

NORTHWEST BUILDING MAINTENANCE **Bouten Construction Corporate Office PETCO 241** Penske Truck Leasing Co LP Mallon Ave Univar USA Inc Spokane Sharp Ave MY CAR COLLISION CENTER EXXON MOBIL SPOKANE TERMINAL ADVANCED MECHANICAL SYSTEMS CONOCOPHILLIPS PARKWATER TERMINAL **Big Bubbas Tires & Custom Wheels** LES SCHWAB TIRE CENTER **UNIVERSAL SALES & SERVICES** Craig's Automotive Collision **UNIVERSAL SALES & SERVICE OUARRY TILE CO** NORTHSTAR CLEAN CONCEPTS Auto Service Centre Inc J & A BODY SHOP INC Du Mor Recycling INLAND NORTHWEST LIGHTHOUSE **Broadway Oil Inc RIVER CITY PAINTING BALDWIN SIGN COMPANY KENWORTH SALES-SPOKANE** ROCKET ENGINEERING CORP Caliber Collision Center JACK L MASSENDER DBA ZILLAH HAULING Five Mile Park And Ride **Evergreen State Towing ALBERTSONS FUEL CTR 265** 873594 Darlow - Dish Modifications CAT SCALES **BROADWAY TRUCK STOP** LOWES HIW INC OF N SPOKANE AVISTA CORPORATION AMERICAN WAY AUTO BODY **TERRY'S TRUCK CENTER HD FOWLER COMPANY** JAYENESS MOULDING COMPANY, INC WA WSU Spokane Riverpoint Campus **TERRY'S TRUCK CENTER** Maverik - #655 Moody Aviation CAR WASH PLAZA NEVADA ST SIGNS FOR SUCCESS ARROTTA'S AUTO CENTER Keigley & Company

706 S RAY 706 W FRANCIS 707 N FREYA 7102 N DIVISION 713 N COOK 715 N Crestline 715 N HOGAN 717 N HAMILTON 721 N HOGAN 723 E JACKSON 724 N MADELIA 727 N HOGAN **727 N NAPA** 727 W FRANCIS **728 N CRESTLINE** 7307 N DIVISION STE 102 731 N SUPERIOR 7320 N DIVISION 737 N CRESTLINE 738 N COOK 7414 N DIVISION 755 E HOLLAND 7630 N DIVISION 7704 N DIVISION 7902 N DIVISION 802 E PACIFIC STE A 809 N HELENA 810 N STONE 811 E Rosewood **811 N CRESTLINE** 811 N NAPA 8115 N NEVADA 814 N YARDLEY 818 E MISSION 819 N Crestline 822 W 2nd 824 N THIERMAN 8277 N Crestline 828 E MISSION 840 E Spokane Falls Blvd 8510 N CRESTLINE 8510 N CRESTLINE 8624 N NEVADA 8702 N Division 8919 N CEDAR 900 N FANCHER 900 N Nelson

EXPRESS TRANSPORTATION Unocal SS 4755 MORAN FENCE INC Sherwin William Trackman Inc SpokAnimal Care Trane EZ Loader Boat Trailers Inc **Compass Construction Inc TEEN-AID ROSES & MORE RESCUE RESTORATION INC** Pozzi's GREEN GABLES PHOTOGRAPHY INC LAMBCO REFRIGERATION INC Sunrise Dental **KRUEGER SHEET METAL COMPANY** Jiffy Lube BA MOTORS N' MORE SHAW PLUMBING SERVICES **DOLLAR TREE STORES INC #2677** AVENUE DENTAL CARE MICHAEL'S **BATTERIES PLUS** NOMNOM S & A MEDICAL RODS ELECTRIC INC. COLVICO INC INT REM **Tiny Car Shop** LYMAN DUST CONTROL INC **RAINBOW ELECTRIC** PUMP STATION UST 97342 **B & B Truck Service Inc** NOLTE CONSTRUCTION **ROCKS-GEMS & MORE Divines MidCity RWC GROUP** Verizon Wireless SPO Lidgerwood CLARK CLEANERS.ERNIE EZ TAVERN Health Science Building CPM DEVELOPMENT CORP RECYCLE CRUSH **Central Pre Mix Crestline** Cedar Creek Chevron **O'REILLY AUTO PARTS #3801** T-Mobile Cell Array Modifications ASC MACHINE TOOLS INCORPORATED **Custom Spray Service** 

9000 N Division 901 E SHARP 903 E MARIETTA 904 N COLUMBUS 907 N Dyer 909 E SPRAGUE 910 E HOLLAND 910 N Dver 910 N WASHINGTON 911 E MARIETTA 911 N THIERMAN 9116 N NEWPORT HWY 914 E NORTH FOOTHILLS DR 915 N NELSON **921 N HOWE** 9212 N Colton 922 N CARNAHAN 9222 N NEWPORT HWY STE 1 924 E FRANCIS 925 E WELLESLEY 925 N Fancher 9257 N NEVADA 9265 N NEVADA 9304 N NEWPORT HWY 933 E MISSION 936 E SPRAGUE 9405 N Newport Hwy Ste 1 9412 N Newport Hwy 9420 N NEWPORT HWY 103 9470 N COLTON 9470 N COLTON 9470 N COLTON 9651 N NEVADA 9770 N NEWPORT HWY

Wendle Ford/Nissan/Isuzu TESORO 2GO #62149 VALSVIG MARKET INTERIORS INC. Qwest Corporation W00780 **Dickson Recycling** SPOKANE CITY SEWER MAINTENANCE DEPT Alton's Tire Rama WSF LLC dba Western Systems & Fabrication Columbia Surgerical Specialties Building ACTION RECYCLING INC WSF LLC dba Western Systems & Fabrication Home Depot 4719 SPOKANE CITY WATER DEPT City of Spokane Central Service Center SCOTTY'S TIRE AND AUTOMOTIVE Wal Mart Store 2549 OLDCASTLE PRECAST **US HEALTHWORKS - NORTH SIDE** SAM'S STOP & SHOP #6 **DIVINE CORP** Airgas Warehouse Winco WinCo v 68 Verizon Facility Improvements - Country Homes CRAN SAFEWAY #255 MAE Aspen Dental Spokane **COLUMBIA PAINT & COATINGS** Multicare Indigo - Spokane North 824570 - SEGEG00055B - Dish Cell Tower AT&T WIRELESS COUNTRY HOMES T-Mobile Cell Array Spokane Eye Clinic Target Store 0636

## 5.3 Sample letter for Identified Potential Contaminant Sources


Local Water Utilities United for Safe Drinking Water

Carnhope Irrigation District No. 7 City of Spokane Consolidated Irrigation District No. 19 East Spokane Water District No. 1 Honeywell Electronic Materials, Inc. Hutchinson Irrigation District No. 16 Irvin Water District No. 6 Kaiser Aluminum - Trentwood Liberty Lake Sewer & Water District Moab Irrigation District No. 20 Model Irrigation District No. 18 Modern Electric & Water Co. North Spokane Irrigation District No. 8 Orchard Avenue Irrigation District No. 6 Pasadena Park Irrigation District No. 17 Spokane County Water District No. 3 Spokane Business & Industrial Park City of Millwood Trentwood Irrigation District No. 3 Vera Water and Power Whitworth Water District No. 2

#### Jeremy Jenkins SAJB President

Tonilee Hanson Program Manager 509-847-4337 July 2022 Dear Business Owner or Manager,

The Spokane Aquifer Joint Board (SAJB) is a consortium of twentyone water purveyors who provide safe, clean drinking water to more than 500,000 Spokane County residents and businesses each day. We live and work in this area because of the quality of life, which includes the excellent water derived from the Spokane Valley Rathdrum Prairie Aquifer, our sole source of drinking water.

Your business is one of more than 2,000 businesses located over the Aquifer that may pose a potential for contamination of our drinking water source. Federal law mandates we notify you of this and remind you that any contaminant released on or under the ground is predicted to reach the Aquifer and eventually be drawn into public water supply wells. Storm drains in your parking lot are often a direct pathway to the Aquifer.

IN CASE OF A TOXIC SPILL CALL 911 FIRST.

Next Call Washington State Department of Ecology's

24-Hour Response Line at 509-329-3400

Let's work together to maintain the exceptional quality of our Aquifer by safely storing and properly disposing of all contaminants. A resource guide is enclosed for your reference.

Need help getting rid of your wastes? The Spokane Waste and Recycle Directory is a local resource for businesses or residents to help you locate a vendor who will safely dispose of hazardous and other wastes. The Directory also has health and environmental information for over 275 different wastes. www.SpokaneWasteDirectory.org.

Finally, your business can become EnviroCertified and receive recognition and promotion, at no cost to the business, for properly disposing of wastes and conserving resources. To apply call 509-847-4337 or go to <u>www. EnviroCertified.org</u>.

Thank you for your efforts to protect the Aquifer. If you have any questions, please call your water provider, or visit our website at <u>www.spokaneaquifer.org</u> to learn more about the Aquifer and your water provider.

Best wishes for your business success, The Spokane Aquifer Joint Board

SPOKANE AQUIFER JOINT BOARD 1521 N. Argonne Rd. Suite C PMB 250 Spokane Valley, WA 99212 www.spokaneaquifer.org info@spokaneaquifer.org

# 5.4 Contingency Plan from Wellhead Protection Program

#### Section 5 Contingency Plan

#### 5.1 Introduction

The Safe Drinking Water Act (SDWA) and its 1986 amendments require public water purveyors to develop contingency plans to manage and maintain an adequate water supply. In addition, Washington State Department of Health (DOH) requires contingency planning for wellhead protection programs to be incorporated into the purveyor's comprehensive water plan (WAC 246-290-100 and WAC 246-290-210).

A contingency plan for wellhead protection describes multiple actions to be implemented if either of the following conditions occurs:

- Groundwater monitoring detects a significant reduction in water quality either in a monitoring well or in a production well/well field.
- An emergency event which poses a threat to shut down one or more production wells.

Although other conditions for contingency planning exist (e.g. loss of transmission main, pumping station difficulties, etc.), only those that relate to potential contamination threats are discussed in this report.

The Washington State DOH's Wellhead Protection Program further lists several issues that contingency planning must address. As they apply to the City of Spokane, these are:

- Identify the maximum water system capacity including transmission and storage capacity and the impact from loss of the supply from the largest well.
- Evaluate expansion options for the system
- Identify potential interties to other public systems and costs to buy and deliver supplies from these systems.
- Evaluate current emergency procedures and make recommendations for contingency planning
- Identify future potential water sources and methods necessary for the protection of new sources
- Maintain a list of emergency phone numbers relevant to wellhead protection.

#### **5.2** Contamination Detection

Events that trigger implementation of the contingency plan are detection of a contaminant threat or an emergency event that could lead to a contaminant threat. Actual detection could occur in a monitoring well or a production well. Detection of a contaminant in a monitoring well, but yet to be discovered in a production well, indicates that the City probably has time to respond in a non-crisis mode. If contaminants are detected in a production well, the City must respond in a more timely manner, depending on the concentration of the contaminant, and how close it is to the regulatory maximum contaminant level (MCL).

Preventive action limits (PALs) have been established to identify a threshold concentration at which additional action **should be considered**. PALs should not be used to prescribe or limit action of the City to protect the water supply. The PAL shall only be used to heighten the awareness, and possibly take action, to determine the cause and location of the contaminant.

These PALs are lower than the regulatory MCLs to provide the City some time to consider response alternatives. Chemical constituents of an aesthetic nature are not subject to regulatory MCLs and need not be considered in this contingency plan.

PALs for volatile organic compounds (VOCs), synthetic organic compounds (SOCs), and for inorganic constituents were established using different criteria. Because SOCs and VOCs do not occur naturally in groundwater, their presence suggests manmade contamination. Inorganic constituents occur naturally at levels that fluctuate over time and distance. PALs for each category are defined as:

- SOCs/VOCs: twenty five percent of the MCL (Table 5-1 and 5-2)
- Inorganics: fifty percent of the MCL (Table 5-3)

Table 5-1 Volatile Organic Constituents Maximum Contaminant Levels (MCL)/Preventive Action Limits (PAL)				
CAS No.	Contaminant	MCL (mg/L)	PAL (mg/L)	
75-01-4	Vinyl chloride	0.002	Detection	
71-43-2	Benzene	0.005	0.00125	
56-23-5	Carbon tetrachloride	0.005	0.00125	
107-06-02	1,2-Dichloroethane	0.005	0.00125	
79-01-06	Trichloroethylene	0.005	0.00125	
106-46-7	para-Dichlorobenzene	0.075	0.0188	
75-35-4	1,1-Dichloroethylene	0.007	0.00175	
71-55-6	1,1,1-Trichloroethane	0.2	0.05	
156-59-2	cis-1,2-Dichloroethylene	0.07	0.00175	
78-87-5	1,2-Dichloropropane	0.005	0.00125	
100-41-4	Ethylbenzene	0.7	0.175	
108-90-7	Monochlorobenzene	0.1	0.025	
95-50-1	o-Dichlorobenzene	0.6	0.150	
100-42-5	Styrene	0.1	0.025	
127-18-4	Tetrachloroethylene	0.005	0.00125	
108-88-3	Toluene	1	0.25	
156-60-5	trans-1,2-Dichloroethylene	0.1	0.025	
1330-20-7	Xylenes (total)	10	2.500	
75-09-2	Dichloromethane	0.005	0.00125	
120-82-1	1,2,4-Trichloro-benzene	.07	0.0175	
79-00-5	1,1,2-Trichloro-ethane	0.005	0.00125	
Notes: Source: 40 CFR 141.61 2. PALs are 25 percent of the MCL or at the method detection limit, whichever is higher Analytical Method: EPA 524.2				

Table 5-2					
Synthetic Organic Constituents (Phase II/V) Maximum Contaminant Levels (MCL)/Preventive Action Limits (PAL)					
Contaminant	MCL (mg/L)	PAL (mg/L)			
Alachlor	0.002	0.0005			
Aldicarb	0.003	0.00075			
Aldicarb sulfoxide	0.004	0.001			
Aldicarb sulfone	0.002	0.0005			
Atrazine	0.003	0.00075			
Carbofuran	0.04	0.01			
Chlordane	0.002	0.0005			
Dibromochloropropane	0.0002	0.00005			
2,4-D	0.07	0.0175			
Ethylene dibromide	.00005	1.25x10-5			
Heptachlor	0.0004	0.0001			
Heptachlor epoxide	0.0002	0.00005			
Lindane	0.0002	0.00005			
Methoxychlor	0.04	0.01			
Polychlorinated biphenyls	0.0005	0.000125			
Pentachlorophenol	0.001	0.00025			
Toxaphene	0.003	0.00075			
2,4,5-TP	0.05	0.0125			
Benzo[a]pyrene	0.0002	0.00005			
Dalapon	0.2	0.055			
Di(2-ethylhexyl) adipate	0.4	0.1			
Di(2-ethylhexyl) phthalate	0.006	0.0015			
Dinoseb	0.007	0.00175			
Diquat	0.02	0.005			
Endothall	0.1	0.025			
Endrin	0.002	0.0005			
Glyphosate	0.7	0.175			
Hexacholorbenzene	0.001	0.00025			
Hexachlorocyclopentadiene	0.05	0.0125			
Oxamyl (Vydate)	0.2	0.05			
Picloram	0.5	0.125			
Simazine	0.004	0.001			
2,3,7,8-TCDD (Dioxin)	3x10-8	7.5 x10-7			

Table 5-3         Inorganic Constituents         Maximum Contaminant Laurels (MCL)/Presenting Action Limits (BAL)				
Contaminant	MCL ( mg/L)	PAL ( mg/L)		
Primary	v Constituents			
Antimony	0.006	0.003		
Arsenic	0.010	0.005		
Barium	2.01	1.0		
Berylium	0.004	0.002		
Cadmium	0.005	0.0025		
Chromium	0.100	0.05		
Copper	1.3	.05		
Iron	0.30 S	0.15		
Lead	0.015 AL	(refer to note 3)		
Manganese	0.050 S	0.025		
Mercury	0.002	0.001		
Nickel	0.10	.05		
Nitrate	10	5		
Nitrite	1.0	0.5		
Selenium	0.05	0.025		
Silver	0.050	0.025		
Thallium	0.002	0.001		
Secondary (Ae	sthetic) Constituents			
Asbestos (>10µm)	7 million fibers/liter	3.5 MFL		
Chloride	250.0	125.0		
Color	15 color units	7.5		
Copper	1.0	0.5		
Flouride	2.0	1.0		
Foming Agents	0.5	0.25		
Iron	0.30	0.15		
Manganese	0.05	0.025		
Odor	3.0	1.5		
ph	6.5 - 8.5			
Silver	0.1	0.05		
Sulphate	250	125		
TDS	500	250		
Zinc	5 S	2.5		

#### Table 5-3 (continued)

#### Inorganic Constituents Maximum Contaminant Levels (MCL)/Preventive Action Limits (PAL)

Notes:

1. Table includes general chemistry constituents and metals.

- 2. The PALfor IOC's was set at one-half the MCL
- 3. "AL" indicates that while no MCL has been established, 0.015 mg/L is a recommended action level for lead (National Primary Drinking Water Standards, U.S. EPA Region 5, updated June 1993). A water supplier is required to take action if greater than 10% of the connections exceed 0.015 mg/L (U.S. EPA drinking water hotline.)

#### 5.2.1 Monitoring Wells/Contaminant Detection

Figure 5-1 is a flow chart showing actions that should be considered if potential contamination is detected in a monitoring well.

Any well with a reported value above the PAL should be re-sampled as soon as possible after the laboratory report. This is necessary to detect false positive results attributable to errors in collection, testing or handling of the sample. Strict field protocol should be followed to minimize the possibility of a false positive result. If re-sampling does not produce a value above the PAL, the contingency plan need not be implemented, but the detection event should be noted for future reference.

If the PAL is exceeded, the City should make a preliminary assessment of potential contaminant sources and the potential impact to the production well. The following issues should be determined:

- What are the potential impacts to the overall City water system?
- Which production wells could be removed from service?
- Can potential sources of the contaminant be identified?
- Could the monitoring well be on the edge of a contaminant plume, with higher concentrations impacting another well?
- What is the closest distance the contaminant could be from a production well?
- What time has elapsed since the previous sampling date and what is the travel rate for the contaminant?

A preliminary assessment must be made to identify the potential source of contamination. The preliminary assessment will determine if additional investigation is necessary. If the assessment determines the source is on City property, the City should report the findings to the following agencies:

- Washington State Department of Health (DOH)
- Washington State Department of Ecology (ECOLOGY)
- Spokane County Water Resources (WQMP)
- Spokane County Health District (SCHD)

Under this condition the City should also be contemplating remedial measures.

If the potential source is not on City property, the City may choose to install a monitoring well immediately downgradient of the suspected source. Information from this monitoring well could be used by ECOLOGY to exercise its regulatory authority for remediation of the source site. The City should monitor the progress of the investigation and remediation, including, when necessary, retain a technical consultant to protect the City's interests in the matter.

If the potential source of contamination is not identified, the City should consult with ECOLOGY and other agencies to determine a future course of action.



#### 5.2.2 Production Well Contaminant Detection

Figure 5-2 is a flow chart showing actions that should be taken if potential contamination is detected in a production well.

Any well with a reported value above the PAL should be re-sampled as soon as possible after the laboratory report. This is necessary to detect false positive results attributable to errors in collection, testing or handling of the sample. Strict field protocol should be followed to minimize the possibility of a false positive result. If re-sampling does not produce a value above the PAL, the contingency plan need not be implemented, but the detection event should be noted for future reference.

If the PAL is exceeded, the City should notify regulators and make a preliminary assessment of the source and potential impact to the production well. The following issues should be determined:

- Is the MCL exceeded? (If so, follow requirements of WAC 246-290-320)
- If the MCL is not violated, should the well remain in service with sampling performed more frequently?
- If the MCL is being exceeded, immediate interim measures can and should be taken, including 1) pumping the well to waste, 2) removing the source from production or 3) providing emergency treatment at the wellhead.

If a source of contamination is not identified and the concentration is below the MCL, the City may continue to use the well while;

- 1. Conducting a source investigation with regulators
- 2. Consider alternatives for the production well, planning for groundwater treatment.

If the source has been identified, control and remedial action should be pursued in the same manner as described in Section 5.2.1 Monitoring, but with more expediency.

Operation of a particular well may influence groundwater migration. If contaminants are migrating toward a well, but have only been detected in monitoring wells, the production well could be shut down reducing the obvious threat to the public health. However, shutting down a well could change the groundwater flow pattern which could affect contaminant travel to other wells. Other less apparent alternatives must be considered, including continued pumping and treatment or pumping the water to waste. *Each case must be evaluated individually*.



#### **5.3 Emergency Event**

Actions taken when an emergency occurs should be consistent and coordinated with the City's overall emergency response plan and the Water Department. The emphasis in this wellhead project is on groundwater contamination and the loss of a production well. The discussion presented in this report should only be considered a part of the City's overall response plan outlined in Section 6.4—2023 City of Spokane Water System Plan Emergency Preparedness and Response

The following emergencies are relevant to WHPAs:

- Tanker-truck/Railcar spill releasing hazardous material to a stormwater dry well, unpaved roadway or yard
- Fire at a hazardous material storage site
- Rupture of tanks storing hazardous materials
- Major failure of a large sanitary interceptor sewer
- Rupture of a surface or subsurface petroleum pipeline

Emergencies can take many forms. This makes rigid and detailed planning difficult, and undesirable. Therefore, an effective contingency plan must be flexible enough to be implemented under a variety of circumstances. Intelligent onsite decisions can only be made when the particular circumstances of an emergency are fully understood. Flexibility, therefore, lies in summoning all appropriate officials to the site so that a complete and balanced response decision can be made. WHP concerns must be addressed at each emergency event. Failure to do so can lead to the loss of a well. For example, the immediate and historical reaction to a fire at a chemical warehouse is to combat the fire to preserve the structure and property at risk. However, that response may lead to large quantities of contaminated water or liquid flowing into the soil. Depending on the particular site conditions, the appropriate response to this emergency may be to allow the structure and stored product to burn. This will minimize the flow of water or liquids that could contaminate groundwater.

The City of Spokane's HAZMAT (Hazardous Materials) Team from the City's Fire Department assumes command at most emergencies that would threaten the aquifer. However, other emergencies could occur that would not involve the HAZMAT team. For this reason, communication links to City and County sewer departments, DOT response team and local Fire Districts need to be established.

In all cases of emergencies, the Director of the City of Spokane's Water/Hydroelectric Services Department fully participates with the primary emergency response teams for the City of Spokane and Spokane County incidents. Once notified of an emergency, the Director's course of action is outlined in the flowchart presented in Figure 5-3.



#### **5.4 Operational Response**

The City of Spokane enjoys the advantages of ample aquifer capacity and adequate distribution system capacity to deal with the loss of a well. If contamination or the possibility of contamination causes a well to be removed from service, the impacts can range from negligible to inconvenient depending on which well is affected and the time of year. The following summary of system characteristics is relevant to understanding operational contingencies:

- 1. Total system operational capacity is 220 million gallons per day (mgd). Reserve capacity of approximately 60 mg/d is available if some wells, booster stations and reservoirs were out of service. Total system capacity for planning purposes is 280 mg/d.<sup>1</sup>
- Daily demand ranges from a low of 30–40 mg/d during winter months to 150 mg/d during hot summer weather. The record demand is 185 mg/d (see Figure 5-4).
- 3. The Well Electric and Parkwater wells are critical to the City's system. Together they can supply fifty two percent of the total system capacity. The combination of the Grace and Nevada wells, the next largest well field can supply only thirteen percent of the total system capacity.
- 4. The Well Electric source can directly or indirectly supply the North Hill and the southside hydraulic systems.
- 5. Loss of a well during the summer season will require reconfiguration of the system. During winter, if Well Electric and Parkwater are inoperable (due to seasonal shutdown), other wells can meet the water demand up to 110 mg/d. The North Hill wells can provide up to 50 mg/d, while the south side wells (Nevada and Ray St.) provide 60 mg/d capacity.
- 6. Figure 5-5 illustrates the schematic layout of the distribution system and the flexibility to meet an emergency situation, when water must be moved from one area or zone to another. There is ample capacity to move water from the North Hill hydraulic system or from the intermediate hydraulic system to supply water to the low system.

<sup>&</sup>lt;sup>1</sup> Leon Sproule, Mark Cleveland City of Spokane Water Department communication 10/3/95



\* Information is from the 1994 records





# 2020

# **CITY OF SPOKANE** WATER SYSTEM OPERATION

# Figure 5.5



Checked by J. FInger P.E. 9-03-2020 3-03-2020 INFORMATION PROVIDED BY J FINGER S MCINOSH Rev 9/25/13

Update per J.Finger P.E. 4-27-2020 Well station numbers removed J. FINGER P.E. 3-19-2020 Tank Elevation update S. Burns P.E. 3-18-2020

#### **5.4.1 Summer Operations**

The Parkwater and Well Electric production wells are critical to meeting the City's summer water demand. These two wells are within the same WHPA, and therefore, for planning purposes, loss of one suggests the probable loss of both water supply sources. This loss would reduce the City's overall system capacity of 220 mg/d to 100 mg/d. Therefore, the City's worst-case planning scenario should assume that the contingency planning capacity is 100 mg/d.

Fortunately, much of the peak water demand during June, July, and August can be curtailed without major impact to public health. During these months, the water demand peaks at an average of 150 mg/d and exceeds the contingency planning capacity of 100 mg/d by 50 mg/d. However, it is estimated that 80–100 mg/d of the peak summer usage is for non-essential public health uses such as lawn watering, car washing, street cleaning, and other non-essential uses. Therefore in order of priority<sup>2</sup>, to reduce water demand by 50 mg/d the City anticipates taking the following steps:

- 1. Utilize the water system's reserve capacity. Activate all well pumps that are in reserve status and reconfigure the distribution system to divert some water from one area or pressure zone to the impacted area or pressure zone. This would include maximizing use of booster stations to supply water from a lower pressure zone to a higher one or partially opening connections between higher pressure zone to a lower one. Reconfiguration of the system could increase capacity by approximately 20 mg/d.
- 2. Curtail or eliminate public landscape watering; i.e., golf courses and parks. This would save approximately 15 mg/d.<sup>3</sup>
- 3. Curtail other City activities requiring large amounts of water such as street washing and hydrant testing. This saving is difficult to quantify, but should be done as a matter of policy.
- 4. Request voluntary reduction from selected users, such as schools and large private industries. This could save approximately 5 mg/d.
- 5. Make a general appeal through the media for voluntary reduction. This could save approximately ten percent of non-essential usage; approximately 10 mg/d.
- 6. Increase public awareness of the problem, and request odd/even watering days for domestic use. This could save an additional 10 mg/d in addition to the 10 mg/d demand reduction of a general media appeal.

<sup>&</sup>lt;sup>2</sup> Leon Sproule, Mark Cleveland City of Spokane Water Department communication 1/19/96

<sup>&</sup>lt;sup>3</sup> Utility Billing Records 1994, City of Spokane

7. As a short term emergency measure, restructure the water rates to severely discourage non-essential usage. This could reduce demand by seventy five percent of all non-essential water use; an additional 20-35 mg/d could be attained..

#### 5.5 Summary

In summary, most of the City's water system demand could be met by utilizing the system's reserve capacity. Additional measures during the hottest months may be necessary, but should meet the system demand without calling on public participation in reduction.

The capacity of future wells and distribution flexibility should consider this contingency plan, along with the potential loss of Parkwater and Well Electric wells.

# 5.5 Notification to First Responders Distribution list for PCSI

#### Spokane Aquifer Joint Board 2022 Potential contaminant Source Inventory Mailing list to Regulatory Agencies, Local Governments, and Emergency Responders

Agency - Organization	Address	City, Zip	Name	Title	email	Phone
City of Liberty Lake Planning & Building Services	22710 East Country Vista Drive	Liberty Lake, WA 99019	Lisa Key	Director/ Planner	Lkey@libertylakewa.gov	509-755-6708
City of Millwood Planning Department	9103 E. Frederick Ave	Spokane, WA 99206	Planning Director		info@millwoodwa.us	509-924-0960
City of Spokane	808 W. Spokane Falls Blvd.,	Spokane, WA 99201	Beryl Fredrickson	Senior Engineer	bfredrickson@spokaneci ty.org	509-625-6008
City of Spokane Emergency Management	808 W. Spokane Falls Blvd.,	Spokane, WA 99201	Sarah Nuss	Director	snuss@spokanecity.org	509-435-7026
City of Spokane Fire Department	44 W Riverside Ave	Spokane, WA 99201	Brian Schaeffer	Fire chief	bschaeffer@spokanecity .org	509-625-7001
City of Spokane Planning Services	808 W. Spokane Falls Blvd.,	Spokane, WA 99201	Spencer Gardner	Director	sgardner@spokanecity.o rg	509-625-6097
City of Spokane Police Department	1100 W. Mallon Ave.	Spokane, WA 99260	Craig Meidl	Police Chief	<u>cmeidl@spokanepolice.o</u> rg	509-625-4063
City of Spokane Public Works	808 W. Spokane Falls Blvd.,	Spokane, WA 99201	Marlene Feist	Director	mfeist@spokanecity.org	509-625-6505
City of Spokane Valley Planning Department	10210 E Sprague Avenue	Spokane Valley, WA 99216	Lori Barlow	Senior Planner	planning@spokanevalley .org	509-720-5335
City of Spokane Valley Police Department	12710 E. Sprague Ave.	Spokane Valley, WA 99216	Dave Ellis	Police Chief	djellis@spokanesheriff.o rg	509-477-3310
Office of Drinking Water   Eastern Regional Office Environmental Public Health   Washington State Department of Health	River View Corporate Center, 16201 East Indiana Ave. Suite 1500	Spokane Valley, WA 99216	Brenda Smits	Regional Planner	brenda.smits@doh.wa.g ov	509-329-2122
Office of Drinking Water   Eastern Regional Office Environmental Public Health   Washington State Department of Health	River View Corporate Center, 16201 East Indiana Ave. Suite 1500	Spokane Valley, WA 99216	Nick Fitzgerald	Regional Engineer	<u>Nick.Fitzgerald@doh.wa.</u> gov	509-329-2213
Office of Drinking Water Department of Health	P.O. Box 47822	Olympia, WA 98504- 7822	Dave Sternberg	Water Quality Compliance Coordinator	<u>David.Sternberg@doh.w</u> a.gov	360-236-3099
Office of Drinking Water Department of Health	P.O. Box 47822	Olympia, WA 98504- 7822	Nikki Guillot	Source Water Protection PM	<u>Nikki.Guillot@doh.wa.go</u> <u>v</u>	360-236-3114
Office of Drinking Water Department of Health	River View Corporate Center, 16201 East Indiana Ave. Suite 1500	Spokane Valley, WA 99216	Scott Mallory	Assistant Regional Manager	<u>Scott.Mallery@doh.wa.g</u> ov_	509-329-2131
Office of Drinking Water Department of Health	P.O. Box 47822	Olympia, WA 98504- 7822	Sheri Miller	Field Operations Manager,	sheri.miller@doh.wa.gov	509-407-7160

Spokane Aquifer Joint Board 2022 Potential contaminant Source Inventory Mailing list to Regulatory Agencies, Local Governments, and Emergency Responders

Spokane County Building and	1026 W Broadway Ave	Spokane, WA 99260	Scott Chesney	Director of	schesney@spokanecoun	509-477-7212	
Spokane County Emergency Management	1121 W. Gardner	Spokane, WA 99201	Broussard, David D.	Program Specialist	ty.org DBROUSSARD@spokane county.org		
Spokane County Emergency Management	1121 W. Gardner	Spokane, WA 99201	Chandra Fox	Deputy Director	<u>CFOX@spokanecounty.o</u>	509-477-7606	
Spokane County Emergency Management	1121 W. Gardner	Spokane, WA 99201	Gerry Bozarth	Mitigation, Disaster Recovery, & PIO	GBOZARTH@spokaneco unty.org	509-477-7212	
Spokane County Sheriff	1100 W Mallon Avenue	Spokane, WA 99260	Ozzie Knezovich	Sheriff		509-477-4754	
Spokane Regional Health District - Environmental Health	1101 W. College Ave.	Spokane, WA 99201	Mike LaScuola	Technical Advisor Environmental Resources	mlascuola@srhd.org	509-324-1574	
Spokane Valley Fire Department	2120 N Wilbur	Spokane Valley, WA 99206	Austin Morrell	Fire Protection Engineer	MorrellA@spokanevalle yfire.com	509-928-1700	
Spokane Valley Fire Department	2120 N Wilbur	Spokane Valley, WA 99206	Bryan Collins	Fire Chief	<u>CollinsB@Spokanevalleyf</u> ire.org	509-928-1700	
Spokane Valley Fire Department	2120 N Wilbur	Spokane Valley, WA 99206	Traci Harvey	Fire Protection Engineer	HarveyT@spokanevalley fire.com	509-928-1700	
WA Department of Ecology Eastern Region	4601 N. Monroe,	Spokane, WA 99205- 1295	Tracy Band	Water Resources PM	treh461@ecy.wa.gov	509-385-5846	
Water Division, Groundwater & Drinking Water Section   19-H16	1200 Sixth Avenue	Seattle, WA 98101	Ryan Gross	Sole Source Aquifer	gross.ryan@epa.gov	206-553-6293	

# 5.6 Template of Notification Letter to Agencies



SPOKANE AQUIFER JOINT BOARD 1521 N. Argonne Rd. Suite C PMB 250 Spokane Valley, WA 99212 www.spokaneaquifer.org

#### Local Water Utilities United for Safe Drinking Water

Carnhope Irrigation District No. 7 City of Millwood City of Spokane Consolidated Irrigation District No. 19 East Spokane Water District No. 1 Honeywell Electronic Materials, Inc. Hutchinson Irrigation District No. 16 Irvin Water District No. 6 Kaiser Aluminum - Trentwood Liberty Lake Sewer & Water District Moab Irrigation District No. 20 Model Irrigation District No. 18 Modern Electric & Water Co. North Spokane Irrigation District No. 8 Orchard Avenue Irrigation District No. 6 Pasadena Park Irrigation District No. 17 Spokane County Water District No. 3 Spokane Business & Industrial Park Trentwood Irrigation District No. 3 Vera Water and Power Whitworth Water District No. 2 Jeremy Jenkins SAJB President

> Tonilee Hanson WIP Program Manager 509-847-4337 info@spokaneaquifer.org

## Spokane Aquifer Joint Board 2022 Potential Contaminant Source Inventory

September 15, 2022

To First Responders, Planning Departments, and Agencies:

The Washington State Department of Health requires water providers to create a list of all potential contaminant threats to the public water supply. Additionally, providers are required to furnish a copy of the list to all Fire Departments and first responders in the area, the Department of Ecology, the Department of Health, and local municipal planning departments.

To make the list as helpful and easy to use as possible we have put it into an ArcGIS format and made it available via drop box and website. If you have any questions or prefer to receive the map and list mailed to you on a zip drive, please contact us at info@spokaneaquifer.org.

To view the Spokane Aquifer Joint Board 2022 Potential Contaminant Inventory Map, visit <u>https://www.spokaneaquifer.org/the-aquifer/potential-contaminant-sources/</u>. The page "For First Responders" is password protected. To view it please enter the password - XXXXX.

#### <u>Sites</u>

The PCSI Map includes sites that pose a potential threat to the Spokane Valley Rathdrum Prairie Aquifer. These sites were collected from the following sources:

- Spokane County Building Permits issued with a hazardous or critical materials identifier
- City of Spokane Building Permits issued with a hazardous or critical materials identifier
- City of Millwood Building Permits issued
- Liberty Lake Building Permits issued
- City of Spokane Valley Building Permits issued with a hazardous or critical materials identifier
- State Department of Ecology Facility / Site Identification System that includes EPA and Tier 2 (Fire District) information.

Sites listed by the Department of Ecology as Contaminated are red. The rest are green. To learn more, click on the site. The site name, physical address, owner name and mailing address are available for each site. You can also download a spreadsheet with all of the businesses shown on the map.

Thank you for everything you do to keep our community safe.

Sincerely, Spokane Aquifer Joint Board Local Water Utilities United for Safe Drinking Water.

# 6.1 Operating Strategy (Summer and Winter)

#### TANKS & RESERVOIRS SUMMER OPERATING RANGES (O.R.)

TANK	Year	Сара	City Base	City Over	NAV88	NAV88	NAV88	Max	PSI		Summer		Summer
	Built	city		flow	Base	Over flow	Levelo	water		Low	Low	High	High
		MG					meter			Level	0.R.	Level	O.R.
14th + Grand	2004	0.52	2217.45	2296.13	2204.35	2283.03	2201.7	78.68		2251.00	2260.00	2278.00	2277.00
9th + Pine	1969	7.2	2095.93	2113.78	2082.83	2100.68	2077.3	17.85	15	2088.80	2088.80	2099.00	2099.00
Brown Park 1	1958	5.0	2524.50	2559.16	2511.75	2546.24	2504.8	34.66	30	2532.00	2535.50	2545.00	2545.00
Brown Park 2	1991	5.0	2524.85	2559.34	2511.40	2546.06	2504.8	34.49		2532.00	2535.50	2545.00	2545.00
Cedar Hills	1998	0.30	2252.50	2272.90	2239.40	2259.80	2233.9	20.40	15	2251.00	2252.00	2258.50	2258.00
Eagle Ridge*	1995	0.54	2322.50	2345.00	2309.40	2331.90	2309.4	22.50		2318.00	2320.00	2329.00	2328.50
Eagle Ridge 2	2005	1.2			2336.46	2466.46	2474.5	129.00		2440.00	2435.00	2461.00	2459.00
Five Mile	1956	10.2	2172.78	2203.25	2159.68	2190.15	2160.9	30.47	15	2166.90	2166.90	2188.00	2188.00
Garden Park	1956	3.1	2410.05	2483.36	2396.95	2470.26	2399.0	73.31	50	2436.00	2450.00	2469.00	2463.00
Geiger Hts		0.25	2458.00	2489.00	2444.90	2475.90		31.00		oos			
Glennaire 1	1958	0.015	2854.98	2865.00	2841.88	2851.90		10.02		oos			
Glennaire 2	1991	1.0	2835.00	2864.95	2821.90	2851.85	2818.8	29.95	15	2841.00	2840.00	2850.50	2849.50
Highland	1966	1.0	2289.84	2398.94	2276.74	2385.84	2270.8	109.10		2362.00	2368.00	2384.00	2383.00
Indian Canyon		0.32	2274.00	2297.00	2260.90	2283.90	2262.5	23.00	15	oos			
Indian Hills	1995	0.03	2314.42	2338.45	2301.32	2325.35	2301.6	24.03		2310.00	2310.00	2324.00	2324.00
Indian Trails	1995	4.8	2159.35	2201.18	2146.25	2188.08	2146.2	41.83	30	2157.00	2157.00	2187.00	2187.00
Кетре	2010	1.1			2433.46	2567.46	2428.6	134.00	150	2515.00	2510.00	2563.00	2562.50
Lamonte	1930	1.25	2444.37	2479.04	2431.27	2465.94	2350.7	34.67		2444.00	2450.00	2465.00	2463.00
Lincoln Hts W	1994	10.0	2266.00	2293.00	2249.90	2279.90	2251.0	30.00	50	2251.00	2263.00	2279.00	2279.00
Lincoln Hts E	1994	10.0			2249.76	2279.76	2251.3	30.00	50	2251.00	2263.00	2279.00	2279.00
Mallen Hill	1985	4.0	2593.36	2648.36	2580.26	2635.26	2576.5	55.00	30	2608.00	2615.00	2634.00	2633.20
Midbank	1960	0.58	2244.00	2306.00	2230.90	2292.90	2227.5	62.00	50	2281.40	2282.00	2291.50	2291.00
North Hill	1986	10.7	2157.43	2203.15	2144.33	2190.05	2125.6	45.72	50	2166.90	2166.90	2188.00	2188.00
Qualchan	1992	1.25	2071.00	2114.00	2057.90	2100.90	2048.4	43.00	30	2082.00	2082.00	2099.00	2099.00
Rockwood	1948	11.0	2096.64	2112.77	2083.54	2099.67	2083.7	16.13		2088.80	2088.80	2098.00	2098.00
Shadle	1965	4.8	2044.47	2114.00	2031.37	2102.22	2035.7	70.85	50	2081.00	2081.00	2100.00	2100.00
Shawnee 1	1978	0.022	2275.00	2289.26	2261.90	2276.16	2256.3	14.26	15	2265.40	2266.00	2275.00	2274.00
Shawnee 2	1993	0.054	2275.00	2290.03	2261.90	2276.93		15.03		2265.40	2266.00	2275.00	2274.00
SIA 1	1935	0.5	2465.80	2503.22	2452.70	2490.12	2368.4	37.42		2465.00	2472.00	2489.00	2487.50
SIA 2	1984	4.0	2377.66	2502.41	2364.56	2489.31	2364.7	124.75	60	2468.00	2472.00	2488.50	2487.50
Southview**	1994	0.048	2970.48	3012.00	2957.38	2998.90	2961.9**	41.52	30	2973.00	2967.00	2996.00	2995.00
Strong	1982	2.0	2409.43	2534.00	2396.33	2520.90	2391.1	124.57	150	2479.00	2496.00	2519.00	2517.50
Sunset	1968	0.35	2271.36	2295.00	2258.26	2281.90	2260.4	23.64	15	2268.00	2273.00	2280.00	2279.00
Thorpe	1983	3.5	2059.77	2114.00	2046.67	2100.90	2043.3	54.23		2084.00	2084.00	2099.00	2099.00
West Drive	1956	1.0	2079.50	2115.00	2066.40	2101.90	2060.7	35.50		2084.00	2084.00	2100.00	2100.00
Woodridge	2004	0.255	2398.50	2420.00	2385.40	2406.90	2379.4	21.50	15	2397.50	2394.00	2405.90	2405.00
ER 2*: Altitude	ER 2*: Altitude Valve Set to Open @ 2317Ft Southview**: Levelometer won't read below 2964.1Ft Updated March 2021												

#### TANKS & RESERVOIRS WINTER OPERATING RANGES (O.R.)

TANK	Year Built	Capa city	City Base	City Over flow	NAV88 Base	NAV88 Over flow	NAV88 Levelo	Max water	PSI		WINTER Low	High	WINTER
		MG					meter			Low	O.R.	Level	O.R.
14th + Grand	2004	0.52	2217.45	2296.13	2204.35	2283.03	2201.7	78.68		2251.00	2260.00	2278.00	2277.00
9th + Pine	1969	7.2	2095.93	2113.78	2082.83	2100.68	2077.3	17.85	15	2088.80	2090.00	2099.00	2099.00
Brown Park 1	1958	5.0	2524.50	2559.16	2511.75	2546.24	2504.8	34.66	30	2532.00	2535.50	2545.00	2544.90
Brown Park 2	1991	5.0	2524.85	2559.34	2511.40	2546.06	2504.8	34.49		2532.00	2535.50	2545.00	2544.90
Cedar Hills	1998	0.30	2252.50	2272.90	2239.40	2259.80	2233.9	20.40	15	2251.00	2254.00	2258.50	2258.00
Eagle Ridge*	1995	0.54	2322.50	2345.00	2309.40	2331.90	2309.4	22.50		2318.00	2324.00	2329.00	2328.50
Eagle Ridge 2	2005	1.2			2336.46	2466.46	2474.5	129.00		2435.00	2441.00	2461.00	2459.00
Five Mile	1956	10.2	2172.78	2203.25	2159.68	2190.15	2160.9	30.47	15	2166.90	2170.00	2189.00	2188.00
Garden Park	1956	3.1	2410.05	2483.36	2396.95	2470.26	2399.0	73.31	50	2436.00	2455.00	2469.00	2464.00
Geiger Hts		0.25	2458.00	2489.00	2444.90	2475.90		31.00		oos			
Glennaire 1	1958	0.015	2854.98	2865.00	2841.88	2851.90		10.02		oos			
Glennaire 2	1991	1.0	2835.00	2864.95	2821.90	2851.85	2818.8	29.95	15	2841.00	2840.00	2850.50	2848.00
Highland	1966	1.0	2289.84	2398.94	2276.74	2385.84	2270.8	109.10		2362.00	2368.00	2384.00	2383.50
Indian Canyon		0.32	2274.00	2297.00	2260.90	2283.90	2262.5	23.00	15	oos			
Indian Hills	1995	0.03	2314.42	2338.45	2301.32	2325.35	2301.6	24.03		2310.00	2310.00	2324.00	2324.00
Indian Trails	1995	4.8	2159.35	2201.18	2146.25	2188.08	2146.2	41.83	30	2157.00	2170.00	2187.00	2187.00
Kempe	2010	1.1			2433.46	2567.46	2428.6	134.00	150	2515.00	2514.00	2563.00	2555.00
Lamonte	1930	1.25	2444.37	2479.04	2431.27	2465.94	2350.7	34.67		2444.00	2450.00	2465.00	2464.00
Lincoln Hts W	1994	10.0	2266.00	2293.00	2249.90	2279.90	2251.0	30.00	50	2251.00	2263.00	2279.00	2278.00
Lincoln Hts E	1994	10.0			2249.76	2279.76	2251.3	30.00	50	2251.00	2263.00	2279.00	2278.00
Mallen Hill	1985	4.0	2593.36	2648.36	2580.26	2635.26	2576.5	55.00	30	2608.00	2614.00	2634.00	2633.20
Midbank	1960	0.58	2244.00	2306.00	2230.90	2292.90	2227.5	62.00	50	2281.40	2278.00	2291.50	2287.00
North Hill	1986	10.7	2157.43	2203.15	2144.33	2190.05	2125.6	45.72	50	2166.90	2170.00	2188.00	2187.00
Qualchan	1992	1.25	2071.00	2114.00	2057.90	2100.90	2048.4	43.00	30	2082.00	2085.00	2099.00	2098.00
Rockwood	1948	11.0	2096.64	2112.77	2083.54	2099.67	2083.7	16.13		2088.80	2090.00	2098.00	2098.00
Shadle	1965	4.8	2044.47	2114.00	2031.37	2102.22	2035.7	70.85	50	2081.00	2085.00	2100.00	2099.00
Shawnee 1	1978	0.022	2275.00	2289.26	2261.90	2276.16	2256.3	14.26	15	2265.40	2265.00	2275.00	2274.00
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SIA 1	1935	0.5	2465.80	2503.22	2452.70	2490.12	2368.4	37.42		2465.00	2473.00	2489.00	2487.00
SIA 2	1984	4.0	2377.66	2502.41	2364.56	2489.31	2364.7	124.75	60	2468.00	2473.00	2488.50	2487.00
Southview**	1994	0.048	2970.48	3012.00	2957.38	2998.90	2961.9**	41.52	30	2973.00	2964.00	2996.00	2992.00
Strong	1982	2.0	2409.43	2534.00	2396.33	2520.90	2391.1	124.57	150	2479.00	2497.00	2519.00	2518.00
Sunset	1968	0.35	2271.36	2295.00	2258.26	2281.90	2260.4	23.64	15	2268.00	2273.00	2280.00	2279.00
Thorpe	1983	3.5	2059.77	2114.00	2046.67	2100.90	2043.3	54.23		2084.00	2085.00	2099.00	2099.00
West Drive	1956	1.0	2079.50	2115.00	2066.40	2101.90	2060.7	35.50		2084.00	2085.00	2100.00	2099.00
Woodridge	2004	0.255	2398.50	2420.00	2385.40	2406.90	2379.4	21.50	15	2397.50	2393.00	2405.90	2399.80
ER 2*: Altitude Valve Set to Open @ 2317Ft Southview**: Levelometer won't read below 2964.1Ft Updated March 2021													

# 6.2 2021 Technical Drinking Water Report



## City of Spokane Water Department

# 2021 Technical Drinking Water Report

CITY OF SPOKANE – Water Department 914 E. North Foothills Dr.,; Spokane, WA 99207-2794; (509) 625-7800



### REPORT ON CITY OF SPOKANE DRINKING WATER FOR 2021

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#### **Executive Summary**

Spokane's drinking water meets or exceeds all State and Federal drinking water quality standards. This annual report prepared by the City of Spokane's Water Department supports and informs our Water Department annual Consumer Confidence Report, distributed as the City of Spokane Water Quality Report. This report provides wholesale water customers, businesses and the public with a more detailed discussion, with additional references, a complete list of the year's testing, and thorough consideration on the reasons for testing.

The City tested for 35 different inorganic parameters. There were detections of regulated chemicals; arsenic, barium and nitrate.

The drinking water was tested for 127 organic compounds, and none were detected.

Radionuclide testing revealed levels of gross alpha emitters, Radium 228, and radon in the drinking water.

In home testing for lead and copper was performed in August. 64 homes were sampled. The highest concentration of lead in a sample was 5.46  $\mu$ g/L (ppb) for lead and 111  $\mu$ g/L for copper. The regulatory point is the 90<sup>th</sup> percentile sample. For lead this was 1.83  $\mu$ g/L and for copper 80.9  $\mu$ g/L. The homes tested had copper service lines. The City completed the removal of all known residential lead service lines in 2018.

The City disinfects the drinking water with chlorine gas, resulting in the generation of low concentrations of disinfection byproducts. The city tests for nine of these compounds quarterly. There were detections at the farthest reaches of the distribution system.

The City tests both the source water and the distribution system for microbiological contaminants. In 2021, there were no detections of total coliform in the distribution system during routine regulatory sampling.

The following narrative and attachments summarize and explain recent results in more detail. Appendix V and the last two pages of this narrative (General Information) contain information relevant to the annual Consumer Confidence Report. As such, the information may be redundant relative to the main text of this report.

The detections mentioned are below applicable drinking water standards. The results were within the range of results from previous testing. Arsenic, Barium, and radionuclides, including radon, are from naturally occurring geological sources. Nitrate is primarily from anthropogenic sources such as fertilizer and septic systems but has declined in recent years with the conversion of individual septic systems to centralized sewer systems.

#### Introduction and Source Water Information

All of the City of Spokane's drinking water comes from the Spokane Valley-Rathdrum Prairie Aquifer - designated a sole source aquifer in 1978. The Spokane Valley-Rathdrum Prairie Aquifer slowly flows through two different states and a number of different counties and is the source water for a large number of water purveyors, including the City of Spokane. This water and any contaminants freely move across political boundaries. Many groups and/or private individuals may claim this water to be used for diverse purposes. Some of these competing interests include (but are not limited to) drinking water rights, irrigation, fisheries, hydroelectric power, and industrial processes. The Spokane Aquifer (that portion of the larger aquifer lying within Washington State) and the Spokane River exchange water. While the aquifer contains a large volume of water, many factors play into the volume of water in the Spokane River, complicating the management of these resources. Some of these factors include pumping for irrigation and potable water, hydroelectric dam operations, and the variations of weather and precipitation. Learn more about the Spokane Valley-Rathdrum Prairie Aquifer by downloading the Aquifer Atlas from <u>www.spokanecounty.org/1227/SVRP-Aquifer-Home</u>

The City of Spokane's Water Department delivers up to 150 million gallons of clean, safe drinking water every day to more than 230,000 people in our community. The City's water system is the fourth largest in the state of Washington based on number of connections behind Seattle, Tacoma and Vancouver. Our water system includes pumps, reservoirs, seven source wells, and more than 1,000 miles of water mains and smaller water lines that bring water from our wells to homes and businesses.

Due to the porous nature of the ground surface and the number of potential contaminant sources, the possibility of contaminating the aquifer exists if good housekeeping measures are not followed for all activity over and adjacent to the aquifer. The physical and economic health of our area depends on the quality of our drinking water. In order to safeguard water quality, the City continues its efforts to make available to the community information about, and appropriate disposal mechanisms for, dangerous wastes that are generated in the Aquifer Sensitive Area. The City, in cooperation with other local governments and the Spokane Aquifer Joint Board, continues to work toward strengthening regulations for the storage and use of critical materials to safeguard the local water supply.

City of Spokane Water Department	(509) 625-7800	www.spokanewater.org/
Spokane County - Water Resources	(509) 477-7579	www.spokanecounty.org/4627/Water-Programs
Spokane Regional Health District – Environmental Health Div.	(509) 324-1560	www.srhd.org/programs-and-services/#-environmental-hazards- resources
Washington State Department of Health - Eastern Regional Office (Drinking Water)	(509) 329-2100	www.doh.wa.gov/YouandYourFamily/HealthyHome/DrinkingWater
Washington State Department of Ecology – Eastern Regional Office	(509) 329-3400	www.ecy.wa.gov/
U.S. EPA Safe Drinking Water Hotline	1-800-426-4791	www.epa.gov/your-drinking-water

For additional information regarding the City of Spokane's drinking water or related issues:

**Table 1 List of Resources** 



# QUALITY Drinking Water An Invaluable Community Resource

#### **INORGANICS**

The City typically has a Washington State Department of Ecology accredited laboratory run a full drinking water inorganics analysis once every three years on each of our source wells. In addition, nitrates are tested annually, as required. The most recent inorganic results for all wells from accredited laboratories are in Appendix III. All sources are in compliance with existing National Primary Drinking Water Regulations for Inorganic Maximum Contaminant Levels (MCL).

#### ARSENIC

**In 2021 the City of Spokane performed inorganic testing at the Nevada, Parkwater, and Ray Street wells. Arsenic readings were 2.27 μg/L, 2.91 μg/L, and 3.53 μg/L respectively.** The MCL for arsenic is 10 μg/L, or parts per billion (ppb). For City drinking water, 5.13 μg/L of arsenic in 2009 from Ray Street Well represents the highest result to date.

**City drinking water currently meets EPA's drinking water standard for arsenic.** However, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's health effects against the cost of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is a mineral known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems.

Further information concerning health impact issues, regulatory requirements, and compliance costs for water utilities/water customers can be found at <a href="http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-167.pdf">www.doh.wa.gov/Portals/1/Documents/Pubs/331-167.pdf</a>.

#### BARIUM

The Barium readings in 2021 for the Nevada, Parkwater, and Ray Street wells were 0.017 mg/L, 0.025 mg/L, and 0.049 mg/L respectively. The MCL for Barium is 2 mg/L. For City drinking water the highest result for barium is 0.0595 mg/L from the Ray Street well in 2018.

#### LEAD - COPPER

Lead and copper testing of sources and at-risk residences were conducted in 2021. The highest reading of lead in a home was 5.46  $\mu$ g/L (ppb). The maximum reading for copper was 111  $\mu$ g/L. These results for lead and copper continue to be less than the 15  $\mu$ g/L Action Level for lead and the 1300  $\mu$ g/L Action Level for copper. The lead results, based on City in-home sampling, also continue to qualify our water system as having "Optimized Corrosion Control."

**City drinking water currently meets EPA's drinking water standards for lead and copper.** The EPA standard for lead balances the current understanding of lead health effects against the effectiveness and cost of corrosion control processes. The EPA released new rules for lead and copper testing in December of 2021 which will be effective in October 2024. For more information on the revised lead and copper rule visit the EPA page at <u>www.epa.gov/ground-water-and-drinking-water/review-national-primary-drinking-water-regulation-lead-and-copper</u>

In July of 2018, the City completed its program to remove the remaining lead service lines in the City's water system. In May 2016, the City initiated a project to eliminate the final 486 lead service lines. City records indicate that originally

some 981 homes built during World War II were connected to the City's distribution system with lead alloy pipes. In addition, before lead solder was banned in 1988, it was commonly used to connect copper piping in homes.

Sampling methods require testing water left sitting in lead-containing pipes, including those copper service lines with lead solder, for at least 6 hours. This results in a worst-case scenario for lead to move into the water. The City encourages anyone with this kind of plumbing, drawing water for cooking or drinking purposes, to let water run from the tap until cold before filling their container, especially if the water is to be given to infants or children.

For further information concerning lead in drinking water, you can go to <u>www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/Lead</u>. Or the EPA at <u>www.epa.gov/ground-water-and-drinking-water/basic-information-about-lead-drinking-water</u>

Further information about copper in drinking water can be found at www.doh.wa.gov/CommunityandEnvironment/DrinkingWater/Contaminants/Copper

Drinking water is only one of many potential sources of exposure to lead. An EPA publication titled "Protect Your Family From Lead In Your Home" can be downloaded from <u>www.epa.gov/lead/protect-your-family-lead-your-home</u>.

NITRATE - NITROGEN

The Ray Street Well continues to be monitored quarterly for Nitrate-N. In 2021, the highest accredited lab quarterly result for the Ray Street Well was 3.21 mg/L, or parts per million (ppm). The federal MCL for Nitrate –N is 10 mg/L. The result from a duplicate sample analyzed by the Riverside Park Water Reclamation Facility (RPWRF) Laboratory was 3.27 mg/L. The quarterly results for Ray Street Well for 2021 are as follows:

Sample Date	Accredited Laboratory Result - Nitrate-N, mg/L	RPWRF Laboratory Result – Nitrate+Nitrite-N, mg/L
26-January-2021	2.99	3.27
27-April-2021	3.21	3.16
27-July-2021	2.40	2.31
26-October-2021	2.63	3.18

Table 2 Ray Street Well Nitrate levels

All other City sources average 1.04 mg/L for 2021, less than a fifth of the MCL for nitrate-nitrogen. The 2021 results for the other City source wells are as follows:

Source Well	Accredited Laboratory Result - Nitrate-N, mg/L	RPWRF Laboratory Result – Nitrate+Nitrite-N, mg/L
Well Electric	1.23	1.35
Parkwater	1.40	1.43
Hoffman	1.25	1.32
Grace	0.71	0.81
Nevada	0.79	0.79
Central	0.85	.97
Federal MCL	10	

 Table 3 City Source Well Nitrate levels

The following map depicts the results of monitoring wells sampled during 2021 by the Spokane County Water Resources Program. The results are for nitrate+nitrite as nitrogen from monitoring wells and springs along the Spokane River and purveyor wells over the Spokane Aquifer. Where multiple sampling events occurred at the same location, the highest result is depicted on the map. There are a number of wells that had results between 2.51and 4.99 mg/L. These wells,

including the City of Spokane Ray Street Well, are typically located along the edge of the aquifer and appear to be subject to nitrate loading to the aquifer that originates at higher elevations.



#### Figure 1 Aquifer Nitrate level

For further information concerning nitrate in drinking water and potential health issues, you can access the Washington State Dept. of Health website at <u>www.doh.wa.gov/Portals/1/Documents/Pubs/331-214.pdf</u>. (Para ver información adicional, visite al; <u>www.doh.wa.gov/Portals/1/Documents/Pubs/331-214.pdf</u>)

#### **RADIONUCLIDES & RADON**

#### RADIONUCLIDES

In 2021, the City of Spokane tested the Grace and Well Electric source wells for Radium 228 and Gross Alpha. The table below has the results.

	Gross Alpha Particle Activity	Radium 228	Combined Radium 226/228 *
Grace	< 3	.53	1.5
Well Electric	< 3	1.38	2.88
MCL	15		5

**Table 4 Radionuclide Results** 

All results in picocuries per liter (pCi/L)

Gross Alpha particle activity has an MCL of 15 pCi/L. The federal MCL for Radium 226 and Radium 228 (combined) is 5 pCi/L. The City of Spokane results were below the MCL.

The radionuclide rule allows Gross Alpha results to be used in lieu of Radium 226 if the Gross Alpha particle activity is below 5 pCi/L. If the gross alpha particle activity result is below the detection limit, one-half of the detection limit is used to determine compliance<sup>1</sup>. The radionuclide rule also allows a Gross Alpha particle activity measurement to be substituted for the required uranium measurement provided that the measured gross alpha particle activity does not exceed 15 pCi/l. The Gross Alpha activity was below 15 pCi/L so the City did not test for Uranium.

For more information on radionuclides visit the EPA at <u>https://www.epa.gov/dwreginfo/radionuclides-rule</u>

\* If the Radium 228 or 226 value is <1.0, a value of zero will be used to calculate the Combined Radium 226/228<sup>2</sup>.

#### RADON

# The Water Department monitored the Grace, Nevada, and Well Electric source wells for radon in 2021, with results of 410 pCi/L, 400 pCi/L, and 370 pCi/L respectively.

The Environmental Protection Agency has published a proposed rule for regulating the concentration of radon-222 in drinking water. The rule proposes a maximum contaminant level goal (MCLG) of zero, a maximum contaminant level (MCL) of 300 pCi/L, and an alternative maximum contaminant level (AMCL) of 4000 pCi/L.

Comments for the proposed rule were accepted until February 4, 2000; however no final rule was promulgated and at this time the regulatory action is not on the EPA agenda list.

Currently, water purveyors are required to inform their customers of known results for Radon-222 testing, which the City of Spokane voluntarily monitors.

Radon gas is one of a number of radioactive elements that result from the radioactive decay of uranium found locally in natural deposits. Exposure to excessive amounts of radon may increase cancer risk. Most of these risks result from exposure to radon in indoor air. The EPA has determined that 1-2% of the radon in indoor air comes from drinking water. General information concerning radon in the environment and the associated health issues, including drinking water, can be found at <a href="https://www.epa.gov/radon">www.epa.gov/radon</a> or call the Radon Hotline at *1-800-SOS-RADON* [1-800-767-7236]. An EPA publication titled "A Citizen's Guide to Radon" can be downloaded from <a href="https://www.epa.gov/radon.action.pdf">2016\_a\_citizens\_guide\_to\_radon.pdf</a> (epa.gov) The EPA has published a National Radon Action Plan (<a href="https://www.epa.gov/radon/national-radon-action-plan-strategy-saving-lives">https://www.epa.gov/radon/national-radon-action-plan-strategy-saving-lives</a>) to more broadly mitigate Radon exposure.

<sup>&</sup>lt;sup>1</sup> 40 CFR 141.26a (5)

<sup>&</sup>lt;sup>2</sup> 40 CFR 141.26c (3) v
### ORGANICS

### $DISINFECTION \ By \text{-} PRODUCTS - DISTRIBUTION \ SYSTEM$

The maximum value during 2021 compliance monitoring of the distribution system for total trihalomethanes (TTHM) was 3.78 µg/L and for haloacetic acids (HAA5) was no detection. This is well below the federal MCL of 80 µg/L for total trihalomethanes and 60 µg/L for the sum of five haloacetic acids. The by-products are only detected at the extreme end of the distribution system. The Stage 2 Disinfectants and Disinfection By-products Rule requires a Locational Running Annual Average (LRAA) be used for reporting compliance. This is the average of four quarterly samples for each sampling location. The City uses small amounts of chlorine as a drinking water disinfectant. However, the disinfectants themselves can react with materials in the water to form byproducts, which may pose health risks. The maximum value for TTHM was 3.88 µg/L. Appendix IV has the results for all 2021 quarterly sampling. There were no detections of haloacetic acids at any sampling sites in 2021.



In 2021, two sites were sampled every quarter. They were Eagle Ridge Two and Southview. For more information on the Stage 2 Disinfection and Distribution By-Product Rule (DPBR), go to the EPA website

water.epa.gov/lawsregs/rulesregs/ sdwa/stage2/index.cfm

2021 was the 11th year of sampling under the Stage 2 DPBPR. Starting in 2007 and continuing until 2010, the City Water Department performed assessment monitoring at over 20 locations (approximately five each year) to determine the potential for disinfection by-products (DBP) to be formed during the detention period in the distribution system. The DBP assessment sampling sites were selected from the existing coliform sampling sites. Based on this sampling and analysis of the retention time of water in the distribution system. locations were determined for the Stage 2 distribution system sampling program.

Figure 2 Disinfection Byproduct Monitoring Sites

### VOLATILE ORGANICS

In 2021, the City of Spokane tested the Ray Street and Well Electric well stations for Volatile Organic Compounds (VOC). There were no detections. A complete list of the chemicals analyzed is in Appendix I.

Trihalomethanes (THMs; chloroform, bromoform, bromodichloromethane, dibromochloromethane) are one group of volatile organic compounds in the test panel, disinfection by-products. They can originate from chemical interactions between a disinfectant (chlorine gas in the City's system) and any organic matter present in the raw water. **There were no detections of THMs in source water monitoring for 2021**.

### SYNTHETIC ORGANICS

The City of Spokane sampled the Nevada, Parkwater, Ray Street, and Well Electric wells for Synthetic Organic Chemicals (SOC's) in 2021. There were no detections. The City conducts tests for 74 different chemicals including pesticides, herbicides, PCB, and phthalates (plasticizers). A complete list of chemicals analyzed is in Appendix I.

### PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

The City tested for PFAS under federal testing requirements of UCMR 3 in 2015. UCMR 3 had six PFAS compounds on the list of 30 the chemicals sampled and analyzed. The City had no detections of the PAFS compounds. For information on UCMR 3 with the compound list, reporting limits and health effects visit the EPA at <a href="https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule">www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule</a>.

In January of 2022 the State of Washington adopted rules on the testing of five PFAS compounds with monitoring requirements beginning in 2023. With this rule the state implemented State Action Levels (SAL) for these five PFAS. The SALs provide state public health recommendations for the safe, long term consumption of drinking water, below which there is no known or expected health risk. For more information on the state rule including a list of the PFAS and the SALs visit, <u>www.doh.wa.gov/CommunityandEnvironment/Contaminants/PFAS</u>.

The EPA is also implementing testing for PFAS. UCMR 5 will have 29 PFAS compounds. The sampling and testing is set to begin in 2024. For more information on UCMR 5 and the list of PFAS visit the EPA at <u>www.epa.gov/dwucmr/fifth-unregulated-contaminant-monitoring-rule</u>. The EPA is also developing rules on PFAS. For information on work the EPA is undertaking on PFAS in many areas including drinking water visit the EPA at <u>www.epa.gov/pfas</u>

### MICROBIOLOGICAL CONTAMINANTS

### COLIFORM BACTERIA - SOURCE

The City of Spokane well station raw source water (the water before disinfectant chlorination) has been tested regularly for coliform bacteria. While historically there has been no requirement to test for coliform bacteria in source water, the City has monitored for this water quality parameter. More recently, testing requirements to determine whether hydraulic continuity exists with the Spokane River have increased the testing frequency. In 2021, out of 72 tests for coliform bacteria in the City source water wells, there were no detections of total coliform and no detections of fecal coliform.

Out of 396 tests over the five-year period from 2017 through 2021, two positive total coliform results were found. Prior to the detections in 2020 the last total coliform detection was in 2007. There have been no detections of fecal coliform in the source water during this time frame.

HETEROTROPHIC PLATE COUNT BACTERIA – SOURCE

In 2021, out of 72 Heterotrophic Plate Count (HPC) tests on source water, there were 13 positive results. The greatest concentration was 41colonies per milliliter of sample at the Parkwater well. HPC tests were conducted 358 times over the five-year period from 2017 through 2021 on raw source water. There have been 49 positive HPC results. The maximum detection during this five-year period was 43.5 colonies per milliliter at the Central Well in 2018. Without regard to source water HPC levels, City source water is treated with chlorine to safeguard drinking water quality. This is done based on the historical use of open reservoirs (which no longer exist) and to preserve the sanitary quality when a well or piping is open to the environment during construction, repair or routine maintenance. Some water utilities in this area (drawing from the same aquifer) do not add any disinfectant.

### COLIFORM BACTERIA - DISTRIBUTION SYSTEM

Coliform testing is typically done four days a week from various points in the distribution system. The Water Department has more than 230,000 customers. This population tier<sup>3</sup> requires taking 150 samples per month, which was adopted as the target for distribution system coliform monitoring by the Water Department in 2007. **During 2021, the City Water Department had 1986 coliform bacteria samples analyzed with no detections of coliform bacteria.** 1,994 coliform bacteria samples were analyzed in 2020 and, 1,980 samples were analyzed in 2019.



Figure 3 Coliform Monitoring Sites

<sup>&</sup>lt;sup>3</sup> Ref. WAC 246-290-300 (3)(e-Table 2)

The Water Department staff has worked to refine the sampling sites for the distribution system. Concerns about inadvertent contamination of sampling sites and locations that don't adequately represent the distribution of the water system has caused the Water Department staff to establish more dedicated sampling sites at locations more representative of the entire system. Figure 3 is a map of the distribution system sampling sites during 2021, overlaid on the City's water service area. It is important to note that the sample sites are evenly placed based on the distribution system, which may not currently reach all parts of the water service area, and population density.

### Protozoa

A number of cities and towns throughout the country, in years past, have experienced problems with giardia and/or cryptosporidium getting into the distribution systems. Most times, problems with these parasitic organisms in potable water have been associated with surface water sources. The City is not aware of, nor has the State Department of Health indicated an awareness of, cases where infections with these organisms were traced back to the City's water system.

Please note that cryptosporidium and other water borne organisms can be spread in many ways. People who become ill as a result of consuming giardia and/or cryptosporidium typically recover after suffering severe bouts of diarrhea. However, small children, people whose immune systems are compromised, or those who are otherwise in poor health can die as a result of these infections. For further information concerning the potential health effects issues, access the websites at the CDC at <u>www.cdc.gov/parasites/crypto/index.html</u> (cryptosporidium) and <u>www.cdc.gov/parasites/giardia/index.html</u> (giardia).

### COVID 19

The Washington State Department of Health reports that COVID-19 has not been detected in drinking water. They also state "Chlorine is very effective in killing coronaviruses. COVID-19 is a coronavirus and we (Washington State Department of Health) believe chlorine will be effective in killing COVID-19 as well". The City continuously disinfects all the drinking water before it is distributed to any customer.

For more information on COVID-19 and drinking water follow this link to the Centers for Disease Control and Prevention <a href="http://www.cdc.gov/coronavirus/2019-ncov/php/water.html">www.cdc.gov/coronavirus/2019-ncov/php/water.html</a>

### English:

This report contains important information about the drinking water supplied by the City of Spokane. Translate it, or speak with someone who understands it well.

### Spanish:

Este reporte contiene información importante acerca del agua potable suministrada por la Ciudad de Spokane. Tradúzcalo, o hable con alguien que lo entiende bien. (Para ver información adicional, visite al;

http://espanol.epa.gov/espanol/agua)

### Russian:

В этом отчете содержится важная информация относительно питьевой воды, поставляемой службой города Спокэн. Переведите этот отчет или поговорите с тем, кто его хорошо понимает.

### Vietnamese:

Bản phúc trình này chứa đựng những thông tin quan trọng về nước uống được cung cấp bởi City of Spokane. Hãy phiên dịch, hay hỏi thăm người nào hiểu rõ về tài liệu này.

### GENERAL INFORMATION

Across the nation, the sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and radioactive material and can pick up substances resulting from the presence of animals or human activity.

Contaminants that may be present in source water include:

• Biological contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife.

• Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban storm water run-off, industrial or domestic wastewater discharges, oil and gas production, mining, or farming.

• Pesticides and herbicides, which may come from a variety of sources such as agriculture, storm water run-off, and residential uses.

• Organic chemicals, including synthetic and volatile organics, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban storm water run-off and septic systems.

• Radioactive materials, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the Environmental Protection Agency (EPA) prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. Food & Drug Administration (FDA) regulations establish limits for contaminants in bottled water, which must provide the same protections for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by contacting the Environmental Protection Agency's Safe Drinking Water Hotline (1-800-426-4791), on line at <u>www.epa.gov/your-drinking-water/safe-drinking-water-hotline</u>, or you can access additional

information at EPA website: www.epa.gov/your-drinking-water

### HEALTH INFORMATION

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the Safe Drinking Water Hotline (1-800-426-4791).

Additional information concerning:

<u>Radon:</u> During 2021, the City conducted tests at Grace, Nevada and Well Elctric wells for Radon-222. The results were 410 pCi/L, 400 pCi/L, and 370 pCi/L. The EPA has proposed a MCL of 300 pCi/L, which has not been finalized.

Radon is a radioactive gas that you can't see, taste, or smell and is a known carcinogen. Compared to radon entering the home through soil, radon entering the home through tap water will, in most cases, be a small source of radon in indoor air. Breathing air

containing radon can lead to lung cancer and/or drinking water containing radon also may cause increased risk of stomach cancer. If you are concerned about radon in your home, test the air in your home. Testing is inexpensive and easy. Fix your home if the level of radon in your air is 4 picocuries per liter of air (pCi/L) or higher. There are simple ways to fix a radon problem that aren't too costly. For additional information, call EPA's Radon Hotline (1-800-557-2366) or access the EPA website at <u>www.epa.gov/radon/radonhotlines-and-information-resources</u>

<u>Arsenic:</u> The arsenic readings in 2021 at the Nevada, Parkwater, and Ray Street wells were 2.27, 2.91 and 3.53 ppb respectively. The Maximum Contaminant Level (MCL) for Arsenic is 10 ppb.

City of Spokane drinking water currently meets EPA's revised drinking water standard for arsenic. However, it does contain low levels of arsenic. EPA's standard balances the current understanding of arsenic's possible health effects against the cost of removing arsenic from drinking water. EPA continues to research the health effects of low levels of arsenic, which is known to cause cancer in humans at high concentrations and is linked to other health effects such as skin damage and circulatory problems. Information on arsenic in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline.

<u>Lead:</u> In-home testing for lead was performed in 2021. The City tested 65 at-risk residences for lead. The single highest result was 5.46 ppb. This result for lead is below the 15 ppb Action Level for lead. The lead results, based on City in-home sampling, also continue to qualify our water system as having "Optimized Corrosion Control". Source water is analyzed for lead concurrent with the in-home testing. In 2021 the maximum concentration in the source water testing of all the wells for lead was less than 0.10 ppb.

All remaining known lead service lines in the City's water system were replaced during a program from 2016 to 2018.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The City of Spokane is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your drinking water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline, 1-800-426-4791 or at <a href="https://www.epa.gov/your-drinking-water/basic-information-about-lead-drinking-water">www.epa.gov/your-drinking-water/basic-information-about-lead-drinking-water</a>.

### CITY OF SPOKANE'S SYSTEM

All of the City of Spokane's drinking water comes from the Spokane Valley-Rathdrum Prairie (SVRP) Aquifer - designated a "sole source" aquifer in 1978. The Spokane Aquifer (that portion of the SVRP aquifer lying within Washington State) and the Spokane River exchange water. The rates and locations of exchange are the subject of continued study.

Due to the porous nature of the ground surface and the number of potential contaminant sources, the possibility of contaminating the aquifer exists if good "housekeeping" measures are not followed for all activity over and adjacent to the aquifer. In order to safeguard water quality, the City, in coordination with other stakeholders, is currently implementing a Wellhead Protection Program. This program endeavors to inform the public about the Spokane Valley-Rathdrum Prairie Aquifer, and about appropriate disposal mechanisms for dangerous and/or critical materials that are generated in the Aquifer Sensitive Area. The program is advocating land use regulations to help protect drinking water wells from contamination.

For additional information regarding the City of Spokane's Drinking Water or related issues, you can call:

City of Spokane Water & Hydroelectric Services

509-625-7800

The Mayor recommends Water and Hydroelectric Services policy and rates to the Spokane City Council. The Council meets most Mondays at 6:00 p.m. in the Council Chambers at Spokane City Hall (808 W. Spokane Falls Blvd., Spokane, WA).

### Appendix I - Tests Run on City of Spokane Water

#### FIELD TESTS

Chlorine, Free Residual Conductivity Hardness pH Temperature Turbidity

#### RADIONUCLIDES

Alpha emitters (gross) Radon 222 Radium 228

#### MICROBES

BACTERIA Total Coliform - Before & After Treatment Fecal Coliform - Before & After Treatment Heterotrophic Plate Count - Raw water

#### **DISINFECTION BY-PRODUCTS**

TRIHALOMETHANES Chloroform Bromoform methane, Dibromochloromethane, Bromodichloro-Total Trihalomethanes FIVE HALOACETIC ACIDS (HAA5) acetic Acid, Monochloroacetic Acid, Dichloroacetic Acid, Trichloroacetic Acid, Monobromoacetic Acid, Dibromo-

### GENERAL INORGANICS

Color Conductivity Hardness, Total Total Alkalinity Total Dissolved Solids Turbidity

#### INORGANIC IONS

Ammonia Nitrogen Chloride Cyanide Fluoride Nitrate Nitrogen Nitrite Nitrogen \* Phosphorus Sulfate

### **INORGANIC METALS**

Aluminum Antimony Arsenic Barium Beryllium Cadmium Calcium Chromium Copper Iron Lead Magnesium Manganese Mercury Nickel Selenium Silver Sodium Thallium Zinc

#### **VOLATILE ORGANICS**

Benzene benzene, 1,2,3-Trichlorobenzene, 1.2.4-Trichlorobenzene, 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, Bromobenzene, Butylbenzene, Chlorobenzene. Ethvl benzene, Isopropylbenzene, m-Dichlorobenzene, o-Dichlorobenzene, p-Dichlorobenzene, Propylbenzene, sec-Butylbenzene, tert-Butyl-Butadiene, Hexachloro-Chloride, Carbon Tetra-Chloride, Methylene (aka methane, dichloro) Chloride, Vinyl Chloroform (Freon 20)

# ethane, 1,1,1,2-Tetrachloro-

14-Mar-2022

ethane, 1,1,1-Trichloroethane, 1.1.2.2-Tetrachloroethane, 1,1,2-Trichloroethane, 1,1-Dichloroethane, 1,2-Dichloroethene, 1,1-Dichloroethene, cis-1,2-Dichloroethene, Tetrachloroethene, trans-1,2-Dichloroethene, Trichloromethane, Bromomethane, Bromochloromethane, Chloromethane, Dibromomethane, Dichlorodifluoromethane, Trichlorofluoro- (Freon 11) Naphthalene propane, 1,2,3-Trichloropropane, 1,2-Dichloropropane, 1,3-Dichloropropane, Dibromochloro- (DBCP) propene, 1,1-Dichloropropene, 1,3-Dichloro-Styrene Toluene toluene, o-Chlorotoluene, p-Chlorotoluene, p-Isopropyl-Xylene, m&p-Xylene, o-Xylene, total

#### \* - Typically run by the City's Wastewater Laboratory only

### Appendix I (continued) SYNTHETIC ORGANICS

Acenaphthylene Acifluorfen Adipate, Di-(2-ethylhexyl) Alachlor Aldicarb Aldicarb Sulfone Aldicarb Sulfoxide Aldrin Anthracene Anthracene, Benz(a)-Arochlor 1016 Arochlor 1221 Arochlor 1232 Arochlor 1242 Arochlor 1248 Arochlor 1254 Arochlor 1260 Atrazine Bentazon benzene, Hexachlorobenzoic acid, 3,5-Dichloro-Bromacil Butachlor Carbaryl Chlordane

Chrysene D, 2,4-Dalapon DB, 2,4-DCPA (Dacthal) DDD, 4,4-DDE, 4,4-DDT, 4,4-Diazinon Dicamba Dichlorprop Dieldrin Dinoseb Endrin EPTC Ethylene Dibromide Fluoranthene, Benzo(b) Fluoranthene, Benzo(k) Fluorene furan, Carbo-Glyphosate Heptachlor Heptachlor Epoxide Lindane

Methomyl Methoxychlor Metolachlor Metribuzin Molinate Oxamyl pentadiene, Hexachlorocyclophenol, Pentachlorophenyls, Polychlorinated Bi- (PCB, total Arochlor) phthalate, Butylbenzylphthalate, Di-(2-Ethylhexyl)phthalate, Di-n-Butylphthalate, Diethyl phthalate, Dimethyl-Picloram Propachlor Pyrene pyrene, Benzo a-Simazine T, 2,4,5-Terbacil Toxaphene TP, 2,4,5-Trifluralin

\* - Typically run by the City's Wastewater Laboratory only

Appendix II - Annual Testing Summary - Tests Run o	on City of Spokane W	ater				14-Mar-2022		
2021 DRINKING WATER SOURCE	E - COMPLET	FD OLIARTE	RI V MONITO	DRING				
		LD QUIRTL						
	SOURCE #	8	6	5	1	3	4	2
	WELL	CENTRAL	GRACE	HOFFMAN	NEVADA	PARKWATER	RAY STREET	WELL ELECTRIC
BACTERIA		obivitions	Giulon	norman	1.2.111211	THUL WITHIN	iun onebi	in EEE EEE of Inde
COLIFORM - RAW SOURCE *								
Total Coliform -number of samples per year / number of positive de	tections	9 / 0	6 / 0	5 / 0	7 / 0	12 / 0	8 / 0	24 / 0
E. coli - number of samples per year / number of positive detections		9 / 0	6 / 0	5 / 0	7 / 0	12 / 0	8 / 0	24 / 0
HETEROTROPHIC PLATE COUNT - RAW SOURCE *		0.400	6.11	5.40	2 / 1	12/44	0./1	24.72
number of samples per year / greatest result value		9729	6 / 1	5/0	7/1	12/44	8/1	24/3
* All operating wells are typically sampled once per month								
INORGANIC								
FULL LIST- ACCREDITED LAB (phase II & V included)	3rd Qtr - Jul				completed-see App. III	completed-see App. III	completed-see App. III	
					1 11			
NITRATE	1st Qtr - Jan						2.99	
	2nd Qtr - April						3.21	
	3rd Qtr - Jul	0.85	0.71	1.25	0.79	1.4	2.4	1.23
	4th Qtr - Oct						2.63	
NITRATE + NITRITE - RPWRF LAB	1st Qtr - Jan						3.00	
	2nd Qtr - April						3.20	
	3rd Qtr - Jul	0.97	0.81	1.32	0.79	1.43	2.58	1.35
	4th Qtr - Oct						2.77	
ORGANIC								
	1.0.1							
VOLATILES	Ist Qtr - Jan						no detections	
(including TRIHALOMETHANES)	2nd Qtr - April							
	3rd Qtr - Jul							no detections
	4th Qtr - Oct							
SYNTHETIC OP GANICS (515.1, 525.2, 531.1)	1st Otr. Jan							
STNTHETIC ORGANICS (515.1, 525.2, 551.1)	1 st Qui - Jan							
	2nd Qur - April				1	1	1	1
	3rd Qtr - Jul				no detections	no detections	no detections	no detections
	4th Qtr - Oct							
DADIOACTIVE CONTANDIANTS								
RADIOACTIVE CONTAMINANTS	2nd Ota Annil							
Raulull 220 - DCI/L,	2nd Otr April							
Dioss Alpila - pC/L Radon - pC/L	2nd Qu - April		410		400			370
Radon - pCr/L Radium 228 - nCi/L	3rd Otr - Jul		0.53		+00			1 38
Gross Alpha - pCi/I	3rd Otr - Jul		< 3					< 3
Podon DCi/	2rd Otr Jul		~ 3					~ 3
Radon - pCi/L	sra Qtr - Jui		l			1		

### CITY OF SPOKANE

### DRINKING WATER INORGANICS SUMMARY

MOST RECENT WELL STATION MONITORING ANALYTICAL RESULTS ACCREDITED LABORATORIES

								Levels	Goals				
WELL STATION	CENTRAL	ELECTRIC	GRACE	HOFFMAN	NEVADA	PARKWATER	RAY	MCL's**	MCLG's	MEAN	MAX	MIN	COUNT
SAMPLING DATE	23-Jul-2019	23-Jul-2019	28-Jul-2020	28-Jul-2020	27-Jul-2021	27-Jul-2021	27-Jul-2021						
LABORATORY	(Anatek)												
ALKALINITY	111	123	83.5	123	84	138	150	unregulated		116	150	83.5	7
HARDNESS (as CaCO3) #	127	133	87.1	126	102	153	197	unregulated		132	197	87.1	7
CONDUCTIVITY (µmos/cm)	248	275	195	280	228	346	431	700 t		286	431	195	7
TURBIDITY (NTU)	0.152	0.156	0.205	0.228	0.185	0.162	0.176	1 t		0.181	0.228	0.152	7
COLOR (color units)	< 5.00	< 5.00	< 5	< 5	< 5.00	< 5.00	< 5.00	15 s			< 5.00	< 5.00	7
CHLORIDE	4.62	5.33	5.52	7.1	5.68	7.86	19.6	250 s		8.0	19.6	4.62	7
TOT. DISSOLVED SOLIDS	101	89	221	280	91	190	212	500 s		169	280	89	7
MAGNESIUM	13.6	13.8	7.7	14.3	807	15.1	13.9	unregulated		11.2	15.1	7.7	7
CALCIUM	25.8	30.8	23.5	30	24.2	34.2	46.7	unregulated		31	46.7	23.5	7
ORTHO-PHOSPHATE	not tested	unregulated		N/A	N/A	N/A	0						
AMMONIA	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	unregulated			< 0.02	< 0.02	7
CYANIDE	< 0.05	< 0.05	< 0.01	< 0.01	< 0.005	< 0.005	< 0.005	0.2	0.2		< 0.05	< 0.005	7
FLUORIDE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	2 s	4		< 0.1	< 0.1	7
NITRATE (NO3-N)	0.88	1.46	0.65	1.39	0.789	1.4	2.4	10	10	1.28	2.4	0.645	7
NITRITE (NO2-N)	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1	1		< 0.1	< 0.1	7
SILICA (SI02)	11.7	12.2	12.1	12.3	not tested	not tested	not tested	unregulated		12.1	12.3	11.7	4
SULPHATE	11.5	11.6	6.59	12.5	7.13	13.5	12.7	250 s	400	10.8	13.5	6.6	7
ALUMINUM	< 0.05	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05 - 0.2 s			< 0.05	< 0.01	7
ANTIMONY	< 0.003	< 0.003	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.006	0.006		< 0.003	< 0.001	7
ARSENIC	0.00355	0.00474	0.00264	0.00278	0.00227	0.00291	0.00353	0.010	0	0.0032	0.00474	0.00227	7
BARIUM	0.0216	0.0203	0.0151	0.0243	0.0173	0.025	0.0487	2	2	0.0246	0.0487	0.0151	7
BERYLLIUM	< 0.0003	< 0.0003	< 0.001	< 0.001	< 0.0003	< 0.0003	< 0.0003	0.004	0.004		< 0.001	< 0.0003	7
CADMIUM	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	0.005		< 0.001	< 0.001	7
CHROMIUM	< 0.007	< 0.007	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.1	0.1		< 0.007	< 0.001	7
COPPER	0.00372	0.00627	0.00299	< 0.001	0.0119	0.00312	0.00501	TT	1.3	0.0055	0.0119	0.00299	7
IRON	< 0.1	< 0.1	0.011	0.0149	0.0323	< 0.01	0.065	0.3 s		0.0308	0.065	< 0.01	7
LEAD	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	TT	0		< 0.001	< 0.001	7
MANGANESE	< 0.01	< 0.01	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.05 s			< 0.01	< 0.001	7
MERCURY	< 0.0002	< 0.0002	< 0.0001	< 0.0001	< 0.0001	< 0.0001	< 0.0001	0.002	0.002		< 0.0002	< 0.0001	7
NICKEL	< 0.005	< 0.005	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.1 * * *	0.1 * * *		< 0.005	< 0.001	7
SELENIUM	< 0.002	< 0.002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.05	0.05		< 0.002	< 0.001	7
SILVER	< 0.1	< 0.1	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.1 s			< 0.1	< 0.001	7
SODIUM	2.95	3.69	2.65	3.28	2.81	4.23	8.27	unregulated		4.0	8.27	2.65	7
THALLIUM	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.002	0.0005		< 0.001	< 0.001	7
ZINC	0.00242	0.00175	< 0.001	0.00182	0.00216	0.00127	0.00233	5 s		0.00196	0.00242	0.00127	7

RESULTS ARE IN mg/L EXCEPT WHERE OTHERWISE NOTED

\* TT = Treatment Technique; s = Secondary MCL; t = State only MCL

\* \* Aluminum is a secondary regulated contaminant

\*\*\* The MCL and MCLG for Nickel were remanded on February 9, 1995, monitoring requirements still in effect

# divide by 17.1 to convert to grains per gallon

#### 14-Mar-2022

Maximum Contaminant CURRENT DATA SUMMARY

### Appendix IV - Disinfection Byproducts - Distribution System

Distribution System	Reported 14-Mar-2022		2								
Location Date Organics Lab	Southview 8-Aug-2019 Anatek	Eagle Ridge II 8-Aug-2019 Anatek	Southview 13-Nov-2019 Anatek	Eagle Ridge II 13-Nov-2019 Anatek	Southview 13-Feb-2020 Anatek	Eagle Ridge II 13-Feb-2020 Anatek	Southview 13-May-2020 Anatek	Eagle Ridge II 13-May-2020 Anatek	Southview 12-Aug-2020 Anatek	Eagle Ridge II 12-Aug-2020 Anatek	MAXIMUM CONTAMINANT LEVELS (MCL)
Total Chlorine Residual, mg/L									0.25	0.36	
TRIHALOMETHANES, results micrograms/L											
Chloroform	< 0.5	< 0.5	0.57	0.75	< 0.5	< 0.5	0.54	< 0.2	0.4	< 0.2	
Bromodichloromethane	0.81	< 0.5	1.07	< 0.5	0.88	0.57	0.98	< 0.5	0.92	< 0.5	
Dibromochloromethane	1.34	< 0.5	1.27	0.78	1.11	0.75	1.5	< 0.5	1.48	< 0.5	
Bromoform	0.78	< 0.5	0.66	< 0.5	0.6	< 0.5	0.99	< 0.5	1.02	< 0.5	
TOTAL TRIHALOMETHANES	2.93	0	3.57	1.53	2.59	1.32	4.01	0.7	3.82	< 0.2	80
LRAA	3.16	1.22	2.72	0.84	2.72	0.84	2.72	0.89	3.50	0.89	
HALOACETIC ACIDS (HAA5), results micrograms/L											
Chloroacetic acid	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	
Bromoacetic acid	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Di-Chloroacetic acid	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Tri-Chloroacetic acid	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Di-Bromoacetic acid	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
TOTAL HAA (5)	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	60
Chloro,bromoacetic acid *	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	

### Distribution System Sampling for Disinfection Byproducts

Location Date Organics Lab	Southview 10-Nov-2020 Anatek	Eagle Ridge II 10-Nov-2020 Anatek	Southview 9-Feb-2021 Anatek	Eagle Ridge II 9-Feb-2021 Anatek	Southview 13-May-2021 Anatek	Eagle Ridge II 13-May-2021 Anatek	Southview 11-Aug-2021 Anatek	Eagle Ridge II 11-Aug-2021 Anatek	Southview 10-Nov-2021 Anatek	Eagle Ridge II 10-Nov-2021 Anatek	MAXIMUM CONTAMINANT LEVELS (MCL)
Total Chlorine Residual, mg/L	0.18	0.26	0.26	0.29	0.21	0.37	0.19	0.26	0.19	0.22	
TRIHALOMETHANES, results micrograms/L											
Chloroform	0.57	< 0.2	0.59	< 0.2	0.37	< 0.2	0.2	< 0.2	0.43	0.53	
Bromodichloromethane	1.12	0.67	1.21	0.66	0.8	< 0.5	0.6	<0.5	0.98	0.79	
Dibromochloromethane	1.19	0.66	1.42	0.84	1.27	< 0.5	1.37	<0.5	1.47	0.96	
Bromoform	0.54	<0.5	0.66	< 0.5	0.62	<0.5	1.1	<0.5	0.89	0.5	
TOTAL TRIHALOMETHANES	3.42	1.33	3.88	1.5	3.06	< 0.2	3.27	< 0.2	3.77	2.78	80
LRAA	3.46	0.84	3.78	0.88	3.55	0.71	3.41	0.71	3.5	1.07	
HALOACETIC ACIDS (HAA5),											
results micrograms/L											
Chloroacetic acid	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	
Bromoacetic acid	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Di-Chloroacetic acid	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Tri-Chloroacetic acid	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Di-Bromoacetic acid	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
TOTAL HAA (5)	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	60

Chloro, bromoacetic acid \*

#### Appendix V - Drinking Water Testing Summary for 2021

### **CONTAMINANTS FOUND IN DRINKING WATER TESTING IN 2021**

CITY OF SPOKANE, WATER & HYDROELECTRIC SERVICES

Data presented, if not from 2021, is from the most recent testing done in accordance with the regulations.

SOURCE WATER TESTING CONTAMINANT	Units	Highest Average	Detected Maximum	Detected min.	Number Positive Samples	Number of Samples	MCL	MCLG	MAJOR SOURCES
Arsenic	µg/L	(a)	3.5	2.3	3	3	10	0	Erosion of natural deposits; Runoff from orchards; Runoff from glass and electronics production wastes
Barium	mg/L	(a)	0.05	0.02	3	3	2	2	Erosion of natural deposits; Discharge of drilling waste; discharge from metal refineries
Nitrate	mg/L	(a)	3.21	0.71	10	10	10	10	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
Combined Radium 226 and 228 (b)	pCi/L	(a)	2.9	1.5	2	2	5	0	Erosion of natural deposits
DISTRIBUTION SYSTEM TESTING			Detected	Detected	Number Positive	Number of			
CONTAMINANT	Units	LRAA	Maximum	min.	Samples	Samples	MCL	MCLG	MAJOR SOURCES
Disinfection Byproducts - TTHMs [Total Trihalomethanes]	μg/L	3.78	3.88	1.50	6	8	80	0	By-product of drinking water disinfection
CONTAMINANT		Date sampled	90th Percentile (d)	Number of Sites exceeding AL	Number Positive Samples	Number of Samples	MCL	MCLG	MAJOR SOURCES
Copper (c)	mg/L	Aug-21	0.08	0	64	64	TT, AL= 1.3	1.3	Corrosion of household plumbing systems; Erosion of natural deposits: Leaching from wood preservatives
Lead (c)	μg/L	Aug-21	1.83	0	63	64	TT, AL= 15	0	Corrosion of household plumbing systems; Erosion of natural deposits

Notes

(a) Compliance with MCL is determined by single sample results, so no average is used.

(b) Gross Alpha results were used in lieu of Radium 226, one half of the detection limit of 3.0 was used for the ND

(c) Faucet samples were from 'at risk' homes (those with lead service lines and those with copper pipes with lead solder joints).

(d) 90% of at-risk homes had this concentration, or less, of lead/copper.

(e) Unregulated contaminant monitoring help's EPA to determine where certain contaminants occur and whether the Agency should consider regulating those contaminants in the future

Key to Table AL = Action Level = 1 he concentration of a contaminant which, if exceeded, triggers treatment or other requirement which a water system must follow. LRAA = Locational Running Annual Average

MCL = Maximum Contaminant Level = The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG = Maximum Contaminant Level Goal = The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

pCi/L = picocuries per liter (a measure of radioactivity)

# 6.3 2021 Water Quality Monitoring Schedule Report (current)

Generated on: 09/13/2022



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## Water Quality Monitoring Schedule

System: SPOKANE CITY OF Contact: James S Sakamoto PWS ID: 83100 K Group: A - Comm **Region: EASTERN County: SPOKANE** 

NOTE: To receive credit for compliance samples, you must fill out laboratory and sample paperwork completely, send your samples to a laboratory accredited by Washington State to conduct the analyses, AND ensure the results are submitted to DOH Office of Drinking Water. There is often a lag time between when you collect your sample, when we credit your system with meeting the monitoring requirement, and when we generate the new monitoring requirement.

### **Coliform Monitoring Requirements**

	Sep 2022	Oct 2022	Nov 2022	Dec 2022	Jan 2023	Feb 2023	Mar 2023	Apr 2023	May 2023	Jun 2023	Jul 2023	Aug 2023
Coliform Monitoring Population	244817	244817	244817	244817	244817	244817	244817	244817	244817	244817	244817	244817
Number of Routine Samples Required	150	150	150	150	150	150	150	150	150	150	150	150

- Collect samples from representative points throughout the distribution system.

- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.

- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

### **Chemical Monitoring Requirements**

**Distribution Monitoring** 



Generated on: 09/13/2022

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# Water Quality Monitoring Schedule

Test Panel/Analyte	<u># Samples</u> <u>Required</u>	Compliance Period	<u>Frequency</u>	Last Sample Date	<u>Next Sample Due</u>	
Lead and Copper	50	Jan 2022 - Dec 2024	standard - 3 year	08/05/2021	Aug 2024	
Asbestos	0	Jan 2020 - Dec 2028	waiver - 9 year	10/26/1999		
Total Trihalomethane (THM)	2	Jan 2022 - Mar 2022	reduced - quarterly	08/11/2022		
Total Trihalomethane (THM)	2	Apr 2022 - Jun 2022	reduced - quarterly	08/11/2022		
Total Trihalomethane (THM)	2	Jul 2022 - Sep 2022	reduced - quarterly	08/11/2022		
Total Trihalomethane (THM)	2	Oct 2022 - Dec 2022	reduced - quarterly	08/11/2022	Nov 2022	
Halo-Acetic Acids (HAA5)	2	Jan 2022 - Mar 2022	reduced - quarterly	08/11/2022		
Halo-Acetic Acids (HAA5)	2	Apr 2022 - Jun 2022	reduced - quarterly	08/11/2022		
Halo-Acetic Acids (HAA5)	2	Jul 2022 - Sep 2022	reduced - quarterly	08/11/2022		
Halo-Acetic Acids (HAA5)	2	Oct 2022 - Dec 2022	reduced - quarterly	08/11/2022	Nov 2022	

### Notes on Distribution System Chemical Monitoring

- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.

- Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours (e.g. overnight).

- If you are sampling from a faucet that has hot water, make sure cold water is the last water to run through the faucet before it sits overnight.
- If your sampling frequency is annual or every 3 years, collect samples between June 1 and September 30.

For Asbestos: Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.

For Disinfection Byproducts (HAA5 and THM): Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

### Source Monitoring

For Lead and Copper:

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.

- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.

Source S01	Nevada St - AHC725	Well	Use - Permanent	Susceptility - High	
<u>Test Panel/Analyte</u>	<u># Samples</u>	Compliance Period	<u>Frequency</u>	<u>Last Sample</u>	<u>Next Sample</u>
	<u>Required</u>			<u>Date</u>	<u>Due</u>
Nitrate	1	Jan 2022 - Dec 2022	standard - 1 year	07/26/2022	



# Water Quality Monitoring Schedule

### Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.

- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.

Source S01	Nevada St - AHC7	25	Well	Use - Permanent	Susceptility - High	
<u>Test Panel/Analyte</u>		<u># Samples</u> <u>Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample</u> <u>Date</u>	<u>Next Sample</u> <u>Due</u>
Complete Inorganic	(IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	07/27/2021	Jul 2027
Iron		1	Jan 2020 - Dec 2022	standard - 3 year	07/27/2021	
Volatile Organics (V	OC)	1	Jan 2020 - Dec 2022	standard - 3 year	07/28/2020	
Herbicides		1	Jan 2014 - Dec 2022	waiver - 9 year	07/27/2021	
Pesticides		1	Jan 2014 - Dec 2022	waiver - 9 year	07/27/2021	
Soil Fumigants		0	Jan 2020 - Dec 2022	waiver - 3 year	07/27/2021	
Gross Alpha		1	Jan 2020 - Dec 2025	standard - 6 year	05/24/2022	
Radium 228		1	Jan 2020 - Dec 2025	standard - 6 year	05/24/2022	
Source S02	Well Electric - AHC	996	Well	Use - Permanent	Susceptility - High	
000,00 002						
Test Panel/Analyte		<u># Samples</u> <u>Required</u>	Compliance Period	<u>Frequency</u>	<u>Last Sample</u> <u>Date</u>	<u>Next Sample</u> <u>Due</u>
<u>Test Panel/Analyte</u> Nitrate		<u># Samples</u> <u>Required</u> 1	<u>Compliance Period</u> Jan 2022 - Dec 2022	<u>Frequency</u> standard - 1 year	<u>Last Sample</u> <u>Date</u> 07/26/2022	<u>Next Sample</u> <u>Due</u>
<u>Test Panel/Analyte</u> Nitrate Complete Inorganic	(IOC)	<i># Samples <u>Required</u> 1</i> 1	<u>Compliance Period</u> Jan 2022 - Dec 2022 Jan 2020 - Dec 2028	<u>Frequency</u> standard - 1 year waiver - 9 year	<u>Last Sample</u> <u>Date</u> 07/26/2022 07/26/2022	<u>Next Sample</u> <u>Due</u>
<u>Test Panel/Analyte</u> Nitrate Complete Inorganic Volatile Organics (V	(IOC) 'OC)	<u># Samples</u> <u>Required</u> 1 1 1	<u>Compliance Period</u> Jan 2022 - Dec 2022 Jan 2020 - Dec 2028 Jan 2020 - Dec 2025	<u>Frequency</u> standard - 1 year waiver - 9 year waiver - 6 year	<u>Last Sample</u> <u>Date</u> 07/26/2022 07/26/2022 07/27/2021	<u>Next Sample</u> <u>Due</u>
<u>Test Panel/Analyte</u> Nitrate Complete Inorganic Volatile Organics (V Herbicides	(IOC) 'OC)	<i>♯ Samples</i> <u>Required</u> 1 1 1 1	<u>Compliance Period</u> Jan 2022 - Dec 2022 Jan 2020 - Dec 2028 Jan 2020 - Dec 2025 Jan 2014 - Dec 2022	<u>Frequency</u> standard - 1 year waiver - 9 year waiver - 6 year waiver - 9 year	<u>Last Sample</u> <u>Date</u> 07/26/2022 07/26/2022 07/27/2021 07/27/2021	<u>Next Sample</u> <u>Due</u>
Test Panel/Analyte Nitrate Complete Inorganic Volatile Organics (V Herbicides Pesticides	(IOC) 'OC)	<i># Samples</i> <u>Required</u> 1 1 1 1 1	Compliance PeriodJan 2022 - Dec 2022Jan 2020 - Dec 2028Jan 2020 - Dec 2025Jan 2014 - Dec 2022Jan 2014 - Dec 2022	<u>Frequency</u> standard - 1 year waiver - 9 year waiver - 6 year waiver - 9 year waiver - 9 year	<u>Last Sample</u> <u>Date</u> 07/26/2022 07/26/2022 07/27/2021 07/27/2021 07/27/2021	<u>Next Sample</u> <u>Due</u>
Test Panel/Analyte Nitrate Complete Inorganic Volatile Organics (V Herbicides Pesticides Soil Fumigants	(IOC) 'OC)	<u># Samples</u> <u>Required</u> 1 1 1 1 1 0	Compliance PeriodJan 2022 - Dec 2022Jan 2020 - Dec 2028Jan 2020 - Dec 2025Jan 2014 - Dec 2022Jan 2014 - Dec 2022Jan 2020 - Dec 2022	<i>Frequency</i> standard - 1 year waiver - 9 year waiver - 6 year waiver - 9 year waiver - 9 year waiver - 3 year	<u>Last Sample</u> <u>Date</u> 07/26/2022 07/26/2022 07/27/2021 07/27/2021 07/27/2021 07/27/2021	<u>Next Sample</u> <u>Due</u>
Test Panel/Analyte Nitrate Complete Inorganic Volatile Organics (V Herbicides Pesticides Soil Fumigants Gross Alpha	(IOC) 'OC)	<i># Samples</i> <u>Required</u> 1 1 1 1 1 0 1	Compliance PeriodJan 2022 - Dec 2022Jan 2020 - Dec 2028Jan 2020 - Dec 2025Jan 2014 - Dec 2022Jan 2014 - Dec 2022Jan 2020 - Dec 2022Jan 2020 - Dec 2022Jan 2020 - Dec 2025	<u>Frequency</u> standard - 1 year waiver - 9 year waiver - 6 year waiver - 9 year waiver - 9 year waiver - 3 year standard - 6 year	<u>Last Sample</u> <u>Date</u> 07/26/2022 07/26/2022 07/27/2021 07/27/2021 07/27/2021 07/27/2021 07/27/2021	<u>Next Sample</u> <u>Due</u>



# Water Quality Monitoring Schedule

### Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.

- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.

Source S03	Park Water - AHC	722	Well	Use - Permanent	Susceptility - High	
Test Panel/Analyte		<u># Samples</u> <u>Required</u>	Compliance Period	<u>Frequency</u>	<u>Last Sample</u> <u>Date</u>	<u>Next Sample</u> <u>Due</u>
Nitrate		1	Jan 2022 - Dec 2022	standard - 1 year	07/26/2022	
Complete Inorganic	(IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	07/17/2018	Jul 2027
Volatile Organics (V	OC)	1	Jan 2020 - Dec 2022	standard - 3 year	01/26/2021	
Herbicides		1	Jan 2014 - Dec 2022	waiver - 9 year	07/27/2021	
Pesticides		1	Jan 2014 - Dec 2022	waiver - 9 year	07/27/2021	
Soil Fumigants		0	Jan 2020 - Dec 2022	waiver - 3 year	07/27/2021	
Gross Alpha		1	Jan 2020 - Dec 2025	standard - 6 year	04/21/2020	
Radium 228		1	Jan 2020 - Dec 2025	standard - 6 year	04/21/2020	
a aa <i>i</i>					O	
Source S04	Ray St - AHC/23		Well	Use - Permanent	Susceptility - High	
Source S04 Test Panel/Analyte	Ray St - AHC723	<u># Samples</u> <u>Required</u>	Well <u>Compliance Period</u>	<u>Frequency</u>	Susceptility - High <u>Last Sample</u> <u>Date</u>	<u>Next Sample</u> <u>Due</u>
Source S04 <u>Test Panel/Analyte</u> Nitrate	Ray St - AHC723	<u># Samples</u> <u>Required</u> 1	Well <u>Compliance Period</u> Jan 2022 - Dec 2022	<u>Frequency</u> R&C - 1 year	Susceptility - High <u>Last Sample</u> <u>Date</u> 07/26/2022	<u>Next Sample</u> <u>Due</u>
Source S04 <u>Test Panel/Analyte</u> Nitrate Complete Inorganic	(IOC)	<u># Samples</u> <u>Required</u> 1 1	Well <u>Compliance Period</u> Jan 2022 - Dec 2022           Jan 2020 - Dec 2028	<i>Erequency</i> R&C - 1 year waiver - 9 year	Susceptility - High <u>Last Sample</u> <u>Date</u> 07/26/2022 07/17/2018	<u>Next Sample</u> <u>Due</u> Jul 2027
Source S04 <u>Test Panel/Analyte</u> Nitrate Complete Inorganic Volatile Organics (V	(IOC) (OC)	<u># Samples</u> <u>Required</u> 1 1 1	Well <u>Compliance Period</u> Jan 2022 - Dec 2022           Jan 2020 - Dec 2028           Jan 2020 - Dec 2022	Ose - Permanent <u>Frequency</u> R&C - 1 year         waiver - 9 year         standard - 3 year	Susceptility - High <u>Last Sample</u> <u>Date</u> 07/26/2022 07/17/2018 01/26/2021	<u>Next Sample</u> <u>Due</u> Jul 2027
Source S04 <u>Test Panel/Analyte</u> Nitrate Complete Inorganic Volatile Organics (V Herbicides	(IOC) (OC)	<u># Samples</u> <u>Required</u> 1 1 1 1	Well           Compliance Period           Jan 2022 - Dec 2022           Jan 2020 - Dec 2028           Jan 2020 - Dec 2022           Jan 2014 - Dec 2022	Ose - PermanentFrequencyR&C - 1 yearwaiver - 9 yearstandard - 3 yearwaiver - 9 year	Susceptility - High <u>Last Sample</u> <u>Date</u> 07/26/2022 07/17/2018 01/26/2021 07/27/2021	<u>Next Sample</u> <u>Due</u> Jul 2027
Source S04 <u>Test Panel/Analyte</u> Nitrate Complete Inorganic Volatile Organics (V Herbicides Pesticides	(IOC) (OC)	<u># Samples</u> <u>Required</u> 1 1 1 1 1	Well           Compliance Period           Jan 2022 - Dec 2022           Jan 2020 - Dec 2028           Jan 2020 - Dec 2022           Jan 2014 - Dec 2022           Jan 2014 - Dec 2022	Ose - PermanentFrequencyR&C - 1 yearwaiver - 9 yearstandard - 3 yearwaiver - 9 yearwaiver - 9 year	Susceptility - High <u>Last Sample</u> <u>Date</u> 07/26/2022 07/17/2018 01/26/2021 07/27/2021 07/27/2021	<u>Next Sample</u> <u>Due</u> Jul 2027
Source S04 <u>Test Panel/Analyte</u> Nitrate Complete Inorganic Volatile Organics (V Herbicides Pesticides Soil Fumigants	(IOC) (OC)	# Samples           Required           1           1           1           1           1           1           1           0	Well         Compliance Period         Jan 2022 - Dec 2022         Jan 2020 - Dec 2028         Jan 2020 - Dec 2022         Jan 2014 - Dec 2022         Jan 2014 - Dec 2022         Jan 2020 - Dec 2022	Ose - PermanentFrequencyR&C - 1 yearwaiver - 9 yearstandard - 3 yearwaiver - 9 yearwaiver - 9 yearwaiver - 9 yearwaiver - 3 year	Susceptility - High           Last Sample           Date           07/26/2022           07/17/2018           01/26/2021           07/27/2021           07/27/2021           07/27/2021           07/27/2021	<u>Next Sample</u> <u>Due</u> Jul 2027
Source S04 <u>Test Panel/Analyte</u> Nitrate Complete Inorganic Volatile Organics (V Herbicides Pesticides Soil Fumigants Gross Alpha	(IOC) (OC)	# Samples           Required           1           1           1           1           1           1           0           1	Well         Compliance Period         Jan 2022 - Dec 2022         Jan 2020 - Dec 2028         Jan 2020 - Dec 2022         Jan 2014 - Dec 2022         Jan 2014 - Dec 2022         Jan 2020 - Dec 2022         Jan 2014 - Dec 2022         Jan 2020 - Dec 2025	Ose - PermanentFrequencyR&C - 1 yearwaiver - 9 yearstandard - 3 yearwaiver - 9 yearwaiver - 9 yearwaiver - 9 yearwaiver - 3 yearstandard - 6 year	Susceptility - High           Last Sample           Date           07/26/2022           07/17/2018           01/26/2021           07/27/2021           07/27/2021           07/27/2021           07/27/2021           07/27/2021           07/27/2021           07/27/2021           04/21/2020	<u>Next Sample</u> <u>Due</u> Jul 2027



# Water Quality Monitoring Schedule

### Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.

- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.

Source S05	Hoffman Ave - AH	C728	Well	Use - Seasonal	Susceptility - High	
<u>Test Panel/Analyte</u>		<u># Samples</u> Required	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample</u> Date	<u>Next Sample</u> Due
Nitrate		1	Jan 2022 - Dec 2022	standard - 1 year	07/26/2022	
Complete Inorganic	(IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	07/28/2020	
Volatile Organics (V	OC)	1	Jan 2020 - Dec 2022	standard - 3 year	07/26/2022	
Herbicides		1	Jan 2014 - Dec 2022	waiver - 9 year	10/27/2020	
Pesticides		1	Jan 2014 - Dec 2022	waiver - 9 year	10/27/2020	
Soil Fumigants		0	Jan 2020 - Dec 2022	waiver - 3 year	10/27/2020	
Gross Alpha		1	Jan 2020 - Dec 2025	standard - 6 year	05/24/2022	
Radium 228		1	Jan 2020 - Dec 2025	standard - 6 year	05/24/2022	
Source S06	Grace Ave - AHC7	24	Well	Use - Seasonal	Susceptility - High	
Test Panel/Analyte		<u># Samples</u> Required	Compliance Period	<u>Frequency</u>	<u>Last Sample</u>	<u>Next Sample</u>
Nitrate		<u> </u>			Date	<u>Due</u>
		1	Jan 2022 - Dec 2022	standard - 1 year	<u>Date</u> 07/26/2022	<u>Due</u>
Complete Inorganic	(IOC)	1 1	Jan 2022 - Dec 2022 Jan 2020 - Dec 2028	standard - 1 year waiver - 9 year	<u>Date</u> 07/26/2022 07/28/2020	<u>Due</u>
Complete Inorganic Volatile Organics (V	(IOC) ′OC)	1 1 1	Jan 2022 - Dec 2022 Jan 2020 - Dec 2028 Jan 2020 - Dec 2022	standard - 1 year waiver - 9 year standard - 3 year	<u>Date</u> 07/26/2022 07/28/2020 07/26/2022	Due
Complete Inorganic Volatile Organics (V Herbicides	(IOC) /OC)	1 1 1 1	Jan 2022 - Dec 2022 Jan 2020 - Dec 2028 Jan 2020 - Dec 2022 Jan 2014 - Dec 2022	standard - 1 year waiver - 9 year standard - 3 year waiver - 9 year	<u>Date</u> 07/26/2022 07/28/2020 07/26/2022 10/27/2020	Due
Complete Inorganic Volatile Organics (V Herbicides Pesticides	(IOC) /OC)	1 1 1 1 1 1	Jan 2022 - Dec 2022 Jan 2020 - Dec 2028 Jan 2020 - Dec 2022 Jan 2014 - Dec 2022 Jan 2014 - Dec 2022	standard - 1 year waiver - 9 year standard - 3 year waiver - 9 year waiver - 9 year	<u>Date</u> 07/26/2022 07/28/2020 07/26/2022 10/27/2020 10/27/2020	Due
Complete Inorganic Volatile Organics (V Herbicides Pesticides Soil Fumigants	(IOC) ′OC)	1 1 1 1 1 1 0	Jan 2022 - Dec 2022 Jan 2020 - Dec 2028 Jan 2020 - Dec 2022 Jan 2014 - Dec 2022 Jan 2014 - Dec 2022 Jan 2020 - Dec 2022	standard - 1 year waiver - 9 year standard - 3 year waiver - 9 year waiver - 9 year waiver - 3 year	<u>Date</u> 07/26/2022 07/28/2020 07/26/2022 10/27/2020 10/27/2020 10/27/2020	Due
Complete Inorganic Volatile Organics (V Herbicides Pesticides Soil Fumigants Gross Alpha	(IOC) /OC)	1 1 1 1 1 1 0 1	Jan 2022 - Dec 2022 Jan 2020 - Dec 2028 Jan 2020 - Dec 2022 Jan 2014 - Dec 2022 Jan 2014 - Dec 2022 Jan 2020 - Dec 2022 Jan 2020 - Dec 2025	standard - 1 year waiver - 9 year standard - 3 year waiver - 9 year waiver - 9 year waiver - 3 year standard - 6 year	Date 07/26/2022 07/28/2020 07/26/2022 10/27/2020 10/27/2020 10/27/2020 07/27/2021	<u>Due</u>



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## Water Quality Monitoring Schedule

### Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S08	Central Ave - AHC	726	Well	Use - Permanent	Susceptility - High	
Test Panel/Analyte		<u># Samples</u>	Compliance Period	<u>Frequency</u>	<u>Last Sample</u>	<u>Next Sample</u>
		<u>Required</u>			<u>Date</u>	<u>Due</u>
Nitrate		1	Jan 2022 - Dec 2022	standard - 1 year	07/26/2022	
Complete Inorganic	(IOC)	1	Jan 2020 - Dec 2028	waiver - 9 year	07/26/2022	
Volatile Organics (V	OC)	1	Jan 2020 - Dec 2022	standard - 3 year	01/21/2020	
Herbicides		1	Jan 2014 - Dec 2022	waiver - 9 year	10/27/2020	
Pesticides		1	Jan 2014 - Dec 2022	waiver - 9 year	10/27/2020	
Soil Fumigants		0	Jan 2020 - Dec 2022	waiver - 3 year	10/27/2020	
Gross Alpha		1	Jan 2020 - Dec 2025	standard - 6 year	05/24/2022	
Radium 228		1	Jan 2020 - Dec 2025	standard - 6 year	05/24/2022	



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# Water Quality Monitoring Schedule

Other Information	
Other Reporting Schedules	Due Date
Measure chlorine residuals and submit monthly reports if your system uses continue	bus chlorination: monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community s	ystems only): 07/01/2022
Submit CCR certification form to ODW (Community systems only):	10/01/2022
Submit Water Use Efficiency report online to ODW and to customers (Community a	and other municipal water systems only): 07/01/2022
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers
Special Notes	
None	
Eastern Regional Water Quality Monitoring Contacts	
For questions regarding chemical monitoring:	Stan Hoffman: (509) 329-2132: or Stan.Hoffman@doh.wa.gov
For questions regarding DBPs:	Stan Hoffman: (509) 329-2132 or Stan.Hoffman@doh.wa.gov

For questions regarding coliform bacteria and microbial issues:

# Joseph Perkins: (509) 329-2134 or Joseph.Perkins@doh.wa.gov

### **Additional Notes**

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.

# 6.4 Coliform Monitoring – Bacteriological Plan

# COLIFORM MONITORING PLAN



### CITY OF SPOKANE WATER DEPARTMENT PWS ID # 83100K 914 E. North Foothills Dr. Spokane, WA 99207

24 hour contact phone

509 625-7800

Marlene Feist,	509 625-6505
Utilities Director	mfeist@spokanecity.org
Loren Searl,	509 625-7840
Director - Water & Hydroelectric Department	lsearl@spokanecity.org

### WATER QUALITY LABORATORY City of Spokane Water Department Washington Certified Lab # G861 EPA #01196, WDOH #265 N. 2701 Waterworks Avenue Spokane, WA 99212

Seth McIntosh,	509 742-8154 (office)				
Water system & Hydroelectric Plant Manager	509 847-9415 (mobile)				
	smcintosh@spokanecity.org				
Doug Greenlund,	509 742-8166 (office)				
Water Quality Coordinator	509 720-3716 (mobile)				
	dgreenlund@spokanecity.org				

Version 9.2 - Effective April 26, 2022



### COLIFORM MONITORING PLAN City of Spokane Water Department



# COLIFORM MONITORING PLAN



### CITY OF SPOKANE WATER DEPARTMENT PWS ID # 83100K 914 E. North Foothills Dr. Spokane, WA 99207

24 hour contact phone

509 625-7800

Marlene Feist,	509 625-6505
Utilities Director	mfeist@spokanecity.org
Loren Searl	509 625-7840
Director - Water & HydroElectric Dept.	lsearl@spokanecity.org

### WATER QUALITY LABORATORY City of Spokane Water Department Washington Certified Lab # G861 EPA #WA01196, WDOH #265 2701 North Waterworks Street Spokane, WA 99212

Seth McIntosh,	509 742-8154 (office)
Water System & Hydroelectric Plant Manager	509 847-9415 (mobile)
	smcintosh@spokanecity.org
Doug Greenlund,	509 742-8166 (office)
Water Quality Coordinator	509 720-3716 (mobile)
	dgreenlund@spokanecity.org

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Coliform Monitoring Plan

## System Information

Water Facilities Inventory (2020)

1.	System ID No.	83100 K
2.	System Name	Spokane, City of
3.	County	Spokane
4.	Group	A
5.	Type	Comm.
6.	Primary Contact	James A Sakamoto (Principal Enginner – City of Spokane
	Information	Water & Hydroelectric Dept.)
		914 E. North Foothills Dr.
		Spokane, WA 99207-2794
7.	Owner Name & Mailing	Spokane. City of
	Address	Loren Searl Director
		808 W. Spokane Falls Blvd
		Spokane, WA 99201-3317
8.	Owner No.	000830
9	24 Hour Primary Contact	Primary Contact Daytime Phone: 509 625-7854
<i>_</i> .	Information	Primary Contact Mobile/Cell Phone: 509 590-6791
		Primary Evening Phone:
		Fax: 509 625-7816
		E-mail: lsearl@spokanecity.org
10.	Owner Contact	Owner Davtime Phone: 509 625-7840
	Information	Owner Mobile/Cell Phone:
		Owner Evening Phone: 509 625-7800
		Fax: 509 625-7816
		E-mail: lsearl@spokanecity.org
11.	Satellite Management	Not applicable
	Agency – SMA	
12.	Water System	Agricultural
	Characteristics	Commercial/Business
		Day Care
		Food Service/Foot Permit
		1,000 or more person event for 2 or more days per year
		Hospital/Clinic
		Industrial
		Licensed Residential Facility
		Lodging
		Recreational / RV Park
		Residential
		School
		Other (church, fire station, etc.)
13.	Water System Ownership	City/Town
14.	Storage Capacity	105,176,000
	(gallons)	

### Water Facilities Inventory (con't)

1.	System ID No.	2.	Syst	tem N	ame				3.	(	Count	y					4.	Gr	oup				ļ	5. Type				-
83100K		Spokar	ne, Ci	, City of Spokane A						(	Comm.																	
15	16 Source Name	17				So	1 ource	18 Categ	lory					19 Use		2 0			2 Trea	1 tment			22 Dept h	23	24	Sourc	e Loca	ition
Source Number			Well	Well Field	Well in a Well Field	Spring	Spring Field	Spring in Springfield	Seawater	Surface Water	Ranny/Inf. Gallery	Other	Permanent	Seasonal	Emergency	Source Metered	None	Chlorination	Filtration	Fluoridation	Irradiation (UV)	other	Depth to first open interval in feet	Capacity (gallons per mnute)	M, M Section	Section Number	Township	Range
001	Nevada St. – BIX501		х										х			Y							122	31000	NE NE	08	25N	43E
002	Well Electric – AHC996, AHC 995		х										х			Y							50	39160	NW NE	11	25N	43E
003	Parkwater – ANC722, AHC999, BIX566, AHC998		х										х			Y							126	62500	NE SE	11	25N	43E
004	Ray St. – ABR602, AHC723		х										х			Y							75	21550	SE NW	22	25N	43E
005	Hoffman Ave. – ABR552, AHC728		х											х		Y							235	5460	NW NE	04	25N	43E
006	Grace – AHC724		х											х		Y							124	19000	NE NE	08	25N	43E
007	Inactive 11/15/2001 Baxter – AHC726		х											х		Y							126	2600	SE NE	03	25N	43E
008	Central Ave. – BIX502, AHC726		х										х			Y							272	16800	NE NE	31	26N	43E
009	Inactive 04/07/195 Indian Canyon – AHC729		х											х		Y							60	1450	SW SE	14	25N	42E
010	Inactive 08/23/1995 SIA 1 (abandon)		х											х		Y							367	500	SE SE	29	25N	42E

### Infrastructure Inventory

### FACILITY NAME

TYPE

### **LOCATION**

<b>Booster Stations</b>		
14th & Grand	Booster Station	1330 S. Grand Blvd
35th & Ray	Booster Station	3444 S. Ray St
9th & "E"	Booster Station	3230 W. 9th Ave
9th & Pine	Booster Station	24 E. 9th Ave
Abbott	Booster Station	2505 S. Abbott Rd
Belt Street	Booster Station	2202 W. Holyoke Ave
Bishop Court	Booster Station	1011 W. Bishop Ct
Cedar Hills	Booster Station	4920 S. Lincoln Way
Division-Manito	Booster Station	3519 W. Manito Blvd
Eagle Ridge	Booster Station	202 W. Eagle Ridge Blvd
Eagle Ridge II	Booster Station	1200 W. Eagle Ridge Blvd
Five Mile	Booster Station	6910 N. Belt St
Garden Park	Booster Station	2403 E. 37th Ave
Glennaire incl. Annex	Booster Station	4311 E. 57th Ave
Indian Hills	Booster Station	4225 W. Indian Trail Rd
Latah	Booster Station	12th Ave and Chestnut St
Lincoln Heights	Booster Station	2308 S. Ray St
Milton	Booster Station	2722 W. 15th Ave
Kempe	Booster Station	9211 N. Five Mile Rd.
Shawnee	Booster Station	4400 W. Shawnee Ave
Southview	Booster Station	5601 S. Savannah
Spotted Rd	Booster Station	7512 W. Westbow
Sunset	Booster Station	4001 W. Canyon Dr (extended)
Thorpe Rd	Booster Station	3302 W. Thorpe Rd
Woodridge	Booster Station	10002 N. Wieber Dr
Storage		
14th & Grand Standpipe	Reservoir	1330 S. Grand Blvd
33rd & Lamonte Elevated Tank	Reservoir	3216 S. Lamonte St
9th & Pine	Reservoir	8 E. 9th Ave
Browne Park #1	Reservoir	4327 E. 57th Ave
Browne Park #2	Reservoir	4327 E. 57th Ave
Cedar Hills	Reservoir	5202 S. Lincoln Way
Eagle Ridge	Reservoir	1200 W. Eagle Ridge Blvd

Coliform Monitoring Plan

Eagle Ridge II	Reservoir	1000 W. Copper Ridge Blvd
Five Mile	Reservoir	2130 W. Woodside Ave
Garden Park	Reservoir	2403 E. 37th Ave
Glennaire #1	Reservoir	5603 S. Savannah
Glennaire #2	Reservoir	5603 S. Savannah
Highland Standpipe	Reservoir	3103 W. 21st Ave
Indian Hills	Reservoir	4005 W. Hiawatha Dr
Indian Trail	Reservoir	4546 W. Strong Rd
Kempe	Reservoir	3702 W. Hawthorne Rd.
Lincoln Heights #1	Reservoir	2418 S. Ray St
Lincoln Heights #2	Reservoir	2418 S. Ray St
Mallen Hill	Reservoir	7922 S. Thomas Mallen Rd
Midbank Standpipe	Reservoir	3502 W. Excell Ave
North Hill	Reservoir	4701 E. Valley Springs Rd
Qualchan Hills	Reservoir	4910 S. Lincoln Blvd
Rockwood Vista	Reservoir	1024 Southeast Blvd
Shadle Park	Reservoir	4404 N. Belt St
Shawnee #1	Reservoir	10002 N. Wieber Dr
Shawnee #2	Reservoir	10002 N. Wieber Dr
SIA #1 Standpipe	Reservoir	3726 S. Little
SIA #2 Standpipe	Reservoir	3725 S. Little
Southview	Reservoir	5726 S. Savannah
Strong Rd Standpipe	Reservoir	2216 W. Strong Rd
Sunset	Reservoir	4001 W. Canyon Dr
Thorpe Rd	Reservoir	3302 W. Thorpe Rd
West Drive	Reservoir	812 S. West Dr
Woodridge	Reservoir	10600 N. Wieber Dr
Well Stations		
Central Ave	Well Station	5903 N. Normandie St
Grace Ave	Well Station	1024 E. North Foothills Dr
Hoffman Ave	Well Station	2109 E. Hoffman Ave
Nevada St	Well Station	2728 N. Nevada St
Parkwater	Well Station	5317 E. Rutter Ave
Ray Street	Well Station	607 S. Ray St
Well Electric	Well Station	2701 N. Waterworks St

# Source Well Details and Distribution System Characterization from 2020 WRI accessed November 2, 2020

	Active Service Connections	DOH calculation
25. Single Family Residence		
A. Full Time Single Family Residences (Occupied 180 days or more per year)	70652	73449
B. Part Timer Single Family Residences (Occupied less than 180 days per year)	0	
26. Multi-Family Residential Buildings		
A. Apartment Buildings, condos, duplexes, Dorms	0	
B. Full Time Residential Units in the Apartment Buildings, condos, duplexes, Dorms that are occupied more than 180 days/year	2797	
C. Part Time Residential Units in the Apartment Buildings, condos, duplexes, Dorms that are occupied less than 180 days/year	0	
27. Non-Residential Connections		
A. Recreational Services and/or Transient Accommodations	0	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	11172	11172
28. Total Service Connections		84621

29. Full-Time Residential Population								
A. How many residents are serviced by this system 180 or more days per year?								
30. n/a								
31. n/a								
32. n/a								

### Number of Routine Samples Required Monthly by Regulation\*:

33. Routine Coliform Schedule	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	150	150	150	150	150	150	150	150	150	150	150	150

The statutory requirement is 150 samples per month (WAC 246-290-300 (3)(c)(i) & Table 1) for the population cited in our 2016 Comprehensive Plan (see line 29, above) at 227,505 and the range for this category is 220,001 - 320,000.

In an abundance of caution, the City has followed a policy for many years of obtaining no less than 150 samples per month (when 120 was required) and typically targeting 165 samples per month.

### Number of Sample Sites Needed to Represent the Distribution System:

55 sampling sites are active and sited to adequately characterize the distribution system and population weighted to characterize pressure zones.

### **Laboratory Information**

Coliform sampling will typically be conducted by City of Spokane Water Dept. Staff, and coliform analysis will typically be conducted by the City of Spokane Water Quality Laboratory. In the event that additional and/or alternative analytical capacity is deemed necessary, contact Anatek Labs, Inc (currently under contract to the City).

Contact information:

City of Spokane Water Dept. – Water Quality Laboratory 2701 N. Waterworks Spokane, WA 99212 Call in order listed						
Doug Greenlund, Water Quality Coordinator	509 742-8166 (wk)	509 922-6517 (hm)	509-720-3716 (cell)			
Kris Graf, Laboratory Analyst	509 742-8161 (wk)	509 236-2359 (hm)	509 435-3746 (cell)			

Anatek Labs, Spokane (02-28-2017) 504 E Sprague, Ste D Spokane, WA 99202					
(509) 838-3999 (509) 838-4433 (fax) <u>Spokane@AnatekLabs.com</u> Call in order listed:					
Kathy Sattler, Lab Manager	509 838-3999 (wk)	509 926-4701 (hm)	509-879-4797 (cell)		
Karice			509 991-0750 (cell)		

### **Routine Coliform Monitoring**

### Routine Sample Sites (Number / Site Name-characteristic/Pressure System)

(Strike-through designates indefinitely out of service)

Site No.	Site Name	Local Connection	Pressure System
1	Lincoln Heights – new booster station, sample tap on each pump (5)	station service	Intermediate
2	35 <sup>th</sup> and Ray – sink in the 35 <sup>th</sup> and Ray Booster Station	station service	High
3	Glennaire – designated sample tap	transmission main	Southview
4	Southview – designated sample tap	transmission main	Southview
5	Brown Park – designated sample tap	transmission main	Тор
6	Garden Park- new booster station, sample tap on each pump (3)	transmission main	High
7	33 <sup>rd</sup> and Lamonte – dedicated sample tap in valve room at 33 <sup>rd</sup> and Lamonte tank.	transmission main	High
8	Division and Manito – designated tap downstairs	transmission main	High
9	14 <sup>th</sup> and Grand – dedicated sample tap (continuous running) at sink in 14 <sup>th</sup> and Grand Booster Station	station service	Intermediate
10	9 <sup>th</sup> and Pine – dedicated sample tap (continuous running) at sink in 9 <sup>th</sup> and Pine Booster Station	station service	Intermediate
11	Rockwood – designated sample tap	transmission main	Low
12	North Hill – designated sample tap at 4-way valve	transmission main	North Hill
13	5 Mile – sample tap on each pump (5)	station service	North Hill
14	Belt – continuously running copper tap	station service	North Hill
15	Midbank – sample station	transmission main	Midbank
16	Strong Road – sample station	transmission main	5-Mile
17	Indian Trail designated sample tap		North Hill
18	Shawnee – designated sample tap	transmission main	Shawnee
19	Woodridge – designated sample tap		Woodridge
20	Assembly and Dalke (actual location at Park View Lane & Regency) – sample station	transmission main	Low
21	BPA – sample station * *		Northwest Terrace
<del>22</del>	Shadle Park designated sample tap		Low
23	Mallen – designated sample tap	transmission main	West Plains
24	Geiger Heights designated sample tap		Geiger

Coliform Monitoring Plan

25	Spotted – bathroom sink	station service	SIA
26	SIA – designated sample tap	transmission main	SIA
27	Abbott – bathroom sink	station service	Geiger
28	Sunset Reservoir – designated sample tap	transmission main	Highland
29	Milton – designated sample tap	transmission main	Low
30	Highland – sample station	transmission main	Highland
31	Cedar Hills – designated sample tap at 4-way valve	transmission main	Cedar Hills
32	Qualchan – designated sample tap at 4-way valve	transmission main	Cedar Hills
33	Eagle Ridge I – designated sample tap	transmission main	Eagle Ridge 2
34	Eagle Ridge II – designated sample tap	transmission main	Eagle Ridge 2
35	Thorpe – bathroom sink	station service	Low
36	Latah – designated sample tap	transmission main	Low
37	Northside Landfill-scale house sink (out of service 5/2013)		Northwest Terrace
38	Yards – designated sample tap in Meter building	station service	Low
39	Central- bathroom sink ***	station service	North Hill
<b>40</b>	Wastewater designated sample tap in janitor's		
41	NW Boulevard Sample Station (out of service 5/2013)		Low
42	Cedar Springs – Sample Station (service for Cedar Springs Estate III)	customer service	North Hill
43	Manito Golf- Sample Station	customer service (P.U.D.)	Тор
44	Regal off 57 <sup>th</sup> - Sample Station	customer service	Тор
45	Artisan- Sample Station	customer service	Тор
46	Sand Ridge - Sample Station	customer service	Low
47	5 <sup>th</sup> and Ray- Sample Station	customer service	Low
48	N. River Drive- Sample Station		Low
49	Olive Road- Sample Station		Low
50	Westview Court- Sample Station		North Hill
51	Ash at Safeway- Sample Station		Low
52	Strong and Cedar- Sample Station		Five Mile
53	Barnes at Indian Trail- Sample Station		North Hill
54	Buckeye and Custer- Sample Station		Low
55	Airport Way- Sample Station		SIA
56	Freya-North – Sample Station		North Hill
57	Lidgerwood – Sample Station		North Hill

Coliform Monitoring Plan
58	Wellesley & Belt – Sample Station		North Hill
59	Cowley – Sample Station		Intermediate
60	Broadway and Havana – Sample Station *		Low *
61	Fairview and Dearborn - Sample Station *		North Hill *
62	Kempe (formerly N. Five-Mi. Prairie) – designated sample tap		North Hill
63	VA Hospital – Sample Station		Low
64	Oxford – Sample Station		Northwest Terrace
65	Hwy 902 and Craig Road – Sample Station	transmission main	West Plains
	* CT6 sites-Well Electric/Parkwater only, not distribution system monitoring		
	* * BPA Easement for Disinfection Byproducts sampling only		
	* * * Central Well Station not sampled for regulatory reporting. It is sampled monthly as part of our source water screening.		
	Strike-through designates indefinitely out of service		

## **Routine Monitoring Rotation Schedule**

Week	Monday	Tuesday Wednesday		Thursday
1 Comprehensive sampling on Monday & Tuesday of the 1 <sup>st</sup> full week of the month. Covers all sampling sites and includes Heterotrophic Plate Count testing for each site	Yards, Buckeye and Custer, North Hill, Cedar Springs, Lidgerwood, Westview Court, Belt, 5-Mile, Strong and Cedar, Strong Tank, Midbank, Barnes at Indian Trail, Shawnee, Woodridge, Oxford, Kempe, Assembly & Dalke, VA Hospital, Sand Ridge	5th and Ray, Lincoln Heights, 35 <sup>th</sup> and Ray, Artisan, Garden Park, 33 <sup>rd</sup> and Lamonte, Division and Manito, Manito Golf, Regal off 57 <sup>th</sup> , Glennaire, Southview, 14 <sup>th</sup> and Grand, Rockwood, 9 <sup>th</sup> and Pine, Brown	N. River Drive, Olive Rd., Mallen, SIA, Airport Way, Spotted, Abbott, Sunset, Thorpe, Milton, Highland, Latah, Eagle Ridge I&II, Qualchan, Cedar Hills,	Yards, North Hill, Cedar Springs, Westview Court, Belt, 5-mile, Barnes at Indian Trail, Milton, Latah, Thorpe, Manito Golf
2	N. River Drive, Olive Road, Yards, Buckeye and Custer, Cedar Springs, Westview, Strong and Cedar, 5-mile, Belt, Barnes, Assembly & Dalke, VA Hospital, Ash at Safeway, Sand Ridge	5th and Ray, Lincoln Heights, 35 <sup>th</sup> and Ray, Artisan, Garden Park, 33 <sup>rd</sup> and Lamonte, Division and Manito, Manito Golf, Regal off 57 <sup>th</sup> , 14 <sup>th</sup> and Grand, Rockwood, 9 <sup>th</sup> and Pine	Yards, North Hill, Cedar Springs, Westview Court, Belt, 5-mile, Barnes at Indian Trail, Milton, Latah, Thorpe, Manito Golf (Week 2 and 4 only- Airport Way and Mallen)	
3	N. River Drive, Olive Road, Yards, Buckeye and Custer, Cedar Springs, Westview, Strong and Cedar, 5-mile, Belt, Barnes, Assembly & Dalke, VA Hospital, Ash at Safeway, Sand Ridge	5th and Ray, Lincoln Heights, 35 <sup>th</sup> and Ray, Artisan, Garden Park, 33 <sup>rd</sup> and Lamonte, Division and Manito, Manito Golf, Regal off 57 <sup>th</sup> , 14 <sup>th</sup> and Grand, Rockwood, 9 <sup>th</sup> and Pine	Yards, North Hill, Cedar Springs, Westview Court, Belt, 5-mile, Barnes at Indian Trail, Milton, Latah, Thorpe, Manito Golf (Week 2 and 4 only- Airport Way and Mallen)	
4	N. River Drive, Olive Road, Yards, Buckeye and Custer, Cedar Springs, Westview, Strong and Cedar, 5-mile, Belt, Barnes, Assembly & Dalke, VA Hospital, Ash at Safeway, Sand Ridge	5th and Ray, Lincoln Heights, 35 <sup>th</sup> and Ray, Artisan, Garden Park, 33 <sup>rd</sup> and Lamonte, Division and Manito, Manito Golf, Regal off 57 <sup>th</sup> , 14 <sup>th</sup> and Grand, Rockwood, 9 <sup>th</sup> and Pine	Yards, North Hill, Cedar Springs, Westview Court, Belt, 5-mile, Barnes at Indian Trail, Milton, Latah, Thorpe, Manito Golf (Week 2 and 4 only- Airport Way and Mallen)	

Routine sample monitoring is typically the same pattern each month. The following table identifies the daily sampling rotation for a typical month.

#### **Routine Reporting**

#### Sample Logs

Weekly laboratory logs are generated using Microsoft Excel 2007 and are saved with the format "MM-DD-YY.xlsm" (MM designates month, DD designates day, YY designates last two digits of the year, file designation "xlsm" is an macro-enabled Excel Workbook ). Each coliform sample is logged into this spreadsheet with a unique identifier. These sample numbers are generated from the first day of each year with the format 265Y0001 (265 designating DOH, Y is the second digit from the year, (i.e 6 is the year 2016), 0001 the first number of an ongoing sequence).

Each week, on Friday (or before if coliform monitoring is completed for that week), regulatory samples are copied to a regulatory-only sample log. The regulatory only sample log is saved as "MM-DD-YY\_XX.xlsx (XX designates the number of regulatory samples in that specific weekly log). The file type "xlsx" is a macro-disabled file format.

This regulatory-only Excel sheet is emailed as an attachment to the DOH designated recipient for data entry: DOH EPH DW Data Entry at ODWdataentry@DOH.WA.GOV

#### Archive

The weekly log Excel spreadsheet is moved to the archive section of the lab computer. This computer is not hardwired to any outside network. The archive is also saved daily to an archive hard drive and saved on Fridays (typically) onto a flash drive which always leaves the site with the Water Quality Coordinator (or designee).

# Unsatisfactory Routine Coliform Sample

#### **Response Action**

(requirements of Revised Total Coliform Rule (RTCR) and Groundwater Rule (GW)

Routine Coliform Monitoring sample is unsatisfactory:	<ul> <li>If result is Total Coliform positive and <i>E. Coli</i> negative:</li> <li>advise DOH-ERO Drinking Water Office,</li> <li>notify Director of City of Spokane Water Department,</li> <li>notify appropriate consecutive system(s).</li> </ul>			
	<ul> <li>If result is Total Coliform positive and <i>E. Coli</i> positive:</li> <li>DOH-ERO Drinking Water Office must be notified,</li> <li>notify Director of City of Spokane Water Department,</li> <li>notify appropriate consecutive system(s).</li> </ul>			
Resample within 24 hours:				
<ul> <li>RTCR - Identify the five connections upstream and five connections downstream from the sample site with the unsatisfactory sample (see Appendix II), and;</li> <li>GW - Identify the pressure zone for the sample site with the unsatisfactory sample. Identify every source pump directly contributing to this pressure zone during the previous 4 days and every booster pump contributing to this same pressure zone (see Appendix III).</li> </ul>	<ul> <li>Within 24 hours of unsatisfactory sample result obtain one sample from the original sample site, one sample from the set of five upstream connections and one sample from the set of five downstream connections.</li> <li>If possible, priority would be given to sites with at-risk populations (i.e. nursing homes, day cares, medical facilities, etc.).</li> <li>Every contributing source well station to be sampled for raw (unchlorinated) water.</li> <li>All samples must be analyzed for total coliform <u>and E. coli</u> If total coliform present, further escalated sampling to be determined in consultation with DOH. If coliform absent, no further sampling.</li> </ul>			
If all samples were coliform absent, no further sampling. Return to normal monitoring.	If coliform present, continue repeat sampling in consultation with DOH- DOW ( see page 16 – Coliform Contamination.			

#### If one or more repeat sample(s) is(are) unsatisfactory: If any repeat sample result is Total Coliform If any sample result is Total Coliform present and present and all samples are E. Coli absent: any sample(s) is(are) E. Coli present: advise DOH-ERO Drinking Water Office, • If any repeat TC+ sample is also EC+, then the EC+ sample result must be reported to the state notify Director of City of Spokane Water • by the end of the day that the PWS is notified Department, by the end of the day. This is an *E. coli* MCL notify appropriate consecutive system(s) violation. (see page 18). DOH-ERO Drinking Water Office must be The PWS must collect another set of repeat • notified. samples, unless an assessment has been notify Director of City of Spokane Water triggered and the PWS has notified the Department, state notify appropriate consecutive system(s) (see page 19). Level 1 Assessment must be conducted when Level 2 Assessment must be conducted when there more than 5% of the routine and repeat samples is an E. coli MCL violation. are total coliform present. (see Appendix IV for assessment form) (see Appendix V for assessment form, assessment must be conducted by a state approved individual). (A Level 1 Assessment must be conducted if (A Level 2 Assessment must be conducted if there there is a failure to collect the 3 repeat samples is a second Level 1 treatment technique trigger following a coliform present routine sample) within a rolling 12-month period). Note: An E. coli MCL violation can occur four ways: A total coliform-present repeat sample follows an E. coli-present routine sample. An E. coli-present repeat sample follows a total coliform-present routine sample. The lab fails to test a total coliform-present repeat sample for E. coli. A system fails to take 3 repeat samples following an E. coli-present routine sample.

#### **Confirmed** Coliform Present - Results Evaluation and Assessment Needs

## <u>Assessor</u>

Assessments will be conducted by a designee of Loren Searl. Currently the Assessor will be:

Seth McIntosh, WDM-3 Water System and Hydroelectric Plant Manager

Water Distribution Manager 3 Cert. 11751

# **Public Notification**

Violations and Public Notice			
Tier 1 (24 hrs)	Confirmed E. coli present or failure to take repeat		
	samples after E. coli present both trigger Public		
	Notification, a Level 2 assessment and corrective		
	Action		
Tier 2 (30 days)	Required for a treatment technique violation (for failure		
	to conduct assessment or corrective action).		
	(Non-acute Total Coliform violation under previous rule		
	is no longer applicable)		
Tier 3 (1 year) - Monitoring &	Monitoring violation		
Reporting Violations	• System fails to collect all required routine samples.		
	• Routine total coliform-positive; sample not tested for		
	E. coli.		
	Reporting violation		
	System fails to submit a monitoring report or completed		
	assessment form in a timely manner.		
	• System fails to notify us of an E. coli-positive sample		
	in a timely manner.		
	• • Seasonal system fails to submit certification of		
	completion of approved start-up procedure.		

See Emergency Notification Flow Chart for contact information. Typically, contact with Steve Burns will initiate notification to Wash. St. Dept. of Health-Office of Drinking Water for Tier 1 and Tier 2. Steve Burns and City of Spokane Public Utilities Public Information Officer (Marlene Feist) will coordinate with WA DOH-ODW Public Information Officer for public notification.

Tier 3 notification will typically be part of the annual Consumer Confidence Report, and will be coordinated with WA DOH-ODW.

#### **CITY OF SPOKANE WATER DEPARTMENT**

#### **EMERGENCY NOTIFICATION FLOW CHART**



**Coliform Monitoring Plan** 

WSDOH

# **Notification of Consecutive Water Systems**

In the event of a coliform present result (total or *E. coli*) notify the wholesale customer(s), as appropriate;

Kevin Anderson, Public Works Director	kanderson@cawh.org
Physical location:	
City of Airway Heights-Public Works	244-5429 (Public Works Dept.)
12400 W. 21 <sup>st</sup> Ave.	
Airway Heights, WA 99001-9000	
Shane Dougherty, Water Lead for CAWH	SDougherty@cawh.org
	953-5309
Tanya Dashiell, Ad. Asst.	tdashiell@cawh.org
	244-5429 (Public Works Dept.)
Mailing address:	
City of Airway Heights-Public Works	
1208 S. Lundstrom	
Airway Heights, WA 99001-9000	
Tim Murrell, General Manager	tim@whitworthwater.com
Whitworth Water District #2	
17402 N. Newport Rd	466-0550
Mead, WA 99021	
Kelly Williquette, General Manager	kwilliquette@scwd3.org
Spokane County Water District No. 3	
1225 N. Yardley Street	536-0121
Spokane, WA 99212-7001	
William Shelton	william.shelton.3@us.af.mil
Water Quality Program Manager	
92 CES/CEIE, Environmental	247-8163
100 W. Ent St., Suite 155	
Fairchild Air Force Base, WA 99011	
Dennis Overbay	dennis.overbay@gmail.com
Vel View WD #13	
3609 W. Velview Rd.	(509) 466-4322
Spokane, WA 99208-8863	
Michael Nafzgar,	Michael.nafzgar@providence.org
Facilities Manager	
Providence Sacred Heart Medical Center	(509) 474-3290
101 W Eighth Avenue, PO Box 2555	
Spokane WA 99204	(Non-Community Transient, TNC)
Scott Duncan	sduncan@medical-lake.org
City of Medical Lake	
124 S Lefevre St.	(509) 299-7715
P.O. Box 369	
Medical Lake, WA 99022-0369	

# Receiving Notification of Unsatisfactory Coliform Result from Consecutive Water Systems

In the event of notification from a consecutive water system (except Spokane County Water +District #3 – Manito system, see below) of an unsatisfactory result from routine coliform monitoring, consult with DOH-DW ERO to determine specific requirements for source water sampling. In lieu of other sample the raw water from all the appropriate wells that have been in use for the previous 4 days.

#### Specific Response in the event of notification from Spokane County Water District #3 – Manito System PWSID # 933589 (SCWD3-Manito System #8) of an unsatisfactory result from routine coliform monitoring;

Compile a list of the sampling date/time and results for the sites in the following table for the 48 hours prior to the sampling date/time of the unsatisfactory result.

City of Spokane Coliform Monitoring Sites most representative of water provided to SCWD3-Manito System #8

2		
Site No.	Site Name	Pressure Zone
1	Lincoln Heights	High
3	Garden Park	High
4	35th and Ray	High
9	14th and Grand	High
10	Brown Park	Glennaire
11	Division and Manito	Тор
19	Southview	Southview
22	33rd and Lamonte	High
41	Artisan	Тор
42	Regal & 57th	Тор
45	Manito Golf	Тор
55	Cowley	Intermediate
60	Glennaire	Glennaire

Also compile a list of well(s) operating for the Intermediate System during the previous 4 days.

#### **Month Following Unsatisfactory Samples**

Provided that the cause for an Unsatisfactory Sample is resolved and there is no *E. Coli* MCL Violation, the City Water System may return to normal sample schedule in the following month.

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# System Maps

- 2022 Coliform Monitoring Sites (north)
- 2022 Coliform Monitoring Sites (south)
- 2022 Coliform Monitoring Sites (West Plains)

Insert North map here

Insert South map here

Insert West Plains map here

#### **Preparation Information**

System Name: City of Spokane Water Department, PWS ID #83100K Date Plan Completed: ver. 9.2 April 26,2022 Dates Modified:

Name of Plan Preparer: Doug Greenlund Position: Water Quality Coordinator Daytime Phone # (509) 742-8166

State Reviewer Date Last Review

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# Appendix I - Individual Sites; Map, Picture, and Description

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# <u>Appendix II – Repeat Sampling Sites</u>

# **Appendix III – Triggered Source Water Sampling Sites**

Triggered Source Water Response (Groundwater Rule)

Source Well Sampling (raw water) – coordinated with Repeat Sampling.

Identify the pressure zone where the unsatisfactory sample was located. Sample all source wells corresponding to that pressure zone that operated in the previous 4 days.

Systems			Potential Contributing Source Wells			
			DOH		Well	
Low			No.	Well Name	No.	Pump No.
				Nevada	1	pump no. 1
Ea	gleridge		501	Nevada	1	pump no. 2
	0 0	Eagleridge 2	501	Nevada	1	pump no. 3
Ce	Cedar Hills			Nevada	1	pump no. 4
SL	A		SO2	Well Electric	5	pump no. 3
		West Plains		Parkwater	2	pump no. 3
W	oodland	Heights		Parkwater	2	pump no. 4
Hi	ighland	8		Parkwater	3	pump no. 5
	8	Geiger	SO3		U	pump nor e
		Heights	-	Parkwater	3	pump no. 6
		-		Parkwater	4	pump no. 7
				Parkwater	4	pump no. 8
Intermediate					<b>·</b> ·	
			SO2	Well Electric	5	pump no. 1
Hi	igh			Parkwater	1	pump no. 1
То	op		803	Parkwater	1	pump no. 2
	1	Glennaire		Ray	1	pump no. 1
		Southview	SO4	Ray	1	pump no. 2
				Ray	2	pump no. 3
North Hil	11			·		
			sor	Well Electric	4	pump no. 4
Fi	Five Mile Prairie Midbank		302	Well Electric	5	pump no. 2
M			SO5	Hoffman	1	pump no. 1
Inc	dian Hills	5	506	Grace	1	pump no. 1
Sh	Shawnee Woodridge Strong Kempe		300	Grace	1	pump no. 2
				Central	1	pump no. 1
St			SO8			
Ke				Central	2	pump no. 2

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# **Appendix IV – Level 1 Assessment template**

Washington State Dept. of Health Word, DOH 331-569 http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-569.docx

Click on link below for Level 1 Assessment form:

Level 1 Assessment Form for City of Spokane

A Level 1 assessment is a basic water system evaluation that an owner, certified operator, or other knowledgeable person can do. The RTCR requires a Level 1 assessment when one of these treatment technique triggers occurs:

• A water system that collects fewer than 40 routine samples a

month has two or more total coliform-positive samples in the

same month.

• A water system that collects 40 or more routine samples has

coliform-positive results in more than 5 percent of the routine

and repeat samples.

• A water system fails to collect three repeat samples for every total coliform-positive routine sample.

(WA DOH ODW, H<sub>2</sub>Ops, Nov. 2015)

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# **Appendix V – Level 2 Assessment template**

Washington State Dept. of Health Word, DOH 331-570 http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-570.docx

Click on link below for Level 2 Assessment form:

Level 2 Assessment Form for City of Spokane

Level 2 assessment is a more complex assessment that only a person with state-required qualifications, such as an engineer, certified operator (WDM2 or higher), or state or local health staff can do. While state and local health staff are qualified to do Level 2 assessments, their availability may be limited to E. coli events. RTCR requires a Level 2 assessment when one of these treatment technique triggers occurs:

• A water system has an E. coli MCL violation (see definition on page 1).

• A water system has a second Level 1 treatment technique trigger within a rolling 12-month period.

A treatment technique trigger could occur any time you collect routine and repeat samples. You should be ready to

start a system evaluation as soon as the lab notifies you of positive results that trigger the assessment requirement. We

recommend that you sample early in the month, so you can complete the assessment and repeat sampling before you

collect samples the following month. We will be available for consultation.

(WA DOH ODW, H2Ops, Nov. 2015)

# <u>Appendix I</u>

Ver. 9.2 effective 4/26/2022

# Individual Sites; Map, Picture, and Description

#### **Typical Sample Location Installations:**

Many of our samples locations are located in water system facilities like booster stations. A typical example is 35<sup>th</sup> and Ray. Following is a picture of the exterior of the booster station and a picture of a designated sample tap (copper tubing tap) at a sink inside the building;



Approximately half of our sampling locations are Sample Stations (stand-alone sampling taps):



# 







 $\text{\#2-35}^{\text{th}}$  & Ray – inside booster station at the sink





#3 - Glennaire - designated tap in booster station tapped into header main

#4 – Southview – designated tap inside valve room tapped into main for the tank

Picture next page



Glennaire↑ Southview↓





#5- Brown Park - designated tap inside booster station





#6 Garden Park – inside booster station tapped into header main





#7 – 33<sup>rd</sup> & Lamonte – designated tap inside tank structure. Use a flashlight, enter and go diagonally to the left. Good luck

#8 – Division & Manito – designated tap inside booster station in the basement

Picture next page



33<sup>rd</sup> & Lamonte ↑ Division & Manito ↓





# 9 – 14<sup>th</sup> & Grand – designated tap at the sink (continuous running)





# 10 -  $9^{th}$  & Pine – designated tap inside booster station (continuous running)





# 11 – Rockwood – inside access door, designated tap into main pipe




#12 – North Hill – designated tap in booster station at North Hill tank.







#14 – Belt – designated tap in the Belt booster station (continuous running)

Pix on next page



# 13 – 5 mile ↑

# 14 – Belt ↓





#15 – Midbank – sample station on vault





#16 - Strong Rd. - Sample Station on vault to the right of the door.





#18 – Shawnee – designated sample tap inside valve room (driving access to site off either Wieber or Shawnee)





#19 – Woodridge – designated sampling tap inside valve room.





#20 – Assembly & Dalke – Sample Station (actual location Park View Lane & Regency)





#23 - Mallen -designated sample tap inside valve room located at Mallen Tank





#25-Spotted-sample inside booster station at separate tap at the sink





#26 - SIA - designated sample tap inside tank structure





#27 – Abbott – sample at the sink inside the booster station





#28 – Sunset Reservoir – designated sample tap next to bucket valve





#29 - Milton - designated sample tap inside booster station





#30 – Highland – Sample Station on vault lid near access







# 32 – Qualchan

Both designated sample taps in valve rooms, off of 4-way valve

Picture, next page



# 31 – Cedar Hills ↑

# 14 – Qualchan  $\downarrow$ 





# 33- Eagle Ridge One - designated sample tap in booster station; off of 4-way valve

# 34 – Eagle Ridge Two – designated sample tap in booster station; off of chlorine analyzer line

Picture next page



# 33 – Eagle Ridge One ↑





#35 – Thorpe – sample at sink in booster station





#36 - Latah - designated sample tap on main pipe from pump





#37 – Northside Landfill – sample the sink in the scale house

\* \* NOTE: EFFECTIVE MAY 1, 2013, DUE TO LIMITED AVAILABILITY OF THE SCALE HOUSE THIS SAMPLE SITE WILL BE INACTIVE FOR THE INDEFINATE FUTURE.



#38 Yards - designated sample tap in the meter shop at the Water Dept. Yards





#41 – NW Boulevard – stand-alone sample tap west off the roadway

NOTE: EFFECTIVE MAY 1, 2013, THIS SAMPLE SITE WILL NO LONGER IS USED.

(See #63 VA Hospital, also depicted on map above)





#42 – Cedar Springs – Sample Station in landscaping off the south curbline.





#43 – Manito Golf – Sample Station in lawn off west curbline





#44 – Regal off 57<sup>th</sup> – Sample Station in landscaping near driveway, off west curbline





#45 – Artisan – Sample Station in median in the driveway





#46 – Sandridge – Sample Station in lawn





 $#47 - 5^{th}$  & Ray – Sample Station in landscaping on west side of Fred Meyers store





#48 – North River Drive – Sample Station in landscaping near GroupHealth-Riverfront sign





#49 – Olive – Sample Station in landscaping off the corner of Olive & Riverpoint





#50 - Westview - Sample Station in landscaping off the driveway of a commercial building





#51 – Ash at Safeway (just off Maple) – Sample Station in the stormwater swale/landscaping for Safeway





#52 – Strong Rd. – Sample Station in landscaping behind Jersey barriers at the curve.





#53 – Barnes at Indian Trail – Sample Station at n.e. corner of Barnes & Coursier Ln.




# 54 – Buckeye & Custer – Sample Station south of the roadway



Coliform Monitoring Plan



# 55 – Airport Way – Sample Station off the north curbline in landscaping for Wingate Motel





# 56 – Freya-North – Sample Station in dense landscaping off the west curbline





#57 – Lidgerwood – Sample Station in landscaping near Emergency entrance at Holy Family Hospital





# 58 – Wellesley & Belt – Sample Station in landscaping off east curbline near Rite-Aid





#59 – Cowley – Sample Station off east curbline at St. Lukes Rehab Institute





# 62 – Kempe (formerly N. Five Mi. Prairie) – designated sample tap in elbow for main pipe in the booster station for Kempe





#63 – VA Hospital – Sample Station off the south curbline of Wellesley near driveway for strip-mall





# 64 – Oxford (intersection of Oxford & Rifle Club Rd.) – Sample Station in the traffic island in the middle of the street



## <u> Appendix II – Repeat Sampling Sites</u>

**#1 - Lincoln Heights** – sample station is located in the Lincoln Heights Booster Station; as such it samples water being pumped from the Intermediate Pressure Zone (downstream) to the High Pressure Zone (upstream).

Upstream	3157 E. 17 <sup>th</sup> – Owens Auction Gallery
	3153 E. 17 <sup>th</sup> – Tesoro gas station/convenience store
	3147 E. 17 <sup>th</sup> – Greenleaf Psychology And Counseling
	3138 E. 17 <sup>th</sup> – residence
	3137 E. 17 <sup>th</sup> - residence
	Note: Jacobs Java at 17 <sup>th</sup> & Ray not in this pressure zone

Downstream	3204 E. 24 <sup>th</sup>
	3210 E. 24 <sup>th</sup>
	3201 E. 24 <sup>th</sup>
	3207 E. 24th
	3215 E. 24th
	Note:
	Consider priority locations just outside of the first five connections:
	Lincoln Heights Elementary School – 3322 E. 22 <sup>nd</sup>
	South Hill KinderCare (child daycare) - 3201 E. 26 <sup>th</sup> -
	Southside Senior Center - 3151 E. 27th

**#2 - 35th and Ray** - sample station is located in the 35<sup>th</sup> & Ray Booster Station; as such it samples water being pumped from the High Pressure Zone (downstream) to the Top Pressure Zone (upstream).

Upstream	3157 E. 35 <sup>th</sup> – residence
	3152 E. 35 <sup>th</sup> – residence
	3158 E. 35 <sup>th</sup> – residence
	3415 S. Ray - residence
	3507 S. Ray - residence
	Note: in case none of these locations are suitable, the residence nearby are on the same distribution lines ( i.e. 3151, 3144, 3213, 3208 E. 35 <sup>th</sup> )

Downstream	3151 E. 37 <sup>th</sup> – multi-family residence
	3141 E. 37 <sup>th</sup> – multi-family residence
	3203 E. 37 <sup>th</sup> – residence
	3207 E. 37 <sup>th</sup> - residence
	3211 E. 37 <sup>th</sup> - residence
	Note: Consider priority location just outside of the first five connections:
	Ferris High School – 6" consumption service 500' west of 37 <sup>th</sup> & Ray
1	

## #3 – Glennaire

Upstream	5320 S. Glendora Dr.
	5406 S. Glendora Dr.
	5321 S. Glendora Dr.
	5009 E. Glennaire Dr.
	5010 E. Glennaire Dr.
	Note:

Downstream	5608 S. Savannah	
	5614 S. Savannah	
	5620 S. Savannah	
	Southview Terrace P.U.D. :	5011 E. Cyprus Ln.
	5017 E. Cyprus Ln.	5007 E. Cyprus Ln.
	5013 E. Cyprus Ln.	5003 E. Cyprus Ln.
	5710 S. Savannah	
	Note:	

**#4 – Southview** – this sample station is located at the Southview Tank, as such the distribution main running to this tank is the upstream and downstream services depending on demand.

Upstream	5620 S. Savannah	
& Downstream	Southview Terrace P.U.D. :	5011 E. Cyprus Ln.
	5017 E. Cyprus Ln.	5007 E. Cyprus Ln.
	5013 E. Cyprus Ln.	5003 E. Cyprus Ln.
	5710 S. Savannah	
	5722 S. Savannah	
	5719 S. Savannah	
	Note:	

#### **#5 - Brown park**

Upstream	3810 E. 57 <sup>th</sup> – duplex residence \	
	3812 E. 57 <sup>th</sup> – duplex residence /	
	3808 E. 57 <sup>th</sup> – duplex residence \	
	3806 E. 57 <sup>th</sup> – duplex residence /	
	3819 E. 58 <sup>th</sup> Ln.	3812 E. 58 <sup>th</sup> Ln.
	3821 E. 58 <sup>th</sup> Ln.	3810 E. 58 <sup>th</sup> Ln.
	3803 E. 58 <sup>th</sup> Ln.	3818 E. 58 <sup>th</sup> Ln.
	Note:	

Downstream	4224 E. 57 <sup>th</sup> – priority Moran Elementary School
	4312 E. 57 <sup>th</sup> – residence
	4320 E. 57 <sup>th</sup> – residence
	5719 S. Yale Rd. – residence
	5803 S. Yale Rd.
	Note:

**#6 - Garden Park** – this sample site is located at Garden Park Tank, where the booster station pumps from the High System to the Top System. The High System main runs back to 2600 E. 29<sup>th</sup> before there is a distribution main.

2610 E. 29 <sup>th</sup> – Rosauers at Lincoln Heights
2656 E. 29 <sup>th</sup> – multiple tenant commercial building on the S.W. corner of Mt. Vernon
& 29th
2706 E. 29 <sup>th</sup> – gas station
2925 S. Mt Vernon – Aamco Transmission and Total Car Care
2720 E. 29 <sup>th</sup> – Bubble Land Laundromat
Note: The High System main runs back to 2600 E. 29 <sup>th</sup> before there is a distribution main.

Downstream	2312 E. 37 <sup>th</sup> - residence
	3706 S. Stone – residence
	3705 S. Stone – residence
	3714 S. Stone – residence
	3719 S. Stone - residence
	Note:

**#7 - 33rd and Lamonte** – This sample site is located inside the tank structure. The flow of water is dependent on operations and/or demand. As such, upstream or downstream may change frequently. Repeat samples should be obtained at the priority site (to the east) and from one of the residence listed (to the west).

Upstream (east)	3201 S Grand Blvd – dental office
	3120 S. Grand – Manito Post Office Station
	3112 S. Grand – Beacon Laundry and Cleaners
	3103 S. Grand – The Plant Wizard, South Grand Jewelers, The Grand Latte
	3104 S. Grand -
	Note:

Downstream (west)	3227 S. Manito Blvd.
	3221 S. Manito Blvd.
	3211 S. Manito Blvd.
	3203 S. Manito Blvd.
	3125 S. Manito Blvd.
	Note:

#### #8 - Division & Manito

Upstream	3226 S. Division – residence
Connections	3223 S. Division - residence
located on a	9 E. 33 <sup>rd</sup> - residence
12" distribution	15 E. 33 <sup>rd</sup> - residence
main that	10 E. 33 <sup>rd</sup> - residence
connects to the	Note:
24 transmission	
main at 33 <sup>rd</sup> &	
Division	

Downstream	3624 S. Manito Blvd
	3704 S. Manito Blvd
	3718 S. Manito Blvd
	3705 S. Manito Blvd
	3711 S. Manito Blvd
	Note:

**#9 - 14th and Grand** – The booster station located at the 14<sup>th</sup> & Grand tank receives water from the Intermediate System from three different transmission mains\* and boosts it up to the High System

Upstream		
* mains from "A"		705 E. Rockwood Blvd – residence
Intermediate	"A"	709 E. Rockwood Blvd – residence
source wells, "B"		807 E. Rockwood Blvd – residence
9 <sup>th</sup> & Pine booster,		716 E. Rockwood Blvd – residence
and "C" Bishop Ct.		808 E. Rockwood Blvd – residence
Booster.		8 E. Rockwood Blvd – The Madison Inn
Repeat sample from "A", also from "B" and/or "C", if pumping from 9 <sup>th</sup> & Pine	"B"	901 S. Grand Blvd – strip mall including the Qdoba Grill
		101 W 8th Ave. – St. Joseph Care Center
		110 W. 9 <sup>th</sup> Ave. – Sacred Heart Doctor's Building (west)
		102 W. 9 <sup>th</sup> Ave. – Sacred Heart Doctor's Building (east)
	"C"	724 W. 14 <sup>th</sup> – residence
		714 W. 14 <sup>th</sup> – residence
and/or Bishop Ct.		708 W. 14 <sup>th</sup> - residence
		704 W. 14 <sup>th</sup> – residence
		715 W. 14 <sup>th</sup> - residence
		Note:

Downstream	42 E. 14 <sup>th</sup> – residence
	1402 S. Grand – commercial building – multiple medical offices
	1412 S. Grand – commercial building - residence
	1403 S. Grand – commercial building (Grand Office Park)
	1337 S. Grand – commercial building (14 <sup>th</sup> & Grand Salon)
	Note:

## #10 - 9th and Pine

Upstream	East	Rockwood Vista coliform monitoring site
	West/north	177 S. Division – gas station/convenience store
		172 S. Division - Starbucks
		168 S. Division – commercial building
		32 W. 2 <sup>nd</sup> – Catholic Housing Services
		24 W. 2 <sup>nd</sup> Ave – Fr. Bach Housing
		Note:

Downstream	102 W. 9 <sup>th</sup> - Sacred Heart Doctor's Building (east)
	34 W. Rockwood Blvd – The Madison Inn
	910 S. Grand - strip mall including the Qdoba Grill
	12 W. 9 <sup>th</sup> – Mt. Saint Joseph
	9 E. 9 <sup>th</sup> – Mt. Saint Joseph (?) / 34 E. 8 <sup>th</sup> Emilie Ct. Assisted Living
	Note: addresses

## #11 - Rockwood

Upstream	1111 S. Thor – Bethel Church of Nazavene (priority – daycare)
	3403 E. 11 <sup>th</sup>
	3409 E. 11 <sup>th</sup>
	3415 E. 11 <sup>th</sup>
	3421 E. 11 <sup>th</sup>
	Note:

Downstream	# 10 - 9 <sup>th</sup> & Pine Sampling Site	
	If 9 <sup>th</sup> & Pine tank is not in service, use one of the locations listed under	
	9 <sup>th</sup> & Pine Upstream	
	Note:	

**#12 - North Hill** - this sample station is located at the North Hill Tank, as such the distribution main running to this tank is the upstream and downstream services depending on demand.

4210 E. Wellesley - residence
4327 E. Princeton – residence
4316 E. Wellesley – business (?) Clearwater Summit Group
4716 N. Havana – residence (4315 E. Valley Spring Rd.)
4322 E. Princeton - residence
Note:

## #13 - 5 mile

Upstream	6504 N. Belt – residence
	2204 W. Houston - residence
	2211 W. Houston - residence
	2203 W. Houston - residence
	2129 W. Houston - residence
	Note: This is the 5 closest connections from the junction of the transmission main in
	Belt and the distribution main in Houston.

Downstream	7009 N. Belt - residence
	7012 N. Belt - residence
	2130 W. Wedgewood - residence
	7005 N. Elgin - residence
	2131 W. Wedgewood - residence
	Note: This is the 5 closest connections from the junction of the transmission main on Wedgewood and the distribution main on Belt.

#### #14 - Belt

Upstream	2204 W. Houston
	6504 N. Belt
	2211 W. Houston
	2203 W. Houston
	2129 W. Houston
	Note:

Downstream	2204 W. Holyoke
	2212 W. Holyoke
	2220 W. Holyoke
	2211 W. Holyoke
	2203 W. Holyoke
	Note:

**#15 – Midbank** - this sample station is located at the Midbank Tank, as such the distribution main running to this tank is the upstream and downstream services depending on demand.

Upstream &	Hillside P.U.D.		3415 W. Excell
Downstream	:	3403 W. Excell	3408 W. Excell
		3404 W. Excell	3412 W. Excell
	3226 W. Excell		
	3306 W. Excell		
	3307W. Excell		
	3314 W. Excell		
	Note:		

**#16 - Strong Road** - this sample station is located at the Strong Rd. Tank, as such the distribution main running to this tank is the upstream and downstream services depending on demand.

Upstream &	2122 W. Strong Rd.
Downstream	
	2120 W. Strong Rd.
	2204 W. Strong Rd.
	2203 W. Strong Rd.
	2207 W. Strong Rd.
	Note:

#### **#17 - Indian Trail**

Upstream	4404 W. Indian Trail Rd.
	4332 W. Indian Trail Rd.
	4328 W. Indian Trail Rd.
	4322 w. Indian Trail Rd.
	4314 W. Indian Trail Rd.
	Note:

Downstream	5011 W. Lowell – commercial – Providence Family Medicine & various smaller
	medical practices
	5121 W. Lowell – Spokane Fire Dept. – Station 17
	8703 N. Indian Trail Rd. – commercial (Spokane Teacher's Credit Union)
	8701 N. Farmdale – residence
	8702 N. Farmdale - residence
	Note:

## #18 – Shawnee

Upstream	9921 N. Wieber Dr residence
	9915 N. Wieber Dr residence
	9916 N. Wieber Dr residence
	9909 N. Wieber Dr residence
	9910 N. Wieber Dr residence
	Note:

Downstream	10103 N. Wieber Dr.
	10107 N. Wieber Dr.
	10111 N. Wieber Dr.
	10203 N. Prairie Dr.
	10207 N. Prairie Dr.
	Note:

**#19 – Woodridge** - this sample station is located at the Woodridge Tank, as such the distribution main running to this tank is the upstream and downstream services depending on demand.

Upstream &	10205 N. Navaho Dr residence
Downstream	
	10209 N. Navaho Dr residence
	10213 N. Navaho Dr residence
	10203 N. Prairie Dr residence
	10207 N. Prairie Dr residence
	Note:

# #20 - Assembly and Dalke – Located on a transmission main the first upstream connects are multiple occupant facilities

Upstream	6025 N. Assembly – Manor Care facility. Priority (select best clean tap closest to
	Winston Dr.
	4403 W. Winston Ct. (multiple address P.U.D., select a unit at 4403, 4407, or 4411)
	4598 W. Winston Ct. – large P.U.D., select residence(s) closest to Winston Ct.
	6016 N. Assembly – residence
	6022 N. Assemble - residence
	Note:

Downstream	6121 N. Royal Dr residence
	6122 N. Royal Dr residence
	6115 N. Royal Dr residence
	6116 N. Royal Dr residence
	6112 N. Royal Dr residence
	Note: GIS Meter layer does not show a meter at 6112, but shows a service line

#### #21 - BPA - not normally a coliform monitoring site

Upstream	6530 W. Sundance Dr residence
	6520 W. Sundance Dr residence
	6506 W. Sundance Dr residence
	10707 N. Acoma Ct residence
	10715 N. Acoma Ct residence
	Note: on the bluff above the BPA sample station, access from Blackfoot & Indian
	Trail Rd.

Downstream	Sundance Meadows – 10400 N. Nine Mile Rd. (select from the first five residence on S. E. on Maximilian
	Note:

23 – Mallen - this sample station is located at the Mallen Tank, as such the distribution main running to this tank is the upstream and downstream services depending on demand. Additional the main is connected to a loop that runs around the hill, so the connections are dispersed.

Upstream &	
Downstream	9012 W. White Rd residence
	7911 S. Thomas Mallen Rd residence
	8811 W. White Rd residence
	8915 W. White Rd residence
	9501 W. Kite Dr residence
	Note:

## 25 – Spotted – There are two sources on the upstream side; from Thorpe Rd. and from West Dr (SIA)

Upstream –	
West Dr	7410 W. Electric
	7704 W. Geiger Blvd.
	7626 W. Geiger Blvd.
	7821 W. Electric
	7106 W. Pilot Dr. (SIA bldg 1429)
	Note:

Upstream –	
Thorpe	7311 W. Westbow Rd. (WSDOT facility0
	7217 W. Westbow Rd. (El Katif Shrine office)
	4315 S. Cheatham Rd. (mobile home park)
	6625 w. Thorpe Rd residence
	6616 W. Thorpe Rd. (Con-way trucking)
	Note:

Downstream	4725 S. Spotted Rd. (Sprint facility0
	5102 S. Aspen Rd residence
	9115 W. Westbow Blvd - residence
	9009 W. Westbow Blvd residence
	7715 W. Westbow Blvd residence
	Note:

26 – SIA – the sample site is in the west standpipe structure. This location is in the middle of the SIA Industrial Park and has an interconnected web of water distribution line such that there is no actual up or down stream. Also, most of the facilities are isolated by security, vacant, or infrequently attended.

Upstream	
	Geiger Correction Facility (pick one facing Will D. Alton, record building number)
	7201 W. Will D. Alton (commercial building)
	7110 W. Will D. Alton (Pacific Pride fueling station)
	7106 W. Pilot Dr. (Spokane County Detention Work Crew)
	Note:

Downstream	7707 W. Pilot
	7904 W. Pilot (Transporation Safety Administration)
	s.w. corner Pilot Dr. & Davison (U.S. Customs and Border Patrol, good luck)
	8125 W. Pilot Dr. (Aircraft Solutions) or 8122 W. Pilot Dr. (Soundair Aviation
	Services)
	8136 W. Pilot (Hanger 77 Bistro)
	Note:

**27 – Abbott** - Abbott has the capability to pump from Highland to SIA/Geiger, but typically does not. Thorpe feeds Geiger and/or West Dr. feeds SIA <u>and</u> water flows north-south on Abbott. Upstream and Downstream is situational. Confirm Abbott Booster has not been used before Repeat sampling.

Upstream	4213 W. Garden Springs Rd.
Highland Pressure Zone – typically closed off	2121 S. Bemis St.
DO NOT SAMPLE UNLESS ABBOTT BOOSTER	2115 S. Bemis St.
STATION HAS RUN IN THE PREVIOUS FOUR DAYS.	2120 S. Rustle St.
	2108 S. Rustle St. (? &/or 2104 S. Rustle)
	Note:

Up/Downstream-north	5023 W. Garden Springs Rd residence
SIA (Garden Springs Rd.)	5018 W. Garden Springs Rd residence
	5020 W. Garden Springs Rd residence
	5024 W. Garden Springs Rd residence
	5206 W. Lawton Rd. (very long service line) - residence
	Note:

Up/Downstream-south	2701 S. Abbott Rd residence
Geiger Heights (Abbot Rd.)	2725 S. Abbott Rd residence
	2912 S. Abbott Rd residence
	2808 S. Assembly – Lindell Court Apartments
	3405 S. Abbott Rd. – residence

		Note:
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## 28 - Sunset Reservoir

Upstream	3620 W. West Dr.
	910 S. "F" St.
	911 S. "F" St.
	3410 W. Rosamond
	825 S. Montavilla Dr.
	802 S. "F" St.
	Note:

Downstream	1006 S. Carousel Ln.
	3920 W. Canyon Dr.
	3912 W. Canyon Dr.
	3904 W. Canyon Dr.
	1003 S. Primrose Ln.
	Note:

## 29 - Milton

Upstream	2330 W. 16 <sup>th</sup>
	2316 W. 16 <sup>th</sup>
	2312 W. 16 <sup>th</sup>
	2308 W. 16 <sup>th</sup>
	2327 W. 15 <sup>th</sup>
	Note:

Downstream	1504 S. Milton St.
	2815 W. 15 <sup>th</sup>
	2809 W. 15 <sup>th</sup>
	2729 W. 15 <sup>th</sup>
	2725 W. 15th
	Note:

**30 – Highland** – this sample station is located at the Highland Tank, as such the distribution main running to this tank is the upstream and downstream services depending on demand. However the nearby distribution mains forms a loop around the tank. When resampling select a site from each group.

Upstream	3108 W. 21 <sup>st</sup>
(west)	3028 W. 21 <sup>st</sup>
	3116 W. 21 <sup>st</sup>
	3109 W. 21 <sup>st</sup>
	3117 w. 21 <sup>st</sup>
	Note:

Downstream	3025 W. 21 <sup>st</sup>
(east)	3017 W. 21 <sup>st</sup>
	3014 W. 21 <sup>st</sup>
	3006 W. 21 <sup>st</sup>
	3003 w. 21 <sup>st</sup>
	Note:

**31 - Cedar Hills** – this sample station is located at the Cedar Hills Tank, as such the distribution main running to this tank is the upstream and downstream services depending on demand.

Upstream	5124 S. Lincoln Way
& Downstream	5120 S. Lincoln Way
	5125 S. Lincoln Way
	5205 S. Lincoln Way
	5209 S. Lincoln Way
	Note: during repeat sampling select two from the above list. If not available,
	proceed to contact residences as you move away from Anton and Lincoln Way.

## 32 – Qualchan

Upstream	4910 S. Lincoln Way
	4906 S. Lincoln Way
	1312 W. Bolan Ave.
	1311 W. Bolan Ave.
	1307 W. Bolan Ave.
	Note:

Downstream	1305 W. Lincoln Blvd.
	1215 W. Lincoln Blvd.
	4730 S. Pender Lane
	4752 S. Keyes Ct.
	4724 S. Pender Lane
	Note:

## 33 - Eagle Ridge One

Upstream	6408 S. Latah Hills Ct.
	6412 S. Latah Hills Ct.
	6415 S. Latah Hills Ct.
	6603 S. Shelby Ridge St.
	6607 S. Shelby Ridge St.
	Note:

Downstream	6727 S. Ashland Ct.
	6723 S. Ashland Ct.
	6719 S. Ashland Ct.
	6715 S. Ashland Ct.
	6620 S. Springview St.
	Note:

**34 - Eagle Ridge Two** - this sample station is located at the Eagle Ridge Two Tank, as such the distribution main running to this tank is the upstream and downstream services depending on demand.

Upstream	5732 S. Ravencrest Dr.
& Downstream	5730 S. Ravencrest Dr.
	5728 S. Ravencrest Dr.
	5726 S. Ravencrest Dr.
	5729 S. Ravencrest Dr.
	Note: if none of these are available, continue along Ravencrest Dr.

## 35 – Thorpe

Upstream	2730 W. Thorpe Rd.
	2722 W. Thorpe Rd.
	2716 W. Thorpe Rd.
	2704 W. Thorpe Rd.
	2610 W. Thorpe Rd.
	Note:

Downstream	3350 W. Thorpe Rd.
	3325 W. Thorpe Rd.
	3401 W. Thorpe Rd.
	3407 W. Thorpe Rd.
	3609 W. Thorpe Rd.
	Note:

#### 36 - Latah

Upstream	2215 W. 9 <sup>th</sup>
	2219 W. 9 <sup>th</sup>
	2218 W. 10 <sup>th</sup>
	914 S. Coeur d'Alene
	1002 W. Coeur d'Alene
	Note:

Downstream	1602 S. Chestnut
	1527 S. Chestnut
	1517 S. Chestnut
	1611 S. Chestnut – Kop's Construction offices
	2012 W. 16th
	Note:

## 38 - Yards-meter shop

Upstream	914 E. North Foothills Dr. (Main Administration Building)
	2808 N. Nevada (Fire Station)
	2824 N. Nevada – Compass Construction
	2828 N. Nevada – Aalpine Services (carpet cleaning & dyeing)
	920 E. Wolverton Ct. (Water Dept. Eng. Section)
	Note:

Downstream	2803 N. Hamilton
	2807 N. Hamilton
	2811 N. Hamilton
	817 E. North Foothills Dr.
	2818 N. Cincinnati St.
	Note:

**42 - Cedar Springs** – this sample station is located at the service for a P.U.D. (Cedar Springs Estates 3). Multiple samples will be needed (see Notes in each table).

Upstream	925 E. Sharpsburg – Morning Glory Circle Apartments
Obtain a total	7411 N. Nevada – Royal Park Care Center
of 3 samples	1304 E. Sharpsburg
(see Note)	1310 E. Sharpsburg
	7319 N. Perry
	7323 N. Perry
	7409 N. Perry
	Note: obtain one sample from each of the first two facilities and one sample from
	one of the single family residences listed 3-7.

Downstream	1011 E. Sharpsburg – Cedar Springs Estates 3
	Note: obtain one sample from the first units visible from the sample station as you
	face north

## 43 - Manito Golf

Upstream	4322 S. Scott
	4318 S. Scott
	4314 S. Scott
	726 E. 43 <sup>rd</sup> – Rocket Bakery
	4315 S. Scott – commercial (Synergistics, aka SharperLending)
	Note:

Downstream	4402 S. St. Andrews Ln.
	4404 S. St. Andrews Ln.
	4406 S. St. Andrews Ln.
	4408 S. St. Andrews Ln.
	4405 S. St. Andrews Ln.
	Note: very difficult to gain access; contact property managers at Kiemle & Hagood
	(509)838-6541 ( <u>http://www.khco.com/contact-us/</u> )

Upstream	5915 S. Regal – Ben Burr Office Building (second connection north of this connection)
	3117 E. Chaser Ln. – Cedar Canyon Estates (east behind Ben Burr Office Building
	5808 S. Regal – Cedar Hollow Apt. (two connects off Regal at extreme north and
	south ends, best pick of apt. from that location
	Note:

#### 44 - Regal off 57th - service line for the Ben Burr Office Building 5915 S. Regal

Downstream	3012 E. Chaser Ln. – pick from residences as you come off Regal
	6004 S. Regal – Moran Prairie County Library
	2906 S. 61 <sup>st</sup> Ct. – single family residence
	2907 S. 61 <sup>st</sup> Ct. – single family residence
	2913 S. 61 <sup>st</sup> Ct. – single family residence
	Note:

**45 – Artisan** – any apartment in Artisan may be considered downstream. The following tables may respresent upstream from two difference distribution mains.

Upstream	2707E. 36 <sup>th</sup> -single family residence
	2701 E. 36 <sup>th</sup> -single family residence
	3526 S. Mt. Vernon –single family residence
	3602 S. Mt. Vernon –single family residence
	3610 S. Mt. Vernon –single family residence
	Note:

Downstream	3606 S. Regal - Dr. Steven G. Crump, DDS, General Dentistry
	3622 S. Regal – Clown Town Daycare
	2824 E. 37 <sup>th</sup> – single family residence
	2818 E. 37 <sup>th</sup> – single family residence
	2815 E. 37 <sup>th</sup> – single family residence
	Note:

**46 - Sand Ridge** – located in the parking strip on Sandridge . modified list modified 9/14/18 to reflect changes resulting from build-out of the neighborhood.

Upstream	Life Center Church 1202 N. Government Wy.
	1305 N Rogue River St.
	1315 N. Rogue River St.
	1327 N. Rogue River St.
	1403 N. Rogue River St.
	Note:

Downstream	1425 N. River Ridge Blvd
	1423 N. River Ridge Blvd.
	1421 N. River Ridge Blvd.
	1503 N. Sand Brook St.
	1420 N. River Ridge Blvd.
	Note:

**47 - 5th and Ray** – this sample station is connected to a service line for Fred Meyers, making Fred Meyer the immediate downstream connection. However, the flow on the distribution main may come from the north or the south; so a connection from both tables (in addition to Fred Meyers) should be collected (i.e. the repeat sample from the sample station, one from Fred Meyers, one other from the downstream table, and one from the upstream table).

Upstream	3226 E. 4 <sup>th</sup>
	328 S. Ray St.
	324 S. Ray St.
	3216 E. 4 <sup>th</sup>
	408 S. Ray St.
	Note:

Downstream	400 S. Thor St. – Fred Meyers
	416 S. Ray St.
	3215 E. 5 <sup>th</sup> Ave.
	504 S. Ray St.
	508 S. Ray St.
	514 S. Ray St.
	Note:

**48** - **N. River Drive** – the sample station is located on the service line for the Group Health – Riverfront Medical Center. This service line is the only one on, and also at the end of, a distribution line.

Upstream		One sample from designate "A" and one from designate "B"
	А	303 w. North River Dr. – Centennial Hotel (west end, conference rooms)
	А	809 N. Washington St. – Riverfront Park Maintenance
	В	802 N. Washington St. – Keller William Realty office
	В	920 N. Washington St. – Rivercrossing commercial building
	В	411 W. Cataldo – Caterina Winery, basement; U.S. Immigration & Customs on
		Cataldo
		Note:

Downstream	322 W. North River Dr. – Group Health – Riverfront Medical Center
	Note:

#### 49 - Olive Road

Upstream	103 E. Spokane Falls Blvd WSU
	114 E. Spokane Falls Blvd. – WSU Administration (unk if regularly occupied)
	202 E. Spokane Falls Blvd. – Spokane Physical Therapy at Riverpoint
	34 E. Trent – First American Title Insurance Co.
	12 E. Olive – Perkins Family Restaurant
	Note:

Downstream	310 N. Riverpoint Blvd – EWU/WSU Health Sciences Bldg.
	311 N. Riverpoint Blvd – Fairfield Inn
	401 N. Riverpoint Blvd. – Courtyard by Marriott
	501 N. Riverpoint Blvd. – Community Colleges of Spokane, and other businesses
	639 N. Riverpoint Blvd. – PUD Riverpoint Village
	Note:

## 50 - Westview Court

Upstream	1116 E. Westview Ct. – commercial building
	1110 E. Westview ct. – NorthPoint Retirement Community
	1121 E. Westview Ct. – commercial building (The CashLINQ Group, LLC)
	1115 E. Westview Ct. – commercial building (misc. financial services)
	1111 E. Westview Ct. – Jamison Family Medicine (aka Columbia Medical Asso.)
	Note:

Downstream	1131 E. Westview Ct. – commercial building (Ameriprise Financial Services, et al.)
	9718 N. Morton Ct. – Gentiva Health Services
	1225 E. Westview Ct. – PUD Deer Run at Northpointe Apts. (selection first units
	from entrance from cul-de-sac
	1224 E. Westview Ct. – Regency at Northpointe – senior living facility
	Note:

## 51 - Ash at Safeway (aka Maple at Safeway)

Upstream	1528 W. Jackson – single residence
	1524 W. Jackson – single residence
	1527 W. Jackson – single residence
	1523 W. Jackson – single residence
	1517 W. Jackson – single residence
	Note:

Downstream	1616 W. Northwest Blvd – Safeway
	1708 W. Northwest Blvd. – Walgreens
	1807 W. Jackson – single residence
	1811 W. Jackson – single residence
	1827 W. Jackson – single residence
	Note:

## 52 - Strong and Cedar

Upstream	1305 W. Strong Rd. – single residence
	8704 N. Kensington Dr. – single residence
	8704 N. Kensington Dr. – single residence
	8707 N. Cedar Rd. – single residence
	8614 N. Palm Pl. – single residence
	Note:

Downstream	8610 N. Cedar Rd. – single residence
	8620 N. Cedar Rd. – single residence
	8630 N. Cedar Rd. – single residence (may not exist)
	8640 N. Cedar Rd. – single residence
	8650 N. Cedar Rd. – single residence
	Note: 8630 does not exist, there are only four connects downstream from this
	sample station

## 53 - Barnes at Indian Trail

Upstream	9101 N. Indian Trail Rd. – Chase Bank branch
	5302 W. Barnes Rd./9295 Coursier Lane – Selkirk Apartments (select apartments in
	order from approach from Barnes Rd.
	5014 W. Barnes Rd. – single residence
	5010 W. Barnes Rd. – single residience
	5006 W. Barnes Rd. – single residence
	Note:

Downstream	5421 W. Barnes Rd. – Child Care Center/Starbucks Coffee (or other business in the
	same building)
	9404 N. Camden Ln. / 5420 W. Barnes Rd. – Lusitano Apartments (select
	apartments in order from approach from Barnes Rd.
	9008 N. Pamela – single residence
	9015 N. Pamela – single residence
	9009 N. Pamela – single residence
	Note:

## 54 - Buckeye and Custer

Upstream	4705 E. Buckeye – single residence
	4707 E. Buckeye – single residence
	4502 E. Buckeye – single residence
	2811 N. Chronicle – single residence
	4909 E. Upriver Dr. – Upriver Drive Apartments / Beau Rivage Apartments (distinct
	from Beau Rivage Apartments at 4707)
	Note:

Downstream	4707 E. Upriver Dr. – Beau Rivage Apartments
	Note: Service enters the complex from Buckeye & Custer. Select apartments to sample in the furthest building north and west from the entrance on Upriver (approximately 250' south of the cyclone fence line).

## 55 - Airport Way

Upstream	
	2928 S. Spotted Rd. – USPS sorting facility
	2907 S. Spotted Rd. – Spokane County Roads Facility (SpoCo. Dist. 3)
	2929 S. Spotted Rd. – Cobra Building Systems
	7211 W. Flightline Blvd. (commercial building; Cobra Envelope Building Contractors-
	Suite 108, check for others
	Note:

Downstream	2726 S. Flint Rd. – Wyngate by Wyndham Hotel
Sampling site is	8909 W. Airport Dr. – Ramada at Spokane Airport
on the service	
line for	
Wyngate.	
	Note:
### 56 - Freya-North

Upstream	3528 E. Empire – single residence
	3527 E. Empire – single residence
	3524 E. Empire – single residence
	3523 E. Empire – single residence
	3520 E. Empire – single residence
	Note:

Downstream	3939 N. Freya St.
	3611 E. Rich – Classic Heated Storage
	3625 E. Rich – single residence
	3637 E. Rich – single residence
	3701 E. Rich – single residence
	Note:

### 57 – Lidgerwood

Upstream	303 E. Joseph
	304 E. Jospeph
	307 E. Joseph
	308 E. Joseph
	315 E. Joseph
	Note:

Downstream	235 E. Rowan – Holy Family Hospital
	304 E. Columbia – single residence
	308 E. Columbia – single residence
	316 E. Columbia – single residence
	324 E. Columbia – single residence
	Note: unclear if the sample station is tapped to the distribution main or the service
	line for Holy Family Hospital. Regardless, this should be priority sampling
	downstream.

### 58 - Wellesley & Belt

Upstream	2215 W. Wellesley – Rite Aid (address of meter and parcel different)
	4218 N. Belt – Messiah Lutheran Church
	2205 W. Longfellow – single residence
	2215 W. Longfellow – single residence
	2221 W. Longfellow – single residence
	Note:

Downstream	2507 W. Wellesley – 8" service – likely Walmart ?, check with Shadle property
	management (Safeway served from west end?)
	2211 W. Wellesley – McDonalds
	2111 W. Wellesley – Shadle Public Library
	2005 W. Wellesley – Shadle Pool (seasonal)
	2004 W. Wellesley – single residence
	4706 N. Belt – single residence
	Note:

### 59 – Cowley

Upstream	711 S. Cowley – St. Lukes Rehab (meter/service northwest corner of building near
	Hartson & Cowley
	525 S. Cowley – Inland Imaging
	628 S. Cowley – Daybreak Youth Services
	606 S. Cowley – Plastic Surgery Northwest
	101 E. Hartson – St. Margaret's Shelter (multiple meters, may serve south end)
	Note:

Downstream	711 S. Cowley – St. Lukes Rehab (meter/service near sample site)
	237 E. 7 <sup>th</sup> – Rockwood Information Systems
	226 E. 7 <sup>th</sup> – Chandler Apartments (pick one)
	829 S. Cowley – Stonecrest Apartments (pick one from the building directly east
	from the main entrance off Cowley
	803 S. Cowley –Stonecrest Apartment Building (pick one from the building on the
	southeast corner of 7 <sup>th</sup> & Cowley)
	Note:

### 62 – Kempe

Upstream	9112 N. Five Mile Rd. – single residence
	8721 N. Five Mile Rd. – single residence
	8621 N. Five Mile Rd. – single residence
	3024 W. Strong Rd. – single residence
	3028 W. Strong Rd. – single residence
	Note:

Downstream	9419 N. Five Mile Rd. – Spokane Bible Church
	2804 W. Johannsen Rd single residence
	3003 W. Prairie Breeze- single residence
	3002 W. Prairie Breeze- single residence
	3006 W. Prairie Breeze- single residence
	Note:

### 63 - VA Hospital

Upstream	4507 W. Wellesley (former grocery store, vacant)
	4324 W. Wellesley – single residence
	4312 W. Wellesley – single residence
	4308 W. Wellesley – single residence
	4712 N. Assembly – single residence
	Note:

Downstream	4815 N. Assembly – VA Hospital (connection at Wellesley and Independence,
	uncertain what part of VA facilities are being served)
	4607 W. Wellesley
	4632 N. King Ct.
	4629 N. King Ct.
	4625 N. King Ct.
	Note:

#### 64 – Oxford

Upstream	5329 W. Rifle Club Ct Clare Bridge of Spokane (Senior Residence) Priority				
	5314 W. Rifle Club Ct. – multiple residence				
	5302 W. Rifle Club Ct. – multiple residence				
	5214 W. Rifle Club Ct. – multiple residence				
	5202 W. Rifle Club Ct. – multiple residence				
	Note: Clare Bridge – contact building maintenance for sample site closest to service				
	line				

Downstream	All residences downstream are in the Riverside Village P.U.D.:			
	5112 W. Conestoga Ln.			
	5202 W. Conestoga Ln.			
	5208 W. Conestoga Ln.			
	6842 N. Oxford Ln.			
	6843 N. Oxford Ln.			
	Note:			



# 2022 Coliform Monitoring Sites (North)





THIS IS NOT A LEGAL DOCUMENT: The information shown on this map is compiled from various sources and is subject to constant revision. Information shown on this map should not be used to determine the location of facilities in relationship to property lines, section lines, streets, etc.



## 2022 Coliform Monitoring Sites (South)

Printed by: dgreenlund

Print date: 4/25/2022









THIS IS NOT A LEGAL DOCUMENT: The information shown on this map is compiled from various sources and is subject to constant revision. Information shown on this map should not be used to determine the location of facilities in relationship to property lines, section lines, streets, etc.



# 2022 Coliform Monitoring Sites (West Plains)

Printed by: dgreenlund

Print date: 4/25/2022









THIS IS NOT A LEGAL DOCUMENT: The information shown on this map is compiled from various sources and is subject to constant revision. Information shown on this map should not be used to determine the location of facilities in relationship to property lines, section lines, streets, etc.

# 6.5 Lead and Copper Rule Sampling Plan



City of Spokane Water Department

# Lead and Copper Rule Sampling Plan

Doug Greenlund 5-10-2022

### Contents

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#### **BACKGROUND:**

In the winter of 1991the Director of Water & Hydroelectric Services directed that the Construction & Maintenance Department develop two lists of at risk homes. The first is a list of homes with lead service lines. The second, a list of newer homes with copper pipe and potentially lead solder (i.e. constructed with copper plumbing between 1985 and 1986). There are approximately 975 homes with lead service lines. The second list totals 671 residences. These homes should exhibit some of the highest copper and lead levels in the City.

Based on the list of homes the City began sampling in 1992. 100 homes were sampled in the spring of 1992 and then six months later. The 90<sup>th</sup> percentile lead and copper results from this testing were below the action levels.

The City reduced its sampling to 50 homes. We sampled in 1995, 1996, 1997, 2000, 2003, 2006, 2009, 2012, and 2015. The 90<sup>th</sup> percentile lead and copper results from this testing were below the action levels for all this testing.

The Spokane Water Department, in 2000, offered the option to replace lead service lines (LSL). 156 homeowners requested their water service line be replaced. The City has completed work at all 156 sites, replacing the service pipe up to the property line. It was not anticipated, but no lead pipe was found on any homeowner's side of the water service. Additionally, the Water Dept. has been replacing the City lead-alloy services when in-home testing results exceeded Action Limits at that home. Lead service lines were replaced with copper when other water line work was already being conducted. Early in 2016 the City of Spokane initiated a project to eliminate the remaining 486 lead service lines. In July of 2018 the water department completed the program to remove all known lead service lines in the City's water system.

Required in home lead and copper testing in 2018 and 2021 were from a sample pool of homes with copper service lines installed prior to the 1988 ban on lead solder.

#### **PURPOSE:**

The Federal government through the State of Washington has required that water purveyors evaluate and minimize the quantities of lead (Pb) and copper (Cu) in water at household taps. This requirement is intended to address not only sources of Pb and Cu from the system but also from individual residences. It is known that purveyors in some cases are able to reduce lead and copper leaching occurring in homes by prior treatment of the water.

The City of Spokane has to determine:

- 1. What maximum quantities of lead and copper are in the water at residential faucets?
- 2. What quantities of lead and copper are coming from City sources?
- 3. Is the City water considered optimized for corrosion control?

#### **PRE-SAMPLING:**

The Water Quality Coordinator coordinates sampling from homes. At least 50 residents must be identified from listed at risk homes<sup>1</sup> who are willing to cooperate with the City's Water Quality Testing Program. In order to participate these homes must have a cold water faucet with no in-home treatment (i.e. no water softeners, carbon

<sup>&</sup>lt;sup>1</sup>. "at risk homes", as used here, means homes in which one might expect to find elevated lead and/or copper levels because of the use of these metals for the plumbing in the homes or plumbing servicing the homes,

filters, sand filters, etc.). Appendix A contains this list of sampling sites. Appendix D has a map of the locations. For 2021 72 homes were selected as the initial sampling pool to allow for non-participating homes.

A larger list of potential sites believed to meet the criteria (copper with lead solder plumbing) has been established from which this list of at least 50 homes was determined. These 50 sites have been used in past monitoring. It is anticipated that these sampling sites will be used for future testing. In case a location once tested is not available for current and/or future test it will be replaced by a home from the appropriate list so that it meets the same targeting criteria and is within reasonable proximity of the original site.

The list of homes is sent to Water Department clerk's office. The clerks prepare and mail out a letter to each home. Appendix B has a sample of the letter. These letters are sent out approximately three weeks before the scheduled sampling.

Approximately one month before sampling the laboratory under contract by the city (currently Anatek Labs) will be contacted to arrange sample bottle delivery to the Water Department. Sample bottles will be uniquely and consecutively numbered before use. Sample bottle delivery to the residents and bottle pickup will have to be coordinated. Each City source will also be sampled.

#### **SAMPLING:**

Water Department Water Quality staff will take source water samples. The bottle number, date, and time of sampling, well name and number, pump number, name of person doing sampling, type of sample (raw or treated), and pump rate in well and field should all be recorded. When feasible the water temperature, chlorine residual, turbidity, pH, conductivity, and depth to water in well should also be recorded. Source water sampling for lead is concurrent with other required regulatory source water sampling.

A resident will sample drinking water from their home. The Water Department staff will drop off sample bottles to the resident along with written (Appendix C) sampling instructions on Monday of the prearranged sampling week. The bottle will be labeled with street address of the sampling location and placed in individual zip-lock bags. A sample bottle pickup time is set for the next morning, Tuesday. When the bottle is picked up the date and time are recorded on the chain of custody. If there is no sample a reminder notice is left at the home. (see Appendix E). On Wednesday those remaining homes are checked again for a sample. Again, if there is no sample a reminder notice is left at the home. Thursday of the sampling week is the final day of sample collection.

Sampling will be done on "first draw" samples after water has stood motionless in the pipes for at least six hours. Water use during the day prior to sampling should have been typical of its daily use when occupied.<sup>2</sup> The homeowner completes the questionnaire and includes it with the filled sample bottle.

No special work should be done to the sampling faucet prior to sampling. The supplied, clean, plastic, one liter sample bottle should be placed below the spout of the cold water tap in the kitchen or bathroom sink. The <u>cold-water</u> tap should be turned on gently to maintain low flow conditions during sample collection such that the one-liter bottle is filled in approximately 45 seconds. The sample bottle should be filled to the one-liter level marked on the container, and then capped.

Water Department personnel will record the information from the label upon pickup of the sample. The sample will be checked in the field to ensure that an appropriate sample was taken:

- 1. Is bottle filled to the one-liter mark? If not, inform sampler. Discard sample. Reschedule sampling.
- 2. Is questionnaire complete and does the address match the sample? If not, get information from resident if
  - <sup>2</sup> LEAD AND COPPER RULE GUIDANCE MANUAL; VOLUME I: Monitoring; for US-EPA, contract # 68-CO-0062; September 1991

possible, else resample as above.

3. Does sample appear "normal"? If not, see if resident has any explanation. Record appearance & explanations offered.

The filled sample bottle will be stored in a cool place and delivered to the selected drinking water certified lab within ten days of sampling. The bottle numbers, label information, date and means of shipment, laboratory name, address, and contact person(s), along with relevant accounting information will be maintained at the water department.

#### **CONCURRENT SAMPLING AND TESTING:**

Source samples will be taken to measure lead and copper levels. The "in home" testing occurs in the first full week of August. All sample bottles are dropped off on Monday.

If sources are due to be tested for a full inorganic sampling panel, then that sample panel shall include the copper and lead parameters and need not be repeated.

#### **TESTING:**

The laboratory performing the analysis will be certified by DOH for lead and copper testing. The laboratory contracted for analytical chemical analysis will be utilized.

The following test results are required:

- 1. The lead and copper levels found in the submitted samples.
- 2. The laboratory blank results.
- 3. The laboratory duplicate results.
- 4. The laboratory spike results.

Test results should be received within one month of sample submittal. The laboratory will be directed to send the results to:

> Water Quality Coordinator City of Spokane 914 East Foothills Drive Spokane, Washington 99207 - 2794

The original copy of lab results received will be kept on file with the Water Quality Coordinator.

#### ANALYSIS AND RESPONSE:

Within one week of receipt of sample test results the Water Quality Coordinator will complete the following analysis.

• Did we receive the data for all samples sent to the lab? Check data received against record of samples shipped. If not, notify lab of error. Find out when and how they will respond. Note the name of your lab contact.

• Were correct methods used and QC results reported? Check method numbers and QC results received against those specified under Testing section. If not - Notify lab of error. Find out when and how they will respond. Note the name of your lab contact. Notify the Environmental Programs Department.

The time frame for completion of the above analysis is short because the laboratories often will hold samples after analysis for a time. If the analysis is improperly done it may be possible to have it redone correctly providing the lab is notified before the samples are disposed of or the holding times exceeded.

The Water Quality Coordinator will make the following analysis within <u>one week</u> of receipt of sample results;

Do any of the Drinking Water results exceed or Action Levels (AL). Lead Action Level is 0.015 mg/L and the Copper Action Level is 1.3 mg/L.

- If a result exceeds a treatment technique Action Limit notify:
- 1. Director, Water and Hydroelectric Services
- 2. Resident
- 3. Eastern Regional Office, Department of Health, Drinking Water Section

The Water Quality Coordinator should review the laboratory quality assurance data and work with the lab to evaluate and correct in inconsistencies.

When this most recent round of sampling is completed results need to be reported to the Department of Health within ten days of the end of the sampling period (ending Sept. 30, 2000). Sample results for both lead and copper each need to be analyzed in the following manner for the report.

Have copper and/or lead action levels been exceeded?

Determine 90th percentile level of copper and lead -

"The results of all lead or copper samples taken during a monitoring period shall be placed in ascending order from the sample with the lowest concentration to the sample with the highest concentration. Each sampling result shall be assigned a number, ascending by single integers beginning with the number 1 for the sample with the lowest contaminant level. The number assigned to the sample with the highest contaminant level shall be equal to the total number of samples taken."

"The number of samples taken during the monitoring period shall be multiplied by 0.9" "The contaminant concentration in the numbered sample yielded by the calculation in" (the last paragraph) "is the 90th percentile contaminant level."

If the calculated 90th percentile contaminant level for lead exceeds .015 mg/L then the lead action level has been exceeded. If the calculated 90th percentile contaminant level for copper exceeds 1.3 mg/L then the copper action level has been exceeded. (from 40 CFR 141.80, c, 3)

If the action level for either copper or lead is exceeded notify the Director of Water and Hydroelectric Services.

Can City water meet the definition of "optimized corrosion control" without further study and treatment? Check if the difference between the 90th percentile tap water lead level and the highest source water lead result is less than 5 ppb. Notify the Director of Water and Hydroelectric services of the results of the analysis and if the system is or is not considered optimized for corrosion control.

The Lead/Copper Testing report requires the following information:

- 1. The results of all tap samples for lead and copper including the location of each site and the criteria under which the site was selected (designation as Tier 1, Tier 2, or Tier 3).
- 2. Documentation for each tap water lead or copper sample for which the water system requests invalidation pursuant to 141.86(f)(2).
- 3. The 90th percentile lead and copper concentrations measured from among all lead and copper tap water

samples collected during the sampling period.

- 4. With the exception of the first 6 month monitoring period, a list of all sites not previously monitored and an explanation as to why monitoring locations have changed.
- 5. Water quality parameter sampling results pursuant to 141.87(b) though (g) if required.
- 6. Source water lead and copper results.

#### **CITATIONS:**

FEDERAL- 40 CFR Parts 141 & 142 (signed 6 MAY 1991)

Specifically: Lead and Copper Rule (1991 Rule) (published 6/7/91, and as modified 7/15/91, 6/29/92, and 6/30/94). Lead and Copper Rule Minor Revisions (published 1/12/2000)

WASHINGTON STATE- WAC 246-290
Specifically: WAC 246-290-025 (Adoption by reference 40 CFR Part 141, which includes Lead and Copper Rule regulations)

#### **REPORTS**:

Within 30 days of receipt of the laboratory results a letter to each customer that was sampled. Appendix F has an example letter.

A letter to Department of Health Office of Drinking Water certifying each customer was notified of their results within 90 days of notifying the customers. Appendix G has the letter.

#### **FUTURE:**

This plan will be re-evaluated in September 2024 with the requirements of the revised lead and copper rule. It is expected to have a new sampling pool of homes with "galvanized needing replacement". Those homes where a lead service line was removed, and a portion of service remained that is galvanized material.

Appendix A List of 2021 Sampling Sites

Address	City	State	Zip Code
10015 N Moore St	Spokane	WA	99208-9308
6011 N. MONROE ST	Spokane	WA	99205
502 E. Vicksburg Pl	Spokane	WA	99208
503 E. Vicksburg Pl	Spokane	WA	99208
505 E Vicksburg Pl	Spokane	WA	99208
508 E Vicksburg Pl	Spokane	WA	99208-5871
511 E. Vicksburg Pl	Spokane	WA	99208
7510 N Wiscomb	Spokane	WA	99208-6556
7638 N Wiscomb	Spokane	WA	99208-6553
8122 N General Lee Way	Spokane	WA	99208
8123 N General Lee Way	Spokane	WA	99208
8201 N General Lee Way	Spokane	WA	99208
8202 N General Lee Way	Spokane	WA	99208
8206 N General Lee Way	Spokane	WA	99208
8306 N Standard St	Spokane	WA	99208
8311 N Standard St	Spokane	WA	99208
8316 N Standard St	Spokane	WA	99208
8317 N Standard St	Spokane	WA	99208
10207 N Arrowhead Rd	Spokane	WA	99208-9496
10311 N Arrowhead Dr	Spokane	WA	99208
4310 W Shawnee Ave	Spokane	WA	99208-9408
5108 W Ridgecrest	Spokane	WA	99208-8612
5112 W. Ridgecrest Dr.	Spokane	WA	99208
5125 W. Ridgecrest Dr.	Spokane	WA	99208
5136 W. Ridgecrest Dr.	Spokane	WA	99208
5211 W Edgewood Ct	Spokane	WA	99208
5219 W Ridgecrest Dr	Spokane	WA	99208-8902
5231 W. Ridgecrest Dr.	Spokane	WA	99208
5234 W Edgewood Ct	Spokane	WA	99208-8916
5303 W Ridgecrest	Spokane	WA	99208-8904
5624 W Lyons Ct	Spokane	WA	99208-3874
5801 W Shawnee Ave	Spokane	WA	99208
5801 W. Lonewolf Ave.	Spokane	WA	99208
5805 W. Lonewolf Ave.	Spokane	WA	99208
5806 W. Lonewolf Ave.	Spokane	WA	99208
5809 W. Lonewolf Ave.	Spokane	WA	99208
5810 W. Lonewolf Ave.	Spokane	WA	99208
6007 W Shawnee Ave	Spokane	WA	99208-9372
6011 W Shawnee Ave	Spokane	WA	99208
8518 N Valerie	Spokane	WA	99208-8801
8601 N Kelly Court	Spokane	WA	99208-9689
8710 N Kelly Court	Spokane	WA	99208-9681

9402 N Farmdale	Spokane	WA	99208
9405 N Farmdale	Spokane	WA	99208
9406 N Farmdale	Spokane	WA	99208
9410 N Farmdale	Spokane	WA	99208
9414 N Farmdale	Spokane	WA	99208-9133
9522 N Loganberry	Spokane	WA	99208-9406
9615 N Sylvia	Spokane	WA	99208-8632
3410 E 31st Ave	Spokane	WA	99223
3424 E 31st Ave	Spokane	WA	99223
3517 E 32nd Ave	Spokane	WA	99223
3518 E 31st Ave	Spokane	WA	99223-3707
3807 E 47th Ave.	Spokane	WA	99223
3808 E 47th Ave	Spokane	WA	99223
3808 E 48th Ave	Spokane	WA	99223
3811 E 48th Ave	Spokane	WA	99223
3812 E 48th Ave	Spokane	WA	99223-7865
3816 E 47th Ave	Spokane	WA	99223
3816 E 48th Ave	Spokane	WA	99223
4302 S Miami	Spokane	WA	99223
4305 S. Miami	Spokane	WA	99223
4306 S MIAMI	Spokane	WA	99223
4309 S Miami	Spokane	WA	99223
4310 S Miami	Spokane	WA	99223
4314 S Miami	Spokane	WA	99223
4319 S Miami St	Spokane	WA	99223-6144
4427 S Mrytle	Spokane	WA	99223
4431 S Mrytle	Spokane	WA	99223
706 E 34th	Spokane	WA	99203-3144
711 E 35th	Spokane	WA	99203-3159

# Appendix B Introduction Letter

WATER DEPARTMENT WATER QUALITY LABORATORY 914 E. North Foothills Dr. Spokane, WA 99207 (509) 742-8166 www.spokanewater.org



To the Resident of «AddressBlock»

Dear Customer:

During the week of August 2nd, the City of Spokane Water Department is testing the City drinking water for lead and copper. This is an ongoing program of testing as required by Federal and State regulations. We are required to do this testing every three years and we must sample the water at the consumer's tap.

Your residence has been chosen due to the possible presence of copper pipe with lead solder in the water service for your home. We need a special kind of sample from your kitchen or bathroom tap, and we need your help to take the sample. In appreciation for your assistance, you will be given a \$25 credit on your water bill. If you believe that your home is no longer fed by a copper service installed prior to 1986, please let us know and we will check our records.

Sampling your water is easy and will take just a short time, but it is important to sample in a specific manner. We will give you a specially prepared bottle and specific instructions. This includes sampling the first draw of the water, first thing in the morning after it has stood motionless in the pipes for at least six hours (overnight). This allows us to determine the "worst case scenario" for your home. We will then pick up the sample.

# We plan on dropping off the sample kit on Monday, August 2nd. We hope to pick up the filled sample bottle on Tuesday, August 3rd (or Wednesday, August 4th if there is a problem). Please call us at (509) 742-8161 if this is not possible for you.

This will be done at no cost to you, and we will notify you in writing of the results of the sample. If you have any questions, please call the Water Quality Program at 509 742-8166 or 509 742-8161.

Thank you in advance for your assistance, Sincerely,

Doug Greenlund, Water Quality Coordinator City of Spokane-Water Dept., Water Quality Laboratory 914 E. North Foothills Dr. Spokane, WA 99207 509-742-8166 dgreenlund@spokanecity.org

### Appendix C

Sampling Instructions and Questionnaire (on following pages)



WATER DEPARTMENT WATER QUALITY LABORATORY 914 E. North Foothills Dr. Spokane, WA 99207 (509) 742-8166 www.spokanewater.org

#### Lead and Copper Sampling Questionnaire

Please answer the following questions to the best of your ability;

- 1. Did you have any plumbing done on your home in recent months?
- 2. Do you have any in-home water treatment devices (i.e. water softener, inline water filter)? Is it installed on the cold water part of your water system?
- 3. Do you know of any electrical grounding problems in your house?
- 4. Regarding the tap that was sampled for lead and copper, did you use the same tap at night before you sampled for lead and copper? Did you flush the line with cold water before letting the water sit overnight?
- 5. Did you let the water sit in the tap for at least 6 hours (but not more than 72 hours) before taking your lead and copper sample?

Name:	
Address:	
Signature:	Date:

#### Thank you for your assistance



# Taking a Lead and Copper Sample

۳ The Next Morning

# The Night Before

#### Step One: Step Two: Step Three: 🗸 Step Four: First, select a faucet that is The water MUST NOT be Fill the bottle to the shoulder Next, remove the lid from the inside the house, used used for at least 6 hours bottle, and place the lid face and turn off the water. regularly, and does not have a anywhere inside or outside the down on the paper towel Do not overflow the bottle. filtering device attached. Do house (not even flushing the provided in the plastic bag. Place the cap back on the toilet). The water must stay in not remove the aerator. Get the "FIRST DRAW", DO bottle and tighten. Fill out the the house motionless NOT run the faucet without questionnaire (remember to **Then** flush the cold water line the bottle under the tap. sign at the bottom) and place for 3 to 4 minutes using the Turn on the COLD WATER back in the zip lock bag. faucet you will be sampling. and run a gentle stream to fill Leave the bottle on your front the bottle. porch with the completed questionnaire.

Please call 742-8166 or 742-8161, if you have any questions or if you cannot collect the sample on

the date scheduled.

### Appendix D

Location Map



# Appendix E Door Hanger Examples



We will be collecting the Lead and Copper Samples **tomorrow Aug. 3rd**. Please remember to let your water stand for 6 hours and then grab the "first draw". Once your sample is collected please leave it on your front porch with the Lead and Copper Questionnaire. In appreciation of your help, you will receive a \$25 credit on your water bill. SPOKANE

We will be collecting the Lead and Copper Samples **tomorrow Aug. 3rd**. Please remember to let your water stand for 6 hours and then grab the "first draw". Once your sample is collected please leave it on your front porch with the Lead and Copper Questionnaire. In appreciation of your help, you will receive a \$25 credit on your water bill.

Thank you for your assistance

If you have any questions, please contact; Doug Greenlund, City of Spokane-Water Department 742-8166 or <u>dgreenlund@spokanecity.org</u> Thank you for your assistance

If you have any questions, please contact;

Doug Greenlund,

City of Spokane-Water Department

742-8166 or dgreenlund@spokanecity.org



We stopped by today, August 3rd to collect your sample bottle and it was not available. We would like to try again on **Wed. Aug. 4th**. If that is not convenient please let us know when it would be convenient for you to take a sample at 742-8166. Otherwise, please leave the filled bottle on the porch so we can collect it.

Thank you for your assistance

If you have any questions, please contact; Doug Greenlund, City of Spokane-Water Department 742-8166 or <u>dgreenlund@spokanecity.org</u>



We stopped by today, August 3rd to collect your sample bottle and it was not available. We would like to try again on **Wed. Aug. 4th**. If that is not convenient please let us know when it would be convenient for you to take a sample at 742-8166. Otherwise, please leave the filled bottle on the porch so we can collect it.

Thank you for your assistance

If you have any questions, please contact;

Doug Greenlund,

City of Spokane-Water Department

742-8166 or dgreenlund@spokanecity.org



We are trying to finish lead and copper sampling, and we REALLY need your sample. Can you please fill the bottle, or leave out the empty bottle so we can collect it and ask someone else to help?

We will give you a \$25 credit on your water bill for your help. If there is a problem, please call 742-8166 and let us know. Please leave the filled bottle on the porch so we can collect it.

Thank you for your assistance



We are trying to finish lead and copper sampling, and we REALLY need your sample. Can you please fill the bottle, or leave out the empty bottle so we can collect it and ask someone else to help?

We will give you a \$25 credit on your water bill for your help. If there is a problem, please call 742-8166 and let us know. Please leave the filled bottle on the porch so we can collect it.

Thank you for your assistance

If you have any questions, please contact; Doug Greenlund, City of Spokane-Water Department 742-8166 or dgreenlund@spokanecity.org If you have any questions, please contact; Doug Greenlund, City of Spokane-Water Department 742-8166 or dgreenlund@spokanecity.org

#### Appendix F Customer Results Notification Letter

WATER DEPARTMENT WATER QUALITY LABORATORY 914 E. North Foothills Dr. Spokane, WA 99207 (509) 742-8166 www.spokanewater.org



August 23, 2021

To the Resident of «AddressBlock»

Dear Customer:

The City of Spokane Water Department (I.D. no. 83100K) has completed testing the City drinking water for lead and copper. This is an ongoing program of testing as required by Federal and State regulations. This test required testing the water at the consumer's tap. Your residence was chosen due to the possible presence of copper pipe with lead solder in the water service for your home. In the past we have included homes with lead service lines (LSL), however the City has successfully replaced all known LSL for single family residences. Please share this notice with everyone who uses or drinks the water in your residence.

The results at street address are: lead result  $\mu g/L$  (parts per billion) and copper result  $\mu g/L$  (parts per billion).

The maximum contaminant level goal (MCLG) is the level of a contaminant in drinking water below which there are no known or expected risks to health. MCLGs allow for a margin of safety. The action level is the concentration of a contaminant that, if exceeded, triggers treatment requirements or actions a water system must follow.

- The MCLG for lead is "0" and the action level is  $15 \mu g/L$  (parts per billion).
- The MCLG and action level for copper is  $1,300 \ \mu g/L$  (parts per billion).

The water system's compliance with the Lead and Copper Rule (LCR) is calculated by using sample results collected from sites in our sampling pool. Your location's lead or copper results may be higher or lower than the compliance calculation for the overall water system and does not reflect our water system's compliance with the LCR. The calculation result is:

- 1.83  $\mu$ g/L for lead, thus complying with the action level of 15  $\mu$ g/L, and
- 80.9  $\mu$ g/L for copper, thus complying with the action level of 1,300  $\mu$ g/L

If our water system had exceeded the action level, we would be required to notify all water users, <u>this is not the case</u>.

For more information: call: 509-625-7800 mail: 914 E North Foothills Drive, Spokane, WA 99207 email: info@spokanewater.org

Following is some general information concerning health of effects of lead

#### How Lead Gets Into Water

Lead in drinking water most often comes from water distribution lines or household plumbing rather than from the water system source water. Plumbing sources can include lead pipes, lead solder, faucets, valves, and other components made of brass. In most cases in the Spokane area, lead from other sources (such as lead-based paint and contaminated dust or soil) is a substantially greater risk, and can add to lead in drinking water in Spokane.

#### Potential Health Effects of Lead

The greatest risk of lead exposure is to infants, young children, and pregnant women. Lead can cause serious health problems if too much enters the body. Lead is stored in the bones and can be released later in life. Lead can cause damage to the brain and kidneys, interfere with production of red blood cells that carry oxygen, and may result in lowered IQ in children. During pregnancy, the child receives lead from the mother's bones, which may affect brain development. Low levels of lead can affect adults with high blood pressure or kidney problems.

#### How Copper Gets Into Water

Copper is a mineral and natural component in soils. In the correct amounts, it is an essential nutrient for humans and plants. In Washington State, most copper in drinking water comes from corrosion of household plumbing. Plumbing sources can include copper pipe and brass fixtures. Copper from plumbing corrosion can accumulate overnight.

#### Potential Health Effects of Copper

Although copper is an essential mineral in the diet, too much copper can cause health problems. Copper is widely distributed within the tissues of the body, but accumulates primarily in the liver and kidneys. A single dose of 15 mg of copper can cause nausea, vomiting, diarrhea, and intestinal cramps. Severe cases of copper poisoning have led to anemia and to disruption of liver and kidney functions. Individuals with Wilson's or Menke's diseases are at higher risk from copper exposure.

#### How you can reduce exposure:

- When your water has been sitting for several hours, flush the pipe by running the cold-water tap until the water is noticeably colder before using the water for drinking or cooking. (The longer water has been sitting in the pipes, the more dissolved metals it may contain).
- Use only cold water for drinking, cooking, and making baby formula. Water from your hot water tap may contain higher levels of lead or copper.
- Frequently clean the filter screens and aerators in faucets to remove captured particles. It is also a good time to soak the aerator in a mild vinegar solution to remove mineral deposits.
- If building or remodeling, only use "lead free" or low lead piping and materials. Avoid using copper piping or brass fixtures for locations where water will be consumed or used in food preparation (such as kitchen or bathroom sinks).

Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at <u>http://www.epa.gov/safewater/lead</u>.

We appreciate your assistance in ensuring that our water is safe. We also realize that your time is valuable, and you should have already received a \$25 credit on your water bill to help compensate you for your trouble. Thank you for your assistance.

Sincerely,

Doug Greenlund, Water Quality Coordinator City of Spokane-Water Dept., Water Quality Laboratory 914 E. North Foothills Dr. Spokane, WA 99207 509-742-8166 dgreenlund@spokanecity.org

#### Appendix G 2021 DOH Certification Letter

WATER DEPARTMENT WATER QUALITY LABORATORY 914 E. North Foothills Dr. Spokane, WA 99207 (509) 742-8166 www.spokanewater.org



September 20, 2021

Dorothy Tibbetts, Regional Manager Eastern Regional Office, Office of Drinking Water, Washington Dept. of Health 16201 E Indiana Ave Suite 1500 Spokane Valley WA 99216

Dear Ms. Tibbetts,

The City of Spokane Water & Hydroelectric Services Department has completed the 2021 monitoring for the Lead and Copper Rule. This letter summarizes the analytical results and demonstrates that the City of Spokane drinking water system is in compliance for: 1) Action Limit for Lead and Copper, and 2) Optimized for Corrosion Control pursuant to 40 CFR 141.81 (b)(3).

In the summer of 2018, the City completed its project to eliminate all known lead service lines (LSL) in its service area. As there were no LSL at the time of our sampling event, additional Tier 1 homes with copper service lines were selected to achieve a total of 64 samples collected.

Following is a summary of the analytical results for lead and copper in parts per billion (ppb) for samples acquired from 64 at-risk homes in our water system service area. Note that the results are listed from greatest to least, and number 58 (of 64 total) is the 90<sup>th</sup> percentile;

					Copper
Count	Address	Lead (ppb)	Count	Address	(ppb)
64	4309 S Miami	5.46	64	3816 E 48th Ave	111
63	5624 W Lyons Ct	4.07	63	10015 N Moore St	110
62	3811 E 48th Ave	2.5	62	5125 W. Ridgecrest Dr.	103
61	9522 N Loganberry	2.01	61	3518 E 31st Ave	103
60	3517 E 32nd Ave	1.89	60	4309 S Miami	99.3
59	5805 W. Lonewolf Ave.	1.86	59	4427 S Myrtle	87.3
58	3816 E 48th Ave	1.83	58	3808 E 47th Ave	80.9
57	3410 E 31st Ave	1.73	57	4431 S Myrtle	78.6
56	706 E 34th	1.63	56	5112 W. Ridgecrest Dr.	75.7
55	3808 E 47th Ave	1.56	55	3812 E 48th Ave	75.6
54	4306 S MIAMI	1.47	54	6007 W Shawnee Ave	74.4
53	4431 S Myrtle	1.45	53	3811 E 48th Ave	72.8
52	5125 W. Ridgecrest Dr.	1.37	52	4305 S. Miami	68.5
51	4305 S. Miami	1.27	51	4310 W Shawnee Ave	68
50	5231 W. Ridgecrest Dr.	1.22	50	3517 E 32nd Ave	67.6
49	8202 N General Lee Way	1.19	49	3410 E 31st Ave	66.1
48	505 E Vicksburg Pl	1.14	48	4310 S Miami	65.3
47	9406 N Farmdale	1.1	47	4306 S MIAMI	63.6
46	9405 N Farmdale	1.06	46	706 E 34th	63.4
45	3518 E 31st Ave	1.06	45	10207 N Arrowhead Rd	62.5
44	5303 W Ridgecrest	1.04	44	8202 N General Lee Way	58.9
43	4427 S Myrtle	1.04	43	5805 W. Lonewolf Ave.	58.1
42	4310 S Miami	0.998	42	9406 N Farmdale	58.1

41	4310 W Shawnee Ave	0.888	41	9414 N Farmdale	54.6
40	3424 E 31st Ave	0.828	40	5303 W Ridgecrest	54.1
39	3812 E 48th Ave	0.805	39	5810 W. Lonewolf Ave.	53.8
38	8518 N Valerie	0.783	38	3424 E 31st Ave	53.5
37	6007 W Shawnee Ave	0.776	37	5108 W Ridgecrest	52.6
36	5112 W. Ridgecrest Dr.	0.734	36	9615 N Sylvia	51.7
35	8317 N Standard St	0.705	35	8123 N General Lee Way	51.6
34	10015 N Moore St	0.654	34	8710 N Kelly Court	51
33	5108 W Ridgecrest	0.646	33	8311 N Standard St	50.3
32	711 E 35th	0.602	32	5136 W. Ridgecrest Dr.	49.3
31	8201 N General Lee Way	0.581	31	9410 N Farmdale	49.1
30	9414 N Farmdale	0.577	30	5801 W Shawnee Ave	49
29	5801 W Shawnee Ave	0.546	29	503 E. Vicksburg Pl	48.5
28	8206 N General Lee Way	0.539	28	8201 N General Lee Way	46.9
27	5809 W. Lonewolf Ave.	0.488	27	4314 S Miami	45.7
26	8122 N General Lee Way	0.47	26	9405 N Farmdale	43.2
25	10311 N Arrowhead Dr	0.457	25	8122 N General Lee Way	42.3
24	4314 S Miami	0.444	24	5231 W. Ridgecrest Dr.	41.8
23	5136 W. Ridgecrest Dr.	0.417	23	711 E 35th	41.8
22	502 E. Vicksburg Pl	0.411	22	4319 S Miami St	41.7
21	8123 N General Lee Way	0.394	21	8206 N General Lee Way	41.6
20	5219 W Ridgecrest Dr	0.383	20	5809 W. Lonewolf Ave.	41.3
19	8710 N Kelly Court	0.381	19	6011 W Shawnee Ave	40.6
18	8316 N Standard St	0.348	18	9522 N Loganberry	40.4
17	8311 N Standard St	0.346	17	502 E. Vicksburg Pl	39
16	4319 S Miami St	0.346	16	8316 N Standard St	38.1
15	9410 N Farmdale	0.339	15	5211 W Edgewood Ct	36.1
14	503 E. Vicksburg Pl	0.324	14	8317 N Standard St	35.7
13	10207 N Arrowhead Rd	0.31	13	5624 W Lyons Ct	35.4
12	9615 N Sylvia	0.279	12	5219 W Ridgecrest Dr	35.1
11	3807 E 47th Ave.	0.27	11	505 E Vicksburg Pl	35
10	7510 N Wiscomb	0.25	10	5234 W Edgewood Ct	34.4
9	6011 N. MONROE ST	0.189	9	7510 N Wiscomb	33.9
8	5806 W. Lonewolf Ave.	0.184	8	3807 E 47th Ave.	32.4
7	5234 W Edgewood Ct	0.166	7	8518 N Valerie	30.4
6	5810 W. Lonewolf Ave.	0.158	6	10311 N Arrowhead Dr	28.1
5	7638 N Wiscomb	0.149	5	8601 N Kelly Court	20.6
4	6011 W Shawnee Ave	0.1	4	9402 N Farmdale	16.5
3	9402 N Farmdale	0.083	3	5806 W. Lonewolf Ave.	13.5
2	8601 N Kelly Court	0.068	2	6011 N. MONROE ST	12.3
1	5211 W Edgewood Ct	< 0.05	1	7638 N Wiscomb	11.9

1) Action Levels

For our 2021 monitoring effort, the 90<sup>th</sup> percentile for Lead is 1.83 ppb. The Action Level for Lead (§ 141.80 (c)(1)) is 15 ppb. Our 90<sup>th</sup> percentile is less than this Action Level, thereby being in compliance.

For our 2021 monitoring effort, the 90<sup>th</sup> percentile for Copper is 80.9 ppb. The Action Level for Copper (§ 141.80 (c)(2)) is 1.3 ppm (1300 ppb). Our 90<sup>th</sup> percentile is substantially less than the Action Level, thereby being in compliance.

2) Optimization for Corrosion Control:

The ability to show Optimization for Corrosion Control is partially dependent on Source Well Lead concentrations. The following are the concentrations for our wells (laboratory results attached) as sampled on 7/27/2021:

Source Well	Lead, ppb	Copper, ppb
Nevada, SO1	< 1 *	11.9
Well Electric, SO2	< 1 *	5.31
Parkwater, SO3	< 1 *	3.12
Ray, SO4	< 1 *	5.01
Hoffman, SO5	< 1 *	< 1
Grace, SO6	< 1 *	1.66
Central, SO8	< 1 *	1.68

\*these results are reported as Non-detections which is a function of the State Reporting Limit. Anatek stated that the MDL for lead is substantially less than 1 ppb, subsequently these results are used as zero.

§ 141.81 (b)(3)(i) states:

Those systems whose highest source water lead level is below the Method Detection Limit may also be deemed to have optimized corrosion control under this paragraph if the 90th percentile tap water lead level is less than or equal to the Practical Quantitation Level for lead for two consecutive 6-month monitoring periods.

All of our source wells were less than the MDL of 1 ppb and the  $90^{th}$  percentile for lead (1.83 ppb), which is well below the defined PQL (§ 141.89(a)(1)(ii)), which is 5 ppb. We believe this demonstrates that our water system is optimized for corrosion control.

Attached are the laboratory results for our source well sampling, the 56 tap samples, and a generic copy of the letter currently being sent to our customers who participated in the sampling event.

If you have any questions, or need further information, please don't hesitate to contact me. Thank you for your consideration.

Sincerely,

Doug Greenlund Water Quality Coordinator (509)742-8166 dgreenlund@spokanecity.org

cc: Steve Burns, Director-Water Dept.
James Sakamoto, Water System Engineer
Seth McIntosh, Water System & Hydroelectric Plant Manager
Office file: Water Quality Laboratory
Attachment; Anatek Lab results for source wells Results letter for customers

## 6.6 Disinfection By-Product Sampling Plan

# Disinfection Byproducts Phase 2 Compliance Monitoring

**City of Spokane - Water Department Spokane, Washington** 

> Version 4 April 29, 2022



City of Spokane Water & Hydroelectric Services Department 914 E. North Foothills Drive Spokane, WA 99207

24 hour contact phone

509 625-7800

Loren Searl, Director

PWS ID # 83100K

Disinfection Byproducts Phase II Monitoring Plan

Revision 4 – April 29, 2022

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"In the past 30 years, the Safe Drinking Water Act (SDWA) has been highly effective in protecting public health and has also evolved to respond to new and emerging threats to safe drinking water. Disinfection of drinking water is one of the major public health advances in the 20th century. One hundred years ago, typhoid and cholera epidemics were common through American cities; disinfection was a major factor in reducing these epidemics."

"However, the disinfectants themselves can react with naturally-occurring materials in the water to form byproducts, which may pose health risks. In addition, in the past 10 years, we have learned that there are specific microbial pathogens, such as Cryptosporidium, which can cause illness, and are highly resistant to traditional disinfection practices."

"Amendments to the SDWA in 1996 require EPA to develop rules to balance the risks between microbial pathogens and disinfection byproducts (DBPs). The Stage 1 Disinfectants and Disinfection Byproducts Rule and Interim Enhanced Surface Water Treatment Rule, promulgated in December 1998, were the first phase in a rulemaking strategy required by Congress as part of the 1996 Amendments to the Safe Drinking Water Act."

"The Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DBPR) builds upon the Stage 1 DBPR to address higher risk public water systems for protection measures beyond those required for existing regulations."

"The Stage 2 DBPR and the Long Term 2 Enhanced Surface Water Treatment Rule are the second phase of rules required by Congress. These rules strengthen protection against microbial contaminants, especially Cryptosporidium, and at the same time, reduce potential health risks of DBPs."

http://water.epa.gov/lawsregs/rulesregs/sdwa/stage2/regs\_factsheet.cfm

## Background

### DBP Phase 1

The City of Spokane, as a groundwater system and subject to the Stage 1 Disinfection Byproduct (DBP 1) rule, initiated quarterly monitoring for disinfection byproducts in 2004. The sampling locations were chosen to have the longest residence time in the water system. Because the longest residence time changes seasonally, due to different seasonal demands (i.e. changes in irrigation demand), two different sites were identified; Mallen Hill Tank in the winter (January and April) and the Bonneville Power Administration Easement during the summer (July and October).

### DBP 2 site selection

This plan identified six sampling sites<sup>1</sup>; two sites from DBP-Stage 1 and four additional monitoring sites, and specifies compliance calculations, to comply with implementation of requirements for State 2 DBP.

Two of the four additional sites were chosen having detections of Total Trihalomethanes (TTHM) in the site selection process and also having the longest residence time in the system (where trihalomethanes are most likely to form).

The remaining additional two sites were chosen having HAA5 results; and having the longest residence times as possible and still consistently have a chlorine residual greater than 0.20 mg/L (having the greatest likelihood of haloacetic acid formation, and enough chlorine residual to inhibit biological activity that could possibly breakdown any of the haloacetic acids). Consideration was also given to representative distribution throughout the system.

Site	Site Characteristic
Mallen Hill	DBP Stage 1 Monitoring Site
BPA	Oldest Water (potential for greatest TTHM)
Eagle Ridge Two	Greatest TTHM (with oldest water)
Southview	Greatest TTHM result
Strong Road	HAA5 surrogate*
Cedar Hills	HAA5 surrogate*

### Winter Sampling Sites (January and April)

\* no HAA5 was detected in winter monitoring. Sites were selected for the presence of TTHM, a chlorine residual greater than 0.20, water age, and geographic/population representation in the distribution system.

<sup>&</sup>lt;sup>1</sup> 40 CFR 141.605 Table paragraph B

### Summer Sampling Sites (July and October)

Site	Site Characteristic	
BPA	DBP Stage 1 Monitoring Site	
Mallen	Oldest Water (potential for greatest TTHM)	
Eagle Ridge Two	Greatest TTHM (with oldest water)	
Southview	Greatest TTHM result	
Midbank	Greatest HAA5 detection	
Cedar Springs	Greatest HAA5 detection	

### DBP 2 sampling frequency/schedule

Dual samples, one each for trihalomethanes (TTHM) and haloacetic acids (HAA5) for all six sites, were collected on **Thursday, in the second full week of January, April, July, and October.** All samples were transported to our contract laboratory on the same day, or no later than the next day (Friday).

### Compliance calculations:

The results for each site will be compiled separately and tracked over time with a running annual average for each location. This will demonstrate compliance with the requirement for Locational Running Annual Average (LRAA) for each monitoring site<sup>2</sup>. Each LRAA will be compared to the Maximum Contaminant Level (MCL)<sup>3</sup> to determine compliance.

### DBP 2 Compliance Monitoring

Sampling was conducted for both TTHM and HAA5 at the six summer sampling sites and winter sampling sites for at a minimum of four consecutive quarters to calculate the LRAA for each site. There were no HAA5 detections during this monitoring. The TTHM monitoring for all locations was less than half of the MCL. In November of 2013 the City requested a reduced monitoring schedule at two locations Southview and Eagle Ridge 2. This request was granted by DOH in 2014.

<sup>&</sup>lt;sup>2</sup> § 141.64 (b)(2)

<sup>&</sup>lt;sup>3</sup> § 141.64 (b)(1)

## **Current Monitoring Plan**

### **Monitoring Locations**

Southview and Eagle Ridge 2 are the current monitoring locations and have been since 2014. Both locations are at storage tanks. There is a dedicated sampling line at each location.



Figure 1 DBP Sampling Sites

Disinfection Byproducts Phase II Monitoring Plan

### **Monitoring Frequency**

Each location is sampled once per quarter for both TTHM and HAA5. Sampling typically occurs during the second week of the second month of the quarter (February, May, August, and November).

### Sampling Procedure

The required sample vials are provided by the analytical laboratory the City has on contract. Currently, it is Anatek Labs. TTHM has a pair of 40 ml amber vials. HAA5 has a pair of 40 ml amber vials. The samples are collected with no head space. Check for an air bubble by inverting the vial and holding it up to a strong light, the amber vial can be difficult to see through. There must be no visible air bubble. Transfer samples to lab as soon as possible and maintain a temperature of less than 10 °C. Do not freeze the samples.

## **Monitoring Plan – Compliance Determination 4**

Analytical results for DBP Stage 2 monitoring will be complied in an Excel spreadsheet each quarter. The hardcopy of results will be stored on-site (consistent with other regulatory compliance monitoring) at the Upriver Facility (2701 N. Waterworks, Spokane, WA 99212).

The Excel spreadsheet will be used to determine compliance each quarter. The results for each sampling site will be accumulated and the most recent 4 quarters for each sampling site will be averaged and compared to the Maximum Contaminant Level (MCL)<sup>5</sup>.

Example:

 $\frac{Q1 + Q2 + Q3 + Q4}{4} = \text{Locational Running Annual Average (LRAA)}$ 

Where Q1 = the most recent DBP result

Q2 = the most previous DBP result

- Q3 = the next most previous DBP result
- Q4 = the DBP result previous to Q3

The resulting LRAA for each location is assessed against the MCL<sup>6</sup>:

<sup>5</sup> § 141.620 (c) (7)

<sup>6</sup> § 141.64 (b) (2) (i)

Disinfection Byproducts Phase II Monitoring Plan

<sup>&</sup>lt;sup>4</sup> § 141.620

Disinfection Byproduct	Maximum Contaminant Level (MCL) (µg/L)
Total Trihalomethanes (TTHM)	80
Haloacetic Acids (HAA5)	60

The LRAA at every site must comply with the MCL to demonstrate compliance.

# 6.7 Water Quality Parameter Sampling Procedure



# GWI WATER QUALITY PARAMETER MONITORING PLAN

City of Spokane Water Department Water Quality Laboratory



APRIL 25, 2022 CITY OF SPOKANE WATER DEPARTMENT 914 E North Foothills Drive Spokane, <u>W</u>A 99207

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### Appendices

Washington State Department of Health GWI Determination Information -WQ Monitoring Report template

## Background

In 1989 the EPA promulgated the Surface Water Treatment Rule (SWTR) in response to the 1986 Amendments to the Safe Drinking Water Act. The overall goal of the SWTR is to protect consumers from surface water pathogens. The SWTR recommends a multiple-barrier approach including source water protection, filtration, and disinfection when surface water is used a source for drinking water.

Water quality parameter testing began in earnest in December of 1997. The City submitted a Monitoring checklist for Evaluation of "Potential" GWI Sources. The checklist identified the monitoring parameters of a weekly frequency for water temperature, air temperature, conductivity, precipitation, turbidity, and pH. Total/ Fecal Coliform and heterotrophic plate count were to be performed monthly.

In August of 2000 the Washington State Department of Health made a preliminary determination of ground water under the direct influence of surface water for Well Electric wells 4 and 5. The following actions were required

A. The services of a professional engineer must be secured to direct further evaluation and actions regarding the source. Alternatives include:

- (1) Install (filtration treatment)
- (2) Comply with the requirements for the avoidance of filtration, or
- (3) Develop source management and disinfection facilities conforming to the "limited

alternative to filtration",

- (4) Reconstruct the source to exclude surface water impacts, or
- B. Disinfection of the source in accordance with WAC 246-290-461 shall be provided.

C. Microscopic particulate analysis (MPA) results based on a sampling plan approved by the department must be provided.

The city met these requirements. MPA results from the approved plan were submitted to the Department of Health. On February 11, 2004 the City was notified "The water quality data collected to date indicates to that this water source is not subject to the microbial health risk associated with surface water, as long as the provisions in the City's operational plan for Well Electric are met. Therefore, DOH has determined that Well Electric will be classified as "groundwater" for regulatory monitoring and compliance purposes, provided that the provisions in the City's operations plan for Well Electric are followed."

Ongoing Water Quality Parameter (WQP) testing is part of the City's operational plan.

## Current WQP Testing

### **Monitoring Locations**

The current plan has four monitoring locations.

Well Electric well 4. This well has a dedicated sampling pump. This pump supplies water to a dedicated sampling station on the south wall of the old Water lab.

Well Electric well 5. This well has a dedicated sampling pump. This pump supplies water to a dedicated sampling station on the south wall of the old Water lab. The sampling points for well 4 and 5 are next to each other as shown below.



Figure 1 Well Electric wells 4 and 5 Sampling Location

Parkwater well 3. This well has a dedicated sampling pump. The sample location is located along the north wall behind pump 3.



Figure 2 Parkwater well 3 Sampling Location

Spokane River. The river is sampled from the forebay shear boom on the southern end.



Figure 3 Spokane River Sampling Location

Precipitation is measured at the Upriver location. The rain gauge is located on the roof above the operation control room. There is a display in the operations control room.

Information for the pumps in service and flow rate are from the SCADA system.

Well level for Well Electric well 4 and well 5 are from the panel display located on the mezzanine above pump 1 location at Well Electric. (see figure 4). Parkwater is from the SCADA system.



Figure 4 Well Electric Well 4 and 5 level reading location

Head and tail elevation are in the SCADA system. Ask the operator for these readings.

Turbidity readings are from the controller in the field and collected when the other field readings such as water temperature and conductivity are performed. Turbidity meters are shown in figures 1 and 2.

The River flow is from the USGS gage number 12419000 on the Spokane River near Post Falls Idaho.

#### Parameters with Frequency

The following information is collected once per week at each well and the Spokane River

Water Temperature in C Air Temperature in C Conductivity in  $\mu$ S/cm pH Turbidity in NTU Well Level elevation in feet Pumps on at site Instantaneous flow of all pumps in gpm Water Elevation of Tail and Head at dam Precipitation in inches River flow in cubic feet per second

The following information is collected once a month from each well and the Spokane River

Total Coliform and E. coli and Heterotrophic Plate Count (HPC)

#### Sampling Methods

Grab samples are collected for turbidity, pH, conductivity, and temperature. HPC, Total coliform and E. coli are sampled following the Water Quality Laboratory SOP.

#### Data collection

The data is collected on log sheets in the field. These paper records are stored in the Water Quality Laboratory. Data for the Spokane River, Well Electric Well 5 and Parkwater are entered into a Microsoft Access Database. The completed monthly WQ monitoring report is filed in the water quality laboratory with the monthly well data.

## 6.8 Operations Procedure and Standard Form

### **Operations Procedure: CT6 Well Electric Chlorine Residual Testing**

### **Overview Prologue**

The City of Spokane Water Department reports the CT6 for Well Electric Intermediate, Low and North Hill Systems each month to the Washington State Department of Health. Chlorine residual as measured at the entry point to the distribution system is used on the form. The values the Operators enter on the Well Electric Chlorination log are the source of the information. The Intermediate System residual must be at least 0.2 mg/L. The Low System residual must be at least 0.3 mg/L. The North Hill System residual must be at least 0.2 mg/L. These are minimum residual requirements; other operational needs might require higher chlorine residuals. All chlorine residuals should be below 0.4 mg/L. The chlorine residual must be at least 0.2 mg/L in the distribution system [WAC 246-290-010 (80)]

We are required to report a chlorine residual per day for each system in operation.

# Please review Procedure 122 on how to take a chlorine residual and pay special attention to step 6.(agitating the sample for 20 seconds)

### Procedure

Each shift the operator must test and record the residual for each pump in service at Well Electric. This should be done during the regular rounds at the start / beginning of the shift. These steps will also be followed after you start or before you stop a pump during your shift. If you have already taken a residual on your shift you do not need to take another one.

Procedure in an outline format list:

- 1. Sample and test chlorine residual for each running pump
- 2. Record the chlorine residual for the system on the Well Electric chlorination log in the operations control room.
- **3.** Adjust chlorine injection level if the residual is not in the normal range.
- 4. Retake the chlorine residual in 10 to 15 minutes
- 5. Repeat until within normal range.
- 6. Record starting and ending chlorine feed rate (PPD) on Well Electric chlorination log sheet

Caution: Use hearing protection as needed when sampling Well Electric Pumps

Operation Training Manual: 300 GENERAL OPERATIONAL DUTIES



**WARNING:** Chlorine is a highly toxic gas, follow all Chlorine safety procedures when adjusting feed rate.

### **REQ & CT6 DOH GROUND WATER TREATMENT PLANT AND DISTRIBUTION REPORT**

Water System Name: City of Spokane					Month/Year:			1	advington State Department of		
County: Spoka	ane	•				Report submitted by: Doug Greenlund					
PWS ID# : 831	100K					Operator Certification #: 15224					Joalth
DOH Source #:	S02 (Well E	lectric, AHC996)				Signature:				- U I	ieuin
DOH Treatmen	nt Plant ID #: 8	331000002				Telephone: 509-742-8166					
DOH Wa	ter Quality R	equirements: North	h Hill Water System:		DOH Water Qualit	y Requirements: Lo	ow Water System:	D	OH Water Quality Re	quirements: Intern	ediate Water System:
required fre	ee Cl <sub>2</sub> concentra	tion at point of compli-	ance must be $\geq 0.2 \text{ mg/L}$	re	quired free Cl <sub>2</sub> concentration at point of compliance must be $\geq$ <b>0.3</b> mg/L required free Cl <sub>2</sub> concentration at point of compliance must be $\geq$ <b>0.3</b> mg/L			quired free Cl <sub>2</sub> concentrat	ition at point of complicance must be $\ge 0.2 \text{ mg/L}$		
		ution System must be r				ution System must be r			Cl <sub>2</sub> Residual in Distribution System must be no less than 0.2 mg/L		
Free Chl	of Compliance	Free Chlorine Residual in	/ Initials of Sampler /	Dev	Free Chlorine Residual	Free Chlorine Residual in	/ Initials of Sampler /	Dev	Free Chlorine Residual at Point of Compliance	Free Chlorine Residual in	/ Initials of Sampler /
Day at Folia (	(mg/L)	Distribution (mg/L)	Comments	Day	(mg/L)	Distribution (mg/L)	Comments	Day	(mg/L)	Distribution (mg/L)	Comments
1				1				1			
2				2				2			
3				3				3			
4				4				4			
5				5				5			
6				6				6			
7				7				7			
8				8				8			
9				9				9			
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31				31				31			

Please keep a copy for your records and send report by the 10<sup>th</sup> of the following month to: DOH 16201 East Indiana Avenue, Ste. 1500 Spokane Valley WA 99216 or Email: <u>EROChlorination@doh.wa.gov</u> or Fax: 509-456-2997

# 6.9 Cross Connection Control Program

# **City of Spokane**

# **Cross Connection Control Program**

# Protecting the Water Distribution System

from Cross-Connection Contamination

meeting the requirements of <u>WAC 246-290-490:</u>

# Water and Hydroelectric Services

September 6, 2023

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### SECTION I

### LEGAL AUTHORITY

Spokane Water Departments' (SWD) legal authority to implement a cross connection control program is provided by the <u>Spokane Municipal Code 13.04.0818</u> and City of Spokane Ordinance C-31957 adopted by the City of Spokane Council on July 28, 1997. The ordinance requires SWD to implement a cross connection control program in accordance with <u>WAC 246-290-490</u>:or subsequent revisions of the WAC as adopted by the Washington State Department of Health.

### **SECTION II**

### PURPOSE, RESPONSIBILITY, AND GENERAL REQUIREMENTS OF PROGRAM

- A. Purpose and Responsibility
  - 1. The purpose of SWD's cross-connection control program shall be to protect the public water system, as defined in WAC 246-290-490, from contamination via cross-connections.
  - 2. SWD's responsibility for cross-connection control shall begin at the water supply source, include all the public water treatment, storage, and distribution facilities, and end at the point of delivery to the consumer's Water system, which begins at the consumer's water service at a point typically near the property line or utility held easement. As the authority having jurisdiction, we can enforce backflow protection in-premises.
- B. General Program Requirements
  - 1. SWD shall develop and implement a cross-connection control program that meets the requirements of <u>WAC 246-290-490</u>;, but may establish a more stringent program through SWD's ordinance or operating policies.
  - 2. SWD shall ensure that good engineering and public health protection practices are used in the development and implementation of cross-connection control program. Department publications and the most recently published editions of references, such as, but not limited to those listed below, are used as guidance for the cross-connection program development and implementation.
    - a. Accepted Procedure and Practice Cross-Connection Control Manual published by the Pacific Northwest Section of the American Water Works Association (PNWS-AWWA Manual).

- b. Manual of Cross-Connection Control published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California (USC Manual).
- 3. SWD may implement their own cross-connection control program, or any portion thereof, directly or by means of a contract with another agency or party acceptable to the State Department of Health.
- 4. SWD is the authority in all matters concerning cross-connection control. SWD shall document and describe such coordination, including delineation of responsibilities in the written cross connection control program required in subsection 2 (e) of WAC 246-290-490
- 5. SWD shall ensure that cross-connections between the distribution system and the consumer's water system are eliminated or controlled by the installation of an approved backflow preventer commensurate with the degree of hazard. This will be accomplished by implementation of a cross-connection program and policy that relies on:
  - a. Premise isolation as defined in WAC 246-290-010
  - b. In-premise protection as defined in <u>WAC 246-290-010</u>
  - c. Combination of both.
- 6. When SWD's cross-connection control program relies both on premise isolation and/or in-premise protection:
  - a. The program shall comply with the premise isolation requirements specified in subsection (4)(b) of <u>WAC 246-290-490</u>: and
  - b. May reduce premise isolation requirements and rely on in-premise protection for premises other than the type addressed in subsection (4)(b) of <u>WAC 246-290-490</u>: if the conditions in (4)(c)(ii)of that subsection are met.
- 7. SWD <u>may</u> rely on in-premise protection only when the following conditions are met:
  - a. The in-premise backflow preventers provide a level of protection commensurate with the purveyor's assessed degree of hazard:
    - Backflow preventers which provide the in-premise backflow protection shall meet the definition of approved backflow preventers as described in WAC 246-290-010
    - The approved backflow preventers are installed, inspected, tested (if applicable), maintained, and repaired in accordance with subsections (6) and (7) of <u>WAC 246-290-490</u>.
    - 3) Records of such backflow preventers are maintained in accordance with subsections (3)(j) and (8) of <u>WAC 246-290-490</u>; and
    - 4) SWD has reasonable access to the consumer's premise to conduct an initial hazard evaluation and periodic reevaluations to determine whether the inpremise protection is adequate to protect SWD's distribution system.
- 8. SWD shall take appropriate corrective action within its authority if:
  - a. A cross-connection exists that is not controlled commensurate to the degree of hazard assessed by SWD.

- b. A consumer fails to comply with SWD's requirements regarding the installation, inspection, testing, maintenance, or repair of approved backflow preventers required by the <u>WAC 246-290-490</u>:.
- 9. SWD's corrective action may include, but is not limited to:
  - a. Denying or discontinuing water service to a consumer's premises until the crossconnection hazard is eliminated or controlled to the requirements of the purveyor.
  - b. Requiring the consumer to install an approved backflow preventer for premise isolation commensurate with the degree of hazard; or
  - c. SWD installing an approved backflow preventer for premise isolation commensurate with the degree of hazard. All costs associated with the installation of the backflow preventer installed by SWD shall be charged to the property owner.
- 10. SWD denying or discontinuing water service to a consumer's premises for one or more of the reasons listed in subsection 2.(i) of the <u>WAC 246-290-490</u>:shall notify the local administrative authority prior to taking such action except in the event of an emergency.
- 11. SWD shall prohibit the intentional return of used water to the purveyor's distribution system. Such water would include, but is not limited to, water used for heating, cooling, or any other purposes within the consumer's water system.

### **SECTION III**

### APPROVED BACKFLOW PREVENTER SELECTION

### A. SWD CROSS CONNECTION CONTROL SPECIALIST (CCS) ENSURES:

- 1. The degree of hazard posed by the consumer's water system upon SWD's distribution system; and
- 2. Determines the appropriate method of backflow protection for premise isolation in accordance with Table 12 listed in <u>WAC 246-290-490</u>:.
- 3. Premise isolation requirements.
  - a. For service connections with premises posing a high health cross connection hazard including, but not limited to, those premises listed in Table 13, the purveyor shall ensure that an approved air gap or RPBA is installed for premise isolation.
  - b. If SWD's CCS determines that no hazard exists for a connection serving a premise of the type listed in Table 13, the requirements of 3.a. of this section do not apply.
  - c. SWD will document, on a case-by-case basis, reasons for not applying the requirements of 3.a. of this section to a connection serving premises of the type listed in Table 13 and include such documentation in the cross-connection control program summary report as required by <u>WAC 246-290-490</u>:.

### TABLE 12

### APPROPRIATE METHODS OF

### BACKFLOW PROTECTION FOR PREMISES ISOLATION

Degree of Hazard	Application Condition	Appropriate Approved Backflow		
		Preventer		
High health	Backsiphonage or	AG, RPBA, or RPDA		
cross-connection hazard	backpressure backflow			
Low health	Backsiphonage or	AG, RPBA, RPDA, DCVA, or		
cross-connection hazard	backpressure backflow	DCDA		
	-			

### TABLE 13

# HIGH HEALTH CROSS-CONNECTION HAZARD PREMISES REQUIRING PREMISES ISOLATION BY AG OR RPBA

Agricultural (farms, marijuana grows, and dairies)

Beverage bottling plant

Car washes

Chemical plants

Commercial laundries and dry cleaners

Premises where both reclaimed water and potable water are provided.

Film processing facilities

Food processing plants

Hospitals, medical centers or offices, nursing homes, veterinary, medical/dental clinic, and blood plasma centers

Premises with separate irrigation systems using the purveyor's water supply which utilizes chemical addition or a booster pump +

Laboratories

Metal plating industries

Mortuaries

Petroleum processing or storage plants

Premises with an unapproved auxiliary water supply

Survey access denied or restricted

Wastewater lift stations and pumping stations

Wastewater treatments plants\*

Radioactive material processing plants or nuclear reactors\*

+ For example, parks, playgrounds, golf courses, cemeteries, estates, etc.

\* RPBA's for connections serving these premises are acceptable only when used in combination with an in-plant approved air gap; otherwise, SWD shall require an approved air gap at the service connection.

- 4. Backflow protection for single-family residences.
  - a. Single-family residential service connections shall comply with the premise Isolation requirements when applicable.
  - b. If the single family residential premise isolation does not apply and the requirements specified in subsection (2)(h) of <u>WAC 246-290-490</u>: are met, SWD will rely on backflow protection provided at the point of hazard in accordance with <u>WAC 51-46-0603</u> of the Uniform Plumbing Code (UPC) for hazards such as, but not limited to:
    - 1) Irrigation systems
    - 2) Swimming pools or spas
    - 3) Ponds
    - 4) Boilers
- 5. Backflow protection for fire protection systems.
  - a. Backflow protection is not required for residential flow-through or combination fire protection systems constructed to potable water piping and materials.
  - b. For service connections with fire protection systems other than flowthrough or combination system, SWD shall ensure that backflow protection is consistent with <u>WAC 51-46-0603</u> of the UPC is installed. The UPC requires minimum protection as follows:
    - 1) An RPBA or RPDA for fire protection systems with chemical addition or using unapproved auxiliary water supply; and
    - 2) A DCVA or DCDA for all other fire protection systems.
  - c. For new connections made on or after the effective date of the current regulations, SWD shall ensure that backflow protection is installed before water service is provided.
  - d. For existing fire protection systems:
    - 1) With chemical addition or using unapproved auxiliary supplies, SWD shall ensure that backflow protection is installed within ninety days of the purveyor notifying the consumer of the high health cross-connection hazard or in accordance with an alternate schedule based on the level of hazard.
    - 2) Without chemical addition, without on-site storage, and using only SWD's water (i.e., no unapproved auxiliary supplies on or available to the premises), the SWD shall ensure that backflow protection is installed in accordance with a schedule acceptable to SWD or at an earlier date, as the agency administering the Uniform Building Code as adopted under chapter <u>19.27 RCW.</u>
- 6. SWD may require backflow preventers commensurate with the degree of hazard determined by SWD to be installed for premise isolation for connections serving premises that have characteristics such as, but not limited to, the following:

- a. Complex plumbing arrangements or plumbing potentially subject to frequent changes that make it impractical to assess whether cross connection hazards exist.
- b. A repeated history of cross-connections being established or reestablished; or
- c. Cross-connection hazards are unavailable or not correctable, such as, but not limited to tall buildings.
- 7. Any service with a booster pump raises the level of protection requirement by one.

### **SECTION IV**

### APPROVED BACKFLOW PREVENTERS

- A. SWD shall ensure that all backflow prevention assemblies relied upon by the SWD are models included on the current list of backflow prevention assemblies approved for use in Washington State. The current approved assemblies' list is available from the State.
- B. SWD may rely on testable backflow prevention assemblies that are not currently approved by the department, if the assemblies.
  - 1. Were included on the department and/or <u>USC list of approved backflow prevention</u> <u>assemblies</u> at the time of installation.
  - 2. Have been properly maintained.
  - 3. Are commensurate with SWD's assessed degree of hazard; and
  - 4. Have been inspected and tested at least annually and have successfully passed the annual test.
- C. SWD shall ensure that an unlisted backflow prevention assembly is replaced by an approved assembly commensurate with the degree of hazard, when the unlisted assembly:
  - 1. Does not meet the conditions specified in B. of this section of this subsection.
  - 2. Is moved.
  - 3. Cannot be repaired using spare parts from the original manufacturer.
- D. SWD shall ensure that AVB's meet the definition of approved atmospheric vacuum breakers as described in <u>WAC 246-290-010</u>.

### **SECTION V.**

### APPROVED BACKFLOW PREVENTER INSTALLATION

- A. SWD shall ensure that approved backflow preventers are installed in the orientation for which they were originally approved by the certifying laboratory.
- B. SWD shall ensure that approved backflow preventers are installed in a manner that:
  - 1. Facilitates their proper operation, maintenance, inspection, and/or in-line testing (as applicable) using standard installation procedures acceptable to the department such as those in the USC Manual or PNWS-AWWA Manual.
  - 2. Ensures that the assembly will not become submerged due to weather-related conditions such as flooding and ground water.
  - 3. Ensures the assembly is installed in an accessible location with adequate clearances from walls, equipment, etc. that will allow repairs and or replacement of the assemblies.
  - 4. Ensures compliance with all applicable safety regulations.
- C. SWD shall ensure that approved backflow assemblies for premise isolation are installed at a location adjacent to the meter or property line or an alternate location acceptable to SWD.
- D. When premise isolation assemblies are installed at an alternate location acceptable to SWD, SWD and the property owner shall ensure that there are no connections between the point of delivery from the public water system and the approved backflow assembly, unless the installation of such a connection meets cross-connection control requirements and is specifically approved by SWD.
- E. SWD shall ensure that approved backflow preventers are installed in accordance with the following time frames:
  - 1. For new connections made on or after the effective date of these regulations, the following conditions listed in Section A through B shall be met before service is provided.
  - 2. For existing connections where the purveyor identifies a high health cross connection hazard, the provisions listed in Section VII C.3.e.1 shall be met:
  - 3. For existing connections where the purveyor identifies a low health cross connection hazard, the provisions listed in Section VII C.3.e.2 shall be met in accordance with a schedule acceptable to the purveyor.
- F. SWD shall ensure that bypass piping installed around any approved backflow preventer is equipped with an approved backflow preventer that:
  - 1. Affords at least the same level of protection as the approved backflow preventer that is being bypassed; and
  - 2. Complies with all applicable requirements.

### **SECTION VI**

### APPROVED BACKFLOW PREVENTOR INSPECTION AND TESTING

- A. SWD shall ensure that:
  - 1. A SWD CCS inspects backflow preventer installations to ensure that protection is provided commensurate with the assessed degree of hazard.
  - 2. Either a Backflow Assembly Tester (BAT) or CCS inspects:
    - a. Backflow prevention assemblies for correct installation and approval status.
    - b. Air gaps installed in lieu of approved backflow prevention assemblies for compliance with the approved air gap definition.
  - 3. A BAT tests the approved backflow prevention assemblies upon installation for proper operation.
- B. SWD shall ensure that inspections and/or tests of approved air gaps and approved backflow assemblies are conducted:
  - 1. At the time of installation
  - 2. Annually, after installation, or more frequently if required by for connections serving premises or systems that pose a high health cross-connection hazard or for assemblies that repeatedly fail.
  - 3. After a backflow incident; and
  - 4. After an assembly is repaired, reinstalled, or relocated or an air gap is replumbed.
- C. SWD shall ensure that an inspection and testing of an approved backflow assembly after being installed on irrigation systems:
  - 1. At the time of installation.
  - 2. After a backflow incident, and
  - 3. After repair, reinstallation, or relocation
- D. SWD shall ensure that approved backflow prevention assemblies are tested using procedures acceptable to the department, such as those specified in the most recently published edition of the USC Manual. When circumstances, such as, but not limited to, configuration or location of the assembly, preclude the use of USC test procedures, SWD may allow, on a case-by-case basis, the use of alternate (non-USC) test procedures acceptable to the department.
- E. SWD shall ensure that the results of backflow prevention assembly inspections and tests are documented and reported in a manner acceptable to SWD.
- F. SWD shall ensure that an approved backflow prevention assembly, whenever found to be improperly installed, defective, not commensurate with the degree of hazard, or failing a test (if applicable) is properly reinstalled, repaired, overhauled, or replaced.

G. SWD shall ensure that an approved air gap, whenever found to be altered, or improperly installed, is properly replumbed or, if commensurate with the degree of hazard, is replaced by an approved RPBA.

### SECTION VII

### EVALUATION OF PROTECTION REQUIRED

- A. New Water Services Commercial
  - 1. Prior to providing water service, the following procedures are followed:
    - a. A service application shall be properly filled out by the owner of the project or his designated agent.
    - b. A copy of the site plan is required.
    - c. If premise is listed as a high hazard per table 13 in <u>WAC 246-290-490</u>., SWD will initially classify it as a high health hazard.
    - d. If the premise is not listed in table 13 of <u>WAC 246-290-490</u>:or there is a question as to whether it is a high hazard, the following steps are followed:
      - 1) A copy of the mechanical (plumbing) and plumbing fixture schedule is requested.
      - 2) The plans are reviewed for actual and potential cross connections.
      - 3) Each fixture and/or cross connection is assessed for degree of hazard and backflow protection required for each according to plans.
      - 4) Based on this information, the degree of hazard the premise poses to SWD public water system is assessed and backflow protection shall be required in accordance with the assessed degree of hazard.
      - 5) Backflow protection will be required at the property line or where water service enters the premise prior to the first. branch tee. SWD shall have final authority on where the backflow device will be located.
      - 6) When construction begins, SWD monitors & inspecting progress. When backflow prevention assemblies SWD has required are installed, one of SWD's CCS will inspect to assure proper type of assembly has correctly been installed.
      - 7) When installation is approved, SWD gathers the required information for each assembly and the assembly is tested by a certified tester.
      - 8) All required information is gathered for the facility and assemblies are entered into SWD's backflow assembly computer database program.
- B. New Water Services Residential
  - 1. At the time-of-service installation an SWD Water Service Inspector (CCS) will assess the degree of hazard posed by the residential premises to SWD's distribution system.

- 2. Based on this information, the degree of hazard the premise may pose to SWD's distribution system is assessed and backflow protection shall be required in accordance with the assessed degree of hazard.
- C. Existing Water Services
  - 1. All surveys are conducted in accordance with <u>WAC 246-290-490</u>:
  - 2. Backflow protection is required:
    - a. On the service line to some facilities
    - b. Or service lines and at the fixture(s)
    - c. Or required only at the fixture. When relying on only fixture protection, UPC and current PNWS AWWA Cross Connection Control Manual and/or SWD's requirements were depended upon to ensure backflow protection was commensurate with degree of hazard.
  - 3. When the customer is relying on in-premise backflow protection, SWD will require owners to follow the following provisions which includes, but is not limited to:
    - a. A water use survey of premise's entire plumbing system by a SWD inspector (CCS) will be required.
    - b. The SWD Inspector (CCS) shall be required to correctly prepare a cross connection control inspection report including:
      - 1) Identifying all cross connections, including degree of hazard, and if properly controlled in accordance with Section III.A.4.b.
      - 2) Inspect all backflow protection for correct installation and USC approved.
      - 3) A backflow assembly test and a completed test report for all testable backflow preventers.
      - 4) Returning to SWD, by the annual compliance date, the inspection report, test report(s) and documentation of air gap and atmospheric vacuum breaker inspection.
      - 5) If owner does not comply, SWD will proceed with procedures for discontinuing water service or installing backflow protection on water service line as described in Section II.B.9.
  - 4. Under <u>WAC 246-290-490</u>:SWD will implement a program to reevaluate all commercial premises that do not presently have an RPBA installed on their water service.
    - a. A priority list will be made with the premises SWD determine pose the highest hazards to SWD's potable water supply. The list will rank the hazards in order of threat. The greatest threats will be listed at the top and least potential threats at the bottom. Table 13 in the State regulation will be used as a guideline for establishing this list.
    - b. The priority list will be used for re-evaluating the degree of hazard starting with the highest threat and working down the list.
    - c. A letter will be sent to the owners of each facility listed on the priority list. This letter will review cross connection control basics, with the addition of the reasons

for water use reevaluation, and a prospective date for a meeting and/or water use survey.

- d. Degree of hazard will be determined by Table 13 of <u>WAC 246-290-490</u>; the current PNWS AWWA Cross Connection Control Manual, the UPC and/or by a water use survey of the premises.
- e. Backflow protection shall be required based upon the above findings in accordance with Table 12 of <u>WAC 246-290-490</u>:.
  - 1) If it is determined the premise poses a high hazard to SWD's public water system; an RPBA will be required on water service to facility within 90 days or in accordance with an alternate schedule acceptable to SWD.
  - If it is determined the premise poses a low hazard to SWD's public water supply, a DCVA will be required on water service to facility within 90 days or in accordance with an alternate schedule acceptable to SWD. Reason for DCVA requirement shall be, but not limited to:
    - a. SWD has no control of plumbing changes inside premises.
    - b. Lack of personnel to make annual water use surveys of these premises.
- f. Existing fire suppression systems not presently controlled by State approved backflow protection will be required to comply as described in Section III.A.5.d.
- g. Existing irrigation systems that are capable of polluting or contaminating SWD's public water supply and controlled by State approved backflow protection, shall comply, as described in Section III.A.4.b.
- h. Backflow protection will be installed:
  - 1) On the service line to premises requiring premise isolation at or near property line or inside of facility prior to the first, branch tee; or
  - 2) At the point of supply to fire suppression and irrigation systems.
- i. When backflow prevention assemblies are installed, SWD follows the same procedures listed in Section V. SWD shall have final authority on where the backflow assembly will be located.
- D. Periodic Reevaluation
  - 1. All premises without an RPBA installed on a water service are subject to periodic reevaluation.
    - a. All changes in occupancy of commercial and industrial facilities will be monitored through SWD's backflow computer database and business office billing system computer.
    - b. If type of occupancy changes, which may increase degree of hazard, a water use reevaluation will be conducted within 90 days. The procedures followed are:
    - c. A letter will be sent to the owner of each premises to be reevaluated. This letter will review cross connection control basics as described in A. 1.6. of this section

with the reasons for the reevaluation and a prospective date for a meeting and/or water use survey.

d. Based upon the water use survey, backflow protection will be required commensurate with degree of hazard as described in Section III.

### SECTION VIII

### SWD CROSS CONNECTION CONTROL PERSONNEL

- A. 1 Head CCS
- B. 6 Cross Connection Control Inspectors,
- C. 13 State Certified Cross Connection Control Specialists
- D. 12 State Certified Backflow Assembly Testers.

### **SECTION IX**

### ANNUAL TESTING PROGRAM

- A. SWD has developed and implemented a backflow prevention assembly testing quality assurance program. This includes but not limited to:
  - 1. Documentation of tester certification by requiring proof of current certification of all testers.
  - 2. Documentation of brand, model, serial number, and date of last verification of accuracy is required on all test kits used to test backflow Preventers in SWD's jurisdiction.
    - a. Verification of accuracy of test kits is required annually.
  - 3. A test report for each backflow prevention assembly required to be tested is sent to the owner of the backflow preventer.
    - a. Test report lists the following information:
      - 1) Owner's name, address, service number and phone number
      - 2) Name of business, if applicable, and contact person
      - 3) File number and assembly number
      - 4) Cross connection controlled.
      - 5) Location of backflow preventer
      - 6) Type, Brand, Model, and size of backflow preventer
    - b. The tester is required to correctly fill out the test report, including:
      - 1) System water pressure at time of test.
      - 2) Pressure differentials, buffer, etc. for assembly being tested.
      - 3) Note if the assembly passed or failed the test.
      - 4) If the assembly is installed correctly.
      - 5) Are there any unauthorized connections or modifications to the assembly.
      - 6) Test kit brand, model, serial number, and date of last verification of accuracy.
- 7) Print full name and phone number of tester.
- 8) Signature and certification number of tester.
- 9) Date of initial test.
- 10) If assembly failed:
  - a. List repairs made.
  - b. Person making repairs.
  - c. Results of final test.
  - d. Signature and certification number of tester.
  - e. Date of final test.
- c. A letter accompanies the test report that contains basics of cross connection control with the addition of testing requirements and compliance date for returning test report.
  - 1) Test report and letter is sent to owner and lessee, if applicable.
  - 2) A list of area commercial testers is included.
- d. Compliance date for returning completed test is included in the letter.
  - 1) Report is sent out 30 to 40 days prior to the compliance date.
  - 2) If completed test report is not returned by compliance date, a "second notice" (1st letter of non-compliance) is sent.
    - a. This letter is sent by email/mail to the owner.
    - b. The letter indicates that this is the "second notice."
    - c. Completed test report must be returned within 15 days.
    - d. Owner is reminded if test report not returned by due date, SWD will proceed to discontinue water service to premises.
- 4. If completed test report is not returned by compliance date, a "third notice" (2nd letter of non-compliance) is sent.
  - a. Letter is sent by mail to the owner.
  - b. Letter indicates this is the third notice.
  - c. Completed test report must be returned within 5 working days.
  - d. Owner is reminded if test report is not returned by due date, SWD will proceed to discontinue water service to premise.
- 5. If completed test report is not returned by compliance date, a fourth notice, (3rd letter of non-compliance) is sent.
  - a. Letter indicates this is the fourth notice and is delivered in person to the facility/property.
  - b. Completed test report must be returned within 5 working days.
  - c. Owner is reminded if test report is not returned by due date, SWD will proceed to discontinue water service to premise.

# SECTION X

# **RECORD KEEPING**

- A. SWD maintains cross connection control records per <u>WAC 246-290-490:</u>:
  - a. Records of all documented backflow incidents occurring in SWD's service area will be reported within 24 hours to the State. These records will be kept for a minimum of 5 years after the life of the assembly.
  - b. All cross-connection control records and reports are either maintained in a backflow protection computer database program, as hard copies, or both.
  - c. A cross connection control annual summary report will be submitted annually to the State using a form or format available from or approved by the State. These reports will be kept by SWD a minimum of 5 years.

# **SECTION XI**

# BACKFLOW INCIDENT INVESTIGATION PROCEDURES

A. The SWD has adopted the PNWS-AWWA Cross Connection Control Committee Procedures for incident investigation reporting.

# **SECTION XII**

# RECLAIMED WATER

- A. Premises served by SWD receive/utilize reclaimed water, SWD will enforce the State's requirements under a permit issued in accordance with <u>Chapter 90.46 RCW</u>.
- B. Any facility using or producing reclaimed water is required to have an RPBA at premise, and an Air Gap at the point of reclaimed water usage. <u>WAC 246-290-490:</u>

# SECTION XIII

# PUBLIC EDUCATION

- A. An organized and well-executed education program is essential for SWD's Cross Connection Control (CCC) program to succeed. SWD has been involved for years in educating all entities associated with the water works industry. This includes, but is not limited, to the following:
  - 1. CCC Organizations
    - a. SWD has been actively involved in establishing, supporting, and actively participating in National (American Backflow Protection Association), Regional (Pacific Northwest Section American Water Works Association), and Local (Spokane Regional CCC) organizations. These organizations strive to establish continuity of enforcement and requirements in CCC. In doing so, they develop various manuals, brochures, and training aids that are used in education. SWD depends on much of this material for their public education program.
  - 2. Water works related entities.
    - a. Actively involved in educating the related entities that SWD's CCC program is greatly dependent upon. This includes plumbers, plumbing inspectors, fire protection contractors, irrigation installers, etc. This is accomplished by conducting training sessions, distributing brochures, handouts, and face-to-face conversations.
  - 3. SWD Employees
    - a. SWD's water department employees believe in the CCC program and are knowledgeable in cross connection control. This enables them to intelligently discuss, explain, and answer questions regarding CCC.
  - 4. SWD Customers
    - a. Attempts to educate SWD's customers have been conducted through mail stuffers and brochures, through SWD's billing statements, hand out material specifically designed for customers installing irrigation systems; displays and information booths set up in shopping malls, displays set up in SWD's business office, etc.

6.10 Cross Connection Control Program Enforcement Information



# Cross-Connection Control Activities (Blue) Annual Summary Report (ASR) for 2022

#### PWS ID: 83100K PWS Name: SPOKANE CITY OF County: SPOKANE

#### Part 1: Designated Cross-Connection Control Specialist (CCS) Information

CCS Name	Chris Aronson	CCS Phone	509-625-7969	CCS Cert. #	14467	BAT Cert. #	B7390
CCS is: PWS ov	CCS is: PWS owner or employee						

#### Part 2: Status of Cross-Connection Control (CCC) Program at End of 2022

Provide information about the status of your CCC Program at the end of the reporting year.

PWS has	A written CCC Program Plan <sup>1</sup>	©Yes ONo	Program Plan Last Updated <sup>3 01/01/2000</sup>
i no nao.	CCC implementation activities <sup>2</sup>	●Yes ONo	

<sup>1</sup> Enter "Yes" if PWS has any type of written CCC Program Plan, policies, or procedures. Written CCC Program Plan must be part of a Water System Plan (WSP) or Small Water System Management Program (SWSMP).

<sup>2</sup> Enter "Yes" if PWS implemented any CCC Program activities during the reporting year, such as establishing legal authority, conducting hazard evaluations, requiring installation of backflow assemblies to protect the PWS, requiring assembly testing, maintaining CCC records, or enforcing the PWS's or CCC Program requirements.
<sup>3</sup> PWS can update the CCC Program Plan at any time (independent of WSP or SWSMP update).

Provide information regarding PWS's specific CCC Program Elements

Program	Description of Element	This Progra	m Element is:
Element Number	[See WAC 246-290-490(3)]	Included in Written Program Plan	Being Implemented or Is Completed
1	Legal Authority Established	●Yes ONo	● Yes O No
2	Hazard Evaluation Procedures and Schedules	⊛Yes ONo	⊛Yes ONo
3	Procedures/Schedules for Ensuring Installation of Backflow Preventers	©Yes ⊖No	⊛Yes ⊖No
4	Certified CCS Provided	●Yes ONo	€Yes ONo
5	Backflow Preventer Inspection and Testing	⊛Yes ONo	●Yes ONo
6	Assembly Testing Quality Assurance/Quality Control (QA/QC) Program	€Yes ONo	⊛Yes ONo
7	Backflow Incident Response Procedures		●Yes ONo
8	Public Education Program	⊛Yes ONo	⊛Yes ONo
9	CCC Records	⊛Yes ONo	⊛Yes ONo
10	Reclaimed Water Permit	⊖Yes ⊚No ⊖N/A	OYes ⊛No ON/A

#### Part 3A: PWS Characteristics at End of 2022

Enter the number of connections (new and existing) served by the PWS by type.

Type of Service Connection	Number
Residential (As defined by PWS)	71020
All Other (include dedicated fire lines, dedicated irrigation lines, and PWS-owned facilities such as water and wastewater treatment plants and pumping stations, parks, piers, and docks)	7425
Total Number of Connections	78445

Part 3B: Cross-Connection Control for Severe and High-Hazard Premises and High-Hazard Dedicated Lines Served by the PWS

Answer the following questions carefully. These answers control your access to pages 2 and 3 for data entry.		
1. Does your PWS serve any severe or high-hazard premises or any high-hazard dedicated fire or irrigation lines?	⊛ Yes	O No
2. Does PWS serve any high-hazard medical premises?	⊛ Yes	O No

If you answer Yes to both questions, you must enter data in at least one row on page 2 and one row on page 3.

• If you answer Yes to Question 1 and No to Question 2, you must enter data on page 2 only.

• If you answer No to both questions, pages 2 and 3 will be grayed out to prevent data entry.

· Count only premises PWS serves water to.

· Report data as accurately as possible. DOH currently bases CCC compliance actions on this information.

	Num	ber of Connec	tions at end o	f 2022
Type of Severe or High-Hazard Premises or Dedicated Lines [ <mark>WAC 246-290-490(4)(b)]</mark>	A. Being Served Water by PWS <sup>1</sup>	B. With Premises Isolation by AG/RP <sup>2</sup>	C. With Column B AG Inspected or RP Tested <sup>3</sup>	D. Granted Exception from Premises Isolation
Agricultural (farms and dairies)	2	1	1	0
Beverage bottling plants (including breweries)	30	25	24	0
Car washes	37	34	33	0
Chemical plants	0	0	0	0
Commercial laundries and dry cleaners	13	13	13	0
Both reclaimed water and potable water provided	0	0	0	0
Film processing facilities	1	1	1	0
Dedicated fire lines with chemical addition or using unapproved auxiliary supplies	27	26	23	0
Food processing plants (including canneries, slaughter houses, rendering plants)	10	10	10	0
Hospitals, medical centers, medical, dental and veterinary clinics, mortuaries, nursing homes, etc., reported on Part 3C page 3 (totals imported from page 3)	250	221	212	0
Dedicated irrigation systems using purveyor's water supply and chemical addition <sup>4</sup>	18	16	16	0
Laboratories	18	18	18	0
Metal plating industries	3	3	3	0
Petroleum processing or storage plants	5	4	4	0
Piers and docks	0	0	0	0
Radioactive material processing plants or nuclear reactors	0	0	0	
Survey access denied or restricted	0	0	0	0
Wastewater lift/pump stations (non-residential only)	47	45	44	0
Wastewater treatment plants	3	3	3	
Unapproved auxiliary water supply interconnected with potable water supply	29	25	25	0
Other				
Marijuana Growing Operation using Chemical Injection Systems	22	18	16	0
Totals	511	460	443	0

Count multiple connections or parallel installations to the same premises as separate connections.

<sup>2</sup>Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row. <sup>3</sup> Count only connections whose premises isolation preventers were inspected (AGs) or tested (RPs) during the reporting year.

<sup>4</sup> For example, dedicated irrigation lines to parks, playgrounds, golf courses, cemeteries, estates, etc.

#### Part 3C: Cross-Connection Control for High-Hazard Medical Premises Served by the PWS

- Count only medical premises PWS serves water to.
- Don't count the same premises more than once. If you serve different medical category premises through a single connection,
- count the connection under the medical category you consider to pose the highest hazard to PWS.
- Report data as accurately as possible. DOH currently bases CCC compliance actions on this information

	Nurr	ber of Connec	tions at end o	f 2022
Type of High-Hazard Medical Premises [WAC 246-290-490(4)(b)]	A. Being Served Water by PWS <sup>1</sup>	B. With Premises Isolation by AG/RP <sup>2</sup>	C. With Column B AG Inspected or RP Tested <sup>3</sup>	D. Granted Exception from Premises Isolation
Hospitals				
Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)	19	18	16	0
Facilities for Treatment and Care of Patients Not Located in Hospitals	Counted Abov	e		
Same day surgery centers	24	22	22	0
Out-patient clinics and offices	26	26	24	0
Alternative health out-patient clinics and offices	0	0	0	0
Psychiatric out-patient clinics and offices	0	0	0	0
Chiropractors with water-connected X-ray equipment	4	4	3	0
Hospice care centers	2	2	2	0
Childbirth centers	1	1	1	0
Kidney dialysis centers	8	8	8	0
Blood centers	4	4	4	0
Dental clinics and offices	98	79	75	0
Facilities for Housing Patients				
Nursing homes	35	29	29	0
Assisted Living Facilities (formerly Boarding Homes)	0	0	0	0
Residential treatment centers	0	0	0	0
Other Medical-Related Facilities				
Mortuaries with embalming equipment	5	5	5	0
Morgues and autopsy facilities (not in hospitals)	2	2	2	0
Veterinarian offices, clinics and hospitals	22	21	21	0
Totals	250	221	212	0

<sup>1</sup> Count multiple connections or parallel installations to the same premises as separate connections,

<sup>2</sup>Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises preventers only or connections with DCVAs or DCDAs installed for premises isolation. The number in Column B can't be larger than the number in Column A in the same row.

<sup>3</sup>Count only connections with premises isolation AGs or RPs. Don't include connections with in-premises backflow preventers only or connections with premises isolation DCVAs or DCDAs isolation.

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#### Part 4A: Backflow Preventer Inventory and Testing Information for 2022

- · Complete all fields. Enter zero (0), if no backflow preventers in a specific category.
- Count only backflow preventers relied on to protect the PWS.
- Count AVBs on irrigation systems only. Select No to AVB question above Table 2 if PWS doesn't track AVBs.
- · Count multiple tests (or failures) for the same backflow preventer as one test (or failure) for that backflow preventer.
- · For multiple service connections or parallel installations, count each assembly separately.
- Count RPDAs and DCDAs as single assemblies. Count the tests of the mainline assembly and bypass assembly as one test.
   Count the failure of either the mainline or bypass assembly (or the failure of both) as one failure. Count an entire detector assembly taken out of service as one assembly removed from service.
- · Count assemblies installed on dedicated fire or irrigation lines as Premises Isolation Assemblies in Table 1.

	ckflow Preventer Category and Inspection/Testing Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB
Tab	le 1: Premises Isolation Preventers (include prevent	ers isolatin	g PWS-o	whed fac	ilities)				
Exis	sting Premises Isolation Backflow Preventers								
1	In service at beginning of 2022	6	915	15	1056	875			
2	Inspected and/or tested in 2022 <sup>1</sup>	6	835	15	933	811			
3	Failed inspection or test in 2022	0	65	2	52	26			
Nev	v Premises Isolation Backflow Preventers								
4	Installed in 2022 <sup>2</sup>	0	41	0	47	13	-		
5	Inspected and/or tested in 2022 <sup>1</sup>	0	40	0	43	13			
6	Failed inspection or test in 2022	0	4	0	9	3			
Pre	mises Isolation Backflow Preventers (existing or new	N)							
7	Removed from service in 2022 <sup>3</sup>	0	12	0	16	0			
Tota	a) Premises Isolation Preventers at End of 2022	6	944	15	1087	888	0	0	ŷ
Exis	ie 2: In-Premises Preventers (Include preventers with sting In-Premises Backflow Preventers	nin PVVS-ov	whed faci	lities)					
8	In service at beginning of 2022	14	3479	2	3375	168	373	17	upk
9	Inspected and/or tested in 2022 <sup>1</sup>	12	3081	1	2669	156	153	16	GITT
10	Failed inspection or test in 2022	0	313	0	118	6	31		l unk
New	/ In-Premises Backflow Preventers						<u>.</u>	2	unk unk
								2	unk unk
11	Installed in 2022 <sup>2</sup>	0	246	0	258	7	26	2	unk unk unk
11 12	Installed in 2022 <sup>2</sup> Inspected and/or tested in 2022 <sup>1</sup>	0	246 233	0	258 238	7	26 26	2 2 2 2	unk unk unk unk
11 12 13	Installed in 2022 <sup>2</sup> Inspected and/or tested in 2022 <sup>1</sup> Failed inspection or test in 2022	0 0 0	246 233 27	0 0 0	258 238 25	7 6 0	26 26 7	2 2 2 2 2	unk unk unk unk unk
11 12 13 In-P	Installed in 2022 <sup>2</sup> Inspected and/or tested in 2022 <sup>1</sup> Failed inspection or test in 2022 remises Backflow Preventers (existing or new)	0 0 0	246 233 27	0 0 0	258 238 25	7 6 0	26 26 7	2 2 2 2	unk unk unk unk unk
11 12 13 <b>In-P</b> 14	Installed in 2022 <sup>2</sup> Inspected and/or tested in 2022 <sup>1</sup> Failed inspection or test in 2022 remises Backflow Preventers (existing or new) Removed from service in 2022 <sup>3</sup>	0 0 0	246 233 27 66	0 0 0	258 238 25 44	7 6 0	26 26 7 12	2 2 2 2 2	unk unk unk unk unk
11 12 13 In-P 14	Installed in 2022 <sup>2</sup> Inspected and/or tested in 2022 <sup>1</sup> Failed inspection or test in 2022 remises Backflow Preventers (existing or new) Removed from service in 2022 <sup>3</sup>	0 0 0 14	246 233 27 66 3659	0 0 0 2	258 238 25 44 3589	7 6 0 0	26 26 7 12 387	2 2 2 2 2	unk unk unk unk unk

Initial and/or routine annual inspection (for proper installation and approval status) and/or test (for testable assemblies only, using DOH-approved USC field test procedures).

<sup>2</sup> Includes preventers installed on connections where backflow prevention was not previously required and any preventers that replaced those in service at the beginning of the reporting year. Replacement preventers may be of a different type than the originals.

<sup>3</sup> Existing or new preventers taken out of service, whether or not they were replaced by the same or a different type of preventer.

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#### Part 4B: Other Implementation Activities in 2022

Complete all cells. Enter zero if not applicable.

Water Use Questionnaires

#### Did your PWS send any water use questionnaires to customers during 2022?

ig 2022?

 On-site Hazard Surveys

 Did your CCS conduct any on-site hazard surveys during 2022?
 Image: Image

New Exceptions to Premises isolation		
Did your CCS grant any new premises isolation exceptions in 2022 to high-hazard premises? <sup>3</sup>	OYes ⊛No	

**CCC Enforcement Actions** 

Did your PWS take any enforcement actions during 2022?<sup>4</sup>

OYes 
No

OYes 
<sup>●</sup>No

Include services where either premises isolation or in-premises preventers were required to protect the PWS.

<sup>2</sup> Include existing services that need new, additional or higher level backflow prevention.

<sup>3</sup> Submit a completed DOH Exception Form (green) for each new exception granted in the reporting year.

<sup>4</sup> "Enforcement actions" means actions taken by the PWS (such as water shut-off, PWS installation or testing of backflow preventer, assessment of fines, etc.) when the customer fails to comply with the PWS's CCC requirements.

#### Part 5: Backflow Incidents and "Off-Normal" Events in 2022

	Backflow Incidents, Risk Factors, and Indicators during 2022 Number		
Bad	ckflow incidents during 2022		
1	Backflow incidents that contaminated the PWS <sup>5</sup>	0	
2	Backflow incidents that contaminated the customer's drinking water system only <sup>5</sup>	0	
Ris	k Factors for Backflow during 2022		
3	Distribution main breaks per 100 miles of pipe	4.50	
4	Low pressure events (<20 psi in PWS distribution system).	44	
5	Water outage events.	22	
Ind	licators of Possible Backflow during 2022		
6	Total health-related complaints received by PWS. <sup>6</sup>	29	
7	Received during BWA or PN events. <sup>7</sup>	0	
8	Received during low pressure or water outage events.	0	
9	Total aesthetic complaints (color, taste, odor, air in lines, etc.)	29	
10	Received during BWA or PN events. <sup>7</sup>	0	
11	Number of these complaints received during low pressure or water outage events.	0	

<sup>5</sup> Purveyors must submit a Backflow Incident Report form for each backflow incident known to have contaminated the public water system. DOH is also interested in receiving incident report forms for backflow incidents that contaminated the customer's drinking water system only.

<sup>6</sup> Such as stomach ache, headache, vorniting, diarrhea, skin rashes, etc.

<sup>7</sup> "BWA" means Boil Water Advisory and "PN" means Public Notification for water quality reasons.

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- · Enter comments to:
  - · Explain or clarify information in this report.
  - · Describe challenges faced or accomplishments made in this reporting year.
  - · Share your goals and objectives for the coming reporting year.
- · Delete comments that are no longer valid.

Part No.	Date Added	Comments
Pt 1	03-16- 2017	all other line #15 is marijuana grow/processing plants
Pt 1	03-25- 2020	XC2 is the backflow tracking program the 2019 beginning numbers don't match 2018 ending. I am submitting numbers exactly as XC2 reports them per the ASR class that William Bernier w/ the Office of Drinking Water taught
Pt 1	04-19- 2021	XC2 is the backflow tracking program the 2020 beginning numbers don't match 2019 ending. I am submitting numbers exactly as XC2 reports them per the ASR class that William Bernier w/ the Office of Drinking Water taught in 2019
Pt 1	03-15- 2023	We are currently cleaning up data in our XC2 program in order to move to the Swift Comply computer program later this year. Some of these numbers may not match up with the prior year. The numbers we are submitting are what we believe to be accurate at this time for the ASR. These numbers are exactly as XC2 reports them.

#### Part 7: Report Certification and Contact Information

I, [Certified by], certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	02/13/2023	All ASR Forms Certified/Submitted

Designated 008/00	IC Program Stanager <sup>1</sup>				
Name	Chris Aronson	Title	Water Inspector	CCS Cert #	14467
Email Address	watercrossconnection@spokanecity.org	Phone	509-625-7969	Phone Ext	

PWS Manager <sup>2</sup>					
Name	Loren Searl	Title	Water Superintendent	Operator Cert #	12181
Email Address	lsearl@spokanecity.org	Phone	509-625-7851	Phone Ext	

The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).

<sup>2</sup> The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

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# Part 3B: Cross-Connection Control for High-Hazard Premises or Systems Served by the PWS

Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]		Number of Connections at end of <u>2022</u>				
		A. Being Served Water by PWS 1	B. With Premises Isolation by AG or RP 2	C. With Column B AG Inspected or RP Tested	D. Granted Exception from Mandatory Premises Isolation	
	Printed: January 30, 2023					
1	Agricultural (farms and dairies)	0	0	0	0	
2	All Other (discribed in part 6: Comments on page 6)	4	3	3	0	
3	Beverage bottling plants (including breweries)	25	20	19	0	
4	Both reclaimed water and potable water provided	0	0	0	0	
5	Car washes	36	33	32	0	
6	Chemical plants	0	0	0	0	
7	Commercial laundries and dry cleaners	13	13	13	0	
8	Doctors Office	0	0	0	0	
9	Drug and Alcohol Treatment	0	0	0	0	
10	Film processing facilities	1	1	1	0	
11	Dedicated fire protection systems with chemical addition or using unapproved auxiliary supplies	26	26	23	0	
12	Food processing plants (including canneries, slaughter houses, rendering plants)	10	10	10	0	
13	Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics, blood plasma centers and	271	246	234	0	
14	Dedicated irrigation systems using purveyor's water supply and with chemical addition	17	16	16	0	
15	Laboratories	18	18	18	0	
16	Marijuana Growing Operation using Chemical injection systems	18	15	13	0	
17	Metal plating industries	3	3	3	0	
18	Morgue and autopsy facilities (Not in Hospitals)	0	0	0	0	
19	Petroleum processing or storage plants	4	3	3	0	
20	Piers and docks	0	0	0	0	
21	Radioactive material processing plants or nuclear react	0	0	0	0	
22	Retirement Home	0	0	0	0	
23	Survey access denied or restricted	0	0	0	0	
24	Unapproved auxiliary water supply interconnected with potable water supply	29	25	25	0	
25	Wastewater lift/pump stations (non-residential only)	47	45	44	0	
26	Wastewater treatment plants	3	3	3	0	
	Totals	525	480	460		

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# Part 3C: Cross-Connection Control for Medical Premises Served by the PWS

		Numl	Number of Connections at end of 2022				
	Type of High-Hazard Premises or Systems [WAC 246-290-490(4)(b)]	A. Being Served Water by PWS 1	B. With Premises Isolation by AG or RP 2	C. With Column B AG inspected or RP Tested	D. Granted Exception from Mandatory Premises Isolation		
	Printed: January 30, 2023	4		×			
Hos	pital						
ł	Hospitals (include psychiatric hospitals and alcohol and drug treatment centers)	18	18	16	0		
Fac	for Treatment and Care of Patients						
2	Alternative health out-patient clinics	1	1	1	0		
3	Blood centers	4	4	4	0		
4	Childbirth centers	1	1	1	0		
5	Chiropractors	4	4	3	0		
6	Dental clinics and offices	83	78	75	0		
7	Hospice care centers	2	2	2	0		
8	Kidney dialysis centers	8	8	8	0		
9	Out-patient clinics and offices	38	37	33	0		
10	Psychiatric clinics and offices	1	1	1	0		
11	Same day surgery centers	24	22	22	0		
Fac	ilities for Housing Patients						
12	Boarding homes	1	0	0	0		
13	Nursing homes	34	28	28	0		
14	Residential treatment centers	6	4	4	0		
Oth	er Medical-Related Facilities						
15	Morgue and autopsy facilities (Not in Hospitals)	0	0	0	0		
16	Mortuaries	7	7	7	0		
17	Veterinary offices, clinics, hospitals	19	19	19	0		
	Totals	251	234	224			

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# Part 4A: Backflow Preventer Inventory and Testing Data During Year 2022

Note: 'Bypass' Backflow Preventers are not included in this inventory

Printed: January 30, 2023

			•							
	Backflow Preventer Category and Inspection/Testing Information	Air Gap	RPBA	RPDA	DCVA	DCDA	PVBA	SVBA	AVB	Total
Pr	emises Isolation, including preventers isolat	ing PWS-ow	ned facilit	ies. If In-Pr	emises Prot	tection prev	enters are	also includ	ed, check he	re: _
Roi	ws I - 3 pertain ONLY to Premises Isolation prev	enters in servi	ce at beginn	ing of 2022						
	In service at beginning of 2022	9	916	15	1,055	874	0	0	0	2,866
2	Inspected and/or tested in 2022	9	834	15	931	811	0	0	0	2,597
3	Failed inspection or test in 2022	0	65	2	52	26	0	0	0	145
Ro	ws 4 - 6 pertain ONLY to NEW Premises Isolatio	n preventers i	nstalled duri	ng 2022						
4	New preventers installed in 2022	0	40	0	48	13	0	0	0	101
5	Inspected and/or tested in 2022	0	39	0	44	13	0	0	0	96
6	Failed inspection or test in 2022	0	4	0	6	3	0	0	0	16
5	Preventers taken out of service in 2022	0	12	0	16	0	0	0	0	28
P'A	emises Isolation Total at end of 2022	6	944	15	1,087	887	0	0	0	2,939
<u>ل</u> ا	-Premises Protection (Fixture Protection or	r Area Isolati	ion), inclue	ding preven	ters within	PWS-owne	d facilities.			
2	ws 8 - 10 pertain ONLY to In-Premises Protectio.	n Preventers i	n service al	beginning of	2022					
<b>_</b>	In service at beginning of 2022	14	3,478	2	3,378	169	374	17	0	7,432
6	Inspected and/or tested in 2022	12	3,081	1	2,670	156	153	16	0	6,089
101	Failed inspection or test in 2022	0	313	0	118	9	31	5	0	470
2	ows 11 - 13 pertain ONLY to NEW In-Premises P	rotection prev	enters instal	lled during 20	122					
Ξ	New preventers installed in 2022	0	246	0	258	7	26	2	0	539
	2 Inspected and/or tested in 2022	0	233	0	238	9	26	2	0	505
12	Failed inspection or test in 2022	0	27	0	25	•	7	2	•	61
17	1 Preventers taken out of service in 2022	0	66	0	44	0	12	5	0	124
2	n-Premises Isolation Total at end of 2022	14	3,658	2	3,592	176	388	17	0	7,847
0	rand Total at end of 2022	20	4,602	17	4,679	1,063	388	17	0	10,786



# Cross-Connection Control Program Summary (Cream) Annual Summary Report (ASR) for 2022

#### PWS ID: 83100K PWS Name: SPOKANE CITY OF County: SPOKANE

Describe the characteristics of the PWS's Cross-Connection Control (CCC) Program at the end of 2022. Part 1: CCC Program Characteristics

#### A. Type of Program Implemented

Type of Program	Check One
Premises isolation only.	0
Combination program: reliance on both premises isolation and in-premises prevention.	۲
In transition from a combination program to a premises isolation only program.	0

#### B. Coordination with Authority Having Jurisdiction (AHJ) on CCC Issues

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code at the local level. The AHJ is usually your county or city building department, Don't list DOH as an AHJ.

AHJ #	Name of AHJ (City or County Building Department) <sup>1</sup>	P	ws	AHJ Declined to
	(1), 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	Coordinates with AHJ	Has Written Agreement with AHJ	Coordinate
1	City of Spokane	Yes 🖲 No O	Yes 💿 No O	Yes O No O
2	Spokane County	Yes 🔿 No 🖲	Yes O No 🖲	Yes O No⊗

Do not enter an individual's name

#### C. Corrective/Enforcement Actions Available to the Purveyor

Type of Corrective Action/Enforcement Action	Indicate Whether Available	Most Often Used (Check One)
Purveyor denies or discontinues water service.	Yes 🖲 No O	۲
Purveyor installs backflow assembly and bills customer.	Yes 🖲 No O	0
Purveyor assesses fines (in addition to eliminating or controlling cross connection).	Yes  No O	0
Purveyor tests backflow assembly and bills customer.	Yes 🖲 No O	0

Enter detailed description of other enforcement actions available to PWS. Don't enter "None", "Not Applicable", or "Not Available."

Page 1

#### **D. CCC Program Responsibilities**

Do not include enforcement action related procedures or circumstances.

	Responsible Party (Check one per row)		
CCC Program Activity	Customer	Purveyor	
Hazard Evaluation by DOH-certified CCS	0	۲	
Backflow preventer (BP) ownership	۲	0	
BP installation	۲	0	
BP initial inspection (for proper installation - all BPs)	0	۲	
BP initial test (for testable assemblies)	۲	0	
BP annual inspection (Air Gaps and AVBs)	۲	0	
BP annual test (for testable assemblies)	۲	0	
BP maintenance and repair	۲	0	

E. Backflow Prevention for Fire Protection Systems

Please remember to enter number of days allowed if you require retrofitting.

PWS coordinates with AHJ on CCC issues for fire sprinkler systems (FSSs)	Yes  No O N/A O
PWS coordinates with local Fire Marshal on CCC issues for FSSs.	Yes 🖲 No O N/A O
PWS ensures backflow prevention is installed before serving <i>new</i> connections with FSSs.	Yes 🖲 No O
PWS requires retrofits to high-hazard FSSs.	Yes ● No. of days allowed: 90 No O N/A O
PWS requires retrofits to low-hazard FSSs.	Yes

#### F. Backflow Prevention for Irrigation Systems

Minimum level of backflow prevention required on irrigation systems without chemical addition.	Not Addressed O AVB O PV/SVBA I DCVA O RPBA O
PWS currently inspects AVBs upon <i>initial</i> installation.	Yes O No O N/A 🖲
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Yes O No O N/A ®

#### G. Used Water

Does PWS prohibit, by ordinance, rules, policy, by-laws or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system?	Yes © No O	
If not prohibited at present, date plan to prohibit use.	N/A	
Current number of service connections returning used water to distribution system.	0	

# H. Backflow Prevention for Unapproved Auxiliary Water Supplies<sup>1</sup> NOT Interconnected with PWS

Show the minimum backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies when they are NOT interconnected to the PWS.

Existing service connections.	None O DCVA O RPBA   AG O
Type of protection required.	N/A O In-premises prevention O Premises isolation ®
New service connections.	None O DCVA O RPBA @ AG O
Type of protection required.	N/A O In-premises prevention O Premises isolation S

An auxiliary water supply is any water supply on or available to customer's premises in addition to the purveyor's potable water supply.

Page 2 PWSID: 83100K Year: 2022

#### I. Backflow Prevention for Tanker Trucks and Temporary Water Connections

I. Buoknow i referición fer familier fractio and femperary fracte.	
<b>Minimum</b> level of backflow prevention (installed on or associated with the truck) required for tanker trucks taking water from PWS.	AG      O     DCVA O RPBA O     Not Specified O     Tanker trucks not allowed O
PWS requires tanker trucks to obtain water at designated fill sites each equipped with permanently installed backflow preventer(s).	Yes O (Minimum preventer: DCVA O RPBA O ) No O N/A O No sites provided ®
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Yes O No @ N/A O
<i>Minimum</i> level of backflow prevention required for temporary water connections (e.g., for construction sites).	AG O DCVA O RPBA O Not specified O Temp. connections not allowed @
PWS provides approved backflow preventer for temporary connections.	Yes O No O N/A  € (Temp. connections not allowed)
PWS requires testing each time the temporary connection backflow preventer is relocated.	Yes ○ No ○ N/A   (Temp. connections not allowed)

#### J. Backflow Prevention for Non-Residential Connections

For each category shown, indicate whether PWS has non-residential connections of that type and the **minimum** level of **premises** *isolation* backflow prevention required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Prevention Required
Commercial	Yes 🖲 No O	Not Required O DCVA
Industrial	Yes  No O	Not Required O DCVA O RPBA ®
Institutional	Yes 🖲 No O	Not Required O DCVA O RPBA ®

#### K. Backflow Prevention for Wholesale Customers

Indicate whether the PWS requires backflow prevention at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has Customers of this Type	Minimum Backflow Prevention Required (if prevention is required, indicate minimum level).		
Existing	Yes © No O	Not specified / Not required O Always required Required only if purchaser's CCC program is inadequate O	Minimum required (if applicable): DCVA © RPBA O	
New	Yes © No O	Not specified / Not required O Always required ® Required only if purchaser's CCC program is inadequate O	Minimum required (if applicable): DCVA ℗ RPBA 〇	

#### L. Exceptions to Mandatory Premises Isolation

PWS's written CCC Program Plan allows system to grant exceptions to mandatory premises isolation per WAC 246-290-490(4)(b)(iii)	Yes O No    Doesn't Address O
PWS currently grants new Exceptions.	Yes O No 🖲
PWS granted Exceptions in past reporting years.	Yes O No 🖲

Page 3 PWSID: 83100K Year: 2022

#### Part 2: CCC Program Record-Keeping Software

Indicate the type or name of computer software the PWS uses to track CCC records.

BPMS O Cross-Track (BMI) O	Tokay O	XC2 ®	Custom developed for or by PWS <sup>1</sup> O
Other non-CCC software (e.g. Excel) 〇	Other commercial CCC software (specify)	None Used	

<sup>1</sup> Do not include commercial CCC software customized for PWS. If PWS uses customized commercial software, check the box for the appropriate commercial software name.

#### Part 3: Comments and Clarifications

- · Enter comments to:
  - · Explain or clarify information in this report.
  - · Describe accomplishments made in this reporting year.
  - · Identify challenges faced in this reporting year.
  - Share your goals and objectives for the coming reporting year.
- · Delete comments that are no longer valid.

#### No Comments

#### Part 4: Report Certification and Contact Information

I,[Certified by], certify that the information in this form is true, complete and accurate to the best of my knowledge.

	Last Saved	01/10/2023	All ASR Forms Certified/Submitted
Ł	The second s	NAME AND ADDRESS OF TAXABLE PARTY OF TAXABLE PARTY OF TAXABLE PARTY.	

Designated COS/C	CC Program inanager <sup>4</sup>				
Name	Chris Aronson	Title	Water inspector	CCS Cert #	14467
Email Address	watercrossconnection@spokanecity.org	Phone	509-625-7969	Phone Ext	

PWS Manager <sup>2</sup>					
Name	Loren Searl	Title	Water Superintendent	Operator Cert #	12181
Email Address	Isearl@spokanecity.org	Phone	509-625-7851	Phone Ext	

<sup>1</sup> The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).

<sup>2</sup> The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

Page 4 PWSID: 83100K Year: 2022



# Backflow Prevention for Severe Health Hazard Facilities (Gray) Annual Summary Report (ASR) for 2022

PWS ID: 83100K PWS Name: SPOKANE CITY OF County: SPOKANE

#### Part 1: Backflow Prevention Status

- Describe the backflow prevention status at the end of the reporting year for each wastewater treatment plant and nuclear facility
  your system serves.
- If you serve more than one severe health hazard facility, click the "Add Facility" button to display another facility data entry box.
- If you serve more than one connection to the same facility, click the "Add Connection" button to display another connection row for that facility.
- · You may add as many facilities and connections as needed.
- To update this form, you may delete facilities and connections which are no longer served.

Paullity 1 of 2		
Facility Name S Physical Address 4 City S Zip 9	ipokane WWTP 401 N Aubry L White Pkwy ipokane 9205	
NPDES Permit# W Facility Type W Facility	99205 WA0024473B Wastewater Treatment Plant (WWTP)	
Comments		
Feallte's The Health	n S cf 2	
Connection Name	Premises Isolation	
Backflow Prevention Status	n Premises Isolation RP and In-Plant Air Gap	
Connection Comme	ints	
Feallity & Cenneatter	n 2 c/ 2	
Connection Name	Premises Isolation	
Backflow Prevention Status	n Premises Isolation RP and In-Plant Air Gap	
Connection Comme	ints	

#### Fee//Gr of

	Accession of the second s
Facility Name	Spokane County WRP
Physical Address	1004 N Freya
City	Spokane
Zip	99202
NPDES Permit#	WA0093317
Facility Type	Wastewater Treatment Plant (WWTP)
Facility Comments	

Peality 2 Connection 1 a

Connection Name Premis Isolation

#### Part 2: Report Certification and Contact Information

I,[Certified by], certify that the information in this form is true, complete and accurate to the best of my knowledge.

NAMES OF TAXABLE PARTY OF TAXABLE PARTY.	CONTRACTOR OF A DESCRIPTION OF A DESCRIP	
Last Saved	01/05/2023	All ASR Forms Certified/Submitted
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Designated C09/D0C Program Wanager					
Name	Chris Aronson	Title	Water Inspector	CCS Cert #	14467
Email Address	watercrossconnection@spokanecity.org	Phone	509-625-7969	Phone Ext	

Plays Variese?					
Name	Loren Searl	Title	Water Superintendent	Operator Cert #	12181
Email Address	Isearl@spokanecity.org	Phone	509-625-7851	Phone Ext	

<sup>1</sup> The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).

<sup>2</sup> The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.



# Cross-Connection Control Program Summary (Cream) Annual Summary Report (ASR) for 2022

# PWS ID: 83100K PWS Name: SPOKANE CITY OF County: SPOKANE

Describe the characteristics of the PWS's Cross-Connection Control (CCC) Program at the end of 2022. Part 1: CCC Program Characteristics

#### A. Type of Program Implemented

Type of Program	Check One
Premises isolation only.	0
Combination program: reliance on both premises isolation and in-premises prevention.	۲
In transition from a combination program to a premises isolation only program.	0

#### B. Coordination with Authority Having Jurisdiction (AHJ) on CCC Issues

Indicate the status of coordination with AHJs in your service area. The AHJ is the entity that enforces the Uniform Plumbing Code at the local level. The AHJ is usually your county or city building department. Don't list DOH as an AHJ.

AHJ #	Name of AHJ	P	AHJ Declined to	
	Coordinates with AHJ	Has Written Agreement with AHJ	Coordinate	
1	City of Spokane	Yes 🖲 No O	Yes  No O	Yes O No O
2	Spokane County	Yes O No @	Yes O No 🖲	Yes O No 🖲

<sup>1</sup> Do not enter an individual's name.

#### C. Corrective/Enforcement Actions Available to the Purveyor

Type of Corrective Action/Enforcement Action	Indicate Whether Available	Most Often Used (Check One)
Purveyor denies or discontinues water service.	Yes	۲
Purveyor installs backflow assembly and bills customer.	Yes ⊛ No O	0
Purveyor assesses fines (in addition to eliminating or controlling cross connection).	Yes  No O	0
Purveyor tests backflow assembly and bills customer.	Yes 🖲 No O	0

Enter detailed description of other enforcement actions available to PWS. Don't enter "None", "Not Applicable", or "Not Available."

Page 1

#### **D. CCC Program Responsibilities**

Do not include enforcement action related procedures or circumstances.

	Responsible Party (Check one per row)	
CCC Program Activity	Customer	Purveyor
Hazard Evaluation by DOH-certified CCS	0	©
Backflow preventer (BP) ownership	۲	0
BP installation	©	0
BP initial inspection (for proper installation - all BPs)	0	0
BP initial test (for testable assemblies)	۲	0
BP annual inspection (Air Gaps and AVBs)	۲	0
BP annual test (for testable assemblies)	۲	0
BP maintenance and repair	6	0

#### E. Backflow Prevention for Fire Protection Systems

Please remember to enter number of days allowed if you require retrofitting.

	Vac @ No O N/A O
PWS coordinates with AHJ on CCC issues for fire sprinkler systems (FSS)	
PWS coordinates with local Fire Marshal on CCC issues for FSSs.	Yes © No O N/A O
PWS ensures backflow prevention is installed before serving <i>new</i> connections with FSSs.	Yes © No O
PWS requires retrofits to <i>high</i> -hazard FSSs.	Yes  No. of days allowed: 90 No O N/A O
PWS requires retrofits to <i>low</i> -hazard FSSs.	Yes <ul> <li>No. of days allowed: 90</li> <li>No ○ N/A ○</li> </ul>

#### F. Backflow Prevention for Irrigation Systems

Minimum level of backflow prevention required on irrigation systems without chemical addition.	Not Addressed O AVB O PV/SVBA I DCVA O RPBA O
PWS currently inspects AVBs upon <i>initial</i> installation.	Yes O No O N/A @
PWS currently inspects AVBs upon repair, reinstallation or relocation.	Yes O No O N/A @

#### G. Used Water

Does PWS prohibit, by ordinance, rules, policy, by-laws or agreement, the intentional return of used water (e.g. for heating or cooling) into the distribution system?	Yes @ No O	
If not prohibited at present, date plan to prohibit use.	N/A	
Current number of service connections returning used water to distribution system.	0	

# H. Backflow Prevention for Unapproved Auxiliary Water Supplies<sup>1</sup> NOT Interconnected with PWS

Show the minimum backflow preventer and type of protection required for service connections having unapproved auxiliary water supplies when they are NOT interconnected to the PWS.

Existing service connections.	None O DCVA O RPBA @ AG O	
Type of protection required.	N/A O In-premises prevention O Premises isolation @	
New service connections.	'service connections. None ○ DCVA ○ RPBA ◎ AG ○	
Type of protection required.	N/A O In-premises prevention O Premises isolation	

<sup>1</sup> An auxiliary water supply is any water supply on or available to customer's premises in addition to the purveyor's potable water supply. Page 2 PWSID: 83100K Year: 2022

#### I. Backflow Prevention for Tanker Trucks and Temporary Water Connections

<i>Minimum</i> level of backflow prevention (installed on or associated with the truck) required for tanker trucks taking water from PWS.	AG      O     DCVA O RPBA O     Not Specified O     Tanker trucks not allowed O
PWS requires tanker trucks to obtain water at designated fill sites each equipped with permanently installed backflow preventer(s).	Yes O (Minimum preventer: DCVA O RPBA O ) No O N/A O No sites provided ⊛
PWS currently accepts tanker trucks approved by other PWSs without further inspection or testing.	Yes O No ③ N/A O
<i>Minimum</i> level of backflow prevention required for temporary water connections (e.g., for construction sites).	AG O DCVA O RPBA O Not specified O Temp. connections not allowed
PWS provides approved backflow preventer for temporary connections.	Yes O No O N/A
PWS requires testing each time the temporary connection backflow preventer is relocated.	Yes O No O N/A  ⊕ (Temp. connections not allowed)

#### J. Backflow Prevention for Non-Residential Connections

For each category shown, indicate whether PWS has non-residential connections of that type and the minimum level of *premises isolation* backflow prevention required (whether or not PWS currently has that type of customer).

Type of Connection	PWS has Customers of this Type	Minimum Premises Isolation Backflow Prevention Required	
Commercial	Yes @ No O	Not Required O DCVA @ RPBA O	
Industriai	Yes  No O	Not Required O DCVA O RPBA	
Institutional	Yes  No O	Not Required O DCVA O RPBA @	

#### K. Backflow Prevention for Wholesale Customers

Indicate whether the PWS requires backflow prevention at interties with wholesale customers (other PWSs).

Type of Intertie	PWS has Customers of this Type	Minimum Backflow Prevention Required (if prevention is required, indicate minimum level).		
Existing	Yes © No O	Not specified / Not required O Always required <sup>®</sup> Required only if purchaser's CCC program is inadequate O	Minimum required (if applicable): DCVA	
New	Yes 🕲 No O	Not specified / Not required C Always required Required only if purchaser's CCC program is inadequate O	Minimum required (if pplicable): DCVA   RPBA O	

#### L. Exceptions to Mandatory Premises Isolation

PWS's written CCC Program Plan allows system to grant exceptions to mandatory premises isolation per WAC 246-290-490(4)(b)(iii)	Yes O No @ Doesn't Address O
PWS currently grants new Exceptions.	Yes O No 🖲
PWS granted Exceptions in past reporting years.	Yes O No 🖲

Page 3 PWSID: 83100K Year: 2022

#### Part 2: CCC Program Record-Keeping Software

Indicate the type or name of computer software the PWS uses to track CCC records.

BPMS O Cross-Track (BMI) O	Tokay O	XC2 (a)	Custom developed for or by PWS <sup>1</sup> 〇
Other non-CCC software (e.g. Excel) ○	Other commercial CCC software (specify)	<mark>Noπe Used</mark> ⊖	

<sup>1</sup> Do not include commercial CCC software customized for PWS. If PWS uses customized commercial software, check the box for the appropriate commercial software name.

#### Part 3: Comments and Clarifications

- Enter comments to:
  - · Explain or clarify information in this report.
  - · Describe accomplishments made in this reporting year.
  - · Identify challenges faced in this reporting year.
  - · Share your goals and objectives for the coming reporting year,
- · Delete comments that are no longer valid.

#### No Comments

#### Part 4: Report Certification and Contact Information

I,[Certified by], certify that the information in this form is true, complete and accurate to the best of my knowledge.

Last Saved	01/30/2023	All ASR Forms Certified/Submitted	
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Designable COS(CO)	0. Provinsim Aval. Ingis				
Name	Chris Aronson	Title	Water Inspector	CCS Cert #	14467
Email Address	watercrossconnection@spokanecity.org	Phone	509-625-7969	Phone Ext	

PVvS Manage <sup>7</sup>					
Name	Loren Searl	Title	Water Superintendent	Operator Cert #	12181
Email Address	Isearl@spokanecity.org	Phone	509-625-7851	Phone Ext	

<sup>1</sup> The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).

<sup>2</sup> The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

#### Page 4 PWSID: 83100K Year: 2022



# Backflow Prevention for Severe Health Hazard Facilities (Gray) Annual Summary Report (ASR) for 2022

PWS ID: 83100K PWS Name: SPOKANE CITY OF County: SPOKANE

#### Part 1: Backflow Prevention Status

- Describe the backflow prevention status at the end of the reporting year for each wastewater treatment plant and nuclear facility
  your system serves.
- If you serve more than one severe health hazard facility, click the "Add Facility" button to display another facility data entry box.
- If you serve more than one connection to the same facility, click the "Add Connection" button to display another connection row for that facility.
- · You may add as many facilities and connections as needed.
- · To update this form, you may delete facilities and connections which are no longer served.

#### Fertility o Facility Name Spokane WWTP Physical Address 4401 N Aubry L White Pkwy City Spokane 99205 Zip WA0024473B NPDES Permit# Wastewater Treatment Plant (WWTP) Facility Type Facility Comments Fachill / > Colline tio Premises Isolation **Connection Name Backflow Prevention** Premises Isolation RP and In-Plant Air Gap Status **Connection Comments** sol : Gonnec **Connection Name** Premises Isolation **Backflow Prevention** Premises Isolation RP and In-Plant Air Gap Status **Connection Comments**

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#### Feeling - 512

And the second se	and the second s
Facility Name	Spokane County WRP
Physical Address	1004 N Freya
City	Spokane
Zip	99202
NPDES Permit#	WA0093317
Facility Type	Wastewater Treatment Plant (WWTP)
Facility Comments	

Peol/Dy's Connealish 4 al

#### Part 2: Report Certification and Contact Information

I,[Certified by], certify that the information in this form is true, complete and accurate to the best of my knowledge.

THE R. P. LEWIS CO., LANSING MICH.		
Last Saved	01/30/2023	All ASR Forms Certified/Submitted
N		

Quelonaleo CCS/C	CC Frectam wagage <sup>3</sup>				
Name	Chris Aronson	Title	Water Inspector	CCS Cert #	14467
Email Address	watercrossconnection@spokanecity.org	Phone	509-625-7969	Phone Ext	

RWS Manager <sup>2</sup>					
Name	Loren Seari	Title	Water Superintendent	Operator Cert #	12181
Email Address	Isearl@spokanecity.org	Phone	509-625-7851	Phone Ext	

<sup>1</sup> The CCS responsible for developing and implementing the PWS's CCC program (CCC Program Manager).
 <sup>2</sup> The person the designated CCS/CCC Program Manager reports to or other manager having direct oversight of the CCC Program.

6.11 Sanitary Survey



#### STATE OF WASHINGTON DEPARTMENT OF HEALTH EASTERN DRINKING WATER REGIONAL OPERATIONS 16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830 (509) 329-2100 • 711 Washington Relay Service

July 20, 2022

Loren Searl, Director City of Spokane Water Department 914 E. North Foothills Drive Spokane, WA 99207-2794

# Subject:Spokane City of; PWS # 83100; Spokane County<br/>Routine Sanitary Survey Inspection Report – Survey Date: May 2, 3, and 5, 2022

Dear Mr. Searl:

I want to thank you for having Jim Sakamoto, Ryan Treffry, and Seth McIntosh meet with me to conduct a survey of this water system. This letter documents the information collected during the City of Spokane year one of the three-year sanitary survey cycle. In the first year, we looked at wells and reservoirs in certain pressures zones. See Sanitary Survey Schedule for more details.

Department of Health (DOH) identifies defects in your water system facilities or operations that need your immediate attention below as *significant deficiencies* or *significant findings*. Please pay close attention to the information in this letter and the attachments. There may be issues of concern and tasks to accomplish within a required timeframe.

**Significant Deficiencies (SD)**, if left unaddressed, have the potential of causing an immediate or potential risk to the health of the water system customers. A **Significant Finding (SF)** is a problem that imparts a serious but less direct public health threat than a significant deficiency. If left unaddressed, a significant finding creates a risk to the physical safety, security, or reliability of the public water supply.

Checklist #	Required Corrective Action for Significant Deficiencies and Findings
Significant D	eficiencies (SD)
25.	Repair and seal any openings in electrical conduits and junction boxes connected to the well casing to keep insects, rodents, or other contaminants out of the public drinking water supply. See Central Ave- AHC726 Well - Photo #17
75a.	Install a 24-mesh noncorrodible screen on the reservoir vent backed by a four- mesh screen and ensure vent is downward facing opening. – See Rockwood Vista Water Tank
75a.	Install a 24-mesh noncorrodible screen on the reservoir vents backed by a four- mesh screen. See Lincoln Height Reservoir #1: Photo #29, #32, #33 and #34
75a.	Install a 24-mesh noncorrodible screen on the reservoir vents backed by a four- mesh screen. See Lincoln Height Reservoir #2: Photo #29, #32, #33 and #34





Loren Searl July 20, 2022 Page 2

Significant Findings (SF)				
85.	Hire a qualified structural inspector to evaluate the reservoir. Submit a copy of the inspection results and a corrective action plan describing how you will address the inspector's findings. See Lincoln Height Reservoir #1: Photo #30 and #31			
85.	Hire a qualified structural inspector to evaluate the reservoir. Submit a copy of the inspection results and a corrective action plan describing how you will address the inspector's findings. See Lincoln Height Reservoir #2: Photo #30 and #31			

Addressing Significant Deficiencies and Significant Findings. Within forty-five (45) days of the date of this letter, you must correct the Significant Deficiencies and Findings.

Ensuring your water system completes corrections for each Deficiency and Finding is a high priority for the Office of Drinking Water. Failure to complete corrections within the designated timeframe may result in enforcement action.

Upon completion of corrections, please provide verification by submitting photographs and supporting narrative, to:

- Email: <u>ero.sanitarysurveys@doh.wa.gov</u> or
- Mail: "Attn: Mark Steward, Sanitary Survey Program Manager" at the address listed on our letterhead.

In your transmittal, please provide: (1) Water System Name, (2) PWS ID #, and (3) Dates of Correction(s).

If you believe you have good cause and need additional time to correct any Significant Deficiency or Finding, please contact Mark Steward at (509) 329-2136. Be prepared to provide a Corrective Action Plan that specifies the actions your system will take and a proposed timeframe for completion.

**<u>Discussion</u>** – In addition, we reviewed the following items:

## Water Facilities Inventory (WFI) Form

The WFI was reviewed and has been updated.

## Other

Suggest the water system consider starting a program to ensure that weeds/grass are not growing around the reservoir foundation and/or other areas. The weeds/grass may cause issues for the reservoir. See Photo #36 and #42 as examples.

I suggest the water system start to periodically check the serviceability of reservoirs' vent screens, hatches gaskets, and overflows.

By completing this sanitary survey, your water system met the requirements in WAC 246-290-416. DOH will notify you of your next sanitary survey in three to five years. Please note that you should not interpret satisfying the requirements of the sanitary survey as meeting other applicable local, state, or federal statutes, ordinances, and regulations. Accordingly, address other DOH requirements separately from the sanitary survey.





Loren Searl July 20, 2022 Page 3

As provided by WAC 246-290-990 (3)(c), a fee is charged to help recover the cost of conducting a sanitary survey. The Department of Health's (DOH) total cost to complete this sanitary survey is \$5,031.67. The office of Drinking Water has used state and federal funds to pay \$645.67. of this amount. An invoice for the remaining amount due of \$4,386.00 is enclosed.

Thank you again for your cooperation in the successful completion of the sanitary survey. If you have any questions regarding this letter, please contact me at (509) 329-2131 or via email at <u>Scott.Mallery@doh.wa.gov.</u>

Sincerely,

Sutt male

Scott Mallery, PE Assistant Regional Manager Office of Drinking Water Division of Environmental Health

Enclosures: Invoice

cc:

Survey Checklist Survey Photos Sanitary Survey Schedule City of Spokane Sanitary Survey Letter 5-6-2022 Reservoirs Vents DOH 331-250

Spokane Regional Health District James Sakamoto, PE, City of Spokane Water Department Mark Steward, DOH Sanitary Survey Program Manager Brenda Smits, DOH Regional Planner Nick Fitzgerald, PE, DOH Regional, Engineer

# STATE OF WASHINGTON Department of Health OFFICE OF DRINKING WATER SANITARY SURVEY INSPECTION

# **INVOICE**

SPOKANE, CITY OF	WS ID:	83100
SPOKANE CITY OF	Invoice No:	49372
914 E. NORTH FOOTHILLS DRIVE	Invoice Date:	07/20/2022
SPOKANE, WA 99207-2794	Due Date:	09/03/2022

WS NAME: SPOKANE CITY OF	SURVEY DAT	SURVEY DATE: 05/02/2022		
DESCRIPTION	QTY COST	AMOUNT		
Scheduling, Research, Prep	3.00 x \$102.00	\$306.00		
Survey Documentation	10.00 x \$102.00	\$1020.00		
Survey Field Work	20.00 x \$102.00	\$2040.00		
Travel Time	10.00 x \$102.00	\$1020.00		
	Total Amount Due	\$4386.00		

- 1. *Pay online* with a credit card, debit card, or electronic check (ACH) using the Environmental Health Payment System at https://secureaccess.wa.gov/.
- 2. For billing questions, please contact Eastern Drinking Water Regional Operations at (509) 329-2100.
- 3. This invoice is issued in accordance with WAC 246-290-990(3)(c)(iii).
- 4. For persons with disabilities, this document is available on request in other formats. To submit a request, please call 711 Washington Relay Service.
- If paying by check:
   Make checks payable to Department of Health, Federal ID #91-1444603.

Please return the bottom portion of this invoice with your check.

Invoice Number: 49372 INVOICE AMOUNT: \$4386.00 Owner Number: 000830 WS Name: SPOKANE CITY OF Invoice Date: 07/20/2022 Invoice Due Date: 09/03/2022 Region: EA WS ID: 83100

Reference: SANITARY SURVEY INSPECTION PERFORMED ON 05/02/2022

Please remit to: ACCOUNTS RECEIVABLE DOH SANITARY SURVEY PROGRAM PO BOX 1099 OLYMPIA, WA 98507-1099

Office of Drinking WaterImage: Description of the second stateImage: Descripti						
System Name:Spokane, City ofSurvey Date:May 2,3, and 5, 20						May 2,3, and 5, 2022
PWS ID#:	831	00	County:	Spokane	System Type:	A-COMM
Persons Attending Inspection: Jim Sakamoto, PE			noto, PE, City of Spokane (Princ	ipal Engineer)		
Seth McIntosh, City of Spokane (Plant Manager) Ryan Treffry, City of Spokane (Maintenance Supervisor)						
	Brenda Smits, DOH Regional Planner Nick Fitzgerald, DOH Regional Engineer					
Inspector's N	ame:	Scott Mal	lery, DOH A	Assistant Regional Manager		
PART A: SU	MMA		ICANT DEFI	CIENCIES AND SIGNIFICANT FI	NDINGS	
The following is a completed sanitary survey checklist and summary of inspection findings. This completed sanitary survey checklist is the basis for the cover letter you receive from your local health jurisdiction or from the WA Dept. of Health (DOH). The cover letter documents any significant deficiencies or significant findings that must be corrected. The cover letter may also summarize observations concerning compliance with certain rules, and offer recommendations you can use to make improvements to the operation and management of your water system. Contact your DOH regional office with any questions you have about this survey.						
<b>Bolded and highlighted</b> checklist items represent <u>significant deficiencies</u> that, if left uncorrected, create a significant public health risk. Highlighted checklist items represent <u>significant findings</u> that, if left uncorrected, create a significant risk to the physical safety, security, or reliability of the public drinking water supply. You will be required to take some sort of corrective action for each checklist answer that is <b>bolded and highlighted</b> , or highlighted.						
Significant deficiencies and significant findings identified during this sanitary survey:						

Significant Deficiencies (SD)

25. Are conduits and junction boxes sealed to prevent contaminant entry? Central Ave- AHC726 Photo #17

Repair and seal any openings in electrical conduits and junction boxes connected to the well casing to keep insects, rodents, or other contaminants out of the public drinking water supply.

**75a.** If yes, is the air vent constructed to prevent the entry of contaminants? Rockwood Vista Install a 24-mesh noncorrodible screen on the reservoir vent backed by a four-mesh screen and ensure vent is downward facing opening.

75a. If yes, is the air vent constructed to prevent the entry of contaminants? Lincoln Height Res #1: Photo #29, #32, #33 and #34
Install a 24-mesh noncorrodible screen on the reservoir vents backed by a four-mesh screen.

**75a.** If yes, is the air vent constructed to prevent the entry of contaminants? If no, explain below Lincoln Height Res #2: Photo #29, #32, #33 and #34: Install a 24-mesh noncorrodible screen on the reservoir vents backed by a four-mesh screen.

#### Significant Findings (SF)

85. Does the tank show signs of excessive leakage, significant structural cracking, or an advanced concrete spalling? Lincoln Height Res #1 Photo #30 and #31: Hire a qualified structural inspector to evaluate the reservoir. Submit a copy of the inspection results and a corrective action plan describing how you will address the inspector's findings.

85. Does the tank show signs of excessive leakage, significant structural cracking, or an advanced concrete spalling? Lincoln Height Res #2 Photo #30 and #31: Hire a qualified structural inspector to evaluate the reservoir. Submit a copy of the inspection results and a corrective action plan describing how you will address the inspector's findings.

Significant deficiencies or significant findings identified in the previous sanitary survey that remain unaddressed:

NA

Observations and recommendations identified during this survey

NA

#### PART B: GENERAL WATER SYSTEM DESCRIPTION

Provide a general description of the water system including changes, updates, connections, source(s), storage, number of pressure zones, treatment, and control system(s) and alarm(s). Make corrections and updates to the purveyor's water facilities inventory form (WFI).

#### This is first year of 3-year sanitary survey cycle. In 2022, we are looking at wells and tanks based off certain pressure zones.

PART D: SOURCES (This page may be reproduced to add more sources)					
12. Did you observe a source connected to the water system that is NOT listed on the WFI and in active use?				☐Yes ⊠No	
12a. If so, has the source received written DOH approval? (confirm with DOH post-su			t-survey)	Yes No	
13. DOH Source Num	ber:			SO1	SO6
14. Source Name from	n the WFI: (For exan	nple, North Well; V	Vell #2; ABC334.)	Nevada St – AHC725	Grace Ave – AHC724
15. Dept of Ecology V	Vell Tag Number: (U	se Well tag ID#, N	lone or Not readable)	АНС725	AHC724
16. Source Use:	P - Permanent	S - Seasonal	E - Emergency	Р	Р
17. If this is an emer	gency source, shou	ıld it be disconne	cted?	<b>☐Yes</b> ⊠No <b>☐</b> NA	<b>∐Yes _</b> No <b>⊠</b> NA
18. Is the source a pot	ential GWI source?			□Yes ⊠No	∐Yes ⊠No
WELL (if there is no w	vell, skip to questior	34)			
19. Is the Sanitary C contamination?	ontrol Area (SCA)	free of unmitigat	ed potential sources of	Yes <b>No</b>	Yes <b>No</b>
20. Is the wellhead lo	cated in a pit or vau	lt?		Yes 🛛 No	Yes 🛛 No
21. Is the wellhead a	nt risk of submerge	nce?		<b>Yes</b> No	Yes No
22. Is the well cap se	ealed, watertight, a	nd free of unpro	tected openings?	Yes <b>No</b>	Yes No
23. Is the well casing	g free of any unpro	tected openings	?	Yes <b>No</b>	Yes No
24. Is there a vent on	the well?			Yes No	Yes No
24a. If yes, is the v	ent protected? (24	non-corrodible	mesh screen or slots)	Yes <b>No</b>	Yes No
25. Are conduits and	l junction boxes se	aled to prevent o	contaminant entry?	Yes <b>No</b>	Yes <b>No</b>
26. Is the well unrease	onably at risk to phy	vsical damage?		□ Yes ⊠No	<mark>∐Yes</mark> ⊠No
27. Is there a raw wat	er source sample ta	p?		Yes No	Yes No
28. Is the source meter	ered?			Yes 🗌 No	Yes 🗌 No
28a. If yes, is the so	urce meter read at l	east monthly?		Yes 🗌 No	Yes No
28b. If yes, are the v	water production red	cords maintained?		Yes 🗌 No	Yes 🗌 No
29. Is the wellhouse p	oroperly constructed	and maintained?	If no, explain below	Yes 🗌 No	Yes No
30. Is there any evide	nce of infestation by	rodents or other	pests?	☐Yes ⊠No	☐Yes ⊠No
31. Is the wellhouse and well adequately protected from unauthorized access and tampering?			Yes No	Yes No	
32. Is there a pump control valve or vacuum relief valve without an air gap on the valve discharge pipe?			Yes No NA	Yes No NA	
33. Are the source p chronic water outage	ump and pump co es or premature pu	ntrols operationa mp failure? If no	al and adequate to prevent explain below	Yes <b>No</b>	Yes <b>No</b>
Describe and evaluate the source facilities including maintenance, operations, sanitary and security observations and any major change made to the source such as pump replacement, deepening or reconstruction:					and any major change

Nevada – 2 turbines and 2 Submergences and 4 pumps

Grace – 2 turbines

PART D: SOURCES	5		(This page ma	y be reproduced to	add more sources)
12. Did you observe a	a source connected	I and in active use?	☐Yes ⊠No		
12a. If so, has the	source received wr	t-survey)	Yes <b>No</b>		
13. DOH Source Num	ıber:			SO6	SO8
14. Source Name from	m the WFI: (For exan	nple, North Well; N	Well #2; ABC334.)	Central Ave- AHC726	Well Electric- AHC996
15. Dept of Ecology V	Vell Tag Number: (U	se Well tag ID#, N	Ione or Not readable)	AHC726	AHC996
16. Source Use:	P - Permanent	S - Seasonal	E - Emergency	Р	Р
17. If this is an emer	gency source, shou	ıld it be disconne	ected?	<b>☐Yes</b> ⊠No <b>☐</b> NA	<b>∐Yes □</b> No <b>⊠</b> NA
18. Is the source a pot	tential GWI source?			□Yes ⊠No	□Yes ⊠No
WELL (if there is no v	vell, skip to questior	34)			
19. Is the Sanitary C contamination?	ontrol Area (SCA)	free of unmitigat	ed potential sources of	Yes <b>No</b>	Yes <b>No</b>
20. Is the wellhead lo	cated in a pit or vau	lt?		Yes 🛛 No	Yes 🛛 No
21. Is the wellhead a	at risk of submerge	nce?		<b>Yes</b> No	Yes No
22. Is the well cap so	ealed, watertight, a	nd free of unpro	otected openings?	Yes <b>No</b>	Yes No
23. Is the well casing	g free of any unpro	tected openings	?	Yes <b>No</b>	Yes No
24. Is there a vent on the well?				Yes No	Yes No
24a. If yes, is the v	vent protected? (24	non-corrodible	mesh screen or slots)	Yes <b>No</b>	Yes No
25. Are conduits and	d junction boxes se	aled to prevent	contaminant entry?	Yes XNo	Yes <b>No</b>
26. Is the well unrease	onably at risk to phy	<mark>∐Yes</mark> ⊠No	Yes No		
27. Is there a raw wat	er source sample ta	Yes No	Yes No		
28. Is the source met	ered?			Yes 🗌 No	Yes No
28a. If yes, is the so	ource meter read at l	east monthly?		Yes 🗌 No	Yes 🗌 No
28b. If yes, are the	water production red	cords maintained?	)	Yes 🗌 No	Yes No
29. Is the wellhouse properly constructed and maintained? If no, explain below			Yes 🗌 No	Yes No	
30. Is there any evidence of infestation by rodents or other pests?			☐Yes ⊠No	Yes 🛛 No	
31. Is the wellhouse a tampering?	and well adequately	Yes No	Yes No		
32. Is there a pump control valve or vacuum relief valve without an air gap on the valve discharge pipe?				<b>∐Yes</b>	Yes No NA
<b>33.</b> Are the source pump and pump controls operational and adequate to prevent chronic water outages or premature pump failure? If no explain below				Yes <b>No</b>	Yes <b>No</b>

Describe and evaluate the source facilities including maintenance, operations, sanitary and security observations and any major change made to the source such as pump replacement, deepening or reconstruction:

Central Avenue - Two well houses and 2 turbines – one in each. #25 Open hole into the well. Well Electric - has several turbines being repaired/upgraded and other turbines running.

PART E: DISINFECTION (if no	disinfection, answer question 41 an	d skip rest of Part E)		
41. Does the operator batch chlorinate the source, the distribution system, or routine or repeat coliform samples? If yes, provide details below.	∏Yes ⊠No			
42. Did you observe disinfection treatment connected to the water system the WFI? If yes, explain below	in active use that is NOT listed on	□Yes ⊠No		
43. Is ultraviolet light (UV) used for disinfecting a drinking water source? If	no, skip to question 46.	□Yes ⊠No		
44. Is the UV unit sized for the maximum flow rate, and is there a UV transmolector solenoid valve or other device to shut off supply if the UV light fails?	nittance sensor controlling a	☐Yes ☐No		
45. Describe the UV equipment including:				
UV manufacturer and model number:	Rated capacity (gpm):			
Cleaning frequency of quartz sleeve :	Mo/Yr UV light last rep	placed:		
46. Is there continuous chlorination? If no, skip to Part F	46. Is there continuous chlorination? If no, skip to Part F			
46a. If yes, please measure the free chlorine residual from a representative location in the distribution system.				
Location description:	Free chlorine residual:			
47. Is there a water supply line plumbed directly into a chlorine solution pressure backflow assembly on the supply line?	n tank without a reduced	<b>∐Yes</b> ⊠No		
48. Is there a post-treatment sample tap?		Yes No		
49. Does the chlorine compound meet NSF/ANSI Standard 60? - household bleach is exempted		Yes No		
50. Is a backup chemical feed pump or spare parts for the operating chemi	Yes 🗌 No			
51. According to the operator, is there a DOH requirement for Chlorine Contact Time? If no, skip to Part F		□Yes ⊠No		
51a. If yes, measure and record the free chlorine residual at the CT6 compliance location: Describe compliance sampling location below – location must be prior to the first service connection downstream of chlorine addition.				
52. Is the chlorine pump and pump controls constructed and maintained to p treatment? If no, describe below.	provide uninterrupted, reliable CT6	□Yes □No		
Describe the chlorination facilities including purpose for chlorination, concer keeping of monthly reports, and sanitary and security observations:	rns with maintenance or operations, p	urveyor's record		
Each well has two 1-ton chlorination gas.				

PART I: FINISHED WATER STORAGE				
69. Is there a finished water storage tank in use? If no, skip Part I				
70. If unable to physically inspect the storage tank hatch, vent, roof, or overflow outlet, select the method you discussed with the purveyor to document their condition:				
a Reviewed and discussed maintenance records and recent photos				
b Photos will be taken and mailed by purveyor; additional follow-up required by	/ DOH			
c Purveyor unable or unwilling to document; additional follow-up required by D	ОН			
Insert Tank Names	Rockwood Vista	14 <sup>th</sup> & Grand (Standpipe)		
71. Is the storage tank protected from unauthorized entry or vandalism? If no, explain below	Yes No unk	Yes No unk		
72. Is the reservoir roof free of any unprotected openings? If no, explain below	Yes <b>No</b> unk	Yes <b>No</b> unk		
73. Is the access hatch constructed and sealed to prevent the entry of contaminants? If no, explain below	Yes <b>No</b> Ounk	Yes <b>No</b> Uunk		
74. If able to open hatch, is the stored water free of visible contaminants? If no, explain below	Yes No Dunk	Yes No Dunk		
75. Is there a dedicated air vent on the storage tank?	Yes No unk	Yes No unk		
<b>75a.</b> If yes, is the air vent constructed to prevent the entry of contaminants? If no, explain below	☐Yes ⊠ <b>No</b> ☐unk	Yes <b>No</b> Uunk		
<ul><li>76. Is the overflow line constructed to prevent contaminants from entering the tank? If no, explain below</li></ul>	Yes <b>No</b> Uunk	Yes <b>No</b> Uunk		
77. Does the overflow line discharge near ground level?	Yes No Uunk	Yes No Unk		
78. Is the overflow line discharge area protected from potential erosion?	Yes No Dunk	Yes No Unk		
79. Does the overflow line discharge into a storm drain or surface water?	Yes No unk	Yes No unk		
79a. If yes, is there an air gap at the discharge of the overflow OR does the overflow drop at least 34 vertical feet measured from the overflow connection to the reservoir down to the receiving water body?	Yes <b>No</b> Uunk	Yes <b>No</b> Uunk		
80. Does the overflow line discharge directly into a sanitary sewer without an air gap?	<b>☐Yes</b> ⊠No <b>☐</b> unk	<b>Yes</b> ⊠No <b></b> unk		
81. Can the reservoir be isolated from the rest of the water system and be drained through a dedicated drain line?	Yes No Uunk	Yes No Uunk		
82. When was the tank inspected last? Explain below if necessary	February 2022	2022 coming		
83. What is the tank cleaning frequency? Explain below if necessary	When needed	2022 coming		
84. Does the tank size, operation, and internal piping configuration appear to provide adequate water turnover (i.e. separate inlet/outlet, baffling or mixing to reduce stagnant water)? If no, explain below	Yes No Uunk	Yes No Uunk		
85. Does the tank show signs of excessive leakage, significant structural cracking, or an advanced concrete spalling?	☐Yes ⊠No	Yes No		
Describe and evaluate the finished water storage facilities including volume, operational drawdown, configuration of the inlet/outlet piping, any concerns about operations and maintenance, and sanitary and security observations:				

Page 5

PART I: FINISHED WATER STORAGE					
69. Is there a finished water storage tank in use? If no, skip Part I					
70. If unable to physically inspect the storage tank hatch, vent, roof, or overflow outlet, select the method you discussed with the purveyor to document their condition:					
a 🛛 Reviewed and discussed maintenance records and recent photos					
b Photos will be taken and mailed by purveyor; additional follow-up required by	/ DOH				
c Purveyor unable or unwilling to document; additional follow-up required by D	ОН				
Insert Tank Names	Lincoln Height Res #1	Lincoln Height Res #2			
71. Is the storage tank protected from unauthorized entry or vandalism? If no, explain below	Yes No unk	Yes No Uunk			
72. Is the reservoir roof free of any unprotected openings? If no, explain below	Yes <b>No</b> unk	Yes <b>No</b> unk			
73. Is the access hatch constructed and sealed to prevent the entry of contaminants? If no, explain below	Yes <b>No</b> Uunk	Yes <b>No</b> Uunk			
74. If able to open hatch, is the stored water free of visible contaminants? If no, explain below	Yes 🗌 No 🗌 unk	Yes No Uunk			
75. Is there a dedicated air vent on the storage tank?	Yes No unk	Yes No unk			
<b>75a.</b> If yes, is the air vent constructed to prevent the entry of contaminants? If no, explain below	☐Yes ⊠ <b>No</b> ☐unk	Yes <b>No</b> Dunk			
<ul><li>76. Is the overflow line constructed to prevent contaminants from entering the tank? If no, explain below</li></ul>	Yes <b>No</b> unk	Yes <b>No</b> unk			
77. Does the overflow line discharge near ground level?	Yes No Ounk	Yes No Unk			
78. Is the overflow line discharge area protected from potential erosion?	Yes No 🗌 unk	Yes No Dunk			
79. Does the overflow line discharge into a storm drain or surface water?	☐Yes ⊠No ☐unk	Yes No unk			
79a. If yes, is there an air gap at the discharge of the overflow OR does the overflow drop at least 34 vertical feet measured from the overflow connection to the reservoir down to the receiving water body?	Yes <b>No</b> unk	Yes <b>No</b> unk			
80. Does the overflow line discharge directly into a sanitary sewer without an air gap?	<b>Yes</b> ⊠No <b>unk</b>	<b>Yes</b> ⊠No <b>_</b> unk			
81. Can the reservoir be isolated from the rest of the water system and be drained through a dedicated drain line?	Yes No Uunk	Yes No Uunk			
82. When was the tank inspected last? Explain below if necessary	2017	2017			
83. What is the tank cleaning frequency? Explain below if necessary	When needed (5 years or so)	When needed (5 years or so)			
84. Does the tank size, operation, and internal piping configuration appear to provide adequate water turnover (i.e. separate inlet/outlet, baffling or mixing to reduce stagnant water)? If no, explain below	Yes 🗌 No 🗌 unk	Yes No Uunk			
85. Does the tank show signs of excessive leakage, significant structural cracking, or an advanced concrete spalling?	Yes No	Yes No			
Describe and evaluate the finished water storage facilities including volume, operational drawdown, configuration of the inlet/outlet piping, any concerns about operations and maintenance, and sanitary and security observations:					
PART I: FINISHED WATER STORAGE					
--	--------------------------------	--------------------------------	--	--	--
69. Is there a finished water storage tank in use? If no, skip Part I		Yes No			
70. If unable to physically inspect the storage tank hatch, vent, roof, or overflow outlet, select the method you discussed with the purveyor to document their condition:					
a Reviewed and discussed maintenance records and recent photos					
b Photos will be taken and mailed by purveyor; additional follow-up required by	/ DOH				
c Purveyor unable or unwilling to document; additional follow-up required by D	ОН				
Insert Tank Names	Thorpe Reservoir	Five Mile Reservoir			
71. Is the storage tank protected from unauthorized entry or vandalism? If no, explain below	Yes No unk	Yes No unk			
72. Is the reservoir roof free of any unprotected openings? If no, explain below	Yes <b>No</b> unk	Yes <b>No</b> unk			
73. Is the access hatch constructed and sealed to prevent the entry of contaminants? If no, explain below	Yes <b>No</b> Uunk	Yes <b>No</b> Uunk			
74. If able to open hatch, is the stored water free of visible contaminants? If no, explain below	Yes No Uunk	Yes No Uunk			
75. Is there a dedicated air vent on the storage tank?	Yes No unk	Yes No unk			
<b>75a.</b> If yes, is the air vent constructed to prevent the entry of contaminants? If no, explain below	Yes <b>No</b> unk	Yes <b>No</b> unk			
<ul><li>76. Is the overflow line constructed to prevent contaminants from entering the tank? If no, explain below</li></ul>	Yes <b>No</b> unk	Yes <b>No</b> unk			
77. Does the overflow line discharge near ground level?	Yes 🛛 No 🗌 unk	Yes No Dunk			
78. Is the overflow line discharge area protected from potential erosion?	Yes 🗌 No 🗌 unk	Yes No Ounk			
79. Does the overflow line discharge into a storm drain or surface water?	Yes No unk	☐Yes ⊠No ☐unk			
79a. If yes, is there an air gap at the discharge of the overflow OR does the overflow drop at least 34 vertical feet measured from the overflow connection to the reservoir down to the receiving water body?	Yes <b>No</b> Unk	Yes <b>No</b> Uunk			
80. Does the overflow line discharge directly into a sanitary sewer without an air gap?	<b>Yes</b> ⊠No <b></b> unk	<b>Yes</b> ⊠No <b>_</b> unk			
81. Can the reservoir be isolated from the rest of the water system and be drained through a dedicated drain line?	Yes 🗌 No 🗌 unk	Yes No Uunk			
82. When was the tank inspected last? Explain below if necessary	2015	2021			
83. What is the tank cleaning frequency? Explain below if necessary	When needed (5 years or so)	When needed (5 years or so)			
84. Does the tank size, operation, and internal piping configuration appear to provide adequate water turnover (i.e. separate inlet/outlet, baffling or mixing to reduce stagnant water)? If no, explain below	☐Yes ⊠No ☐unk	☐Yes ⊠No ☐unk			
85. Does the tank show signs of excessive leakage, significant structural cracking, or an advanced concrete spalling?	Yes No	Yes No			
Describe and evaluate the finished water storage facilities including volume, operational drawdown, configuration of the inlet/outlet piping, any concerns about operations and maintenance, and sanitary and security observations:					

Suggest - cleaning up grass around the tanks - (Thorpe) Photo #36 and (5 mile) Photo #42

PART I: FINISHED WATER STORAGE					
69. Is there a finished water storage tank in use? If no, skip Part I	69. Is there a finished water storage tank in use? If no, skip Part I				
70. If unable to physically inspect the storage tank hatch, vent, roof, or overflow outlet, select the method you discussed with the purveyor to document their condition:					
a Reviewed and discussed maintenance records and recent photos					
b Photos will be taken and mailed by purveyor; additional follow-up required by	DOH				
c Purveyor unable or unwilling to document; additional follow-up required by D	НС				
Insert Tank Names	IndianTrail Reservoir	North Hill Reservoir			
71. Is the storage tank protected from unauthorized entry or vandalism? If no, explain below	Yes No unk	Yes No unk			
72. Is the reservoir roof free of any unprotected openings? If no, explain below	Yes <b>No</b> unk	Yes <b>No</b> unk			
73. Is the access hatch constructed and sealed to prevent the entry of contaminants? If no, explain below	Yes <b>No</b> unk	Yes <b>No</b> unk			
74. If able to open hatch, is the stored water free of visible contaminants? If no, explain below	Yes No Ounk	Yes No Uunk			
75. Is there a dedicated air vent on the storage tank?	Yes No unk	Yes No unk			
<b>75a. If yes, is the air vent constructed to prevent the entry of contaminants?</b> If no, explain below	Yes <b>No</b> Uunk	Yes <b>No</b> Uunk			
<ul><li>76. Is the overflow line constructed to prevent contaminants from entering the tank? If no, explain below</li></ul>	Yes <b>No</b> unk	Yes <b>No</b> Uunk			
77. Does the overflow line discharge near ground level?	Yes No Uunk	☐Yes ⊠No ☐unk			
78. Is the overflow line discharge area protected from potential erosion?	Yes No Uunk	Yes No Dunk			
79. Does the overflow line discharge into a storm drain or surface water?	☐Yes ⊠No ☐unk	Yes No unk			
79a. If yes, is there an air gap at the discharge of the overflow OR does the overflow drop at least 34 vertical feet measured from the overflow connection to the reservoir down to the receiving water body?	Yes <b>No</b> unk	Yes <b>No</b> Uunk			
80. Does the overflow line discharge directly into a sanitary sewer without an air gap?	<b>∐Yes</b> ⊠No <b></b> unk	<b>☐Yes</b> ⊠No <b>☐</b> unk			
81. Can the reservoir be isolated from the rest of the water system and be drained through a dedicated drain line?	Yes No Uunk	Yes No Uunk			
82. When was the tank inspected last? Explain below if necessary	2014	2015			
83. What is the tank cleaning frequency? Explain below if necessary	When need years or so)	When needed ( 5 years or so)			
84. Does the tank size, operation, and internal piping configuration appear to provide adequate water turnover (i.e. separate inlet/outlet, baffling or mixing to reduce stagnant water)? If no, explain below	⊠Yes □No □unk	Yes No Dunk			
85. Does the tank show signs of excessive leakage, significant structural cracking, or an advanced concrete spalling?	Yes No	Yes No			
Describe and evaluate the finished water storage facilities including volume, operational drawdown, configuration of the inlet/outlet piping, any concerns about operations and maintenance, and sanitary and security observations:					

### PART N: SUPPLEMENTAL NOTES AND SAFETY CONCERNS

Supplemental comments from other parts of the checklist, and documentation of field safety concerns:

















# 6.12 PFAS Sampling Results Table

		Well Electric	Parkwater						
	Nevada SO1	SO2	SO3	Rav Street SO4		Grace SO6		Central SO8	SAL
Compound	1st Quarter	1st Quarter	1st Quarter	1st Quarter	2nd Quarter	1st Quarter	2nd Quarter	1st Quarter	
(PFOS) PFoctane sulfonic acid	ND	ND	ND	4.4ng/L	4.7 ng/L	2ng/L	2.1 ng/L	ND	15ng/L
(PFOA) PFoctanoic acid	ND	ND	ND	2.8ng/L	3.0 ng/L	ND	ND	ND	10ng/L
(PFNA) PFnonanoic acid	ND	ND	ND	ND	ND	ND	ND	ND	9ng/L
(PFHxS) PFhexane sulfonic acid	ND	ND	ND	ND	ND	ND	ND	ND	65ng/L
(PFBS) PFbutane sulfonic acid	ND	ND	ND	2.9ng/L	2.9 ng/L	ND	ND	ND	345ng/L
(PFUnA) PFundecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(PFPeS) PFpentanesulfonic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(PFPeA) PFpentanoic acid	ND	ND	ND	2.9ng/L	2.8 ng/L	ND	ND	ND	None
(PFMPA) PF-3-methoxypropanoic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(PFMBA) PF-4-methoxybutanoic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(PFHxA) PFhexanoic acid	ND	ND	ND	2.9ng/L	2.2 ng/L	ND	ND	ND	None
(PFHpS) PFheptanesulfonic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(PFHpA) PFheptanoic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(PFEESA)PF(2-ethoxyethane)slfnc acd	ND	ND	ND	ND	ND	ND	ND	ND	None
(PFDoA) PFdodecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(PFDA) PFdecanoic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(PFBA) PFbutanoic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(NFDHA) NonaF-dioxaheptanoic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(HFPO-DA) Hexafluoropropylene oxide	ND	ND	ND	ND	ND	ND	ND	ND	None
(ADONA) 4,8-Dioxa-3H-perfluorononan	ND	ND	ND	ND	ND	ND	ND	ND	None
(9CI-PF3ONS) 9-Chlorohexadecafluor	ND	ND	ND	ND	ND	ND	ND	ND	None
(8:2FTS) H-PFdecane sulfonic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(6:2FTS) H-PFoctane sulfonic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(4:2FTS) H-PFhexane sulfonic acid	ND	ND	ND	ND	ND	ND	ND	ND	None
(11CI-PF3OUdS) 11-Chloroeicosafluor	ND	ND	ND	ND	ND	ND	ND	ND	None

PFAS Compound Sampling 2023

ND non detect with a detection limit of 2 ng/L results in ng/L (parts per trillion)

SAL State Action Level

7.1-7.3 Examples of correspondence, approvals, inspection documentation, record drawings, reports, Council actions, Washington State Department of Health correspondence, reports, and approvals



.....

# **CONSTRUCTION COMPLETION REPORT FORM**

In accordance with WAC 246-290-120 (5), a *Construction Completion Report* is required for all approved construction projects. Operators **must** submit a Construction Completion Report to us within sixty (60) days of completion and before use of any water system facility. This includes any source, water quality treatment, storage tanks, booster pump facilities, and distribution projects.

Please type or pr	int legibly in ink:					
City of Spokane		DOH System ID No.:	83100K			
Name of Water System						
Loren Searl		DOH Project No.	#20-0109 (if applicable)			
Name of Purveyor (Owner or System Contact)					(	
914 E. North Foothills Dr.			Date Construction Documents			
Mailing Address			Approved by DOH	April 8, 2020		
Spokane	WA	99207-2794		(If applicable)		
City	State	Zip				

#### PROJECT NAME AND DESCRIPTIVE TITLE: Five Mile Booster Station

CHECK ONE: 🔀 Entire Project Completed. 📃 Description of Portions Completed.

#### PROFESSIONAL ENGINEER'S ACKNOWLEDGMENT (Complete items below Attach additional sheets as needed)

The undersigned professional engineer (PE), or their authorized agent, has inspected the above-described project which, as to layout, size and type of pipe, valves and materials, reservoir and other designed physical facilities, has been constructed and is substantially completed in accordance with construction documents reviewed by the purveyor's engineer or approved by the Department of Health. In the opinion of the undersigned engineer, the installation, physical testing procedures, water quality tests, and disinfection practices were carried out in accordance with state regulations and principles of standard engineering practice.

I have reviewed the disinfection procedures  $\square$ , pressure test results  $\square$ , and results of the bacteriological test(s)  $\square$  for this project and certify that they comply with the requirements of the construction standards/specifications approved by the Department of Health. (Check all boxes that apply that are consistent with the nature of the project.)

This project changes the physical capacity of the system to serve consumers. The system is now able to serve equivalent residential units (ERUS.) 🛛 Not applicable

Please return completed form to your regional office checked below.         NWRO Drinking Water       SWRO Drinking Water         Department of Health       Department of Health         20425 72 <sup>nd</sup> Ave. S, Ste 310       PO Box 47823         Kent, WA 98032-2388       Olympia, WA 98504-7823         253-395-6750       360-236-3030	A SULTAN OF MARCHAN	14 July 2022         Date Signed         City of Spokane         Name of Engineering Firm         James S. Sakamoto         Name of PE Acknowledging Construct         914 E. North Foothills Dr.         Mailing Address	ction
Please return completed form to your regional office checked below.         NWRO Drinking Water       SWRO Drinking Water         Department of Health       Department of Health         20425 72 <sup>nd</sup> Ave. S, Ste 310       PO Box 47823         Kent, WA 98032-2388       Olympia, WA 98504-7823         253-395-6750       360-236-3030	A STORE OF THE STO	Spokane WA City State Engineer's Signature State/Federal Funding Type (if an	99207-2794 Zip
NWRO Drinking WaterSWRO Drinking WaterERO Drinking WaterDepartment of HealthDepartment of HealthDepartment of Health20425 72 <sup>nd</sup> Ave. S, Ste 310PO Box 4782316201 E. Indiana Ave, StKent, WA 98032-2388Olympia, WA 98504-7823Spokane Valley, WA 992253-395-6750360-236-3030509-329-2100	e return completed form to your regional office	checked below.	
	WRO Drinking Water	SWRO Drinking Water Department of Health PO Box 47823 Olympia, WA 98504-7823 360-236-3030	ERO Drinking Water Department of Health 16201 E. Indiana Ave, Suite 1500 Spokane Valley, WA 99216 509-329-2100

For people with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TDD/TTY call 711).



STATE OF WASHINGTON DEPARTMENT OF HEALTH EASTERN DRINKING WATER REGIONAL OPERATIONS 16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830 711 Washington Relay Service

February 19, 2020

Dan Kegley City of Spokane 914 E North Foothills Dr. Spokane, WA 99207

### Subject: Spokane, City of, PWS ID#83100, Spokane County Five Mile Booster; DOH Project #20-0109; Comment Letter

Dear Mr. Kegley:

The Department of Health (DOH) reviewed the engineering report, plans and specifications received January 22, 2020. Based upon the information submitted and the requirements of chapter 246-290 WAC, the following comments need to be addressed before DOH can approve the project:

- Clarify booster pump operations Parallel/Scries
- Does the booster pump have protection from power disruption (i.e. Lighting, loss of voltage, loss of phase, etc.)?
- What type of alarms conditions and controls (i.e. flow, pressure, alarms, etc.) will the Booster Pump Station have (i.e. pump failure, low pressure, suction head lost, visible alarm light, automatic signal transmitted, etc.)?
- Provide a sample tap on the common discharge line to aid in water quality monitoring and investigation or for each booster pump line.
- Provide an injection tap on the common discharge line or for each booster pump line to aid in emergency treatment.
- How are the routine and preventive operations and maintenance tasks and their frequency being documented? Also, what is the role of a certified operator in completing them?

WAC 246-290-990 authorizes a schedule of fees to be implemented to help recover the cost of reviewing water system plans, reports, and construction documents. The Department of Health's (DOH) total cost to complete this review is \$2,653.00. The review fee includes the first submittal review and second review leading to the approval letter. Please note that we are required to charge 25% of the review fee for addition reviews after the second review. An invoice is enclosed.

Dan Kegley February 19, 2020 Page 2

Thank you for this opportunity to review and comment on your construction documents. Please contact me at (509) 329-2121 or email: <u>scott.mallery@doh.wa.gov</u> if you or your engineering consultant have any questions concerning this letter.

Sincerely,

Scott ne

Scott Mallery, PE Assistant Regional Manager Office of Drinking Water Division of Environmental Public Health

Enclosures: Invoice

cc: Spokane Regional Health District James Sakamoto, PE, City of Spokane Cindy Kinzer, PE, City of Spokane George Simon, DOH Compliance Program Manager



STATE OF WASHINGTON DEPARTMENT OF HEALTH EASTERN DRINKING WATER REGIONAL OPERATIONS 16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830 711 Washington Relay Service

January 23, 2020

Daniel Kegley City of Spokane 914 E North Foothills Dr. Spokane, WA 99207-2794

Subject: Spokane City of; PWS ID #83100; Spokane County Five Mile Booster; DOH Project #20-0109

Dear Mr. Kegley:

We received the documents for the above-named project on January 22, 2020. We are now reviewing these documents.

To better track your project, we have assigned it a unique project number: #20-0109. Please use this number on all future correspondence about this project.

We are authorized by state regulations to charge a fee for reviewing water system plans, reports, and construction documents. Please use this link to access our fee schedule: http://www.doh.wa.gov/portals/1/Documents/pubs/331-228.pdf.

We will send you an invoice for this fee after our initial review of your engineering documents. Payment is due at that time. The base fee includes our initial review, and review of one resubmittal if needed. If additional reviews are needed, we will send you a separate invoice.

The department's review of your water system documents will not confer or guarantee any right to a specific quantity of water. Our review will be based on your representation of available water quantity. If the Washington Department of Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represent, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

Thank you for giving us the opportunity to serve you. We look forward to working with you to ensure your community has safe and reliable drinking water at the tap. Please call me at 509-329-2131, if you have any questions.

Sincerely,

Bobby Isus ty for

Scott Mallery, PE Assistant Regional Manager Office of Drinking Water Division of Environmental Public Health

cc: Spokane Regional Health District James Sakamoto, PE, City of Spokane Cindy Kinzer, PE, City of Spokane George Simon, DOH Compliance Program Manager

Notice: Anyone who begins construction on a project without all required approvals may be subject to a penalty of up to \$5,000 per service connection, and may be required to expose system components for our inspection at their own expense. The Department of Health may be unable to accept any component that is installed or constructed prior to approval.



STATE OF WASHINGTON DEPARTMENT OF HEALTH EASTERN DRINKING WATER REGIONAL OPERATIONS 16201 E Indiana Avenue, Suite 1500, Spokane Valley, Washington 99216-2830 711 Washington Relay Service

April 8, 2020

Dan Kegley City of Spokane 914 E North Foothills Dr. Spokane, WA 99207

Subject: Spokane, City of; PWS ID #83100; Spokane County Five Mile Booster; DOH Project #20-0109; APPROVAL

Dear Mr. Kegley:

The engineering report, plans and specifications for the above project received in this office January 20, 2020, together with response to comments received March 31, 2020, have been reviewed and, in accordance with the provisions of WAC 246-290, are hereby APPROVED.

Please Note:

• Provide record drawings if any changes in construction documents.

As required in WAC 246-290-040 – Within sixty days following the completion of, and prior to the use of, the above project or portions thereof, the attached Construction Completion Report must be completed by a professional engineer and returned to this department.

WAC 246-290-120 provides if the certification of completion has not been submitted within two years of the date of this letter, this approval will become null and void unless you take action at that time to arrange for an extension of the approval period in the manner prescribed.

We acknowledge receipt of a final environmental document related to the subject plans and specifications and state that the contents of the document were used in the review process leading to this approval.

Please note that the water system is expected to permit additional new connections in a manner consistent with this project or your approved water system plan, or both, so that physical capacity and water rights are not exceeded.

DOH Disclaimer: The department's approval of your water system design does not confer or guarantee any right to a specific quantity of water. The approved number of service connections is based on your representation of available water quantity. If the Washington Department of Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represented, the

Dan Kegley April 8, 2020 Page 2

number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

If you have any questions please feel free to contact me at (509) 329-2131.

Sincerely,

Seattha

Scott Mallery, PE Assistant Regional Manager Office of Drinking Water Division of Environmental Public Health

Enclosures: Construction Completion Report

cc: Spokane Regional Health District James Sakamoto, PE, City of Spokane George Simon, DOH Compliance Program Manager Matt Hadorn, DOH Regional Specialist



WATER DEPARTMENT 914 E North Foothills Drive Spokane WA 99207-2794 (509) 625-7800 FAX 625-7816

March 31, 2020

Scott Mallery, P.E. Assistant Regional Manager Office of Drinking Water Division of Environmental Public Health Washington State Department of Health

Subject: Five Mile Booster; DOH Project #20-0109

Dear: Scott

Please find below responses to your comments dated February 19, 2020 for the Five Mile Booster Station Project; DOH Project #20-109.

1. Clarify booster pump operations - Parallel/Series,

Response: The five pumps positions in the new booster station are set up in a parallel configuration for operation. This configuration provides the flexibility and redundancy for reliable and efficient operation of this station. The existing booster station that will be replaced is in series with the new station. This will allow for concurrent operation of the old and new booster stations for a short time for startup operations and testing of the new station to ensure consistent delivery of water until the new station is fully operational.

2. Does the booster pump have protection from power disruption (i.e. Lightning, loss of voltage, loss of phase, etc.)?

Response: Yes, surge protection is an incorporated part of the motor control center (MCC) for this and all of the other booster stations and well stations operated by the City.

3. What type of alarms conditions and controls (i.e. pump failure, low pressure, suction head lost, visible alarm light, automatic signal transmitted, ect.)?

Response: The booster station will be connected to the Supervisory Control and Data Acquisition (SCADA) network. Real time monitoring of suction pressure, discharge pressure, flow and pump on/off are monitored at the control room. Real time data is transmitted by radio to the closed secure SCADA network.

4. Provide a sample tap on the common discharge line to aid in the water quality monitoring and investigation or for each booster pump line.

Response: A sample tap will be added and installed by City forces for monitoring and investigation.

5. Provide an injection tap on the common discharge line or for each booster pump line to aid in emergency treatment.

Response: The suction supply for the booster station is Five Mile Reservoir co-located at the booster station site. Emergency treatment, if ever necessary, would enter the booster station from the suction side through the four way valve from the Five Mile Reservoir. If a chlorine room were added to the booster station significant structural revisions and ventilation requirements would be necessary to accommodate a chlorine room for emergency purposes.

6. How are routine and preventative operations and maintenance tasks and their frequency being documented? Also, what is the role of a certified operator in completing them?

Response: Routine preventative maintenance is completed at a minimum weekly by mechanics who are assigned to that specific station and logged in the station log. The booster stations are visited 3 times a week on a Monday, Wednesday, Friday schedule during the trap line by operators who read and monitor instrumentation and check and verify SCADA operations and report any irregularities to the mechanics. If repairs are required which requires a crew from the water department those repairs with the parts, equipment and labor are recorded in CityWorks, the Water Departments maintenance Management system. Repair crews are led by a Foreman who is a certified operator and some of the mechanics and operators are certified operators.

Please review the response to comments received dated February 19, 2020 for the Five Mile Booster Station Project; DOH Project #20-109. Please contact me if there are any questions or additional information you require.

Sincerely,

James Sakamoto, P.E. Principal Engineer – Water Department City of Spokane, WA

JSS/jss

City of Spokane

# **PROJECT REPORT**

Relating to

Five Mile Booster Station Rehabilitation





December 2019

# 1.1 Purpose of Project 1.2 SEPA DNS 1.3 Source Development/Treatment 1.4 Consumer Complaints 1.5 Compatibility with City Planning Requirements 2.1 Planning Area 2.2 Current and Projected Population and Water Demand Estimates 2.3 Supply and Storage for Planning Area 2.4 Proposed Construction Schedule, Cost, Financing 3.1 Description of Existing Main 3.2 Alternatives Considered 5.1 Overview 5.2 Main Sizing 6.1 Design & Construction Standards 6.2 Property APPENDIX SEPA DNS 2016 WSP Figure 1.3.1 (Pressure Zone Map) 2016 WSP Table 4.5.3 (Water Right Status) 2016 WSP Table 4.5.4 (20-Year Forecasted Water Rights) PLANS AND SPECIFICATIONS

### TABLE OF CONTENTS

Five Mile Booster Station Project, ES File # 2017104



# **1. PROJECT OVERVIEW**

WAC 246-290-110 (4)(a)

### 1.1 Purpose of Project

The existing Five Mile Booster Station was built in 1976. The pumps station is inefficient and the components of the station are reaching the end of their design life. The station components will be replaces and updated to provide a broader operating strategies and the project will include a new upgraded building, switchgear and yard piping for efficient operation.

### 1.2 SEPA DNS

A SEPA checklist has been completed and a Determination of Non-Significance (DNS) issued for this project. A copy of the DNS is included in the Appendix.

### **1.3 Source Development/Treatment**

The proposed booster station rehabilitation project does not pertain to source development or treatment. This project is the rehabilitation of an existing booster station with a more efficient and reliable booster station. The City has adequate source capacity and water rights for the Five Mile Booster Station.

### 1.4 Consumer Complaints

The City's Water Department has not received complaints related to water delivery in the Top pressure zone of the City serviced by this booster station that would precipitate this rehabilitation. This project is being undertaken by the water department to avoid future problems which would reduce service levels below City/state design standards and customer complaints.

## 1.5 Compatibility with City Planning Requirements

The Five Mile Booster Station Rehabilitation Project is in the City of Spokane Water Department's 6 year capital improvement program and has been adopted by the City Planning Commission.

# 2. PLANNING DATA

WAC 246-290-110 (4)(b)

### 2.1 Planning Area

The area served by the Five Mile Booster Station is the Five Mile Pressure Zone and the Kempe pressure zone which is boosted from the Five Mile Pressure Zone. Figure 1.3.1 from the Water System Plan is included in the appendices depicting the pressure zones for the City of Spokane water system.

### 2.2 Current and Projected Population and Water Demand Estimates

The Five Mile Pressure Zone has shown in Figure 1.3.1 and the Kempe Pressure Zone, which is boosted from the Five Mile Pressure Zone, are served by only the Five Mile Booster Station emphasizing the need for a reliable booster facility with maximum flexibility and redundancy.

Analysis of the metered use through the pressure zone and pumping from the station indicate seasonal variations in pumping requirements with a minimum use and pumping rate of 522 GPM during the winter months to a seasonal peak use and pumping rate requirement of 6698 GPM during the summer months at peak hour demand. These pumping rates are average pumping requirements from the past three years of data recorded for the existing Five Mile Booster Station. Average winter flow for the Five Mile Pressure Zone for the past three years is 1003 GPM and 3032 GPM for average summer flow over the same period.

Modest Growth due to infill and development on the Five Mile Prairie reflect an increase in pumping to the pressure zones indicative of the growth of just over 1%. The Five Mile and Kempe Pressure zones combined represents between 2% to 3% of the water systems total production use.

## 2.3 Supply and Storage for Planning Area

The Five Mile booster station services the Five Mile Pressure Zone boosting water from the North Hill Pressure Zone to the Strong Road Standpipe. The Kempe Pressure zone draws water from the Five Mile Pressure Zone and is boosted to the Kempe Reservior.

The Strong Road Standpipe provides 2 million gallons of storage for the Five Mile Pressure zone with water boosted through the Five Mile Booster Station. The Kempe Reservoir provides 1.1 million gallons of storage for the Kempe Pressure Zone with water boosted through the Kempe Booster Station from the Five Mile Pressure Zone.

# 2.4 Proposed Construction Schedule, Cost, Financing

Design of this project is completed and construction started in Fall 2019 for the building construction and associated yard piping that will not interfere with the existing booster station operation. Startup of the station is anticipated for Spring 2020 with station testing early 2020 with the intent to have this main in service before the high demand portion of summer 2020 pending all successful testing and approvals.

The estimated project cost including design and construction phase engineering, tax and contingencies is approximately \$3.98M which will be paid out of water department discretionary construction funds and will have no rate impact.

# 3. ALTERNATIVES CONSIDERED

WAC 246-290-110 (4)(c)

# 3.1 Description of Existing Booster Station

The existing Five Mile Booster Station contains four positions for pumps. The four existing pumps are one (1) 75 Hp, one (1) 125 Hp and two (2) 250 Hp motors with a total name plate capacity of the existing station at 6535 GPM through 12 inch discharge piping through a 24 inch header.

# 3.2 Alternatives Considered

A number of alternatives were considered for the replacement of the Five Mile Booster Station. A brief narrative of the alternatives considered are provided including the key factors considered in the process.

# 3.2.1 Do Nothing

The 'Do Nothing' alternative would keep the current booster station with no changes. This alternative was rejected since the current booster station has shown reliability issues with pumps showing sign of aging and wear with the associated increase in maintenance costs. The existing station could keep up with current demands however pump cycling to meet max day demands is inefficient and the current station does not provide adequate redundancy for operation in this critical pressure zone.

# 3.2.2 Rebuild Existing Booster Station

Rebuilding the existing booster station alternative was considered early in the initial design review. This option was rejected since a compete rebuild of the station would require taking the station off line and with no redundant station to provide service to the pressure zone, the logistics and potential costs to continue adequate service rendered this option unfeasible. In addition the current station design contains 12 inch discharge lines feeds a 24 inch header. In order to reduce velocities in the discharge piping and increase efficiency at max day demands larger discharge piping would be required and would need to be part of the rebuild design. Further, to provide the needed redundancy for the pressure system and additional pump position should be included with the rebuild design. This would require significant alterations to the existing station. For these reasons the rebuild costs would meet or exceed the cost of a new booster station building to replace the aging station.

# 3.2.3 Construct New Booster Station in New Location

Construction of a new booster station at a new location was studied to search viable locations for a new booster station and weigh potential costs. Property acquisition, zone changes to allow the booster station and the requirement for the addition of new suction and discharge piping to any new acceptable site caused rejection of this option.

# 3.2.4 Construct New Booster Station on Existing Booster Station Property

Sufficient property exists at the current site of the existing booster station for a parallel construction of a replacement booster station. This also provides convenient access to suction and discharge piping for the new station. Site zoning to build the new station on this site

requires minimal approvals in comparison to a new site depending upon zoning. And site acquisition would not be required. Construction of the replacement booster station on the existing site was shown to be the most cost effective option.

# 4. SUPPLY & WATER RIGHTS ASSESSMENT

WAC 246-290-110 (4)(d, e)

As documented in Section 4 of the 2016 WSP, the City is well within both its water rights and supply capacity for both current and 20 year projected demands. Two tables, one comparing projected demand and existing water rights and the other comparing projected demand with existing supply capacity, both from the 2016 WSP, are included in the Appendix.

#### 5. SIZING JUSTIFICATION WAC 246-290-110 (4)(f)

#### 5.1 Booster Station Sizing

The existing Five Mile Booster Station includes 4 pump positions with a total station nameplate pumping capacity of 6535 GPM. In order to meet summer demands in the system multiple pumps must operate to provide the average day summer demands of 3,032 GPM and the booster station will rely on system storage for the max day peak hour demands of 6698 GPM. Additionally the current pump configuration of the existing booster station does not provide the resiliently and redundancy to provide flow to the pressure zone when multiple pumps are offline. The current configuration of the existing 4 position booster station is one (1) 75 HP – 620 GPM pump, one (1) 125 HP – 1040 GPM pump and two (2) 250 HP pumps at 2375 GPM and 2500 GPM respectively.

The replacement Five Mile Booster Station will include five positions with a total nameplate capacity of 8750 GPM. The station will be sized to meet summer peak demands and provide pumping redundancy. The proposed configuration of the five vertical turbine pump positions are one (1) 125HP- 750 GPM pump, two (2) 250HP- 1500 GPM pumps and two (2) 350HP-2500 GPM Pumps. Discharge piping will be upsized to accommodate additional flows from the larger capacity pumps.

Anticipated growth for the area served is expected to be moderate following current tends so the proposed station is expected to provide adequate service under the expected growth projections for 20 years and could support the projected 50 year growth requirement with larger pump replacements.



# 6. MISCELLANEOUS

WAC 246-290-110 (4)(g, i)

# 6.1 Design & Construction Standards

Section 7 of the City's 2016 WSP references design & construction standards which will be followed for this project.

#### 6.2 Property

The proposed booster station replacement will be installed in City owned real property owned and operated by the City of Spokane Water Department.



# Appendix

# SEPA DNS

# 2016 WSP Figure 1.3.1

2016 WSP Table 4.5.3 (Water Right Status)

2016 WSP Table 4.5.4 (20-Year Forecasted Water Rights Status)



# **SEPA DNS**

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#### SPOKANE ENVIRONMENTAL ORDINANCE

(WAC 197-11-970) Section 11.10.230(3) Determination of Non-Significance (DNS) File No. 2017104

#### DETERMINATION OF NON-SIGNIFICANCE

Description of Proposal: Five Mile Booster Station Replacement

Proponent: City of Spokane Department of Engineering

Location of proposal, including street address, section, township and range if any: Northeast of the intersection of Woodside Avenue and Belt Street just east of Five Mile Road. 6910 North Belt Street, Section 25 SE, Township 26, Range 42, Parcel No. 26254.0006.

Lead agency: City of Spokane, Department of Engineering Services

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An Environmental Impact Statement (EIS) is not required under RCW 43.21C.030(2)(c). This decision was made after review of a completed Environmental Checklist and other information on file with the lead agency. This information is available to the public on request.

- [ ] There is no comment period for this DNS.
- [ ] This DNS is issued after using the optional DNS process in Section 197-11-355 WAC. There is no further comment period on the DNS.
- [X] This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by December 18, 2018.

Responsible official: Kyle Twohig

Position/Title: Director of Engineering Services Phone: (50

Phone: (509) 625-6700

Address: 2nd Floor, City Hall, 808 W. Spokane Falls Blvd., Spokane, WA 99201-3343

Date: December 4, 2018 Signature:

You may appeal this determination to Kyle Twohig, Director of Engineering Services

at (location): 2nd Floor, City Hall, Spokane, WA 99201-3343

no later than (date): December 18, 2018

by (method): written

You should be prepared to make specific factual objections.

Contact Frances Perkins at (509) 625-6700 to read or ask about the procedures for SEPA appeals.

#### DISTRIBUTION LIST FOR COMMENTS

#### PROJECT NAME: Five Mile Booster Station Replacement

FILE No.: 2017104

#### E-mail Copies

#### **City Departments**

- Asset Management, Attn: Dave Steele
- City Attorney, Attn: James Richman
- City Treasurer: Renee Robertson
- Code Enforcement, Attn: Kris Becker
- Construction Management, Attn: Joel Graff\* \*\*
- Engineering Services, Attn: Dan Buller\* \*\*
- Fire Dept., Attn: Dave Kokot \*
- Historic Preservation, Attn: Megan Duvall
- Integrated Capital Management, Attn: Marcia Davis\* \*\*
- Integrated Capital Management, Attn: Katherine Miller \* \*\*
- Integrated Capital Management: Scotty Allenton\* \*\*
- Library Services, Attn: Daniel Pringle\*
- Neighborhood & Business Services, Attn: Dawn Kinder
- Neighborhood Services, Attn: ONS Team
- Parks Dept., Attn: Garrett Jones\*
- PCED, Attn: Theresa Sanders
- Planning & Development, Attn: Omar Akkari
- Planning & Development, Attn: Kris Becker
- Planning & Development, Attn: Eldon Brown\*\*
- Planning & Development, Attn: Joelie Eliason
- Planning & Development, Attn: Erik Johnson
- Planning & Development, Attn: Patty Kells\*
- Planning & Development, Attn: Dermott Murphy
- Planning & Development, Attn: Mike Nilsson\*\*
- Planning & Development, Attn: Tami Palmquist
- Planning & Development, Attn: Andy Schenk
- Planning & Development, Attn: Heather Trautman
- Police Department, Attn: Sgt Chuck Reisenauer\*
- Public Works, Attn: Scott Simmons
- Solid Waste, Attn: Scott Windsor
- Solid Waste, Attn: Rick Hughes\*
- Street Operations, Attn: Inga Note\*\*
- Street Operations, Attn: Bob Turner\*\*
- Street Operations, Attn: Gary Kaesemeyer\*\*
- Street Operations, Attn: Greg Martin\*\*
- Wastewater Management, Attn: Mike Morris\*\*
- Wastewater Management, Attn: William Peacock\*\*
- Wastewater AWWTP, Attn: Mike Coster\*\*
- Water Department, Attn: Dan Kegley\*\*
- Water Department, Attn: Jim Sakamoto\*\*

#### **County Departments**

- Spokane County Public Works, Attn: Scott Engelhard
- Spokane County Planning Department, Attn: John
  Pederson
- Spokane County Engineering Dept., Attn: Gary Nyberg
- Spokane Regional Health District, Attn: Jon Sherve
- Spokane Regional Health District, Attn: Paul Savage
- Spokane Regional Health District, Attn: Eric Meyer
- SRCAA, Attn: April Westby

#### Washington State Agencies

- Department of Natural Resources, Attn: Dave Harsh
- Department of Natural Resources Aquatics
- Department of Natural Resources, Attn: SEPA Center
- Department of Commerce, Attn: Dave Andersen
- Department of Archaeology & Historic Preservation, Attn: Gretchen Kaehler
- Department of Ecology, Attn: Environmental Review Section
- Department of Ecology, Attn: Jacob McCann
- Department of Ecology, Eastern Region, Attn: Jeremy Sikes, Shoreline Permit Reviewer
- Department of Ecology, Eastern Region, Attn: David Moore, Wetlands/Shoreline
- Department of Transportation, Attn: Char Kay
- Department of Transportation, Attn: Greg Figg
- Department of Fish & Wildlife, Attn: Karin Divens -Habitat Program

#### Other Agencies

- U.S. Army corps of Engineers, Attn: Jess Jordan
- Avista Utilities, Attn: Lu Ann Weingart
- Avista Utilities, Attn: Dave Byus
- Avista Utilities, Attn: Randy Myhre
- Avista Utilities, Attn: Larissa Pruitt
- Gheney School District Operations, Attn: Jeff McClure
- City of Spokane Valley Planning, Attn: Lori Barlow
- City of Spokane Valley Planning, Attn: Mike Basinger
- District 81 Capital Projects, Attn: Candy Johnson
- Mead School District Facilities & Planning, Attn: Ned Wendle
- Spokane Aquifer Joint Board, Attn: Tonilee Hanson
- Spokane School District, Attn: Phil Wright
- Spokane Transit Authority, Attn: Gordon Howell
- Spokane Transit Authority, Attn: Mike Hynes
- Spokane Transit Authority, Attn: Mike Tresidder
- Spokane Transit Authority, Attn: Kathleen Weinand
- Spokane Regional Transportation Council, Attn: Ryan Stewart
- Williams Northwest Pipeline, Attn: Michael Moore

#### Hard Copies

#### Other Agencies

- U.S. Postal Service, Attn: Postmaster
- Spokane Tribe of Indians, Attn: Randy Abrahamson (Section 25 SE, Township 26, Range 42)

#### DISTRIBUTION LIST FOR COMMENTS

#### PROJECT NAME: Five Mile Booster Station Replacement

FILE No.: 2017104

COMMENTS: (Use additional sheets if necessary)

Authorized Signature

Department or Agency

Date

Concurrency Passed/Failed
Evaluation for Agency Use Only

# State Environmental Policy Act (SEPA) ENVIRONMENTAL CHECKLIST

File No. 2017104

# PLEASE READ CAREFULLY BEFORE COMPLETING THE CHECKLISTI

#### Purpose of Checklist:

The State Environmental Policy Act (SEPA) chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An Environmental Impact Statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to reduce or avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

#### Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

#### Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered "does not apply."

IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (Part D).

For nonproject actions, the references in the checklist to the words "project," "applicant," and "property or site" should be read as "proposal," "proposer," and "affected geographic area," respectively.

# Evaluation for Agency Use Only

# A. BACKGROUND

- 1. Name of proposed project: Five Mile Booster Station Replacement
- 2. Applicant: City of Spokane, Department of Engineering Services
- 3. Address: 808 W. Spokane Falls Boulevard

   City/State/Zip: Spokane/WA/99201
   Phone: (509) 625-6700

   Agent or Primary Contact: Cindy Kinzer

   Address: 808 W. Spokane Falls Blvd

   City/State/Zip: Spokane, WA 99223

   Phone: 509-625-6391

   Location of Project: north east of the intersection of Woodside Ave. & Belt St. just east of Five Mi Rd.

 Address: 6910 N. Belt St.\_\_\_\_\_

 Section: 25\_\_\_\_\_\_
 Quarter: SE \_\_\_\_\_\_
 Township: 26 \_\_\_\_\_\_
 Range: 42 \_\_\_\_\_\_

 Tax Parcel Number(s) 26254.0006 \_\_\_\_\_\_

- 4. Date checklist prepared: 11-28-18
- 5. Agency requesting checklist: City of Spokane, Department of Engineering Services
- 6. Proposed timing or schedule (including phasing, if applicable): Construction planned for spring, summer, fall, 2019
- 7. a. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain. *No.* 
  - b. Do you own or have options on land nearby or adjacent to this proposal? If yes, explain. No. The land on which the proposed booster station is to be located is a single 20± ac parcel
- 8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. *None aside from this SEPA checklist*
- 9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. *No\_\_\_\_\_\_*
- 10. List any government approvals or permits that will be needed for your proposal, if known. City council of construction project following project bidding
- 11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain

aspects of your proposal. You do not need to repeat those answers on this page. The proposed project consists of a construction of a replacement booster station whose size will be up to 40' x 80' x 15' high (ceiling height) to the southeast of the existing booster station. The existing booster station will likely be removed. Also included is associated site piping.

12. Location of the proposal: Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit application related to this checklist.

north east of the intersection of Woodside Ave. & Belt St. just east of Five Mi Rd.\_\_\_\_\_

- 13. Does the proposed action lie within the Aquifer Sensitive Area (ASA)? The General Sewer Service Area? The Priority Sewer Service Area? The City of Spokane? (See: Spokane County's ASA Overlay Zone Atlas for boundaries.) yes to all of these \_\_\_\_\_\_
- 14. The following questions supplement Part A.
- a. Critical Aquifer Recharge Area (CARA) / Aquifer Sensitive Area (ASA)
  - (1) Describe any systems, other than those designed for the disposal of sanitary waste installed for the purpose of discharging fluids below the ground surface (includes systems such as those for the disposal of stormwater or drainage from floor drains). Describe the type of system, the amount of material to be disposed of through the system and the types of material likely to be disposed of (including materials which may enter the system inadvertently through spills or as a result of firefighting activities). Site drainage for the proposed booster station likely will consist of a grassy swale which may include a drywell all of which would be constructed in accordance with the Spokane Regional Stormwater Manual
  - (2) Will any chemicals (especially organic solvents or petroleum fuels) be stored in aboveground or underground storage tanks? If so, what types and quantities of material will be stored? No \_\_\_\_\_\_

- (3) What protective measures will be taken to insure that leaks or spills of any chemicals stored or used on site will not be allowed to percolate to groundwater. This includes measures to keep chemicals out of disposal systems. n/a \_\_\_\_\_\_
- (4) Will any chemicals be stored, handled or used on the site in a location where a spill or leak will drain to surface or groundwater or to a stormwater disposal system discharging to surface or groundwater? No\_\_\_\_\_\_
- b. Stormwater
  - (1) What are the depths on the site to groundwater and to bedrock (if known)? Unknown but likely greater than 50'\_\_\_\_\_
  - (2) Will stormwater be discharged into the ground? If so, describe any potential impacts. \$\$site drainage will be routed to a grassy swale which may also include a drywell all in accordance with the Spokane Regional Stormwater Manual.

## **B. ENVIRONMENTAL ELEMENTS**

## 1. Earth

a. General description of the site (check one):

🗆 Flat	Rolling	🗋 Hilly	Steep slopes	Mountainous	
Other:					

- b. What is the steepest slope on the site (approximate percent slope)? 10%
- c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. *Coarse textured sand, excessively drained per USGS soil survey*
- d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe. \_

No

- e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill: *Minimal grading, excavation associated with slab on grade building footings and associated site piping. The most significant excavation will be associated with the pump "cans" each of which are approx.. 4' in dia. by 20' deep and will be located within the pump station.*
- f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Yes but it is unlikely given that the proposed booster station will be located in a low area\_\_\_\_\_

- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt, or buildings)? The parcel is 20 acres which entirely impervious except the existing reservoir which has an approx. 1 ac footprint which has a 0.02 ac footprint. The new booster station may be up to 40' x 80' (0.07 ac). So following removal of the existing booster station and construction of the replacement booster station, the total impervious area will be about 1.07 ac which is approx. 5% of the site.
- h. Proposed measures to reduce or control erosion or other impacts to the earth, if any: Silt fencing or other appropriate measures during construction.

# 2. Air

- a. What type of emissions to the air would result from the proposal during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities if known. *Typical emissions from earth moving machinery (excavator, front end loader)*\_
- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe. No \_\_\_\_\_\_
- c. Proposed measures to reduce or control emissions or other impacts to air, if any: None \_\_\_\_\_

# 3. Water

# a. SURFACE WATER:

- (1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into. No\_\_\_\_\_\_
- (2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans. *No*
- (3) Estimate the amount of fill and dredge material that would be placed in or removed from the surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material. None \_\_\_\_\_\_
- (4) Will the proposal require surface water withdrawals or diversions? If yes, give general description, purpose, and approximate quantities if known. No
- (5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan. No\_\_\_\_\_
- (6) Does the proposal involve any discharge of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge. No\_\_\_\_\_\_

#### b. GROUNDWATER:

- (1) Will groundwater be withdrawn from a well for drinking water or other purposes? If so, give a general description of the well, proposed uses and approximate quantities withdrawn from the well. Will water be discharged to groundwater? Give general description, purpose, and approximate quantities if known. No \_\_\_\_\_\_
- (2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve. The sink/toilet to be installed in the booster station will connect to the sewer system in Belt St.

- c. WATER RUNOFF (INCLUDING STORMWATER):
  - (1) Describe the source of runoff (including stormwater) and method of collection and disposal if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

Site stormwater will be collected, treated and infiltrated into an on-site swale and potentially an on-site drywell.

- (2) Could waste materials enter ground or surface waters? If so, generally describe. Accidents are possible. But the site stormwater system described in the preceding response will be constructed in accordance with the Spokane Regional Stormwater Manual
- (3) Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? If so, describe.No
- *d.* PROPOSED MEASURES to reduce or control surface, ground, and runoff water, and drainage patter impacts, if any.

Site stormwater collection, treatment and disposal will be treated in accordance with the Spokane Regional Stormwater Manual.

# 4. Plants

a. Check the type of vegetation found on the site:

Deciduous tree: 🔲 alder 🖾 maple 🗀 aspen			
Other:			
Evergreen tree: 🛛 fir 🔲 cedar 🛛 pine			
Other:			
□ Shrubs ⊠ Grass □ Pasture □ Crop or grain			
Orchards, vineyards or other permanent crops			
Wet soil plants: 🔲 cattail 🔲 buttercup 🔲 bullrush 🔲 skunk cabbage			
Other:			
Water plants: 🗋 water lily 🔲 eelgrass 🔲 milfoil			

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Other: \_\_\_\_\_
Other types of vegetation: \_\_\_\_\_

- b. What kind and amount of vegetation will be removed or altered? Small amount of grass and several trees will be removed.
- c. List threatened and endangered species known to be on or near the site. None.\_\_\_\_\_
- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: Because the proposed replacement booster station will be located in a natural area, replacement landscaping likely will consist of dryland grass seeding only \_\_\_\_\_
- e. List all noxious weeds and invasive species known to be on or near the site. None
- 5. Animals
- a. <u>Check and List</u> any birds and other animals which have been observed on or near the site or are known to be on or near the site:

Birds: 🖾 hawk 🖾 heron 🖾 eagle 🖾 songbirds
Other:
Mammals: 🛛 deer 🔲 bear 🗌 elk 🖾 beaver
Other: domestic pets
Fish: 🗆 bass 🖾 salmon 🖾 trout 🗖 herring 🖾 shellfish
Other:
Other (not listed in above categories):

- b. List any threatened or endangered animal species known to be on or near the site. None known.\_\_\_\_
- c. Is the site part of a migration route? If so, explain. Yes. Within 20 miles of bird sanctuary.
- d. Proposed measures to preserve or enhance wildlife, if any: none
- e. List any invasive animal species known to be on or near the site. None known

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## 6. Energy and natural resources

- a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc. *Electric for pumps, lighting and heating*\_\_\_\_\_\_
- b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe, *No*.

# 7. Environmental health

- - (1) Describe any known or possible contamination at the site from present or past uses. None known
  - (2) Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity. *None known*
  - (3) Describe any toxic or hazardous chemicals/conditions that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project. None \_\_\_\_\_\_
  - (4) Describe special emergency services that might be required. Construction of a facility like this requires earth moving machinery, working near high pressure water mains, etc. Accidents can happen in such situations which may require emergency medical services. Long term, the facility will contain large pumps and high voltage electrical controls. Accidents can happen in such settings which may require emergency medical services.

- (5) Proposed measures to reduce or control environmental health hazards, if any: *Watering for dust* control during construction.
- b. NOISE:
  - (1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)? *None*.
  - (2) What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example: traffic, construction, operation, other)? Indicate what hours noise would come from the site. Short-term construction equipment noise during time of construction. City noise ordinance is from 10 p.m. to 7 a.m.
  - (3) Proposed measure to reduce or control noise impacts, if any: City of Spokane Noise Ordinance.

#### 8. Land and shoreline use

- a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? If so, describe. *\$\$The proposed booster station replacement is to be constructed on a 20 ac city owned parcel in a residential area. On that 20 ac parcel is situated the existing booster station, 240' diameter water reservoir and associated site piping. The proposed booster station replacement will not affect current land uses on the subject or adjacent properties\_\_\_*
- b. Has the project site been used as working farmlands or working forest lands? If so, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use? The project site has not been used as farmland or working forestland.
  - 1) Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? If so, how: *No*
- c. Describe any structures on the site. Existing 20' x 40' booster station, 240' diameter reservoir and a 18' x 20' building of unknown purpose.
- d. Will any structures be demolished? If so, which? Yes, the existing booster station

- e. What is the current zoning classification of the site? Adjacent properties are zoned residential single family \_\_\_\_\_\_
- f. What is the current comprehensive plan designation of the site? Residential 4-10\_\_\_\_\_
- g. If applicable, what is the current shoreline master program designation of the site? N/A.
- h. Has any part of the site been classified as a critical area by the city or the county? If so, specify. Hazardous geology, critical aquifer recharge area.
- i. Approximately how many people would reside or work in the completed project? 1-2 workers would visit the booster station up to once a day for 1-2 hours the booster station is not continuously manned.
- j. Approximately how many people would the completed project displace? None.
- k. Proposed measures to avoid or reduce displacement impacts, if any: None needed.
- Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any: The project site has been used as a booster station for decades. The proposed project is consistent with that historic usage \_\_\_\_\_\_
- m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any: *N/A*.

# 9. Housing

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or lowincome housing. *None.\_\_\_\_\_*
- b. Approximately how many units, if any, would be eliminated? Indicate whether high-, middle- or lowincome housing. *None.*\_\_\_\_\_\_
- c. Proposed measures to reduce or control housing impacts, if any: None.

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## 10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed? 25' or less at the building peak.
- b. What views in the immediate vicinity would be altered or obstructed? None the proposed pump station building will be set back from the adjacent Belt St. approx. 80'.
- c. Proposed measures to reduce or control aesthetic impacts, if any: The building exterior will be designed by an architect to blend into its surroundings and be aesthetically appealing.

# 11. Light and Glare

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur? Building perimeter lighting, at night.
- b. Could light or glare from the finished project be a safety hazard or interfere with views? No.
- c. What existing off-site sources of light or glare may affect your proposal? None.
- d. Proposed measures to reduce or control light and glare impacts, if any: None.

# 12. Recreation

- a. What designated and informal recreational opportunities are in the immediate vicinity? N/A the proposed booster station replacement does not pertain to recreational facilities it neither creates, removes nor creates demand for recreational facilities \_\_\_\_\_
- b. Would the proposed project displace any existing recreational uses? If so, describe. No.
- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any: *None the proposed booster station replacement does*

not pertain to recreational facilities – it neither creates, removes nor creates demand for recreational facilities.

#### 13. Historic and cultural preservation

- a. Are there any buildings, structures, or sites, located on or near the sited that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? If so, specifically describe. No. \_\_\_\_\_\_
- b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. None \_\_\_\_\_\_
- c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archaeology and historic preservation, archaeological surveys, historic maps, GIS data, etc. *Consultation with Megan Duvali, City of Spokane Historic Preservation Officer and Steve Dampf, the city's on-call cultural resource protection consultant*
- *d.* Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required *inclusion of an inadvertent discovery plan in the project specifications*\_\_\_\_\_\_

# 14. Transportation

- a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on site plans, if any. The proposed booster station is located within a fairly dense grid of residential street. Access is Five Mile Rd. to Woodside Ave. to Belt St.
- *b.* Is site or affected geographic area currently served by public transit? If so, generally describe. If not, what is the approximate distance to the nearest transit stop? *No\_\_\_\_\_*
- c. How many additional parking spaces would the completed project or non-project proposal have?
   How many would the project or proposal eliminate? Booster station will have 2-3 parking spots, more than adequate for the one vehicle that will typically access this facility at a time \_\_\_\_\_\_

- e. Will the project or proposal use (or occur in the immediate vicinity of) water, rail or air transportation?
   If so, generally describe. No.

(24 hours).)

- *g.* Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? If so, general describe. *No*
- h. Proposed measures to reduce or control transportation impacts, if any: None.

# 15. Public services

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, public transit, health care, schools, other)? If so, generally describe. *No. The proposed booster station replacement provides increased levels of public services (water)*
- b. Proposed measures to reduce or control direct impacts on public services, if any: None.

# 16. Utilities

- a. Check utilities currently available at the site:
  - A electricity
  - 🛛 natural gas
  - 🛛 water
  - I refuse service

Evaluation for Agency Use Only

🛛 i	telephone
⊠ :	sanitary sewer
□ :	septic system
Othe	er:

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed: All required utilities are available either on the parcel itself or in the adjacent Belt Rd. including water, sewer, electricity, natural gas and garbage service\_\_\_\_\_

# C. SIGNATURE

concludes that:

I, the undersigned, swear under penalty of perjury that the above responses are made truthfully and to the best of my knowledge. I also understand that, should there be any willful misrepresentation or willful lack of full disclosure on my part, the *agency* must withdraw any determination of Nonsignificance that it might issue in reliance upon this checklist.

Date: 11-28-18	Signature:	20	1de	
Please Print or Type:		· · · ·		
Proponent: City Of Spokane	_Address: 8	108 W. Spokar	ne Falls Boulevard	
Phone: (509) 625-6700	-			
Person completing proponent):	form	(if	different	from
Phone:	Address:			
FOR STAFF USE ONLY	1			
Staff member(s) reviewing check	dist: DAN BU	uae		
Based on this staff review of the	environmental check	dist and other	r pertinent information	n, the staff

A. there are no probable significant adverse impacts and recommends a Determination of Nonsignificance.

B. probable significant adverse environmental impacts do exist for the current proposal and recommends a Mitigated Determination of Nonsignificance with conditions.

C. there are probable significant adverse environmental impacts and recommends a Determination of Significance.

2016 WSP Figure 1.3.1

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Q.)



Figure 1.3.1

2016 WSP Table 4.5.3 Water Right(s) Status



TABLE 4.5.3:	Existing Wate	sr Right(s	) Status							
Permit Certificate of	Name of Right-holder	Priority Date	Source Name/	Primary or Supplemental	Existing Wa	ter Rights	Existing Pumpir Annual Con	ig Capacity & Isumption	Current Water (Excess/De	Right Status ficiency)
Claim #	or claimant		Number		Maximum Instantaneous Flow Rate (Q,) gpm	Maximum Annual Volume (Q <sub>s</sub> ) Acre-ft	Maximum* Instantaneous Flow Rate (Qi) gpm	Maximum Annual Volume (Q <sub>a</sub> ) Acre-ft	Maximum Instantaneous Flow Rate (Q <sub>i</sub> ) gpm	Maximum Annual Volume (Q <sub>a</sub> ) Acre-ft
3199-A	СПТ	1956	S 01 NEVADA ST	Primary	25,000	20,000	25,000	12,615	0	7,385
504-D	cίτΥ	1926 1907	S 02 WELL ELECTRIC	Primary	54,750	36,000	39,300	20,519	15,450	15,481
548.A	стү	1946	S 03 PARKWATER	Primary	63,000	51,240	63,000	24,791	0	26,449
505-D 593-D 504-D 507-D	CITY	1937 1907 1926 1945	S 04 RAY STREET	Primary	14,000 7,000 1,250 2,600**	1,870 350 2,000 520**	21,550	6,057	3,300	(1,317)
506-D	СІТҮ	1938	S 05 HOFFMAN AVE	Primary	11,600	1,280	10,920	1,418	680	(138)
728-A 593-D	СПҮ	1950 1907	S 06 GRACE AVE	Primary	11,000 20,000	4,080 1,000	19,000	4,026	12,000	1,054
3903-A 593-D 4503 728-A	CITY	1959 1907 1961 1950	S 08 CENTRAL AVE	Prìmary	000'6 2,000 7,000	11,480 350 12,640 4,760	16,800	12,084	14,100	17,146
	TOTAL	FOR PRI	MARY WELLS		241,100	147,570	195,570	70,374***	45,530	77,196***
G3-27181	СПҮ		SIA	Not presently used	200****	526****			200	526
508-D	CITY (PARKS)		S 09 INDIAN CANYON	Golf Course	728	265	750	250	(22)	15
PENDING RIGHT APPI	WATER LICATION	PE	ME ON RMIT	DATE SUBMITTED	PRIM/ SUPPLE	ARY or MENTAL		PENDING WAT	ER RIGHTS	
Non	ġ						Maximum Insta Flow Rate (Q.) I gpm	antaneous Requested	Maximum Volume (Q <sub>a</sub> ) Acre	Annual Requested -ft
* Based on water	right or maximum	installed pun	nping capacity, whichew	er is the lesser amount.	Nevada Street Well S	tation is only one b:	ased on water right. Ma	iximum pumping cap	acity of Nevada Stree	t is 31,000 gpm.
*** Based on max Therefore, sun	timum total from Ta n of individual num	s willour was bers will not	onicially decommission idividual well volumes b, equal total numbers.	ieu in 2003 will water n ased on maximum year	for that well in <b>Table</b> <i>i</i>	kay sueet weil as 4.3.2. Well use can	snown. Prionty date is vary from year to year l	January 1∠, 1945. based on energy cos	sts, pump maintenance	etc.
**** 250 gpm and the remaining	89 acre feet were } water right.	sold and trar	nsferred to Goodrich Co	rporation in 2005 for \$3:	50 per acre-foot, proce	ssed through the W	lashington State Depar	tment of Ecology. T	he City is looking for a	beneficial use of

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# 2016 WSP Table 4.5.4 20-Year Forecasted Water Right(s) Status



TABLE 4.5.4:	20-Year Fored	casted Wo	ater Right(s) Status	with Conservatio	Ľ					
Permit Certificate of	Name of Right-holder	Priority Date	Source Name/	Primary or Supplemental	Existing Wat	ter Rights	Forecasted Pum & Annual Cor	ping Capacity nsumption	Forecasted Wate	er Right Status
*					Maximum Instantaneous Flow Rate (Q <sub>1</sub> ) gpm	Maximum Annual Volume (Q <sub>a</sub> ) Acre-ft	Maximum* Instantaneous Flow Rate (Q <sub>i</sub> ) gpm	Maximum Annual Volume (Q <sub>a</sub> ) Acre-ft	Maximum Instantaneous Flow Rate (Q <sub>i</sub> ) gpm	Maximum Annual Volume (Q <sub>a</sub> ) Acre-ft
3199-A	СІТҮ	1956	S 01 NEVADA ST	Primary	25,000	20,000	25,000	14,500	0	5,500
504-D	сіту	1926 1907	S 02 WELL ELECTRIC	Primary	54,750	36,000	49,000	23,500	5,750	12,500
548-A	СПТҮ	1946	S 03 PARKWATER	Primary	63,000	51,240	63,000	29,300	0	21,940
505-D 593-D 504-D 507-D	СІТҮ	1937 1907 1926 1945	S 04 RAY STREET	Primary	14,000 7,000 1,250 2,600	1,870 350 2,000 520	24,850	4,700	0	40
506-D	СПУ	1938	S 05 HOFFMAN AVE	Primary	11,600	1,280	11,600	1,200	0	80
728-A 593-D	СПУ	1950 1907	S 06 GRACE AVE	Primary	11,000 20,000	4,080 1,000	19,000	4,700	12,000	380
3903-A 593-D 4503 728-A	СП	1959 1907 1961 1950	S 08 CENTRAL AVE	Primary	7,000 7,000 9,000	11,480 350 12,640 4,760	19,000	14,100	11,900	15,130
	TOTAL	FOR PRI	IMARY WELLS		241,100	147,570	211,450	80,500**	29,650	67,070**
PENDING RIGHT APPI	WATER	PE	ME ON RMIT	DATE SUBMITTED	PRIMA	RY or MENTAL		PENDING WA	TER RIGHTS	
Nor	<u>م</u>						Maximum Inst Flow Rate (Q;) gpm	antaneous Requested	Maximurr Volume (Qa) Acre	ı Annual Requested s-ft
* Based on water	right or maximum i	installed pur	mping capacity, whichever	r is the lesser amount.						
** Based on pro	jected use as pres	sented in Ta	able 2.2.3. Individual wel	I volumes based on	maximum potential us	e on a year to ye	ar basis subject to wh	nich wells are used	I as determined by en	lergy costs, pump

5 ĥ 5 5 ς. 2 Ś maintenance, etc. Therefore, sum of individual numbers will not equal total numbers.

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# 7.4 Water Main Upsize Policy and Oversize Justification Approval

# CITY OF SPOKANE DEPARTMENT POLICY AND PROCEDURE TEMPLATE

# CITY OF SPOKANE DEPARTMENT POLICY AND PROCEDURE

DEPT 4100-2022-

# TITLE: CITY OF SPOKANE WATER & HYDROELECTRIC SERVICES DEPARTMENT – WATER MAIN UPSIZE POLICY

EFFECTIVE DATE: MAY \_\_\_\_\_, 2023 REVISION DATE (IF APPLICABLE)

# 1.0 GENERAL

1.1 PURPOSE

This policy outlines the City of Spokane's Water Department Water Main Upsize Policy. Often private Developers seek to develop in areas which do not have current City water infrastructure available to support the proposed development. When this occurs, the City requires the Developer to upsize the water infrastructure to support anticipated planned or projected future growth and development.

# 1.2 TABLE OF CONTENTS

- 1.0 GENERAL
- 2.0 DEPARTMENTS/DIVISIONS AFFECTED
- 3.0 REFERENCES
- 4.0 **DEFINITIONS**
- 5.0 POLICY
- 6.0 PROCEDURE
- 7.0 **RESPONSIBILITIES**
- 8.0 APPENDICES

# 2.0 DEPARTMENTS/DIVISIONS AFFECTED

This policy shall apply to the Water & Hydroelectric Services Department

3.0 REFERENCES

Chapter 13.04. SMC Chapter 17H.010 SMC SMC 17H.010.090 City of Spokane Comprehensive Plan Coordinated Water System Plan

# 4.0 DEFINITIONS

None.

# 5.0 POLICY

5.1 Anyone (hereafter, Applicant) desiring City water service to be extended to their property(ies) which is not currently connected to City Water service, must request permission to construct an extension of water service to such location(s) by submitting a written request to the City of Spokane through the Developer Services Section of Engineering Services.

5.2 Most requests are for a water distribution main extension(s), including fire hydrants as needed, to the desired location(s).

5.3 There are situations where, in order to extend City water service to the property and maintain all acceptable water pressure and water quantity necessary for domestic needs and to provide adequate fire protection, that additional water system infrastructure components may need to be constructed. These additional water system infrastructure components include, without limitation, reservoir(s), pumping station(s) and transmission water main(s).

5.4 The sizing of all necessary mains and appropriate water system infrastructure shall be determined by the City of Spokane, in its sole discretion. Considerations may include: (1) the needs of the applicant for the water service extension; (2) the quantity of water necessary for domestic, irrigation, and fire protection needs; and (3) whether the water can be delivered at acceptable water pressure. A hydraulic analysis to support the applicant request, may be necessary prior to City approval towards obtaining permission for construction of the water system extension.

5.5 The necessary quantity of water for domestic service shall be determined by the applicant's consultant engineer and such determination shall be subject to the approval of the Director of Water & Hydroelectric Services.

5.6 The necessary quantity of water for fire protection shall be determined by the fire district of the jurisdiction and approved by the Director of Water & Hydroelectric Services.

5.7 The applicant shall be responsible for all costs necessary for the construction of all needed water main(s) and appropriate water system infrastructure required for project(s).

5.8 In reviewing the water plans submitted by the applicant, the Director of Water & Hydroelectric Services may determine that the water main(s) should be

constructed at a larger size than needed for just the applicant's project or development in order to meet the City's future needs relative the City's water system.

5.9 When the Director of Water & Hydroelectric Services makes such determination, the Director shall order the water plans to be revised to reflect the pipe size(s) so deemed necessary by the Director and, further, to require that the construction be in conformance with the revised water plans and consistent with the City's standards and policies for the water system.

5.10 The Director, in making such determination, shall review a written justification for the upsize and any agreements shall be memorialized in a contract between the City and Developer.

5.11 The Director is authorized to enter into an agreement to reimburse the applicant for such costs incurred relative the upsizing of the water main(s) upon the City Council's approval of the improvement(s) for the City's operation and maintenance.

# 6.0 PROCEDURE

- 6.1 The portion of the project that is reimbursable is limited to the water main infrastructure system which is part of the public water system or which is intended to become part of the public water system. Further, the portion of the project that is reimbursable is the difference in material cost only, including pipes, valves, fittings and pipe restrainment, and other appurtenances. The Difference is calculated as the difference between the material cost for construction of the Developer's need and the City's requested upsize.
- 6.2 The process for determining the amount to be reimbursed is established by the City utilizing bids provided by local material suppliers. The difference in material costs is established on the lowest of the bids received as a package for all materials involved as follows:

6.2.1 First, the lowest bid for all materials necessary for the construction of the water main(s) based the size(s) representing the required needs of the applicant.

6.2.2 Second, the lowest bid for all materials necessary for the construction of the water main(s) based the size(s) representing the required needs of the City.

6.2.3 Utilizing the two low bids received, the City will compute the eligible reimbursable amount, including applicable sales tax, relative water main oversizing cost(s) for the project(s).

# 7.0 **RESPONSIBILITIES**

The City of Spokane Water & Hydroelectric Services Department shall administer this policy.

8.0 APPENDICES N/A

APPROVED BY:

City Attorney

Division or Department Director

# 7.5 Water Service Minimum Vault Dimensions

# MINIMUM WATER SERVICE VAULT DIMENSIONS

	<u>W X L X H (INSIDE)</u>
3" DOMESTIC	6'X8'X6'6"
3" DOMESTIC W/DCVA	6'X10'X6'6"
3" IRRIGATION W/DCVA	6'X10'X6'6"
4" DOMESTIC	6' X 8' X 6'6"
4" DOMESTIC W/DCVA	6' X 10' X 6'6"
4" FIRE ONLY	6' X 7' X 6'6"
4" FIRE & DOMESTIC	6' X 12' X 6'6"
4" IRRIGATION W/DCVA	6' X 10' X 6'6"
6" DOMESTIC	6' X 8' X 6'6"
6" DOMESTIC W/DCVA	6' X 12' X 6'6"
6" FIRE ONLY	6' X 8' X 6'6"
6" FIRE & DOMESTIC	6' X 14' X 6'6"
6" IRRIGATION W/DCVA	6' X 12 X 6'6"
8" FIRE ONLY	6'X 10'X 6'6"
8" FIRE & DOMESTIC	6'X 16'X 6'6"
10" FIRE ONLY	6'X 10'X 6'6"
10" FIRE & DOMESTIC	6'X 16'X 6'6"

1. IF THERE ARE 2 SERVICES, (EG TWO LINES 4" AND LARGER OR THREE LINES 2" AND LARGER RUNNING PARALLEL IN VAULT) ALL VAULTS SHALL BE A MINIMUM OF 8' WIDE.

2. IF THERE ARE MORE THAN 2 SERVICES, VAULT DIMENSIONS MUST BE OBTAINED FROM THE TAPPING DEPARTMENT (509) 625-7847

3. ALL VAULTS WILL BE HEAVY DUTY TRAFFIC RATED

4. THESE VAULTS ARE MINIMUM INSIDE DIMENSIONS



7.6 City of Spokane Water Department Rules and Regulations for Water Service Installations.

# CITY OF SPOKANE WATER DEPARTMENT RULES AND REGULATIONS FOR WATER SERVICE INSTALLATIONS Revised 2/10/2023

For Water Tap and Meter Applications	509-625-6300, 509-625-6999 or ( <u>permitteam@spokanecity.org</u> )
Tap and New Meter Installation	509-625-7847
South Side Inspection	509-625-7844 or 509-435-5567
North Side Inspections	509-625-7845 or 509-994-1669
Cross Connection Inspections	509-625-7969

- 1. THE RULES AND REGULATIONS INCLUDED HEREIN ARE NOT TO BE CONSIDERED AS COMPLETE. THE FOLLOWING PAMPHLET IS DESIGNED TO ADDRESS THE MORE COMMON CONCERNS FOUND DURING INSPECTIONS OF THE WATER SYSTEM. IT SHALL BE THE RESPONSIBILITY OF THE BUILDER, OWNER, OR CONTRACTOR, TO CALL INSPECTORS TO CLARIFY ANY SITUATION THAT IS NOT CLEARLY ADDRESSED IN THESE REGULATIONS IN REGARD TO SITE PLANS, BUILDING DESIGN, ETC. ALL REQUIREMENTS LISTED MUST BE MET PRIOR TO A CERTIFICATE OF OCCUPANCY BEING ISSUED.
- 2. All excavations will be sloped, shored, or benched according to DOSH Department of Labor and Industry standards to provide safe access per WAC 296 155 Part N. Water service excavation, bedding & backfill/restoration shall be responsibility of property owner/developer unless otherwise stated.

# 3. **INSPECTIONS:**

- New service lines. No on property inspection will be scheduled or performed until a meter permit has been purchased.
- Repairing an existing service requires a service repair permit.
- All Water Service Installations, from the property line to the main shut-off valve or valves inside the building or basement, require inspection by the Water Department Inspector before covering.
- ALL INSPECTIONS REQUIRE A 48 HOUR NOTICE.

#### 4. BACKFLOW / CROSS-CONNECTION:

The policies, procedures, and criteria for determining Backflow/Cross Connections (actual and possible) and appropriate levels of protection shall be in accordance with the City of Spokane Water Department Cross Connection Control and Backflow program, Water Department Rules and Regulations, Washington Administrative Code (WAC 246-290-490) and the City of Spokane Municipal Code 13.04.0814.

- Some examples of areas where devices/assemblies will be needed: Backflow protection shall be installed on service laterals where the point of use exceeds 30 feet above the distribution main, Strip malls/multi use facilities, medical facilities, laboratories/clinics, fire protection systems, irrigation systems (yard hydrants are considered a part of an irrigation system), boilers, post mix soda pop machines, food processing, commercial coffee machines with under-counter boiler, steam generating equipment, water cooled ice machines, car washes, plumbing systems with booster pumps, and/or other facilities where chemicals are used or are injected into the water system, wells and unapproved auxiliary sources, etc.
- All Backflow Assemblies must be on the Washington State Approved Assemblies list. All Backflow Assemblies shall be tested by a State Certified Backflow Tester (BAT) when initially installed, repaired, replaced, moved and annually thereafter. If the backflow assembly has been turned off for freeze protection it must be tested before it is returned to service.
  - The property owner is required to have a WA State certified backflow assembly tester (BAT), test all backflow assemblies annually. The BAT shall tag assemblies tested noting date of test. Where a meter exists in a meter box and the concrete rings are 36" or less inside diameter, then the DCVA for irrigation must be installed outside of the meter box and plumbed into a box of the appropriate size to allow for testing and repair as per the City of Spokane Water Department Municipal Codes. All installations must meet the City of Spokane Water Department requirements. Where premises isolation is required, thermal expansion could exist from a water heater or boiler. Thermal expansion may result in an unsafe buildup of pressure within the plumbing system. Please follow the local rules, regulations, and the Uniform Plumbing Code to protect from thermal expansion. Reduced Pressure Backflow Preventers for premises isolation of high health hazard (Table 13 WAC 246 290 490) and irrigation systems utilizing a booster pump shall be required and installed at the property line. Where the meter is installed at the property line, the Reduced Pressure Backflow Preventer shall be installed downstream of the meter near the property line.
- Single Check replacement in vaults, shall be inspected by the Cross-Connection Control Inspector before removal of old assembly and again after the new assembly has been installed and tested. All service lines must have a City of Spokane Meter.

# 5. <u>NEW TAPS AND RETAPS</u>:

In ALL cases the property owner is responsible for service location and depth.

In all cases where a new water service is to be installed, a stake marked "WATER" and the Address point to be served must be placed at the property line by the contractor, builder or the owner showing where the service is to enter property. If the service extends through a utility easement, a second stake shall be placed by the contractor, builder or the owner denoting the end of the service line installation. Failure to place these stakes will result in the tap not being made and a reschedule permit must be purchased before the tap is scheduled and completed.

Only City Water Personnel will tap or make connections to the City Water mains. Size of tap shall be maintained to the water meter. Taps on new mains will not be made until bacteriological tests are taken and the sample has been approved by County Health Department. All water services must be 5 feet deep from finished grade. (A depth of 5 feet shall be maintained through any 208 or swale system.) After backfilling the new service must have 2 vertical blue 2x4's no less than 3' out of the ground 1 at

After backfilling the new service must have 2 vertical blue 2x4's no less than 3' out of the ground 1 at depth of curb stop and 1 at depth of end of copper at the edge of easement.

# 6. WATER SERVICE PIPE:

Materials for all water services shall be:

- In the public right of way, 1" shall be seamless, soft- annealed, type "K" copper.; with flared fittings or approved compression fittings within the public right of way or traveled roads and to the water meter. All water services from main to curb stop/right of way shall be installed by the City of Spokane water department.
- Outside public right-of-way and downstream of the water meter services up to 1-1/2" shall be seamless, soft- annealed, type "K" copper or HDPE (250 psi CTS SDR 9) with steel stiffeners and compression fittings with steel stiffeners and compression fittings. Pack joints are not allowed, and contractor shall supply all fittings downstream of the meter valve.
- 2" Outside public right-of-way and downstream of the water meter services shall be seamless, softannealed Type K copper, HDPE (250 psi, CTS or IPS, SDR 9) with stainless steel stiffeners and compression fittings. Pack Joints are not allowed, and contractor shall supply all fittings downstream of the meter valve.
- All HDPE pipe will be installed with 12-guage tracer wire and affixed to pipe every 10'.
- 3" shall be HDPE shall meet the requirements of AWWA C901, with a minimum 250 psi rating, SDR 9, and have butt fused joints.
- 4" and larger shall be ductile iron. Fittings must be used when a change in direction of pipe is necessary.
- All pipes shall be bedded per standard detail A-1.
- All water services in the same trench shall have a horizontal separation of 2 feet.
- Elbows for change in horizontal direction are not allowed between tap at the main and the meter box/vault. Service line must be perpendicular to water main.

All services need to meet current water department standards if building is gone or service is off, and meter has been removed for over a year.

No galvanized fittings shall be directly buried.

All water services viable or not that will not be reused shall be disconnected at the water main before a certificate of occupancy will be completed. The physical disconnection will be done by Water Department personnel at no charge, all excavations and surface restorations will be at the owner's expense prior to the Certificate of Occupancy.

The installation of all curb and valve boxes are the responsibility of the property owner or contractor. They are to be installed flush with finished grade or paving, made of iron, and marked WATER on the lid. Boxes must line up with the curb stop or valve centered within the box allowing full operation of the valve. Any curb box located within a proposed or established vehicle pathway, or in concrete must have traffic rated valve box top section.

# 7. WATER AND SEWER SEPARATION:

The sewer must be a minimum of 18" deeper and a minimum of 5' horizontally from the center line of ANY water service.

When sewer elevation is higher than the water service, there must be a separate water trench with 6 feet

of undisturbed earth between water and sewer. All water service installations shall be at least 10 feet from any cesspool, catch basin, septictank.

Sleeving for parallel sewer and water lines that cannot meet the above distance criteria, must be pressure rated oversized pipe and shall be limited to straight runs and cannot be used to install water and sewer services in the same trench. No more than one service per sleeve is allowed. 2" and smaller must be wrapped with split foam pipe insulation. The end of the sleeves must be sealed with waterproof foam. Water/sewer crossings must meet City of Spokane Standard Plan A-5.

# 8. OTHER UTILITIES:

# <u>All other utilities (telephone, cable TV, electric, gas, etc.) shall have a minimum of 5-foot horizontal</u> <u>separation from the water line.</u>

# 9. WATER SERVICE ENTERING BUILDING:

Where a water service pipe enters a building a depth of 5 feet shall be maintained. Where there is no basement i.e., crawl space or slab floor, the water service pipe, including fire lines will maintain a 5 foot bury and extend 2 feet inside the footing before rising to the point of use. No joints will be allowed under the floor, or within 5 feet of the outer wall. DI piping may have one mechanical joint fitting under the floor for the vertical riser. All service installations running parallel to buildings shall be at least 10 feet from the outer foundation walls.

# 10. METER LOCATION:

Residential and Commercial meters shall be in an approved meter box or vault on property, within 3' of the closest property line. On a commercial service, when the building is within 20'of the property line the meter may be installed inside on a case-by-case basis as approved by the Water Director. All meters within a building must be installed in a room with a concrete floor and an approved floor drain. The installation must also include shutoff valves on both the inlet and outlet sides of the meter. Meters shall not be installed under stairs, in closets, crawl areas, garages, or unheated areas. There shall be not more than 18" of exposed pipe before the meter. All 3/4" or 1" services where water pressure is 80 psi or higher, shall have an approved pressure reducer installed before the meter when the meter is located within the structure. On services 1½" and larger, the pressure regulator shall be after the meter.

Roughed in meter makeup shall be / 16.5" length for 1" / 14" length for ¾" / 12.5 "length for 5/8"

# 11. LARGE WATER SERVICES (3" AND LARGER):

All meters 3" or larger shall be installed at the property line, in a vault built to Water Department Specifications, or can be installed in the building when less than 20 feet from property line to meter. For maintenance, all large meters must be accessible and have a minimum 12" clearance from any wall or floor. Water Department personnel and owners' representatives will visit the site prior to the estimate for a complete determination of requirements. Meters and backflow devices are no longer allowed to be located within structural/vault sidewalks (typical of downtown).

# 12. WATER SERVICE REPAIR AND REPLACEMENT:

The repair of service leaks after the first right of way or property line is the responsibility of the property owner. Any repair or replacement of existing services shall follow all current rules and regulations and be *inspected before covering. No service relays shall be pulled unless a minimum depth of 4 ½' can be maintained with a minimum of 5' sewer separation.* Where a new building, or an addition to existing building, is erected over an existing service, the water service shall be either sleeved or offset by relaying the service a minimum of 10' from outer foundation wall. Repairs can be made with like materials. Silver solder is acceptable for repairing underground copper services.

The property owner is responsible for any water service located near or behind a manmade obstruction such as a retaining wall and must maintain their service at their own expense per Spokane Municipal Code 13.04.0806. This applies to obstructions located within the public right of way.

# 13. <u>RECORDED EASEMENTS REQUIRED</u>:

Easements shall be avoided but considered on a case-by-case basis, granted by the Director of the Spokane Water Department.

When water services cross property other than the property being serviced, the water meter shall be installed in a water department approved meter box. This box must be installed no more than 3' inside the first property line and an easement number must be filed and recorded with the County Recorder's office. If approved, minimum water easement width is 10 feet for private and 20 feet for public to allow for excavation and stockpiling.

# 14. <u>METER BOX</u>:

Meter boxes and vaults, for single meters up to 1" in size, when installed by the property owner, shall meet City of Spokane Water Department traffic rating standards, shall be placed on property not more than 3' inside the closest property line, and built to Water Department specifications. All meter boxes and lids shall be maintained by the property owner.

Single meters 1.5" or 2" in size require a meter box with a minimum dimension of 36" inside 42" outside, made of concrete, and have a 24" cast iron ring and cover.

If there will be two meters 2" in size or smaller and serving the same property, a concrete meter box with a 48" minimum inside diameter with a standard 24" cast iron ring and cover will be required.

For meters larger in size than 2" or if there will be more than two meters, please contact our inspectors for appropriate vault dimensions. All meter boxes and vaults must meet H20 traffic load rating if in an area where traffic loads are expected.

Any meter box located within a proposed or established vehicle pathway must be traffic rated. Plastic or PVC meter boxes are not considered traffic rated and must be installed at least 1' off any driveway or established vehicle pathway.

# 15. <u>REMOTE READOUT CONDUIT</u>:

All commercial buildings and residential homes with a vault or concrete meter box (including duplex and triplex dwellings) are required to install an approved ¾ inch PVC electrical grade conduit per meter or as approved by the inspector and must be installed from the water meter to an accessible location on the outside of the building (or near an above ground structure such as a metal post or bollard), approximately 3' above finished grade. If the length of the conduit exceeds 50', a pull string shall be provided. All directional changes will be made with sweeps, 90-degree elbows will not be allowed.\_All commercial buildings which are remodeled, reconstructed, or additions added on will be required to install conduit.

# **REMOTE READER CABLE INSTALLATION POLICY**

The City of Spokane Water Department will require a minimum three wire, 22-gauge, color coded cable to be installed by the builder during the construction of all residential and commercial buildings for remote water meter reading purposes.

The cable shall begin at the water meter location and terminate on the street side of the building or on either side of the building within two feet of the street side of the building. The cable shall be in an accessible location approximately 36 inches above finished grade and with approximately 4' of excess cable left on each end.

# 16. CONTRACTOR'S GUARANTEE:

Work being done by private contractors, pertaining to quality of materials and installation procedures, shall be guaranteed for two (2) years from time of installation.

# 17. OPERATION OF CURB STOPS

If water is turned on or found on without proper inspection by the Water Division, the following City Ordinance applies:

# **CITY ORDINANCE CHAPTER 13.04 WATER**

13.04.200 PENALTY. Any person violating any of the provisions of this chapter, or the rules and regulations of the Water Division, shall be deemed guilty of a misdemeanor and, upon conviction thereof, shall be punished by a fine in any sum not exceeding \$300.00, or by imprisonment in the City Jail for not more than ninety days, or by both fine and imprisonment. Each day of a continuing violation shall constitute a new and separate violation unless otherwise specified. (Source, Section 40, C2452) <u>City Ordinance Chapter</u> <u>13.04 WATER 13.04.130 Sub-Section D</u>

The Director of the City of Spokane Water department may also permit qualified plumbers, licensed, and bonded in accordance with state laws, to open and shut the street cock to make the necessary repairs or to test their work, and in every such case such persons shall leave the stop cock as they found it. They shall be responsible for any damage, losses, or liabilities of the City or third parties arising from their acts, errors, or omissions. (Source, Section 35, part C-2452; Cross ref., Section 13.04.0806 - 13.04.0812)
### 18. Temporary Zoning Change (Ordinance No. C36232) and ADU Guidelines

The interim zoning ordinance will allow duplexes, triplexes, guadplexes and townhomes in all residential zones citywide for one year. The ordinance has no restrictions on the allowable number of attached town houses. The housing allowed in this ordinance shall follow the water service rules and regulations listed in this document. With the specialized use we have the following requirements.

- a. The water meter(s) shall be placed within 3-feet of the first property line per standards.
- b. Each service line after the meter shall have a valve located outside of the structures, to be able to isolate the service without interrupting any other service.
- c. Existing water service shall be 1-inch to be able to serve two units or provide engineering analysis showing the existing service is adequate.
- d. Due to house setbacks being 10-feet or less the parallel water service shall be sleeved when adjacent to new or existing homes per section 9 above.
- e. Easements shall be avoided but considered on a case-by-case basis, granted by the Director of the Spokane Water Department per section 13 above.

### SPECIFICATIONS FOR UNDERGROUND INSTALLATION OF LARGE DOMESTIC WATER SERVICES, MAINS, AND FIRELINES (Shall Conform to A.P.W.A. with Spokane Supplemental Standards)

### All material installed in the City of Spokane, including fire hydrants and valves, must conform to City of

- 1. Spokane Specifications. Pipe and Fittings shall be approved ductile iron. All fire hydrants must be individually valved. When in Fire Districts outside of City of Spokane jurisdiction, installation, and materials will conform to City of Spokane Rules and Regulations.
- 2. Water services shall meet current backflow standards per WAC 246-290-490 and follow City of Spokane Water Department Rules and Regulations for Water Service Installations. https://static.spokanecity.org/documents/business/resources/engineeringpolicies/water-service-rulesand-regulations.pdf
- Pipe shall be laid at a minimum depth of 5 feet deep from finished grade. (A depth of 5 feet shall be 3. maintained through any 208 or swale system.)
- 4. Pipe and fittings shall be pressure class 350 ductile and installed in accordance with manufactures instructions and in an approved manner. (A.W.W.A C600-64) (Example - Tyton slip joint connections require continuity wedges, and all taps 2-in or less will have Double strap saddles and greater than 2-in will have a stainless-steel tapping sleeve)
- Pipes shall be clean inside when installed and open ends shall be protected when work is stopped, to 5. prevent foreign material from entering pipe.
- 6. Pipe joints will be either mechanical joint or Tyton slip joint; change in direction shall not exceed 75% of manufacturers' maximum deflection standards.
- All tees, plugs, caps and bends on pipe installed underground shall be mechanically restrained. Mega lugs 7. and field lock gaskets or other restraint systems approved by the Director of the City of Spokane Water Department, shall be used. Thrust blocking is not acceptable.

- 8. All underground fire lines, or fire suppression systems that are separated or protected from the potable water system requires a State Level III or "U" licensed contractor for installation.
- 9. All hydrants shall be properly restrained, from the main to the hydrant (mega lugs or field lock gaskets).
- 10. All water mains and appurtenances 3" and larger shall be tested in sections of convenient length under a hydrostatic pressure equal to 1.5 times that under which they will operate or in no case shall the test pressure be less than 175 psi. Fire lines will be tested at 200 psi or 1.5 times the operation pressure, whichever is greater. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping and measuring equipment necessary for performing the test shall be furnished and operated by the contractor. Contractor must provide restrained MJ cap on last pipe (or plug on last new valve) near intertie with existing water line and include 2" threaded port with 2" ball valve/curb stop assembly for flushing and testing. Chlorination shall only be done by city forces at the expense of the developer and all arrangements shall be made through the City of Spokane water service inspectors.
- 11. During cold weather, the contractor is responsible for protecting all mains and services from freezing, to include all equipment used for flushing, pressure testing and chlorination. Failure to adequately protect mains, services, and equipment from freezing could result in the replacement of these items at the contractor's expense.
- 12. Earth shall be well tamped (per std. plan A-1 & A-2) under and around pipes to prevent settling or lateral movement. Care shall be taken to prevent rocks, etc. from damaging pipe while backfilling. Frozen earth and/or asphalt shall not be used for backfilling material. Backfilling will be done according to APWA specifications.
- 13. If the property line is in a 208-swale area the meter vault\box may have to be relocated farther on property in a recorded utility easement.
- 14. All approved main extension installations will be required to extend 10' beyond the property line unless otherwise required by the water department.
- 15. Fire hydrant use requires a City of Spokane issued reduced pressure backflow preventer (RPBA) and flow meter assembly for all fire hydrant water usage (e.g., construction phase dust control, etc.). Hydrants that have been locked are no longer available for public use. Call 311 or City Water Dept. at 509-625-7800 for more info on Fire Hydrant Use
- 16. All Fire Hydrants, meter vault\box, curb boxes, & valve boxes must maintain an unobstructed 3' radius.
- 17. FDC's & PIV's must be installed downstream of the water meter and backflow assembly.
- 18. If a bypass service line is installed it must be metered, and with same backflow protection as the service being bypassed.
- *19.* When the meter or the double check are susceptible to being submerged in ground water, they must be installed above ground or in an approved watertight vault.

### IF THERE ARE ANY QUESTIONS PLEASE CALL (509)625-7800

### MORE INFORMATION CAN BE FOUND AT THE FOLLOWING WEBSITES

City of Spokane Business and Development & Permits https://my.spokanecity.org/business/

The Municipal Code Water Section can be found at:

https://my.spokanecity.org/smc/?Chapter=13.04

Standard Plans can be found at:

https://my.spokanecity.org/business/bid-and-design/standard-plans/

Design Standards can be found at:

https://my.spokanecity.org/business/bid-and-design/design-standards/

General Special Provisions (City Std. Specs) for Private Contracts

https://my.spokanecity.org/business/bid-and-design/private-gsps/

WSDOT Standards and Specifications can be found at:

http://www.wsdot.wa.gov/Publications/Manuals/M41-10.htm

Washington State Department of Labor and Industries http://www.lni.wa.gov/SAFETY/TOPICS/ATOZ/ABOUT/DEFAULT.ASP

Washington State Safety Standards for Construction Work http://app.leg.wa.gov/wac/default.aspx?cite=296-155

Revised 2/2023

7.7 Examples construction completion forms submitted to the Department of Health



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### **CONSTRUCTION COMPLETION REPORT FORM**

In accordance with WAC 246-290-120 (5), a *Construction Completion Report* is required for all approved construction projects. Operators **must** submit a Construction Completion Report to us within sixty (60) days of completion and before use of any water system facility. This includes any source, water quality treatment, storage tanks, booster pump facilities, and distribution projects.

Please type or pl	rint legibly in ink:			
City of Spokane	2		DOH System ID No.:	83100K
Name of Water Syste	cin .			
Loren Searl			DOH Project No.	#20-0109
Name of Purveyor (C	Owner or System Contac	t)	(	if applicable)
914 E. North Fo	othills Dr.		Date Construction Docu	iments
Mailing Address			Approved by DOH	April 8, 2020
Spokane	WA	99207-2794		(If applicable)
City	State	Zip		

### PROJECT NAME AND DESCRIPTIVE TITLE: Five Mile Booster Station

CHECK ONE: 🔀 Entire Project Completed. 📃 Description of Portions Completed.

### PROFESSIONAL ENGINEER'S ACKNOWLEDGMENT (Complete items below Attach additional sheets as needed)

The undersigned professional engineer (PE), or their authorized agent, has inspected the above-described project which, as to layout, size and type of pipe, valves and materials, reservoir and other designed physical facilities, has been constructed and is substantially completed in accordance with construction documents reviewed by the purveyor's engineer or approved by the Department of Health. In the opinion of the undersigned engineer, the installation, physical testing procedures, water quality tests, and disinfection practices were carried out in accordance with state regulations and principles of standard engineering practice.

I have reviewed the disinfection procedures  $\square$ , pressure test results  $\square$ , and results of the bacteriological test(s)  $\square$  for this project and certify that they comply with the requirements of the construction standards/specifications approved by the Department of Health. (Check all boxes that apply that are consistent with the nature of the project.)

This project changes the physical capacity of the system to serve consumers. The system is now able to serve equivalent residential units (ERUS.) 🛛 Not applicable

Spokane       WA       99207-2794         Civ       Stat       Zip         Engineer s Signature       Stat       Zip         State/Federal Funding Type (if any)       State/Federal Funding Type (if any)       State/Federal Funding Type (if any)         Please return completed form to your regional office checked below.       SWRO Drinking Water       ERO Drinking Water         Department of Health       Department of Health       Department of Health         20425 72 <sup>nd</sup> Ave. S, Ste 310       PO Box 47823       I6201 E. Indiana Ave, Suite 15         Kent, WA 98032-2388       Olympia, WA 98504-7823       Spokane Valley, WA 99216         253-395-6750       360-236-3030       509-329-2100	A States of the second	SAKAMO A	14 July 2022 Date Signed City of Spokane Name of Engineering Finn James S. Sakamoto Name of PE Acknowledging C 914 E. North Foothills E Mailing Address	Construct. )r	ion
Please return completed form to your regional office checked below.         NWRO Drinking Water       SWRO Drinking Water       ERO Drinking Water         Department of Health       Department of Health       Department of Health         20425 72 <sup>nd</sup> Ave. S, Ste 310       PO Box 47823       16201 E. Indiana Ave, Suite 15         Kent, WA 98032-2388       Olympia, WA 98504-7823       Spokane Valley, WA 99216         253-395-6750       360-236-3030       509-329-2100	STORESSION STORESSION	AL BIOMON	Spokane WA State Engineer's Signature State/Federal Funding Type	Curro e (if any	99207-2794 Zip
NWRO Drinking WaterSWRO Drinking WaterERO Drinking WaterDepartment of HealthDepartment of HealthDepartment of Health20425 72 <sup>nd</sup> Ave. S, Ste 310PO Box 4782316201 E. Indiana Ave, Suite 15Kent, WA 98032-2388Olympia, WA 98504-7823Spokane Valley, WA 99216253-395-6750360-236-3030509-329-2100	Please return completed form to you	ur regional office checked below			
	NWRO Drinking Water Department of Health 20425 72 <sup>nd</sup> Ave. S, Ste 310 Kent, WA 98032-2388 253-395-6750	SWRO Drink Department o PO Box 47823 Olympia, WA 360-236-3030	ing Water f Health 98504-7823		ERO Drinking Water Department of Health 16201 E. Indiana Ave, Suite 1500 Spokane Valley, WA 99216 509-329-2100

For people with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TDD/TTY call 711).



### **CONSTRUCTION COMPLETION REPORT FORM**

In accordance with WAC 246-290-120 (5), a *Construction Completion Report* is required for all approved construction projects. Purveyors **must** submit a Construction Completion Report to the Office of Drinking Water (ODW) within sixty (60) days of completion and before use of any water system facility. This includes any source, water quality treatment, storage tanks, booster pump facilities, and distribution projects.

Please type or	print legibly in ink:			
City of Spoka	ne		DOH System ID No.;	83100K
Name of Water Sy	stem			
Dan Kegley, D	irector - City of Spol	ane Water Department	DOH Project No.	16-0604
Name of Purveyor	(Owner or System Contact)		(i	if applicable)
914 E. North I	Foothills Dr.		Date Construction Docur	ments
Mailing Address			Approved by DOH	June 19, 2017
Spokane, WA	99207-2794			(If applicable)
City	State	Zip		

### PROJECT NAME AND DESCRIPTIVE TITLE: <u>Central Avenue Well Station #1 Rehabilitation</u>

CHECK ONE: C Entire Project Completed. Description of Portions Completed.

### PROFESSIONAL ENGINEER'S ACKNOWLEDGMENT (Complete items below-Attach additional sheets as needed)

The undersigned professional engineer (PE), or their authorized agent, has inspected the above-described project which, as to layout, size and type of pipe, valves and materials, reservoir and other designed physical facilities, has been constructed and is substantially completed in accordance with construction documents reviewed by the purveyor's engineer or approved by the DOH. In the opinion of the undersigned engineer, the installation, physical testing procedures, water quality tests, and disinfection practices were carried out in accordance with state regulations and principles of standard engineering practice.

I have reviewed the disinfection procedures  $\boxtimes$ , pressure test results  $\boxtimes$ , and results of the bacteriological test(s)  $\boxtimes$  for this project and certify that they comply with the requirements of the construction standards/specifications approved by the DOH. (Check all boxes that apply that are consistent with the nature of the project.)

February 7, 2018

	Date Signed	
Signation of the second	City of Spokane. Name of Engineering Firm James S. Sakamote Name of PE Acknowledgin 914 E. North Foot Mailing Address Spokane, WA 99 City Engineer & Signature Steto/Endered Funding To	Water Department o. P.E. g Construction hills Dr. 207-2794 Zip
Please return completed form to DOH region.	al office checked below	
NWBO Drinking Water	SWRO Drinking Water	EBO Drinking Water
Benartment of Health	Department of Health	Department of Health
20425 72 <sup>nd</sup> Ave. S. Ste 310	PO Box 4782.3	16201 E. Indiana Ave. Suite 1500
Kent. WA 98032-2358	Olympia, WA 98504-7823	Spokane Valley, WA 99216
(253) 395-6750	(360) 236-3030	(509) 329-2100

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).

The purveyor must attach a completed Water Facilities Inventory (WFI) form in accordance with WAC 246-290-120(6), if applicable. Contact the regional office in your area for WFI forms or additional Construction Completion Report forms.

### 8.1 Six-Year Capital Program 2023-2028

### 2023-2028 Water Capital Improvement Program FINAL December 5, 2022





### Acknowledgements

**City of Spokane Mayor** Nadine Woodward **City of Spokane Council President** Breean Beggs

**Plan Commission President Todd Beyreuther** 

# Capital Improvement Program (CIP) Team

The Budget Office wishes to acknowledge the many individuals and departments who contributed to the preparation of this document.

The Capital Improvement Program is an implementing strategy of the Capital Facilities Plan of Spokane's Comprehensive Plan. This Program is developed in compliance with the Washington State Growth Management Act.

Date Created: September 6, 2022

www.spokanecity.org

Date Updated: December 5, 2022

Spokane Washington 99201

808 W Spokane Falls Blvd

City of Spokane

## Water Department

### **Department Goals**

The paramount goal of both the City of Spokane's Water Department and Integrated Capital Management (ICM) Department is "to provide affordable high quality water with excellent customer service and ample fire protection." In general, capital projects are programed through the ICM Department and funded through the Integrated Capital fund and utility revenue. Water utility revenue is generated by metered water consumption and hydroelectric power generation at the Upriver Dam Hydroelectric Project.

Both departments are dedicated to careful planning, condition assessments, asset management, continuing education and conservation. Through this effort, the water system and hydroelectric plant are positioned to meet the needs of our present and future customers for many years to come. Using this approach, we have grown from our beginnings in 1894 with just 2 miles of water main and a reliance on the Spokane River for water to become the 3rd largest water system in the state with more than 1,000 miles of water main utilizing water from the Spokane Valley Rathdrum Prairie Aquifer and a 177 MW power plant on the Spokane River.



## **Department Contact Information**

City of Spokane Water Department:

Loren Searl, Director, 625-7821, Isearl@spokanecity.org

Integrated Capital Management Department:

Marcia Davis, Interim Director, 625-6398, mdavis@spokanecity.org

Name	Title	Telephone	Email
James Sakamoto	Principal Engineer	625-7854	jsakamoto@spokanecity.org
Seth Mcintosh	Plant Manager	742-8154	smcintosh@spokaneity.org
Marcia Davis	Principal Engineer	625-6398	<u>mdavis@spokanecity.org</u>

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The Water Program is organized into five elements and within these elements, the department has both specific individual projects and continuing maintenance projects with large capital expenditures. Minor maintenance work is completed under the utility's operation budget and will not be found in this document. The five elements are:

- Distribution Mains: Water mains delivering service to our customers, most of which were installed prior to World War II.
- Facilities and Operations: In addition to operating and maintaining the water system, the City's Water Department is responsible for several facilities, including the Upriver Dam. The Upriver dam site has five Kaplan hydroelectric turbines in two powerhouses and a spillway on the Spokane River, which provides power to pump ground water at the water system's two largest well sites. Excess power production is sold to our local power utility, Avista Corp.
- Source Well and Booster Pump Stations: Source wells extract water from the Spokane Valley Rathdrum Prairie Aquifer, the City's sole source for drinking water. Booster pump stations move the water across distances and to storage facilities at higher elevations providing service throughout the City.
- Storage Systems Improvements: The City's water system has several varieties of tanks and reservoirs that provide water storage. These facilities are located throughout the City, and they serve the dual purposes of balancing customers supply needs and fire protection. In addition tanks help equalize the water pressure in the entire system.
- <u>Transmission Mains</u>: Pipes deliver water from the Aquifer to water customers. Large-diameter pipes that transport water across the city to storage facilities are called transmission mains. Smaller diameter pipes that carry water to residences and businesses are called distribution mains.

### Level of Service Standard

The City presently has seven well sites for its water supply source. Ideal design practice recommends that the source of supply capacity be equal to the maximum minutes to several hours. The flow rate must be provided at no less than 30 psi (pounds per square inch) at all points in the distribution system (measured at any day demand (MDD), allowing stored water to be used for the peaking requirements of the system. The total system pumping capacity is 282 MGD. The highest recorded MDD is 185 MGD. Minimum level of service standards were established in the Countywide Planning Policies. According to these policies, distribution requires that the water system provide the specified level of service at a minimum pressure of 45 psi. Water pressures of at least 45 psi have proven more customer's water meter or at the property line if no meter exists) except for fire flow conditions. By existing policy, the City of Spokane Water Department pipelines must be designed to deliver sufficient water to meet peak customer demands (peak hourly demand), this period occurring over a range of a few satisfactory in terms of meeting the water needs for most customers.

# **Spending by Project Type Summary**

### Water

roject Type		2023	2024	2025	2026	2027	2028	Total
Administrative Facilities	Ŷ	1,200,000 \$	2,500,000 \$	\$ '	· ·	1	÷ خ	\$ 3,700,000
:quipment		154,000	I	I	I	ı	I	154,000
ource Wells and Booster Stations		13,850,000	5,450,000	22,000,000	13,500,000	12,300,000	13,000,000	80,100,000
/ehicles and Equipment		000'006	965,000	1,015,000	1,300,000	925,000	150,000	5,255,000
Vater Mains		20,065,000	19,826,000	2,775,000	5,110,000	16,565,000	20,245,000	84,586,000
torage Systems		12,613,486	10,573,486	2,330,000	I	800,000	8,000,000	34,316,972
Vater Maintenance		7,920,000	12,205,000	12,328,000	10,390,000	7,248,000	6,248,000	56,339,000
	Ŷ	56,702,486 \$	51,519,486 \$	40,448,000 \$	\$ 000'006'08	37,838,000	\$ 47,643,000	\$ 264,450,972



**Funded Projects** 

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### Water

Project Description	2023	2024	2025	2026	2027	2028	6 Year Estimate
WAT-2012-141 - Plains System New Booster	\$ 600,000	\$ 3,000,000 \$	\$ 3,000,000 \$	-	-	- -	6,600,000
WAT-2012-184 - Thorpe Road Reservoir No. 2	500,000	5,000,000	2,330,000	ı	ı		7,830,000
WAT-2013-156 - Metering	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	14,400,000
WAT-2013-157 - SCADA System	200,000	375,000	75,000	75,000	75,000	75,000	875,000
WAT-2013-158 - Water Service Replacement Program	ı	240,000	120,000	120,000	120,000	120,000	720,000
WAT-2013-163 - Tank Rehabilitation Fund	1,500,000	ı	100,000	1,750,000	ı		3,350,000
WAT-2013-167 - SIA System Additional Reservoir	8,000,000	2,200,000	ı	ı	ı		10,200,000
WAT-2013-172 - Hoffman Well Station Rehabilitation	500,000	ı	ı	ı	ı		500,000
WAT-2013-173 - High System Tank	3,373,486	3,373,486	ı	ı	ı		6,746,972
WAT-2013-174 - Havana Well	2,000,000	ı	ı	5,000,000	1,000,000		8,000,000
WAT-2014-151 - Rebuild Generators #2 and #3 in Powerhouse #1	ı	1,000,000	ı	ı	ı		1,000,000
WAT-2014-163 - 16th Ave Transmission Main, Chestnut to Milton Booster	300,000	2,000,000	1,000,000	I	I	ı	3,300,000
WAT-2015-104 - TJ Meenach Dr. Water Transmission Main; Bridge to NW Blvd	865,000	ı	ı	ı	I	,	865,000
WAT-2015-115 - Ray St., 11th to Hartson Ave, Main Replacement	2,500,000	ı	ı	ı	ı	·	2,500,000
WAT-2015-121 - Post Street Bridge Water Main	10,000	ı	ı	ı	ı		10,000
WAT-2015-144 - Parkwater Pump and Motor Replacements	640,000	ı	700,000	ı	ı		1,340,000
WAT-2016-17 - Study - Water Capital Facilities Plan	300,000	ı	ı	ı	ı		300,000
WAT-2016-50 - Whistalks Way Transmission Main Replacement	ı	ı	ı	50,000	400,000	100,000	550,000
WAT-2016-53 - 1st Avenue, Monroe to Wall, Distribution Main Replacement	ı	ı	ı	ı	5,000	ı	5,000
WAT-2016-54 - Napa Distribution Replacement (2nd to Sprague)	ı	ı	ı	30,000	300,000	ı	330,000
WAT-2016-56 - 4th Avenue Distribution Main Replacement (Sunset to Maple)	ı	ı	20,000	200,000	I	ı	220,000
WAT-2016-89 - Water Facilities Backup Power Retrofit	ı	200,000	100,000	100,000	100,000	100,000	600,000

Spokane 2023 Capital Improvement Program

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### Water - Continued

Project Description	2023	2024	2025	2026	2027	2028	6 Year Estimate
WAT-2016-94 - Well Electric Well Station Update	1,250,000	500,000	5,000,000	8,000,000	5,000,000	1	19,750,000
WAT-2016-95 - Ray Street Well Station Update	2,500,000	ı	ı	ı	ı	ı	2,500,000
WAT-2016-96 - Marshall Road from Thorpe to Qualchan Transmission Main	8,000,000	3,050,000	ı	ı	ı	I	11,050,000
WAT-2017-21 - Main Ave, Monroe St to Browne St	I	I	ı	150,000	500,000	1,000,000	1,650,000
WAT-2017-22 - Riverside Ave, Monroe to Division	50,000	ı	·	ı	I	ı	50,000
WAT-2017-24 - Riverside Ave, Monroe St to Wall St.	I	ı	110,000	100,000	1,000,000	ı	1,210,000
WAT-2017-26 - Freya St Transmission Main, Garland Ave to Francis Ave	·	ı	1,030,000	2,050,000	2,000,000	,	5,080,000
WAT-2017-27 - SIA Transmission Line Crossing Under I-90	2,000,000	3,000,000	ı	ı	I	ı	5,000,000
WAT-2017-34 - Assessment of Existing Pipes	250,000	250,000	250,000	250,000	250,000	250,000	1,500,000
WAT-2017-92 - Dump Truck	ı	350,000	350,000	ı	375,000	ı	1,075,000
WAT-2017-117 - 1st Avenue, Maple to Monroe, Distribution Main Replacement	ı	ı	ı	ı	5,000	ı	5,000
WAT-2017-118 - 1st Avenue, Wall to Bernard, Distribution Main Replacement	I	ı	ı	ı	5,000	ı	5,000
WAT-2018-34 - Mallon Avenue, Monroe to Howard Main Replacement	I	ı	30,000	200,000	200,000	ı	430,000
WAT-2018-35 - 27th Avenue, SE Blvd to Ray St, Main Replacement	I	ı	ı	25,000	175,000	ı	200,000
WAT-2018-37 - Spokane Falls Blvd, Post to Division Street Main Replacement	ı	ı	I	200,000	1,500,000	500,000	2,200,000
WAT-2018-39 - Havana Street, Sprague to Broadway Avenue Main Replacement	ı	ı	ı	I	70,000	145,000	215,000
WAT-2018-43 - Wellesley Avenue, Freya to Havana Street Main Replacement	I	70,000	500,000	200,000	I	ı	770,000
WAT-2018-44 - Thor and Freya, Hartson to Sprague Avenue Water Upgrades	800,000	ł	ı	ł	I	T	800,000

Spokane 2023 Capital Improvement Program

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### Water - Continued

				5000			6 Year
Project Description	2023	2024	5707	7070	707	2028	Estimate
WAT-2018-47 - Service Truck Replacement	ı	I	400,000	800,000	400,000	ı	1,600,000
WAT-2018-48 - Broadway Avenue, Ash to Post Street Main							
Replacement	ı	I	35,000	300,000	100,000	I	435,000
WAT-2018-121 - Backhoe	350,000	350,000	ı	350,000	ı	ı	1,050,000
WAT-2018-122 - Loader	400,000	ı	·	ı	ı	·	400,000
WAT-2018-146 - Upriver Dam Ops Facility Remodel	100,000	1,500,000	·	ı	ı		1,600,000
WAT-2018-1508 - Upriver Dam Spillway Rehabilitation Phase 3a	210,000	ı	ı	ı	ı	ı	210,000
WAT-2018-1509 - Upriver Dam Spillway Rehabilitation Phase 3b	540,000	180,000	2,680,000	2,680,000	ı	ı	6,080,000
WAT-2018-1510 - Upriver Dam Spillway Gate Replacement	1,780,000	1,360,000	1,475,000	1,587,000	ı	ı	6,202,000
WAT-2019-10 - NSC Planning from Spokane River to Sprague Avenue	5,000	5,000	5,000	ı	·	,	15,000
WAT-2019-13 - 9th & Pine Booster Station	6,000,000	ı	·	ı	ı		6,000,000
WAT-2019-28 - NSC Planning from Interstate 90 to Sprague Avenue	5,000	5,000	5,000	5,000	5,000	ı	25,000
WAT-2019-30 - Study - Water System Vulnerability Assessment	50,000	ı		ı	ı		50,000
WAT-2019-51 - NSC Wellesley Avenue PH2 - Haven Street to Market Street	85,000	ı		·	ı	Ţ	85,000
WAT-2019-64 - Water Distribution Main Resiliency & Water Quality Program	ı	600,000	300,000	300,000	300,000	300,000	1,800,000
WAT-2020-7 - NSC - Trent Interchange Water Reroute	950,000	100,000	·	I	ı	ŀ	1,050,000
WAT-2020-12 - NSC - 2nd Ave Water Reroutes	3,000,000	2,200,000		I	I	·	5,200,000
WAT-2020-13 - NSC - Trumpet Area Water Reroutes	200,000	1,000,000	125,000	ı	ı	ı	1,325,000
WAT-2020-14 - NSC - 3rd Ave Water Reroute	150,000	800,000	85,000	I	ı	ı	1,035,000
WAT-2020-35 - Fire Suppression System Upgrades	300,000	I	ı	I	I	ı	300,000
WAT-2020-37 - 12th Avenue - Deer Heights to Flint	I	I	30,000	300,000	I	I	330,000
WAT-2020-48 - Rebuild Generators #4 and #5 in Powerhouse #2	300,000	3,000,000	3,000,000	I	ı	·	6,300,000

Spokane 2023 Capital Improvement Program

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### Water - Continued

							6 Year
Project Description	2023	2024	2025	2026	2027	2028	Estimate
WAT-2020-50 - Upriver Dam Spillway Rehabilitation Phase 4	ı	I	ı	800,000	2,975,000	2,975,000	6,750,000
WAT-2020-51 - Indian Trail Reservoir Frontage Improvements	440,000	I		ı	ı	I	440,000
WAT-2020-52 - Study - Nevada Well Station Rehabilitation	200,000	I	·	·	·		200,000
WAT-2020-58 - Nevada Well Station Rehabilitation	I	525,000	5,250,000	ı			5,775,000
WAT-2020-1514 - Water Distribution System District Metering and Pressure Management Areas	·	435,000				I	435,000
WAT-2020-1515 - Distribution System Monitoring	50,000	250,000	150,000	150,000	150,000	150,000	900'006
WAT-2021-12 - Highland Booster Capacity Improvements	I	525,000	5,250,000	ı	·	·	5,775,000
WAT-2021-13 - Northwest Terrace PRV's	300,000	400,000	3,500,000		ı		4,200,000
WAT-2021-14 - Study-Well Transmission Optimization	150,000	I			·		150,000
WAT-2021-16 - Ray St., 17th to 11th Ave, Main Replacement	300,000	1,000,000	ı	ı	ı		1,300,000
WAT-2021-22 - Future Development Water Projects	250,000	250,000	250,000	250,000	250,000	250,000	1,500,000
WAT-2021-23 - Latah-9th and Pine Transmission Main	I	I			1,000,000	10,000,000	11,000,000
WAT-2021-25 - Northwest Terrace Transmission Main	320,000	3,200,000	·	ı	ı		3,520,000
WAT-2021-26 - Latah Booster to Thorpe Reservoir Transmission Main	ı	I		ı	800,000	8,000,000	8,800,000
WAT-2021-27 - Westbow Transmission Main - Thomas Mallen to Spotted			,	800,000	8,000,000	ı	8,800,000
WAT-2021-62 - Electric Vehicles (EV) Charging Station Development	I	I	·	300,000	1,000,000	ŗ	1,300,000
WAT-2021-69 - Water Dept. Ops Facility Maintenance and Renovation	1,100,000	1,000,000		·	'	ı	2,100,000
WAT-2021-73 - Mechanics Truck	ı	115,000	115,000	ı	ı	·	230,000
WAT-2021-75 - Light Vehicles	150,000	150,000	150,000	150,000	150,000	150,000	000'006
WAT-2021-1504 - FERC Part 12-D	I	165,000	28,000	28,000	28,000	28,000	277,000
WAT-2021-1556 - Lowboy Trailer	154,000	I	ı	ı	ı	ı	154,000

Spokane 2023 Capital Improvement Program

# **Summary of Funded Projects**

### Water - Continued

							6 Year
Project Description	2023	2024	2025	2026	2027	2028	Estimate
WAT-2022-1460 - 14th and Grand Booster Station Rehabilitation	I	ı	I		300,000	3,000,000	3,300,000
WAT-2022-1461 - Shawnee Booster Station Rehabilitation	ı	500,000	I	ı	1,000,000	10,000,000	11,500,000
WAT-2022-1462 - Latah Booster Capacity Improvement	I	ı	I	500,000	5,000,000	ı	5,500,000
WAT-2022-1464 - Highland Reservoir	I	ı	I		800,000	8,000,000	8,800,000
WAT-2022-1506 - NSC - Regal St. Water Main Crossing	125,000	2,562,000	150,000	·		ı	2,837,000
WAT-2022-1507 - NSC - Napa St. Water Main Crossing	125,000	2,259,000	150,000		·	I	2,534,000
WAT-2022-1513 - Upriver Dam FERC Relicensing	I	ı	200,000	100,000	100,000	100,000	500,000
WAT-2022-1554 - Study - Asset Management Framework	75,000	75,000			ı		150,000
	\$56,702,486	\$51,519,486	\$40,448,000	\$30,300,000	\$37,838,000	\$47,643,000 \$	264,450,972

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ivision	Booster
Water D	em New
5200-500 -	Plains Syst

Budg	r Stations Budg	Regio
dget Year:	dget Stage:	gion:
2023	Adopted Budget	Outside City

### **Description**

Design and construct a new booster station to increase supply to the West Plains area.

Project #2018102

### <u>Justification</u>

International Airport develops. This proposed booster station will balance our system of supply by eliminating a weak link in the supply system System by providing redundancy and increased capacity. The exact location of this booster station has not been determined, but is needed in A new booster station will be constructed in the West Plains area. The new booster station will improve water service to the Plains Pressure west of the Spokane International Airport area. Demand in the Plains System is increasing as marketable land near and around the Spokane the vicinity of the existing Spotted Road Booster Station. This booster station will supply customers and the increasing demands south and that provides water to this area.

## **Comprehensive Plan Goals Met**

CFU 2.1 - Available Public Facilities. This project will help to meet growth in the West Plains. CFU 1.2 - Operational Efficiency. This project will help to improve the efficiency of the system in the West Plains.

### Funding

			2023	2024	2025	2026	2027		2028	6 Year	Total
Reserves	Integrated Capital Management	Ş	600,000 \$	3,000,000 \$	3,000,000 \$	Ş.	I	Ş	·	\$ 6,60	0,000
Total		Ś	600,000 \$	3,000,000 \$	3,000,000 \$	\$	ı	ş		\$ 6,60	0)000
Spending											
			2023	2024	2025	2026	2027		2028	6 Year	Total
Design	Integrated Capital Management	÷	¢000'009	1	-	\$ -	ı	Ş		\$ 60	0,000
Construction	Integrated Capital Management		,	3,000,000	3,000,000		ı		ı	6,00	0,000

Spokane 2023 Capital Improvement Program

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600,000 \$ 3,000,000 \$ 3,000,000

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Total

5200-500	) - Wat	ter Division							
<b>Thorpe R</b>	Road R	eservoir No. 2							
Project Num	ber:	WAT-2012-184		Bu	dget Year:	2023			
Project Type		Storage Systems		Bu	dget Stage:	Adopt	ed Budget		
Year Identifi	ed:	2012		Re	gion:	Distric	t 2		
<u>Description</u> This project v	will constr	uct a 5.0 million gallon seco.	nd reservoir ne	ext to the existin	ոց one on Thor	pe Road.			
Justification The storage a Zone. The ex the Spokane	analysis fc kisting res Internatic	or the Capital Facility Plan for ervoir serves the Low Pressu onal Airport (SIA) and Plains p	r Water (20 ye ire Zone and th pressure zones	ar plan) has det 'e new reservoi s on the West Pl	ermined additi r will provide r <sup>l</sup> ains.	onal storage edundancy a	is needed fo nd additiona	r the Low Il capacity	Pressure for growth in
<u>Comprehen</u> CFU 1.2 - Ope Public Faciliti	<mark>sive Plan</mark> erational ies. Const	I Goals Met Efficiency. This project will in truction of this project will pr	mprove the op rovide adequa <sup>-</sup>	berational efficie te infrastructure	ency by reducin at the time of	g required m <sup>c</sup> developmer	laintenance. ht.	CFU 2.1	Available
Funding			2023	2024	2025	2026	2027	2028	6 Vear Total
Reserves	Integrated	d Capital Management	\$ 500,000 \$	\$ 5,000,000 \$	2,330,000 \$	\$ -	\$	1	\$ 7,830,000
Total		- и	\$ 500,000 \$	\$ 5,000,000 \$	2,330,000 \$	\$ -	ج		\$ 7,830,000
Spending									
			2023	2024	2025	2026	2027	2028	6 Year Total
Design	Integrated	d Capital Management	\$ 500,000 \$	\$- \$	، ئ	۰ ک	۰ ۲	I	\$ 500,000
Construction	Integrated	d Capital Management	I	5,000,000	2,330,000	I	I	I	7,330,000
Total			\$ 500,000 \$	\$ 5,000,000 \$	2,330,000 \$	, Ş	, Ş	ı	\$ 7,830,000

u		
5200-500 - Water Divisio	Metering	

Project Number:	WAT-2013-156	Budget Year:	2023
Project Type:	Water Maintenance	Budget Stage:	Adopted Budget
Year ldentified:	2013	Region:	District 1

### **Description**

This would be an ongoing annual costs for upgrading the meter reading equipment: meters, radios, readers, programs, etc. Starting 2019 purchasing costs for all meter equipment was added to this project to align with accounting practices.

### <u>Justification</u>

This equipment allows the water department to account for usage and accurately bill usage.

## **Comprehensive Plan Goals Met**

CFU 1.2 - Operational Efficiency. CFU 5.2 - Water Conservation.

### Funding

		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves	Water Division	\$ 2,400,000 \$	; 2,400,000 \$	2,400,000	\$ 2,400,000 \$	2,400,000	\$ 2,400,000	\$ 14,400,000
Total		\$ 2,400,000 \$	2,400,000 \$	2,400,000	\$ 2,400,000 \$	2,400,000	\$ 2,400,000	\$ 14,400,000
Spending								
		2023	2024	2025	2026	2027	2028	6 Year Total
Purchases	Water Division	\$ 2,400,000 \$	2,400,000 \$	2,400,000	\$ 2,400,000 \$	2,400,000	\$ 2,400,000	\$ 14,400,000
Total		\$ 2,400,000 \$	\$ 2,400,000 \$	2,400,000	\$ 2,400,000 \$	2,400,000	\$ 2,400,000	\$ 14,400,000

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### **SCADA System**

Project Number:	WAT-2013-157	Budget Year:	2023
Project Type:	Water Maintenance	Budget Stage:	Adopted Budget
Year Identified:	2013	Region:	District 1

### **Description**

This would be an ongoing annual costs for upgrading control equipment: radios, PLCs, data collectors, control programs, etc.

### **Justification**

This equipment allows the department to monitor the system.

## **Comprehensive Plan Goals Met**

CFU 1.2 - Operational Efficiency. CFU 6.5 - Infrastructure Maintenance.

### Funding

			2023	2024	2025	2026	2027	2028 61	/ear Total
Reserves Water	r Division		200,000 \$	375,000 \$	75,000 \$	75,000 \$	75,000 \$	75,000 \$	875,000
Total	&	5	200,000 \$	375,000 \$	75,000 \$	75,000 \$	75,000 \$	75,000 \$	875,000
Spending									
			2023	2024	2025	2026	2027	2028 61	/ear Total
Construction Water	r Division \$	10	200,000 \$	375,000 \$	75,000 \$	75,000 \$	75,000 \$	75,000 \$	875,000

875,000

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75,000

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375,000

200,000 \$

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Total

Water Service	<b>Replacement Progr</b>	am						
Project Number:	WAT-2013-158		Bu	dget Year:	202	~		
Project Type:	Water Maintenance		Bu	dget Stage:	Ado	pted Budget		
Year Identified:	2013		Re	gion:	Dist	rict 1		
<u>Description</u> This is an aid program	ı for repair or replacement o	f service lines t	hroughout the	city for qualifie	ed candidate	ss.		
<u>Justification</u> City Council Resolutio meeting.	n 20 Presented on January	/ 25, 2021 at th	e Public Infrast	ucture, Envirc	onment, & S	ustainability (	PIES) comn	nittee
Comprehensive Plar CFU 1.2 - Operational	<mark>n Goals Met</mark> Efficiency. CFU 1.3 - Mainte	nance. CFU 5.2	- Water Conser	vation. CFU 6.	5 - Infrastru	cture Maintei	nance.	
Funding		2002	VCUC	3035	2076	2000	2078	letoT reav A
Reserves Water Di	vision	\$ - \$	\$ 240,000 \$	120,000 \$	120,000 \$	120,000 \$	120,000	\$ 720,000
Total		\$ -	\$ 240,000 \$	120,000 \$	120,000 \$	120,000 \$	120,000	\$ 720,000
Spending				1000				
Construction Water Di	vision	<b>5707</b> - \$	\$ 240,000 \$	120,000 \$	120,000 \$	120,000 \$	120,000	\$ 720,000
Total		· •	\$ 240,000 \$	120,000 \$	120,000 \$	120,000 \$	120,000	\$ 720,000

5200-500 - Water Division

5200-500 - W	<b>/ater Division</b>							
Tank Rehabil	itation Fund							
Project Number:	WAT-2013-163		Buc	lget Year:	2028	~		
Project Type:	Water Maintenance		Buc	lget Stage:	Ado	pted Budget		
Year Identified:	2013		Re	gion:	Disti	rict 1		
<u>Description</u> These projects will	extend the service life of the r	eservoirs as well as	limit leaking	and poten	tial contamina	ition issues asso	ociated wi	ith the City's
storage facilities.								
<u>Justification</u> The water departm materials used. A r	ient has 34 reservoirs. The co	atings and liners use t been in place or fc	ed have a life llowed for π	expectanc	y of 10 to 40 y This would be	ears depending the continuati	g on tank : ion of a pr	style and ogram
Started in 2014. Comprehensive P	lan Goals Met							
CFU 1.2 - Operatior Infrastructure Main	al Efficiency. CFU 1.3 - Mainte ntenance.	enance. CFU 1.5 - U	tility Constru	ction Stand	ards. CFU 5.2	- Water Conser	vation. EL	) 3.5 -
Funding								
		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Water	Division	\$ 1,500,000 \$	\$ -	100,000 \$	1,750,000 \$	\$ -	I	\$ 3,350,000
Total		\$ 1,500,000 \$	- \$	100,000 \$	1,750,000 \$	- \$	I	\$ 3,350,000
Spending								
		2023	2024	2025	2026	2027	2028	6 Year Total

\$ 3,350,000 \$ 3,350,000

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100,000 \$ 1,750,000

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\$ 1,500,000 \$ \$ 1,500,000 \$

Water Division

Purchases Total

5200-500	0 - Wate	r Division							
SIA Syste	em Addi	tional Reservoir							
Project Num	ber:	WAT-2013-167		Bud	get Year:	2023			
Project Type	••	Storage Systems		Budį	get Stage:	Adop	ted Budget		
Year Identifi	ed:	2013		Regi	on:	Distri	ict 2		
<u>Description</u> This project v require prop	will construc erty purcha	ct an additional 3.6 MG in s se; however, if another site	torage for the selected, pur	sIA Pressure Zor chase may be rec	ie. A site ha quired.	s been identii	fied on airpor	t property	that will not
<u>Justification</u> The two exis existing tank future growt	ting reservc is in poor c h around th	virs in the SIA system are no ondition and requires repla he airport.	ot of adequate Icement. The I	e capacity to fully new reservoir will	serve existii both provi	ng demand in de adequate :	the pressure storage for ex	zone. The isting dem	: older ands and for
<u>Comprehen</u> CFU 1.2 - Opi potential ind	<u>Isive Plan G</u> erational Ef ustrial grow	<u>soals Met</u> ficiency for the Plains Press ⁄th.	ure Zone. CFL	J 2.1 - Available P	ublic Faciliti	es to provide	adequate sei	vice today	and meet
Funding			5606	VEUE	<b>J 1 J 1</b>	3000	LCUC	9CUC	letoT reav a
Reserves	Integrated C	Capital Management	\$ 2,900,000 \$	\$ 2,000,000 \$	ب ۲	- \$	- -	-	\$ 4,900,000
Debt	Integrated C	Capital Management	5,100,000	200,000	ı		ı	ı	5,300,000
Total			\$ 8,000,000 \$	\$ 2,200,000 \$	\$ -	\$ -	\$ -		\$ 10,200,000
Spending			5002	4CUC	2025	2026	7000	2028	6 Vear Total
Construction	Integrated C	Capital Management	\$ 8,000,000 \$	\$ 2,200,000 \$	۰ ۲	- \$	\$ -		\$ 10,200,000
Total			\$ 8,000,000 \$	\$ 2,200,000 \$	\$ 	ۍ ۱	\$ -		\$ 10,200,000
		I							

Hoffman Well	Station Rehabilitatic	nc						
Project Number:	WAT-2013-172		Budg	get Year:	2023			
Project Type:	Source Wells and Booster S	Stations	Budg	get Stage:	Adop	ted Budget		
Year Identified:	2013		Regio	:uo	Distri	ct 1		
<u>Description</u> Hoffman Well Station the existing cracked c	has been evaluated to impro asing. Also included are new	ve capacity and ope pumps, motors, cor	eration. The	project wil witchgears	l include insta for both Well	illation of a n 1 and Well 2	ew steel li	ner within
Project #2018104								
<u>Justification</u> Well 2 has not been in production capacity.	n production since the crack ir	n the casing was dis	covered. Th	iis project w	vill bring Well	2 back on lin	e and rest	ore the well's
<u>Comprehensive Plai</u> CFU 1.2 - Operational Maintenance. This pr	<u>1 Goals Met</u> efficiency. This project impro oject maintains an existing ut	oves operation effici ility asset.	iency throug	gh redundai	ncy and increa	ased capacity	. CFU 1.3 -	
Funding								
		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Integrate	d Capital Management	\$ 500,000 \$	- \$	- Ş	- \$	- \$	I	\$ 500,000
Total		\$ 500,000 \$	÷	۰ بې	۰ ۲	۰ ج	•	\$ 500,000
Spending								
		2023	2024	2025	2026	2027	2028	6 Year Total
Construction Integrate	d Capital Management	\$ 500,000 \$	÷	۰ ک	۔ ج	۰ ۍ	,	\$ 500,000
Total		\$ 500,000 \$	- \$	- \$	- \$	- \$	•	\$ 500,000

5200-500 - Water Division

Water Division	n Tank
5200-500 - W	High System <sup>-</sup>

### **Description**

This project will construct a 1.9 MG reservoir to increase the amount of storage in the High Pressure Zone and improve operational reliability in the summer months.

### **Justification**

The High Pressure Zone currently has insufficient water storage for operational purposes. During summer months, the pump stations serving requirements for storage and pumping. Cost savings may be possible with natural surface access road rather than pavement and with a this pressure zone operate in excess of the firm capacity allowed to meet demands. This project would allow this system meet state shorter connection pipeline. Rock excavation will be required for the pipeline regardless of route selected.

## **Comprehensive Plan Goals Met**

CFU 1.1 - Level of Service. CFU 1.2 - Operational Efficiency.

### Funding

		2023	2024	2025		2026		2027		2028	6 Year Total
Reserves	Integrated Capital Management	\$ 3,373,486 \$	3,373,486 \$	I	Ş		Ş	ı	Ş	ı	\$ 6,746,972
Total		\$ 3,373,486 \$	3,373,486 \$		Ş		Ş		ş		\$ 6,746,972
Spending											
		2023	2024	2025		2026		2027		2028	6 Year Total
Construction	Integrated Capital Management	\$ 3,373,486 \$	3,373,486 \$	ı	Ş	-	Ş	1	Ş		\$ 6,746,972
Total		\$ 3,373,486 \$	3,373,486 \$	I	Ş	I	Ş		ş		\$ 6,746,972

Havana Well								
Project Number:	WAT-2013-174		Budg	get Year:	202	3		
Project Type:	Source Wells and Booste	er Stations	Budg	get Stage:	Ado	pted Budget		
Year ldentified:	2013		Regi	:uo	Dist	rict 2		
<u>Description</u>								
This project will site, construction and will	develop, and connect a wel connect to the intermediat	l source to suppleme e pressure zone. The	nt the City?s second build	existing w ding is sch	ater system. eduled to beg	One building is in construction	currently in 2026 a	under nd will
connect to the low pr	essure zone.							
Project # 2019171								
<u>Justification</u>								
Currently the city?s w water as far, and incr	ells all lie in the north and ease system reliability and	eastern portions of th flexibility by not havir	ne City. This p ng all the wel	oroject wil Is in one l	l increase effi ocation in the	ciencies of oper City.	ration by r	lot pumping
Comprehensive Plar	n Goals Met							
CFU 1.2 - Operational wells. CFU 2.1 - Availa	Efficiency. The project wil ble Public Facilities. This p	l allow the water syst roject will allow the C	em to operat Jity to meet f	te more ef uture dem	ficiently by re nand without	educing pump d decreasing curr	listance fro rent level o	om current of service.
Funding								
		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Integrate	d Capital Management	\$ 2,000,000 \$	÷	۰ ک	5,000,000 \$	1,000,000 \$	I	\$ 8,000,000
Total		\$ 2,000,000 \$	۰ ۲	۰ ۲	5,000,000 \$	1,000,000 \$		\$ 8,000,000
Spending								
		2023	2024	2025	2026	2027	2028	6 Year Total
Construction Integrate	d Capital Management	\$ 2,000,000 \$	÷	ج	5,000,000 \$	1,000,000 \$	ı	\$ 8,000,000
Total		\$ 2,000,000 \$	\$ -	\$ -	5,000,000 \$	1,000,000 \$	I	\$ 8,000,000

5200-500 - Water Division

	verhouse #1
	#3 in Pov
Division	s #2 and
0 - Water I	Generator
5200-50	Rebuild

Budget Year: 2023	Budget Stage: Adopted Budget	Region: District 1	
WAT-2014-151	Water Maintenance	2014	
Project Number:	Project Type:	Year Identified:	Docoriation

### **Description**

Rebuilding of generators #2 and #3 in powerhouse #1 at Upriver Dam.

### **Justification**

These generators has not been rebuilt in over 30 years. This project will increase asset life while improving performance and power generation.

## **Comprehensive Plan Goals Met**

CFU 1.2 - Operational Efficiency. CFU 1.3 - Maintenance. CFU 6.5 - Infrastructure Maintenance.

### Funding

			2023	2024	202	25	2026		2027		2028	6 Year Total
Reserves	Water Division	Ş	I	\$ 1,000,000 \$	ı	Ş		Ş	I	Ş	I	\$ 1,000,000
Total		Ş		\$ 1,000,000 \$	•	Ş	•	Ş		Ş		\$ 1,000,000
Spending												
			2023	2024	202	25	2026		2027		2028	6 Year Total
Construction	Water Division	Ş	I	\$ 1,000,000 \$	ı	Ş		Ş	I	Ş	I	\$ 1,000,000
Total		Ş	I	\$ 1,000,000 \$	I	Ş	I	Ş	I	Ş	I	\$ 1,000,000

Project Type: Year Identifiec					19 Dund	et rear:		707	~			
Year Identified	Wate	er Maintenance			Budge	st Stage:		lopA	oted Bud	get		
	<b>i:</b> 2014				Regio	ü		Distı	ict 2			
<b>Description</b>												
Planning phase	e is pipe condit	ion assessment 2022, de	sign in 2023,	and replace	ement	t of a 30-	inch ste	sel tran	smission	line 2(	024.	
<u>Justification</u>												
The existing st	eel line is expo	sed and vulnerable to fa	lure. This pro	oject would	repla	ce the st	eel mai	n with a	a buried	ductile	iron pip	ē.
<u>Comprehensi</u> CFU 1.3 ? Mair	ve Plan Goals Itenance. CFU	Met 1.5 ? Utility Construction	Standards.									
Funding												
			2023	2024		2025	2	026	202	7	2028	6 Year Total
Reserves M	Vater Division	Ş	300,000 \$	2,000,000	\$ 1,0	\$ 000'0c	1	Ŷ	ı	Ŷ		\$ 3,300,000
Total		~	300,000 \$	2,000,000	\$ 1,0	\$ 000'00	ı	Ş		Ş	·	\$ 3,300,000
Spending												
			2023	2024		2025	7	026	202	~	2028	6 Year Tota
Design V	Vater Division	Ş	300,000 \$	I	Ŷ	۰ ک	ı	Ŷ	ı	Ŷ	I	\$ 300,000
Construction M	Vater Division		ı	2,000,000	1,0	000'00	ı.		I		I	3,000,000
Total		ŝ	300,000 \$	2,000,000	\$ 1,0	\$ 000'0C	I	Ş		Ŷ	·	\$ 3,300,000

5200-500 - Water Division

5200-500 - W	ater Division							
TJ Meenach I	Dr. Water Transmissi	on Main; E	Sridge to N	W Blvd				
Project Number:	WAT-2015-104		Bu	dget Year:	2023			
Project Type:	Water Mains		Bu	dget Stage:	Adop	ted Budget		
Year Identified:	2015		Re	gion:	Distr	ict 3		
<u>Description</u> Approximately 1,70	00 feet of 18 inch cast iron tran	ısmission main	will be replaced	with the str	eet project.			
<u>Justification</u> The roadway along	this section is being completed	ly reconstructed	d as part of othe	r city projec	ts, and this pr	oject will repl	ace the ag	ed 18-inch
cast iron line with a next 100 years or n	ı new ductile iron water main. ıore.	This will compl	ete the renewa	of the road	way system ar	ıd insure systı	em functio	onality for the
<u>Comprehensive P</u>	lan Goals Met							
CFU 1.2 - Operatior This project will ref	ial Efficiency. This project will i abilitate an existing capital fac	improve the op cility.	erational efficie	ոcy by reduc	ing required n	naintenance.	CFU 1.3 - I	Maintenance.
Funding								
		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Integra	ated Capital Management	\$ 865,000	ۍ - ډ	، ئ	ک	۰ ک	ı	\$ 865,000
Total		\$ 865,000	• •	۰ بې	ب	بې		\$ 865,000
Spending								
		2023	2024	2025	2026	2027	2028	6 Year Total
Construction Integra	ated Capital Management	\$ 865,000	\$ -	، ک	ک	۰ ک		\$ 865,000
Total		\$ 865,000	\$ •	۰ بې	۰ بې	۰ ج		\$ 865,000

5200-500 - Wa	ter Division							
Ray St., 11th to	o Hartson Ave, Ma	in Replacemen	t					
Project Number:	WAT-2015-115		Bud	get Year:	2023			
Project Type:	Water Mains		Budg	get Stage:	Adop	oted Budget		
Year Identified:	2015		Regi	on:	Distr	ict 2		
<u>Description</u> The 1936 steel water makes this project a g	main will be lined in lieu of çood candidate for lining.	being dug and recon	structed. Th	ere are chal	lenges with r	ight of way aı	nd topogra	phy which
<u>Justification</u> The existing transmiss condition.	sion main is in poor shape,	and at the end of its u	seful life. A	pipe assess	ment has be	en completed	to confirm	its
<u>Comprehensive Plar</u> CFU 1.3 - Maintenanc	<mark>n Goals Met</mark> e. CFU 3.2 - Coordination o	f Utility Installations.						
Funding								
		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Integrate	ed Capital Management	\$ 2,500,000 \$	\$ -	\$ -	\$ -	\$ -	I	\$ 2,500,000
Total		\$ 2,500,000 \$	۲	۰ ج	\$ -	\$ '	I	\$ 2,500,000
Spending								
		2023	2024	2025	2026	2027	2028	6 Year Total
Construction Integrate	d Capital Management	\$ 2,500,000 \$	۔ ج	ŗ	÷	۔ ک	ı	\$ 2,500,000
Total		\$ 2,500,000 \$	۰ ۲	۰ بې	۰ بې	۰ ۲	ı	\$ 2,500,000

5200-500 - Wa	ater Division											
<b>Post Street Br</b>	idge Water Main											
Project Number:	WAT-2015-121			BL	udget Yea	Ľ	2023					
Project Type:	Water Mains			BL	idget Sta	se:	Adop	oted Budg	et			
Year Identified:	2015			Re	gion:		Mult	iple				
Description An 18-inch water ma relocation associated crosswalk.	ain will be installed in the red d with the north and south t	construct oridge lan	ed Post Str dings as we	eet Bridge. ell as realigr	This proje iment of t	ect also the wat	included v erline in P	vater pip ost Street	eline co south	of the b	ons an ridge	d to the
<u>Justification</u> The Post Street Brid <sub>§</sub> the river at this poin	ge previously had a water m t would increase reliability a	ain in it, k ind redun	out long ag dancy of th	o became u ne downtow	nservicea 'n water s	ble. Re ystem.	establishn	nent of a	water c	connecti	ion act	SSO.
<u>Comprehensive Plá</u> CFU 1.2 - Operationá Installations. This is á	<mark>an Goals Met</mark> al Efficiency. The project cre an integrated project with o	ates a red ther infra	lundant dis structure c	itribution lir omponents	ie across t	the Spo	kane Rivel	CFU 3.2	- Coor	dination	of Ut	ility
Funding												
			2023	2024	2025		2026	2027		2028	6 Үеа	r Total
Reserves Integrat	ed Capital Management	\$ 1	°,000 \$	- \$	I	Ş	- Ş	I	Ş		Ş	10,000
Total		\$ 1	0,000 \$	۰ بې		Ŷ	÷	•	ş		Ş	10,000
Spending												
			2023	2024	2025		2026	2027		2028	6 Үеа	r Total
Construction Integrat	ed Capital Management	\$ 1	,0,000 \$	÷ ,	I	Ş	۔ ک	I	Ş	ı	Ş	10,000
Total		\$ 1	\$ 000'0	, Ŷ	ı	Ŷ	۰ بې		Ŷ	·	Ş	10,000

5200-500 - Wat	er Division							
Parkwater Pum	p and Motor Replac	cements						
Project Number:	WAT-2015-144		Bu	dget Year:	2023			
Project Type:	Water Maintenance		Bu	dget Stage:	Adopt	ed Budget		
Year Identified:	2015		Re	gion:	Distric	t 1		
<u>Description</u>								
Phased replacement of in 2020, Position 6 and	f old, worn out and inefficient 8 in 2021, Position 5 and 7 ir	t pumps and mo 1 2023, Position	tors for the v 1 & 3 in 202	water system. 5.	Pump and m	otor will be r	eplaced fo	r Position 4
<u>Justification</u> The existing pumps and and motors.	d motors have reached the er	nd of their usefu	l/efficient lif	e. They will be	replaced wit	.h more reliak	ole, efficie	nt pumps
<u>Comprehensive Plan</u>	<u>Goals Met</u>							
CFU 1.2 - Operational E	Efficiency. CFU 1.3 - Maintena	ance. CFU 6.5 - Ir	ıfrastructure	Maintenance.				
Funding								
		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Water Divi	ision \$	\$ 640,000 \$	\$ -	700,000 \$	- \$	\$ -	I	\$ 1,340,000
Total	<b>\$</b> ∥	\$ 640,000 \$	۰ ج	700,000 \$	۰ ۲	۔ ب	I	\$ 1,340,000
Spending								
		2023	2024	2025	2026	2027	2028	6 Year Total
Construction Water Divi	ision \$	\$ 640,000 \$	۔ ئ	700,000 \$	۔ ج	, Ş	ı	\$ 1,340,000
Total	Ş	\$ 640,000 \$	۰ بې	700,000 \$	۰ بې	۰ بې	ı	\$ 1,340,000

	Plan
	lities
vision	l Faci
er Div	apita
Wate	ter C
500 -	- Wa
200-	study

Project Number:	WAT-2016-17	Budget Year:	2023
Project Type:	Source Wells and Booster Stations	Budget Stage:	Adopted Budget
Year Identified:	2016	Region:	District 1

### **Description**

This analysis of the water system will determine where improvements are needed within the next 20 years as part of Link-Utilities and create a capital facilities plan.

Project #2017091

### **Justification**

This project is necessary to plan the appropriate improvements needed to keep the water system functioning as necessary.

## **Comprehensive Plan Goals Met**

CFU 2.2 - Concurrency Management System requires Capital Facility programs.

### Funding

			2023	2024		2025		2026		2027		2028	6 Ye	ar Total
Reserves	Integrated Capital Management	Ş	300,000 \$	ı	Ş		Ş	1	Ş		Ş		Ş	300,000
Total		Ş	300,000 \$	I	Ş		Ş	I	Ş	ı	Ş	ı	Ş	300,000
Spending														
			2023	2024		2025		2026		2027		2028	6 Ye	ar Total
Planning	Integrated Capital Management	Ŷ	300,000 \$	ı	Ş	ı	Ş	I	Ş	ı	Ş	ı	Ş	300,000
Total		Ŷ	300,000 \$	I	Ş	•	Ş	1	Ş	I	Ş	ı	Ş	300,000

5200-500	0 - Wate	r Division											
Whistalk	<mark>s Way T</mark>	ransmission Mai	n Rep	olacer	nent								
Project Num	iber:	WAT-2016-50				Bud	get Year:	2	023				
Project Type		Water Mains				Budg	get Stage	Α.	dopted Bu	ıdget			
Year Identifi	ied:	2016				Regi	:uo	Ω	istrict 3				
<u>Description</u> This project r construction.	replaces apr . This is an i	oroximately 3,500 feet of integrated project.	<sup>:</sup> 12-inch	ו distrib	ution aı	nd 1,000 fe	et of 18-i	nch transmi	ssion maii	ר cast ir	on pipe wi	th the street	
<u>Justification</u> These existin planning pha	<u>ו</u> 19 water ma 13e, the pipe	ins are cast iron built in 1 size and operations will	l967. Tł be anal	hese pip yzed to	oelines l determ	ikely would ine an opti	dn't surviv imized de	ve the const sign.	ruction of	the nev	w street. D	uring the	
<u>Comprehen</u> CFU 3.2 - Coc infrastructur	<u>nsive Plan G</u> ordination o e investmer	<u>ioals Met</u> of Utility Installation. This nt.	project	will be	constru	icted with	a street p	roject to rec	duce disru	ption ar	nd protect	the	
Funding													
				2023		2024	2025	2026	5(	127	2028	6 Year Total	
Reserves	Integrated C	apital Management.	ş		\$	Ŷ	1	\$ 50,000	\$ 400,(	\$ 000	100,000	\$ 550,000	
Total			ş		\$	Ŷ	1	\$ 50,000	\$ 400,(	\$ 000	100,000	\$ 550,000	
Spending													
				2023		2024	2025	2026	5(	127	2028	6 Year Total	
Design	Integrated C	apital Management	Ŷ	ı	\$	Ŷ	1	\$ 50,000	ۍ ۱	ዯ	I	\$ 50,000	
Construction	Integrated C	apital Management.			ı				400,(	000	100,000	500,000	
Total			Ş	1	÷ -	Ş		\$ 50,000	\$ 400,(	\$ 000	100,000	\$ 550,000	
5200-50	00 - Wat	ter Division											
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<b>1st Avei</b>	nue, Mo	onroe to Wall, Dist	ributio	n Mai	in Rep	lacem	ent						
Project Nur	mber:	WAT-2016-53				Budge	t Year:		2023				
Project Typ	e:	Water Mains				Budge	t Stage:	1	Adopted	Budget			
Year Identii	fied:	2016				Region	<u>.</u>		District 2				
<u>Descriptio</u> The project 12-inch. All	<u>n</u> : replaces c I pipe will t	ast iron distribution main c oe replaced with 12-inch pi	onstructe oe.	d in the (	early 190	0s with t	he street	t project.	Existin£	ç pipe sizes r	ange fro	m 10-inch	to
<u>Justificatio</u> The existing	<mark>on</mark> 3 cast iron	pipe will not likely survive t	he constru	uction of	the stre	et projec	نہ						
Comprehe CFU 3.2 ? Co infrastructu	insive Plan oordinatio ire investm	<u>I Goals Met</u> n of utility installations. Thi ent.	s project v	vill be cc	instructe	d with a	street pr	oject to r	educe d	isruption an	d protec	t the	
Funding													
			7	023	2024		2025	2026		2027	2028	6 Year Tot	<u>la</u>
Reserves	Integrate	d Capital Management	۔ خ	Ş	I	\$	Ş.	ı	Ş	5,000 \$	I	\$ 5,00	8
Total			۰ ۲	Ş		به	Ŷ	I	Ş	5,000 \$		\$ 5,00	8
Spending													
			2	023	2024		2025	2026		2027	2028	6 Year Tot	<u>le</u>
Planning	Integrate	d Capital Management	ې ۲	Ŷ	ı	Ŷ	Ŷ	ı	Ŷ	5,000 \$	,	\$ 5,00	8
Total			۰ ب	Ş	•	\$	\$	•	Ş	5,000 \$	ı	\$ 5,00	00

5200-500	) - Wate	er Division												
Napa Dis	tributio	on Replacement (	2nd t	o Spr	ague	(ö								
Project Num	ber:	WAT-2016-54				B	udget Yeaı		2023					
Project Type:		Water Mains				ā	udget Stag	ë	Adop	ted Budget				
Year Identifi	ed:	2016				Ř	egion:		Distri	ct 1				
<u>Description</u> The project n	eplaces 11	50 feet of 16-inch cast irc	on distril	bution I	nain tł	nat was co	onstructed	in 1895	5 as part o	f the street	construc	ction.		
Justification The existing p	pipe has re	ached its useful life and li	ikely wo	uld not	surviv	e the con	struction c	of the st	:reet proje	ct.				
<u>Comprehen:</u> CFU 3.2 - Util	<mark>sive Plan</mark> lity Installa	<u>Goals Met</u> tions in coordination with	ן public	street p	project	Ś								
Funding														
				2023		2024	2025		2026	2027	20	28 6	Year To	otal
Reserves	Integrated	Capital Management	Ŷ	ı	Ŷ	÷	ı	Ŷ	30,000 \$	300,000	1	Ŷ	330,C	000
Total			Ŷ		Ş	۰ ج	ı	\$ 	30,000 \$	300,000		Ş	330,0	000
Spending														
				2023		2024	2025		2026	2027	20	28 6	Year To	otal
Design	Integrated	Capital Management	Ŷ	ı	Ŷ	۰ ئ	I	Ŷ	30,000 \$	1	1	Ŷ	30,0	000
Construction	Integrated	Capital Management		т		ı	I		I	300,000	ı		300,0	000
Total			Ŷ		Ş	۰ بې	·	ş	\$ 000'08	300,000	'	Ŷ	330,0	000

5200-500	) - Wat	ter Division											
4th Aven	ue Dis	tribution Main Rep	olacei	nent	(Sunset	to N	1aple)						
Project Num	ber:	WAT-2016-56				Budg	et Year:	202	3				
Project Type:	••	Water Mains				Budg	et Stage:	Ado	pted Budg	et			
Year Identifi	ed:	2016				Regic	:"	Dist	rict 2				
<u>Description</u> This project n	eplaces 1	.,300 feet of cast iron distrik	oution n	nain with	the stree	t consti	uction. Tl	ne main was	originally o	constru	cted in	1893.	
<u>Justification</u> The cast iron	pipe has	reached the end of its usefu	ul life ar	oluow br	l not likely	survive	the stree	t constructio	n project.				
Comprehen	<u>sive Plan</u>	<u>Goals Met</u>		:									
CFU 3.2 - Util	lity Install	ations coordinated with str	eet con	structior	_								
9				2023	2024	_	2025	2026	2027		2028	6 Year T	otal
Reserves	Integrated	d Capital Management	Ŷ	- <sup>-</sup>		Ŷ	20,000 \$	200,000 \$		Ŷ		\$ 220,	000
Total			Ŷ	- -	ı	ş	20,000 \$	200,000 \$	ı	ş		\$ 22 <b>0</b> ,	000,
Spending				CLUC			JOJE	JEVE	2000		0000	T 2007 J	
Design	Integrated	d Capital Management	ۍ ا	\$ -		۰ م	20,000 \$	\$ -	-	Ŷ	-	\$ 20,	000
Construction	Integrated	d Capital Management		ı	I		ı	200,000	I		I	200,	000(
Total			Ś	י אי	ı	Ŷ	20,000 \$	200,000 \$	I	Ŷ		\$ 22 <b>0</b> ,	000

5200-500 - Wat	ter Division								
Water Facilities	s Backup Power Re	trofit							
Project Number:	WAT-2016-89			Buc	lget Year:	2023			
Project Type:	Water Maintenance			Buc	lget Stage:	Adop	ted Budget		
Year Identified:	2016			Re	çion:	Distri	ct 1		
<u>Description</u> Retrofitting of existing include an assessment	; water facilities with backu : study of existing power an	o power disc d communic	connec	t and/or on s to prioritize	ite backup ge upgrades and	nerators at w emergency a	vater departn action plannir	nent facilit. Ig.	ies. This shall
<u>Justification</u> Backup power generat and communication w	tors or a backup power disc ith facilities during power e	onnect for p mergencies.	ortabl	e generators	are necessary	' at water fac	ilities to ensu	ıre water d	listribution
Comprehensive Plan CFU 1.2 - Operational I	<u>Goals Met</u> Efficiency CFU 1.5 - Utility C	onstruction	Standa	ards. CFU 6.5	- Infrastructu	re Maintenaı	nce.		
Funding									
		202	ŝ	2024	2025	2026	2027	2028	6 Year Total
Reserves Water Div	ision	÷ ج	Ş	200,000 \$	100,000 \$	100,000 \$	100,000 \$	100,000	\$ 600,000
Total		¢ -	Ş	200,000 \$	100,000 \$	100,000 \$	100,000 \$	100,000	\$ 600,000
Spending									
		202	3	2024	2025	2026	2027	2028	6 Year Total
Construction Water Div	vision	- \$	Ş	200,000 \$	100,000 \$	100,000 \$	100,000 \$	100,000	\$ 600,000
Total		\$	Ŷ	200,000 \$	100,000 \$	100,000 \$	100,000 \$	100,000	\$ 600,000

Well Electric V	Vell Station Update							
Project Number:	WAT-2016-94		Bı	udget Year:	202	13		
Project Type:	Source Wells and Booste	r Stations	Bı	udget Stage:	Add	opted Budget		
Year Identified:	2016		Re	gion:	Dis	trict 1		
<u>Description</u>								
The Well Evaluation improving the reliabl construction.	Study determined that a nev e capacity and augmenting y	v vertical well field /ields. This project	on the Well funds the in	Electric Well vestigation n	Station prop eeded to cor	berty will meet t istruct a new we	he objecti ell station	ves of and the
<u>Justification</u>								
The deep sand layer the likelihood of indu was drilled, a second	discovered beneath the Wel ucing nearby river water, esp bore hole needs to be drille	l Electric Well Stati becially during peric ed and tested to cou	on creates a ods of high r nfirm the ca	n opportunit iver flow and aability of the	y to install d increase cap e a new well	eeper wells in th acity. Because c field.	ie aquifer only one b	to minimize ore hole
<b>Comprehensive Pla</b>	n Goals Met							
CFU 1.2 - Operationa Maintenance. This p	l Efficiency. This project will roject will	l improve the opera isting capital facilit	ational effici y.	ency by redu	cing required	d maintenance. (	CFU 1.3 -	
Funding								
		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Integrate	ed Capital Management	\$ 1,250,000 \$	500,000 \$	5,000,000 \$	8,000,000 \$	; 5,000,000 \$	ı	\$ 19,750,000
Total		\$ 1,250,000 \$	500,000 \$	5,000,000 \$	8,000,000 \$	\$ 2,000,000 \$	ı	\$ 19,750,000
Spending								
		2023	2024	2025	2026	2027	2028	6 Year Total
Construction Integrate	ed Capital Management	\$ 1,250,000 \$	500,000 \$	5,000,000 \$	8,000,000 \$	5,000,000 \$	ı	\$ 19,750,000
Total		\$ 1,250,000 \$	500,000 \$	5,000,000 \$	8,000,000 \$	\$ 2,000,000 \$	ı	\$ 19,750,000

Ray Street We	ll Station Update								
Project Number:	WAT-2016-95		Bud	get Year:	C	:023			
Project Type:	Source Wells and Booste	r Stations	Budg	get Stage:	4	Adopted Bu	dget		
Year Identified:	2016		Regi	:uo		District 2			
<u>Description</u> Upgrades to Ray Stree currently only has one	et Well Station will include e e pump. The power system	extending existing pu will also be upgrade	mp intakes d	leeper int	o the aquif	er and addi	ng a pur	np to We	ll 2, which
Project #2018101									
<u>Justification</u> Upgrading the wells v	vill help maintain the well st	tation capacity in late	e summer mo	onths and	during dro	ught condit	ions wit	h the sea	sonal
variations in aquifer l	evels. Upgrading the power	r system will increase	e resiliency of	the well	station.				
Comprehensive Plai CFU 1.2 - Operational Maintenance. The pr	n Goals Met Efficiency. Project will imp oject upgrades the existing	rove the operational well by lowering inta	efficiency by kes and addi	/ making I ng a pum	nore water p.	available c	luring dr	ought. Cl	-U 1.3 -
Funding									
		2023	2024	2025	2026	20	27	2028	6 Year Total
Reserves Integrate	ed Capital Management	\$ 2,500,000 \$	- Ş	-	-	÷ \$	Ş	I	\$ 2,500,000
Total		\$ 2,500,000 \$	۰ ۲	1	'	۰ ک	Ş	I	\$ 2,500,000
Spending									
		2023	2024	2025	2026	20	27	2028	6 Year Total
Construction Integrate	ed Capital Management	\$ 2,500,000 \$	۔ ج	1	1	۔ خ	÷	ı	\$ 2,500,000
Total		\$ 2,500,000 \$	, v	1		\$	Ŷ		\$ 2,500,000

5200-500 - W;	ater Division							
Marshall Road	d from Thorpe to Qu	ualchan Trar	nsmission <b>[</b>	Main				
Project Number:	WAT-2016-96		Bud	get Year:	202	53		
Project Type:	Water Mains		Bud	get Stage:	Pd	opted Budget		
Year Identified:	2016		Reg	ion:	Dis	trict 2		
<u>Description</u> A secondary transm Qualchan Drive.	ission will be constructed fro	m the Low Pressu	ıre Zone transm	ission mai	ר located in T	horpe Road to	transmissi	on main in
<u>Justification</u> Current only transm be shut down to the this area.	iission main services the soutl e area. The additional transm	hwest portion of ission main is req	the service area luired for redun	. Mainter dancy and	ance activiti provide addi	ss on this mair tional capacity	i require wa to serve cu	ater service Istomers in
Comprehensive Pli CFU 1.2 - Operationa	<mark>an Goals Met</mark> al Efficiency. This project will	improve the oper	rational efficien	cy by redu	cing required	maintenance		
Funding				1000				
Reserves Integrat	ted Capital Management	\$ 8,000,000 \$	3.050.000 \$		0707 ,	\$ - \$	2020 7	\$ 11,050,000
Total		\$ 8,000,000 \$	3,050,000 \$	\$	1	- \$		\$ 11,050,000
Spending				3035	9000	FCOC		
Construction Integrat	ted Capital Management	\$ 8,000,000 \$	3,050,000 \$	\$ 777			- -	\$ 11,050,000
Total		\$ 8,000,000 \$	3,050,000 \$	۰ ۲	1	-		\$ 11,050,000

· Division	e St to Browne St
00-500 - Wa	ain Ave, Moi
520(	Mai

Project Number:	WAT-2017-21	Budget Year:	2023
Project Type:	Water Mains	Budget Stage:	Adopted Budget
Year Identified:	2017	Region:	District 2

### **Description**

Replace 12-inch distribution main and associated service laterals along the Main Avenue with street project.

## **Justification**

The existing 12-inch cast iron water main was installed in 1902. The main and services may be damaged during the street improvement work. The pipe will be evaluated to determine if a larger size is necessary for future demands in the area.

# **Comprehensive Plan Goals Met**

CFU 3.2 - Utility installation in coordination with public street construction.

### Funding

			2023		2024		2025		2026	2027	2028	6 Year Total
Reserves	Integrated Capital Management	Ŷ	ı	Ş	I	Ş	ı	Ŷ	150,000 \$	500,000 \$	1,000,000	\$ 1,650,000
Total		Ŷ		Ş		Ş	•	Ş	150,000 \$	500,000 \$	1,000,000	\$ 1,650,000
Spending												
			2023		2024		2025		2026	2027	2028	6 Year Total
Design	Integrated Capital Management	Ş	T	Ş	ı	Ş	ı	Ş	150,000 \$	\$ -	I	\$ 150,000
Construction	Integrated Capital Management		ī		ī		ı		ı	500,000	1,000,000	1,500,000
Total		Ş	•	Ş	I	Ş	ı	Ş	150,000 \$	\$ 000'00S	1,000,000	\$ 1,650,000

5200-500 - Wat	ter Division								
Riverside Ave,	<b>Monroe to Divisior</b>								
Project Number:	WAT-2017-22		B	udget Year:	20	123			
Project Type:	Water Mains		B	udget Stage:	Ac	lopted Budg	et		
Year Identified:	2017		R	egion:	Di	strict 2			
<b>Description</b>									
Remove and replace t to include replacemen	he existing 10-inch cast iron It of associated galvanized v	main with 12- vater service la	inch line betwe terals. This is a	en Bernard a n integrated	nd Division project.	along the C	entral Cit	y Line r	oute. Work
<u>Justification</u>		-	-	-	=	-	-	-	
This project will be int 100 years old.	egrated into the planned Ki	verside Avenue	e street improv	ement projec	t and will re	place main	and later	als that	are over
<u>Comprehensive Plan</u>	i Goals Met								
CFU 3.2 ? Coordinatio	n of utility installations.								
Funding									
		2023	2024	2025	2026	2027		2028 (	Year Total
Reserves Integrated	d Capital Management	\$ 50,000	\$ - \$	۰ ج	ı	¢ '	\$ '	- S	50,000
Total		\$ 50,000	\$ - \$	۰ ۲	·	\$ '	ج	÷	50,000
Spending									
		2023	2024	2025	2026	2027		2028	i Year Total
Construction Integrated	d Capital Management	\$ 50,000	\$ - \$	۰ ک	·	¢ '	Ŷ	÷.	50,000
Total		\$ 50,000	\$ - \$	۰ ۲		¢.	بې		50,000

<b>Riversid</b>	e Ave,	Monroe St to Wall	St.							
Project Num	ıber:	WAT-2017-24				3udget Year:	202	23		
Project Type		Water Mains				3udget Stage:	Ad	opted Budget		
Year Identifi	ied:	2017				Region:	Dis	trict 2		
<u>Description</u> The existing replacement	8-inch ca	st iron main between Monr ated galvanized water servi	oe and W ice latera	/all Stree	t will be rer an integrat	noved and rep ed project.	laced with a	12-inch pipe.	Work to in	clude
<u>Justificatior</u> This project <sup>1</sup> 100 years old	ם will be int d and wou	egrated into the planned Ri uld have a high probability c	iverside <i>A</i> of damag	venue st e during :	creet impro street cons	vement projec rruction.	t and will re <sub>l</sub>	place main an	d laterals th	hat are over
<u>Comprehen</u>	<u>ısive Plan</u>	<u>ı Goals Met</u>								
CFU 3.2 ? Co	ordinatio	n of utility installations.								
Funding										
				2023	2024	2025	2026	2027	2028	6 Year Total
Reserves	Integrate	d Capital Management	- \$	Ş	1	\$ 110,000 \$	100,000	\$ 1,000,000 \$	-	\$ 1,210,000
Total			\$	Ş	I	\$ 110,000 \$	100,000	\$ 1,000,000 \$	-	\$ 1,210,000
Spending										
				2023	2024	2025	2026	2027	2028	6 Year Total
Design	Integrate	d Capital Management	ې ۲	Ŷ	1	\$ 110,000 \$	1	· ·	1	\$ 110,000
Construction	Integrate	d Capital Management	I		ı	ı	100,000	1,000,000	ı	1,100,000
Total			\$ 	Ş		\$ 110,000 \$	100,000	\$ 1,000,000 \$	'	\$ 1,210,000

5200-500	) - Wat	er Division										
Freya St	Transm	ission Main, Garl	and A	we to	Francis	Ave						
Project Num	ber:	WAT-2017-26				Budg	et Year:	2(	123			
Project Type		Water Mains				Budg	et Stage:	Ā	dopted Budge	t		
Year Identifi	ed:	2017				Regic	:uc	D	istrict 1			
<u>Description</u> A new 30-inc Wellesley wil	ch transmis Il be replac	ssion main will be installec ced as part of full depth rc	d betwe	en Welles reconstru	sley and Fr ction road	ancis, a lway pr	and an ex oject bet	isting 30-inc ween Garlaı	h steel line be and Francis	etween Ga S.	irland	and
<u>Justification</u> This project i integral impr	s part of c	ity's effort to encourage b for meeting the needs of f	uusiness uture bu	developr usiness.	nent in 'Th	ie Yard	s' develop	ment zone.	The transmis	sion main	d lliw	an
Comprehen CFU 1.2 - Opt This project v cost.	<mark>sive Plan</mark> erational E vill rehabil	Goals Met Efficiency. This project will litate an existing facility. C	improv CFU 3.2 -	e operati	onal efficie stallation.	ency by This pr	reducing oject will	required m be construe	aintenance. C cted with a sti	.FU 1.3 - N eet projec	1ainte ct to re	nance. educe
Funding				2023	2024		2025	2026	2027	20	28 6	Year Total
Reserves	Integrated	Capital Management	Ŷ	\$   	1	\$ 1,(	30,000 \$	2,050,000	\$ 2,000,000	\$	ŝ	5,080,000
Total			Ŷ	۰ ب	I	\$ 1,(	30,000 \$	2,050,000	\$ 2,000,000	۰ ج	ŝ	5,080,000
Spending				2023	2024		2025	2026	2027	20	28 6	Year Total
Design	Integrated	Capital Management	Ŷ	- -	ı	۰. ۲	\$ 000'009		۔ ج	۔ ج	ŝ	500,000
Construction	Integrated	Capital Management		I	ı	2,	30,000	2,050,000	2,000,000	ı		4,580,000
Total			Ŷ	۰ ۲	ı	\$ 1,(	30,000 \$	2,050,000	\$ 2,000,000	۰ ج	Ŷ	5,080,000

5200-500 - Wa	ater Division								
<b>SIA Transmiss</b>	ion Line Crossing U	Inder I-90							
Project Number:	WAT-2017-27		Bud	get Year:		2023			
Project Type:	Water Mains		Bud	set Stage:		Adoptec	l Budget		
Year Identified:	2017		Regi	:uo		District	2		
<b>Description</b>									
Construct approxima Reservoirs. This incl	ately 3,200 feet of 30-inch d udes a section under Interst	luctile iron water 1 ate-90 in carrier p	transmission pipe pipe.	eline conn	ecting th	e new Plá	ains Boost(	er Station t	o SIA
<u>Justification</u> This project will con 30-inch line.	nect booster stations to the	SIA reservoir. The	e existing 18-inch	will rema	in in serv	ice to wo	ırk in conjı	unction wit	h the new
<u>Comprehensive Pla</u>	<u>an Goals Met</u>								
CFU 1.2 - Operationa Public Facilities. Con	al Efficiency. This project will struction of this project will	ll improve the ope provide adequate	erational efficienc e infrastructure a	sy by redu t the time	cing requ of develo	ired maiı opment.	ntenance.	CFU 2.1 - /	wailable
Funding									
		2023	2024	2025	202	9	2027	2028	6 Year Total
Debt Integrat	ed Capital Management	\$ 2,000,000 \$	3,000,000 \$	۰ ک	1	Ş	- Ş	I	\$ 5,000,000
Total		\$ 2,000,000 \$	\$ 3,000,000 \$	۰ ک	1	ş	۰ ۲	I	\$ 5,000,000
Spending									
		2023	2024	2025	202	9	2027	2028	6 Year Total
Construction Integrat	ed Capital Management	\$ 2,000,000 \$	3,000,000 \$	۰ ۲	1	Ş	۰ ک	ı	\$ 5,000,000
Total		\$  2,000,000  \$	\$ 3,000,000 \$	۰ ک	1	Ŷ	۰ ۲	·	\$ 5,000,000

5200-500 - Wa	iter Division								
Assessment of	f Existing Pipes								
Project Number:	WAT-2017-34			Buc	dget Year:	2023			
Project Type:	Water Mains			Buc	dget Stage:	Adop	oted Budget		
Year Identified:	2017			Re	gion:	Distr	ict 1		
<u>Description</u>		4+ 00				li +aconoc			
	ווווושושה הו השלוק ושווח לופ	ווה חווה	CONTRACTION		in wileli lepio		ne liecessai y.		
<u>Justification</u>									
Many pipes within th condition may not re	ie water system have been id quire replacement for many '	lentifie years.	ed as a pote This proje	ential risk base ct is a proactiv	d on age, ma 'e approach t	terial, and cr o determine	itical users; ho if these suspe	owever, th ct water p	e actual pipe ipes need
repair or replacemen needed. Pipelines as Trent; NSC at I-90 wit	it. Several methods of pipe ir sociated with integrated proj th Thor & Freya; 4th Ave from	nspect jects v n Suns	ion may be vill be the f	used to deter irst focus. The e; Broadway &	mine the curr first assessm Mallon west	ent conditio ents identifi of Monroe;	in and evaluat ed are: Havan Main Ave fror	e what act a from Spr n Monroe	ions are ague to to Brown.
Comprehensive Pla	n Goals Met								
CFU 1.3 - Maintenand with a street project	ce. This project will rehabilita to reduce disruption and pro	ite an tect th	existing cap าe infrastru	oital facility. CF cture investm	:U 3.2 - Utility ent.	Installation	. This project v	vill be con	structed
Funding									
			2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Integrate	ed Capital Management	ŝ	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000	\$ 1,500,000
Total		\$	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000	\$ 1,500,000
Spending									
			2023	2024	2025	2026	2027	2028	6 Year Total
Construction Integrate	ed Capital Management	ŝ	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000	\$ 1,500,000
Total		ŝ	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000	\$ 1,500,000

Division	
Water [	
- 200 -	I
5200	(

# Dump Truck

Project Number:	WAT-2017-92	Budget Year:	2023
Project Type:	Vehicles and Equipment	Budget Stage:	Adopted Budget
Year Identified:	2017	Region:	District 1
Dacrintion			

### **Description**

Replacement of 6 wheel dump truck

## **Justification**

Current dump truck is past its useful life and unsuited for the current use. The existing dump truck condition is to the point where repair and maintenance costs are greater than justifiable and its replacement is required for operation safety in towing and operation.

# **Comprehensive Plan Goals Met**

CFU 1.3 - Maintenance. CFU 6.5 - Infrastructure Maintenance.

### Funding

			2023		2024	2025	2026	2027	2028	6 Year Total
Reserves	Water Division	Ş	1	Ş	350,000 \$	350,000 \$	\$ -	375,000 \$		\$ 1,075,000
Total		Ş	1	Ş	350,000 \$	350,000 \$	\$ -	375,000 \$	•	\$ 1,075,000
Spending										
			2023		2024	2025	2026	2027	2028	6 Year Total
Purchases	Water Division	Ş	1	Ş	350,000 \$	350,000 \$	\$ -	375,000 \$	I	\$ 1,075,000
Total		Ŷ	1	ŝ	350,000 \$	350,000 \$	۰ ک	375,000 \$	ı	\$ 1,075,000

5200-50	0 - Wat	ter Division											
<b>1st Aver</b>	nue, Mi	aple to Monroe, Di	istribu	Ition	Maiı	n Repl	aceme	nt					
Project Nun	nber:	WAT-2017-117				Bu	Idget Yea	Ľ	2023				
Project Typ	e:	Water Mains				Bu	idget Stag	;e:	Adop	ted Budget			
Year Identif	fied:	2017				Re	gion:		Distri	ct 2			
<u>Descriptior</u> The project inch to 12-ir	<u>1</u> replaces c nch. All piț	ast iron distribution main c oe will be replaced with 12 <sup>.</sup>	onstruct -inch pip	ed in t e. Cor	he early. Istructic	y 1900s w on will oc	/ith the st cur in 202	reet co :8, cost	instruction. s will show	. Existing pipe up in that yea	sizes ran r.	ge from 1	Ģ
<u>Justificatio</u> The existing	<u>n</u> 5 cast iron j	oipe will not likely survive t	he const	ructio	n of the	street pr	oject. Fur	ıding sl	hown for th	nis project is fo	r design	only.	
Comprehel CFU 3.2 ? Co infrastructu	<u>nsive Plan</u> oordinatio re investm	l <u>Goals Met</u> n of utility installations. Th ent.	is projec	t will t	je const	ructed w	ith a stree	et proje	ect to reduc	ce disruption a	nd prote	ct the	
Funding													
				2023		2024	2025		2026	2027	2028	6 Year Tc	otal
Reserves	Integrate	d Capital Management	Ş	1	\$ \$	Ş.	ı	Ş	- Ş	5,000 \$	I	\$ 5,(	000
Total			Ŷ	1	ج	Ŷ	ı	Ş	÷	5,000 \$		\$ 5,(	000
Spending													
				2023		2024	2025		2026	2027	2028	6 Year Tc	otal
Planning	Integrate	d Capital Management	Ş		Ş	Ş.	ı	Ş	- \$	5,000 \$	I	\$ 5,(	000
Total			Ş		Ş	\$ -		Ş	- \$	5,000 \$		\$ 5,(	000

5200-50	0 - Wat	er Division											
<b>1st Aver</b>	nue, Wa	Il to Bernard, Dist	cributi	on Ma	ain Re	placer	nent						
Project Nun	nber:	WAT-2017-118				Budg	et Year:		2023				
Project Typ	e:	Water Mains				Budg	et Stage:		Adopte	d Budget			
Year Identif	ied:	2017				Regic	:u		District	2			
<u>Descriptior</u> The project to 12-inch.	<mark>1</mark> replaces ca All pipe wil	ist iron distribution main c l be replaced with 12-inch	onstruct pipe.	ed in ear	'ly 1900s	along w	ith the st	reet proje	ect. Exist	ing pipe size	is range 1	rom 10-ii	nch
<u>Justificatio</u> The existing	<u>n</u> cast iron p	iipe will not likely survive t	he const	ruction o	of the str	eet proje	ect.						
<u>Compreher</u> CFU 3.2 ? Cc infrastructur	nsive Plan oordinatior re investm	<u>Goals Met</u> i of utility installations. Th ent.	is projec	t will be	construc	ted with	a street	project to	o reduce	disruption ar	nd prote	ct the	
Funding													
				2023	202	14	2025	20:	26	2027	2028	6 Year To	otal
Reserves	Integrated	Capital Management	Ş	- Ş	I	Ş	1	1	Ş	5,000 \$	I	\$ 5,	000
Total			Ş	\$ -		Ş	·	1	Ş	5,000 \$	ı	\$ 5,	000
Spending													
				2023	202	14	2025	20:	26	2027	2028	6 Year To	otal
Planning	Integrated	Capital Management	Ş	- Ş	ı	Ş	1	1	Ş	5,000 \$	I	\$ 5,	000
Total			Ŷ	\$ -	•	Ş	• <b>•</b> •	'	Ŷ	5,000 \$	ı	\$ 5,	000

5200-500	- Water	Division										
Mallon A	venue, N	<b>Aonroe to Howa</b>	Ind M	lain F	Repla	cemer	٦t					
Project Numb	er: W	'AT-2018-34				Bu	idget Year:	202	23			
Project Type:	Ň	'ater Mains				Bu	idget Stage:	Adc	opted Budget			
Year Identifie	<b>d:</b> 20	)18				Re	gion:	Dis	trict 3			
<u>Description</u> The existing w	ʻater distribu	ution mains will be repl	aced wit	th 12-in	าch duc	tile iron v	vater pipe as	part of the s	street constru	ction proj	ject.	
<u>Justification</u> The existing w 1918. A larger	/ater cast iro	in pipes in this section f installed for future gro	Vallon	Avenue	are un	likely to s	urvive constr	ruction. The	e 8-inch wate	r main wa	is inst	alled in
Comprehensi	ive Plan Go	<u>als Met</u>										
CFU 1.3 - Mair with a street p	ntenance. Th oroject to rec	iis project will rehabilit: duce disruption and pro	ate an e: otect the	xisting e infras	capital tructur	facility. C e investm	:FU 3.2 - Utili ìent.	ty Installatio	n. This projec	t will be c	onstr	ucted
Funding												
				2023		2024	2025	2026	2027	202	8	Year Total
Reserves	ntegrated Cap	oital Management	Ş	1	ş	\$ -	30,000 \$	200,000 \$	\$ 200,000 \$	-	Ş	430,000
Total			Ş		Ş	\$ -	30,000 \$	200,000 \$	\$ 200,000	-	Ş	430,000
Spending												
				2023		2024	2025	2026	2027	202	8	Year Total
Design	ntegrated Caμ	oital Management	Ŷ	I	Ś	۰ ئ	30,000 \$	1	-	1	Ŷ	30,000
Construction l	ntegrated Caμ	oital Management			·		ı	200,000	200,000	ı		400,000
Total			Ş		Ş	\$ -	30,000 \$	200,000 \$	\$ 200,000	-	Ş	430,000

5200-50(	) - Water Division													
27th Ave	nue, SE Blvd to Ra	y St, Ma	in R	epla	cem	lent								1
Project Num	<b>ber:</b> WAT-2018-35						Budget Ye	ear:	202	ŝ				
Project Type	: Water Mains						Budget St	age:	Ado	pted Budge				
Year Identifi	ed: 2018						Region:		Dist	rict 2				
<u>Description</u> An 8-inch wa project.	ter main will be installed fr	om Ray to Fi	iske S	treet t	io con	nect the	existing d	istribut	ion piping a	is part of the	e street c	onstr	uction	
<u>Justification</u> Connecting t	he gap in the distribution p	iping will im	prove	the n	etwor	k and fu	ture conn	ections.						
<u>Comprehen</u> CFU 2.1 ? Avi	<u>sive Plan Goals Met</u> ailable Public Facilities. Cor	nstruction of	<sup>t</sup> this	projec	t will <sub>F</sub>	orovide a	adequate i	nfrastru	ucture at th	e time of de	velopme	nt.		
Funding														
				2023		2024	20:	25	2026	2027	2(	128	6 Year Total	I
Reserves	Integrated Capital Manageme	ent \$		-	Ş	ı	- \$	Ş	25,000 \$	175,000	- \$	0,	200,000	
Total		\$		1	Ş	•	\$ -	Ş	25,000 \$	175,000	\$	Vr	200,000	
Spending				2023		2024	20	25	2026	2027	5	128	6 Year Total	
Design	Integrated Capital Manageme	ent \$			Ŷ	1	÷ خ	Ŷ	25,000 \$	'	۔ ج		25,000	
Construction	Integrated Capital Manageme	ent		-		I	ı		I	175,000			175,000	
Total		Ş			Ş	·	- \$	Ş	25,000 \$	175,000	- \$	v,	200,000	

5200-500 - Wé	ater Division									
<b>Spokane Falls</b>	Blvd, Post to Divis	ion St	reet <b>N</b>	<u> </u>	Replace	ement				
Project Number:	WAT-2018-37				Bud	get Year:	20	23		
Project Type:	Water Mains				Bud	get Stage:	Ad	opted Budget		
Year Identified:	2018				Regi	ion:	Dis	trict 2		
<u>Description</u> The existing 16-inch This is an integrated	water transmission mains v project.	vill be re	placed v	vith 18	inch ductil	e iron watı	er pipe as pa	rt of the road o	construction	η project.
<u>Justification</u> The existing water ci installed in 1891.	ast iron pipes in this section	Spokan	e Falls B	ouleva	rd are unlik	ely to surv	ive construc	tion. The 16-in	ch water m	lain was
<u>Comprehensive Pla</u> CFU 1.3 - Maintenan with a street project	in Goals Met ce. This project will rehabili to reduce disruption and p	tate an e rotect th	existing (	capital tructur	facility. CFI e investme	J 3.2 - Utili nt.	ty Installatic	n. This project	will be con	structed
Funding										
Reserves Integrat	ed Canital Management	v	<b>5202</b> '		<b>2024</b>	¢ (707		\$ 1 500 000 \$		
Total		~   v			+ + + + + + + + + + + + + + + + + + +	-	200,000	\$ 1,500,000 \$	500,000	\$ 2,200,000
Spending			ς.υς			207E	3606	LCOC	0CUC	letoT reo 2
Design Integrat	ed Capital Management	ş	C707	\$		\$ -	200,000	\$ - \$		\$ 200,000
Construction Integrat	ed Capital Management		ı		ı	ı	ı	1,500,000	500,000	2,000,000
Total		Ş	ı	Ş	÷	- \$	200,000	\$ 1,500,000 \$	500,000	\$ 2,200,000

5200-50(	0 - Wa	ter Division												
Havana (	Street,	, Sprague to Broad	way /	Aven	ue N	1ain R	eplace	emen	t					
Project Num	iber:	WAT-2018-39				-	Budget <b>\</b>	/ear:		2023				
Project Type		Water Mains				_	Budget S	tage:		Adopt	ed Budget			
Year Identifi	ied:	2018				-	Region:			Distric	t 1			
<u>Description</u> The 48-inch : pipe from 19	l steel trar )64 may t	ısmission main for the Low oe necessary. The pipe will ŀ	Pressur <sup>i</sup> Je asses	e Zone sed to	will be deterr	e replace	d with tł ill replac	iis proje ement i	ect. In ac s necess	ldition ary. T	repair of th his is an inte	e 8-inch d grated pro	istribı oject.	ution
Justificatior This segmen installed in 1 entire 2700 f	<u>1</u> It of Hava 1929 and feet of pi	na Street has 3 transmissio is expected to need replace pe needs replacement. Pip	n mains :ment w e assess	. Two i ith the	of thes street s planr	se main h : project. 1ed to be	ave bee This piț gin 2022	n replac Je is a ci 2.	ced. The	e rema	ining 48-inch sessment to	ı steel mai determin	in was e if th	e e
Comprehen	<u>isive Plar</u>	n Goals Met												
CFU 1.3 - Ma with a street	aintenanc t project t	e. This project will rehabilit to reduce disruption and pr	ate an ∈ otect th	e infra	capita structu	al facility. Ire invest	. CFU 3.2 tment.	: - Utilit <sub>y</sub>	/ Installa	ition. T	his project v	vill be con	struct	ed
Funding														
				2023		2024	2(	025	202	ر	2027	2028	6 Ye	ar Total
Reserves	Integrate	d Capital Management	Ŷ	ı	Ŷ	- 1	۔ ج	Ŷ	'	ş	70,000 \$	145,000	Ş	215,000
Total			Ş		Ş		- \$	Ş	•	Ş	70,000 \$	145,000	Ś	215,000
Spending														
				2023		2024	21	025	202	5	2027	2028	6 Ye	ar Total
Design	Integrate	ed Capital Management	Ŷ	I	Ŷ	1	Ŷ	Ŷ	ı	Ŷ	70,000 \$	I	Ŷ	70,000
Construction	Integrate	d Capital Management		ı		I	I		'		I	145,000	•••	145,000
Total			Ŷ	ı	Ŷ	1	, \$	Ŷ		Ŷ	70,000 \$	145,000	ŝ	215,000

5200-500 -	- Water Division								
Wellesley	Avenue, Freya to Hav	ana Stro	eet Ma	in Replac	cement				
Project Numbe	<b>г:</b> WAT-2018-43			Bu	dget Year:	2023			
Project Type:	Water Mains			Bu	dget Stage:	Adopt	ed Budget		
Year Identified.	: 2018			Re	gion:	Distric	t 1		
<u>Description</u> The existing wa	iter distribution mains will be re	olaced with	12-inch	ductile iron w	ater pipe as p	art of the stre	et constructio	n project	
<u>Justification</u> The existing wa inch water mair	iter cast iron pipes in this section n to the east was installed in 199	Wellesley 8 and is e	/ Avenue \ kpected to	vill be upgrac be in good c	led to a 12-in ondition.	ch water main	west of Rebe	cca Stree	t. The 12-
<u>Comprehensiv</u>	<u>ve Plan Goals Met</u>								
CFU 1.2 - Opera This project will	ational Efficiency. This project wi I rehabilitate an existing capital	ll improve acility.	the opera	itional efficie	ոcy by reducir	ıg required ma	aintenance. Cl	<sup>=</sup> U 1.3 - N	laintenance
Funding									
			2023	2024	2025	2026	2027	2028	6 Year Total
Reserves	tegrated Capital Management	م	Ŷ	70,000 \$	500,000 \$	200,000 \$	۰ ئ		\$ 770,000
Total		به	Ŷ	70,000 \$	500,000 \$	200,000 \$	۰ ۲	•	\$ 770,000
Spending									
			2023	2024	2025	2026	2027	2028	6 Year Total
Design In:	tegrated Capital Management	Ŷ	Ŷ	70,000 \$	۰ ک	۰ ئ	۰ ک	ı	\$ 70,000
Construction In	tegrated Capital Management			ı	500,000	200,000			700,000
Total		\$	\$ -	70,000 \$	500,000 \$	200,000 \$	- \$	•	\$ 770,000

5200-500	0 - Wa	ter Division											
Thor and	l Freya	a, Hartson to Sprag	ue A	venue W	ater Upg	rades							
Project Num	ıber:	WAT-2018-44			Bud	get Year:		2023					
Project Type		Water Mains			Bud	get Stage		Adop	ted Budge	ىد			
Year Identifi	ied:	2018			Reg	ion:		Multi	ple				
<u>Description</u> The project in replacement	includes u	upsizing the transmission me ater line in Freya (3rd to Ha	ain on rtson)	Thor (3rd to l . This is an in	Hartson) and tegrated proj	Hartson. ect.	Additi	onally, the	e project in	icludes	in kinc		
<u>Justification</u> The street co pavement. L	ם onstructic Upgrades	on is planned to be concrete will be in conjunction with i	for T the st	hor and Freya reet project.	for this proje	ct. Utilit	ies nee	id to be up	ograded fo	r the lif	e of th	e concre	ete
Comprehen	<u>ısive Plaı</u>	n Goals Met											
CFU 3.2 - Coc	ordinatio	n of Utility Installations.											
Funding													-
			-	2023	2024	2025	-	2026	2027		2028	6 Year T	otal
Keserves	Water DI	VISION	ጉ	300,000 \$	ሉ '	ı	ጉ	· ۲	ı	' ጉ			000
Reserves	Integrate	ed Capital Management		500,000	ı	·		-	ı	'		500	000,
Total			Ŷ	800,000 \$	÷		Ş	۰. ۲		\$		\$ 800	000,
Spending													
				2023	2024	2025		2026	2027		2028	6 Year T	otal
Construction	Water Di	ivision	Ŷ	300,000 \$	۰ ئ	I	Ŷ	Ŷ	I	\$		\$ 300	,000
Construction	Integrate	ed Capital Management		500,000	ı	ı		ı	ı	'		500	,000
Total			Ş	\$ 000'008	۰ ۲	·	Ş	۰ بې	•	۔ ج		\$ 800	000,

iter Division	Replacement
0 - Wa	<b>Fruck</b>
200-50	ervice 1

Project Number:	WAT-2018-47	Budget Year:	2023
Project Type:	Vehicles and Equipment	Budget Stage:	Adopted Budget
Year Identified:	2018	Region:	District 1
Doccrintion			

### **Description**

Replacement of 10 Service Trucks.

## **Justification**

maintenance costs are greater than what is justifiable and the replacement is required for operational safety. The phased approach to the The current aging service truck fleet are past its useful life. The existing condition of the service trucks are to the point where repair and replacement over 5 years is to even the capital replacement costs over a period of time.

# **Comprehensive Plan Goals Met**

CFU 1.3 - Maintenance. CFU 6.5 - Infrastructure Maintenance.

### Funding

			2023		2024		2025	2026	2027	2028	6 Year Total
Reserves	Water Division	Ş		Ş		Ş	400,000 \$	\$ 000,008	400,000 \$	I	\$ 1,600,000
Total		ş		Ş		Ŷ	400,000 \$	800,000 \$	400,000 \$		\$ 1,600,000
Spending											
			2023		2024		2025	2026	2027	2028	6 Year Total
Purchases	Water Division	Ş		Ş		Ş	400,000 \$	\$ 000,008	400,000 \$	I	\$ 1,600,000
Total		Ş	ı	Ş		Ş	400,000 \$	\$ 000'008	400,000 \$		\$ 1,600,000

5200-500	- Watei	r Division												
Broadway	<u> / Avenu</u>	e, Ash to Post St	reet	Main	Rep	lacen	nent							
Project Numb	er: v	VAT-2018-48					Budget Y€	ear:	202	ε				
Project Type:	>	Vater Mains				-	Budget St	age:	Adc	pted Budge	et			
Year Identified	<b>d:</b> 2	018				_	Region:		Dist	rrict 3				
<u>Description</u> The existing 6- part of the stre	-inch water eet constru	distribution mains will b iction project.	ie repla	iced wit	th an 8	-inch pi	be and the	e existin	g 8-inch w	ater main v	vith a 2	12-inchv	vater pip	oe as
<u>Justification</u> The existing w. 1918 and the f	ater cast ir 6-inch wate	on pipes in this section B er main was installed in 1	troadwa 891. Tł	ay Aver 1e 6-inc	nue are ch is pli	e unlikely anned to	/ to surviv be repla	/e const ced wit	ruction. Th מו 8-inch	ie 8-inch wa	ater m etter n	ain was etwork	installec distribut	d in tion.
Comprehensi	ive Plan G	<u>oals Met</u>												
CFU 1.2 - Oper Public Facilitie:	rational Eff s. Construc	iciency. This project will i tion of this project will p	improv irovide	e the o adequí	peratic ate infr	onal effic astructu	iency by l ire at the	reducin time of	g required developm	maintenan ent.	ce. CFI	J 2.1 - A	vailable	
Funding														
				2023		2024	202	25	2026	2027		2028	6 Year T	otal
Reserves Ir	ntegrated C	apital Management	Ş	ı	Ş		\$ 35,00	\$ OC	300,000 \$	100,000	Ş	г	\$ 435	,000
Total			ş		Ş	1	\$ 35,00	\$ 00	300,000 \$	100,000	ş		\$ 435	000
Spending														
				2023		2024	202	25	2026	2027		2028	6 Year T	otal
Design Ir	ntegrated C	apital Management	Ŷ	I	Ŷ	1	\$ 35,00	\$ OC	۰ ۲	ı	Ŷ	ı	\$ 35	000
Construction Ir	ntegrated C	apital Management		ı		I	I		300,000	100,000		ı	400	,000
Total			Ŷ		Ş	1	\$ 35,00	\$ 0C	300,000 \$	100,000	Ş	ı	\$ 435	000

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## Backhoe

Project Number:	WAT-2018-121	Budget Year:	2023
Project Type:	Vehicles and Equipment	Budget Stage:	Adopted Budget
Year Identified:	2018	Region:	District 1
Description			

Replace Existing Backhoe.

## **Justification**

The current aging backhoe is past its useful life. The existing condition of the backhoe is to the point where repair and maintenance costs are greater than justifiable and the reliability of the equipment used in daily operations is becoming questionable.

# **Comprehensive Plan Goals Met**

CFU 1.3 - Maintenance. CFU 6.5 - Infrastructure Maintenance.

### Funding

			2023	2024	2025	2026	2027	2028	6 Year Total
Reserves	Water Division	ş	350,000 \$	350,000 \$	\$ -	350,000 \$	\$ -	I	\$ 1,050,000
Total		Ş	350,000 \$	350,000 \$	\$ -	350,000 \$	\$ -	ı	\$ 1,050,000
Spending									
			2023	2024	2025	2026	2027	2028	6 Year Total
Purchases	Water Division	Ş	350,000 \$	350,000 \$	\$ -	350,000 \$	\$ -	I	\$ 1,050,000
Total	v,	Ŷ	350,000 \$	350,000 \$	۰ ئ	350,000 \$	۰ ج	ı	\$ 1,050,000

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### Loader

Project Number:	WAT-2018-122	Budget Year:	2023
Project Type:	Vehicles and Equipment	Budget Stage:	Adopted Budget
Year Identified:	2018	Region:	District 1
Description			

Replace existing Loader.

## **Justification**

The current aging loader is past its useful life. The existing condition of the loader is to the point where repair and maintenance costs are greater that justifiable and the reliability of the equipment is daily operations is questionable.

# **Comprehensive Plan Goals Met**

CFU 1.2 - Maintenance. CFU 6.5 - Infrastructure Maintenance.

### Funding

			2023	2024		2025		2026		2027		2028	6 Y€	er Total
Reserves	Water Division	Ş	400,000 \$	I	Ş	I	Ş		Ş	ı	Ş	I	Ş	400,000
Total	. "	Ş	400,000 \$	I	Ş	ı	Ş		Ş	Т	Ş	ı	Ş	400,000
Spending														
			2023	2024		2025		2026		2027		2028	6 Y€	er Total
Purchases	Water Division	Ŷ	400,000 \$	I	Ş	ı	Ş	T	Ŷ	ı	Ŷ	ı	Ŷ	400,000
Total		Ş	400,000 \$	I	Ş	ı	Ş	ı	Ş	ı	Ş	ı	Ş	400,000

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Budget Year: 2023	acilities Budget Stage: Adopted Budget	Region: District 1
WAT-2018-146	Administrative Faciliti	2018
Project Number:	Project Type:	Year Identified:

### **Description**

Remodel Upriver Dam administration building for control room, office space, equipment storage, work areas, meeting areas, etc.

## **Justification**

Project makes city owned facility more usable and efficient.

# **Comprehensive Plan Goals Met**

CFU 1 - Adequate Public Facilities and Services CFU 5 - Environmental Concerns NE 1 - Water Quality

### Funding

		2023	2024	2025	20	26	2027		2028	6 Year Total
Reserves Water Di	ivision \$	100,000 \$	1,500,000 \$	\$ -		Ş	I	Ş	-	\$ 1,600,000
Total	\$	100,000 \$	1,500,000 \$	\$ -	•	Ş		Ş		\$ 1,600,000
Spending										
		2023	2024	2025	20	26	2027		2028	6 Year Total
Construction Water Di	ivision \$	100,000 \$	1,500,000 \$	۰¥ ۱	I	Ŷ	I	÷	1	\$ 1,600,000

\$ 1,600,000

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100,000 \$ 1,500,000

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Total

5200-500 - Wat	er Division									
Upriver Dam Sp	illway Rehabilitatio	on Phase 3a								
Project Number:	WAT-2018-1508		Bud	lget Year:		2023				
Project Type:	Water Maintenance		Bud	lget Stage		Adopte	d Budget			
Year Identified:	2018		Reg	țion:		Multipl	Ð			
<u>Description</u> Rehabilitation of the U <sub>l</sub> rehabilitation of piezon	oriver Dam Spillway. Phase 3 neters required for dam mor	3a of the rehabilit	ation include	es addition	nal concr	ete work,	gate 5 in	spection an	ıd repa	ir and
<u>Justification</u> Required rehabilitation	of the existing dam structur	e for the continue	ed safe opera	ation and	monitori	ng of the	hydroelee	ctric facility		
Comprehensive Plan	<u>Goals Met</u>									
CFU 1.2: Operational El CFU 1.3: Maintenance CFU 1.5: Utility Constru	ficiency Iction Standards									
Funding										
		2023	2024	2025	2(	126	2027	2028	6 Ye	ar Total
Reserves Water Divi	sion	\$    210,000  \$	\$ -	I	- \$	Ş	1	-	Ş	210,000
Total		\$    210,000   \$	۰ ج	I	\$	Ş	1		Ş	210,000
Spending										
		2023	2024	2025	2(	126	2027	2028	6 Ye	ar Total
Construction Water Divi	sion	\$    210,000  \$	÷ Ş	I	\$ -	Ş	1	-	Ş	210,000
Total	.,	\$    210,000   \$	۰ بې	ı	۔ ج	ş		'	\$	210,000
	I									

5200-500 - Water Div	vision							
Upriver Dam Spillwa	iy Rehabilitation	Phase 3	0					
Project Number: WAT-2	2018-1509		8	udget Year:	202	3		
Project Type: Water	r Maintenance		Δ	udget Stage:	Ado	pted Budget		
Year Identified: 2018			R	egion:	Mul	tiple		
<u>Description</u> Rehabilitation of the Upriver D repair of the north abutment o	Jam Spillway. Phase 3b concrete wall.	of the rehabi	litation inclu	des auxiliary	spillway rehal	bilitation, wetl	ands mitig	ation, and
<u>Justification</u> Required rehabilitation of the	existing dam structure	for the contin	ued safe op	eration and r	nonitoring of t	he hydroelect	ric facility.	
Comprehensive Plan Goals I	<u>Met</u>							
CFU 1.2: Operational Efficiency CFU 1.3: Maintenance CFU 1.5: Utility Construction Si	y standards							
Funding								
		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Water Division	Ş	540,000 \$	180,000 \$	2,680,000 \$	\$ 2,680,000 \$	\$ -	I	\$ 6,080,000
Total	\$ \$	540,000 \$	180,000 \$	2,680,000 \$	\$ 2,680,000 \$	\$ -	I	\$ 6,080,000
Spending		5005	2024	2025	2026	7000	2028	6 Vear Total
Design Water Division	\$	540,000 \$	180,000 \$		\$ -	\$ -		\$ 720,000
Construction Water Division		-	I	2,680,000	2,680,000	-	I	5,360,000
Total	Ş	540,000 \$	180,000 \$	2,680,000 \$	\$ 2,680,000 \$	Ş.	I	\$ 6,080,000

5200-500 - Wa	ter Division							
Upriver Dam S	pillway Gate Repla	cement						
Project Number:	WAT-2018-1510		BL	ldget Year:	2023			
Project Type:	Water Maintenance		BL	idget Stage:	Adol	oted Budget		
Year Identified:	2018		Re	gion:	Mult	iple		
<u>Description</u> Replacement of spillv	vay gates and replacement/r	ehabilitation of g	ate trunnion	bearings at t	che Upriver Da	m Facility. Rep	blacement	of Gates #3
and #6 in 2023, Gate:	s #4 and #5 in 2024, Gates #1	1 and #7 in 2025 a	and Gates #2	and #8 in 20	26.			
<u>Justification</u> Spillway gates have e	xceeded their useful life and	l require replacem	nent for the s	afe operatio	n of the hydro	electric facility		
Comprehensive Pla	n Goals Met							
CFU 1.2: Operational CFU 1.3: Maintenanc CFU 1.5: Utility Const	Efficiency e ruction Standards							
Funding								
)		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Water Di	ivision	\$ 1,780,000 \$	1,360,000 \$	1,475,000 \$	1,587,000 \$	۰ ۍ	ı	\$ 6,202,000
Total		\$ 1,780,000 \$	1,360,000 \$	1,475,000 \$	1,587,000 \$	\$ -		\$ 6,202,000
Spending								
		2023	2024	2025	2026	2027	2028	6 Year Total
Construction Water Di	ivision	\$ 1,780,000 \$	1,360,000 \$	1,475,000 \$	1,587,000 \$	- Ş	ı	\$ 6,202,000
Total		\$ 1,780,000 \$	1,360,000 \$	1,475,000 \$	1,587,000 \$	۰ بې	·	\$ 6,202,000

NSC Plai	nning fr	om Spokane River	to Sp	rague /	Avenue							
Project Nur	nber:	WAT-2019-10			Bud	get Year:	2023	~				
Project Typ	e:	Water Mains			Bud	get Stage:	Adop	oted Budge	t			
Year Identii	fied:	2019			Reg	ion:	Distr	ict 1				
<u>Descriptio</u> Utility planr	<u>n</u> ning for relo	cation, protection or upgra	de of w	ater utility	facilities near	the planned	North Spok	ane Corrid	or.			
<u>Justificatio</u> To relocate	<u>or</u> protect v	water facilities due to confli	icts with	ן planned ו	Vorth Spokane	e Corridor co	nstruction.					
<mark>Comprehe</mark> CFU 1 - Ade	<mark>nsive Plan</mark> quate Publi	<u>Goals Met</u> c Facilities and Services. CF	U 3 - Co	ordination								
Funding												
				2023	2024	2025	2026	2027		2028	6 Year	Total
Grant	Integrated	Capital Management	Ş	5,000 \$	5,000 \$	5,000 \$	\$ -	I	Ş	-	\$ 15	2,000
Total			Ş	5,000 \$	5,000 \$	5,000 \$	\$ -		Ś		\$ 15	2,000
Spending												
				2023	2024	2025	2026	2027		2028	6 Year	Total
Planning	Integrated	Capital Management	Ŷ	5,000 \$	5,000 \$	5,000 \$	Ş.	I	s		\$ 15	5,000

5200-500 - Water Division NSC Planning from Snokane River to Snrague A 15,000

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9th & Pin	e Boost	ter Station								
Project Numb	er:	WAT-2019-13		Bud	lget Year		2023			
Project Type:	.,	Source Wells and Booster	Stations	Bud	lget Stag		dopy	ted Budget		
Year Identified	d:	2019		Reg	ion:		Distri	ct 2		
<u>Description</u> A new booster demolished. T	r station ar The project	nd switch gear will be cons t is in the planning phase.	tructed at the same	site includ	ing a nev	/ buildin	g. The e	kisting booste	r station	will be
Project #2019:	156									
<u>Justification</u>										
The booster st electrical syste power voltage	tation is cu em and pu . The boo	rrently out of service and mps need to be upgraded ster station contains older	is needed for redun to current standard submersible style p	dancy to th s. Currently umps, which	e Interm y, the 23( ch are no	ediate P 00 switcl t energy	ressure Z 1 gear is ( efficient	one and futur directly conne and are very	e demanc cted to A expensive	ds. The vista's high e to
maintain. The Analysis of the demands. Thi	e pump sta e water sys s project w	tion is subsurface and the stem for growth over the n vill construct an entirely ne	lids leak. The subm lext 20-years has de ew booster station a	ersible pur termined 9 ind the old	ps will b th & Pine station w	e replace booster ill be de	ed with m r station ' molished	ore efficient . will be need to	vertical tu o meet fu	urbines. ture
<u>Comprehensi</u>	<u>ive Plan G</u>	ioals Met								
CFU 1.2 - Oper Public Facilitie	rational Efi s. Constru	ficiency. This project will i uction of this project will p	mprove the operati rovide adequate inf	onal efficier rastructure	at the tin	ducing re ne of de	equired n velopme	naintenance. ( nt.	CFU 2.1 -	Available
Funding										
			2023	2024	2025		2026	2027	2028	6 Year Total
Reserves	ntegrated C	apital Management	\$ 6,000,000 \$	۰ ئ	ı	ې ۲	Ŷ	۰ ۍ	ı	\$ 6,000,000
Total			\$ 6,000,000 \$	\$ -		\$	Ş	ۍ ۲		\$ 6,000,000
Spending										
			2023	2024	2025		2026	2027	2028	6 Year Total
Construction In	ntegrated C	apital Management	\$ 6,000,000 \$	۔ ئ	ı	۔ ک	Ŷ	۰ ۲	ı	\$ 6,000,000
Total			\$ 6,000,000 \$	۰ ۲		۔ ج	Ş	۰ ۲		\$ 6,000,000

5200-50	00 - Wate	er Division									
<b>NSC Plai</b>	nning fr	om Interstate 90 t	o Spr	ague Av	/enue						
Project Nun	nber:	WAT-2019-28			Bud	get Year:	2023				
Project Typ	ē:	Water Mains			Bud	get Stage:	Adopte	ed Budget			
Year Identif	fied:	2019			Reg	ion:	Distric	t 2			
<u>Descriptior</u> Utility planr	n 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	cation, protection, or upgr	ade of v	water utility	/ facilities nea	r the planned	North Spoka	ne Corridor.			
Justificatio	ç										
To relocate	or protect v	water facilities due to confl	licts wit	h planned N	Vorth Spokane	e Corridor cor	istruction.				
Comprehe	nsive Plan	<u>Goals Met</u>									
CFU 1 - Ade	quate Publi	c Facilities and Services. CF	:U 3 - C(	oordination							
Funding											
				2023	2024	2025	2026	2027	2028	6 Yea	ır Total
Grant	Integrated	Capital Management	Ş	5,000 \$	5,000 \$	5,000 \$	5,000 \$	5,000 \$		Ş	25,000
Total			Ş	5,000 \$	5,000 \$	5,000 \$	5,000 \$	5,000 \$		Ş	25,000
Spending											
				2023	2024	2025	2026	2027	2028	6 Yea	ır Total
Planning	Integrated	Capital Management	Ş	5,000 \$	5,000 \$	5,000 \$	5,000 \$	5,000 \$	ı	Ş	25,000

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Total

5200-50	0 - Wate	er Division											
Study - <b>N</b>	Water S	ystem Vulnerabili	ty As	sessmer	It								
Project Num	nber:	WAT-2019-30			Buc	lget Year		202	ñ				
Project Type	e:	Source Wells and Booste	r Static	suc	Buc	lget Stag		Ado	pted Buo	lget			
Year Identifi	fied:	2019			Re	gion:		Dist	rict 1				
<u>Description</u> The risk and developed. F	1 1 resiliency r Phillips 66 is	eport of the water system s providing funding toward	ו was כ ds asse	completed in ssment for t	March of 20: he Yellowsto	20. Subse ne pipelir	equently impa	/, an em cts	ergency	respon	se plan n	eeds to	o be
lustificatior		)											
America's W the risks and	<u></u> Vater Infrasi d resilience	tructure Act of 2018 requi of its system.	ires wa	ter systems t	hat serve mo	ore than 3	300 pe	ople to	prepare	vulnera	ability ass	essme	ints of
Compreher	nsive Plan	<u>Goals Met</u>											
CFU 1.2 - Op expectancy (	perational E of existing <	fficiency-project outcome wells.	s will b	ooth improve	operational	efficiency	/ or red	uce cost	s by incr	easing t	the capac	ity or l	life
Funding													
				2023	2024	2025		2026	20:	7	2028	6 Yea	r Total
Reserves	Integrated	Capital Management	Ş	50,000 \$	\$ -	I	Ş	\$ -	ı	Ş	I	Ş	50,000
Total			Ŷ	50,000 \$	۲		S	Ş		Ş		Ş	50,000
Spending													
				2023	2024	2025		2026	20:	7	2028	6 Үеа	r Total
Planning	Integrated	Capital Management	Ş	50,000 \$	- \$	I	Ş	\$ -	ı	Ş	I	Ş	50,000
Total			Ŷ	<b>50,000</b> \$	۰ ۲		Ś	۰ بې	ı	Ŷ	ı	Ş	50,000

5200-500 - Wa	ter Division									
<b>NSC Wellesley</b>	Avenue PH2 - Have	en Stre	et to M	larket Str	eet					
Project Number:	WAT-2019-51			Budg	get Year:	202				
Project Type:	Water Mains			Budg	get Stage:	Ado	oted Budget			
Year Identified:	2019			Regi	:uo	Dist	ict 1			
<u>Description</u>										
This project will repla Spokane Corridor (NS	ace and lower the transmissi SC) project. The project will l	on and dis oe constru	tribution r cted with	mains due to the Wellesley	lowering o Ave. stree	f Wellesley A	/e. as part of th ion work.	ie WSDO <sup>-</sup>	r North	
<u>Justification</u> The transmission and	l distribution mains need to	be replace	d and low	ered due to l	owering th	e profile of M	ellesley Avenu	e and Ma	rket Street.	
Comprehensive Pla	n Goals Met									
Meets Transportation updates and by coorc	n goal G. Maximize Public Be Jinating with the North Spok	inefits and ane Corric	Fiscal Res lor project	ponsibility W t under WSD0	ith Integra JT's purvie	tion by integr w.	ating street wo	ork with m	ajor utility	
Funding										
		2	023	2024	2025	2026	2027	2028	6 Year Total	
Grant Integrate	ed Capital Management	\$ 85,	\$ 000	\$ -	÷,	- \$	- Ş	I	\$ 85,000	
Total		\$ 85,	\$ 000	÷	۔ ج	\$ -	۰ ج	ı	\$ 85,000	
Spending										
		2	023	2024	2025	2026	2027	2028	6 Year Total	
Construction Integrate	ed Capital Management	\$ 85,	\$ 000	\$-	- \$	- \$	- \$	I	\$ 85,000	
Total		\$ 85,	\$ 000	\$ -	\$ -	\$ -	\$ '		\$ 85,000	1
										I.

5200-500 - Wat	ter Division										
Water Distribu	tion Main Resilien	cy & Wate	er Q	uality P	rogram						
Project Number:	WAT-2019-64			BL	idget Year:	202	3				
Project Type:	Water Maintenance			Bı	idget Stage:	Ado	pted Budget				
Year Identified:	2019			Re	gion:	Dist	rict 1				
<u>Description</u> Construction, Design a relocate meters out o	and Planning of water distri f basements.	bution main a	nd ser	vice conne	ctions to elimi	nate dead e	nd lines, pro	vide system	looping and		
<u>Justification</u> The addition of water water audit improvem	distribution connections a nents, and in strategic locat	nd relocating r ions will add s	neters ystem	out of bas resiliency a	ements will m and increase fi	itigate pote re flow.	ntial water q	uality issues.	implement		
Comprehensive Plar CFU 1.2 - Operational	<u>1 Goals Met</u> Efficiency. CFU 1.5 - Utility	Construction 5	Standa	ards. CFU 6.	5 - Infrastruct	ure Mainter	lance.				
Funding		2023		2024	2025	2026	2027	2028	6 Year Total		
Reserves Water Div	vision	- -	Ŷ	600,000 \$	300,000 \$	300,000 \$	300,000	300,000	\$ 1,800,000		
Total		ۍ ۲	Ś	600,000 \$	300,000 \$	300,000 \$	300,000 \$	300,000	\$ 1,800,000		
Spending											
		2023		2024	2025	2026	2027	2028	6 Year Total		
Construction Water Div	vision	\$ '	ş	600,000 \$	300,000 \$	300,000 \$	300,000 \$	300,000	\$ 1,800,000		
Total		\$	Ŷ	600,000 \$	300,000 \$	300,000 \$	300,000 \$	300,000	\$ 1,800,000		
5200-50	0 - Wat	er Division									
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NSC - Tr	ent Into	erchange Water R	erou	te							
Project Nun	nber:	WAT-2020-7			Bui	dget Year:	202	m			
Project Typ	е:	Water Mains			Bui	dget Stage:	Ado	pted Budge	ىد		
Year Identif	fied:	2020			Re	gion:	Dist	rict 1			
<b>Description</b>	CI.										
Realign exis project likelv	tting water 'y includes	main in Trent Ave (10-inch betterments that will be fu	n) to er Inded	able const by the City	ruction of NSC	Trent Interch	ange . New	main will be	a 12-inc	h line	. The
<u>Justificatio</u> This project	n will be con	npleted in support of the <b>h</b>	NSC.								
Compreher	nsive Plan	Goals Met									
CFU 1.2 - OF efficiency or	perational r reduce cc	Efficiency, Require the dev sts by increasing the capad	elopm city, us	ient of capi se, and/or l	tal improveme ife expectancy	nt projects th of existing fa	nat either im cilities.	prove the ci	ty?s opei	ration	al
Funding											
				2023	2024	2025	2026	2027	2(	028	6 Year Total
Reserves	Integrate	d Capital Management	Ş	250,000 \$	\$ -	\$ -	\$ -	ı	- \$	0,	250,000
Grant	Integrate	1 Capital Management		700,000	100,000	I	I	ı	I		800,000
Total			Ş	\$ 000'056	100,000 \$	÷	\$ -	ı	÷ د	V,	1,050,000
Spending											
				2023	2024	2025	2026	2027	5(	028	6 Year Total
Design	Integrate	1 Capital Management	ዯ	130,000 \$	۔ ۲	۰ ک	ې ۲	I	ۍ ۲	0,	130,000
Construction	Integrate	d Capital Management		820,000	100,000	1	I	I	I		920,000
Total			Ş	950,000 \$	100,000 \$	- \$	÷ -	•	\$ -	v,	1,050,000

0-500 - Water Division	: - 2nd Ave Water Reroutes
520	NSC

Remove and relocate water mains to the north of I-90 as needed to support the NSC and 2nd Ave realignments.

### **Justification**

This project will be completed in support of the NSC.

# **Comprehensive Plan Goals Met**

CFU 1.2 - Operational Efficiency, Require the development of capital improvement projects that either improve the city?s operational efficiency or reduce costs by increasing the capacity, use, and/or life expectancy of existing facilities.

#### Funding

		2023		2024		2025		2026		2027		2028	6γ	ear Total
Grant	Integrated Capital Management	\$ 3,000,000	\$ 2	2,200,000	Ş	I	Ŷ	I	Ŷ	ı	Ş	ı	ş	6,200,000
Total		\$ 3,000,000	\$ 2	,200,000	Ş		Ş		Ş	•	Ş	•	Ş	,200,000
Spending														
		2023		2024		2025		2026		2027		2028	6 γ	ear Total
Design	Integrated Capital Management	\$ 800,000	Ş	I	Ş	I	Ş	I	Ş	I	Ş	ı	Ş	800,000
Construction	Integrated Capital Management	2,200,000	0	2,200,000		ı		ı		·			7	1,400,000
Total		\$ 3,000,000	\$ 2	,200,000	ş	•	Ŷ		Ŷ		Ŷ	1	\$ \$	;,200,000

5200-50	0 - Water I	Division								
NSC - Tri	umpet Are	a Water Reroute	S							
Project Nun	nber: WA	T-2020-13			Buc	dget Year:	2023			
Project Typ	e: Wa	ter Mains			Buc	dget Stage:	Adop	ted Budget		
Year Identif	<b>ied:</b> 202	0			Re	gion:	Distri	ct 1		
Descriptior Remove and	ן relocate water	mains as needed to sup	port the NS	SC Trur	npet area c	onstruction in	cluding the a	irea from I-9	0 to Spragu	ue & Lacey to
ггеуа.										
Justificatio	cl									
This project	will be complet	ed in support of the NSC								
Compreher	nsive Plan Goa	ls Met								
CFU 1.2 - OF efficiency or	serational Efficie r reduce costs by	ency, Require the develol y increasing the capacity,	pment of c use, and/c	apital i or life €	improvemeı expectancy	nt projects tha of existing faci	it either imp ilities.	rove the city	?s operatic	onal
Funding										
			2023		2024	2025	2026	2027	2028	6 Year Total
Grant	Integrated Capit	tal Management \$	200,000	\$ 1,C	\$ 000'000	125,000 \$	\$ -	\$ -	I	\$ 1,325,000
Total		<del>\$</del>	200,000	\$ 1,C	\$ 000'000	125,000 \$	\$ -	\$ -	I	\$ 1,325,000
Spending										
			2023		2024	2025	2026	2027	2028	6 Year Total
Design	Integrated Capit	tal Management \$	200,000	Ŷ	۰ ک	۰ ۍ	۰ ۍ	۰ ک	I	\$ 200,000
Construction	Integrated Capit	tal Management	ı	1,0	000,000	125,000	I	ı	I	1,125,000
Total		Ş	200,000	\$ 1,C	\$ 000'000	125,000 \$	\$ -	\$ -	I	\$ 1,325,000
		I								

NSC - 3rd	Ave Wa	ater Reroute							
Project Numb	Jer:	WAT-2020-14		Bud	get Year:	2023			
Project Type:	-	Water Mains		Bud	get Stage:	Adopte	ed Budget		
Year Identifie	;d:	2020		Reg	ion:	Distric	t 2		
<u>Description</u>									
Remove and r installing new	relocate wa ⁄ 48-inch tra	ater mains in new 3rd alignr ansmission main in 3rd Ave	nent as neede from Freya to	ed to support the Liberty Park. Th	NSC 3rd Ave is betterment	realignment. will be funde	Includes bett ed by the City	erment e	lement
<u>Justification</u>									
This project w	vill be comp	oleted in support of the NSC	ci						
<u>Comprehens</u>	sive Plan G	<u>soals Met</u>							
CFU 1.2 - Ope efficiency or r	erational Eff	ficiency, Require the develc is by increasing the capacity	opment of cap /, use, and/or	ital improvemen life expectancy c	t projects that of existing facil	: either impro ities.	ove the city?s	operatio	nal
Funding									
			2023	2024	2025	2026	2027	2028	6 Year Total
Grant	Integrated C	Capital Management	\$ 150,000 \$	\$ 000'008	85,000 \$	\$ -	¢ -	T	\$ 1,035,000
Total			\$ 150,000 \$	800,000 \$	85,000 \$	\$ -	- \$	ı	\$ 1,035,000
Spending									
			2023	2024	2025	2026	2027	2028	6 Year Total
Construction 1	Integrated C	Capital Management	\$ 150,000 \$	800,000 \$	85,000 \$	۰ ک	۰ ک	ı	\$ 1,035,000
Total			\$ 150,000 \$	\$ 000 <b>,</b> 008	85,000 \$	۰ ۲	, Ş	ı	\$ 1,035,000
		Ι							

2	Upgrades
Water Divisio	ession System
5200-500 -	<b>Fire Suppr</b>

Project Number:	WAT-2020-35	Budget Year:	2023
Project Type:	Storage Systems	Budget Stage:	Adopted Budget
Year Identified:	2020	Region:	District 1

improvements, booster pump/station improvements and transmission main improvements needed to bring existing fire suppression storage This project will identify where fire suppression upgrades are needed throughout the City. These upgrades may include storage system deficiencies up to standard.

### **Justification**

This project is necessary for public safety.

# **Comprehensive Plan Goals Met**

CFU 1.1 - Level of Service. CFU 1.2 - Operational Efficiency.

			2023	2024		2025		2026		2027		2028	6 Υ	ear Total
Reserves	Integrated Capital Management	Ŷ	300,000 \$	1	ş	I	Ş		Ş	ı	Ŷ	ı	ş	300,000
Total		ş	300,000 \$	•	Ş		Ş	•	Ş		Ş		Ş	300,000
Spending														
			2023	2024		2025		2026		2027		2028	6 Υ	ear Total
Construction	Integrated Capital Management	Ş	300,000 \$	-	Ş	I	Ş	-	Ş		Ş		Ş	300,000
Total		Ŷ	300,000 \$	I	Ş		Ş	I	Ş		Ş	ı	Ş	300,000

12th Avenue -	Deer Heights to Fl	int							
Project Number:	WAT-2020-37		Bu	dget Year:	202	3			
Project Type:	Water Mains		Bu	dget Stage:	Ado	pted Budget			
Year Identified:	2020		Re	gion:	Dist	rict 2			
<u>Description</u> As part of the new st	reet construction, this port	ion of the project v	vill include ins	tallation of a	n 18-inch wa	ıter main.			
<u>Justification</u> The project is necess	ary to serve future develop	oment north of 12th	Ave with the	retail service	e area.				
Comprehensive Pla CFU 3.2 ? Coordinati	in Goals Met on of utility installations. T	his project will be c	onstructed wi	th a street pr	oject to red	uce disruptic	n and pro	tect th	e
Funding									
		2023	2024	2025	2026	2027	202	8 6 1	ear Total
Contribution Water D	ivision	\$ - \$	\$ -	30'000 \$	300,000 \$	-	- \$	Ş	330,000
Total		\$ '	۰ ۲	30,000 \$	300,000 \$	1	- \$	Ŷ	330,000
Spending									
		2023	2024	2025	2026	2027	202	8 6 Y	ear Total
Design Water D	ivision	\$ - \$	۰ ۍ	30,000 \$	۰ ک	1	' ۲	Ŷ	30,000
Construction Water D	ivision	ſ		ı	300,000	ı	ı		300,000
Total		\$ - \$	۰ بې	30,000 \$	300,000 \$		۰ د	Ŷ	330,000

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Budget Year: 2023	Budget Stage: Adopted Budget
WAT-2020-48	Water Maintenance
Project Number:	Project Type:

District 1

**Region:** 

#### **Description**

2020

Year Identified:

Rebuilding of generators #4 and #5 in powerhouse #2 at Upriver Dam.

### **Justification**

These generators has not been rebuilt in over 30 years. This project will increase asset life while improving performance and power generation.

# **Comprehensive Plan Goals Met**

CFU 1.2 - Operational Efficiency. CFU 1.3 - Maintenance. CFU 6.5 - Infrastructure Maintenance.

			2023	2024		2025	202	56	2027		2028	6 Year Total
Reserves	Water Division	···	\$ 000'008	3,000,000	\$ 3	\$ 000'000'	T	Ş	I	Ş		\$ 6,300,000
Total	\$	\$	300,000 \$	3,000,000	\$ 3	\$ 000'000'		Ş		Ş		\$ 6,300,000
Spending												
			2023	2024		2025	202	<u>6</u>	2027		2028	6 Year Total
Construction	Water Division	 	\$ 000'008	3,000,000	\$ 3	\$ 000'000'		Ş	ı	Ş		\$ 6,300,000
Total	\$	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	\$ 000'008	3,000,000	\$ 3	\$ 000'000'	I	Ş	ı	Ş	ı	\$ 6,300,000

5200-500 - W	ater Division									
Upriver Dam :	<b>Spillway Rehabilitat</b>	ion Ph	ase 4							
Project Number:	WAT-2020-50				Budget Yea	:16	20:	23		
Project Type:	Water Maintenance				Budget Sta	ge:	Ad	opted Budget		
Year Identified:	2020				Region:		Dis	trict 1		
<u>Description</u> The Spillway at Upriv	ver Dam is a concrete structu	ire that re	equires n	epair and r	ehabilitatio	n to rei	nain safe	and function	al.	
<u>Justification</u> This project is desigr	ned to rehabilitate the spillwa	ay so it wi	ill remair	ו in safe op	erating con	dition.				
Comprehensive Pla CFU 1.2 - Operationa	<mark>an Goals Met</mark> al Efficiency. CFU 1.3 - Mainte	enance. C	FU 6.5 -	Infrastruct	ure Maintei	nance.				
Funding										
			2023	2024	202	10	2026	2027	2028	6 Year Total
Reserves Water L	Division	۔ ب	Ŷ	I	÷ ځ	ŝ	800,000	\$ 2,975,000	\$ 2,975,000	\$ 6,750,000
Total		\$	Ş	ı	¢	Ş	800,000	\$ 2,975,000	\$ 2,975,000	\$ 6,750,000
Spending										
			2023	2024	202	10	2026	2027	2028	6 Year Total
Construction Water L	Division	\$ 	Ŷ	ı	¢ '	ŝ	800,000	\$ 2,975,000	\$ 2,975,000	\$ 6,750,000
Total		ب	Ŷ	•	¢.	\$	800,000	\$ 2,975,000	\$ 2,975,000	\$ 6,750,000

5200-500 - Water Division	Indian Trail Reservoir Frontage Improvements

sidewalk, curb and landscaping (1/2 width). Extension of transmission mains in Strong and Tessa Ct are also included as well as a culvert in The project includes frontage improvements on Strong Road at the Indian Trail Reservoir site. These improvements will include paving, Tessa Ct.

## **Justification**

The project is necessary as part of the developer agreement.

# **Comprehensive Plan Goals Met**

CFU 3.2 - Coordination of Utility Installations. CFU 5.3 - Stormwater.

			2023	2024		2025		2026		2027		2028	6 Ү	ear Total
Reserves	Integrated Capital Management	Ŷ	440,000 \$	ı	Ş	I	Ş		Ş	ı	Ş	·	Ş	440,000
Total		Ś	440,000 \$	•	Ş		Ş	•	Ş	•	Ş	•	Ş	440,000
Spending														
			2023	2024		2025		2026		2027		2028	6 Ү	ear Total
Construction	Integrated Capital Management	ş	440,000 \$	-	Ş		Ş		Ş		Ş		Ş	440,000
Total		Ş	440,000 \$	I	Ş		Ş	I	Ş		Ş	I	Ş	440,000

5200-50	00 - Wa	ter Division												
Study -	<u>Nevad</u>	a Well Station Rehal	bilita	ation										
Project Nur	mber:	WAT-2020-52				Budg	et Year:		202	~				
Project Typ	e:	Source Wells and Booster	Statior	JS		Budg	et Stage		Ado	pted Budရ	get			
Year Identii	fied:	2020				Regio	ü		Disti	rict 1				
<u>Descriptio</u> Nevada We submersible	<mark>n</mark> ell Station e e pumps fe	consists of a large caisson we or a total station capacity of 3	ll desig 31,000	gn contain GPM. The	ing 4 pum e study is ı	ps. Tw require	o 800 H ed to de	P vertic termine	al turbir e the bes	ie pumps st method	and tw of sta	vo 400 Hl tion reha	o Ibilitatio	ċ
Justificatio The Nevada base zone v very expens and require adequate w	<u>on</u> a Well Stat which feed sive to ma ss rehabilit vater servi	tion is one of three well static d much of the water system. intain and have long lead tim tation for safe reliable and eff ce.	ons pro Two of es for ficient	vviding wa f the pump repair. All operation	ter to the os are olde of the agi	Low Pr er subn ng infr ion is c	essure nersible astructu ritical fi	Zone ar style pi ire at th or opera	id is the umps wl is statio ational f	second la nich are n n is reach lexibility a	Irgest c ot enei ing the	ontribut rgy effici e end of i lundancy	or to thi ent and ts usefu ' to mair	s are I life ntain
<mark>Comprehe</mark> CFU 1.2 - O <sub>l</sub>	<u>ensive Pla</u>	<mark>n Goals Met</mark> I Efficiency. CFU 1.3 - Mainter	lance.											
Funding														-
Reserves	Integrate	ed Capital Management	\$ 2(	\$ 000,00	707 -	Ŷ	CZ02	۔ ج	\$	707	Ŷ	7020	\$ 200	000
Total			\$ 2(	\$ 000'00		ş		, \$	Ş		ş		\$ 200	000,
Spending														
				2023	2024		2025		2026	2027		2028	6 Year T	otal
Planning	Integrate	ed Capital Management	\$ 2(	\$ 000'00	ı	Ş	1	Ş	Ş	I	Ş		\$ 200	000
Total			\$ \$	\$ 000'00	I	Ŷ		\$	Ş		Ŷ	1	\$ 200	000

5200-50	0 - Wat	er Division									
Nevada	Well St	ation Rehabilitatio	u								
Project Num	ıber:	WAT-2020-58			ш	3udget Year:	2(	<b>)</b> 23			
Project Type		Source Wells and Booster	Stations			Sudget Stage:	Ā	dopted Bud	lget		
Year Identifi	ied:	2020			Œ	legion:	D	istrict 1			
<u>Description</u> The existing maintain.	u well statio	n is in need of repair and is	beyond its u	iseful li	ife. The st	tation is no lo	nger operat	ing efficien	tly and is	difficult	to
<u>Justificatior</u> This project	<mark>n</mark> is necessar	ry for the City to continue t	o effectively	۸lddus	water to	the low press	ure zone.				
<mark>Compreher</mark> CFU 1.2 - Op maintains ar	<u>nsive Plan</u> serational Ε n existing u	Goals Met Efficiency. This project impl Itility asset.	oves operat	ional e	fficiency t	hrough increa	ased capacit	.y. CFU 1.3	- Mainte	nance.	This project
Funding									ļ		-
			502		2024	5702	2026	707		2028	6 Year lotal
Reserves	Integrated	l Capital Management	- ጉ	ŝ	525,000 \$	5,250,000 \$	1	۲	s	1	5,775,000
Total			ۍ ۲	Ś	525,000 \$	5,250,000 \$	'	ج	¢	1	5,775,000
Spending											
			2023	-	2024	2025	2026	202	7	2028	6 Year Total
Design	Integrated	l Capital Management	¢	ŝ	525,000 \$	ۍ ۲	1	ې ۲	Ŷ	,	525,000
Construction	Integrated	l Capital Management	ı		I	5,250,000	ı	I		1	5,250,000
Total			۰ ج	\$	525,000 \$	; 5,250,000 \$	'	\$	Ŷ	1	5,775,000

5200-500 - Wa	ater Division								
Water Distribu	ution System Distric	t Metering	and Pressu	ire Mana	gement .	Areas			
Project Number:	WAT-2020-1514		Bud	lget Year:	2023				
Project Type:	Water Maintenance		Bud	lget Stage:	Adop	ted Budget			
Year Identified:	2020		Reg	ion:	Multi	ple			
Description Installation of pressu Central which have b the system that was	ire reducing valves and comm een identified as areas for Di completed in 2020.	unication for mo strict Metering A	onitoring flow a rreas (DMA) or	nd pressure Pressure Ma	to Northwest nagement Ar	: Terrace, Pe	aceful Vall om the Wa	ey and ater A	d West udit of
<u>Justification</u> The goal of DMA and metering is intended	l PMA's is the reduction of Dis to identify and quantify loss	stribution Systen for the reductior	ר Pr. (DSL). Pr ס מלדה מו	essure mana ystem DSL.	ıgement is int	tended to slc	w loss and	l distr	ict
Comprehensive Pla CFU 1.2: Operational CFU 5.2: Water Cons	<mark>In Goals Met</mark> Efficiency ervation								
Funding									
		2023	2024	2025	2026	2027	2028	6 Ye	ar Total
Reserves Water D	ivision	\$ - \$	435,000 \$	- \$	- \$	. \$	I	Ş	435,000
Total		\$ - \$	435,000 \$	۰ ۲	\$ '	۰ ۲	ı	ş	435,000
Spending									- - 
		2023	2024	2025	2026	2027	2028	6 Ye	ar Total
Construction Water D	ivision	\$ - \$	435,000 \$	۔ ک	۔ ج	۔ ک	ı	Ş	435,000
Total		\$ - \$	435,000 \$	۰ ب	۰ ب	۰ ۲	ı	Ş	435,000

379

5200-500 - Wa	iter Division							
<b>Distribution S</b>	ystem Monitoring							
Project Number:	WAT-2020-1515		Bui	dget Year:	2023			
Project Type:	Water Maintenance		Bui	dget Stage:	Adop	oted Budget		
Year Identified:	2020		Re	gion:	Mult	iple		
<u>Description</u> Installation of pressu water distribution sy:	ire monitors and communicatio stem. The project is phased ove	ns to the Supe r 6 years for co	rvisory Contro ompletion.	l & Data Acqu	iisition (SCAD	)A) system at 3	0 points in t	he City's
<u>Justification</u> Monitoring of the wa regulatory standards	ater distribution system for flow and aid in the identification of	and pressure system loss to	is necessary to reduce distrib	e ensure the a ution system	idequate deli loss (DSL).	ivery of water	and fire flov	/ to meet
<u>Comprehensive Pla</u>	n Goals Met							
CFU 1.2: Operational CFU 5.2: Water Consi	Efficiency ervation							
Funding								
		2023	2024	2025	2026	2027	2028 6	Year Total
Reserves Water D	ivision \$	50,000 \$	250,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	900'006
Total	<del>\$</del>	50,000 \$	250,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	900'006
Spending								
		2023	2024	2025	2026	2027	2028 6	Year Total
Construction Water D	ivision \$	50,000 \$	250,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	900'006
Total	Ş	50,000 \$	250,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	000'006

5200-500 - Wa	iter Division							
<b>Highland Boos</b>	ster Capacity Impro	vements						
Project Number:	WAT-2021-12		Ш	udget Year:	2023			
Project Type:	Source Wells and Booste	r Stations	ш	udget Stage:	Adopt	ed Budget		
Year Identified:	2021		Ľ	legion:	Distri	ct 2		
<u>Description</u> Modeling and analys location has not beel	is has determined that addit n determined.	ional pumping c	apacity is nee	ded to supply w	ater to the H	ghland Reser	voir. The	specific
<u>Justification</u> The project is necess	ary to maintain levels of ser	vice to this press	ure zone.					
Comprehensive Pla	<mark>in Goals Met</mark>							
CFU 1.2 - Operationa Construction of this p	ll Efficiency. This project wil oroject will provide adequat	l improve the op e infrastructure f	erational effic	ciency of the sys wth.	tem. CFU 2.1	Available P	ublic Facil	ties.
Funding								
		2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Integrat	ed Capital Management	\$ - \$	525,000 \$	5,250,000 \$	\$ -	\$ -	ı	\$ 5,775,000
Total		\$ - \$	525,000 \$	5,250,000 \$	- \$	- \$	ı	\$ 5,775,000
Spending								
		2023	2024	2025	2026	2027	2028	6 Year Total
Construction Integrat	ed Capital Management	\$ - \$	525,000 \$	5,250,000 \$	\$ -	- \$	I	\$ 5,775,000
Total		\$ - \$	525,000 \$	5,250,000 \$	\$-	\$-	ı	\$ 5,775,000

5200-500 - Wa	iter Division		
<b>Northwest Te</b>	rrace PRV's		
Project Number:	WAT-2021-13	Budget Year:	2023
Project Type:	Source Wells and Booster Stations	Budget Stage:	Adopted Budget

2021

Year Identified:

the North Hill Pressure Zone. The valve would reduce pressures from Low Pressure Zone to Northwest Terrace. The specific location has not This initial analysis will identify the pressure reducing valve station that will allow for increased transmission main capacity in Indian Trail for been determined.

District 3

**Region:** 

## **Justification**

This project will increase capacity in the Indian Trail area and North Hill Pressure Zone.

# **Comprehensive Plan Goals Met**

CFU 1.2 - Operational efficiency is improved to meet water demand and improve operational efficiency.

			2023	2024	2025		2026		2027		2028	6 Year	Total
Reserves	Integrated Capital Management	ş	300,000 \$	400,000 \$	3,500,000	Ş		Ş		Ş		\$ 4,20	000'00
<b>Fotal</b>		Ş	300,000 \$	400,000 \$	3,500,000	Ş		Ş		Ş		\$ 4,20	000'00
Spending													
			2023	2024	2025		2026		2027		2028	6 Year	Total
Design	Integrated Capital Management	Ŷ	300,000 \$	\$ -	ı	Ş	·	Ş		Ş		\$ 3C	000'00
Construction	Integrated Capital Management		·	400,000	3,500,000		·		I		ı	3,90	000'00
<b>Fotal</b>		Ş	300,000 \$	400,000 \$	3,500,000	Ş	•	Ş	•	Ş	•	\$ 4 <b>,</b> 20	000'00

5200-50	0 - Watei	r Division											
Study-W	/ell Trans	mission Optimiza	ition										
Project Num	vber: V	VAT-2021-14			Buc	lget Year:		2023					
Project Type		ource Wells and Booster	Stations		Buc	lget Stage		Adopt	ed Budge	et			
Year Identifi	ied: 2	:021			Reg	gion:		Distric	t 1				
<u>Description</u> This study w would be mo	<u>1</u> vill inform on ore efficient f	the best way for the City for one pressure zone to k	to optimiz oe pulling	te transm from a w	iission from ell that curr	the variou ently does	us well sta i not feed	itions. T that zoi	here ma ıe.	y be sc	enarios	where	it
Justificatior Demand and whether the	<mark>n</mark> 1 growth as w :re may be a i	/ell as a new well station l more efficient way to do t	have chan that than	ged how what we	we deliver v are current <sup>h</sup>	vater to tl y doing.	ne various	s pressu	re zones.	This s	tudy wil	l infor	uo u
Compreher CFU 1.2 - Op expectancy o	<mark>nsive Plan G</mark> Derational Effi of existing as	<mark>oals Met</mark> iciency-project outcomes sets.	will both	improve	operational	efficiency	or reduce	e costs b	y increas	sing the	e capaci	ty or lif	e
Funding													
			20	23	2024	2025	20	26	2027		2028	6 Year	Total
Reserves	Integrated C	apital Management	\$ 150,C	\$ 00	- Ş	ı	\$ -	Ş	ı	Ş	1	\$ 15(	0,000
Total			\$ 150,0	\$ 00	۰ ئ	·	۔ ج	Ş		Ş	1	\$ 15(	0,000
Spending													
			20	23	2024	2025	20	26	2027		2028	6 Year	Total
Planning	Integrated C	apital Management	\$ 150,C	\$ 00	- Ş	ı	\$ -	Ş	I	Ş	1	\$ 15(	0,000
Total			\$ 150,0	\$ 00	' Ŷ	·	÷ ۲	Ŷ		Ş	1	\$ 15(	0,000

5200-500	0 - Wate	er Division										
Ray St., 1	17th to	11th Ave, Main R	epla	cemen	It							
Project Num	ber:	WAT-2021-16			Bu	idget Yea	Ľ	202	3			
Project Type		Water Mains			Bu	idget Stag	:e:	Pd	opted Buo	lget		
Year Identifi	ed:	2021			Re	gion:		Dis	trict 2			
<u>Description</u> The 1936 ste integrated pr	el water m roject.	ain will be replaced with	36-inc	h ductile i	ron pipe in cool	dination	with th	e street	reconstru	ction p	roject. T	nis is an
<u>Justification</u> The existing 1	<u>1</u> transmissic	on main is in poor shape, a	and at	the end o	ıf its useful life.	A pipe as	sessme	ent has o	onfirmed	its conc	dition.	
Comprehen	sive Plan	<u>Goals Met</u>		- - -								
CFU 1.3 - Ma	untenance.	. CFU 3.2 - Coordination of	r Utilit	y Installat	ions.							
Funding												
				2023	2024	2025		2026	20:	2	2028	6 Year Total
Reserves	Integrated	Capital Management	Ŷ	300,000	\$ 1,000,000 \$	ı	Ş	1	'	ş	I	\$ 1,300,000
Total			ŝ	300,000	\$ 1,000,000 \$		ş		'	ş		\$ 1,300,000
Spending								100	Č	2		
Design	Integrated	Capital Management	Ś	300,000	5 - 2024 S	C707	Ŷ			~ ~	7020	\$ 300.000
Construction	Integrated	Capital Management	-		1,000,000	ı	-		I		ı	1,000,000
Total			Ŷ	300,000	\$ 1,000,000 \$	•	Ş		'	Ŷ		\$ 1,300,000

5200-500 - Wat	ter Division								
Future Develop	oment Water Proje	cts							
Project Number:	WAT-2021-22			Bud	lget Year:	202	ŝ		
Project Type:	Water Mains			Bud	lget Stage:	Ado	pted Budget		
Year Identified:	2021			Reg	ion:	Dist	rict 1		
<u>Description</u> This project assigns dc projects will be define	ollars to potential water sys d as development occurs.	tem improve	ments	that could be	e made in co	njunction w	ith developer p	orojects. Th	lese
<u>Justification</u> The water system requ hannening	uires upgrades. Often then	e are cost sav	ings by	<pre>/ performing</pre>	these upgra	des when de	svelopment cor	nstruction i	S
Comprehensive Plan	i Goals Met								
CFU 1.3 - Maintenance	e. CFU 3.2 - Utility Installati	on. CFU 3.3 -	Utilitie	s Coordinatio	on.				
Funding									
		2023		2024	2025	2026	2027	2028	6 Year Total
Reserves Integrated	d Capital Management	\$ 250,000	Ş (	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000	\$ 1,500,000
Total		\$ 250,000	Ş	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000	\$ 1,500,000
Spending									
		2023		2024	2025	2026	2027	2028	6 Year Total
Construction Integrated	d Capital Management	\$ 250,000	Ş (	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000	\$ 1,500,000
Total		\$ 250,000	\$	250,000 \$	250,000 \$	250,000 \$	250,000 \$	250,000	\$ 1,500,000

5200-500	) - Wate	er Division										
Latah-9t	h and Pi	ine Transmission I	Main									
Project Num	ber:	WAT-2021-23					Budget Ye	ar:	20	23		
Project Type:		Water Mains					Budget Sta	ige:	Ac	opted Budg	et	
Year Identifi	ed:	2021					Region:		Di	strict 2		
<u>Description</u> This project c allow additio	constructs a	a new transmission main c o be piped to the southwe	connect est part	ting the	e Latał e city a	ו Boostel nd meet	and 9th a demands.	nd Pine Design	reservo will beg	r. This new in in 2028 w	transmission r ith constructic	nain will n in 2029.
<u>Justification</u> This project v	r vould provi	ide necessary additional c	apacity	r for th	e sout	hwesteri	n portion o	f the cit	÷			
Comprehen. CFU 1.2 - Ope	<mark>sive Plan (</mark> erational Ef	<u>Goals Met</u> fficiency. This project will i	mprov	ed the	opera	tional ef	iciency by	reducin	g requir	ed maintene	nce.	
Funding												
				2023		2024	202	5	2026	2027	2028	6 Year Total
Reserves	Integrated (	Capital Management	Ş	-	Ş		¢ -	Ş	I	\$ 1,000,000	\$ 10,000,000	\$ 11,000,000
Total			ş		Ş	ı	, Ş	Ş	ı	\$ 1,000,000	\$ 10,000,000	\$ 11,000,000
Spending				2023		2024	202	ъ	2026	2027	2028	6 Year Total
Design	Integrated (	Capital Management	Ş	ī	Ş	ı	- \$	Ş		\$ 1,000,000	- \$	\$ 1,000,000
Construction	Integrated (	Capital Management				I	I			I	10,000,000	10,000,000
Total			Ş	ı	Ş	ı	÷	Ş	ı	\$ 1,000,000	\$ 10,000,000	\$ 11,000,000

5200-500	0 - Wai	ter Division										
Northwe	est Ter	race Transmission	Mai	L								
Project Num	iber:	WAT-2021-25			Bud	get Year:		2023				
Project Type		Water Mains			Bud	get Stage:		Adopte	ed Budget			
Year Identifi	ied:	2021			Reg	ion:		District	ŝ			
<u>Description</u> This project v the water fro	e will const om the Lo	ruct an 18-inch transmissic w to Northwest Terrace Pi	on maii ressure	ו along H\ Zones. T	NY 291 to relieve his is an integrat	demands ed project	from Ind with the	lian Trail Francis/	transmiss Assembly	sion by su roundab	upplyii oout.	ng most of
<u>Justification</u> There is limit	<u>n</u> ted transr	nission main capacity in In	dian Tr	ail and thi	is alleviates that i	ssue.						
Comprehen	<u>ısive Plar</u>	n Goals Met										
CFU 1.2 - Opu transmission	ierational າ will supp	Efficiency. The new feed c bly additional water to the	reates Northv	redundan vest Terra	icy and efficiency ice Pressure Zone	in the sys	tem. CFU	2.1 - Av	ailable Pu	blic Facili	ities. T	he
Funding												
				2023	2024	2025	20	26	2027	20	28 6	Year Total
Reserves	Integrate	d Capital Management	Ŷ	320,000	\$ 3,200,000 \$		-	Ş	1	-	Ş	3,520,000
Total			Ş	320,000	\$ 3,200,000 \$	1	'	Ş	1	'	Ş	3,520,000
Spending												
				2023	2024	2025	20	26	2027	20	28 6	Year Total
Design	Integrate	d Capital Management	ዯ	320,000	\$-\$	I	10	Ŷ	1	1	ዯ	320,000
Construction	Integrate	d Capital Management			3,200,000	ı	ı			ı		3,200,000
Total			\$	320,000	\$ 3,200,000 \$	1	۱ ۱	Ŷ	1	'	Ŷ	3,520,000

5200-500 - W	ater Division												
Latah Booste	r to Thorpe Reservo	oir Tra	insmi	ssio	n Mai	c							
Project Number:	WAT-2021-26					Budget Ye	ar:	2	023				
Project Type:	Water Mains					Budget Sta	:əge	A	dopte	ed Budget			
Year Identified:	2021					Region:			istric	2			
<u>Description</u> Additional transmis additional flow will	ssion main capacity is require be pushed through the pipe	ed betwe s exceed	en Lata ing the	ih Boo ir capë	ster and acity. This	Thorpe re	servoir. will cre	Once th ate suff	ne nev ficien	w reservo : capacity	ir is const to fill the	ructe new	d, reservoir.
<u>Justification</u> To meet demands t	to fill the new Thorpe reserve	oir. Thes	e dema	nds in	clude bo	th domest	ic and f	ire flow					
Comprehensive P CFU 1.2 - Operatior	<mark>lan Goals Met</mark> 1al Efficiency. This project wi	ll improv	'e the o	perati	onal effic	ciency by r	educing	trequire	em be	intenance			
Funding													
			2023		2024	202	5	2026		2027	202	8	Year Total
Reserves Integra	ated Capital Management	Ş	Т	Ş	1	-	Ş		Ş	800,000	8,000,00	\$ 0(	8,800,000
Total		Ş	ı	Ş	1	1	Ş	ı	Ş	800,000	8,000,00	\$ 00	8,800,000
Spending													
			2023		2024	202	5	2026		2027	202	8	Year Total
Design Integra	ated Capital Management	ዯ	I	Ŷ	1	1	Ŷ	ı	Ŷ	800,000	1	Ŷ	800,000
Construction Integra	ated Capital Management		I		I	I		Ţ		I	8,000,00	00	8,000,000
Total		Ş	ı	Ş	1	1	Ş	ı	Ş	800,000	8,000,00	\$ 0(	8,800,000

5200-500 -	Water Division								
Westbow T	ransmission Main - T	homas	Malle	n to Spot	ted				
Project Number:	: WAT-2021-27			Bı	ıdget Year:	202	23		
Project Type:	Water Mains			Bı	Idget Stage:	Adi	opted Budget		
Year Identified:	2021			Re	gion:	no	tside City		
Description This project will intertie agreeme not have capacit	construct a new transmission m ents with Fairchild AFB will requ y.	nain conne ire additic	ecting the onal trans	new Plains B mission to th	ooster and T e reservoir ar	homas Mallc d the Plains	on tank. Both de Pressure Zone.	velopme The existi	nt and ng pipe does
<mark>Justification</mark> The new pipe is r	necessary to deliver the require	ed water to	o the Tho	mas Mallon t	ank to supply	the Plains F	ressure Zone.		
<u>Comprehensive</u> CFU 1.2 - Operat	<u>e Plan Goals Met</u> ional Efficiency. This project wi	ll improve	the opera	ational efficie	ency by reduc	ing required	maintenance.		
Funding									
			2023	2024	2025	2026	2027	2028	6 Year Total
Reserves Inte	egrated Capital Management	Ş	- Ş	÷,	- Ş	800,000	\$ 8,000,000 \$	ı	\$ 8,800,000
Total		Ş	÷ -	- \$	\$ -	800,000	\$ 8,000,000 \$	ı	\$ 8,800,000
Spending									
			2023	2024	2025	2026	2027	2028	6 Year Total
Design Inte	egrated Capital Management	Ŷ	۔ ئ	۰ ک	۰ ک	800,000	ۍ ۲	ı	\$ 800,000
Construction Inte	egrated Capital Management				ı		8,000,000		8,000,000
Total		Ş	۰ بې	۰ ک	, Ş	800,000	\$ 8,000,000 \$	ı	\$ 8,800,000

	<b>Jevelopment</b>
sion	harging Station
Divis	(EV) C
0 - Water	Vehicles (
5200-50	Electric

Project Number:	WAT-2021-62	Budget Year:	2023
Project Type:	Water Maintenance	Budget Stage:	Adopted Budget
Year Identified:	2021	Region:	District 1
<b>Description</b>			

Electric Vehicles (EV) charging station development.

**Justification** 

Necessary before purchase and use of all-electric Vehicles.

**Comprehensive Plan Goals Met** 

CFU 1.3 - Maintenance. CFU 1.5 - Utility Construction Standards ED 6.1 - Infrastructure Projects.

#### Funding

		2023		2024		2025		2026		2027	2028	6 Year Total
Reserves Water Division	Ş	ı	Ş		Ş	ı	Ş	300,000	\$ 1,0C	\$ 000'0	ı	\$ 1,300,000
Total	Ş	ı	Ş	ı	Ş	I	Ş	300,000	\$ 1,00	\$ 000 <b>'</b> 0	ı	\$ 1,300,000
Spending												
		2023		2024		2025		2026		2027	2028	6 Year Tota
Construction Water Division	Ŷ	ī	Ŷ	ı	Ŷ	I	Ŷ	300,000	\$ 1,0C	\$ 000'0	I	\$ 1,300,000

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Total

5200-500 - Wat	ter Division							
Water Dept. O	ps Facility Maintenan	e and Ren	novation					
Project Number:	WAT-2021-69		Budg	et Year:	2(	)23		
Project Type:	Administrative Facilities		Budg	et Stage:	Ac	Jopted Budget		
Year Identified:	2021		Regic	:uc	D	strict 1		
<u>Description</u> Facility upgrades are r	equired for industrial hygiene $\pi$	itigation, office	e space, bathro	oom space	e, and stora	ge requiremer	its.	
<u>Justification</u> Water Dept. has ident access, undersized bat	ified unacceptable air quality cc throom facilities, etc.	nditions, unfav	orable office s	space con	ditions, lack	of storage, ur	lacceptabl	e levels of
<u>Comprehensive Plan</u> CFU 1 - Adequate Pub	Goals Met lic Facilities and Services CFU 5 -	Environmenta	l Concerns ED	6.1 INFRA	STRUCTUR	E PROJECTS		
Funding								
		2023	2024	2025	2026	2027	202	8 6 Year Total
Reserves Water Div	vision \$	l,100,000 \$ 1,	\$ 000'000	¢ -	I	¢ -	¢	\$ 2,100,000
Total	\$ 	1,100,000 \$ 1,	\$ 000'000	÷ -	ı	¢ '	, Ż	\$ 2,100,000
Spending								
		2023	2024	2025	2026	2027	202	8 6 Year Total
Construction Water Div	vision \$	l,100,000 \$ 1,	000'000 \$	۰ ک	ı	¢	\$ '	\$ 2,100,000
Total	Ş	1,100,000 \$ 1,	\$ 000'000	, Ş	ı	, Ş	, è	\$ 2,100,000

Vater Division	-
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Project Number:	WAT-2021-73	Budget Year:	2023
Project Type:	Vehicles and Equipment	Budget Stage:	Adopted Budget
Year Identified:	2021	Region:	District 1
Description			

Replacement of 2 mechanics trucks in consecutive years.

### **Justification**

Vehicles are necessary for the completion of mechanics duties to maintain the water system and hydroelectric facilities.

# **Comprehensive Plan Goals Met**

CFU 1.2 - Operational Efficiency: Projects that either improve the city?s operational efficiency or reduce costs by increasing the capacity, use, and/or life expectancy of existing facilities. CFU 6.5 - Infrastructure Maintenance: Maintain infrastructure at safe and efficient levels.

			2023		2024	2025	2026	2027		2028	6 Ye	ar Total
Reserves	Water Division	Ş	ı	Ŷ	115,000 \$	115,000 \$			Ş	1	Ŷ	230,000
Total		Ş	•	Ş	115,000 \$	115,000 \$			Ş		Ş	230,000
Spending												
			2023		2024	2025	2026	2027		2028	6 Ye	ar Total
Purchases	Water Division	Ş		Ş	115,000 \$	115,000 \$	-		Ş	1	Ş	230,000
Total		Ş	I	Ş	115,000 \$	115,000 \$	v,		Ş	-	Ş	230,000

		Budget Year:
ter Division		WAT-2021-75
5200-500 - Wai	Light Vehicles	Project Number:

Project Type:Vehicles and EquipmentBudget Stage:Adopted BudgetYear Identified:2021Region:District 1	Project Number: WAT-2021-75 Budget Year: 2023	2023 Adopted Budget District 1	Budget Year: Budget Stage: Region:	WAT-2021-75 Vehicles and Equipment 2021	Project Number: Project Type: Year Identified:
	Project Type:Vehicles and EquipmentBudget Stage:Adopted BudgetYear Identified:2021Region:District 1				

Replacement of 2 light Vehicles in 2023 for the Water Quality Coordinator and the Upriver Superintendent. Vehicles are at the end of useful life and require replacement.

### <u>Justification</u>

Replacement of aging fleet Vehicles for reliability and safety. Current Vehicles and equipment are reaching the end of useful life and are showing increased maintenance costs.

# **Comprehensive Plan Goals Met**

CFU 1.2 - Operational Efficiency: Projects that either improve the city?s operational efficiency or reduce costs by increasing the capacity, use, and/or life expectancy of existing facilities. CFU 1.3 - Maintenance: Require the maintenance, rehabilitation, and renovation of existing facilities.

			2023	2024	2025	2026	2027	2028	6 Year Total
Reserves	Water Division	Ş	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000	900,000
Total		Ş	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000	900,000
Spending									
			2023	2024	2025	2026	2027	2028	6 Year Total
Purchases	Water Division	Ş	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000	900,000
Total		Ş	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000 \$	150,000	900'006

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Water [	2
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/AT-2021-1504 Budget Year: 2023	/ater Maintenance Budget Stage: Adopted Budget	021 Region: Multiple
WAT-2021-1504	Water Maintenand	2021
Project Number:	Project Type:	Year ldentified:

Federal Energy Regulatory Commission (FERC) dam study, Part 12-D, for the Upriver Dam Facility. This is the 9th Part 12-D Study completed for this facility.

### **Justification**

This study is a FERC requirement for the licensing of the Upriver Dam Facility.

# **Comprehensive Plan Goals Met**

CFU 1.2: Operational Efficiency CFU 1.3: Maintenance CFU 1.5: Utility Construction Standards

#### Funding

			2023		2024	2025	2026	2027	2028	6 Year Tota
Reserves	Water Division	Ş	I	Ş	165,000 \$	28,000 \$	28,000 \$	28,000 \$	28,000	277,000
Total		Ş	ı	Ş	165,000 \$	28,000 \$	28,000 \$	28,000 \$	28,000	277,000
Spending										
			2023		2024	2025	2026	2027	2028	6 Year Tota
Planning	Water Division	Ş	I	Ş	165,000 \$	28,000 \$	28,000 \$	28,000 \$	28,000	277,000
Total		Ş	I	Ş	165,000 \$	28,000 \$	28,000 \$	28,000 \$	28,000	277,000

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# Lowboy Trailer

Project Number:	WAT-2021-1556	Budget Year:	2023
Project Type:	Equipment	Budget Stage:	Adopted Budget
Year ldentified:	2021	Region:	Multiple
<u>Description</u>			

The City's Water Department needs a replacement lowboy equipment trailer.

## **Justification**

The current trailer is 41 years old and does not meet current Washington bridge load standards.

# **Comprehensive Plan Goals Met**

CFU 1.2: Operation Efficiency

CFU 1.3: Maintenance

#### Funding

			2023	2024		2025		2026		2027		2028	6 Υ.	ear Total
Reserves	Water Division	ş	154,000 \$	T	Ş	ı	Ş	Ţ	Ş	T	Ş	I	Ş	154,000
Total		Ş	154,000 \$	ı	Ş	•	Ş	·	Ş	·	Ş	ı	Ş	154,000
Spending														
			2023	2024		2025		2026		2027		2028	6 Υ	ear Total
Purchases	Water Division	Ş	154,000 \$	ı	Ş	I	Ş	ı	Ş	I	Ş	I	Ş	154,000
Total		Ş	154,000 \$		Ş	ı	Ş	ı	Ş	I	Ş	I	Ş	154,000

5200-50	0 - Wat	er Division											
14th anc	d Grand	<b>Booster Station R</b>	ehab	ilitat	tion								
Project Num	:per:	WAT-2022-1460					Budget	: Year:		202	ŝ		
Project Type		Source Wells and Booster	Station	S			Budget	: Stage:		Adc	pted Budge	ţ	
Year Identifi	ied:	2022					Region	••		Dist	trict 2		
<u>Description</u> The booster improvemer	l station at 1 its.	14th and Grand needs to b	e updat	ed. Up	odates	include	new pr	ımps, n	lotors	, Motor	Control Ce	ters (MCCs),	and building
<u>Justificatior</u> The station u	<u>n</u> updates are	: required to meet the dem	tands of	f the h	igh pre	essure z	one.						
<mark>Compreher</mark> CFU 1.2: Opé CFU 2.1: Ava	erational Ef	<mark>Goals Met</mark> ficiency ic Facilities											
Funding													
				2023		2024		2025		2026	2027	2028	6 Year Total
Reserves	Integrated	Capital Management	Ş		Ş		, Ş	0,		¢ -	300,000	\$ 3,000,000	\$ 3,300,000
Total			Ŷ		ş		م	V		\$	300,000	\$ 3,000,000	\$ 3,300,000
Spending													
				2023		2024		2025		2026	2027	2028	6 Year Total
Design	Integrated	Capital Management	Ş		Ş	,	\$	Ű,		\$ -	300,000	- \$	\$ 300,000
Construction	Integrated	Capital Management					'				ı	3,000,000	3,000,000

300,000 \$ 3,000,000 \$ 3,300,000

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Total

5200-50	00 - Wa	ter Division								
Shawne	se Boos	ter Station Rehab	ilitatio	u						
Project Nu	mber:	WAT-2022-1461			8	udget Year:	2(	023		
Project Typ	)e:	Source Wells and Boost	er Statior	SI	Δ	udget Stage	A :	dopted Budg	et	
Year Identi	fied:	2022			æ	egion:	Ω	istrict 3		
<u>Descriptio</u> The Shawn building, pu require righ	<mark>n</mark> ee Booster umps, motu it of way p	Station needs to be repla ors, controls and electrical urchase.	ced. The . This wil	station is I replace	outdated an the existing s	d has excee tation locat	ded its usefu ed in an und	l life. The pro erground vau	oject will inclu It. The buildi	de a new ng will
<u>Justificatic</u> The rehabil	<u>on</u> litated stat	ion will improve reliability	and redu	Indancy fo	or the needs	of the servic	e area.			
<mark>Comprehe</mark> CFU 1.2: Op CFU 2.1: Av	ensive Plar perational ailable Puk	<u>n Goals Met</u> Efficiency blic Facilities								
Funding										
				2023	2024	2025	2026	2027	2028	6 Year Total
Reserves	Integrate	d Capital Management	Ş	\$ -	500,000 \$	ı	- \$	\$ 1,000,000	\$ 10,000,000	\$ 11,500,000
Total			Ş	\$ -	500,000 \$		\$ -	\$ 1,000,000	\$ 10,000,000	\$ 11,500,000
Spending										
				2023	2024	2025	2026	2027	2028	6 Year Total
Land Purchase	Integrate	d Capital Management	Ş	ţ.	500,000 \$	1	, ,	- Ş	, Ş	\$ 500,000
Design	Integrate	d Capital Management		ı	ı	ı	ı	1,000,000	ı	1,000,000

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Construction Integrated Capital Management

Total

\$ 1,000,000 \$ 10,000,000 \$ 11,500,000

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# Latah Booster Capacity Improvement

Project Number:	WAT-2022-1462	Budget Year:	2023
Project Type:	Source Wells and Booster Stations	Budget Stage:	Adopted Budget
Year Identified:	2022	Region:	District 2

#### **Description**

The City will construct a new booster station in the vicinity of the existing Latah Booster to improve reliability and redundancy in the service area.

## **Justification**

Additional boosting capacity is needed to serve areas south of US 195. The station will improve reliability and redundancy for the needs of the service area.

# **Comprehensive Plan Goals Met**

CFU 1.2: Operational Efficiency

CFU 2.1: Available Public Facilities

			2023		2024		2025		2026	2027		2028	6 Υ	ear Total
Reserves	Integrated Capital Management	Ŷ	,	Ş		ş	I	Ş	\$ 000'005	5,000,000	ţ (	ı	¢ Ş	,500,000
Total		ş		Ş		Ş		Ş	500,000 \$	5,000,000	\$ (	•	\$ 2	,500,000
Spending														
			2023	_	2024		2025		2026	2027		2028	6 Ү	ear Total
Design	Integrated Capital Management	Ŷ	,	Ş		ş	I	Ş	\$ 000'005	-	Ŷ	ı	Ş	500,000
Construction	Integrated Capital Management		ı		·		ı		ı	5,000,000	~	ı	ы	,000,000
Total		ŝ		ş	I	Ŷ	1	ş	500,000 \$	5,000,000	\$ (		У С	,500,000

Water Division	ocorroir
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Highland Reservoir	
<b>Highland Reservoir</b>	
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This project will construct a new water storage reservoir within the Highland Pressure Zone. The exact location of the tank is to be determined.

## **Justification**

The additional reservoir will provide needed storage to meet fire flow demands in the pressure zone.

# **Comprehensive Plan Goals Met**

CFU 1.2: Operational Efficiency

CFU 2.1: Available Public Facilities

			2023	~	2024		2025		2026		2027	2028	6 Year Tota	_
Reserves	Integrated Capital Management	Ş		Ŷ	ı	Ş	ı	Ş		\$	200,000 \$	2,000,000	\$ 2,200,000	
Revenue	Integrated Capital Management		·		ī		ı		ı	•	500,000	6,000,000	6,600,000	0
Total		Ŷ		Ş		Ş		Ş	1	Ş	\$ 000'008	8,000,000	\$ 8,800,000	
Spending														
			2023	~	2024		2025		2026		2027	2028	6 Year Tota	_
Design	Integrated Capital Management	Ş		Ŷ	ı	Ş	1	Ş		۰ ج	\$ 000'008	·	\$ 800,000	
Construction	Integrated Capital Management		ı		I		ı		ı		ı	8,000,000	8,000,000	0
Total		Ş	ı	ş	ı	Ş		Ş	1	ş	\$ 000,008	8,000,000	\$ 8,800,000	0

				na	dget Year:	202	ŝ			
Project Typ	e: Water Mains			Bu	dget Stage:	Adc	pted Budge	st		
Year Identif	ied: 2022			Re	gion:	Mu	ltiple			
<u>Descriptior</u> The City will	1 install new casing and a water lin	e for I-9(	0 crossing. Thi	s project sup	ports North S	pokane Cor	ridor (NSC)	constructi	on.	
<u>Justificatio</u> This project Transportat	n will be completed to support the ion's (WSDOT) utility agreements	overall <b>N</b> for utiliti	VSC project. Th ies below state	ıis work is ne e highways.	cessary to co	mply with V	Vashington	State Dep	artmen	t of
<u>Comprehei</u> CFU 1.2: Op	<u>nsive Plan Goals Met</u> erational Efficiency									
Funding										
			2023	2024	2025	2026	2027	20	28 6Y	ear Total
Grant	Integrated Capital Management	Ŷ	125,000 \$ 2	,562,000 \$	150,000 \$	\$ -	I	- \$	Ş	2,837,000
Total		Ś	125,000 \$ 2	,562,000 \$	150,000 \$	\$ '	I	÷	Ş	2,837,000
Spending										
			2023	2024	2025	2026	2027	20	28 6 Y	ear Total
Design	Integrated Capital Management	Ŷ	125,000 \$	۰ ک	۰ ئ	۰ ک	I	ې ۲	Ŷ	125,000
Construction	Integrated Capital Management		- 2	,562,000	150,000	T	ı	I	. •	2,712,000
Total		Ŷ	125,000 \$ 2	,562,000 \$	150,000 \$	۰ ئ	I	ې ک	S	2,837,000

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Project Nun	<b>ber:</b> WAT-2022-1507			Bu	ldget Year:	2023			
Project Type	e: Water Mains			Bu	dget Stage:	Adop	oted Budget		
Year Identifi	ied: 2022			Re	gion:	Mult	iple		
Description The City will	l install new casing and a water lin	e for I-9(	) crossing. <sup>-</sup>	This project sup	ports North S	pokane Corri	dor (NSC) cc	nstruction	
<u>Justificatio</u> This project Transportati	<u>1</u> will be completed to support the ion's (WSDOT) utility agreements	overall N for utiliti	ISC project. es below st	. This work is ne tate highways.	ecessary to co	mply with W	ashington St	ate Depart	ment of
Compreher CFU 1.2 :Opt	<u>nsive Plan Goals Met</u> erational Efficiency								
Funding									
			2023	2024	2025	2026	2027	2028	6 Year Total
Grant	Integrated Capital Management	Ş	125,000 \$	; 2,259,000 \$	150,000 \$	- Ş	. \$	I	\$ 2,534,000
Total		ŝ	125,000 \$	; 2,259,000 \$	150,000 \$	۰ ئ	۰ ۲		\$ 2,534,000
Spending			2023	2024	2025	2026	2027	2028	6 Year Total
Design	Integrated Capital Management	Ŷ	125,000 \$	· ·	ۍ ۲	۔ ب	\$ -	ı	\$ 125,000
Construction	Integrated Capital Management		,	2,259,000	150,000	ı	,	ı	2,409,000
Total		Ŷ	125,000 \$	; 2,259,000 \$	150,000 \$	، بې	۰ ۲	ı	\$ 2,534,000

Upriver Dam FE	RC Relicensing								
Project Number:	WAT-2022-1513			Budg	get Year:	202	3		
Project Type:	Water Maintenance			Budg	get Stage:	Ado	pted Budget		
Year Identified:	2022			Regi	:uo	Mul	Itiple		
<u>Description</u> Relicensing of the Upriv FERC by May 2026 to be completed with the reli	er Dam Facility with the Fe egin the relicensing of the 1 censing effort.	:deral Energy <sup>F</sup> acility which ε	Regulatory Co Sepires in 203	ommi 31. Th	ssion (FERC) iis funds the	. The Notic necessary	e of Intent (N studies and fi	OI) must be eld work th	tiled with at must be
<u>Justification</u> Required relicensing of operation of this facility	the Upriver Dam Hydroele	ctric Facility w	ith the Feder	ral Ene	ergy Regulat	ory Commi	ssion for the e	continued s	afe
<u>Comprehensive Plan</u> ( CFU 1.2: Operational Ef	<u>Goals Met</u> ficiency								
Funding					1000				
Reserves Water Divis	ion	<b>2022</b> 2	ζ - <b>2</b> 024	l so	\$ 000,002	100,000 \$	100,000 \$	100,000	5 500,000
Total		- \$	- \$	ŝ	200,000 \$	100,000 \$	100,000 \$	100,000	\$ 500,000
Spending									
		2023	2024		2025	2026	2027	2028	6 Year Total
Construction Water Divis	ion	- Ş	\$ -	ş	200,000 \$	100,000 \$	100,000 \$	100,000	\$ 500,000
Total		- \$	- \$	ŝ	200,000 \$	100,000 \$	100,000 \$	100,000	\$ 500,000

5200-500 - Wa	ater Division									
Study - Asset I	Management Frame	ewor	·k							
Project Number:	WAT-2022-1554			Bud	get Year:	202	3			
Project Type:	Water Mains			Bud	get Stage:	Add	opted Bud	get		
Year Identified:	2022			Reg	ion:	Mu	ltiple			
<u>Description</u>										
This is a study that w departments. The w	ill provide the City with a fra ater and wastewater depart	amewo	rk for develo will be provi	oping an asset iding funding i	managemer n their own	nt program budgets. Fi	for the wa unding shc	ter and wn is o	wastew nly Integ	ater rated
Capital Management	t's (ICM's) share (Utility Rate	s-IC) of	f the larger s	tudy total.						
<u>Justification</u> An asset managemer	nt program will give the City	the ba	sis to make <sub>l</sub>	good decisions	on repair/r	eplacement	t of existin	g asset:	Ġ	
<u>Comprehensive Pla</u>	in Goals Met									
CFU 1.3: Maintenanc CFU 1.6: Managemer	te nt Plans									
Funding										
			2023	2024	2025	2026	202	1	2028	6 Year Total
Reserves Integrat	ed Capital Management	Ş	75,000 \$	75,000 \$	¢ -	-	-	Ş	-	\$ 150,000
Total		ş	75,000 \$	75,000 \$	- ¢	v)- 1	'	Ş		\$ 150,000
Spending										
			2023	2024	2025	2026	202	~	2028	6 Year Total
Construction Integrat	ed Capital Management	Ŷ	75,000 \$	75,000 \$	۔ ج	1	'	Ş	ı	\$ 150,000
Total		Ş	75,000 \$	75,000 \$	۰ ب	v)-	1	Ş	I	\$ 150,000