City of Cashmere
101 Woodring Street
Cashmere, WA 98815
Ph (509) 782-3513 Fax (509) 782-2840
Website www.cityofcashmere.org

CASHMERE CITY COUNCIL MEETING
MONDAY, JANUARY 11, 2021 6:00 P.M., CITY HALL

DUE TO THE COVID-19 PANDEMIC AND THE GOVERNOR'S STAY AT HOME ORDER; CITY COUNCIL MEMBERS AND THE PUBLIC ARE REQUIRED TO CALL IN TO PARTICIPATE IN A DIGITAL CONFERENCE CITY COUNCIL MEETING. PLEASE CALL IN 5 MINUTES PRIOR TO MEETING.

To Join the Meeting Go To https://zoom.us
Meeting ID: 882 719 9871 Passcode: 788276
Audio Only: PH# 1-(253)-215-8782

AGENDA

CALL TO ORDER

ROLL CALL

ANNOUNCEMENTS

APPROVAL OF AGENDA

CONSENT AGENDA

1. Minutes of December 14, 2020 Regular Council Meeting by Digital Conference
2. Payroll and Claims Packet Dated December 31, 2020 Month End

BUSINESS ITEMS

1. Council Discussion Topics – no action needed at this time
   - Draft report on utility technology control and monitoring upgrades (SCADA)
   - Utility services succession and future operations
   - Railroad Avenue property utility extensions
   - North Central Regional Library District report on Cashmere Library

PROGRESS REPORTS

ADJOURNMENT

TO ADDRESS THE COUNCIL, PLEASE BE RECOGNIZED BY THE MAYOR AND STATE YOUR NAME WHEN YOU BEGIN YOUR COMMENTS
Americans with Disabilities Act (ADA) accommodations provided upon request (48-hour notice required)

MINUTES OF THE CASHMERE CITY COUNCIL MEETING
MONDAY DECEMBER 14, 2020 AT CASHMERE CITY HALL – DIGITAL CONFERENCE

OPENING
Mayor Jim Fletcher opened the regular City Council meeting via digital conference at 6:00 p.m. at City Hall. City Clerk-Treasurer Kay Jones took minutes.

Now for the roll call of the council members to document attendance. Please respond with an acknowledgment of your presence when your name is called.

ATTENDANCE

	Present	Not Present
Mayor:	Jim Fletcher	
Council:	Daniel Scott - digital Chris Carlson - digital Dave Erickson - digital Jayne Stephenson - digital Derrick Pratt - digital	
Staff:	Kay Jones, Clerk-Treasurer	Steve Croci, Director of Operations
	Chuck Zimmerman, City Attorney	
Public:	Kirk Beckendorf, Cashmere Valley Record – digital Deanna Gregory, Bond Counsel - digital	

EXECUTIVE SESSION – RCW 42.30.110(1)(i) to discuss potential litigation
At 6:01 p.m. Mayor Fletcher entered into an Executive Session to discuss potential litigation for approximately 30 minutes. Executive Session closed at 6:27 p.m.

Mayor Fletcher reconvened the Regular Session at 6:30 p.m.

ANNOUNCEMENTS AND INFORMATION
Mayor Fletcher announced that the State Auditors have completed the three-year audit and an exit conference has been scheduled. Councilmembers are invited to attend. Councilor Erickson and Councilor Scott will be attending.

The Mayor announced that the City is accepting amendments to the Comprehensive Plan for consideration.

APPROVAL OF AGENDA
MOVED by Councilor Pratt and seconded by Councilor Stephenson to approve the agenda as submitted. Motion carried 5-0.

CONSENT AGENDA
Minutes of November 23, 2020 Regular Council Meeting by Digital Conference
Minutes of November 30, 2020 Special Council Meeting by Digital Conference
Payroll and Claims Packet Dated December 14, 2020
Claims Direct Pay and Check #40829, #40832 and #40834 through #40864 totaling $154,262.38

Payroll Direct Deposit and Check # 40830 through #40831 totaling $102,201.20
Replaced Lost Check #40155 with Check #40833
Extending completion date to 12/31/2021 on Perteet Task Authorization #1
Extending completion date to 12/31/2021 on Perteet Task Authorization #2

MOVED by Councilor Stephenson and seconded by Councilor Erickson to approve the items on the Consent Agenda. Motion carried 5-0.

SECOND SETTLEMENT AGREEMENT BETWEEN TREE TOP AND CITY OF CASHMERE
MOVED by Councilor Erickson and seconded by Councilor Carlson to approve the Second Settlement Agreement between Tree Top and the City and authorize the Mayor to sign. Motion carried 5-0.

ORDINANCE NO. 1296 ADOPTING THE BUDGET FOR 2021
MOVED by Councilor Carlson and seconded by Councilor Scott to adopt Ordinance No. 1296 adopting the budget for 2021. Motion carried 5-0.

ORDINANCE NO. 1297 AUTHORIZING THE ISSUANCE OF THE WATER AND SEWER REFUNDING BONDS 2021
MOVED by Councilor Scott and seconded by Councilor Pratt to adopt Ordinance No. 1297 authorizing the issuance of the Water and Sewer Refunding Bonds 2021. Motion carried 5-0.

RESOLUTION NO. 09-2020 AMENDING WASTEWATER RATES THROUGH 2025
MOVED by Councilor Pratt and seconded by Councilor Stephenson to adopt resolution No. 09-2020 amending Wastewater Rates through 2025. Motion carried 5-0.

RESOLUTION NO. 10-2020 APPOINTING J.C. BALDWIN AS THE CITY REPRESENTATIVE ON THE GREATER WENATCHEE REGIONAL EVENTS CENTER PUBLIC FACILITIES DISTRICT BOARD
MOVED by Councilor Pratt and seconded by Councilor Carlson to adopt Resolution No. 10-2020 appointing a City representative on the GWREC Public Facilities District Board. Motion carried 5-0.

PROGRESS REPORTS
Mayor Fletcher reported that the gutter repair for the City Pool will be ready to bid early this spring. The deck drains need to be repaired also; however, he is holding off on having the engineers design the deck drains. He wants to move forward on the gutter repair and look at options in repairing the deck drains.

The water and sewer availability study for the City property on Railroad Avenue has been completed. The Mayor will forward a copy to the Council. The next step is talking with the Port District for insight on future values and economic developments for the property.

ADJOURNMENT
Mayor Fletcher adjourned the meeting at 6:47 p.m.

_____
James Fletcher, Mayor

Attest:

_____
Kay Jones, City Clerk-Treasurer

Staff Summary

Date: **January 7, 2021**

To: **City Council**

From: **Jim Fletcher, Mayor**

RE: **Council Agenda Discussion Topics – NO Action at this time.**

Starting 2021 with a request for the Council to discuss several topics regarding future operation and projects. Each of these topics requires additional information before making recommendations to the Council for action. Your opinions and guidance in determining what option(s) to pursue and recommendations on actions policies and budgets.

1. Draft report on utility technology control and monitoring upgrades (SCADA).
    a. Full implementation of capital improvements is estimated at $310,000, amount presently budgeted $100,000
    b. RH2 preliminary report attached

2. Utility services succession and future operations
    a. Level 3 operator search
    b. Adding customers, long term approach, policies
    c. Impacts to budget and rates to be determined

3. Railroad Ave. property utility extensions
    a. Next step options, technical assistance from Port,
    b. Pace report attached
    c. Not presently budgeted, Regional Port Authority grant carried over.
    d. Valuation of property with utilities TBD
    e.
4. North Central Regional Library Dist. (NCRL) report on Cashmere Library
    a. Consultants suggested facility capital improvements, 20-year plan
    b. Consultants draft report attached
    c. Copy of Library Lease, expires 12/31/23

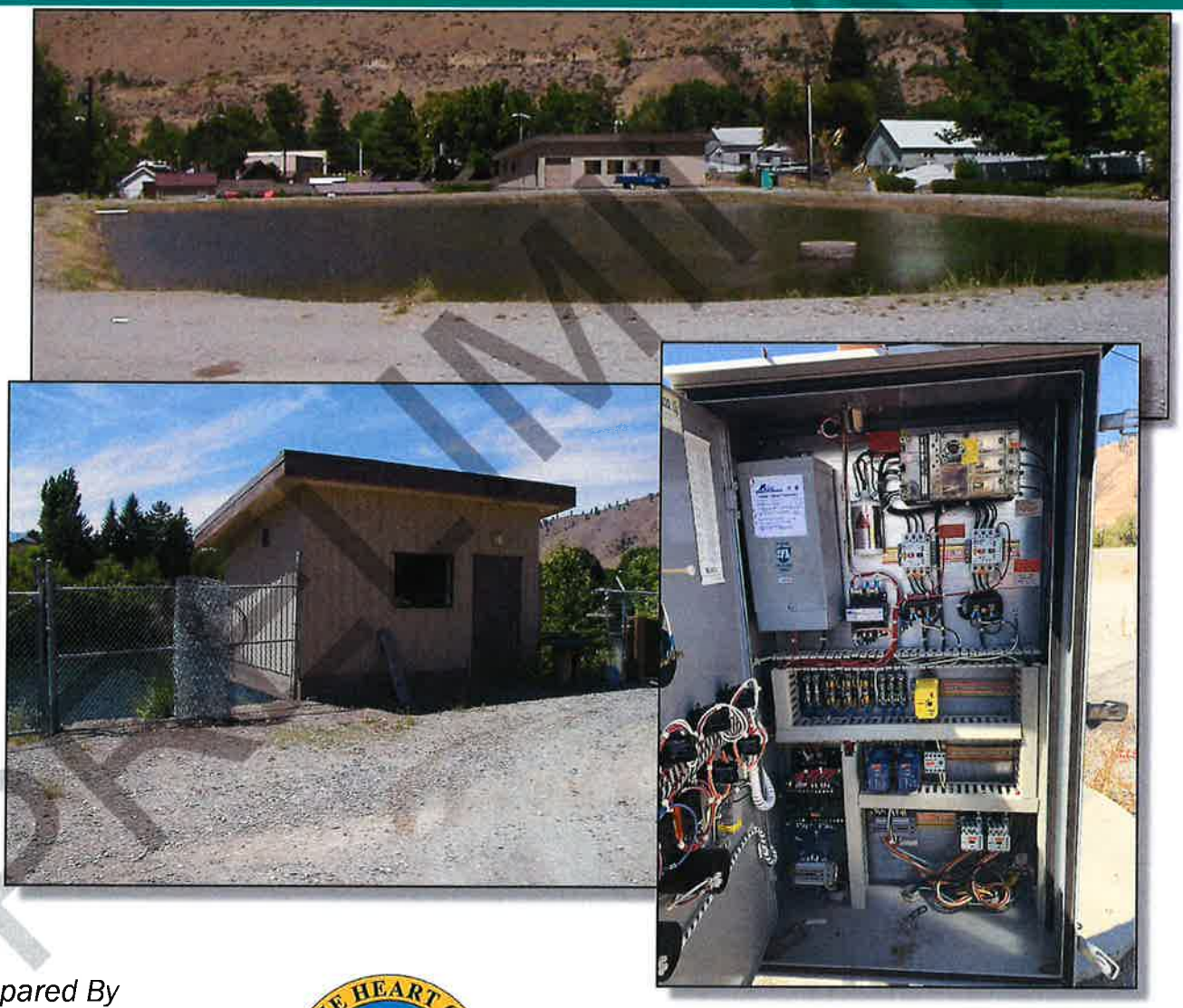
Staff Recommendation: Provide Advice and Guidance

SCADA Improvements Budget Estimates

	CIP		Capital Est	Annual
H20	1	Chlorine Monitoring	$ 11,500	
H20	5	Water TP Turbidity	$ 17,500	
H20	9	Water TP Intake	$ 4,000	
H20	10	Well 4 Controls	$ 1,200	$ 240
H20	11	Well 11 Communications	$ 1,200	$ 240
H20	12	Water Treatment Controls	$ 125,000	
H20	14	Vist Heights Booster Pump	$ 8,500	
H20	15	Sherman Pump Controls	$ 40,000	
		SubTotal Water	**$ 208,900**	$ 480
WWTP	2	WWTP Server	$ 9,000	
WWTP	3	WTTP Firewall	$ 1,500	
WWTP	4	SCADA Software	$ 11,000	$ 720
WWTP	6	W. Lift Station Tele	$ 11,500	
WWTP	7	W. Lift Control	$ 6,000	
WWTP	8	E. Lift Alarm	$ 48,000	$ 360
WWTP	16	WWTP DAF Control	$ 2,750	
		SubTotal Wastewater	**$ 89,750**	$ 1,080
Both	13	Radio Site Network	$ 10,000	
		TOTAL SCADA CIP	**$ 308,650**	**$ 1,560**

City of Cashmere

SCADA MASTER PLAN



Prepared By

RH2

THE HEART OF CASHMERE WASHINGTON

REVIEW

DECEMBER XX, 2020

City of Cashmere

SCADA Master Plan

1 INTRODUCTION

SCADA (Supervisory Control and Data Acquisition) is a catchall term to describe the infrastructure used to remotely monitor and adjust control systems. When it comes to the City of Cashmere (City), SCADA is used throughout the City's Water and Wastewater system.

In 2020, The City of Cashmere authorized RH2 Engineering, Inc., (RH2) to prepare a SCADA master Plan. The primary purpose of the SCADA Master Plan is to identify and develop standards for the City's control, SCADA, and communication systems. Several areas have been identified as areas needing improvement, including the following:

- Use of smart controls system-wide to allow for greater water control between pressure zones.
- Increased system information to allow for better troubleshooting of issues in the City.
- Ability for the City Operators to adjust controls and perform day-to-day tasks without physically visiting the sites.
- Increased monitoring and control to meet regulations to remove weekend duty.
- Addition of video equipment for security and monitoring of systems.

This is a planning document only, it is not intended as a definitive statement or analysis of the full scope of all control systems held by the City or in which the City may have an interest.

2 EXISTING SCADA

Currently the City operates two different SCADA systems, one SCADA system is centered around the City's Wastewater Treatment Plant (WWTP) and the other for the City's locations remote to the WWTP.

The City's WWTP uses a custom SCADA solution built on upon two servers running AVEVA Intouch (Wonderware has since changed its name to AVEVA). WWTP SCADA is used to inform operators of the plant's operational status. This includes alarming out to operators if the system identifies issues and historical trending of the systems performance. Of the two servers, one SCADA server is used for operation from the TV in the common space of the Plant. The second SCADA server is located on the operations desk and is additionally used for operator adjustments to the remote alarming.

Remote locations include the City's Water Treatment Plant (WTP), reservoirs, booster pump stations (BPS), and lift stations. Most of these sites are currently monitored by the City's secondary SCADA system, Mission Communication SCADA (MCS). Sites with MCS have different capabilities depending on licensing that can limit a site to remote monitoring without the ability to control that sites equipment. Operators interface with MCS systems by using a website

provided by Mission Communications. Additionally, not all remote sites have any SCADA at all. The following sites currently have MCS and are contain their abilities in the parenthesis:

- Museum Lift (Only High Level)
- Well 4 (Run/Fail, manual start/stop)
- Sherman (Run/Fail. Automatic Control with Setpoints, level transducer)
- Kennedy (Level Transducer)
- Well 10 (Run/Fail, Manual Start/Stop, CL2 Leak detector)
- WTP (Well pump Run/Fail, Automatic Control level, CL2 analyzer, Turbidity, Cl2 Detector, Low Sump float Alarm, Flood Switch)
- City Lift (Run/Fail, High Level Float)

For the sites without any SCADA connection systems, the City relies on operators to view these sites daily, or for notifications from the public on issues. This has resulted in the need for weekend duty, overtime due to unknown issues during the normal working hours, and unknow system usage due to no long term data trending. The following sites currently have no SCADA system:

- East Lift Station
- West Lift Station
- Vista Hights BPS
- WTP Intake
- City Hall

3 OPPORTUNITIES FOR IMPROVEMENTS

CIP 1: CITY HALL CHLORINE MONITORING

Issue: To meet DOH requirements, City operators are required to visit City Hall to take chlorine samples.

Improvement: Adding an automatic chlorine analyzer will help alleviate operator workload by eliminating the need for operators to go to City Hall and take samples. An automatic chlorine analyzer will continuously record the free chlorine levels in the City's distribution system. From there it will connect to the City's control system network and then be displayed on the WWTP SCADA screen.

Cost: $11,500.0

CIP 2: WWTP SCADA SERVER REPLACEMENT

Issue: Of the two WWTP SCADA servers running, the oldest, installed in 2016, is coming up on the end of its 5-year reliable operational period. At this point the manufacturer will have stopped providing support for the equipment and chance of catastrophic failure increases. Additionally, the operating system currently installed on the server is Windows Server 2012 R2.

Microsoft has ended mainstream support in January 9th, 2018 and extended support is ending in January 10th, 2023.

Additionally, the interface used for the server to talk to the phone system is becoming outdated, newer versions of Win911 do not support it, and the latest versions of Windows breaks the connection.

Improvement: It is proposed that a new server be installed with an updated operating system. New hardware will carry with it manufacturer support and reduce chances of aging hardware failure. For cyber security purposes it is also recommended that the operating system be updated during the server upgrade.

Along with the server hardware upgrade, the TAPI modem should be replaced by a VOIP solution. A VOIP solution will reduce reliance on windows and allow for new versions of Win911 to be used.

Cost: $9,000.00

CIP 3: WWTP FIREWALL REPLACEMENT

Issue: The existing WWTP firewall appliance, a Sonicwall TZ 215, has reached its end of life for software replacement and firmware upgrades. For the network security of the WWTP, it is imperative this is replaced.

Improvement: Replacement of the existing Sonicwall firewall with a newer unit that has the latest security features allows for a like-in-kind replacement without needing to reconfigure or reprogram individual end users.

Cost: $1,500.0

CIP 4: SCADA SOFTWARE

Issue: The City's current SCADA software was installed during the Cashmere Wastewater Treatment Plant startup in 2014. Over the past 6 years support for these programs has ended. In 2021 Win911 V7 Pro will be shutting down their mobile Win911 services and is moving to the new Win911 interactive.

Improvements: To get back in support it is recommended to upgrade to newer and supported software. This would include upgrading AVEVA InTouch runtime and Win911.

InTouch version currently being used for the City's SCADA system is 2012 r2, updating the license would bring it up to the latest 2020 license. Besides regaining support, upgrading will bring with it all the updates from a newer program, ensure that it will be able to run on newer Windows operating systems, and latest security patches. Currently the City license is for runtime only, which allows for the SCADA program to be run, but not modified. If the City desires the ability to update the program themselves a developer license can be bought for additional cost. Updating the license will also require that the current SCADA program be converted to run on the newer software.

At the end of 2021 Win911 is planning on shutting off their Win911 V7 Pro mobile servers. Win911 has moved their resources to their newer product, Win911 Interactive. With the City's

ongoing support contract the upgrade to Interactive is free. However unlike V7 Pro, to keep the mobile features running a current support contract is needed.

Cost: $11,000.00

Yearly Cost: $720.00

Optional development license: $15,000

CIP 5: WATER TREATMENT PLANT INTAKE – TURBIDITY

Issue: The Water Treatment Plant can experience periods of poor water quality that clog up the plant intake screens and filter cells. To prevent clogs, operators need to constantly visit the intake to monitor water quality.

Improvements: To help the system performance and reduce the number of visits operators have to perform, a turbidity sensor can be added. A turbidity sensor will continuously monitor the water quality being pumped into the filter cells. If the sensor detects poor quality a signal will be sent to out to stop pumps. Additionally, the turbidity of the water will be sent to SCADA to monitor the presence of suspended particles. This will consist of the turbidity sensor, turbidity sensor insertion mount, turbidity transmitter, radios between intake build and WTP, networking equipment, and fiber connection to PUD. The communication and networking equipment will be used as a backbone for future improvements.

Cost: $ 17,500.00

CIP 6: WEST LIFT STATION TELEMETRY PANEL

Issue: West Lift Station telemetry panel is currently non-operational. The PLC and OI are both non-operational preventing remote and local alarming. Operators currently must monitor the station in person instead of remotely.

Improvement: Both the PLC and OI are to be replaced and communications restored to the WWTP. Alarms will be added into the City's call out system and the systems performance to be displayed on SCADA.

Cost: $11,500.0

CIP 7: WEST LIFT STATION CONTROL UPGRADE

Issue: West Lift Station is currently controlled by a failing Flygt MultiTrode pump controller. Additionally, the lift station cannot be controlled remotely.

Improvements: Assuming CIP 6 for the telemetry panel upgrades has been performed, it is recommended that the operations of West be performed by the telemetry panel. Operation from the telemetry panel will allow for custom lift station program that will have the ability to be remotely controlled and monitored.

Cost: $6,000.00

CIP 8: EAST LIFT STATION

Issue: Currently East Lift Station (East) does not have any capabilities for remote alarming, monitoring, or control.

Improvements: To add basic remote features to East, a MCS unit can be added. If an existing site that had a MCS unit was upgraded to a custom control solution, that MCS unit can be re used at East. In the case of full remote alarming, monitoring, and control is wanted a new telemetry panel will need to be added with additional level monitoring, project bidding, and design needs.

If choosing a custom control system, the project would need to be designed and bid due to the price of the project.

Costs:

Mission Control System:

Used: $6,200

New: $9,500

Yearly communication fee: $360

Custom control system: $48,000

CIP 9: WATER TREATMENT PLANT INTAKE – LEVEL

Issue: Water level at the Water Treatment Plant is currently not monitored.

Improvement: Assuming CIP 5 was performed, adding a submersible level transmitter with sounding tube and modify the Turbidity transmitter to accept added analog input. Water intake level will be continuously monitored and will be displayed on SCADA.

Cost: $4,000

CIP 10: WELL NO. 4 CONTROLS UPGRADES

Issue: Well No. 4 is currently controlled by MCS. With the current MCS setup, remote control of pumps or alarming is not enabled.

Improvement: Upgrade Well No. 4 MCS to enable remote control features.

Cost: $1,200.00

Added Yearly Cost: $240.00

CIP 11: WELL NO. 11 MISSION COMMUNICATION UPGRADES

Issue: Well No. 10 is currently controlled by MCS. With the current MCS setup, remote control of pumps or alarming is not enabled.

Improvement: Upgrade Well No. 10 MCS to enable remote control features.

Cost: $1,200.00

Added Yearly Cost: $240.00

CIP 12: WATER TREATMENT CONTROL UPGRADES

Issue: The WTP building control system is a mix of limited MCS SCADA equipment and standalone instrument panels that control specific issues. There are many areas of the plant currently only monitored by operators who stop there daily. Some of these items can change throughout a normal working day and could cause for afterhours callouts.

Improvement: The MCS SCADA system and standalone panels would be replaced and combined into a central, PLC based control system. Existing devices would be used for their raw or engineered values like flow, level, CL2 residual, intake turbidity (assuming CIP5) and intake level (assuming CIP 9), but the PLC would be programmed to make intelligent decisions on plant operation. Non-monitored features would be integrated including a flood switch in the drywell, clear well level, and piezometer tube level low level monitoring. Cameras would be added for remote monitoring of the piezometer levels in real-time. The WTP would be integrated into the WWTP SCADA system and thus would assume CIP 5 was completed with Fiber already available at the WTP.

This project would need to be designed and bid due to the complexity of the project.

Cost: $125,000

CIP 13: RADIO COLLECTOR AND SITE NETWORKING

Issue: The existing remote sites either rely on cellular connections for the MCS control system or does not currently have any network or remote communication means.

Improvement: A new high-speed radio network utilizing wireless internet service provider (WISP) equipment would be created between all of the sites; see **Figure 1**. A central collector would be installed at Kennedy reservoir with the chance of having one or two point-to-point (PTP) radio connections where Kennedy line of site might not be perfect. Kennedy would receive a backup power supply to keep the communication system running in the event of a power outage.

This would allow for cameras, existing radios, and cellular systems to be removed for service if needed.

Cost: $10,000

CIP 14: VISTA HEIGHTS BPS MONITORING UPGRADE

Issue: The existing control system at Vista Heights BPS is not monitored. Kennedy Tank is monitored by MCS for control of Sherman Booster Pumps only.

Improvement: If CIP 13 has been completed, a simple PLC can be installed inside of the Vista Heights BPS to allow for integration into the SCADA system at the WWTP. At this time, a simple pressure transmitter and pressure switch can be added for remote level monitoring of the Kennedy reservoir and backup high level monitoring in leu of a float.

Cost: $8,500

CIP 15: SHERMAN TANK AND BPS CONTROL REPLACEMENT

Issue: The Sherman BPS is controlled and monitored by MCS for simplistic control to fill the Kennedy Tank.

Improvement: Assuming CIP 12, 13, and 14 have been completed, Sherman Tank and BPS should be upgraded to reduce the need for MCS control for the major sites of the City's water system. The upgrade would bring advanced monitoring and control capabilities to the system including system fill schemes to make use of the WTP more efficient. This would lead to lower maintenance on the systems.

Cost: $40,000

CIP 16: WWTP DAF HOPER LEVEL CONTROL UPGRADE

Issue: The existing DAF Hopper level control is by a float. At times of the year, the sludge thickened by the DAF will weigh down the float, causing control issues after hours or during the weekends.

Improvement: To eliminate after hours or weekend issues with the DAF operation, the float should be replaced by a digital pressure control switch. City staff should provide the mechanical connection, with an electrician's time to extend wiring and RH2's time for setup and programming changes.

Cost: $2,750

While the CIP projects are numbered 1 to 16, individual CIP projects can be performed out of order. If the City wants to proceed with a CIP project that assumes another CIP completion, either cost or improvements should be adjusted to compensate for the desired outcome.

4 Conclusion

RH2 Recommends that the City immediately move forward with... [Follow-up with City]

Figures

Figure 1:

City High-Speed Network Potential Radio Communication Paths

Figure of 5 GHz Radio Communication Paths. Figure developed with Ubiquiti Airlink Software.

North Central Regional Library Dist.
Requests for Cashmere Library

Subsystem	Budget Year	PR Total
D3050 Terminal and Package Units	2021	$131,200
D5090 Other Electrical Systems	2021	$1,500
D5037 Low Voltage Fire Alarm	2022	$18,100
D5039 Low Voltage Data	2022	$4,000
D4030 Fire Protection Specialties	2022	$2,500
D3060 Controls and Instrumentation	2025	$22,200
D5032 Low Voltage Communication	2026	$11,100
D2090 Other Plumbing Systems	2026	$3,600
D5020 Lighting and Branch Wiring	2028	$63,700
E2010 Fixed Furnishings	2028	$4,700
D3040 HVAC Distribution Systems	2030	$41,000
D2010 Plumbing Fixtures	2030	$22,200
D2030 Sanitary Waste	2030	$16,800
D2040 Rain Water Drainage	2030	$4,200
D5039 Low Voltage Data	2030	$3,700
D5010 Electrical Service and Distribution	2030	$1,700
D2020 Domestic Water Distribution	2031	$7,800
B2020 Exterior Windows	2031	$3,800
C3010 Wall Finishes	2032	$3,300
B2030 Exterior Doors	2032	$3,100
C3020 Floor Finishes	2034	$29,300
B3010 Roof Coverings	2034	$15,700
C1030 Fittings	2037	$8,100
D5039 Low Voltage Data	2038	$3,400
C3030 Ceiling Finishes	2039	$32,800
TOTAL		**$459,500**

NORTH CENTRAL
REGIONAL LIBRARY

Draft Facility Condition Report

Cashmere Public Library

Prepared by MENG Analysis

September 3, 2020

Contents

Tables

Figures

Section 1. Executive Summary

1.1 Project Overview

In late 2019, North Central Regional Libraries (NCRL) engaged MENG Analysis to perform a comprehensive facility condition assessment (FCA) of the facilities which house NCRL branches. These facilities are a combination of standalone buildings and dedicated spaces within larger facilities. Some are owned by NCRL whereas others are leased spaces, maintained by the City, building owner, or friends of the library groups. The purpose of this assessment is to support each library branch in understanding, prioritizing, and budgeting for their maintenance needs in both the short term (5-year) and long term (20-year). **Table 1** lists the facilities reviewed in this assessment.

Table 1. NCRL Facilities List

Facility	Address	City	ZIP	County
Brewster Public Library	108 S 3rd Street	Brewster	98812	Okanogan
Bridgeport Public Library	1206 Columbia Avenue	Bridgeport	98813	Douglas
Cashmere Public Library	300 Woodring Street	Cashmere	98815	Chelan
Chelan Public Library	216 N Emerson Street	Chelan	98816	Chelan
Coulee City Public Library	405 W Main Street	Coulee City	99115	Grant
Curlew Public Library	11 River Street	Curlew	99118	Ferry
East Wenatchee Public Library	271 9th Street NE	East Wenatchee	98802	Douglas
Entiat Public Library	14138 Kinzel Street	Entiat	98822	Chelan
Ephrata Public Library	45 Alder Street NW	Ephrata	98823	Grant
George Public Library	109 N Washington Way	George	98824	Grant
Grand Coulee Public Library	225 Federal Avenue	Grand Coulee	99133	Grant
Leavenworth Public Library	700 Highway 2	Leavenworth	98826	Chelan
Manson Public Library	80 Wapato Way	Manson	98831	Chelan
Mattawa Public Library	101 Manson Lane	Mattawa	99349	Grant
Moses Lake Public Library	418 E 5th Avenue	Moses Lake	98837	Grant
NCRL Administrative Offices	16 N Columbia Street	Wenatchee	98801	Chelan
Okanogan Public Library	228 Pine Street	Okanogan	98840	Okanogan
Omak Public Library	30 Ash Street South	Omak	98841	Okanogan
Oroville Public Library	1276 Main Street	Oroville	98844	Okanogan
Pateros Public Library	174 Pateros Mall	Pateros	98846	Okanogan
Peshastin Public Library	8396 Main Street	Peshastin	98847	Chelan
Quincy Public Library	208 Central Avenue South	Quincy	98848	Grant
Republic Public Library	794 South Clark Avenue	Republic	99166	Ferry
Royal City Public Library	136 Camelia Street NW	Royal City	99357	Grant
Soap Lake Public Library	32 Main Avenue East	Soap Lake	98851	Grant
Tonasket Public Library	209 South Whitcomb	Tonasket	98855	Okanogan
Twisp Public Library	201 Methow Valley	Twisp	98856	Okanogan
Warden Public Library	305 South Main Street	Warden	98857	Grant
Waterville Public Library	107 W Locust Street	Waterville	98858	Douglas
Wenatchee Public Library	310 Douglas Street	Wenatchee	98801	Chelan
Winthrop Public Library	49 State Route 20	Winthrop	98862	Okanogan

1.2 Report Organization

This report is organized into two sections:

- **Section 1. City-specific Executive Summary** presents the project and process overview and FCA terminology and concepts, together with summary information for each City library branch
- **Section 2. Database Reports** includes the detailed condition and cost assessment reports for each library facility

In addition to the written report, we are also providing NCRL and each individual City library with an interactive dashboard that presents FCA report data in a visual format. It should be noted that this dashboard is intended to be used as a visualization tool, but not as a standalone asset condition management system.

1.3 Terminology and Abbreviations

To ameliorate readers' understanding of the data and concepts presented in this report, the following section presents common terms and abbreviations related to the FCA process.

Facility Condition Assessment (FCA): A structured process to document the conditions of site infrastructure and building systems. FCAs are typically performed by a multi-disciplinary team of architects, engineers, construction, and cost specialists. Facility information and condition data should be maintained in a database for ease of updating and reporting. The data should be renewed over time.

Facility Condition Index (FCI): A benchmark used to compare relative condition of facilities within a portfolio of assets; derived by the following formula:

$$FCI = \frac{\text{Backlog of Maintenance and Repair (BMAR)}^{1}}{\text{Current Replacement Value (CRV)}}$$

Life Cycle Renewal Model: A theoretical forecast of when building systems will exceed their typical lifespan and funding will be required for renewals.

Parametric Costs: Parametric cost estimating is a technique that uses statistical relationships between historical cost data and other program variables such as system condition or age. Historical cost data is typically used at a high level (e.g., cost per square foot) and often represent conceptual, order-of-magnitude costs for initial planning or discussion purposes.

Remaining Useful Life: An estimate of the years that a facility system may remain serviceable or in operation before failure; which would then require system renewal or replacement.

Subsystem: The term subsystem in this report refers to a Uniformat Level 3 building systems category (e.g., B3010 - Roof Coverings; or B3020 – Roof Opening; or B3030 – Projections).

System: The term system in this report refers to a Uniformat Level 2 building system category (e.g., B30 – Roofing)

[1] This assessment uses a parametric method that calculates BMAR based on the assessed condition scores. The statistical basis is a study conducted by NASA on over 10,000 surveyed facilities that evaluated the backlog of repair items relative to qualitative condition scores 1 through 5. The parametric backlog for each system is calculated based on a statistical theoretical percentage of that system that would need repair or replacement for each of the qualitative condition scores. The costs of those systems are the facility use cost models customized for NCRL.

Table 2. Commonly Used Abbreviations

ACT	Acoustic ceiling tile
ADA	Americans with Disabilities Act
A/V	Audio/video
AED	Automated external defibrillator
CO	Carbon monoxide
CCTV	Closed-circuit television
CMU	Concrete masonry unit
CU	Condensing unit
DW&V	Drain, waste, and vent
ESCO	Energy Services Company
EIFS	Exterior insulation and finish system
FRP	Fiberglass reinforced plastic
FACP	Fire alarm control panel
FDC	Fire department connection
GRD	Grilles, registers, and diffusers
G&DS	Gutter and downspout
HID	High-intensity discharge
LED	Light-emitting diode
MC	Metal-clad
PTAC	Packaged terminal air conditioner
POTS	Plain old telephone system
PIV	Post indicator valve
RPBP	Reduced-pressure backflow preventer
T-stat	Thermostat
T&G	Tongue and groove
TVSS	Transient voltage surge suppressor
VAV	Variable air volume
VVT	Variable volume and temperature
VCT	Vinyl carpet tile
VOIP	Voice over Internet Protocol
WAP	Wireless access point

1.4 Process

The field survey team was composed of MENG Analysis technical experts who reviewed civil, structural, architectural, mechanical, electrical, plumbing, and site infrastructure systems at each facility to a Uniformat Level 3 (subsystem) detail[2]. These individual subsystem descriptions and scores can be found in **Section 2** in the Facility Summary. These descriptions and scores are the basis for calculating the facilities' Facility Condition Index (FCI) and Weighted Average Condition Score (WACS).

Facility Condition Index (FCI)

A Facility Condition Index (FCI) is an industry standard used for benchmarking and evaluating a portfolio of facility assets over time[3]. The FCI is the ratio between a facility's Backlog of Maintenance and Repair (BMAR) and the Current Replacement Value (CRV) of the facility. The lower the FCI, the lower the cost of maintenance backlog in relation to the cost of a full building replacement.

The FCI for the Cashmere Public Library is 0.11

Weighted Average Condition Score (WACS)

Each surveyed building is broken down into Uniformat categories, systems, and subsystems. The surveyors use standard criteria for scoring each subsystem from 1 to 5, where 1 is Excellent, and 5 is Unsatisfactory. These subsystem scores are combined to a weighted average (based on prevalence) to the system level. A similar weighed calculation is performed at the category level, resulting in a 1-5 score for the building as a whole. This is called the Weighted Average Condition Score (WACS).

The WACS for the Cashmere Public Library is 2.8

---

[2] http://www.uniformat.com/index.php/unifrmt-ii/astm-standards/98-classification-of-building-elements-per-astm-uniformat-ii-standard

[3] Since 1999 GASB 34 has required government agencies to improve Basic Financial Statements, including periodic Condition Assessment of capital assets; subsequent protocols were developed by GSA, NASA, States, NCUBO and others with most sharing similar definitions of BMAR, CRV & FCI.

1.5 Cost Overview

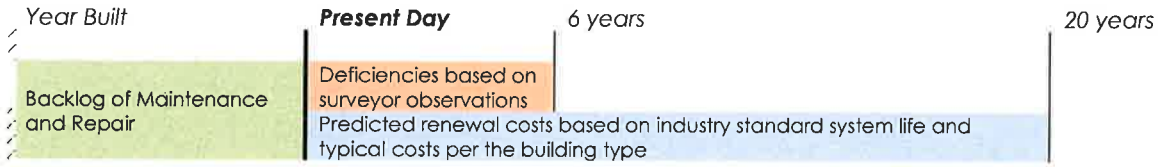
This report contains two types of cost data. The first type of cost data is Observed Deficiency (OD) Costs. An observed deficiency is defined as a subsystem or part of a subsystem that requires repair or replacement now or within the next 5 years (2020 – 2025), with a direct replacement cost of $5,000 or greater. The second type of cost is Predicted Renewal (PR) Costs. These costs predict when, how much of, and what the cost will be when the building components and systems need renewal or replacement based on their typical expected life. For this project, PR costs cover a 20-year time horizon (2020 – 2039).

Estimated costs are *calculated* for short-term Observed Deficiencies (ODs) and *modeled* for long-term Predicted Renewals (PRs).

It is important to clarify that 2020 – 2025 ODs should not be added to 2020 – 2025 PRs. ODs are based on *known conditions* that are witnessed by or disclosed directly to the field surveyors. Alternatively, PRs are based on *predictive models* that use industry-standard expected life data, combined with original construction or remodel dates and system scores from surveyors to estimate when a system will require renewal. Often the 2020 – 2025 ODs and PRs align; however, PRs may indicate a system needs renewal that is not evident from visual survey. Conversely, a model might indicate that a renewal is due based on timing, but survey conditions estimate a longer life. Therefore, ODs are generally the best short-term planning tool, while PRs are best used for long-term rough order-of-magnitude budgeting.

All the cost information contained in this FCA was reviewed by Matt Lersch on the MENG Analysis team. Matt has extensive experience in cost estimating a wide range of facility projects. The cost data was additionally reviewed by Hill International to provide a second opinion on costs, especially due to the rural location and small facility size of many of the branches. The agreed upon costs are what is included in this FCA.

Figure 1. Graphic Representation of Cost Projections and Maintenance Backlog

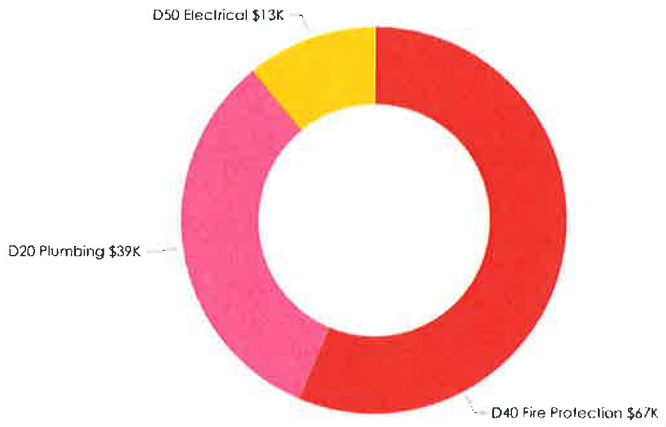


1.6 Observed Deficiencies (ODs)

Observed Deficiencies are items that are observable by surveyors, or disclosed to them directly (e.g. if there is a known roof leak reported to surveyors, but it is not readily apparent when they are on site, they would document it as an Observed Deficiency although they did not personally witness it). The surveyors do not complete any destructive or invasive testing (cutting into walls, etc.), so concealed issues may not be documented as a deficiency.

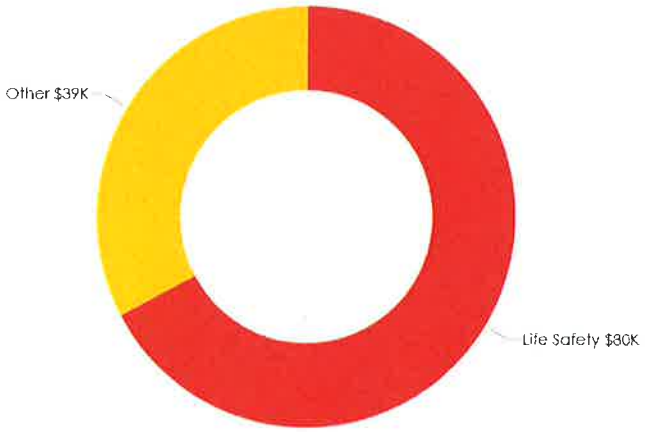
The total OD amount for the Cashmere Public Library is estimated at $119,000. Breakouts by system and action type are shown in **Figures 2** & **3** below.

Figure 2. ODs totaled by System



For greater clarity and drilldown options for these graphics, please view them in the Microsoft BI dashboard that accompanies this report.

Figure 3. ODs totaled by Action Type



1.7 Predicted Renewals (PRs)

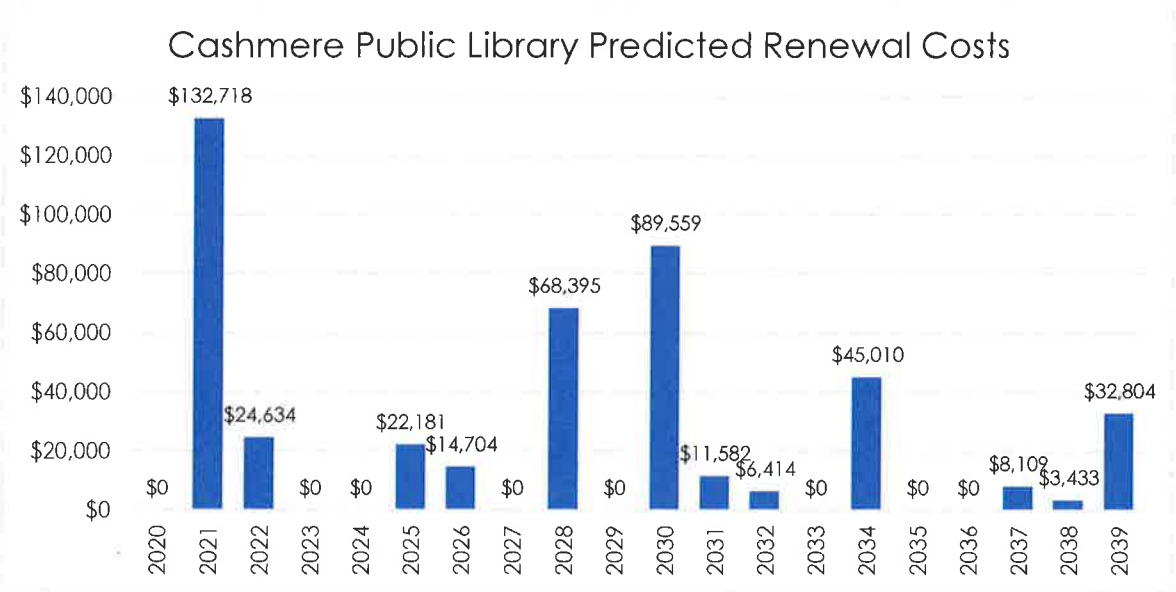
Because Predicted Renewal costs are based on statistical models, they are best suited for long term budget planning. The actual replacement may need to be done sooner or later than the model suggests, and/or be more or less expensive than anticipated, based on maintenance practices, building use behaviors, extreme weather conditions, etc. Furthermore, these costs are representative and do not account for fluctuations in the construction and technical trades market. Therefore, actual costs may be higher or lower than the model predicts depending on the market conditions in that year.

Because site infrastructures vary widely, there is not a statistically sound way to predict their future needs. Therefore, PRs are not modeled for site infrastructure, only for buildings.

Furthermore, for facilities that are only a portion of a larger building, it may not be possible to only replace the library portion of a system. If a large replacement such as a roof is required, the library may not be able to independently perform this upgrade as it is connected to the whole building. The PR costs presented in this report are based on the library square footage and do not account for full-building renewals.

Figure 4 shows the modeled Predicted Renewal cost for the Cashmere Public Library from 2020 – 2039. For details about what systems are due for renewal each year, please review the Microsoft BI dashboard that accompanies this report.

Figure 4. Total PRs by Year



Section 2. Database Reports

This section includes the database reports for each library facility presented in alphabetical order. Each report begins with a Facility Summary, followed by the infrastructure summary report, observed deficiencies with cost and photos, and a summary of OD costs with markups.

Facility Summary

North Central Regional Library FCA
Cashmere Public Library
Cashmere Public Library

300 Woodring Street
Cashmere, WA 98815

Year Of Original Construction	1964
Facility Use Type	Library
Construction Type	Medium
# of Floors	1
Energy Source	Electric
Year Of Last Renovation	1964
Historic Register	No

			Total Project Cost	Total Project Cost - Present Value
Weighted Avg Condition Score	**2.8**			
Facility Condition Index (FCI)	0.11	**Predicted Renewal Budget (ALL)**	$495,000	$460,000
Current Replacement Value (CRV)	$1,181,000	**Observed Deficiencies (ALL)**	$120,000	$119,000
Beginning Budget Year	2020	**Opportunity Total Project Cost**		N/A

Facility Condition Summary

One-story timber-framed structure with brick walls and mostly original single-glazed windows; low-slope roof with recently coated roof covering. Mostly open library reading and stack area, with circulation desk, computer room, staff work and break room, Men's and women's rooms, small janitor closet, and outside accessed utility room. Forced air heating and cooling, indoor plumbing, electric lighting and high-speed data, but no fire alarm or fire sprinkler.

Facility Components

Systems	Original System Date	Last Renewal Date	Score	Surveyor	Survey Date	Comments
A Substructure			**3.0**			
A10 Foundations						
A1030 Slab On Grade	1964	1964	3	MAL	06/18/20	Concrete slab on grade with thickened edge integrated footings. Cracks observed on both corners on rear of building. Cracks appear to be caused by stress from building settlement. Recommend monitoring to verify building does not move further. Does not appear significant as masonry wall is not cracking along corners which would be typical of a larger structural problem.
B Shell			**2.1**			
B10 Superstructure						
B1020 Roof Construction	1964	1964	2	MAL	06/18/20	Wood-framed roof over center glulam beam on steel posts, batt insulation, plywood roof sheathing, and acoustic ceiling tiles over gypsum board.
B20 Exterior Closure						
B2010 Exterior Walls	1964	1964	2	MAL	06/18/20	Brick masonry walls over framed walls, batt insulation, and gypsum wallboard.
B2020 Exterior Windows	1964	1964	3	MAL	06/18/20	Wood-stopped single-glazed windows. Wood-stopped double-glazed window at entry.
B2030 Exterior Doors	1964	1964	3	MAL	06/18/20	Single-glazed aluminum storefront at entry vestibule. Hollow metal frames with wood/metal slabs at emergency exit and mechanical space.
B30 Roofing						
B3010 Roof Coverings	1964	1964	2	MAL	06/18/20	Roof appears to be a built-up asphalt roof with a recent application of cool coat. Metal edge metal and snow guards above entry.
C Interiors			**2.0**			

Facility Summary

North Central Regional Library FCA
Cashmere Public Library
Cashmere Public Library

300 Woodring Street
Cashmere, WA 98815

Facility Components

Systems	Original System Date	Last Renewal Date	Score	Surveyor	Survey Date	Comments
C10 Interior Construction						
C1010 Partitions	1964	1964	2	MAL	06/18/20	Wood-framed partitions with gypsum wallboard. Wood-stopped single-glazed relites in computer room and work room.
C1020 Interior Doors	1964	1964	2	MAL	06/18/20	Wood slab doors with wood frames.
C1030 Fittings	1964	1964	2	MAL	06/18/20	Plastic and stainless steel restroom accessories and grab bars. Koala Kare baby changing stations. Projector and projector screen.
C30 Interior Finishes						
C3010 Wall Finishes	1964	1964	2	MAL	06/18/20	Painted gypsum wallboard. Ceramic tile in restrooms.
C3020 Floor Finishes	1964	1964	2	MAL	06/18/20	Carpet, VCT, and sheet vinyl. Rubber base.
C3030 Ceiling Finishes	1964	1964	2	MAL	06/18/20	Acoustic ceiling tiles in main library. Painted gypsum board.
D Services			**3.4**			
D20 Plumbing						
D2010 Plumbing Fixtures	1964	1964	3	DCS	06/18/20	Mix of original fixtures at women's and somewhat newer at men's restroom, plus one single-height (non-ADA) drinking fountain, and one stainless steel kitchen sink at staff workroom - minor maintenance to replace older fixtures at women's if desired, and to replace trim (faucets and flush valves) upon failure.
D2020 Domestic Water Distribution	1964	1964	3	DCS	06/18/20	Original galvanized piping with new (2018) A.O. Smith 50-gal electric hot water heater, but missing expansion tank - minor maintenance to install.
D2030 Sanitary Waste	1964	1964	3	DCS	06/18/20	Original cast iron drain, waste & vent (DW&V) piping where observed with tested fixtures flushing and draining ok and no reported issues.

Facility Summary

North Central Regional Library FCA
Cashmere Public Library
Cashmere Public Library

300 Woodring Street
Cashmere, WA 98815

Facility Components

Systems	Original System Date	Last Renewal Date	Score	Surveyor	Survey Date	Comments
D Services			**3.4**			
D20 Plumbing						
D2040 Rain Water Drainage	1964	2015	3	DCS	06/18/20	Small section of gutter near main and service entries, but otherwise roof sheet flows to hard- and soft-scape along drip edge, assume acceptable for this location.
D2090 Other Plumbing Systems	1964	1964	3	DCS	06/18/20	Modest aquarium adjacent to computer, near rear exit door with no issues reported.
D30 HVAC						
D3040 HVAC Distribution Systems	1964	2001	3	DCS	06/18/20	Original underground concrete supply air duct to perimeter floor supply air grilles - reportedly cleaned and serviced about 2017 - spot-checked openings did look clean. Two Trane 4-ton split-Dx heat pump systems with both indoor furnace (blower coil) and outside condensing units; all replaced in 2001 & 2002, with 5 to 10 years remaining life with good maintenance.
D3050 Terminal and Package Units	1964	1964	4	DCS	06/18/20	Original electric wall heaters in bathrooms missing parts and are a hazard to children - minor maintenance to replace.
D3060 Controls and Instrumentation	1964	2001	3	DCS	06/18/20	Programmable T-stats for packaged HVAC equipment - aging but functional.
D40 Fire Protection						
D4030 Fire Protection Specialties	1964	2000	4	DCS	06/18/20	Minimal fire extinguisher coverage - minor maintenance to add near each exit.
D50 Electrical						
D5010 Electrical Service and Distribution	1964	2001	3	DCS	06/18/20	Two Square D panels, one 120V single-phase for lighting and receptacles, one 208V 3-phase for HVAC equipment; gutter-type distribution is obsolete, but appears functional with newer panels; no issues reported.

Facility Summary

North Central Regional Library FCA
Cashmere Public Library
Cashmere Public Library

300 Woodring Street
Cashmere, WA 98815

Facility Components

Systems	Original System Date	Last Renewal Date	Score	Surveyor	Survey Date	Comments
D Services			**3.4**			
D50 Electrical						
D5020 Lighting and Branch Wiring	1964	2015	3	DCS	06/18/20	Original light fixtures upgraded to LED lamps, but still with all-manual control. Minimal receptacles, hence power strips needed for data equipment.
D5032 Low Voltage Communication	1964	2000	3	DCS	06/18/20	POTS telephone; ADA doorbell (needs battery); A/V system with overhead projector and sound system.
D5037 Low Voltage Fire Alarm	1964	2000	4	DCS	06/18/20	Several battery-operated smoke detectors.
D5039 Low Voltage Data	1964	2010	3	DCS	06/18/20	High-speed data with fiber-optic service and WiFi antenna; data equipment located in mechanical room - minor maintenance to organize.
D5090 Other Electrical Systems	1964	1964	4	DCS	06/18/20	Placard exit signs only - minor maintenance to install combination egress lighting and exit sign bug-wall packs with on-board battery back-up.
E Equipment and Furnishings			**3.0**			
E10 Equipment						
E1010 Commercial Equipment	1964	2000	3	DCS	06/18/20	Light-duty appliances at staff kitchenette - minor maintenance to replace upon failure.
E20 Furnishings						
E2010 Fixed Furnishings	1964	1964	3	DCS	06/18/20	Older built-in cabinetry and shelving requires ongoing maintenance for continued function.

Facility Summary

North Central Regional Library FCA
Cashmere Public Library
Infrastructure

300 Woodring Street
Cashmere, WA 98815

Facility Condition Summary

Just under 1/2-acre site in town fronting Woodring Street and Elberta Avenue, both with sidewalks, with nicely landscaped main entry area; parking lots to north off alley and to east bordering adjacent property; one-story library building on-site with no outbuildings or sheds. Overall site condition is fair to good, noting marginal ADA access.

Facility Summary

North Central Regional Library FCA
Cashmere Public Library
Infrastructure

300 Woodring Street
Cashmere, WA 98815

Facility Components

Systems	Original System Date	Last Renewal Date	Score	Surveyor	Survey Date	Comments
G Sitework						
G20 Site Improvements						
G2020 Parking Lots	1964	1964	3	MAL	06/18/20	Asphalt parking lot. Areas of deterioration and cracking.
G2030 Pedestrian Paving	1964	1964	3	MAL	06/18/20	Concrete sidewalks and curbs. Some minor settling observed.
G2050 Landscaping	1964	1964	2	MAL	06/18/20	Nicely landscaped property and well-maintained. Only concern is patio pavers and fill around mechanical units along front elevation. Pavers and fill cover the bottom row of brick masonry facade and the weep holes that allow the brick assembly to drain. Recommend pulling back the fill and removing part of the pavers to open up weep holes.
G30 Site Civil / Mechanical Utilities						
G3010 Water Supply	1964	1964	3	DCS	06/18/20	City water with estimated 1-inch meter, in-turn appearing to sub-feed the site irrigation system via a reduced pressure backflow preventer (RPBP) located in the water meter vault.
G3020 Sanitary Sewer	1964	1964	3	DCS	06/18/20	City sewer with no issues reported.
G3030 Storm Sewer	1964	1964	3	DCS	06/18/20	City storm sewer with two parking lot catch basins needing cleaning as minor maintenance. Roof drainage is not connected, and sheet flows along drip edge to soft and hardscape below.
G40 Site Electrical utilities						
G4010 Electrical Distribution	1964	1964	3	DCS	06/18/20	Chelan PUD 208V, 3-phase power with meter #88636 inside utility room with no issues reported; power appears fed underground for power pole at alley.

Facility Summary

North Central Regional Library FCA
Cashmere Public Library
Infrastructure

300 Woodring Street
Cashmere, WA 98815

Facility Components

Systems	Original System Date	Last Renewal Date	Score	Surveyor	Survey Date	Comments
G Sitework						
G40 Site Electrical utilities						
G4020 Site Lighting	1964	2010	3	DCS	06/18/20	One utility pole light at parking lot to east; wall-pack for parking lot north; older recessed cans with CFL lamps at eaves and newer surface-mounted LED fixtures at main entry; all exterior lighting is reportedly photocell-controlled, but all were on during daylight hours - minor maintenance to correct.
G4030 Site Communications and Security	1964	2010	3	DCS	06/18/20	High-speed fiber-optic service overhead from pole at street, with stress-relief device failed at building, apparently due to large tree limbs - minor maintenance to trim tree and reattach fiber-optic cable anchor. No observed CCTV or other site or building electronic security - opportunity to add, similar to other NCRL library facilities in the region.
G90 Other Site Construction						
G9090 Other Site Systems	1964	1990	2	DCS	06/18/20	Nice library reading-themed sculpture at main entry.

North Central Regional Library FCA

Site: Cashmere Public Library

Facility: Cashmere Public Library

D2020 Domestic Water Distribution

Score	Remaining Life	Survey Year	Qty	Unit Cost	Unit	Direct Cost	Marked Up Cost
4	2	2020	3,400	$6.00	SF	$20,400	$39,951

Deficient Material: Galvanized pipe

Slow fixture flow and discolored water due to original galvanized pipe past end of life.

Remedial Action:

Replace with copper and/or PEX.

Action Type:

Other

Facility: Cashmere Public Library

D4010 Fire Protection Sprinkler Systems

Score	Remaining Life	Survey Year	Qty	Unit Cost	Unit	Direct Cost	Marked Up Cost
5	0	2020	3,400	$10.00	SF	$34,000	$66,586

Deficient Material: Fire Sprinkler

No fire sprinkler.

Remedial Action:

Install fire sprinkler per NCRL standard.

Action Type:

Life Safety

Facility: Cashmere Public Library

D5037 Low Voltage Fire Alarm

Score	Remaining Life	Survey Year	Qty	Unit Cost	Unit	Direct Cost	Marked Up Cost
4	2	2020	3,400	$2.00	SF	$6,800	$13,317

Deficient Material: Fire alarm

No fire alarm; only battery-operated smoke detectors.

Remedial Action:

Install fire alarm system.

Action Type:

Life Safety

Deficiency Repair Cost Markups By System 2020 - 2025

North Central Regional Library FCA

Site: Cashmere Public Library

Facility	System		Direct Construction Cost	Contingency 20%	Contractor's OH & P 20%	Project Soft Cost 36%	Total Project Cost	Total Project Cost (Present Value)
Cashmere Public Library	Plumbing		$20,400	$4,080	$4,896	$10,575	$39,951	$39,193
	Fire Protection		$34,000	$6,800	$8,160	$17,626	$66,586	$66,586
	Electrical		$6,800	$1,360	$1,632	$3,525	$13,317	$13,064
		Facility Total	**$61,200**	**$12,240**	**$14,688**	**$31,726**	**$119,854**	**$118,844**
		Site Total	**$61,200**	**$12,240**	**$14,688**	**$31,726**	**$119,854**	**$118,844**

MEMORANDUM

DATE: November 30, 2020

TO: Steve Croci, Operations Director
City of Cashmere

FROM: Robin Nelson, P.E. RN

SUBJECT: Water and Sewer Availability Study Parcel ID # 20949

PURPOSE

The City owns a parcel of land that lays south of the BNSF railroad tracks, parcel ID # 20949. The City requested that PACE explore water and sewer availability for this parcel. The City is exploring alternatives to develop this parcel located within the Warehouse/Industrial Zone of the city. The following documents were referenced to perform the water and sewer availability study:

- City of Cashmere Comprehensive Water System Plan
- City of Cashmere General Sewer Plan
- As-built plans for water and sewer utility
- City of Cashmere GIS

LAND USE

Figure No. 1 illustrates the location of parcel #20949, owned by the City of Cashmere. The parcel is located to the south of the BNSF railroad tracks, within the city's downtown core. The 27,878.40 sf parcel lies at the intersection of Railroad Avenue and Maple Street. Access to the parcel is along Railroad Avenue.

The parcel lies within the city's Warehouse Industrial zoning designation. Permitted land use is defined in Cashmere Municipal code section 17.18.020 and further discussed in section 17.40. Typical permitted uses include, but are not limited to; day care centers, medical/dental clinic, farmer's market, and retail stores.

PACE Engineers, Inc.
11255 Kirkland Way, Suite 300
Kirkland, Washington 98033-3417
p: 425.827.2014 | f: 425.827.5043
www.paceengrs.com

WATER SYSTEM CAPABILITIES

Parcel #20949 lies within the 895 pressure zone providing city water from the Sherman Reservoir to city customers north of the BNSF railroad within city limits. It also serves a small area immediately south of the BNSF railroad including #20949.

Water Service Option #1 (Railroad Avenue)

A 6-inch ductile iron watermain lies within Railroad Avenue and fronts parcel #20949. The 895 pressure zone is capable of providing domestic water service to this site. However, based upon the fire flow system performance as depicted in the City's Comprehensive Water System Plan, dated August 12, 2020, the current infrastructure can only provide 826 gallons per minute, in accordance with accepted minimum pressure requirements.

The rough order of magnitude cost to extend the 6-inch watermain into the City's parcel would range between $15,000 and $25,000. These costs include sales tax and 40 percent contingency.

Water Service Option #2 (Mission Avenue)

A 6-inch ductile iron watermain is also located within Mission Avenue, which is north across the BNSF railroad tracks from the City parcel. This portion of the distribution system is also served by the 895 zone and the Sherman Reservoir. As with option #1, adequate domestic capacity is available from this main to serve the City parcel. Fire flow capabilities within this main are significantly better than in option #1. System performance as depicted in the City's Comprehensive Water System Plan, dated August 12, 2020, ranges between 1,663 gallons per minute and 1,741 gallons per minute.

To serve this parcel, a casing would need to be permitted by BNSF and installed crossing the railroad right-of-way. A 16-inch diameter casing would be required and would need to extend the width of the BNSF railroad, approximately 100 feet. An 8-inch watermain would then be installed through this casing and extended into the parcel. The location for this new crossing would be near Maple Street and include approximately 225 feet of new 8-inch watermain extended to Railroad Avenue.

The rough order of magnitude cost to extend the 6-inch watermain including the BNSF crossing would range between $90,000 and $120,000. These costs include sales tax and 40 percent contingency.

Fire Flow Requirements

Table B105.2[1] defines the required fire flow requirements in accordance with the International Fire Code which provides fire flow standards enforced by the City. The necessary flow would

[1] International Fire Code 2018 (IFC 2018) International Code Council

need to be 2,813 gallons per minute for a 3-story structure or 1,125 gallons per minute for single story structure.

TABLE B105.2 REQUIRED FIRE-FLOW FOR BUILDINGS OTHER THAN ONE- AND TWO-FAMILY DWELLINGS, GROUP R-3 AND R-4 BUILDINGS AND TOWNHOUSES		
AUTOMATIC SPRINKLER SYSTEM (Design Standard)	**MINIMUM FIRE-FLOW (gallons per minute)**	**FLOW DURATION (hours)**
No automatic sprinkler system	Value in Table B105.1(2) (IFC 2018)	Duration in Table B105.1(2)
Section 903.3.1.1 of the *International Fire Code*	25% of the value in Table B105.1(2)[a] (IFC 2018)	Duration in Table B105.1(2) at the reduced flow rate
Section 903.3.1.2 of the *International Fire Code*	25% of the value in Table B105.1(2)[b] (IFC 2018)	Duration in Table B105.1(2) at the reduced flow rate
For SI: 1 gallon per minute = 3.785 L/m. The reduced fire-flow shall be not less than 1,000 gallons per minute. The reduced fire-flow shall be not less than 1,500 gallons per minute.		

The current Comprehensive Water System Plan did not include capital improvements in the 20-year horizon that would improve the fire flow capabilities in the watermain fronting parcel #20949. Without performing extensive hydraulic modeling, which is beyond the scope of this evaluation, further improvements to the City's distribution system was not explored.

To meet fire flow requirements, additional on-site equipment will be needed. The extent and size of the equipment is dependent upon the proposed land use for the site. This cost would be borne by the proposed builder/developer and included in the cost to develop the site. A rough order of magnitude cost is unattainable for fire flow needs until a site master plan is prepared and specific structures are better defined.

SEWER SYSTEM CAPABILITIES

Mission Avenue Sewer (Gravity)

Figure No. 1 depicts existing sewer improvements near parcel #20949. North of the BNSF railroad, an 8-inch gravity sewer main lies within Mission Avenue flowing generally to the east. The gravity sewer is approximately 10 feet below finished grade of the roadway and has adequate capacity to serve permitted uses for parcel #20949.

To serve this parcel, a casing would need to be permitted by BNSF and installed crossing the railroad right-of-way. A 16-inch diameter casing would be required and would need to extend the width of the BNSF railroad, approximately 100 feet. An 8-inch lateral gravity sewer would then be installed through this casing and be connected to the existing gravity sewer main in Mission Avenue. The location for this new crossing would be near Maple Street and include approximately 225 feet of new gravity sewer extended to Railroad Avenue at sufficient depth to

be extended in the future to serve unsewered parcels to the south and east. A gravity side sewer would then be extended into parcel #20949 to provide sewer service.

The rough order of magnitude cost to extend the gravity sewer option from Mission Avenue to Railroad Avenue under the BNSF railroad could range between $135,000 and $165,000. These costs include sales tax and 40 percent contingency.

Railroad Avenue Sewer (Low-pressure)

Figure No. 1 also depicts an existing gravity sewer main located in Railroad Avenue at the intersection with Washington Street. This is also an 8-inch gravity sewer main but is only approximately 3.5 feet below the roadway surface flowing to the west. This sewer main lies approximately 300 feet to the west of the City's parcel and is shallow, and therefore unable to be extended to provide gravity sewer service.

However, sewer service could be provided by installing an on-site grinder pump and low-pressure sewer extended from the parcel and connecting into the shallow manhole at Railroad Avenue and Washington Street. There are several manufacturers that provide commercial grade grinder pumps that would provide adequate serviceability for the permitted land uses for this site.

The rough order of magnitude cost to provide an on-site grinder pump and approximately 300 feet of 1.5-inch diameter low pressure sewer main could range between $45,000 and $60,000. These costs include sales tax and 40 percent contingency.

Public Works Maintenance Shop Sewer

Not shown on Figure No. 1, sewer service is provided to the City's maintenance building directly across Railroad Avenue. This facility is served by a grinder pump and low-pressure sewer main. Wastewater is pumped from the maintenance facility to the south along Olive Street. There is little as-built information existing on this pressure system and its point of connection. Further, gravity sewer service from the maintenance facility could not be provided to parcel #20949. It would also require a grinder pumping system. This option would require additional detailed information and extensive modifications to both the maintenance facility pumps and low-pressure sewer main. Due to the absence of available data, this sewer alternative was not explored further.

Wastewater Treatment Capacity

The City recently upgraded their existing wastewater treatment plant. The upgrades included additional capacity to serve the proposed land use within the UGA including parcel #20949.

WATER AVAILABILITY

Domestic water supply can be provided to parcel #20949 from the 6-inch watermain fronting the site located in Railroad Avenue. The water service would need to be sized based upon proposed improvements. This option would be the least capital cost.

The existing water distribution system is incapable of meeting the fire flow requirements for the land uses allowed in the Warehouse Industrial zoning designation. Therefore, additional on-site improvements will be required and depend upon the size and height of the proposed development. As discussed above, fire flow requirements can vary from 2,813 gallons per minute to 1,125 gallons per minute depending upon the height of the proposed buildings. At a minimum, the structures may be required to provide fire retarded materials and fire suppression equipment. Fire suppression equipment could include on-site water storage, booster pump, and, associated piping and appurtenances to achieve compliance with the International Fire Code and local Fire Marshall requirements.

SEWER AVAILABILITY

Two options were evaluated to provide sewer service to the parcel, a gravity sewer and low-pressure sewer. The gravity sewer option requires crossing the BNSF Railroad and extensive permitting to obtain a utility franchise and crossing permit from BNSF. Further, City staff expressed additional utility crossing under the BNSF Railroad would not be ideal. This option would also be the highest capital cost option as well.

The low-pressure sewer option would require the least capital cost to provide sewer service to the site. A grinder pumping system and low-pressure conveyance system is an approved alternative to gravity sewer collection with design guidance included in the Department of Ecology's Criteria for Sewage Works Design.

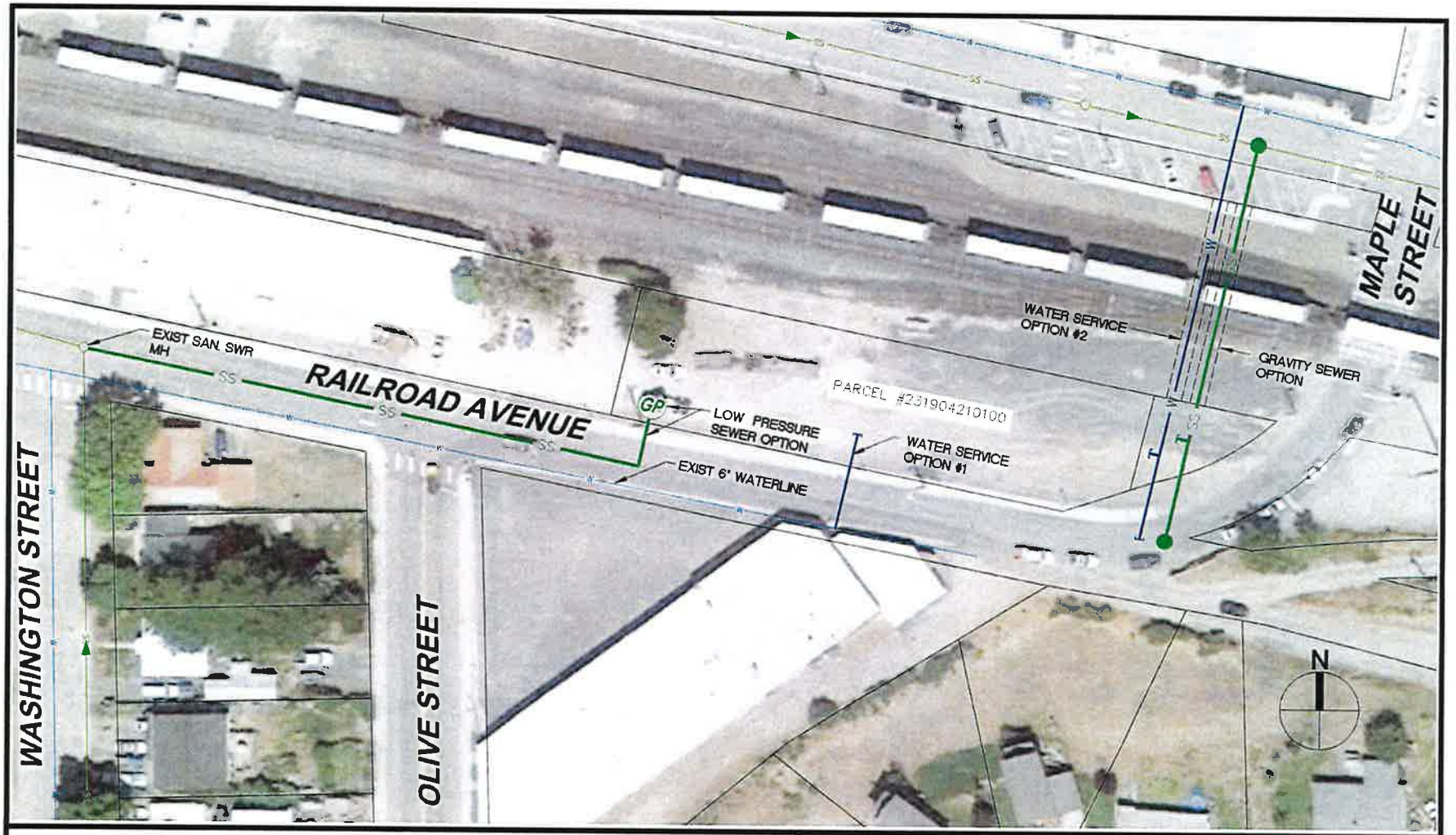


FIGURE No. 1
CITY OF CASHMERE
PARCEL #20949
WATER AND SEWER AVAILABILITY