Lakewood Pierce County Library building condition assessment, roof evaluation, and structural engineering reports

LWD Building Analysis – Executive Summary

Provided to PCLS Admin Team
By Christina Neville-Neil, Facilities Project Manager
September 21, 2022

A detailed assessment of the existing Lakewood Library building was performed by various engineering consultants and trade specialists. This summary analysis combines the reports provided by the following:

- BuildingWork Architects: Condition Assessment Report on October 20, 2021
- Wetherholt and Associates, Inc.: Roof Evaluation on March 10, 2022 and Roof and Structure Report on April 21, 2022
- Smith Fire Systems: Proposal on March 15, 2022
- PCS Structural Solutions: Structural Evaluation Report on August 31, 2022
- BCE Engineers, Inc.: Electrical and Mechanical Assessments Report on September 9, 2022

Lakewood Library Existing Conditions

The library was originally constructed in 1963 with additions in 1974 and some renovations in 1994 with additional remodels in 2006. The total building interior is 32,592 square feet (sf) with 10,136 sf as the basement and 22,456 sf as the public areas on the first and second floors. The second story is located over the central portion of the building while the majority of the building is a single-story structure. There is a large basement at the west third of the building with a smaller basement near the southeast corner.

Architectural:

The interior of the building is mainly in the original 1963 GWB walls with some updates in the additions and renovations from 1974 and 1994. The flooring consists mainly of carpets with some tiles in the restrooms. The public restrooms are not ADA compliant. The windows are original, single pane and insulated units in wood frames. There is currently a parking lot with mature landscaping and an irrigation system on site. The exterior cladding of the building consists of brick, stucco, wood trim and terra cotta trim.

Structural:

The building roof consists of multiple different roof planes, slopes, offsets, and shapes. The original roofing material was clay tile and replaced with asphalt shingles after 1994, in phases by different roofing contractors.

The roof structure for the building is Tectum roof panels supported by steel beams, steel girders, and steel columns. The steel columns are laid out in an 18-ft. by 18-ft. grid pattern in the original portion of

the building. The 1994 addition's columns are supported on spread footings, with a small portion of the roof constructed with 1 1/2-in. steel metal deck supported by steel purlins and steel girders.

The building structure is dependent on a combination of structural brick walls, steel beams and columns, interior brick walls around the north stairwell and elevator shaft, and concrete topping over metal deck on steel beams. The basement is constructed with concrete walls below grade.

Plumbing:

The plumbing system is a mixture of original galvanized piping with new copper piping system from the 1993/1994 renovation. The insulation appears to be mainly fiberglass though some of the original galvanized piping may include materials that would need to be tested and verified. The waste and vent system is a mix of original cast iron with newer cast iron and plastic. The plumbing fixtures (faucets, sinks, water closets) appear to be from the 1990s. Several hot water tanks supply the building with domestic hot water and appear to be relatively new but connected to aged piping systems.

HVAC:

The central heating system consists of 2 boilers (approximately 12-year old units) that provide heating hot water pumped throughout the building. The insulation material on the piping system is a mix of original and newer insulation. The hot water pipes feed into 3 air handlers and hydronic duct coils. The air handlers provide heating and cooling throughout the building via duct distribution. Additional duct coils are used at various locations throughout the building to provide zoned temperature control. Ventilation for the building is supplied via exterior louvers that feed Outside Air (OSA) into the air handlers. Digital control for the HVAC system is an aged Alerton system.

Fire Protection:

There is a limited wet fire sprinkler system serving the entire large basement area, the boiler room, and archive spaces, along with under the concrete stairs. No sprinklers are present above the basement area.

The building is currently being monitored by an outdated Spectronics conventional system wired in zone format (analog). The devices (smoke detectors, duct detectors, pull stations, strobes, horns, speakers, etc.) and panels with power supply are outdated and unsupported with replacement parts.

Electrical:

The building is outfitted mainly with fluorescent fixtures and compact fluorescent fixtures in the interior, controlled manually. While HID (metal halide and high-pressure sodium) fixtures are used for exterior poles and time-clock or photocell controlled.

The main power service into the building was updated in the 1974 renovation with a transformer with a meter at the main distribution board. The other interior electrical panels were either from the original construction or added during the 1974 renovation. There is surface mounted raceways throughout the building.

Recommended Updates:

Architectural:

The interior of the building is dated and in need of a comprehensive remodel and update, including interior finishes, furniture and technology. The windows, exterior doors, skylights and roofing need to be replaced. A range of site improvements are needed, including side sewer repair or replacement, landscaping, irrigation, parking, and site security. For more details, see Assessment report by BuildingWork Architects, dated October 20, 2021.

Recommendation	Estimated Cost
Parking lot resurfacing	$ 270,000
Landscaping	$ 245,000
Site security and access control	$ 70,000
Window and door replacement	$ 192,000
New skylight	$ 88,000
New elevator	$ 1,750,000
IT upgrade	$ 135,000
Interior finishes (floors, walls, ceilings)	$ 765,000
Furnishings and casework	$ 855,000
Subtotal	**$ 4,370,000**

Structural:

From the report from Wetherholt and Associates, Inc. dated April 1, 2022 and site evaluation on March 10, 2022, it was observed that the north and west portions of the lower roofs are in poor condition. Water has passed beyond the shingles and deteriorated the underlayment, plywood and substrate board. This area is no longer serviceable and should be replaced. The remaining south and east portions of the lower roof appear to be serviceable for 3 to 5 more years. There were leaks reported in the low slope roof area and the transition between the skylight and steep slope roof on the east side. A temporary fix was applied to both areas. Due to the extensive damage of the roof and the leaks reported, Wetherholt and Associates, Inc. recommends removal of the existing roof and replace with new substrate and rebuild with proper structural steel decking. They also recommend replacement of the skylights to accommodate for proper integration into the roof system and replacement of windows and clerestory glazing to be properly flashed in the roof and openings.

Additional structural analysis of the building indicates that a full seismic upgrade is recommended and should be completed because it does not appear to have a complete or well-defined load path for lateral forces. Due to the multiple roof planes and elevations, it is suspected that existing shear walls may not be able to accept the lateral forces in a seismic event, with collapse or partial collapse a possibility.

Masonry walls would need to be investigated to determine if the walls were grouted or reinforced. Based on the length of the shear walls, it was expected that the masonry walls are under-reinforced and recommended that backup wall framing be provided to support lateral forces. Due to the age of construction of the building, it is suspected that non-bearing walls are not compliant with current

seismic codes in either footing sizes or reinforcement. Recommendation to anchor the walls to the roof with braces and supplemental framing to prevent failure or collapse.

The second story is braced by the shear walls around the elevator and stairwell core and two steel braces. Additional shear walls and braces are recommended as the existing load most likely exceed the capacity.

Additionally, there is no redundancy (safety factor) to the existing system as required by current International Building Code.

Recommendation	Estimated Cost
Replacement of lower north and west roof area only ($110-150/sf)	$ 637,670 - $ 869,550
Replacement of full scope of roof work for entire building ($85-125/sf)	$ 2,409,750 - $ 3,543,750
Improvements to structural system ($55-65/sf)	$ 1,307,570 - $ 1,545,310
Subtotal	**$ 4,354,990 - $ 5,958,610**

Plumbing:

New domestic water, waste and vent piping should be replaced. The existing sewer lifts have had reports of flooding during heavy rains. The domestic water piping system is a mixture of galvanized and copper pipes that has been in place for several decades. The fixtures do not comply with current water conservation code requirements. The existing hot water heaters are connected with old plumbing system that could cause failure.

HVAC:

Replacement of the existing HVAC system to meet current Washington State Energy Code (WSEC) is recommended. The existing units use a combination of gas and electric fuel but natural gas as a resource is being phased out. An all-electric solution may be required in the near future. With the existing aged controls system, a new Direct Digital Controls will need to be provided to operate the building systems within the requirements of the current codes.

Fire Protection:

A new sprinkler service and system would need to be installed throughout the building to meet current codes. This would include a wet system for full coverage within the building and a dry system to serve and cover any cold attic area or overhangs.

A new digital monitoring system with updated compatible devices will need to be installed throughout the building to replace the outdated system.

Electrical:

Current lighting system does not meet current energy code. While existing fixtures can remain in areas that are not being repaired/replaced or demolished, newly created spaces will need to meet energy codes. If more than 50% of the building is being renovated, the entire building will need to be brought

up to code. It is recommended that all fixtures be replaced with LED fixtures and current energy code controls to lower energy costs and reduce maintenance requirements.

It is also recommended that the electrical panels be replaced with modern panels that have replacement parts. The current system is past its expected lifespan of 30 years.

The telecommunications system is currently in surface mounted raceways. With a renovation, the cables can be concealed in the walls and incorporated into the building allowing for less tampering and better aesthetics.

Recommendation	**Estimated Cost**
Plumbing replacement	$ 325,920
Sewer system replacement	$ 80,000
HVAC replacement	$ 1,466,640
Controls	$ 260,736
TAB/Commissioning	$ 114,072
Fire sprinkler	$ 488,880
Fire monitoring system (from Smith Fire Systems)	$ 97,000
Lighting fixtures and controls	$ 391,104
Electrical gear and distribution	$ 260,736
Branch wiring	$ 325,920
Low voltage systems	$ 114,072
Subtotal	**$ 3,828,080**

Summary:

Base on the recommendations and observations of the architects, engineers, and trade specialists, the projected renovation costs to bring the existing building up to current building and energy codes are in the rough order of magnitude (ROM) of $22 Mil. This does not include an analysis of any potential hazardous building materials (asbestos, lead paint, mercury and PCB materials) that may still remain from the original construction, which may be additional remediation costs.

Budget Analysis for a Renovation:

Architectural	**$ 4,370,000**
Structural and Roofing	**$ 4,354,990 - $ 5,958,610**
MEP	**$ 3,828,080**
General conditions (12%)	**$ 1,506,368 – 1,698,803**
Subtotal of hard costs (averaged structural costs)	**$ 14,957,466**
Permit fees (2.5%)	**$ 373,937**
Sales Tax	**$ 1,480,789**
A/E fees (15%)	**$ 2,243,620**
Contingency (20%)	**$ 2,991,493**
Total Project Budget	**$ 22,047,305**

Pierce County Library System

Condition Assessment Report for Lakewood Library and Tillicum Library

October 20, 2021

BUILDINGWORK
architecture design preservation

BUILDINGWORK
architecture design preservation

October 20, 2021

Kristina Cintron
Facilities Manager
Pierce County Library System
3005 - 112th Street
Tacoma, WA 98446

Dear Kristina:

At your request we have completed a high-level condition assessment report for the Lakewood Library and the Tillicum Library. Due to the limited scope and time frame of this condition assessment report, there was no participation by engineers, sub-consultants, contractors, or cost estimators in this study.

This condition assessment report for the Lakewood and Tillicum libraries is based on the following information:

- Lists of known deficiencies for each library provided by PCLS.
- Drawings and basic information on each facility provided by PCLS.
- A site visit and visual inspection of each library conducted by Matt Aalfs (BuildingWork), on October 1, 2021.
- BuildingWork's experience with other similar public library renovation projects in Western Washington.

The folllwing pages include an executive summary, a photographic survey, a Facility Condition Assessment Survey, and a project budget analysis for both the Lakewood and Tillicum libraries. The project budget analyses describe the probable construction costs of a future renovation project for each library, as would likely be required to address the deficiencies and needs for maintenance, repairs, or improvements that have been identified during this study. The costs shown in these project budget analyses are based on our experience with other similar, recent library projects in Western Washington. Please note that the project budget analyses provided herein are for planning purposes only, and are based on a visual inspeciton of the facilities and conversations with PCLS. If it is decided to proceed with a renovation project for either library, we recommend that a qualified architecture and engineering team be engaged to conduct a thorough pre-design study to analyze the scope and the construction cost of the project with greater detail and specificity.

Please let me know if you have questions or comments about this condition assessment report.

Sincerely,

Matt Aalfs AIA
Principal

Lakewood Library

The Lakewood Library was originally constructed in 1963. There was an addition in 1974 and the library was renovated in 1993. The interior of the Lakewood Library is dated and in need of a comprehensive remodel and update, including interior finishes, furniture, and technology. Building systems including the elevator, HVAC, plumging, lighting, and electrical are also in need of upgrades or replacement. The windows, exterior doors, skylights, and roofing need to be replaced. A range of site improvements are needed, including side sewer repair or replacement, landscaping, irrigation, parking, and site security.

A preliminary project budget to address these deficencies of Lakewood is in the range of $10.5 to 11 million. A detailed budget analysis is provided in this report.

Windows near entry

Courtyard near entry

Windows near entry with failed glazing seals

Single pane windows with failed seal at corner joint

Courtyard

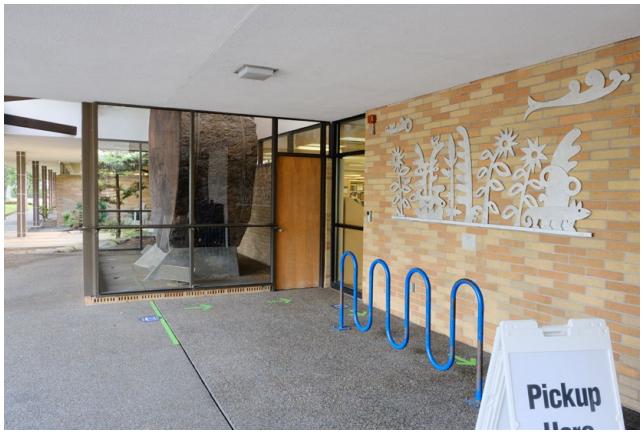
Courtyard

Lakewood Library Photo Survey

Fenced area at NE presents a security problem

Roof overhang at north side

Staff Entry side



Main public entry

Staff Entry side

Parking lot

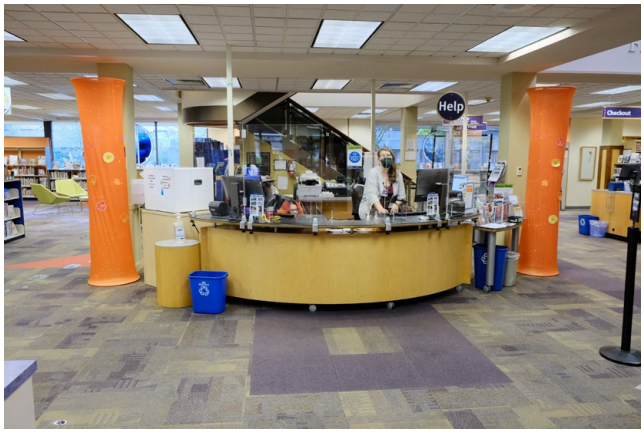
Entry Lobby

Entry Lobby and Elevator

Public Restroom

Meeting Room

Friends book sale area



Main service desk area

Children's area

Technology area

Public seating at main Reading Room

Reading Room display

Teen area

Non-Print area

Lakewood Library Photo Survey

Reading Room seating

Reading Room study area

Branch Manager's office

Staff work room

Staff break room

Staff break room kitchen

Lakewood Library Photo Survey

Upstairs public restroom

Upstairs study area

Upstairs atrium area

Basement storage area

Staff restroom in basement

Basement mechanical room

I. General Information

1. Library Name: Lakewood Library
2. Library Address: Street 6300 Wildaire Road SW
   City Lakewood Zip 98499
3. How large is the Library (total square feet)? 32,592 SF
4. How large are the public areas (net square feet)? 22,456 SF
5. How large are the staff areas (net square feet)? 4,054 SF (Staff) 10,136 SF (Basement)
6. When was the Library constructed? 1963
7. Is the architect known? ○ Yes ◉ No
   If yes, who was the architect? _____
8. Has the Library been renovated? ◉ Yes ○ No
   If yes, when? 1974 By? _____
9. Do you have architectural plans of the Library (original or renovation)? ○ Yes ◉ No
10. Please provide labeled digital photographs of overall building (one view for each side of the building if possible). Attach photographs:

II. Library Function Needs

1. Is the reading room size adequate? ◉ Yes ○ No

   Comments:

   Meeting Room finishes and AV/technology systems are outdated.

2. Are there space needs for additional special areas such as Children, Teen, Computers, or Quiet Study, etc? ◉ Yes ○ No

   Comments:

   Finishes and AV/technology systems are outdated.

3. Is there a need for a new or enlarged Meeting Room? ○ Yes ◉ No

   Comments:

4. Is there a need for additional Study Rooms? ○ Yes ◉ No

   Comments:

5. Are the Public Restrooms adequate? ○ Yes ◉ No

   Comments:

   Public restrooms are not ADA compliant. Need to be renovated / enlarged.

6. Is there a need for an improved Entry Lobby or Entry Vestibule? ○ Yes ◉ No

   Comments:

   Entry lobby finishes are outdated.

II. Library Function Needs

7. Are the other spaces or functional improvements to the public areas needed? ○ Yes ◉ No

   Comments:

8. Is the Staff Work Room size adequate? ◉ Yes ○ No

   Comments:

   Needs new finishes

9. Is the Staff Break Room adequate? ○ Yes ◉ No

   Comments:

   Needs new finishes and appliances

10. Is the Staff Restroom adequate? ○ Yes ◉ No

    Comments:

    Needs remodel with new fixtures and finishes

11. Are other spaces or functional improvements to the staff areas needed? ◉ Yes ○ No

    Comments:

    Staff areas are too spread out - need to remodel to consolidate staff functions in one area.

12. Please attach label digital photographs of the following areas, if applicable:

    Reading room
    Special areas (Children, Teens, Computers, Quiet Study, etc)
    Meeting room(s)
    Study room(s)
    Entry lobby/vestibule
    Public restroom(s)
    Staff work room
    Staff restroom(s)
    Staff break room

III. Library Building Condition: Site

1. Is there accessible parking? ◉ Yes ○ No

   Comments:

2. Is the building entrance accessible? ◉ Yes ○ No

   Comments:

3. Is there adequate parking? ○ Yes ◉ No

   Comments:

   Need more parking

4. Is there adequate lighting at the parking and building entrance? ○ Yes ◉ No

   Comments:

   Need new stie lighting

5. Is the parking surface and parking stall striping in good conditions? ○ Yes ◉ No

   Comments:

   Need new surfacing, layout, and striping

III. Library Building Condition: Site

6. What is the condition of the landscaping?

   Comments:

   Landscaping is aged. Need new landscape design and installation.
   Need to replace the irrigation system.

7. Are there other maintenance or upgrades needed to the Library site? ◉ Yes ○ No

   Comments:

   Need to replace side sewer line. Sewer lines back up during heavy rains.

   Safety and security of the site needs to be addressed - areas of the site are open to the public yet hidden from view. Unauthorized access to the service areas and to the roof of the building occur.

8. Please attach labeled digital photographs of the following areas, if applicable:

   Building entrance

   Parking area

   General landscaping

III. Library Building Condition: Architecture—Exterior

Condition Terms:

Good In new or well maintained condition, with no visual evidence of wear, damage, or deficiency

Fair Some visible wear but still in serviceable and functional condition

Poor Subjected to hard or long term wear. Nearing the end of useful life.

Critical Has reached the end of serviceable life. Replacement now is necessary.

Provide the material and the condition of the exterior in the following areas:

1. Roof:
   Material: brick Condition: ○ Good ○ Fair ◉ Poor ○ Critical
   Comments:
   There are roof leak problems
2. Gutters and Downspouts:
   Condition: ○ Good ◉ Fair ○ Poor ○ Critical
   Comments:
3. Exterior Cladding:
   Material: brick Condition: ○ Good ◉ Fair ○ Poor ○ Critical
   (eg: painted wood siding, brick, stucco, etc)
   Comments:
   There is brick, stucco, wood trim, terra cotta trim.
   Brick is in good condition, other materials in poor condition / need maintenance or repair.

III. Library Building Condition: Architecture—Exterior

4. Exterior Trim:

   Condition: ○ Good ◉ Fair ○ Poor ○ Critical

   Comments:

5. Windows (frame material eg: wood, aluminum, vinyl, etc):

   Frame Material: wood Condition: ○ Good ○ Fair ◉ Poor ○ Critical

   Comments:

   Windows are original, single pane and insulated units in wood frames.
   All are in poor condition and/or do not meet current energy code requirements.
   All wondows should be replaced with new.

6. Sealant at the windows:

   Condition: ○ Good ○ Fair ◉ Poor ○ Critical

   Comments:

   Sealant is in poor condition and has failed in some locaitons.

7. Exterior Doors:

   Material: wood, aluminum Condition: ○ Good ◉ Fair ○ Poor ○ Critical

   Comments:

   Recommend replacement of all exterior doors.

III. Library Building Condition: Architecture—Exterior

10. Do the windows have ○ insulated glass ◉ or single pane glass?

Comments:

A mix of both, but all is in need of replacement.

12. Are there water leaks or weather intrusion at the:

Roof?	◉ Yes	○ No
Walls?	○ Yes	◉ No
Windows?	○ Yes	○ No
Doors?	○ Yes	○ No
Foundation?	○ Yes	○ No

Comments:

There are roof leak problems.

13. Are there other maintenance or upgrades needed to the building exterior? ◉ Yes ○ No

Comments:

14. Please attach labeled digital photographs of a representative example of the following areas:

Roof	Gutters	Downspout
Exterior cladding	Exterior trim	Exterior doors
Windows	Window frames	Window sealant
Areas with water leaks or weather intrusions		

III. Library Building Condition: Structural

1. Has there been a structural analysis or any seismic retrofit work done on the building?
   ○ Yes ◉ No
   Comments:

2. Is there noticeable sagging or out-of-plane at the:
   Roof? ○ Yes ◉ No
   Exterior Walls? ○ Yes ○ No
   Floor? ○ Yes ○ No
   Comments:

3. Is there visible rot, rust, or significant weathering damage to building elements?
   ○ Yes ◉ No
   Comments:

4. Building foundation:
   Condition: ○ Good ◉ Fair ○ Poor ○ Critical
   Comments:

5. Please attach labeled digital photographs of a representative example of the following areas:
   Areas of noticeable sagging or out-of-place (roof, exterior walls, floor)
   Areas of visible rot, rust, or significant weathering damage
   Building foundation

III. Library Building Condition: Architecture—Interior

Provide the material and the condition of the interior finishes in the following areas.

Examples of finished materials include, but are not limited to:

- Painted drywall
- Carpet tile
- Carpet broadloom
- Vinyl flooring
- Ceramic tile
- Acoustic ceiling tiles
- Wood

1. Library Entrance Area:

Floor
Material: carpet Condition: ○ Good ○ Fair ○ Poor ◉ Critical

Walls
Material: GWB Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Ceiling
Material: GWB Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Comments:

Interior finishes are in need of replacement.

II. Library Building Condition: Architecture—Interior

2. Public Reading Room Areas:

Floor
Material: Carpet Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Walls
Material: GWB Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Ceiling
Material: ACT Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Comments:

Interior finishes are in need of replacement.

3. Public Restrooms:

Floor
Material: tile Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Walls
Material: tile/ GWB Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Ceiling
Material: GWB Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Comments:

Interior finishes are in need of replacement.

II. Library Building Condition: Architecture—Interior

4. Staff Areas:

Floor
Material: carpet Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Walls
Material: GWB Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Ceiling
Material: ACT Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Comments:

Interior finishes are in need of replacement.

5. Staff Restroom:

Floor
Material: tile Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Walls
Material: tile / GWB Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Ceiling
Material: ACT Condition: ○ Good ○ Fair ◉ Poor ○ Critical

Comments:

Interior finishes are in need of replacement.

III. Library Building Condition: Architecture—Interior

6. What is the condition of the interior doors and door hardware?

   Condition: ○ Good ○ Fair ◉ Poor ○ Critical

   Comments:

7. What is the condition of fixed casework or build-in shelving or furniture?

   Condition: ○ Good ○ Fair ◉ Poor ○ Critical

   Please attach labeled digital photographs of a representative examples.

   Comments:

8. Are the public areas and the public restroom accessible? ○ Yes ◉ No

   Comments:

9. Are the staff areas and staff restroom accessible? ○ Yes ◉ No

   Comments:

10. Are there other maintenance or upgrades needed to the Building Interior? ◉ Yes ○ No

    Comments:

    Interiors are in need of a though and complete remodel, for programing updates, accessibility, lighting, furniture, carpet, ceilings, shelving, etc.

III. Library Building Condition: Mechanical Systems

1. What type of equipment is in place for heating ventilation and air conditioning (HVAC)?

gas-fired boilers

2. How old is the HVAC equipment? unknown, but old

3. When was the HVAC equipment last serviced? _____

4. Does the HVAC system work adequately? ○ Yes ◉ No

Comments:

The HVAC system appears to beyond its expected service span and is in need of replacement.

5. Are there other maintenance or upgrades needed to the HVAC system? ◉ Yes ○ No

Comments:

III. Library Building Condition: Plumbing Systems

1. What is the age of the water heating equipment? unknown

2. Have the toilets and faucets been replaced with water-saving units? ○ Yes ◉ No
   Comments:

3. Do the toilets work adequately? ○ Yes ◉ No
   Comments:

4. Do the sinks and faucets work adequately? ○ Yes ◉ No
   Comments:

5. Are there other maintenance or upgrades needed to the plumbing system? ◉ Yes ○ No
   Comments:
   The sewer lines frequently back up. All plumbing fixtures are original or old, and are in need of replacement.

III. Library Building Condition: Electrical Systems

1. Has the electrical service panel been replaced? ○ Yes ○ No
   If yes, when? _____

2. Are there adequate power outlets where needed? ○ Yes ◉ No
   Comments:

3. What type of light fixture lamps are in place (incandescent, florescent, LED, etc.)?
   incandescent and flourescent. All lighting is in need of replacement.

4. Are there occupancy sensors or other energy efficiency lighting control systems in place?
   ○ Yes ◉ No
   Comments:
   Recommend a new lighting control system.

5. Is there broadband wifi service in the Library for both patrons and staff? ◉ Yes ○ No
   Comments:

IV. Additional Comments

If you have any additional comments, please provide them below. If you need additional room, feel free to attach an additional document. If necessary, provide relevant, labeled photographs.

Condition Assessment Summary:

The Lakewood Library is in need of a comprehensive renovation. The renovation scope should include, at a minimum, the following:

Site
- parking lot re-surfacing
- new landscaping and irrigation
- replace side sewer line
- improvements to site security and public access

Building Exterior
- new windows and exterior doors
- new roofing and skylights

Building Systems
- new elevator
- new HVAC system
- replace plumbing system
- upgrade or replace electrical system and distribution
- new lighting and lighting control system
- wifi system upgrades

Building Interior
- remodel staff work areas, offices, staff restroom, staff break room
- remodel meeting room and study rooms
- remodel entry lobby
- remodel public restrooms
- remodel reading room areas and collections, including new furniture, shelving
- all new floor finishes, ceiling finishes, & wall finishes

Lakewood Library October 18, 2021

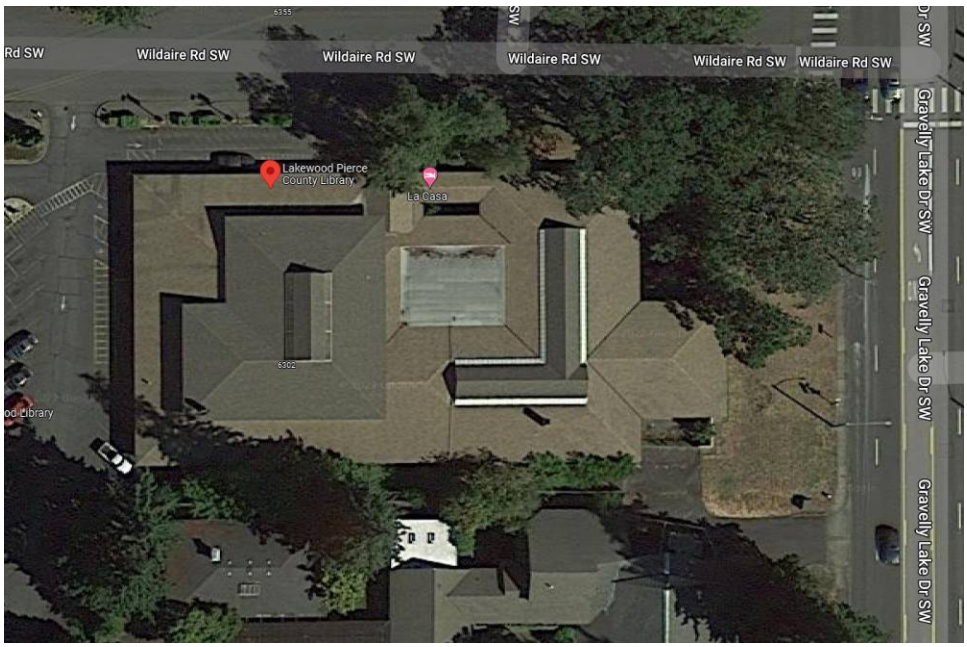
Budget Analysis for Renovation

Item	Cost / SF	Area (SF)		Budget
Parking Lot improvements	$ 6.00	45,000	= $	270,000
Landscaping	$ 7.00	35,000	= $	245,000
Site Lighting	$ 3.00	45,000	= $	135,000
Site Security / Access Control	$ 7.00	10,000	= $	70,000
Soffit repair & paint	$ 12.00	4,800	= $	57,600
New Windows & Entry Doors	$ 48.00	4,000	= $	192,000
New Skylights	$ 44.00	2,000	= $	88,000
New Roofing & Flashing	$ 14.00	34,000	= $	476,000
New HVAC System	$ 45.00	22,500	= $	1,012,500
Plumbing System Repair & New Fixtures	$ 18.00	10,000	= $	180,000
Fire Protection System	$ 4.00	32,000	= $	128,000
Elevator			= $	1,750,000
Electrical System uprades	$ 30.00	22,500	= $	675,000
IT upgrades	$ 6.00	22,500	= $	135,000
Interior Lighing and Controls	$ 28.00	22,500	= $	630,000
Interior Finishes (floors, walls, ceilings)	$ 34.00	22,500	= $	765,000
Furnishings and Casework	$ 38.00	22,500	= $	855,000
Hard Costs Subtotal			**$**	**7,664,100**
Sales tax		9.90%	= $	758,746
Permit fees		2.5%	= $	191,603
Construction Cost Escalation (12 months out)		4.0%	= $	306,564
Budget Contingency		15.0%	= $	1,149,615
Architecture, Engineering, & Consultant Fees		11.0%	= $	843,051
Soft Costs Subtotal			**$**	**3,249,578**
Total Project Budget			**$**	**10,913,678**

Attachment 2:
Wetherholt and Assoc.
Roof Evaluation

W E T H E R H O L T A N D A S S O C I A T E S , I N C .

LAKEWOOD LIBRARY
ROOF EVALUATION
MARCH 10, 2022



for

Pierce County Library System
3005 112th Street E
Tacoma, WA 98446

Attn: Kristina Cintron

April 1, 2022

2202-03A1

14715 NE 95th Street, Suite 100 • Redmond, WA 98052
Phone: 425-822-8397 • Fax: 425-822-7595

W E T H E R H O L T A N D A S S O C I A T E S , I N C .

April 1, 2022
2202-03A1

Pierce County Library System
3005 112th Street E.
Tacoma, Washington 98446

Phone #: 253 548-3454

Attn: Kristina Cintron

Sent via email: kcintron@piercecountylibrary.org

Ref: Lakewood Library
6300 Wildaire RD SW
Lakewood, WA

Greetings,

At the request of Kristina Cintron, this writer and Greg Guillen, CG Engineers met with Frankie Nickerson, PCLS; and Billy and Davis, Wayne's Roofing; on March 10, 2022 to review the roof and structure at the Lakewood Library.

Items of Understanding

The Lakewood Library building was constructed in 1963, expanded in 1974, and renovated in 1994 including an addition. The library was further remodeled in 2006. At an unknown date following the 1994 renovation, the roof was replaced in 2 phases, one of the phases may have coincided with the 2006 remodel. Historic information taken from the PCLS website History of Lakewood Pierce County Library and the Pierce County Assessors website.

Water intrusion was reported at the north and west lower-level steep slope roofs. Evidence of the water intrusion was visible in the soffit areas below the noted roofs. Two other locations of water entry were noted, but temporary repairs performed by Wayne's Roofing have stopped the water entry.

It is understood that Wayne's Roofing performs roof maintenance on the building.

Wayne's Roofing was retained to perform destructive openings to review the condition of the structure. CG Engineers was retained to review the roof structure.

Observations

The Lakewood Library is a 1.5 story structure with architectural laminate shingles manufactured by Tamko on the lower section of the roof, and unidentified architectural laminate shingles installed at the upper roof and skylight roofs. It was indicated that the shingles were installed at different times and by different roofing contractors. It was indicated that Wayne's Roofing installed the shingles at the upper and skylight roofs.

The roof system at the lower roof west half consists of the following from the top down as confirmed during the test openings. Architectural laminate shingles, asphaltic underlayment, plywood sheathing, polyethylene faced self-adhered membrane, and cementitious wood fiber substrate board. Cementitious wood fiber substrate board is known by the trade name Tectum. Cementitious wood fiber substrate board is constructed with cementitious binder and wood fiber filler.

The roof system at the lower roof east half and upper roof areas appears to consist of the following from the top down as indicated on the as-built drawings provided. Architectural laminate shingles, underlayment, plywood sheathing, and structural steel decking.

The low slope roof appears to consist of the following from the top down as indicated on the as-built drawings provided. A multi-ply built-up roof applied in hot asphalt, plywood sheathing, metal decking, and R-30 batt insulation secured directly to the underside of the metal deck with stick pins. Slope to drain is provided by structure and the cricket between the drains is wood framed. This roof area was added during the 1994 addition and remodel.

The 1994 as-built drawings indicate that the steep slope roof system at the time was clay tile. The roof has no provisions for venting, nor does there appear based on the provided drawings to be a vent cavity. A clay tile roof would not need to be vented in the same manner that a shingle roof would need to be vented.

The steep slope roofs positively slope at approximately 4:12 to the eave edges. At the lower roof areas there are external gutters and downspouts, and at the upper roof area there is external gutter and downspouts only at the bottom of the valley. Valleys at the lower roof are configured with sheet metal valley liners, and at the upper roof as closed cut valleys. The skylight roofs slope at approximately 5:12.

The low slope roof slopes to the north and is drained via 2 cast iron primary drains located in the northeast and northwest corners of the roof. Overflow drains consist of a drainpipe extending approximately 1-inch above the surface of the roof flashed with a lead integrated into the roof. This type of overflow is commonly known as a contractor style overflow. There is a dead valley behind a rising wall at the roof over the log. The dead valley drains to the west and north and then transitions to the steep slope roof.

Rising walls above the lower roof area clad with marblecrete. The marblecrete transitions to the steep slope roof with headwall flashing. The marblecrete terminates at the top of the roof. In some areas the marblecrete was reworked, and through wall flashing was installed, the marblecrete terminates approximately 4-nches above the surface of the roof. The marblecrete in the reworked areas differs in color than the adjacent marblecrete. In some areas the marblecrete is cracked or otherwise damaged.

At the east half of the lower roof and at the upper roof there are sloped skylights. The skylights consist of a fiberglass sandwich panel, situated between steep slope roofing. The ends of the skylights are clerestories with windows extending to the surface of the roof. At the upper roof the south clerestory is stripped into the shingles with fluid applied flashing.

Roof penetrations are minimal, pipe penetrations are flashed with leads, and the chimney penetrations are flashed with sheet metal flashing. At the rake conditions the shingles are integrated into the walls with step shingles counterflashed with through wall flashing.

At the south half of the roof between what is presumed to be the original building, and the 1973 addition is an area dividing wall. This may be an expansion joint that does not extend through the low slope roof that was installed in 1994.

Discussion and Recommendations

The lower steep slope roofs at the north and west portions of the building are in poor condition. It appears that water has passed beyond the shingles for an extended period of time. The wetting of the components beneath the shingles has deteriorated the underlayment, plywood, and in areas, the cementitious wood fiber substrate board. This is evidenced by the plywood and underlayment being in good condition in areas where the upper roof overhangs the lower roof and provides some protection from water. The lower steep slope roofs at the west half of the building are no longer serviceable and should be replaced.

The cementitious wood fiber substrate board is deteriorated in many areas, and likely not serviceable to maintain a solid substrate for a new roof system. Where observed cementitious binder was washed away leaving only the wood fibers. The lack of binder has caused the cementitious wood fiber substrate board to weaken and deflect. The deflecting substrate boards cause the shingles to deflect, further exacerbating water entry as water can travel laterally creating further water entry and damage.

The substrate at the steep slope roofs to the south and east of the second floor, the eastern roof section, and the upper roofs do not appear to have water damage. The substrate felt solid, and no deflection was observed. Water entry described at the north and west roof areas was not indicated in these areas.

The shingles at the upper roof areas and at the south and east roof areas below the second story, and the shingles at the east half of the building are in fair condition. With maintenance, repairs, and proper tenant improvements these roof areas should be serviceable for 3-5 more years at what point the roofs should be reevaluated for options for further repairs or replacement.

Cupping shingles were noted at the lower north sloping roof area adjacent to the second story, minor mineral granule loss, and cracked shingles were noted at the lower south slope roof areas. The cracking shingles should be carefully removed and replaced with matching shingles. Moss growth was observed at the perimeters of the upper roof areas, if desired the moss can be cleaned from the surface of the roof with a medium bristle push broom, removal of the moss is not necessary. Nails were observed backed out and penetrating the overlying shingles at the east sloping roof at the east half of the building. At the east sloping upper roof nails were observed to be backed out but not penetrating the overlying shingles. Backed out nails not penetrating the overlying shingles should be redriven and the overlying shingle hand tabbed down. Where nails have penetrated the overlying shingles, the nails should be redriven and the overlying shingle replaced with new to match the existing.

Trees are in close proximity to the roof at the north, south, and east sides of the roof. The trees should be trimmed back away from the roof. Organic debris on the roof should be removed from the roof on a regular basis.

The low slope roof is in fair condition, and with proper maintenance, repairs, and tenant improvement should remain serviceable for 3-5 years. The roof should be reevaluated in 5 years for options for repair or replacement. A leak was reported under the low slope roof which was patched by Wayne's Roofing prior to the site visit. Following the application of roof cement further water entry was not reported.

The low slope roof should be cleaned of organic debris, and the are where roof cement was applied should be patched with an application of Alsan RS. The surface of the roof should be prepped, and the patch should extend a minimum of 6-inches in all direction away from the damaged area. The approximate area of the temporary repair is marked with a 1 on the overview photo below.

A leak (marked with a 2) was reported in an area below the transition between the skylight and steep slope roof. Application of sealant at the skylight appears to be aged indicating that water entry in this location has likely occurred multiple times. A new application of roof cement at the bottom of the skylight by Wayne's Roofing prior to this writer's site visit has reportedly stopped the water entry. The skylight panels and area below can be cleaned and prepped and an application of Alsan RS can be applied over the area as a long-term patch.

The ends of the skylight roofs are configured as clerestories with aluminum framed storefront windows set at the same height as the roofing. Sheet metal flashing extends from beneath the window frames lapping over the shingles. At the south end of the upper roof skylight the base of the window has been stripped in with fluid applied flashing similar to the recommended repair above. The fiberglass skylight panels at the upper roof are darkened and have lichen growth on them.

Damaged marblecrete at the rising walls above the lower roof areas, should be cut out and patched with new marblecrete. Holes in the soffits should be covered or patched.

Recommendations above are temporary short-term repairs. The following options for long term repairs should be considered. The options include removal of a portion of the existing decking which may require temporarily closing the library or a portion of the library.

The lower roof areas to the north and west of the second story (west half of the building) are no longer serviceable. The existing roof system, plywood, and cementitious wood fiber substrate board should be removed to expose the steel structure. Any needed repairs to the steel structure should be performed once exposed. This scope of work will create a condition where the interior under the roof areas noted will be exposed to weather.

The remaining roof areas configured with cementitious wood fiber substrate board should be addressed in the same manner as recommended above. These areas are believed to be the roof areas to the south and east of the second story west of the addition. Further exploratory openings may need to be performed to confirm the make-up of these roof areas. If a full set of as-built drawings are located those drawings may show the make-up.

At roof areas where the cementitious wood fiber substrate board is removed to expose the steel framing, new steel pan decking should be installed to create a solid continuous substrate. The design of the new steel pan decking attachment, and gauge should be performed by a Structural Engineer.

The upper roof area, the east roof areas, and the skylight roofs should be replaced with a new vented roof assembly. The existing shingles and underlayment should be removed to expose the plywood sheathing. Replace any deteriorated plywood sheathing that is found.

A new vented roof assembly consisting of the following layers from the structural steel decking up should be installed. Plywood or gypsum substrate board, self-adhered underlayment, R-38 (or local code required insulation) polyisocyanurate insulation in a minimum of 2-layers, 2x wood sleepers spaced and gapped to create cross venting, plywood sheathing, 1 layer of self-adhered underlayment and 1 layer of synthetic underlayment over the entire roof, and new shingles. Roof related sheet metal, and the external gutters should be removed and replaced with new. Existing steel decking and plywood components, where installed, can remain in place. Insulation below the roof deck should be removed.

To accommodate the thickness of the new roof system, the single pane aluminum windows at the rising wall above the lower roof should be removed and replaced with new. The marblecrete should be removed and replaced with new architectural sheet metal or fiber cement board cladding. The skylights should be replaced with new sloped aluminum framed skylights integrated into the roof system. The clerestory glazing at the ends of the skylights will need to be replaced with new smaller framed windows to accommodate the thickness of the new roof system. The new windows at the rising walls, and at the clerestories should be configured a minimum of 8-inches above the finished roof surface and properly flashed into the roof and openings.

The low slope roof should be removed and replaced with a new torch applied roof system. The system should be configured with a gypsum substrate board, self-adhered temporary roof/vapor retarder, R-38 (or local jurisdiction required insulation) polyisocyanurate insulation in a minimum of 2-layers, gypsum coverboard, a self-adhered basesheet, a torch applied midply, and a torch applied mineral surfaced capsheet. The overflow drains should be reworked and configured with a cast iron drain body integrated into the new roof assembly. Insulation below the roof deck should be removed.

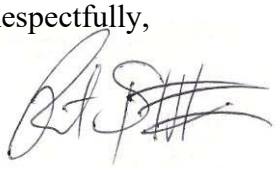
Rough order of magnitude (ROM) costs for replacement of the lower north and west roof areas only should be between $110-150 per square foot. The lower north and west sloping roof areas equate to approximately 5,800 square feet. Total pricing should be between $637,670 and $869,550. The full building has approximately 28,350 square feet of roofing. ROM costs for the full scope of work should be between $85-125 per square foot. Total pricing for the entire project scope of work should be between $2,409,750 and $3,543,750 The ROM costs do not include design costs or permitting fees.

The above recommended repairs and replacement options are extensive and general in nature. A licensed Architectural Firm should be retained to provide full design services. Wetherholt and Associates can be retained to provide consulting during design and inspection during construction. Recommended design firms can be provided upon request.

Enclosed are photographs and notes taken during our site visit for your review. These photographs and notes may provide additional information to that discussed above, and should be considered as part of this report.

We trust the above discussion has been of assistance. If you have any questions, or if we may be of further service, please do not hesitate to call.

Respectfully,



Pravat Sripranaratanakul, RRO, RRC, RWC
Senior Field Engineer
Wetherholt and Associates, Inc.

Alex Murphy, RRO
Field Engineer
Wetherholt and Associates, Inc.

Enclosures: photographs

Please note that this evaluation is provided at the request of Kristina Cintron, Pierce County Library System. No liability, warranty of merchantability, or guarantee of roofing, waterproofing, or building envelope service life is accepted or implied. Wetherholt and Associates, Inc., is a neutral roofing, waterproofing, and building envelope consulting firm specializing in resolving building envelope and moisture related issues.

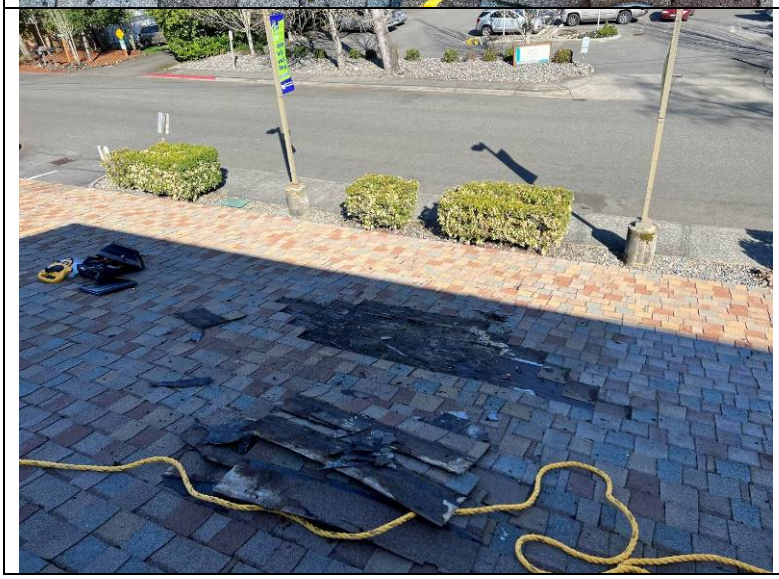
The area highlighted above are the north and west lower roof areas. The locations noted as 1 and 2 are the areas of water entry noted.

Photograph 1: Overview of the north elevation of the Lakewood Library.

Photograph 2: Overview of the area where test openings 1-3 were made by Wayne's Roofing personnel.

Photograph 3: Overview of the area where test opening 4 was made by Wayne's Roofing personnel.

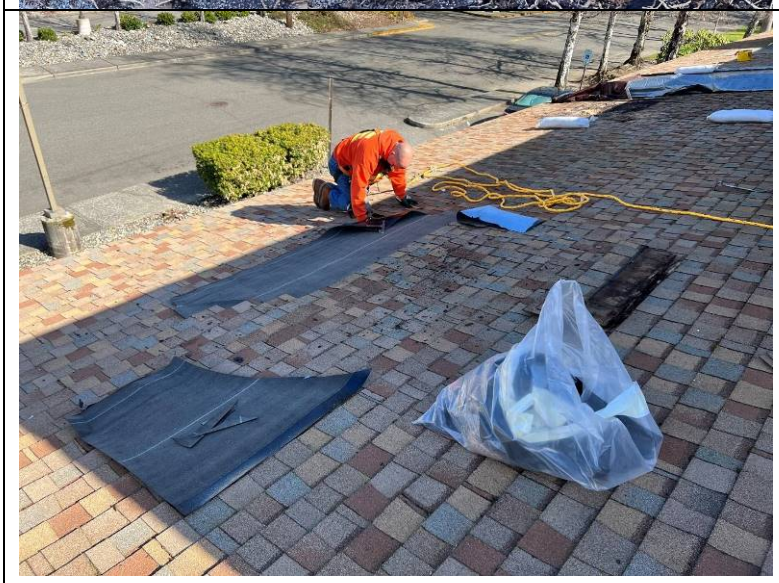
	Photograph 4: Water staining at the soffit under the area where test openings were made.
	Photograph 5: Water staining at a light fixture in the soffit under the area where test openings were made.
	Photograph 6: Water staining at the soffit under the area where test openings were made.

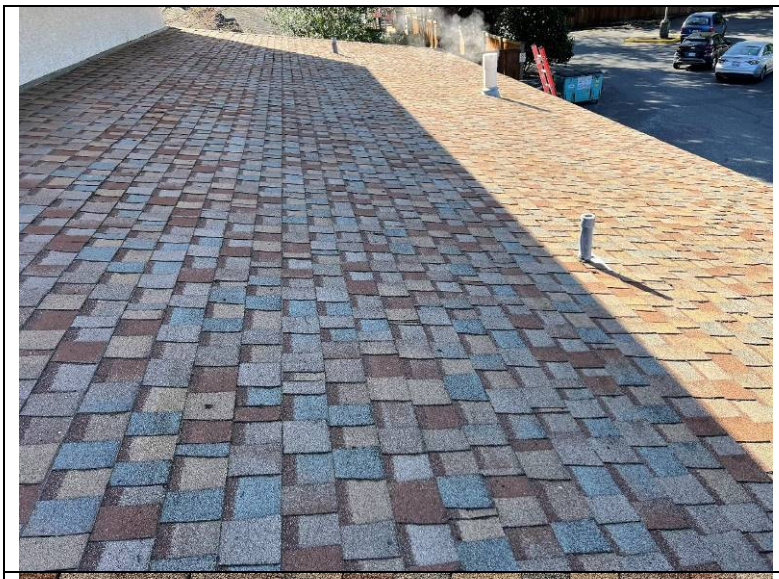
	Photograph 7: Water staining at the soffit under the area where test openings were made.
	Photograph 8: Test opening #1 was situated under the overhang from the upper roof. The plywood at this location appears light in color and solid. The underlayment was in good condition.
	Photograph 9: Overview of test opening location #2. The plywood at this location which was exposed is deteriorated and black in color. The underlayment was deteriorated.

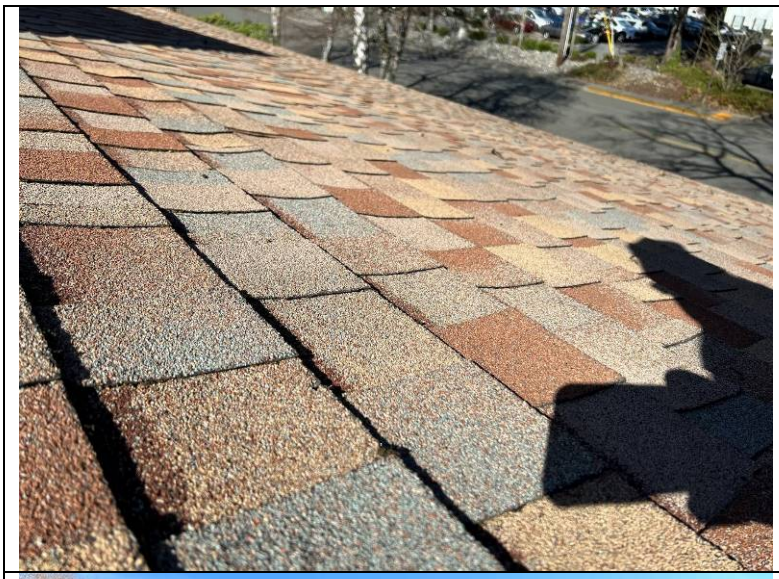
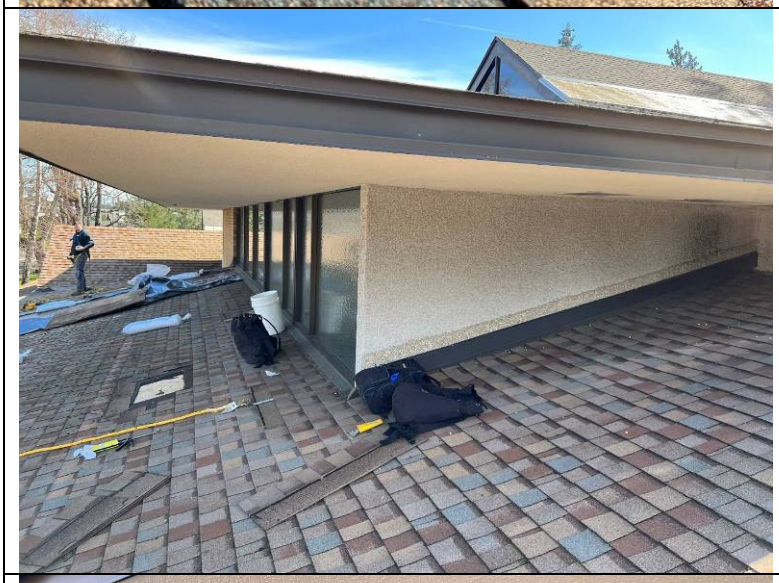
	Photograph 10: Closer view of the area shown in Photograph 9.
	Photograph 11: Overview of opening location #3.
	Photograph 12: Closer view of the area shown in Photograph 11. Note the plywood sheathing and cementitious wood fiber are deteriorated.

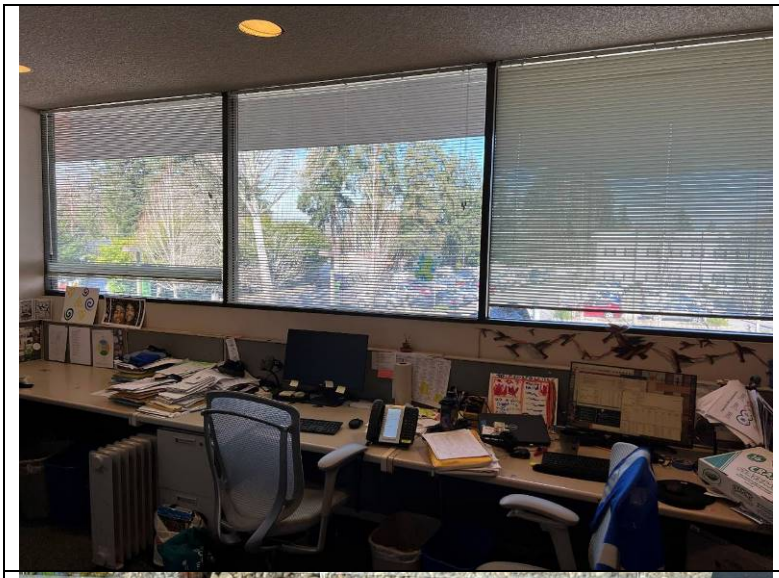
	Photograph 13: Portion of the cementitious wood fiber substrate was removed to provide visual access to the structure below. Note the cementitious wood fiber substrate board is deteriorated.
	Photograph 14: Closer view of the cementitious wood fiber substrate board at the test opening.
	Photograph 15: Asphaltic membrane with a polyethylene surfacing. The asphaltic membrane was situated over the cementitious wood fiber substrate board.

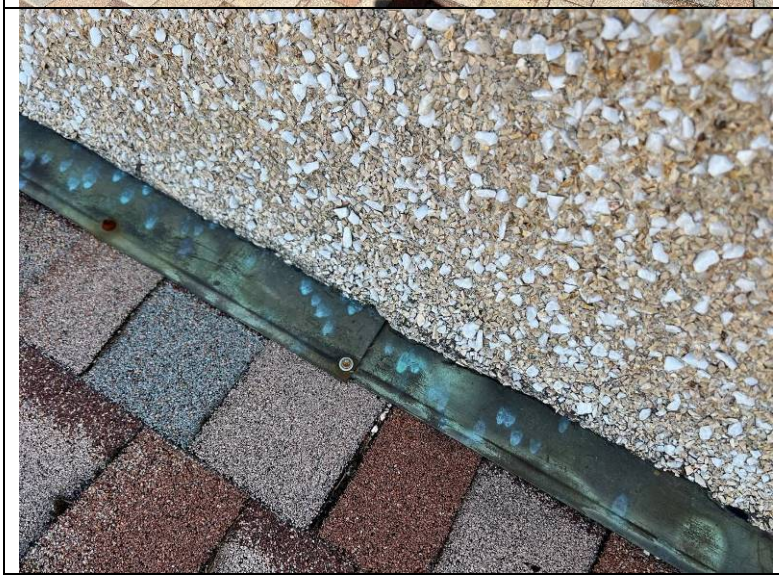
	Photograph 16: Alternate view of test opening #3.
	Photograph 17: Overview of test opening #4.
	Photograph 18: Cementitious wood fiber substrate board removed at test opening #4. Similar to test opening #3 the cementitious binder has washed away and only the wood fibers remained.

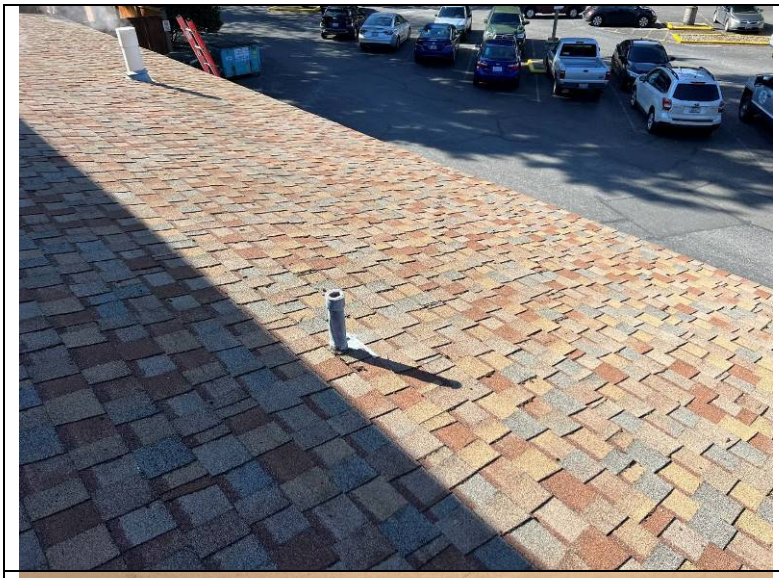
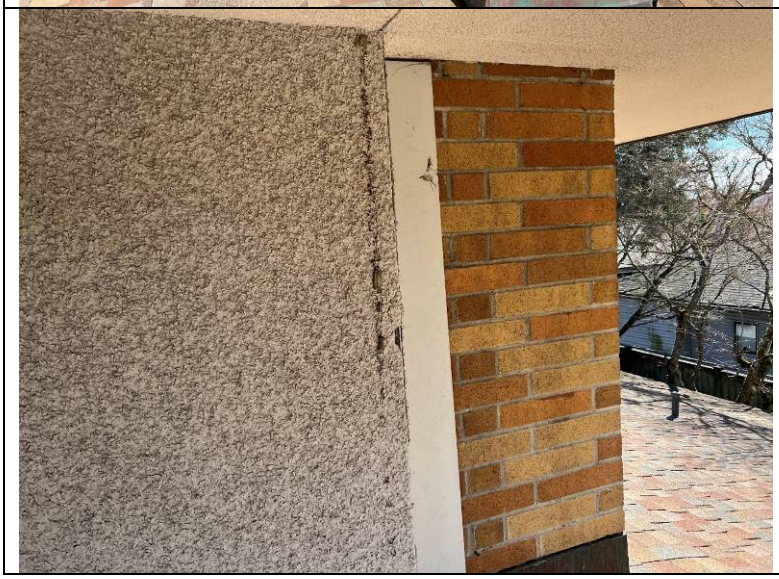
	Photograph 19: Closer view of test opening #4 showing the deteriorated cementitious wood fiber substrate board.
	Photograph 20: Alternate view of the area shown in Photograph 19.
	Photograph 21: Temporary roof repairs were made with self-adhered membrane integrated into the shingles in a water shedding manner. In locations where the plywood sheathing and cementitious wood fiber substrate board were deteriorated and could not support weight new plywood was placed over the opening prior to placing the patch. Where previously installed the tarp was repositioned.

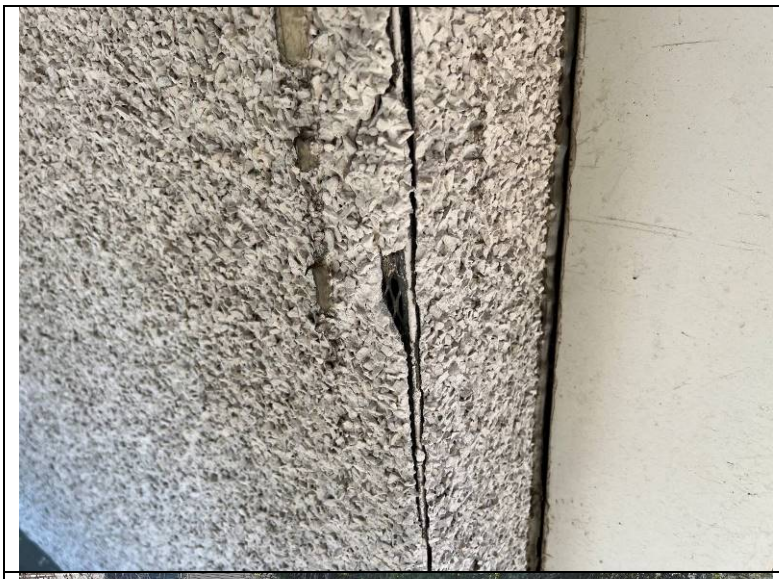
	Photograph 22: Looking laterally across the Tamko architectural laminate shingles.
	Photograph 23: Closer view of the Tamko architectural laminate shingles.
	Photograph 24: Tamko label on the backside of one of the removed shingles.

	Photograph 25: Slight curling or cupping of the Tamko shingles was observed in various areas of the roof.
	Photograph 26: Looking east along the rising window wall at the north sloping roof area.
	Photograph 27: Windows at the upslope edge of the north sloping roof area. The windows sit less than 5-inches above the surface of the roof.

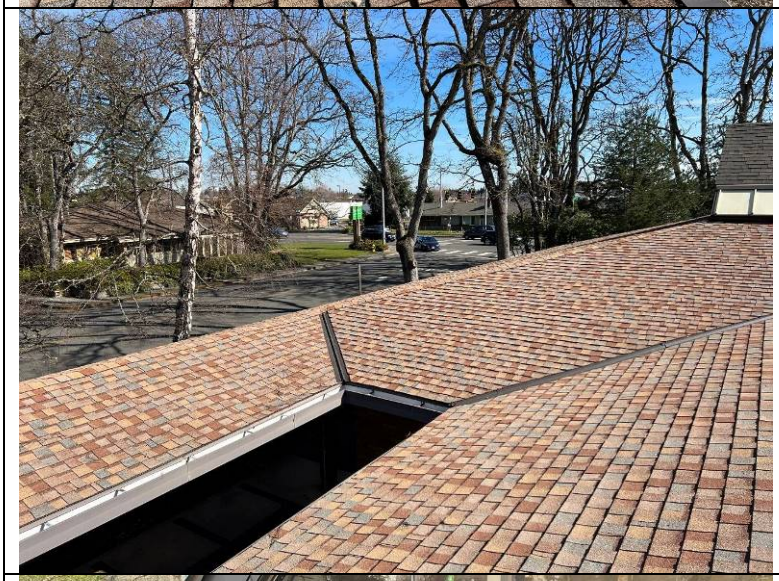
	Photograph 28: Windows shown in Photograph 27 as seen from the interior.
	Photograph 29: Closer view of the base of the windows shown in Photograph 27.
	Photograph 30: Closer view of the bottom of the windows shown in Photograph 27 as seen from the interior.

	Photograph 31: Typical marblecrete clad rising wall above the lower roof. The marblecrete comes down to the surface of the roof and transitions to the roofing with sheet metal flashing.
	Photograph 32: Roof to wall transition along a rake wall. The apparent different color in the marblecrete indicates that the marblecrete was reworked. The flashing height at this location differs from areas where the marblecrete was not reworked.
	Photograph 33: Closer view of the headwall flashing.

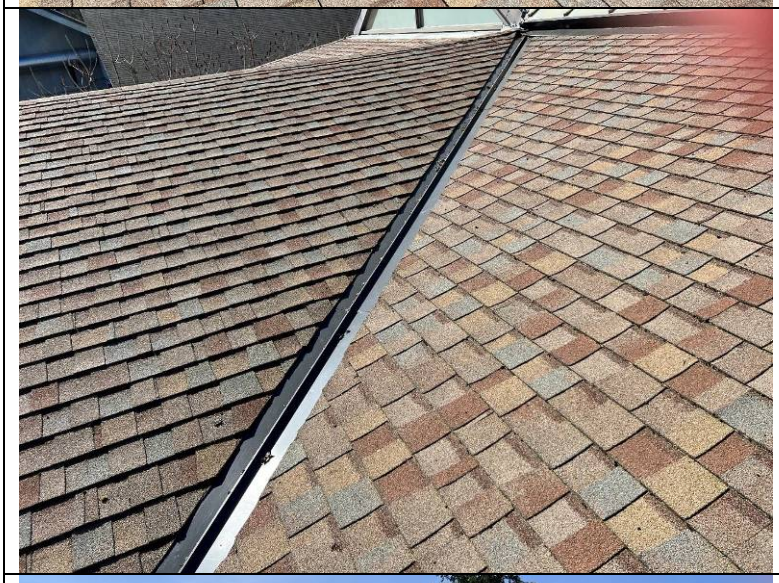
	Photograph 34: Typical pipe penetration flashed with a lead penetration flashing.
	Photograph 35: Cracked marblecrete at a rising wall corner transition.
	Photograph 36: Closer view of the damage shown in Photograph 35.

	Photograph 37: Closer view of the area shown in Photograph 35. Damage is likely due to age, settling, and differential movement.
	Photograph 38: Sheet metal cover over an area dividing wall. This is situated at the transition between the original building and the 1974 expansion.
	Photograph 39: Closer view of the sheet metal cover shown in Photograph 38.

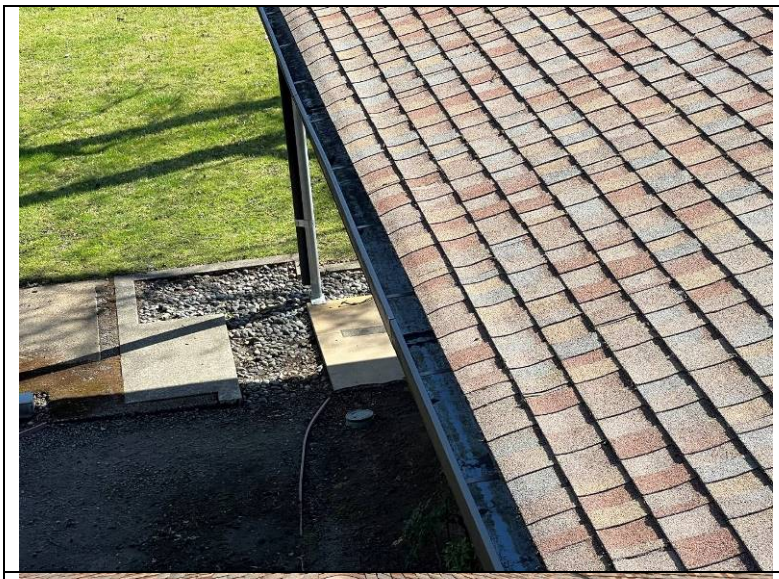
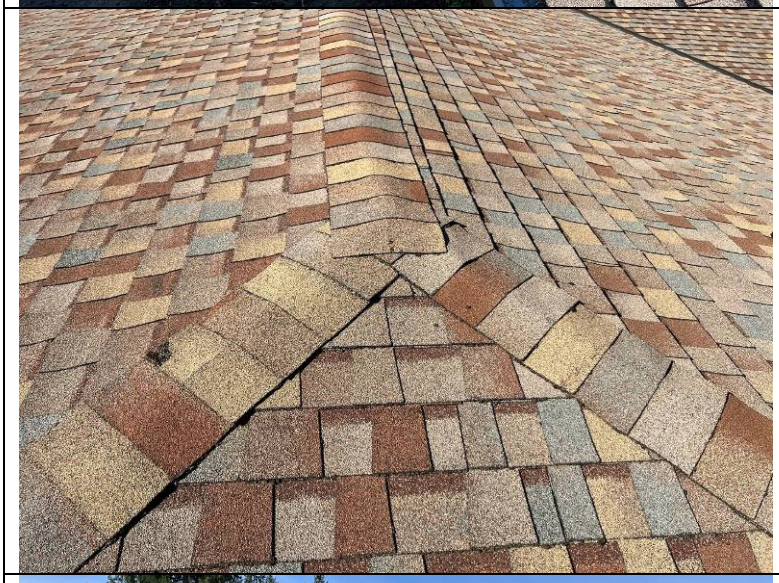
	Photograph 40: Overview of the south sloping roof and trees within close proximity of the roof.
	Photograph 41: Low roof to high roof transition at the translucent skylight panels.
	Photograph 42: Dead valley with mineral surfaced capsheet in the valley. Water drains through the channel indicated by the arrow. Note the valley lacks slope to drain and leaves are collecting in the dead valley.

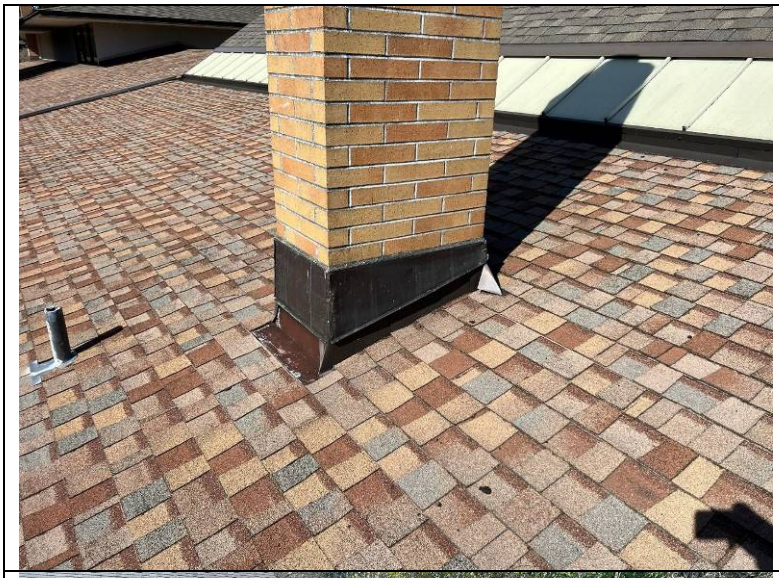
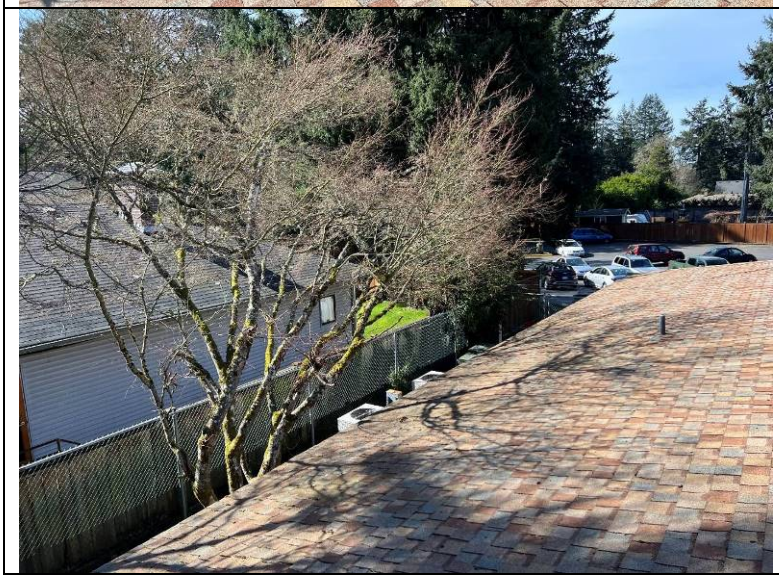
	Photograph 43: Steep slope to low slope roof transition. The leading edge of the shingle roof is terminated with sheet metal flashing.
	Photograph 44: Opening in the roof at the north central side of the roof. The roof slopes to the draining edge and exterior hung gutter.
	Photograph 45: Roof to clerestory transition. Sheet metal flashing appears to be integrated under the clerestory windows. Note the clerestory windows sit at the same level as the roof.

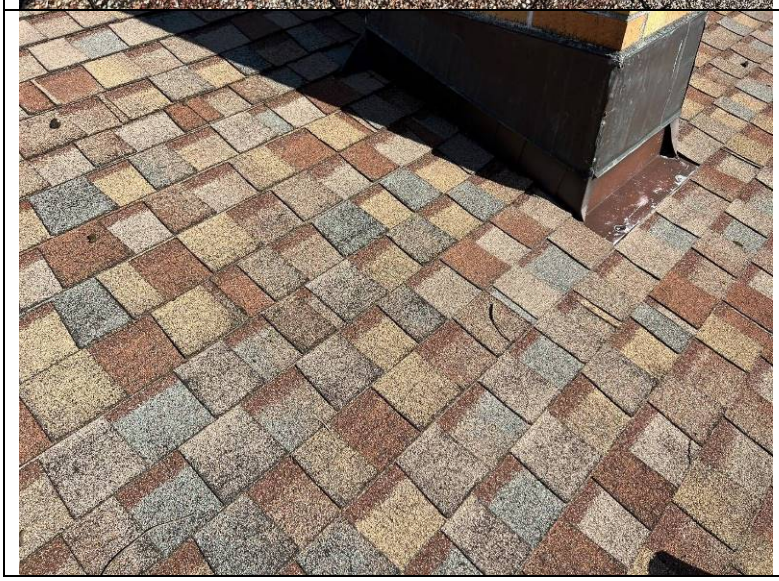
	Photograph 46: Hip condition, roofed with hip shingles. Note the backed-out nails (highlighted).
	Photograph 47: Closer view of the backed-out nails. Note Wayne's Roofing personnel drove the nails in and applied roof cement over the nail heads as a temporary measure.
	Photograph 48: Closer-up view of the backed-out nails.

	Photograph 49: Typical valley at the lower roofs configured with a sheet metal valley flashing.
	Photograph 50: Closer view of the sheet metal valley flashing.
	Photograph 51: Overview of a leak location temporarily sealed by Wayne's Roofing.

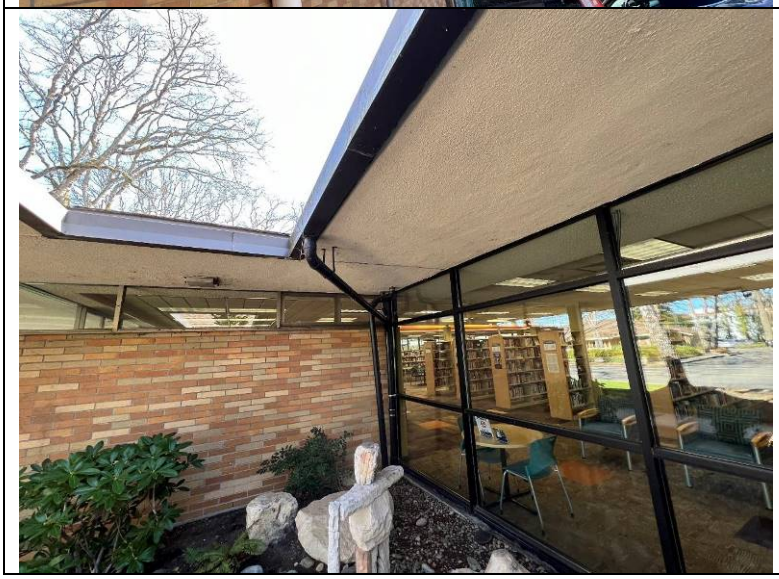
	Photograph 52: Closer view of the area shown in Photograph 51. Roof cement appears to have been applied in response to the previous water entry.
	Photograph 53: Sealant at this location is older and was likely applied in response to previous water entry.
	Photograph 54: Area below the area circled in Photograph 51. Arrows indicate apparent water staining on the ceiling.

	Photograph 55: Typical drainage detail with external hung gutter.
	Photograph 56: Ridge to hip transition.
	Photograph 57: Chimney penetration flashed with sheet metal flashing.

	Photograph 58: Closer view of the chimney penetration shown in Photograph 57.
	Photograph 59: Trees in close proximity to the roof along the south side of the roof.
	Photograph 60: Trees in close proximity to the roof along the south side of the roof.

	Photograph 61: At the south sloping roofs, the mineral granules are eroding from the surface of the shingles.
	Photograph 62: Closer view of the surface of the shingles.
	Photograph 63: Alternate view of an area with displaced mineral granules.

	Photograph 64: Cracked shingles at the south sloping roof. (Arrows)
	Photograph 65: Boiler vent penetration. The PVC penetration is flashed with a b-vent, with a storm collar above the flashing. The storm collar is rusty.
	Photograph 66: Splash pad beneath the downspout from the upper roof.

	Photograph 67: Equipment mounted to the exterior wall through the marblecrete. The fastener penetrations are not sealed.
	Photograph 68: Damaged gutter (arrow) at the west side of the roof.
	Photograph 69: Gutter downspout.

	Photograph 70: Overview of the east end of the north elevation. This area appears to be the 1974 addition.
	Photograph 71: Area to the left of the red line appears t be the 1974 addition.
	Photograph 72: Overview of the repairs at the test openings.

Photograph 73: Overview of the low slope roof.

Photograph 74: Typical cast iron roof drain and adjacent contractor style overflow (arrow).

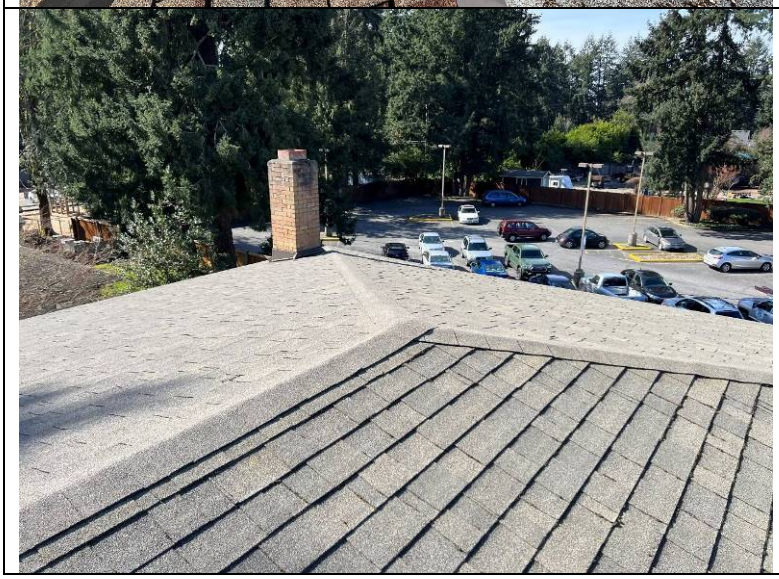
Contractor style overflows consist of a pipe stubbed above the roof flashed into the roof with a lead flashing.

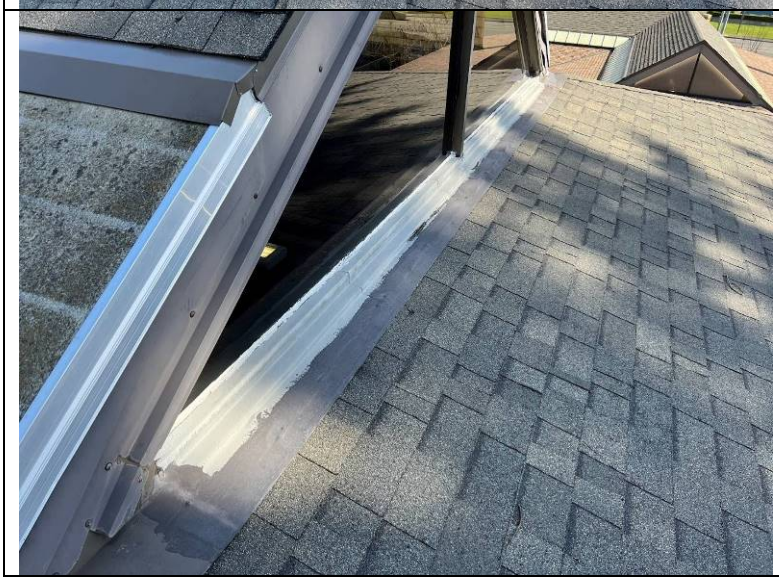
Organic debris is collecting on the surface of the roof.

Photograph 75: Closer view of a cast iron roof drain and contractor style overflow (arrow).

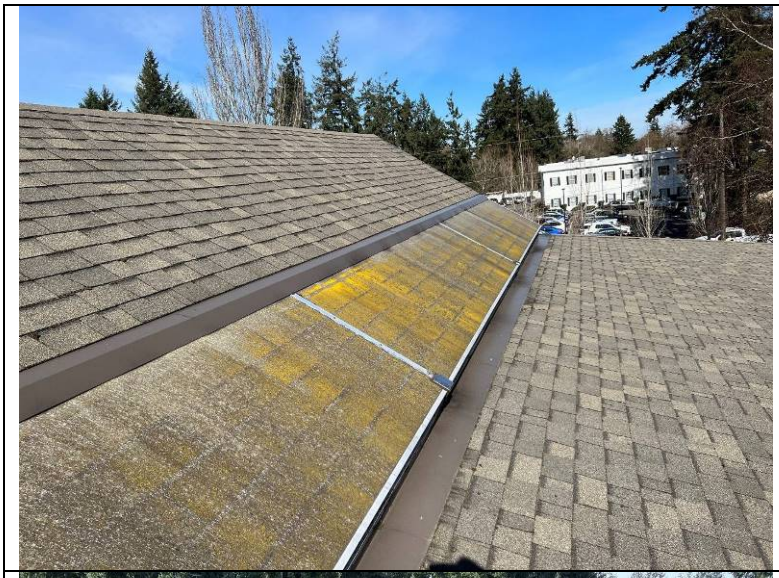
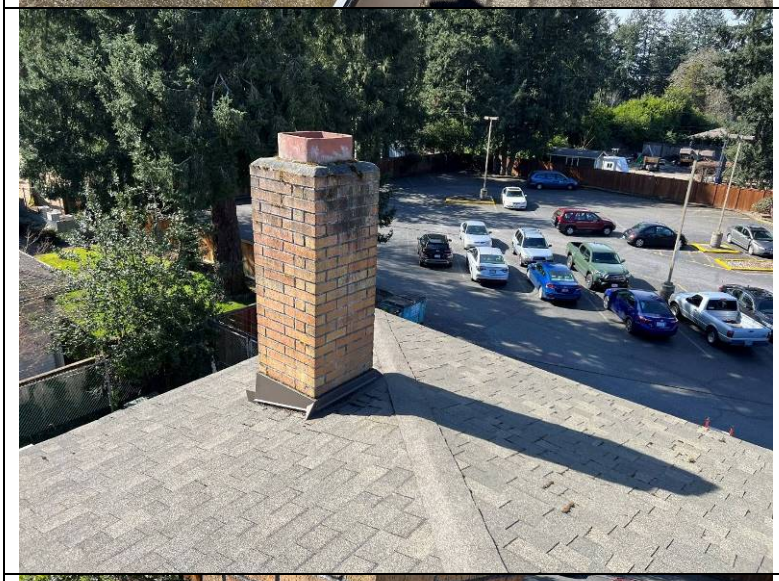
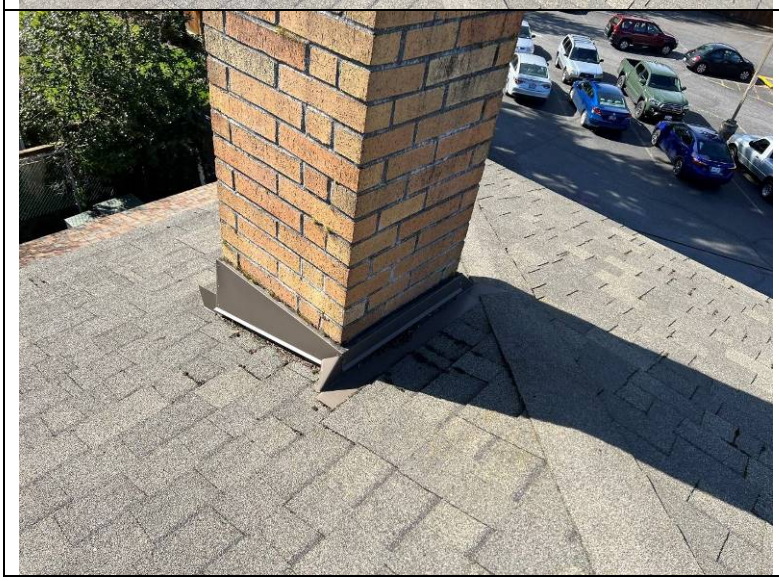
	Photograph 76: Closer view of the contractor style overflow.
	Photograph 77: Roof cement patch over an apparent location of damage.
	Photograph 78: Closer view of the roof cement patch circled in Photograph 77. Note the repair was performed by Wayne's Roofing in response to previous water entry.

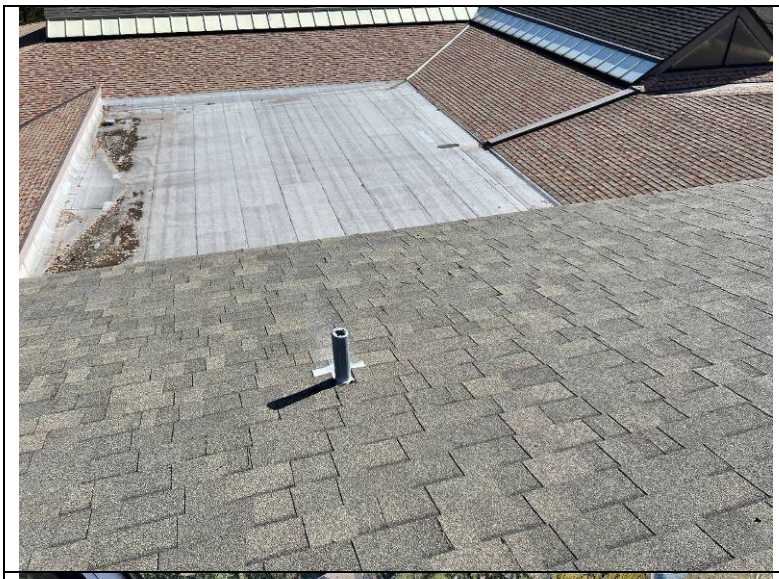
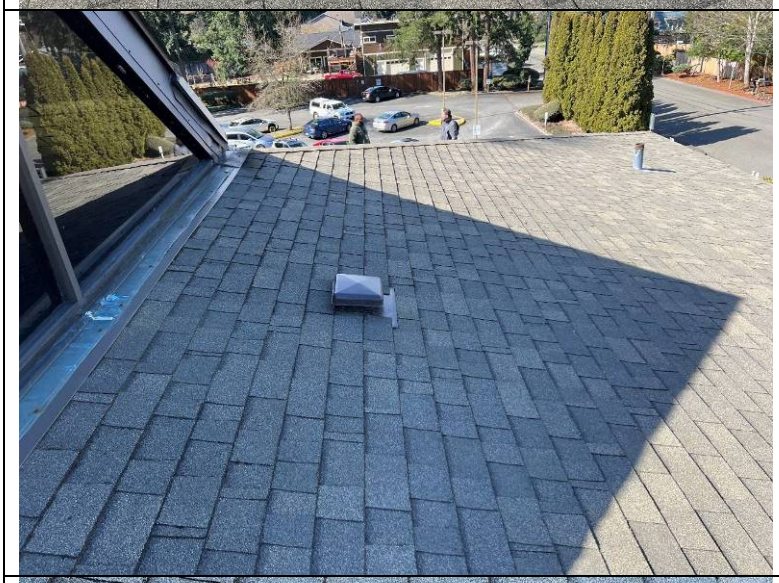
	Photograph 79: Approximate area beneath the roof cement patch shown in Photographs 77 and 78.
	Photograph 80: Closer view of stained ceiling tiles shown in Photograph 79.
	Photograph 81: Closer view of the stained ceiling in the general area shown in Photograph 79.

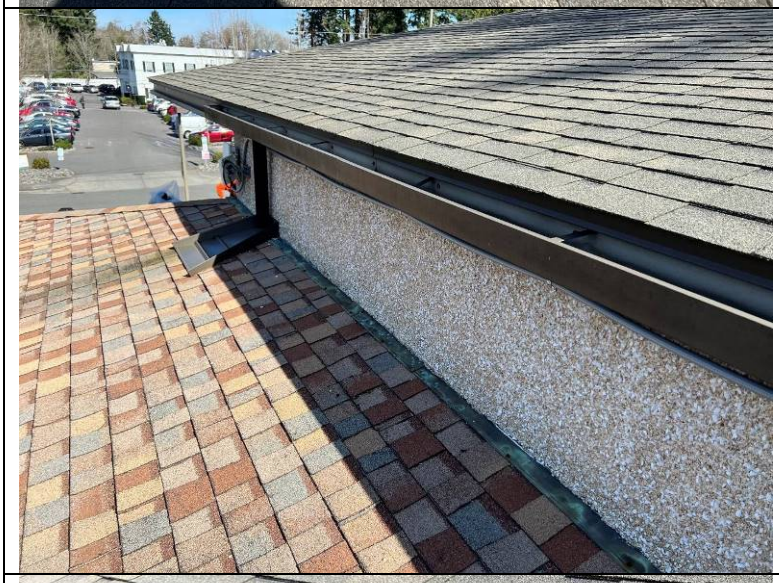
	Photograph 82: Steep slope to low slope roof transition.
	Photograph 83: Closer view of the steep slope to low slope transition.
	Photograph 84: Overview of the upper roof.

	Photograph 85: Typical closed cut valley at the upper roof.
	Photograph 86: Roof to skylight transition.
	Photograph 87: Roof to clerestory transition. Note the fluid applied flashing at the base of the window. It is likely the fluid applied flashing was applied in response to water entry.

	Photograph 88: Overview of the skylights at the upper roof. Note the lichen growth on the surface of the skylight lenses.
	Photograph 89: Moss growth along the perimeter of the shingles.
	Photograph 90: Alternate view of the moss growth at the upper roof.

	Photograph 91: Looking laterally across the skylight. The skylight lens is discolored and has lichen growing on it.
	Photograph 92: Chimney penetration at the upper roof.
	Photograph 93: Closer view of the sheet metal chimney flashing.

	Photograph 94: Typical pipe penetration flashed with a lead.
	Photograph 95: Typical roof vent stripped into the shingle roof.
	Photograph 96: Closer view of the roof vent shown in Photograph 95.

	Photograph 97: Pipe penetration flashed with a lead flashing. Note the lead flashing does not extend to the top of the penetration and is topically sealed with sealant.
	Photograph 98: Draining edge and gutter at the upper roof.
	Photograph 99: Closer view of the gutter and draining edge shown in Photograph 98.

	Photograph 100: Downspout and splash pad. Repair to the marblecrete can be seen in the background of the photo. The darker colored marblecrete is the newer patched areas.
	Photograph 101: Eave edge without a gutter.
	Photograph 102: Soffit above the low roof. Arrow indicates a hole in the soffit.

	Photograph 103: Closer view of the hole indicated by the arrow in Photograph 102. Holes in the soffit should be covered to prevent rodent or insects from entering into the building.
	Photograph 104: Damaged shingle at the eave edge.
	Photograph 105: Arrow indicates an apparent nail backing out and lifting the overlying shingle.

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STRUCTURAL OBSERVATION REPORT

Project: Lakewood Library Dry Rot	**Purpose:** Structural Evaluation of roof sheathing
Location: 6300 Wildaire Rd SW, Lakewood, WA 98499	**Date:** 04/21/2022
CG Project: 22094	**Report:** 1
Client: Wetherholt & Associates	**General Contractor:**
Field Rep: Greg Guillen, PE, SE	

PURPOSE AND SCOPE

A field representative of CG Engineering was on site on **March 10th, 2022,** to evaluate sheathing system on the existing library. When we arrived on-site the contractor (Wayne's Roofing) started exposing some areas on the roof for inspection. They had two areas opened that appeared to have some roof deflection. We met with Pravat Sripranaratankul from Wetherholt & Associates to review the areas being opened.

EXISTING BUILDING

The existing building is a one and two story, library structure circa 1964 and renovated in 1974. Water damage has been noted in the soffit areas below the roofs on the north side of the building.

OBSERVATIONS & RECOMMENDATIONS

1. Roof System Exposed at North side of Building – The roof in this area consisted of asphalt shingles over underlayment, plywood sheathing over the cementitious wood fiber substrate board commonly called Tectum. As the roof was removed from the areas of investigation the plywood was significantly deteriorated. See photo #1 which shows the underlayment and what is left of the plywood sheathing. The wood fiber could also be observed in this photo. We had the contractor cut through the whole roof system to view the sub structure. Photo #2 shows the Tectum approximately 4" thick with some water damage. The Tectum panels support the roof structure by spanning between the roof beams. Photo #3 shows how deteriorated the Tectum is in another test location. Once the roof gets wet the plywood and Tectum loose strength and start to deflect causing more water damage. The deflection noticed in some roof areas will likely be areas where water damage has occurred. This lower roof system investigated has extensive damage in some locations. We recommend that this area of the roof be replaced with a new decking system supported by the existing structural steel roof system.

2. Steel Beam Roof Supports – We were able to observe the structural steel beam that supports the Tectum roof panel system by looking through one of the holes cut into the roof. It appears in the areas investigated that the tectum spans between steel roof beams with a spacing of approximately 6-7 feet. Photo #4 shows the red primed steel beam support in good condition. We did not observe corrosion of the steel beam in this one section investigated. When the roofing system is removed for a re-roof and corrosion is discovered simple grinding and recoating of the structural steel with primer could be easily accomplished. Should a decision to replace the roof system in this area be made, reconstruction could occur by taking out the Tectum system and using a metal deck system to span between the steel beam roof structure.

250 4th Avenue South, Suite 200
Edmonds, WA 98020
ph. 425.778.8500 | f. 425.778.5536
www.cgengineering.com

Obtaining existing structural drawings for this building would be helpful in providing a new roof system design for bidding and construction.

DISCLAIMER
This observation is the professional opinion of CG Engineering PLLC based on the information available during this assessment or evaluation. This report does not warrant or guarantee that all conditions were discovered at the time of the observation. This report was prepared subject to the standard of care applicable to professional services at the time the services were provided.

04/21/2022

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Photo 1 – Deteriorated Plywood Low Roof @ North

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Photo 2 – Tectum Structural Panel Section

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Photo 3 - Tectum Water Damage

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Photo 4 - Structural Steel Beams & Soffit Framing

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www.cgengineering.com

SMITH FIRE SYSTEMS
1106 54th Avenue East · Tacoma, Washington 98424 Phone 253-926-1880 · Fax 253-896-1216

March 15, 2022

Pierce County Library System
6300 Wildare
Lakewood, WA
ATTN: Jacob March

RE: Pierce County Library - Fire Alarm

Estimate #: FA22-0228

Smith Fire Systems will provide and install fire alarm equipment for **$57,244.00**.

Price includes the following:

1) Provide and install one (1) new Siemens addressable fire alarm control panel with back up batteries.
2) Provide and install one (1) new Siemens remote annunciator display panel.
3) Provide and install one (1) new Siemens booster power supply panel.
4) Provide and install forty-eight (48) new Siemens addressable smoke detectors.
5) Provide and install seven (7) new Siemens addressable relay modules for the smoke doors.
6) Provide and install nine (9) new Siemens addressable pull stations.
7) Provide and install sixty-six (66) new Siemens notification devices, color: red.
8) Provided and install one (1) new Siemens weatherproof horn/strobes, color: red.
9) Provide and install one (1) new AES radio communicator. Includes one (1) year monitoring service with signed monitoring contract.
10) Final acceptance test with Lakewood Fire Prevention Bureau.

Clarifications and assumptions:

1) Based upon IFC (2015 Edition) and NFPA #72 (2016 Edition) and the approval of the Lakewood Fire Prevention Bureau.
2) This proposal is good for 30 days from the date of this proposal.
3) This proposal is based on plans, site walk and archive documents.
4) All work will be performed during normal business hours, Monday - Friday, 7:00am to 3:00pm.
5) This proposal is based on free and unhindered access throughout the facility including access to all ground space beneath our devices and wiring routes.
6) Installation/Design time frame will begin when a signed copy of this proposal is returned to Smith Fire Systems, materials cannot be purchased until this time.
7) Design work for submittals is currently beginning three weeks following executed contracts.
8) Monitoring must be established and functional prior to final inspection.
9) Provided by others: A 120VAC dedicated circuit will need to be installed for the fire alarm panel and booster power supply panel; assume one (1).
10) Provided by others: A 120VAC dedicated outlet will need to be installed for the radio communicator; assume one (1).
11) Provided by others: A ¾“underground raceway with a pull string will need to be provided from the main sprinkler riser to the PIV/Vault; assume none (0).
12) Provided by others: Fire Barrier on any penetrations to maintain wall ratings, deck ratings or roof weatherproofing.

Exclusions:

1) Washington State Sales Tax.
2) Clean-up fees or shared dumpster costs. SFS will provide timely clean-up and removal of debris generated by our work.
3) Patching or painting of any kind.
4) 120 VAC dedicated power.
5) Drilling and coring.
6) Fire Barrier Penetrations.
7) Roof Penetrations.
8) Elevator shunt controls. (Monitoring only)
9) Phone Lines.
10) Installation of underground raceway.
11) HVAC duct detectors and design.
12) Fire Smoke dampers
13) Any fire watch that may be required.
14) Fire doors.
15) Prevailing wage.
16) Additional devices required by AHJ.

Thank you for the opportunity to submit our proposal. Please contact me if you have any questions.

Sincerely,

Jef Marquez

Jef Marquez | Fire Alarm Manager
Smith Fire Systems
1106 54th Ave East | Tacoma, WA. 98424
T 253 248 2007 | F 253 926 2350
Email: jmarquez@smithfire.com

SMITH FIRE SYSTEMS (hereinafter called "SFS") will furnish and install a Fire Alarm or Security System described fully in SFS Scope of Work, hereinafter called "Scope of Work" in accordance with the terms and conditions set forth herein. Buyer acknowledges that the Scope of Work and the following terms and conditions have been read, the Buyer intends to be bound thereby, and that Buyer has retained a copy of this contract as signed.

1. INSPECTION AND ACCEPTANCE

The inspection shall be conducted solely to determine if SFS has performed its obligations as specified hereunder. Requirements not included in the specification but required by the inspection organization shall be treated as additions to and not within the scope of this contract. The issuance of an acceptance or approval inspection report as to the work specified herein shall be conclusive evidence of full performance by SFS of its obligations hereunder. Any notices of deficiencies shall be promptly submitted to SFS by Buyer.

2. BUYER'S OBLIGATIONS IN ADDITION TO THOSE SPECIFIED

a) The Buyer warrants that the structure of the property in which installation is to be made is sufficient to support the installation and fire protection system specified herein.

b) Until SFS receives full payment hereunder, the Buyer agrees to insure the premises and the materials to be used in this contract and located in and around the premises against loss or damage by fire, other casualty, or theft, in a sum which will at all times exceed the unpaid balance of this contract and the reasonable value of the said materials. Buyer agrees to assume the full risk of damage to the premises and to the improvements, fixtures, equipment and all personal property located thereon, resulting from any of the perils insured against in the Standard Fire and Extended Coverage Insurance Policy, regardless of cause or origin, and regardless of whether or not the loss or damage is insured; and if insured, whether in full or in part. *Buyer shall furnish proof of insurance to SFS.*

3. DELAYS

SFS will not be liable for any damages, direct, incidental or consequential, or delays arising directly or indirectly from causes not within the direct control of SFS including but not limited to: work stoppages, discontinuance of work, casualties, fires, acts of the elements, labor difficulties, acts of governments or shortages of materials or labor.

4. ALL MODIFICATIONS TO BE WRITTEN

This contract constitutes the entire agreement between the parties and may not be modified, amended or rescinded except by written instrument signed by both Buyer or its agents and an Officer of SFS.

5. SECURITY AGREEMENT

a) This contract is the subject of a security agreement between the Buyer and SFS. All materials and equipment described herein are also included and shall hereinafter be called "apparatus."

b) The Buyer agrees to pay SFS for the apparatus in accordance with the terms of clauses 6 and 7 hereof.

c) The title to and ownership of the apparatus herein contracted for, shall remain with SFS until the entire purchase price herein agreed to be paid shall be actually paid in cash by the Buyer.

d) The apparatus will not be sold, transferred or disposed of or be subjected to any unpaid charge, including taxes, or to any subsequent interest of a third person created or suffered by Buyer voluntarily or involuntarily, unless Seller consents in advance in writing to such charge, transfer, disposition or security interest.

e) In case of failure or refusal on the part of the Buyer to make the payments, or any of them, when due under this contract, then, and in any such events, the whole of the unpaid portion of the purchase money, however secured, and whenever payable, shall thereby at the option of SFS become immediately due and payable.

f) In case of any default on the part of the Buyer, SFS shall have the right to enter upon the premises upon which the specified apparatus is installed, and, by its agents, representatives and employees take possession of and remove all or part of the same, and the Buyer shall afford every facility therefore.

g) If the specified apparatus shall be taken by SFS under this contract, by reason of the default by the Buyer, then and in any such case, the Buyer shall pay SFS all expenses, including reasonable legal fees, incurred by SFS under this contract and in retaking and selling the apparatus specified herein, and for all damages to SFS arising from wear and tear of the apparatus, but this shall not be construed to preclude SFS from pursuing any legal remedy for the recovery of any other sum which may be due it, under the terms of this agreement.

h) The Buyer agrees to cooperate with SFS and execute a financing statement, or any other form or agreement required to perfect, record, and file SFS' security interest.

6. TERMS OF PAYMENT

On the fifth day of each month, Buyer shall pay SFS for One Hundred Percent (100%) of the amount chargeable to Buyer for labor and materials furnished in the preceding month, based upon the percentage of completion of the installation determined by SFS. The balance of the unpaid amount of the contract including extras and other price adjustments shall be due and payable within thirty (30) days after the installation is physically completed in accordance with the specifications attached hereto. Interest at the rate of 1.5% per month, shall be applied to the unpaid balance when thirty (30) days past due.

7. WARRANTIES

The equipment and supplies specified in this contract are warranted to be free from defects in workmanship and materials for one year from installation. No other express warranty is given and no affirmation of SFS by words or actions, shall constitute a warranty.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ANY OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

ESTIMATE: FA22-0219, PRICE: $69,950.00

BY SIGNING THIS PROPOSAL BUYER AGREES TO THE TERMS AND CONDITIONS AS NOTED ON PAGE 3

BY: _____DATE: _____

PCS Structural Solutions

Seattle 1011 Western Avenue, Suite 810 | Seattle, WA 98104 | 206.292.5076
Tacoma 1250 Pacific Avenue, Suite 701 | Tacoma, WA 98402 | 253.383.2797
Portland 101 SW Main Street, Suite 280 | Portland, OR 97204 | 503.232.3746

www.pcs-structural.com

August 31, 2022

Pierce County Library System
3005 112th St E
Tacoma, WA 98446

ATTN: Christina Neville-Neil

RE: *Lakewood Pierce County Library*
6300 Wildaire Rd SW, Lakewood, WA 98499
Structural Evaluation

Dear Christina:

As requested, we have performed a structural evaluation of the existing Lakewood Pierce County Library building at the above noted address. Our evaluation focused on areas of structural vulnerability to vertical and lateral loads, especially seismic hazards; and areas of potential structural distress or deterioration. The evaluation consisted of a walk-through looking at exposed conditions, a review of available existing drawings from a 1994 renovation, and a review of previous roof evaluations and engineering reports.

We did not perform a detailed lateral or vertical analysis of the building, nor did we perform any testing of existing materials. Our observations, recommendations and conclusions are based on similar evaluations that we have performed in the past.

BUILDING DESCRIPTION

According to the Pierce County Assessor's records the building was constructed in 1963 and there was a small addition and renovation in 1994. The total building area is 23,774 sq. ft., excluding the basement. Most of the structural components of the building have remained unchanged since it was built.

The building is a two-story library building with basements. The second story is located over the central portion of the building and is accessed by two stairs and an elevator, though the majority of the building is a single-story structure. There is a large basement at the west third of the building which is a storage area for the library and also has a mechanical room. A smaller basement near the southeast corner has a small storage area and a mechanical room.

The building roof consists of multiple different roof planes, slopes, offsets and shapes. Most of the roof surfaces are sloped and have asphalt shingles for the roof. According to existing drawings from 1994 the original roofing material was clay tile, and it was apparently replaced by asphalt shingles after 1994. There are areas of low-sloped roofs with built-up roofing.

Pierce County Library System
Christina Neville-Neil
Lakewood Pierce County Library
6300 Wildaire Rd SW, Lakewood, WA 98499
Structural Evaluation

The building is subject to loads including environmental loads from snow, wind and seismic effects, and these loads are governed by the *International Building Code.* The site is located in a seismically active area, though according to the *Liquefaction Susceptibility Map of Pierce County* by the Washington Division of Geology and Earth Resources the site is classified as having a "very low" susceptibility to liquefaction. Seismic parameters for the site are Ss = 1.349g, and S1 = 0.471g.

VERTICAL LOAD RESISTING SYSTEM

The roof structure for the building is Tectum roof panels supported by steel beams, steel girders, and steel columns. Tectum roof panels are composed of wood fibers impregnated and bound together into slab form with mineral cements. The panels vary in thickness and make-up as required to span between supports. The panels can also provide diaphragm capacity, depending on span, connections to supports, and edge connections.

The roof structure is supported by steel columns that are laid out in an 18-ft. by 18-ft. grid pattern. The columns appear to be mostly round, though there are some wide-flange columns that were added in 1994. Based on the drawings for the 1994 addition the columns are supported on spread footings. A small portion of the roof, constructed in 1994, was constructed with 1 ½-in. steel metal deck supported by steel purlins and steel girders.

Along a significant length of the building exterior there are structural brick walls that support the roof framing, typically along the south wall and at a section of the north wall. At the remainder of the building exterior the roof is supported by steel beams and columns, though there is a partial height exterior brick wall with windows above. It is unknown whether there is any reinforcement or grout in the exterior brick walls, and the age of the building does not provide sufficient evidence to ascertain the likelihood that there is or is not reinforcement or grout.

There are several interior brick walls that are structural walls, and these walls are around the north stairwell and the elevator shaft.

The second floor structure is constructed with concrete topping over composite metal deck over steel beams. The floor structure is supported by structural steel columns, at the spacing noted previously. Two steel braces were added in the 1994 renovation, presumably as part of the main lateral force resisting system.

The basement is constructed with concrete walls below grade. The floor framing for the main level floor above the basement is constructed with cast-in-place concrete slabs over the mechanical rooms, and with concrete topping over metal deck over steel beams above the storage areas.

The floor for the east two-thirds of the building and for the basement is concrete slab on grade.

Pierce County Library System
Christina Neville-Neil
Lakewood Pierce County Library
6300 Wildaire Rd SW, Lakewood, WA 98499
Structural Evaluation

LATERAL FORCE RESISTING SYSTEM

The lateral force resisting system for the building includes diaphragms of Tectum at the roof and concrete topping over metal deck at most of the floors. The diaphragms transfer lateral forces to shear walls and braces. There are a number of roof offsets and clerestory walls that occur at the roof, and it is unclear how lateral forces are transferred from roof level to roof level. In order to transfer lateral forces to the existing shear walls we would expect there to be collector members, and it appears that adequate collectors are not present.

Brick shear walls resist lateral forces that are transferred from the roof. The brick walls that extend to the roof are primarily along the south wall of the building. There is a single brick shear wall along the north side of the building and there are brick walls around the elevator/stair core.

There are two steel braces that were added in 1994 and these provide lateral bracing for the second floor framing.

OBSERVATIONS AND COMMENTS

The observations and comments noted below are based on our visual evaluation, review of the drawings for the 1994 remodel and on similar evaluations conducted in the past.

1. Tectum Panels. A detailed report from Wetherholt and Associates, Inc. dated March 10, 2022 and a report from CG Engineering dated April 21, 2022 describe conditions of the roofing and roof substrate especially at the north and west sides of the building. The Wetherholt report notes that evidence of water staining was observed at the soffits along the north and west sides, and we observed similar evidence during our visit. The reports also note that the Tectum roof panels, especially along the north side of the roof, were saturated and the roof panels were damaged. During the time of our visit a large portion of the roofing had been removed and was covered by a temporary roof covering to prevent further damage. Engineering reports for Tectum panels indicate that the panels should not be exposed to moisture from building leaks or condensation, and we expect that degradation of the panels should be expected. Based on the previous reports of water damaged Tectum panels, all areas of the roof with moisture damaged panels should have the panels replaced.

Pierce County Library System
Christina Neville-Neil
Lakewood Pierce County Library
6300 Wildaire Rd SW, Lakewood, WA 98499
Structural Evaluation

2. Lateral Force Resisting System. The building does not appear to have a complete or well-defined load path for lateral forces. There are relatively few shear walls at the building, as described above. There are shear walls along the south side of the building, but only one short shear wall along the north wall and some shear walls around the elevator/stairwell core. There are no shear walls at the east or west sides. The multiple roof planes, roof offsets and elevation changes make the transfer of shear forces even more challenging, and it is not expected that there are collectors to transfer lateral forces to the existing shear walls. Based on these observations we would expect the building to perform poorly in a seismic event, with collapse or partial collapse a possibility. A full seismic upgrade is recommended and it should be completed in accordance with the *2018 International Existing Building Code (IEBC)* and/or *ASCE 41-17 Seismic Evaluation and Retrofit of Existing Buildings.* A full seismic upgrade would likely include the following:

    a. Improved roof diaphragms at select locations.
    b. Improved load transfer at roof offsets
    c. Addition of diaphragm chords and collectors at the roof level to transfer loads to shear walls/braced frames
    d. Improve anchorage of diaphragm to existing shear walls.
    e. Add shear walls or braced frames at multiple locations throughout the building to resist lateral forces in the east-west and north-south direction.
    f. Addition of footings below new shear walls to resist sliding and overturning effects.

3. Masonry Wall Reinforcing. We do not know if the masonry walls are reinforced or grouted, and further investigation is required to determine if the walls are reinforced. Reinforcing is required for both out-of-plane lateral forces and in-plane lateral forces, and collapse of walls is possible if reinforcing is not adequate. Collapse of masonry bearing walls would also result in loss of support for roof framing. Based on the lengths of the shear walls provided we expect that the masonry walls are under-reinforced for in-plane shear forces. We recommend providing backup wall framing or similar method to provide support for out-of-plane lateral forces. To lower in-plane forces in the walls to an acceptable level additional shear walls should be added.

4. Wall Anchorage-non bearing masonry walls. Masonry walls throughout the building perimeter exist with no wall anchorage at the tops of walls for out-of-plane forces. These particular walls are non-bearing walls and it is possible that the walls were originally designed to cantilever out of the foundation which would rely on significant wall reinforcing, grouted reinforcing, and a large footing. We could not visually verify any of the reinforcing or footing sizes, but based on the age of construction we don't expect that the condition complies with current code. In a seismic event the masonry walls could fail or collapse, endangering building occupants. Recommend anchoring the walls to the roof with braces and supplemental framing.

Pierce County Library System
Christina Neville-Neil
Lakewood Pierce County Library
6300 Wildaire Rd SW, Lakewood, WA 98499
Structural Evaluation

5. Wall Anchorage – bearing masonry walls. Masonry walls supporting the roof structure are typically anchored to steel beams at 6- to 7-ft. on center. We would expect that many of these walls would not require additional anchorage for out-of-plane forces. If there are walls that are not adequately braced, then supplemental wall anchorage is recommended.

6. Second floor bracing. The second floor appears to be braced by the shear walls around the elevator/stairwell core and by two steel braces. The forces in the shear walls and braces most likely exceeds the capacity of these lateral force resisting elements. Additional shear walls and braces should be added.

7. Redundancy. The number of lines of frames and shear walls along each line of resisting should be more than one. For the roof and second floor diaphragms there is a lack of redundancy. Improvement of the overall lateral force resisting system as noted in item 2 would resolve the redundancy issue.

8. Torsion. Due to the layout of the lateral force resisting system there is significant torsion at the roof and floor diaphragms. Improvement of the overall lateral force resisting system as noted in item 2 would resolve the torsion issue.

9. Condition observations. We observed no signs of significant settlement of the building. We observed signs of water leaks, and based on previous reports there is significant damage to the Tectum roof panels. Most of the other structural components appear to be in satisfactory condition.

RECOMMENDATIONS AND CONCLUSIONS

The existing library building has multiple structural issues and concerns, and based on our evaluation the building would be susceptible to damage or collapse in a seismic event. As expected due to the age of the building, it is not in compliance with the provisions of the current *International Building Code.* We recommend seismically upgrading the building for compliance with the provisions of the *International Existing Building Code,* which would greatly improve the safety of the building, and would extend the useful life of the building. Specific structural improvements, some previously mentioned above, include the following:

a. Improved roof diaphragms at select locations.
b. Improved load transfer at roof offsets.
c. Addition of diaphragm chords and collectors at the roof level to transfer loads to shear walls/braced frames.
d. Improve anchorage of diaphragm to existing shear walls.

Pierce County Library System
Christina Neville-Neil
Lakewood Pierce County Library
6300 Wildaire Rd SW, Lakewood, WA 98499
Structural Evaluation

e. Add shear walls or braced frames at multiple locations throughout the building to resist lateral forces in the east-west and north-south direction.
f. Addition of footings below new shear walls to resist sliding and overturning effects.
g. Remove and replace damaged structural elements, specifically the water damaged Tectum panels.
h. Add backing walls or bracing elements to properly brace the existing brick walls.

COSTS

ROM costs for improvements to the structural system noted above are $55-$65/sq. ft. Please note that these are structural costs only, and that architectural, MEP and other costs would be significantly more than this. In our experience a major renovation/upgrade project would cost about 75% - 90% of the cost of a new building.

Thank you for the opportunity to be of service to the Pierce County Library System. Please contact us if you have any questions.

Very truly yours,

PCS STRUCTURAL SOLUTIONS

Jack J. Pinkard, S.E.
Senior Principal

JJPmap
22-694

PIERCE COUNTY LIBRARIES – LAKEWOOD LIBRARY: ASSESSMENT
MECHANICAL EXISTING CONDITIONS NARRATIVE

GENERAL

The building was originally built in 1963, with an addition in 1974 and a renovation in 1993.

PLUMBING

The plumbing system is operational, but a mixture of original and changes that were made between then and now. The water service is galvanized with a shut off valves (no pressure gauges) located in the large basement boiler room with no apparent backflow devices. The main stub into the smaller basement mechanical room is also galvanized and transitions to copper downstream of the shut off valves. The water piping systems throughout the building are a mix of galvanized piping and copper piping, appears to be the 1993 renovation sections were done in copper, with the original piping that remained being galvanized. The piping insulation appears to be mainly fiberglass, though some of the original galvanized piping may include other materials that would need to be tested and verified. The waste and vent piping system is a mix of Hub and Spigot cast iron (original construction) with some no-hub cast iron piping systems and a small portion of plastic (at the fixture connections). There appear to be (3) sewage lift stations, (2) located in the large main basement mechanical room and (1) smaller one located in the small basement mechanical room. These are in-slab units and the piping appears to tie together and exit the building below outside grade elevation.

The plumbing fixtures are operational and for their age in fairly reasonable condition. Most of the fixtures appear to be from the 1990's, which would be from the renovation, with some that date further back (janitor sinks, etc..). All faucets and flushvlaves are manual, with some water closets being tank type. All of which are higher volume fixtures that would need to be replaced to achieve higher water efficiency for the building and/or meet current codes.

The domestic hot water generation is accomplished by several means, a nearly new electric tank-type unit located in the small basement mechanical room and a tankless, high efficiency gas-fired water heater located in the large basement boiler room. Both units appear to be less than 5 years old, which is well within their useful life expectancy, however they are connected to aged piping systems and may be compromised if a full renovation was done. Recirculation system appears to be in place.

The building does have gas available to the site, that currently serves the domestic water heating and heating water boiler systems. The meter appears to be low pressure (less than 2psi delivery) and is located outside adjacent to the building.

HVAC

In general, the HVAC system is operational throughout the building. The central heating system consists of (2) AERCO condensing gas-fired boilers that provide heating hot water that is pumped throughout the building. These boilers (and associated pumps) are approximately 12 years old, which is within range of their useful life, but in the last third. The distribution piping system is steel, which appears in decent shape, without being able to open up piping and verifying wall thickness remaining. The insulation on the hot water piping systems is a mix between original and newer insulation material. The older material may be asbestos containing and will need to be tested and abated, if necessary, for any renovations disturbing those piping systems. There is an old original boiler shell in the small basement mechanical room that has been abandoned in place and not operational or connected to any piping systems.

The hot water distribution piping feeds (3) air handlers and downstream hydronic duct coils. The air handlers are all constant volume and consist of supply fan, hot water coil, DX cooling coil, dampers and duct connections for return and OSA. (2) air handlers are located in the large basement mechanical space with the boiler plant. The third air handler is located in the smaller basement mechanical space. The air handlers provide heating and cooling with duct distribution throughout the main and upper levels of the building. Downstream reheat duct coils are utilized to create additional zoning temperature control. The DX coils are connected to outdoor condensing units located on grade with refrigerant piping, some of the piping is not insulated. This HVAC arrangement does not currently meet code and could create simultaneous heating and cooling. There is a new split system cooling unit for the elevator machine room, that could remain.

Ventilation is supplied to this building via exterior louvers that feed OSA to the air handlers. The (2) air handlers int eh main large basement mechanical room appear to be capable of economizer cooling. The air handler in the smaller basement mechanical room is fed from a relatively small louver and is not ducted, therefore the mechanical space is an outside air plenum, which could create temperature issues int eh winter for the piping systems within that space. Individual exhaust systems serve the restrooms as well janitor and storage spaces.

CONTROLS

The control of the building is an aged Alerton digital control system. The controls for the building, in general, are operational, but would need to be replaced in a major renovation (the system is not supported any longer).

FIRE SPRINKLING

There is a limited fire sprinkler system serving a portion of this building. The riser is located in the large lower basement area adjacent to the boiler room. This space was used for archive storage. The riser feeds a wet pipe sprinkle system that covers the entire large basement area including the boiler room and the archive spaces, along with protection under the concrete stairs that go from the main level down to the basement level. No sprinklers are present above the basement area.

MECHANICAL SYSTEM PROPOSED RECOMMENDATIONS/OPTIONS

PLUMBING

Based on the level of renovation for the building, most, if not all new domestic water, waste and vent piping would need to be provided throughout the building. The waste could be reviewed and if the fixtures are not relocated, could be reused based on some investigative study on the current condition for the existing cast iron waste piping systems. The domestic water piping systems would need to be replaced, there is a mixture of galvanized and copper that has been in place for several decades and would be best to replace in full. The plumbing fixtures and faucets/flush valves will all need to be replaced to comply with current water conservation code requirements. The existing domestic hot water heaters could be reused, however they are existing and have been connected to old plumbing systems that could have compromised or shortened the life expectancy of the equipment. The recommendation would be to fully replace in a major renovation so as not to witness early failures of the equipment being reused.

HVAC

All new HVAC systems would need to be provided to all areas of the building, these systems would need to comply with current WSEC. Current codes still allow the use of natural gas, but it is being phased out, so depending on the timing of the renovation, an all electric solution may be needed to comply with energy code.

An all electric solution would need to utilize heat pump technology for the HVAC systems. One proposed system would include a ventilation system that utilizes Dedicated Outside Air System (DOAS) that serves ventilation air that is ducted throughout the building. The DOAS units would include supply and return fans as well as energy recovery and coils fed from the VRF system to provide room neutral ventilation air. Multiple DOAS units would feed the entire building, these units could be located in the existing basement mechanical areas currently housing the air handling units. The space heating and cooling will utilize air-cooled Variable Refrigerant Flow (VRF) heat pump systems that utilize refrigerant piping to convey the medium for space conditioning to all areas of the building. The VRF terminal units are comprised of in-ceiling cassette type units as well as ducted fan coil units for spaces with adequate ceiling space and ductwork routing within each zone. The sizing for the VRF system will accommodate the loads of the building as well as the ventilation loads.

This system approach utilizes the least amount (and size) of distribution to feed the building, which would make routing the distribution (which is mainly refrigeration piping and small ventilation ducting) throughout the building and in the concealed spaces. Other options would be available, such as a high efficiency airside VAV system, though this would require larger air handlers, larger ductwork routing throughout the building and could have implications with noise that would need to be mitigated.

CONTROLS

All new Direct Digital Controls (DDC) will need to be provided to operate the building systems within the requirements of the current codes.

FIRE SPRINKLING

A new sprinkler service and system would need to be installed throughout the building to meet current codes. This would include a wet system for full coverage within the building and a dry system to serve and cover any cold attic area or overhangs.

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253.922.0446

Project Number:	222-285	Date:	9/9/2022
Project Name:	**PC Libraries-Lakewood Library**	Prepared by:	
Project Status:	Assessment Cost Opinion		Scott Zimbelman, PE

Item No.	Item Description	Units	Quantity	Material & Labor Price/Unit	Material & Labor Total	Lump Sum Price/Unit	Lump Sum Total	Total Item Cost
	MECHANICAL: Full Upgrade to WSEC Compliant System							
1	General Mechanical (1)	SF	32592			$2.50	$81,480.00	$81,480.00
2	Demolition	SF	32592			$2.00	$65,184.00	$65,184.00
3	Plumbing (2)	SF	32592	$10.00	$325,920.00			$325,920.00
4	HVAC (3)	SF	32592	$45.00	$1,466,640			$1,466,640.00
5	Controls	SF	32592	$8.00	$260,736.00			$260,736.00
6	TAB/CX/Closeout	SF	32592			$3.50	$114,072	$114,072.00
7	Fire Sprinkling (4)	SF	32592	$15.00	$488,880.00			$488,880.00
						Total Sheet Cost		**$2,802,912.00**

Notes:

1) Includes Mobilzation, Submittals, O&M's, and Project Closeout.
2) Includes all new piping systems (retaining the cast iron waste piping), plumbing fixtures and faucets/fluchvalves throughout the building.
3) Includes 2018 WSEC compliant HVAC system (VRF with DOAS). All electric solution.
4) Includes full fire sprinkling coverage, with wet system within the building and a dry system in areas subject to freezing. Will require new sprinkler header. Does not include site piping upgrades or hydrant costs.

* Estimate based on present day construction costs, excluding GC OH&P, Bonds and WSST.

PIERCE COUNTY LIBRARIES - LAKEWOOD
ELECTRICAL EXISTING CONDITIONS ASSESSMENT AND RECOMMENDATIONS NARRATIVE

GENERAL

The library building was originally built in 1963, with an addition in 1974 and a renovation in 1993.

LIGHTING

The existing lighting system consists of recessed parabolic fluorescent (T8) troffers, linear fluorescent pendants, compact fluorescent downlights, track lighting and HID (metal halide and high-pressure sodium) sources. Recessed fluorescent fixtures are utilized in the main library area and offices. Downlights are installed in entrances, soffits in meeting spaces and in smaller corridors. Linear fixtures are in the atriums. Compact fluorescent fixtures are generally utilized in smaller spaces. HID sources appear to be used for exterior pole mounted area fixtures.

Lighting controls generally consist of manual switches in the interior and time-clock and/or photocell controls on the exterior. Some wall mounted combination occupancy sensor switches are installed in a few spaces. Otherwise, standard occupancy and daylight harvesting sensors do not appear to be present.

Fixtures appear to be in serviceable condition with adequate light levels throughout most spaces.

POWER

The existing service was updated with the addition work in 1974. It's currently fed from a TPU pad mount transformer on the south side of the building. The main distribution board is rated 208/120V, 3 phase, 2500A. The utility meter is installed directly to the main distribution board.

The balance of the electrical panels throughout the building appear to date to the original construction or 1974 addition.

Receptacles and wiring devices are also aging. The main library area has surface raceway and cabling routed along the walls. Power poles are utilized the second-floor conference room and above book stacks on the first floor.

LOW VOLTAGE SYSTEMS

Telecommunications
Data and phone lines come in from the service providers to a telecom closet in the basement. There is an IDF in a closet on the first floor. Outlets and WiFi are sprinkled throughout the facility.

Electronic Security Systems
Access Control and CCTV systems appear to be installed in select areas. These appear to be installed within the last 5-10 years and are in good working order.

Fire Alarm System
The existing fire alarm system is from Spectronics. It appears to be functional, however it is outdated.

ELECTRICAL SYSTEM PROPOSED RECOMMENDATIONS

LIGHTING

While the existing lighting is in adequate shape and appears fully functional, it does not meet current energy code. The fixtures are substantially less efficient than modern LED fixtures, and there are very few automatic shut-off or daylight harvesting controls. Energy code will allow the existing fixtures to remain in areas that are minimally impacted- provided that less than 50% of fixtures are demolish/replaced. Newly created spaces will require new fixtures that meet energy code. In a similar manner, existing lighting controls can remain in areas that don't incorporate new lighting or revised circuiting. New spaces and areas that have revised lighting/fixture wiring will require new controls that meet current energy code.

We recommend replacing all of the existing fixtures as part of the building renovation to lower energy costs and reduce the maintenance requirements that exist with replacing fluorescent bulbs.

POWER

The balance of the electrical distribution system is well past its expected lifespan of 30 years. Used circuit breakers and listed refurbished breakers that fit these older panels are difficult to obtain (and are becoming more so). Extremely old breakers do not function as well as new breakers.

We recommend converting the existing main distribution board and panelboards within the building to modern panels with safe, readily available breakers. The main service size is not anticipated to increase.

LOW VOLTAGE SYSTEMS

Telecommunications
The existing system is functional, but could use a refresh and update to modern equipment. A building refresh would allow visible cables and surface raceway to be concealed.

Electronic Security Systems
The existing ESS appear to be functional and do not appear to require replacement.

Fire Alarm System
The existing fire alarm system should be replaced with a new addressable system that meets AHJ requirements.

ELECTRICAL COST OPINION

To replace the existing distribution system, install new LED fixtures and code compliant lighting controls, update the telecommunications systems, and replace the existing fire alarm system the ROM electrical cost will be $1.3 million. See attached cost estimate for a detailed breakdown of the costs.

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Project Number:	222-285	Date:	9/1/2022
Project Name:	**Lakewood Library MEP**	Prepared by:	
Project Status:	Cost Opinion		Scott Watling

Item No.	Item Description	Units	Quantity	Material & Labor Price/Unit	Material & Labor Total	Lump Sum Price/Unit	Lump Sum Total	Total Item Cost
	ELECTRICAL							
1	General Electrical (1)	SF	32592			$3.00	$97,776.00	$97,776.00
2	Demolition	SF	32592			$1.75	$57,036.00	$57,036.00
3	Lighting Fixtures and Controls (2)	SF	32592	$12.00	$391,104.00			$391,104.00
4	Electrical Gear and Distribution (3)	SF	32592	$8.00	$260,736			$260,736.00
5	Branch Wiring (4)	SF	32592	$10.00	$325,920.00			$325,920.00
6	Low Voltage Systems (minor updates)	SF	32592			$3.50	$114,072.00	$114,072.00
7	Fire Alarm	SF	32592	$1.50	$48,888.00			$48,888.00
						Total Sheet Cost		**$1,295,532.00**

Notes:

1) Includes Mobilzation, Submittals, O&M's, and Project Closeout for full Electrical scope.
2) Includes all new fixtures and controls.
3) Assumes full replacement of MDB.
4) Assumes full electrical scope with partial reuse of existing conduit.

* Estimate based on present day construction costs, excluding GC OH&P, Bonds and WSST.