REGIONAL DISTRICT OF NORTH OKANAGAN

CIVIC ARENA ENGINEERING ASSESSMENT

FINAL REPORT

Revised to 4 March 2014

Regional District of North Okanagan
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CIVIC ARENA ENGINEERING ASSESSMENT

EXECUTIVE SUMMARY

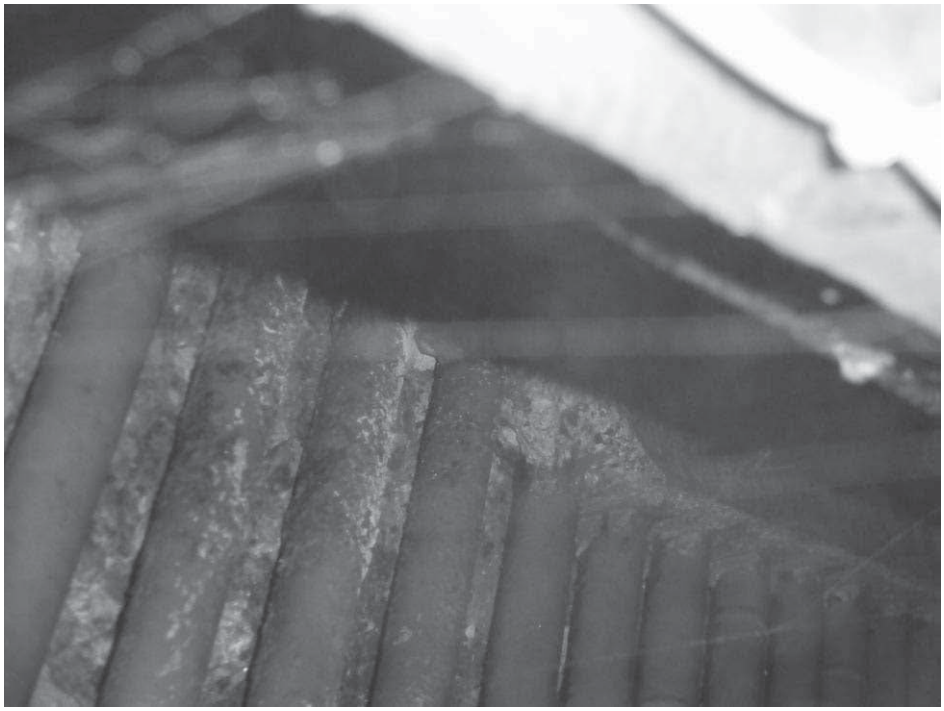
Above:
Historical photo of the refrigeration piping being welded in situ
Below and right:
Refrigeration pipe during a recent repair

In the winter of 2014, the Regional District of North Okanagan (RDNO) retained Bruce Carscadden Architect Inc (BCA) and their team of, structural, mechanical, electrical, and refrigeration engineering consultants and hazardous materials consulting, to conduct a comprehensive architectural and engineering review and assessment of the Vernon Civic Arena.

With the support of the Regional District of North Okanagan, the City of Vernon, and the staff at the Vernon Civic Arena, the consultants undertook an iterative (back and forth), collaborative process of information gathering, review, and analysis. The facilities assessment identified life safety/maintenance and 2-5 year and 10 year priorities and opportunities. The consultants worked with the RDNO and the City of Vernon to explore concepts to address these priorities and time lines so that informed decisions could be made about the possible future the Vernon Civic Arena.

A graphic summary of issues and necessary upgrades and decision points on the facility are presented, providing the Regional District of North Okanagan and stakeholders with plans to consider for the future of the Vernon Civic Arena.

Detailed cost planning of a preferred option was a project enhancement that was not undertaken but might be a next step for the Regional District to consider.



INTRODUCTION.1

The Regional District of North Okanagan – CIVIC ARENA ENGINEERING ASSESSMENT represents a substantial effort on the part of the District and community to review the Vernon Civic Arena and assess its ability to continue serving the community.

This document summarizes the findings of the client, Bruce Carscadden Architect, and its team of consultants. It assembles the review, design drawings, and budgets to provide the Regional District of North Okanagan with a comprehensive study on the Vernon Civic Arena so the District and the stakeholders can make informed choices on the ways to best address the community's needs.

TEAM

To achieve the project goals, a complimentary and experienced team of professionals was assembled:

Architecture & Planning	Bruce Carscadden Architect Inc Bruce Carscadden
Refrigeration Engineering	Bradley Refrigeration Consultants Eric Bradley
Structural Engineering	CWMM Consulting Engineers David Mackinnon
Mechanical Engineering	Smith and Andersen Falcon Engineering Graeme Staley
Electrical Engineering	Smith and Andersen Falcon Engineering Kenton Galloway
Hazardous Materials	Peak Environmental Tim Becker

The consulting team was greatly assisted by the contributions of the elected officials and staff members who gave their time, energy and guidance in this process and in the preparation of this report. Key participants included:

Keith Pinkoski, Parks Planner	Regional District of North Okanagan
Jim Coughlin, Facilities Manager	Regional District of North Okanagan
Stan Mitchell, Arenas Manager	City of Vernon
	Vernon Museum & Archives

INFORMATION GATHERING.2

INFORMATION GATHERING

A wealth of existing technical information, completed studies, and reference and policy material was made available for the project. Documentation was made available for review from the Regional District and the City of Vernon, and included the following:

- Vernon City Centre Neighbourhood Plan, 14 November 2011
- City of Vernon Transportation Plan 2008-2031
- Civic Arena aerial view, no date
- 1979 Renovations Civic Arena Vernon, B.C, Okanagan Associated Architects, cover page
- 1979 Renovations Civic Arena Vernon, B.C, Okanagan Associated Architects, drawings #1-6
- 1979 Renovations Civic Arena Vernon, B.C, Okanagan Associated Architects, drawings E-1, E-2
- 1979 Renovations Civic Arena Vernon, B.C, Okanagan Associated Architects, drawings M.1, M.2
- Plans, Proposed Exit for Beer Garden, Vernon Civic Arena, The BBH Engineering Group, May 23, 1997, 1 of 2 and 2 of 2
- Bleacher Upgrading for the Vernon Civic Arena,, Rene J. Bourcet, Structural and Civic Engineer, sheets 1 of 3, 2 of 3, and 3 of 3, January 1989
- Plan and Section, Compressor Stand for Vernon Civic Arena, The BBH Engineering Group, August 31, 1993, Drawing 1
- 1979 Renovations Civic Arena Vernon, B.C, Okanagan Associated Architects, drawing R-1
- Civic Arena, Ice Surfaces – 1985, The Corporation of the City of Vernon Engineering Department, February 20, 1998
- Civic Arena, Ice Surfaces – 1986, The Corporation of the City of Vernon Engineering Department, February 20, 1998
- Civic Arena, Ice Surfaces, The Corporation of the City of Vernon Engineering Department, February 20, 1998
- Topographic Plan of Civic Arena, William E. Maddox BC Land Surveyor, 3 September 2009
- Topographic Plan of Civic Arena, Shoesmith Land Surveyors, 9 April 1998
- Greater Vernon Parks and Recreation District Vernon Civic Arena P & I Diagram, RH Strong and Associates, 14 June 2004
- Vernon Civic Arena, Structural Repair of Cracked Tension Tie of Truss, Rene J. Bourcet, Structural and Civil Engineer, November 1987
- Historical photographs of Vernon Civic Arena, Vernon Museum
- Associated Structural Survey, 1988
- R/A Engineering Structural Assessment, 2010
- Topography Report, 2011
- Can Tech Brine Pipe Inspection, 2013

INFORMATION GATHERING.2

PROJECT INITIATION MEETING

A Project Initiation Meeting was held via telephone call on January 13th, 2014, wherein the consulting project team and key staff met to review, identify and prioritize the key issues that affect the project. At this meeting, arrangements were discussed for the Integrated Team Visit. Information collection protocols were established and the project schedule was reviewed.

Meeting notes are including in Appendix B

REVIEW + ANALYSIS.3

SITE REVIEW AND WORKSHOP

On January 22nd, 2014, Bruce Carscadden Architect Inc, Bradley Refrigeration Consulting, CWMM Consulting Engineers, mechanical and electrical engineers from Smith & Andersen Falcon Engineering, and Peak Environmental visited the Regional District of North Okanagan and the Vernon Civic Arena, completing a visual review of the facility and participating in a round table discussion with key staff and stakeholders to discuss the building, the staff's experience, and the consultant's first impressions.

The following is a summary of the review and analysis performed by the consultant team to ascertain, in general, the condition of the Vernon Civic Arena. This review is based on observations from this site visit, and is informed by staff and operator comments and a review of owner provided drawings and documentation.

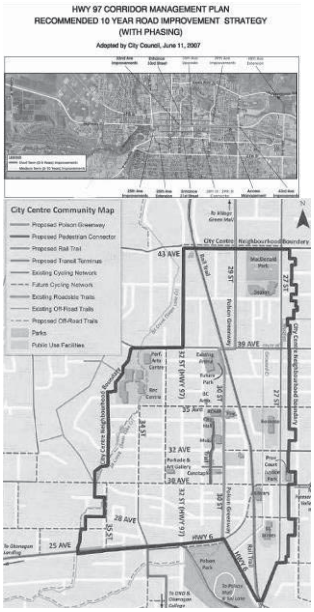
GENERAL

The Vernon Civic Arena played a significant role in the history of the Vernon and RDNO community, and is one of the oldest of its arena types in the province, with construction beginning in 1937 and opening in 1938. The facility has been renovated several times since it was first constructed, including a 1979 addition.

REVIEW + ANALYSIS.3

THE EXISTING BUILDING

The original building dates from 1937 and is constructed of cast in place board form concrete walls and wood roof trusses. Built to accommodate a 180' x 80' refrigerated ice sheet it also included four skate change rooms, washrooms and a gun range in the spaces below the seating. The building has public entrances on all four corners and raised bleacher seating on all four sides. The wood trusses and structures have been upgraded over time.



In 1979, a significant concrete block and steel two-storey addition was added on the south end that added four new skate change rooms at ground level and viewing and concession space on the second level. This building is counterpoint to the original architecture and is very much emblematic of the 1970's

VERNON CITY PLANNING

A high level review of the City of Vernon Planning and Transportation documents relative to the site included general research and phone conversations with The Vernon Planning Department. Important is a clear understanding of the Civic Arena site, its immediate context, and its regional connections.

Section 7.0 of the Vernon City Center Neighborhood Plan, suggests the site might be a future park and will connect with the proposed Polson Park Greenway and the proposed Rail Trail. This future use is consistent with the City of Vernon's polices to "enhance and expand parks, open spaces and public amenities to serve the diverse social and recreational needs of the neighborhood" (p.40).

Together, the proposed park and recreation use of the site, the development of the Rail Trail and Polson Park Greenway as well as the of the City of Vernon Transportation Plan 2008-2031 suggest The Vernon Civic Arena lies at the nexus of a larger community enhancement projects and exists as an important cultural and recreational focal point.

ARCHITECTURAL REVIEW

The architectural review performed by Bruce Carscadden Architect ascertained, in general, the condition of the existing facility and looked specifically at the building envelope, program/spatial relationships, building code including accessibility, and maintenance issues. The review was based on visual observations, owner-provided comments, and a review of existing drawings/reports, but did not include any destructive testing or specialized analysis. Following is a summary of the sometimes interrelated issues and recommendations:

1. 1938 Roofing and water shedding elements constitute an important part of the envelope for the arena. The roof appears to be corrugated metal wall cladding with numerous exposed fasteners and is in poor condition. The rough texture of the roof raises structural concerns.

★ *A new standing seam metal roof, insulation and air vapour barrier is recommended.*

2. Accessibility in the entire complex is limited, and what is available is limited to the public spaces. Change rooms and washrooms are generally not accessible and lack the appropriate space, clearances, and fixtures.

★ *Accessibility is an aspiration of most communities. Opportunities to improve or find new accessible solutions will be important in the next 2 to 5 years*

REVIEW + ANALYSIS.3

3. 1938 Skate Change Rooms, toilets and showers are notably sub-standard and include Health Act-related issues, including waterproofing and insufficient or poorly located shower drains.

★ *Because the change rooms are located below the bleachers, odd and difficult spaces result, renovation may be costly and constrained.*

4. The refrigerated slab is 65 years old, brine pipes are 76 years old, and the dasher boards are site-built of wood, constructed at generally the same time.

★ *A new refrigerated slab is recommended. This would typically include the concrete slab with the cooling pipes, insulation, under-slab heating, and modifications to the header trench as may be required by further technical review. Modern dasher boards would also offer flexibility for player safety.*

5. 1979 Addition, while much younger than the original building, has a number of code issues, including rise and run on the stairs, accessibility, and poor windows particularly on the second floor. The building circulation system and spatial relationships are poor; too narrow, too steep, closed, unconnected. From a code perspective, the requirement for "building upgrades" is usually triggered by a sliding scale on the value of proposed renovations, not maintenance or voluntary upgrades. Significant upgrades can also be triggered by a "change of use".

★ *Short term upgrades might include new finishes, windows, and fixtures. Many of the code shortcomings and poor spatial relationships are unpractical to address.*

6. Exterior Cladding of portions of the buildings included wood and painted concrete walls. Stucco has been added to the exterior of the concrete walls and some cracks are noted in the concrete walls.

★ *Cracks in concrete should be filled to prevent freeze thaw damage. The stucco cladding is in generally poor condition and is less than pleasing in today's context. Repairs or removal might be considered.*

REVIEW + ANALYSIS.3

7. The 1938 interior finishes of the arena include painted board-form concrete walls and wood trusses, which lend the facility a pleasant appearance. Some of the original wood features like wall paneling, doors, and windows remain. Flooring and floor finishes in the lower levels have numerous problems including flooring that is flaking that is considered a hazardous material.

★ *Consider retaining the heritage elements and restoring other features that have been lost like the south elevation. Hazardous flooring materials and paints should be addressed immediately.*

8. Mechanical Spaces and refrigeration plant room have some fire stopping and fire separations issues. The Mechanical rooms at the north end have maintenance and structural issues.

★ *See structural and refrigeration for recommended upgrades.*

9. Perimeter Drainage repairs or replacement are recommended to prevent frost heaves in the

★ refrigerated ice slab.

FACILITY CONDITION INDEX

A facility condition index looks at the building's various components relative to their expected lifespan, renewal dates, and corrected for relative wear from which a facility condition score is produced. This FCI score is one measure of the facility's remaining value;

FCI score
25%

FCI = Total replacement cost per component / value remaining per component.

Based on the engineering and architectural input the Facility Condition Index score of the Vernon Civic Arena is 25%

The fold-out chart used to arrive at this score is included in the appendices of this document.

REVIEW + ANALYSIS.3

The following are brief summaries of the reviews of the Vernon Civic Arena completed by the consultants. Full reports and recommendations made by these team members can be found in the appendices.

REFRIGERATION REVIEW

The refrigeration system for the single sheet of ice at the Vernon Civic Arena is a central refrigeration plant using ammonia as the refrigerant. The refrigeration plant has been upgraded to meet most of the current standards. The arena floor is unique as it was installed in the 1950's and is one of three steel pipe floors in the province.

There are a number of areas and items for upgrade or replacement in the short and long term, but no urgent items. Significantly, the refrigeration plant meets most of the current BC Safety Authority requirements, as well as most Worksafe BC requirements, but it is recommended that the arena floor be considered for replacement.

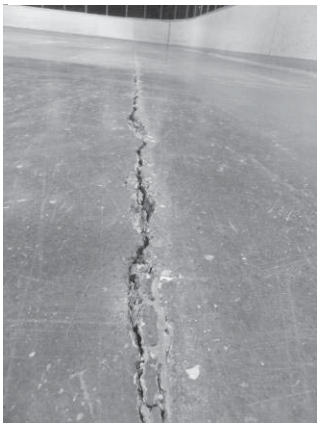
- ★ *The ice slab and its component parts are recommended to be replaced*

Additional details, including the full list of short and long term recommendations can be found in Bradley Refrigeration Consultants report, in the appendices of this document.

STRUCTURAL REVIEW

Generally, the structural review ascertained that although there have been some issues with the roof of the arena over the last 27 years it appears that many of these issues have now been addressed. The cracks in the perimeter concrete walls appear to be stable and not a concern at this time. The truss remediation appears to be largely effective with the exception of truss number 3 (between grid lines E and F) which is exhibiting some cracking in the top chord, resulting in a 33% reduction in capacity. Areas of specific concerns include:

Below: Cracked ice slab today



- ★ *T-beams supporting the speakers require upgrading or relocation of the speakers.*
- ★ *The requirement for a slippery roof material on the main roof has not been met. Providing this will meet the upgrade design requirement of a 23% reduction in snow loading.*
- ★ *The ice arena slab has significant heave and significant longitudinal cracks. It is unknown if any reinforcement is present beyond what the steel refrigeration piping provides.*
- ★ *The roof joists and wall connections for the north one story addition are deficient for snow drift.*

Additional details, including the full list of recommendations can be found in CWMM Consulting Engineering's report, in the appendices of this document.

REVIEW + ANALYSIS.3

MECHANICAL REVIEW

The Vernon Civic Arena has an older mechanical system that is essentially the same as it was when upgraded and expanded in 1979. Small renovations and equipment updates of the system have grown and evolved as the needs and resources arose. With some equipment nearing its life span and some equipment well beyond, there are options to proceed depending on the intent of the facility and the resources available to replace and repair vs. remove and upgrade.

Looking at the entire system holistically we are rejecting large amounts of heat from the ice and simultaneously heating the space. There are redesign options to consolidate system infrastructure and provide symbiotic integration solutions to reduce the overall operating costs of the system.

The greatest payback will be to replace the boilers. This can reduce the actual energy consumption by up to 40%. A full redesign of the boiler heating systems would be able to operate at lower temperatures with new terminal units that should be replaced as well.

Low flow plumbing fixtures and insulation can help reduce domestic hot water loads/consumption. A review of the recirculation design should be completed and options to shorten dead-leg lengths thereby reducing the risk of standing water at dangerous temperatures.

★ *Plumbing leaks on domestic hot water side, fixture replacement are immediate priorities.*

Additional details can be found in S&A Falcon's report, in the appendices of this document.

ELECTRICAL REVIEW

Lighting within the arena area appears acceptable for the usage and does not require to be replaced at this time. The existing T12 lighting should be replaced. This can be done as it presently is being replaced on an 'as needed' basis or possible capital funding could allow for a complete upgrade.

The electrical system in this facility, while generally aged appears to be sufficient for the present use of the building. The existing service would have to be reviewed for capacity if additional loads (for example HVAC) were to be added. If the system were to operate as-is with no additional loads, the existing system could remain with no modifications. An infrared scan should be done for all distribution equipment to ensure there is no overloading on circuits and that all panel connections remain sound.

★ *The emergency lighting system should be thoroughly checked and repairs made as required. Additional emergency lighting should be added to allow for proper illumination of the access to exits.*

★ *Minor revisions to the fire alarm would be required to add bells where audibility is minimal. Pull stations at the bell locations in the arena area could be removed as not required by code. The system would need to be re-verified.*

Additional details can be found in S&A Falcon's report, in the appendices of this document.

REVIEW + ANALYSIS.3

HAZARDOUS MATERIALS REVIEW

A visual inspection was performed for other possible hazardous and regulated materials including PCB (within electrical equipment), mercury (within electrical equipment), lead-based paint, ozone depleting substances, and potentially toxic, flammable or explosive materials (required in Part 20.112 of the WorkSafeBC Occupational Health and Safety Regulation).

This is an un-occupied building survey, and as such, destructive sampling methods were used in order to confirm locations and extents of concealed asbestos applications. Coring was carried out on flooring applications where underlying layers of flooring were suspected.

New additions or completely renovated sections (1990 or later) of buildings are not considered at risk for asbestos-containing materials and therefore were not included in the survey.

Applications containing asbestos included the soft grey insulating cement on hot water heating pipe fittings, vinyl floor tiles, and pipe flange gaskets, all located randomly throughout the original construction building only. Other hazardous or regulated materials identified included PCB-containing fluorescent light ballasts located throughout the building, mercury-containing high voltage lighting on the perimeter exterior of the building, and lead-based paint applications on structural steel members and components located throughout the original construction building. It is also suspected that refrigerators, freezers, wall-mounted air conditioner units, and HVAC units identified contain CFC-based refrigerants.

- ★ *Identified asbestos-containing materials must be removed prior to demolition or renovation.*
- ★ *Inspect all fluorescent light ballasts for manufacturer name and serioal number and determine if PCBs are present.*
- ★ *Collect mercurury vapour lighting for recyling*
- ★ *Removal of lead paint from structural steel members and components is only required where to facilitate renovation work.*
- ★ *Collect all refrigerant devices for collection and disposal by a qualified mecahnical contractor in accordance with Provincial and Federal regulations.*

Additional details can be found in Peak Environmental's report, in the appendices of this document.

MATRIX DEVELOPMENT & UPGRADE OPTIONS.4

Based on the review and analysis, consultant reports, staff consultations, a matrix of recommended upgrades and associated costs was developed. In turn, this matrix was used as the basis for the Upgrade Options, highlight possible improvements and upgrade programs for the Vernon Civic Arena.

MATRIX OF RECOMMENDED UPGRADES

The review resulted in the following upgrade and maintenance recommendations. Recommendations are grouped by building component and prioritized by the following categories:

- Life Safety and Maintenance: Items in this category are a part of the required maintenance or represent a current life safety concern in the facility and should be addressed in the immediate future.
- 2-5 Years: Items in this category require appropriate attention to preclude predictable deterioration or potential downtime and associated damage or higher costs if deferred further and are recommended to be carried in the short term of 2 to 5 years.
- 10+ Years: Items in this category are beyond, or will soon be beyond, their expected useful life, but are currently functioning and in reasonable condition. Some recommendations identified in this category require no action at this time, however may improve the energy performance or functional operation of the existing facility.

Reference prefixes A, R, S, M, E, and HM refer to the architectural, refrigeration, structural, mechanical, electrical, and hazardous materials site reports respectively

Location / Reference	Recommendation	LIFE SAFETY & MAINTENANCE	2-5 YEARS	10+ YEARS
	Written description of the recommendation action and location	*Estimated cost*	*Estimated cost*	*Estimated cost*
SITE				
A10 Architectural Review	Perimeter drainage		800 LF x $50 = $40,000	
BUILDING				
A1 Architectural Review	Arena Roofing is failing, replace with snap rib metal roofing and 2" insulation		34,500 sf x $24 = $825,000	
A2 Architectural Review	Improve accessibility including public washrooms and change rooms		*Estimated cost may vary by options*	Enhancements will vary by option *note 4*
A3 Architectural Review	Improve or replace the 1938 change rooms including accessibility, gender neutral, cleanable		4,000 ft2 x 150 = $600,000 *note 1*	Enhancements will vary by option *note 4*
A4 Architectural Review	Replace ice slab and dasher boards		See R2 below *note 2*	

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Location / Reference	Recommendation	LIFE SAFETY & MAINTENANCE	2-5 YEARS	10+ YEARS
A5 Architectural Review	Improvements to 1979 skate change rooms including new fixtures, and finishes, accessibility, gender neutral where possible		2,000 ft2 x 150 = $300,000	
A6 Architectural Review	Preventative concrete wall repairs and possible enhancements to exterior cladding	See S6.5		Enhancements will vary by option *note 4*
A7 Architectural Review	Hazardous materials remediation and future enhancements to interior finishes, particularly in the 1938 Bldg	See HM 1.1		
A8 Architectural Review	Mechanical spaces improvements and code enhancements	See R1 and S6.7		Enhancements will vary by option *note 4*
ARCHITECTURAL	Subtotal rounded		1,800,000	
Structural				
S -6.1	Arena Roofing, replace with “slippery roof”		*See A1 above*	
S – 6.2	The cracking in the top chord of truss number 3 (between grid lines E and F) should be repaired	$10,000 Allowance		
S – 6.3	Maintenance “torquing of the tension rod upgrades every 5 years” and general review of the condition roof framing elements (just done)		$6,000 Allowance	
S – 6.4	The T-beams supporting the speakers need to be reviewed and upgraded or the speakers relocated. This should be addressed in a 2 to 5 year period		$10,000 Allowance	
S – 6.5	Cracks in the perimeter concrete walls should be grouted against water infiltration.	$5,000 Allowance		
S – 6.6	Replace existing cracked ice slab		See R2 *note 2*	
S – 6.7	The roof joists and wall connections for the north one story addition should be upgraded for snow drift	$10,000 Allowance		
STRUCTURAL	Subtotal rounded	25,000	16,000	

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Location / Reference	Recommendation	LIFE SAFETY & MAINTENANCE	2-5 YEARS	10+ YEARS
Refrigeration				
R1	CODE AND LIFE SAFETY ITEMS including new belt guards, repost process diagram	$5,000 Allowance		
R2	REPLACE ARENA FLOOR with new c/w under floor heating		$1.5 million *note 2*	
R3	CHILLER AND BRINE PUMPS replace with variable drive & CONDENSER with cooling loop by 2017		$150,000 $120,000	
R4	ENERGY UPGRADES including hot water reclaim on ammonia discharge and condenser		$80,000	
REFRIGERATION	Subtotal rounded	5,000	1,900,000	
Mechanical				
M2.2.1 and M2.2.2	WASHROOMS & DRESSING ROOMS Life cycle replacement of fixtures, insulation and removal of galvanized piping		$8,000 to $13,000 note 3	
M2.2.3	WEST WASHROOM serving the ice refinisher area	$1,500 to $2,000 note 3		
M2.2.4	SOUTH MECHANICAL ROOM replace			Enhancements will vary by option *note 4*
M2.2.5	NORTH MECHANICAL ROOM Life cycle replacement of boilers			$40,000 to $60,000 *note 4*
M2.2.6	NORTH MECHANICAL ROOM domestic water leak	$500 to $1,500 note 3		
M2.2.7	DRESSING ROOMS replace damaged water closets	$500 to $1,500 note 3		
M3.3.1	ARENA SEATING HVAC – Repair radiant heater shields and replace exhaust fans	$3,000 to $5,000 note 3		
M3.3.2	NORTH DRESSING ROOMS HVAC – exhaust fan replacement	$2,000 to $2,500 note 3		
M3.3.3	DRESSING ROOMS & WASHROOMS HVAC – Replace gas fired boilers with sealed units for improved energy efficiency		$15,000 to $20,000 note 3	
M3.3.4	NORTH MECHANICAL ROOM HVAC - Replace boilers and HVAC system holistically for energy savings			$80,000 to $120,000 note 3
MECHANICAL	Subtotal rounded	7,500 – 12,500	32,000 – 33,000	

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Location / Reference	Recommendation	LIFE SAFETY & MAINTENANCE*	2-5 YEARS	10+ YEARS
Electrical				
E8.1	Bleacher seating lighting upgrades		$5,000	
E8.2	1938 Electrical System, investigations recommendation	$2,500		
E8.3	Emergency lighting upgrades and repairs	$2,000		
E8.4	Fire alarm panel upgrades and maintenance	$5,000		
ELECTRICAL	Subtotal rounded	$10,000	$5,000	
Hazardous Materials				
HM1	Asbestos abatement	$18,400	$3,900	$4,000
HM2	Regulator Materials Abatement		$9,800	
HAZ MAT	Subtotal rounded	$20,000	$14,000	
	SUBTOTAL	$68,000 to 72,000	$4,000,000	
	Soft Costs (allow 25%)	$17,500	$1,000,000	
	Design/Construction Contingency (allow 15%)	$10,500	$600,000	
	TOTAL	$100,000	$5,600,000	Enhancements will vary by option *note 4*

NOTES:

1. Renovations to improve the 1936 change rooms are not necessarily recommended, other options should be considered, replacement options might be the order of 1.3 to 1.8 million.
2. While this is not a life safety issue, the prospect of imminent failure has been identified. You may determine this is a more urgent item. If it is the owner's plan to not maintain the building long-term, this recommendation should be reconsidered. This item requires inputs from architectural, refrigeration and structural
3. Numbers provided by the mechanical engineer are estimates only. S&A Falcon Engineering recommend a professional cost estimate completed by a quantity surveyor.
4. A long term plan might consider a number of options to improve washrooms and accessibility if it continued use as an ice arena is desired. If adaptive reuse was considered it might be a farmer's market or convention space. A budget would be best developed relative to a preferred option. At this time there is no direction on what that might be.

MATRIX DEVELOPMENT & UPGRADE OPTIONS.4

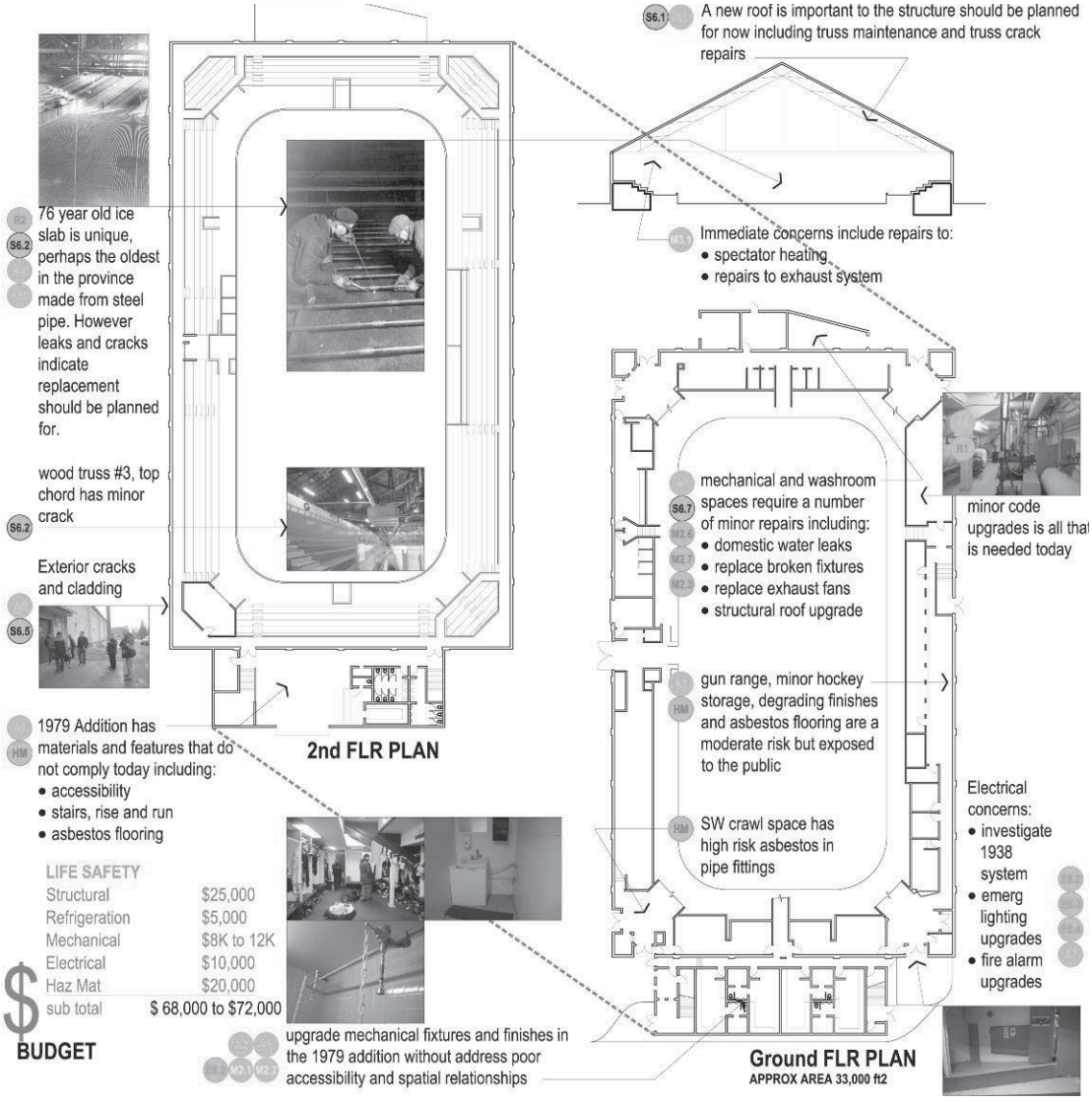
The findings of the assessment and matrix were used to develop three graphic panels highlighting the facility review in general including life safety issues, upgrade options and possible improvements. It is hope that the graphics convey some of the complex, technical and interconnected issues. The panels are titled The Existing Facility, 2 to 5 years and 10+ years and are included in appendix B.

THE EXISTING FACILITY

This graphic summarizes some of the findings of integrated project team. It looks at the specific LIFE SAFETY AND MAINTENANCE concerns to be address in the short term.

TOP THREE ISSUES:

1. Hazardous material in public spaces
2. Minor structural repairs to truss 3, and upgrades to roof joists and wall connections for the north one story addition
3. Plumbing leaks in the west washrooms and north mechanical area.



MATRIX DEVELOPMENT & UPGRADE OPTIONS.4

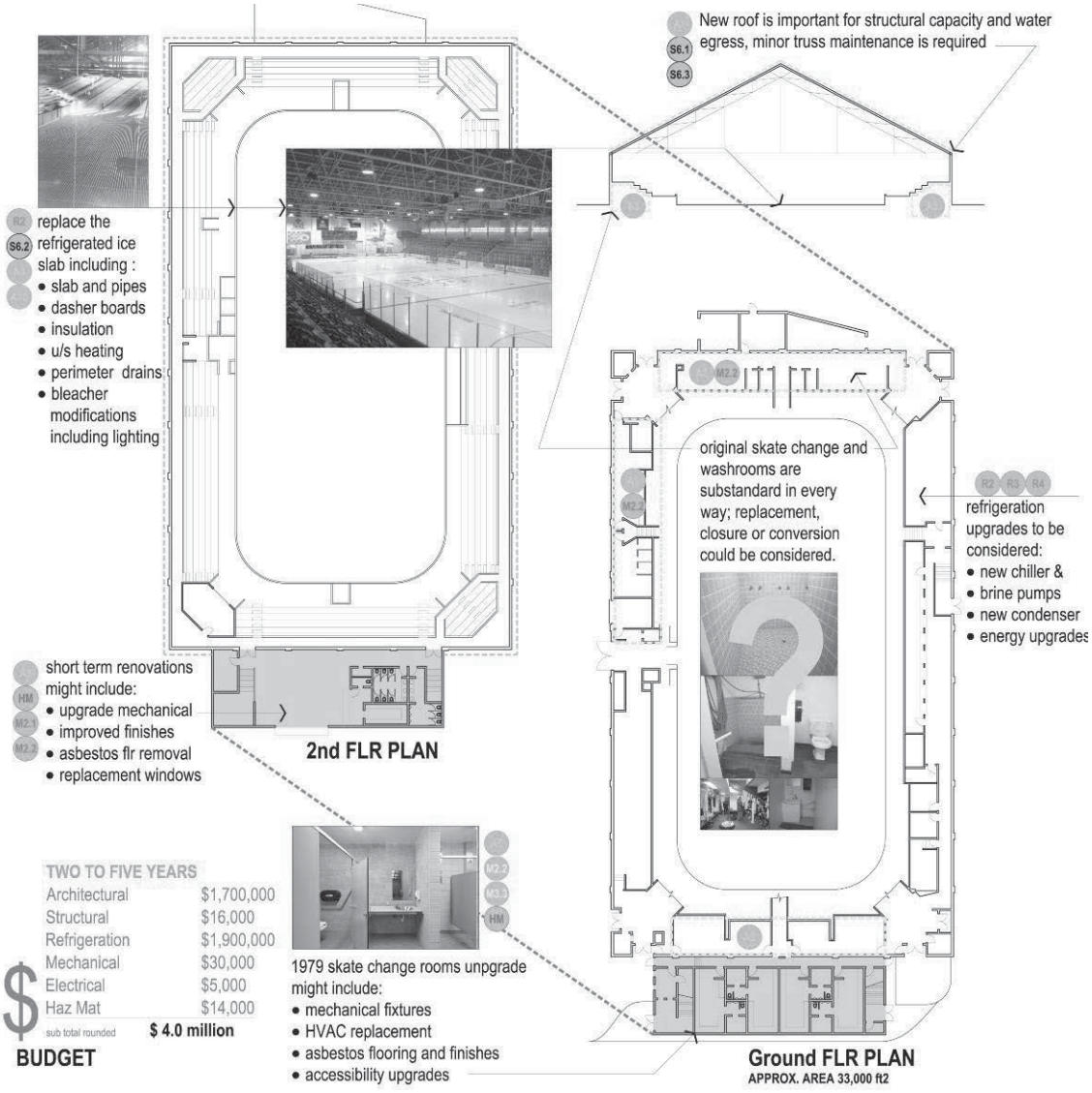
TWO – FIVE YEARS

This panel summarizes medium term enhancements that might ensure the facility could continue to operate much as it has for the medium term (2-5) years.

Definition the project and scope will be important next steps in refining budgets and time lines. Other solutions can be explored that align with other aspirations of the community.

TOP THREE ISSUES:

1. Refrigerated ice slab life cycle replacement
2. Plumbing repairs and fixture replacement
3. Substandard change and washroom facilities are not accessible. 1939 facilities might be better reassigned to other non-public uses



MATRIX DEVELOPMENT & UPGRADE OPTIONS.4

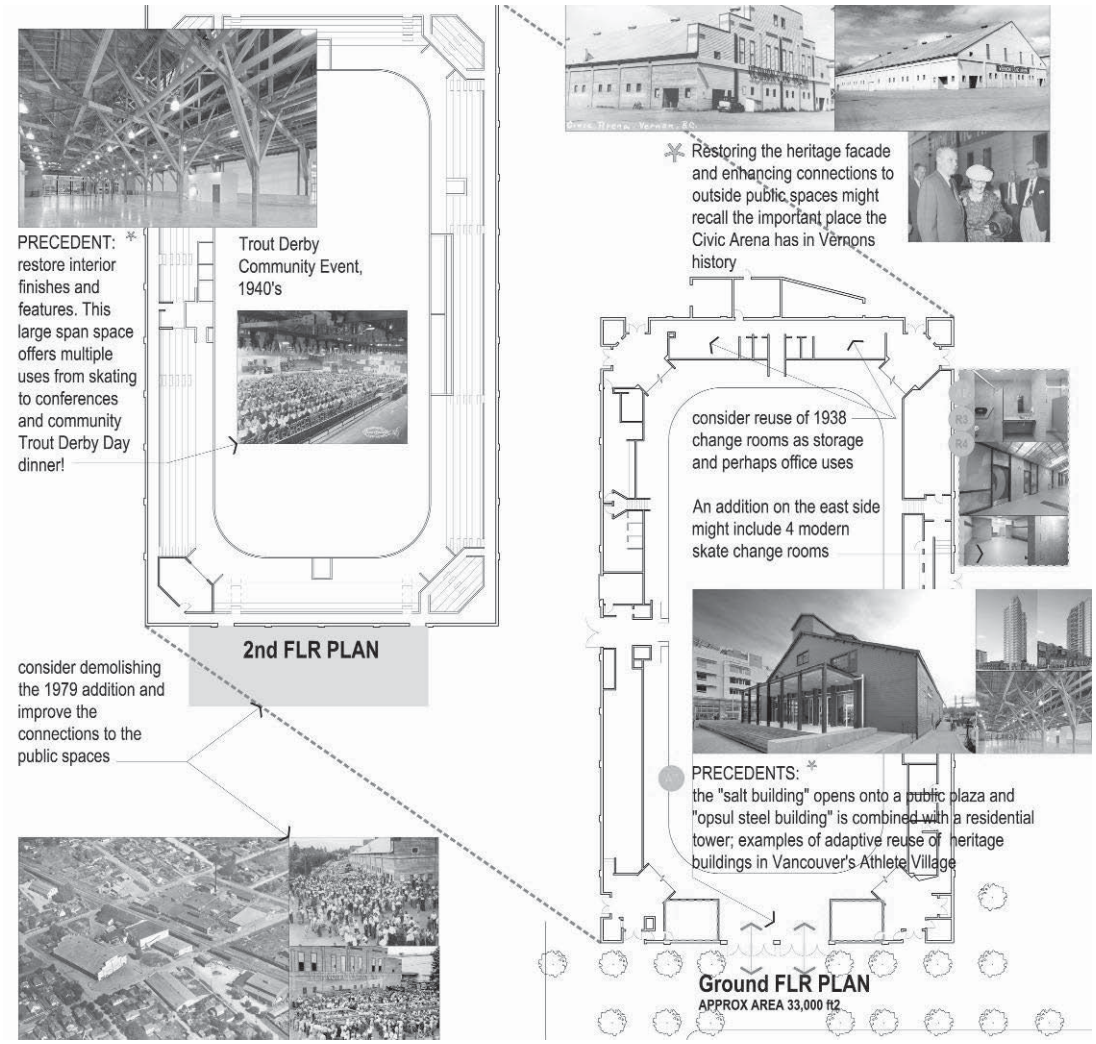
TEN YEARS PLUS

This panel explores ideas that might be considered for the long term, 10 plus years. Perhaps the building is restored to its original status as a multifunction "community centre".

Options include a long-term plan for restoring the heritage character and multifunctional community centre status of the Vernon Civic Arena. It suggests restoring the heritage facade and enhancing exterior public spaces and connections to open space and trials by demolishing the 1979 addition. This plan could see the refurbishment interior historic finishes and features, and even modern additions to accommodate modern skate change rooms, while the existing 1938 change rooms would be converted to office or storage space.

TOP THREE ISSUES:

1. Restoration of the heritage façade and enhancing exterior public connections
2. Addition of 4 modern skate change rooms on the east side
3. Reuse of the 1938 change rooms as storage or office space



THE PREFERRED OPTION + COST ESTIMATES.5

At this stage in the assessment and planning for the future of the Vernon Civic Arena, the Regional District of North Okanagan has not identified a Preferred Option based on the above concepts. The next steps for the Vernon Civic Arena Engineering Assessment would be to identify a Preferred Option – which is often a blending of concepts – and using this as a basis for professional cost estimates completed by a quantity surveyor.

The preferred option and cost estimates would provide the Regional District with the information necessary for grant applications and funding appeals, should they decide to move forward with upgrades to the facility.

CONCLUSION.6

This study reviewed the existing condition of the Vernon Civic Arena and provided architectural, refrigeration, structural, mechanical, electrical, and hazardous materials recommendations for immediate maintenance concerns and short and long term upgrade options. Working closely with the District, the consultant team examined the feasibility and preliminary costs associated with making these improvements.

The concepts presented, based on issues and improvements to be addressed in the immediate, mid-, and long-term, provide the RDNO with a jumping off point for discussions on the Vernon Civic Arena.

At this time, this report provides some of the information necessary, including conceptual design ideas, programming, space requirements, and budget estimates to make informed decisions about the future of the Vernon Civic Arena.

APPENDICES

The following appendices provide supplementary information and record documents for the project.

Appendix A	Meeting Minutes
Appendix B	Presentation Panels
Appendix C	Bradley Refrigeration Report
Appendix D	CWMM Consulting Engineers Structural Report
Appendix E	S&A Falcon Mechanical Report
Appendix F	S&A Falcon Electrical Report
Appendix G	Peak Environmental Hazardous Materials Report
Appendix H	Facility Condition Chart

meeting minutes

bruce carscadden ARCHITECT

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Agenda #1 - revised 1

☒ EMAIL
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TO **Keith Pinkoski,** PARKS PLANNER, keith.pinkoski@rdno.ca
REGIONAL DISTRICT OF NORTH OKANAGAN
9848 Aberdeen Road, Coldstream BC V1B 2K9

CC Consultants as noted below

FROM Bruce Carsadden ARCHITECT AIBC

PROJECT **14-02 Vernon Civic Arena Assessment**

DATE 20 January, 2014 revised

ATTENDEES / INVITEES:

PRESENT	COMPANY
Keith Pinkoski, Parks Planner	Regional District of North Okanagan (RDNO)
Bruce Carscadden	Bruce Carscadden Architect Inc (BCA)
Armen Mamourian	*Bruce Carscadden Architect Inc (BCA)*
David MacKinnon (structural)	CWMM Consulting Engineers Ltd (CWMM)
Graeme Staley (mechanical)	Smith & Anderson Falcon Eng. (S+A)
Kenton Galloway (electrical)	Smith & Anderson Falcon Eng. (S+A)
Eric Bradley (refrigeration)	Bradley Refrigeration Consulting (BRC)
Stephen Ferguson (haz mat)	Peak Environmental

AGENDA / ITINERARY – 22 January 2014

7:50 – 10:30 Air Canada 8410 leaves at 8:50 and arrives Kelowna at 9:50. I have arranged for a minivan and will pick up those arriving by air at the Airport. The drive to Vernon will take 40 minutes.

10:45 – 11:15 KAL TIRE PLACE (meeting room).

Introductions, project background and information gathering

1. Introductions - Bruce / Keith
2. Review project scope, aspirations and background – Keith / Bruce
3. Information gathering – Review / Discussion

Drive over to Vernon Civic Centre (15 minutes)

11:30 – 12:30 VERNON CIVIC CENTRE - FACLITY TOUR and REVIEWS

Individual and group site observations and tour, data collection and documentation. Individual assistance from staff to for access and history in these areas will be valuable.

bruce carscadden **ARCHITECT** inc

DATE: 20 January, 2014
PAGE: 2 of 2

12:30 – 1:00 LUNCH

We will arrange for lunch to be brought in so we can use the time to chat and discuss the project.

1:00 – 2:30 ROUNDTABLE MEETING

We will arrange for lunch to be brought in so we can use the time to do the following:

- Review owners list of “concerns”

Consultants report on first impressions.

1. Architecture / Building Code / Envelope
2. Structural
3. Mechanical
4. Refrigeration
5. Electrical
6. Hazardous Materials

Conclusions, next steps and schedule.

2:30 – 3:00 REVIEW

Any last or second viewings required or suggested and arising from round table discussions, group observations or staff comments.

3:05 – 3:45 Consultant team to airport, others drive home

5:00 6:00 AC8421 departs for Vancouver at 17:10, Bruce is still driving but enjoying the view

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Bruce Carscadden, ARCHITECT AIBC

uce carscadden
ARCHITECT

ast astings t
ancouver
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fa
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eeting Notes

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TO Keith Pin os i keith pinkoski rdno ca
berdeen oad oldstream

CC onsultants as noted below

FRO ruce arsadden

PRO ECT 1 Vernon Ci ic Arena Assessment

DATE arch

PRESENT	CO PANY
eith inkoski arks lanner	egional istrict of orth kanagan
tan itchell renas anager	orporation of the ity of ernon o
im oughlin acilties anager	orporation of the ity of ernon o
ruce arscadden	ruce arscadden rchitect nc
avid ac innon structural	onsulting ngineers td
raeme taley mechanical	mith & nderson alcon ng
enton alloway electrical	mith & nderson alcon ng
ric radley refrigeration	radley efrigeration onsulting
im ecker hazardous materials	eak nvironmental

he following is an account of ite isit and ound able eeting on 22 anuary 2 , at al ire lace and the ernon ivic Arena, am to , and of the ro ect nitiation eeting, held by telephone on anuary th.

eeting OLD BUSINESS

ITE	DESCRIPTION	ACTION BY
	Pro ect Initiation ro ect award and contracts were discussed arrangements for the facility tour and workshop were discussed including schedule and dates to confirm possible dated	

bruce carscadden ARCHITECT inc

arch
of

Information Gathering

he following documents have been collected nfo

- *enovations ivic Arena ernon , O anagan Associated Architects, A A*
- *enovations ivic Arena ernon , O anagan Associated Architects, , 2*
- *enovations ivic Arena ernon , O anagan Associated Architects, , 2*
- *ivic Arena eer ardens, ngineering roup, 2 pages,*
- *ivic Arena leacher pgrades, , ene ourcet, ng, ages*
- *ivic Arena ompressor tand, ngineering roup, pages,*
- *ernon ivic Arena, xit and eating lan, O anagan Associated Architects, ,*
- *ivic Arena, ce urface urvey 5, , , o ng epartment*
- *opographic lan of ivic Arena, . . addox , 2*
- *opographic lan of ivic Arena, hoesmith and urveys,*
- *reater ernon ar s and ecreation istrict ernon ivic entre, iagram, trong and Assoc.2*
- *ernon ivic Arena, tructural epair of russ, , ene ourcet, ng, ages*

indicated that archival plans may be available to be advised

3 Sched le

mportant milestones were noted info

anuary or nd acility our and orkshop
ebruary rd atri eeting *tentative*
arch th resentation of inal eport *tentative*

he following is an account of ite isit and ound able eeting on 22 anuary 2 , at al ire lace and the ernon ivic Arena, am to .

eeting NEW BUSINESS

Introd ctions and Information Gathering info

ntroductions were made as noted above provided some pro ect background information reviewed the scope and aspirations for a scientific assessment of the building and its systems tour of the ernon ivic rena followed

Facility To r and Ro nd Table info

ndividual and group site observations and tour data collection and documentation
ndividual assistance from staff to for access and history in these areas was part of a general on site discussion and tour ollowing this the team sat down at al ire lace to review e pressed concerns from the owner and report on first impressions

he owner noted that the facility gets nasty hot in summer and that there are anitorial issues no closet at the north end but that the facility has historic value to the community

avid commented that while the building is old it has had significant structural upgrades the following issues were noted

- oof cladding is not slippery important as this is the basis of the structural upgrades
- oncrete cracking not concentrated could be related to ice or frost
- eating has been upgraded no seismic wind more applicable

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arch
of

raeme summarized issues related to the mechanical systems

- ystems are hobbled together but running failure replace mode
- times life e pectancy
- oilers of life space
- nergy efficiency old school boilers
- increase in efficiency improvement
- ery simple e isting system
- nvelope upgrades oof insulation upgrade for alternate use
- ube heaters for spec
- lumbing issues fi tures age good shape some fi tures should be replacement

enton reported that there appear to be no ma or electrical problems with the following notes

- othing wrong with the system
- ighting on rink appears acceptable
- leacher lighting is old
- nergy upgrades are possible
- anels are old breakers still available upgrading the panel would cost about
- ire alarm system is years old pull stations
- ire detection system fire e iting short
- ire suppression system at concession removed

ric reported that there appear to be a number of concerns and issues

- efrigerated floor added in later years
- was last upgrade
- ood life left years running well
- lab itself is the at the end of its life steel pipe is rare deteriorated
- uilding drains cleaned igh water and under slab drainage is a problem
- eason is eptember to early pril months with under floor heating
- oils or ground water
- esting is not really an option as the slab will be damaged
- ne brine leak results in more because of the corrosive nature of leaking brine
- teel headers are unusual year life
- lab replacement affected by bleachers
- lan is not big enough to run in summer

im reported the following concerns

- urther testing is re uired and planned urvey will be completed riday date report in weeks
- ontamination issues elbows e posed to patrons and players which is a liability issue
- ag and fittings on old boilers
- ead is a concern if removal of the building is the result
- ork safe concerns
- hromates concerns
- allast if lights are changed

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arch
of

ruce discussed the building envelope accessibility and code compliance in general

- oard form concrete walls and wood trusses offer a very pleasant appearance to one of the oldest arena of its type in the province
- he roofing and the water shedding elements constitute and important part of the envelope for the arena he roof appears to in corrugated wall cladding and poor condition
- ccessibility for is somewhat limited and limited to the public spaces
- hange rooms and washrooms are generally not accessible lacking appropriate space clearances and fi tures hower areas are notably sub standard and have health act issues in the waterproofing and drain locations
- rom a code perspective the re uirement for building upgrades are usually triggered by a sliding scale on the value of proposed renovations not maintenance not voluntary upgrades ignificant upgrades can also be triggered by a change of use
- asher boards are site built old as the building and stiff modern dasher boards offer fle ibility for player safety
- addition while much younger has a number of code issues including rise and run on stairs single glazing

SCHEDULE

he ne t meeting is proposed for uesday th of ebruary

DISTRIBUTION

s noted above

hese notes are considered an accurate account of sub ects discussed and decisions reached during the meeting. lease advise the writer in writing of any errors or omissions.

BRUCE CARSCADDEN ARCHITECT INC

ruce arscadden

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Meeting Notes #3

☒ EMAIL
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REGIONAL DISTRICT OF NORTH OKANAGAN
9848 Aberdeen Road, Coldstream BC V1B 2K9

CC Consultants as noted below

FROM Bruce Carsadden ARCHITECT AIBC

PROJECT **14-02 Vernon Civic Arena Assessment**

DATE 6 February, 2014

ATTENDEES:

PRESENT	COMPANY
Keith Pinkoski, Parks Planner	Regional District of North Okanagan (RDNO)
Bruce Carscadden	Bruce Carscadden Architect Inc (BCA)

Meeting #1&2 **OLD BUSINESS**

ITEM	DESCRIPTION	ACTION BY
1	**Project Initiation / Integrated Round Table Meetings**	
	Project award and contracts were discussed, RDNO to advise	RDNO
	Meeting Notes #2 were reviewed in general and accepted.	Info
2	**Information Gathering**	
2.1	The RDNO confirmed that no additional documents are available and specifically the original Civic Arena Drawings are lost.	Info
2.2	Structural advised that without these original drawings their review has more limitations.	

bruce carscadden **ARCHITECT** inc

DATE: 6 February, 2014
PAGE: 2 of 3

The following is an account of Meeting on 22 January 2014, at Kal Tire Place and the Vernon Civic Arena, 11:00 am to 3:00.

Meeting #3 **NEW BUSINESS**

3 **Discussion** info

The results to the facility tour and round table were discussed in detail. Draft copies of Structural, Refrigeration and Electrical reports were tabled for discussion. BCA tabled a draft matrix of recommendations and upgrades, building code review checklist and Facility Conditions Index. Comments follows:

3.1 MATRIX; the breakdown into Life Safety and Maintenance / 2-5 Years / and Long Range was generally accepted. Long range might also be broken out into 10 plus years and 15 plus years.

3.2 FACILTIY CONDTION INDEX was reviewed only briefly pending inputs from mechanical and hazardous materials.

4 Review and Analysis

4.1 STRUCTURAL CWMM

Structural report was reviewed in general. It was noted the 1937 structure and subsequent upgrades have many years of remaining value. Cracks in concrete were not structural issues however repairs are important so as not affect the structures. Significantly the roof cladding is “not slippery” and replacement is recommended.

4.2 MECHANICAL S+A

Mechanical was discussed only briefly, noting the 1937 spaces and systems are seriously sub-standard.

4.3 ELECTRICAL S+A

Electrical report was reviewed in general. It was noted the arena lighting was generally OK, upgrades to bleacher lighting are recommended.

4.4 REFRIGERATION BRC

Refrigeration report was reviewed in general. Minor code concerns are noted, however significant is the recommendation to replace the ice slab entirely. This can be done during a summer season and typically includes new dasher boards. Maintaining the existing sheet size and perhaps accepting minor reductions in the order of 6 to 12 “ can make the project very practical and predictable.

4.5 HAZARDOUS MATERIALS PE

Report pending

4.6 ARCHITECTURAL BCA

BCA discussed the building envelope, accessibility and code compliance in general. A number of concepts for the building future were imagined. It was proposed to develop graphics and estimates that could represent three future options. These concepts would facilitate decision making and presentation to Greater Vernon Advisory Council, senior levels of government and stakeholders. The following concepts were suggested:

1. DEMO; Tear the whole civic arena down and landscape the site. Coordinate and consider the City of Vernon’s planning aspirations for the site.
2. SAFTEY AND MAINTENANCE; Renovate the 1979 piece including change rooms, replace the ice slab & boards, abandon the old change rooms and washrooms as substandard and consider a new change room addition.
3. ENHANCED; Tear down the 1979 addition, do a “heritage” quality restoration of the old arena, add new modern change rooms on the east side. This concept might include options for ice and for adaptive reuse as farmers market or community hall

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DATE: 6 February, 2014
PAGE: 3 of 3

5 SCHEDULE

5.1 The next meeting is proposed for Friday February 14th and will include a draft presentation of the concept options and a first draft of the assembled report. TBC

5.2 February 26th - Final Draft of the report including the concept options as vetted by RDNO for possible inclusion in the Advisory Committee Agenda.

5.3 March 6th 2014 - Advisory Committee Presentation

6 DISTRIBUTION

6.1 As noted above, and to Structural, Refrigeration, Mechanical, Electrical, Hazardous Materials.

These notes are considered an accurate account of subjects discussed and decisions reached during the meeting. Please advise the writer in writing of any errors or omissions.

BRUCE CARSCADDEN ARCHITECT INC

Bruce Carscadden, ARCHITECT AIBC

presentation panels

the existing facility

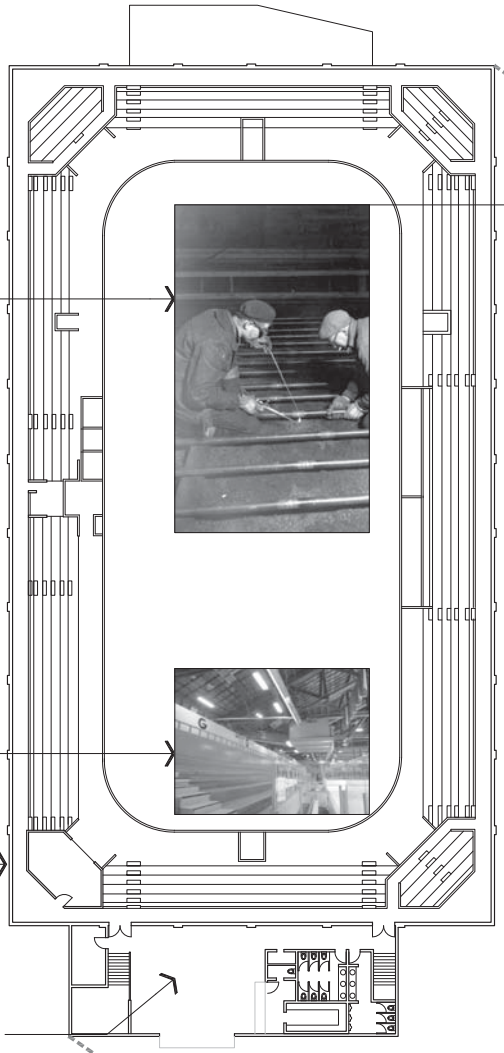
revised to **4 march 2014**

This panel summarizes some of the findings of integrated project team. It also looks at the specific **LIFE SAFETY AND MAINTENANCE** concerns.

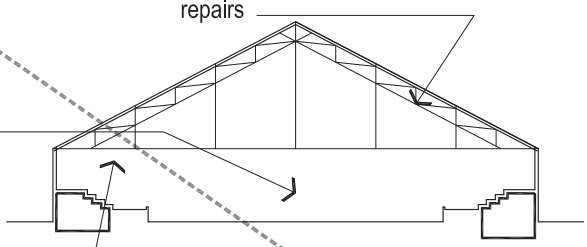
R2 S6.2 — 76 year old ice slab is unique, perhaps the oldest in the province made from steel pipe. However leaks and cracks indicate replacement should be planned for.

wood truss #3, top chord has minor crack — S6.2

Exterior cracks and cladding — S6.5



A8 S6.1 — A new roof is important to the structure should be planned for now including truss maintenance and truss crack repairs



M3.1 — Immediate concerns include repairs to:
- spectator heating
- repairs to exhaust system

A8 R1 — minor code upgrades is all that is needed today

A8 S6.7 M2.6 M2.7 M2.3 — mechanical and washroom spaces require a number of minor repairs including:
- domestic water leaks
- replace broken fixtures
- replace exhaust fans
- structural roof upgrade

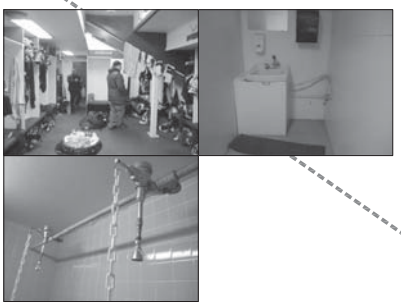
A8 HM — gun range, minor hockey storage, degrading finishes and asbestos flooring are a moderate risk but exposed to the public

HM — SW crawl space has high risk asbestos in pipe fittings

A8 HM — 1979 Addition has materials and features that do not comply today including:
- accessibility
- stairs, rise and run
- asbestos flooring

2nd FLR PLAN

Electrical concerns: — E8.2 E8.3 E8.4 A8
- investigate 1938 system
- emerg lighting upgrades
- fire alarm upgrades



LIFE SAFETY

Structural	$25,000
Refrigeration	$5,000
Mechanical	$8K to 12K
Electrical	$10,000
Haz Mat	$20,000
sub total	$ 68,000 to $72,000

$ BUDGET

A8 S6.1 E8.2 M2.1 M2.2 — upgrade mechanical fixtures and finishes in the 1979 addition without address poor accessibility and spatial relationships

Ground FLR PLAN
APPROX AREA 33,000 ft2

regional district of north okanagan
vernon civic arena assessment 2014

1

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0 6m 20'

two to five years

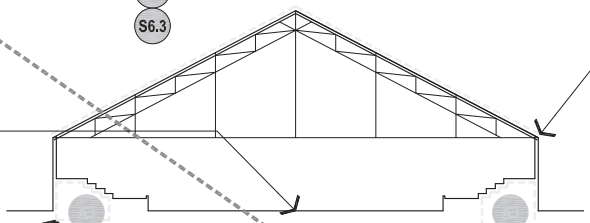
revised to **4 march 2014**

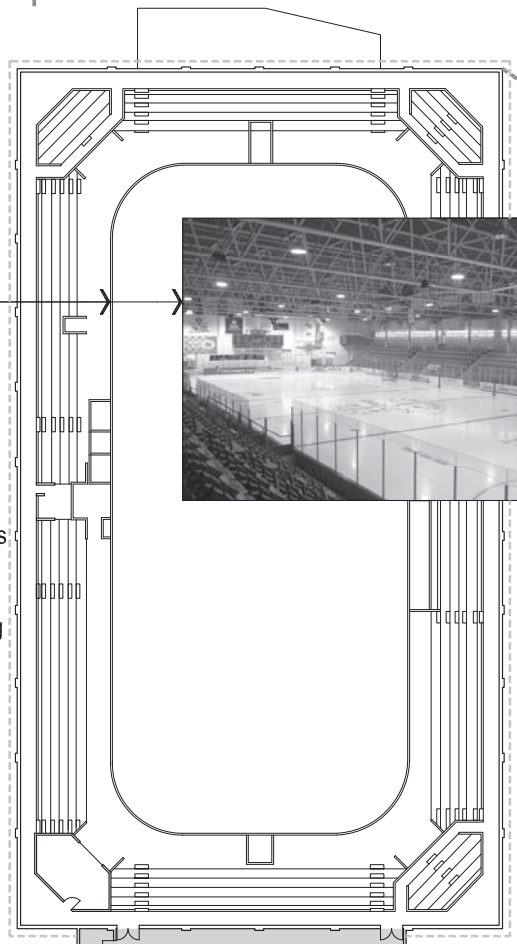
This panel summarizes medium term enhancements to help ensure the facility could continue to operate much as it has for the next **2-5 YEARS**.

R2 S6.2 replace the refrigerated ice slab including :

- slab and pipes
- dasher boards
- insulation
- u/s heating
- perimeter drains
- bleacher modifications including lighting

S6.1 S6.3 New roof is important for structural capacity and water egress, minor truss maintenance is required





A2.1 HM M2.1 M2.2 short term renovations might include:

- upgrade mechanical
- improved finishes
- asbestos flr removal
- replacement windows

2nd FLR PLAN

M2.2 original skate change and washrooms are substandard in every way; replacement, closure or conversion could be considered.

R2 R3 R4 refrigeration upgrades to be considered:

- new chiller &
- brine pumps
- new condenser
- energy upgrades

A2.1 M2.2 M3.3 HM 1979 skate change rooms unpgrade might include:

- mechanical fixtures
- HVAC replacement
- asbestos flooring and finishes
- accessibility upgrades

Ground FLR PLAN

APPROX. AREA 33,000 ft2

TWO TO FIVE YEARS

Architectural	$1,700,000
Structural	$16,000
Refrigeration	$1,900,000
Mechanical	$30,000
Electrical	$5,000
Haz Mat	$14,000
sub total rounded	**$ 4.0 million**

BUDGET

regional district of north okanagan

vernon civic arena assessment 2014

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2

0 6m 20'

ten year plus

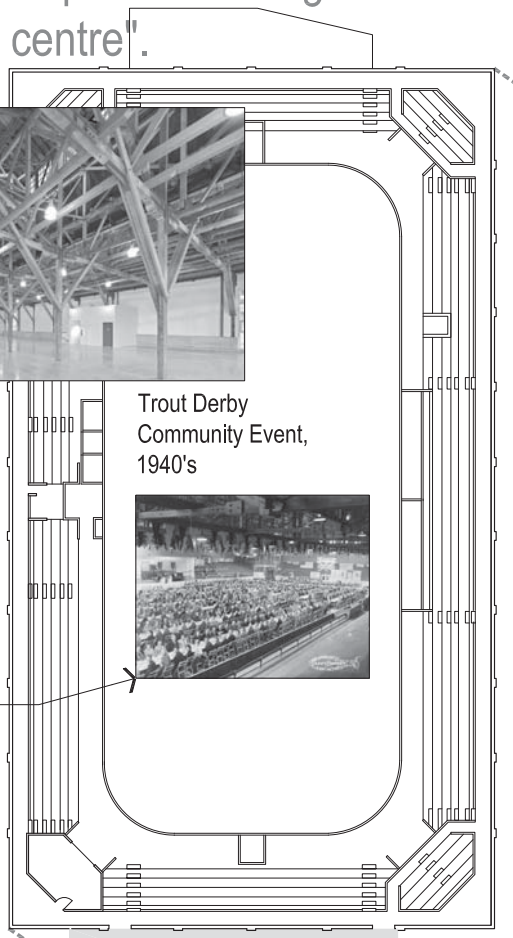
revised to **4 march 2014**

This panel explores ideas that might be considered for the long term, **10 PLUS YEARS**. Perhaps the building is restored to its original status as a multifunction "community centre".

PRECEDENT: * restore interior finishes and features. This large span space offers multiple uses from skating to conferences and community Trout Derby Day dinner!

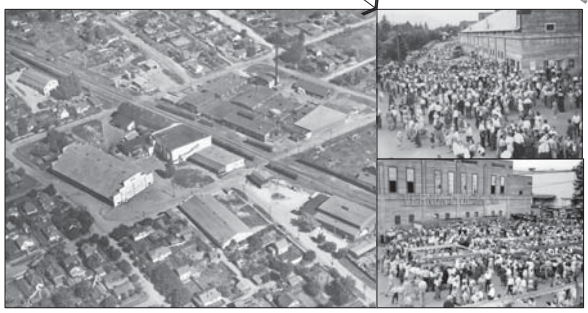
Trout Derby Community Event, 1940's

* Restoring the heritage facade and enhancing connections to outside public spaces might recall the important place the Civic Arena has in Vernons history



2nd FLR PLAN

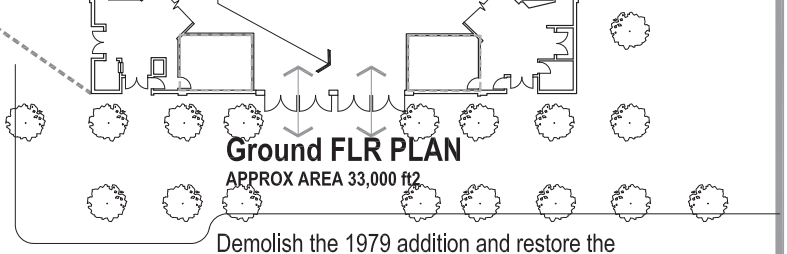
consider demolishing the 1979 addition and improve the connections to the public spaces



consider reuse of 1938 change rooms as storage and perhaps office uses

An addition on the east side might include 4 modern skate change rooms

PRECEDENTS: *
the "salt building" opens onto a public plaza and "opsul steel building" is combined with a residential tower; examples of adaptive reuse of heritage buildings in Vancouver's Athlete Village



Ground FLR PLAN
APPROX AREA 33,000 ft2

Demolish the 1979 addition and restore the heritage facade with enhanced openings and connections to the public spaces

regional district of north okanagan
vernon civic arena assessment 2014

3

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0 6m 20'

bradley refrigeration consulting
refrigeration report

BRADLEY REFRIGERATION CONSULTANTS LIMITED
1236 Fulton Avenue
West Vancouver, B.C. V7T 1N6
Tel: (6020) 20520-72076
Fax: (6020) 925-2571
ericbradley@telus.net

February 28, 2014

Bruce Carscadden Architect
715 East Hastings Street
Vancouver, B. C.
V6A 1R3

Attention: Mr. Bruce Carscadden, MAIBC

Subject: Vernon Civic Centre
Refrigeration Review

Dear Sir,

Executive Summary

This report provides a general assessment of the refrigeration system associated with the artificial ice surface at the Vernon Civic Centre.

Included in this report is a prioritized schedule of the work required to be done and the time lines required to complete the work.

This report covers those items which are in need of repair or replacement for reasons of Code and Safety, or age and condition of the equipment.

The priorities are based on code and safety first, then age and condition of the equipment. The equipment inventory is included in Appendix A. The Summary of costs are included in Appendix B.

The refrigeration plant meets most of the current B. C. Safety Authority requirements as defined in the CSA B.52 Refrigeration Code. The plant also complies with most of the Worksafe BC requirements. Items identified in Section A list the additional work require to bring the plant up to current code and safety requirements.

We are recommending the arena floor be considered for replacement.

Eric C. Bradley, P. Eng.

February 28, 2014

Subject: Vernon Civic Centre
Refrigeration Review

A. Introduction

This section of the study identifies areas pertaining to the refrigeration system that do not comply with the CSA B52-Mechanical Refrigeration Code, Latest Edition. In addition to code items, we have also identified areas, which, in our opinion, constitute good safety practice as well as some common items frequently cited by Worksafe B.C.

B. Methodology

Information was gathered by performing a visual walk through of the plants. No destructive or non-destructive testing was carried out. No calculations were performed or refrigerant inventories taken.

C. Disclaimer

In this report, compliance or non-compliance with the Code is based on our interpretation of the Code. Items identified as good safety practices are based on our experience and information published by the IIAR (International Institute of Ammonia Refrigeration). Items identified as Worksafe B.C. requirements should not be construed as the only requirements of Worksafe B.C.

Opinions in this report are based on visual inspection of the refrigeration equipment and piping. Detailed testing of the piping and vessels and review of the design calculations were not conducted. Additional review of the refrigeration plants may result in further safety issues being identified.

Bradley Refrigeration Consultants Limited are not liable for property damage or personal injury that may result from an omission of a noncompliant Code or safety item.

February 28, 2014

Subject: Vernon Civic Centre
Refrigeration Review

D. Equipment Review Criteria

The following is the refrigeration equipment review for the Vernon Civic Centre Refrigeration Review:

The priorities are rated as follows:

- Code and Safety Related Items: Work that requires immediate attention because life safety is endangered.
- Urgent: Work that requires prompt attention to prevent a subsequent emergency.
- Short term repairs or replacement: Work that should be completed in one to five years.
- Long term replacement: Work that may be required beyond the five year period.
- Energy related: The potential for reducing energy costs will be identified.

February 28, 2014

Subject: Vernon Civic Centre
Refrigeration Review

E. Recommendations:

Discussion

The refrigeration system for the single sheet of ice at the Vernon Civic Centre is a central refrigeration plant using ammonia as the refrigerant.

The refrigeration plant has been upgraded to meet most of the current standards.

The arena floor is unique as it was installed in the 1950's and is one of three steel pipe floors in the province.

I Code and Safety Related Items

1. New belt guards are required to comply with Worksafe BC requirements.

2. The process and Instrumentation diagram needs to be updated and reposted in vestibule.

3. The site-specific emergency response plan should be reviewed. The escape route and congregation areas of the facility experiencing the ammonia exhaust as well as any buildings in the immediate area should be added to the response plan.

II Urgent Items

1. None

February 28, 2014

Subject: Vernon Civic Centre
Refrigeration Review

III Short Term Items

1. We are recommending the arena floor be considered for replacement. The existing floor dates from the 1950's and uses steel pipe for the brine system. The floor has had one brine leak at the header trench end in the last two years. The floor is also undergoing a seasonal heave in the middle of the floor. As long as the ice season is kept to seven and half months or less, the ice forming under the slab will disappear over the summer months. Any extension of the rink season beyond seven and a half months will result in failure of the rink floor due to heaving. Once a brine leak has occurred in a steel pipe floor, additional leaks will occur due to corrosion of the steel pipe from outside due the exposure to brine. These leaks will result in failure of the arena floor. We recommend this floor be considered for replacement in the next two to three years.

IV Long Term Items

1. A new chiller will be required by 2017.

2. A new brine pump and variable speed drive will be required by 2017.

3. A new condenser should be installed by 2017 with a compressor cooling water loop. This loop can be installed when the condenser is replaced.

V Energy Related Items

1. A hot water reclaim unit can be added to the ammonia discharge line to remove the superheat from the discharge gas. This unit can heat the incoming city water up to 120 °F when the refrigeration plant is running resulting in savings of the gas required to heat water.

2. A heat reclaim condenser can be added to provide heat for sources within the building or surrounding buildings.

February 28, 2014

Subject: Vernon Civic Centre
Refrigeration Review

APPENDIX A

INVENTORY OF MAJOR REFRIGERATION EQUIPMENT

Quantity	Type	Model	Age
2	Mycom	N4B	Unknown
2	Motors	75 HP	Unknown
1	BAC Condenser	C 1442	1993
1	Chiller	24” x 12 feet	1998
1	Receiver	24” x 12’	Unknown
1	Brine pump	25 HP	1998
1	Brine Pony Pump Motor	7.5 HP	1998

Plant capacity is 100 TR at 10°F (23.8 PSIG saturated suction pressure) 85°F (151 PSIG saturated discharge pressure) 64°F wet bulb temperature.

February 28, 2014

Subject: Vernon Civic Centre
Refrigeration Review

APPENDIX B

SUMMARY OF COSTS AND TIMELINES

ITEM		Installation Date	Lead Time	Installation Time	Budget
1.	Code Items	2013	1 month	2 days	$ 5,000
2.	Arena Floor	2015	6 months	5 months	$1,500,000
3.	Chiller , Pumps	2017	2 months	6 weeks	$ 150,000
	Condenser with Compressor Cooling Loop	2017	2 months	2 weeks	$ 120,000
4.	Energy Items	No defined schedule	2 months	2 weeks	$ 80,000

Notes: The above costs are in 2014 dollars.

The above costs are for budget purpose only, and subject to review by detailed engineering and contractor's estimates.

cwmm consulting engineers
structural report

STRUCTURAL BUILDING CONDITION ASSESSMENT
Vernon Civic Arena Feasibility Study
Regional District of North Okanagan , B. C.

Report Prepared for:

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STRUCTURAL BUILDING CONDITION ASSESSMENT
Vernon Civic Arena Feasibility Study
Regional District of North Okanagan , B. C.

TABLE OF CONTENTS

STRUCTURAL BUILDING CONDITION ASSESSMENT
Vernon Civic Arena Feasibility Study
Regional District of North Okanagan , B. C.

1.0 INTRODUCTION

CWMM Consulting Engineers Ltd. was requested to provide a structural building condition assessment of the above facility. A site visit was conducted on January 22, 2014.

2.0 ASSESSMENT CRITERIA AND GUIDELINES

The following material was used as a basis for the assessment:

.1 Vernon Civic Arena Structural Survey by Associated Engineering (B.C.) Ltd. dated September 1988.

.2 Structural Assessment of the Civic Arena by R & A Engineering (1997) Ltd. dated September 14, 2010.

.3 Vernon Civic Arena Structural Survey by Associated Engineering (B.C.) Ltd. dated October 2013.

.4 1979 Renovation drawings 1 though 6 inclusive by Okanagan Associated Architects

.5 1997 Beer Garden Renovation drawings 1 & 2 by the BBH Engineering Group Ltd.

.6 January 1989 bleacher upgrade drawings 1 through 3 inclusive from Rene J. Bourcet.

.7 Topographic surveys of the top of the concrete ice slab from 1984, 85, 86, 98 and 2009.

.8 November 1987 drawing by Rene J. Bourcet to repair damaged roof truss tension ties.

.9 National Building Code of Canada 1985 / British Columbia Building Code 1985.

.10 National Building Code of Canada 2006.

.11 British Columbia Building Code 2012.

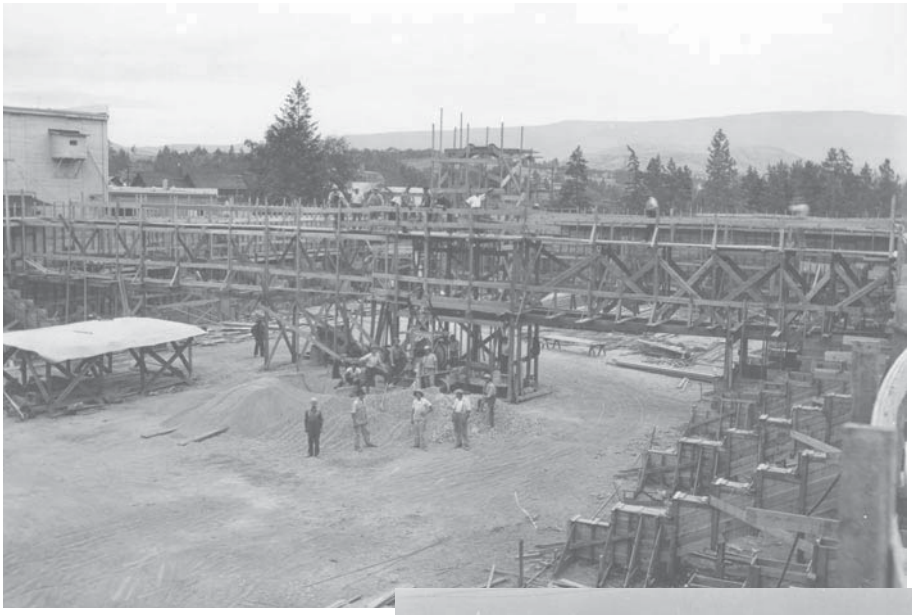
3.0 BUILDING CONSTRUCTION

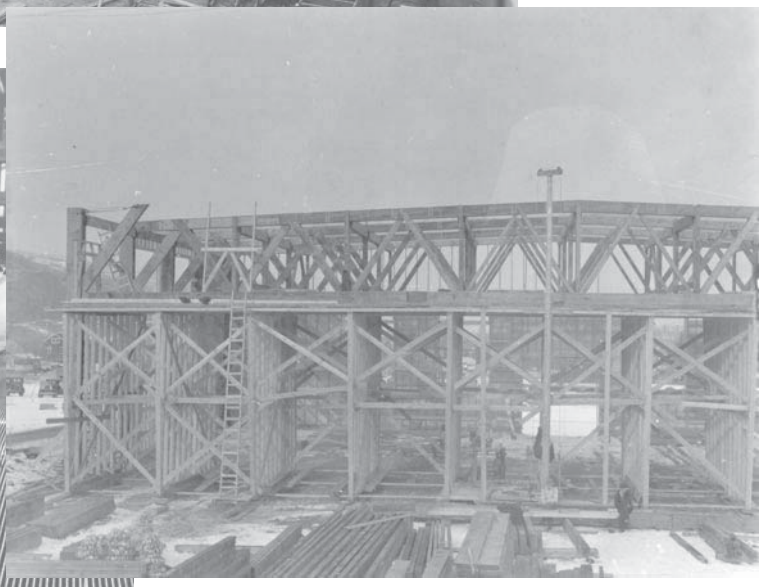
3.1 Main Arena

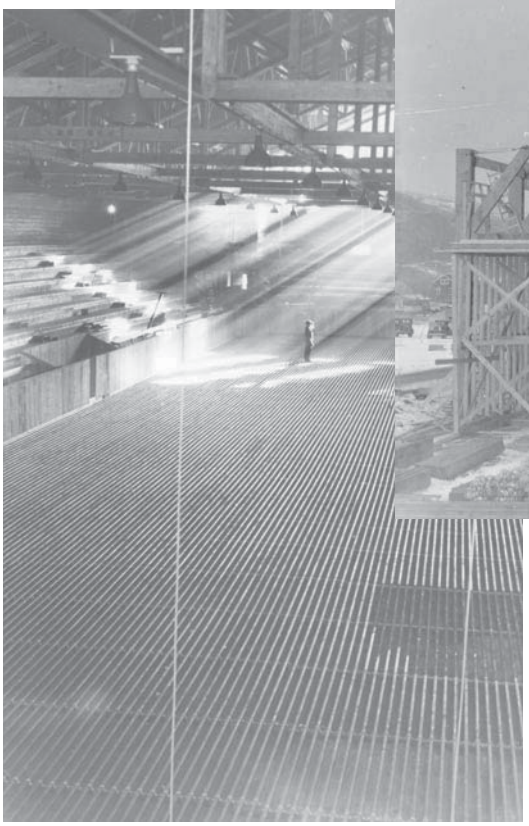
The original arena building was constructed in 1938 with double pitched timber roof trusses spanning 128 ft. clear between the perimeter concrete walls. These trusses in

turn support ¾" shiplap on 2 x 4 rafters at 2'0" on center spanning between intermediate purlins at 8'6" on center. Purlin construction alternates between double 2 ½" by 10 ¼" wood members and built-up timber trusses.

The upper floor is of concrete construction with concrete beams extending down to ice level to support wood frame bleacher seating. It is assumed to be supported upon conventional strip and pad concrete foundations.







The concrete ice sheet slab may not be reinforced apart from the extensive steel pipe present as part of the refrigeration system. This slab is also placed on grade.

3.2 Two Story Southern and One story Northern Additions

The two story addition on the south side was constructed in 1979. The roof consists of TJI joists at 32" on centre c/w 5/8" T & G plywood sheathing. These joists bear on the south arena concrete wall to the north and HSS posts and Glulam beams to the south.

The second floor consists of 5/8" plywood on 2 x 10 wood joists at 16" on centre supported upon a combination of 8" and double wythe 4" concrete masonry walls.

The foundation system is reinforced concrete strip foundations supporting 8" concrete foundation walls. The founding level below grade for frost protection is not noted on the drawings. The main floor is 4" reinforced concrete slab on grade.

No drawings were available for the north addition but the roof is framed with 2 x 8 roof joists at 16" on centre.

4.0 EVALUATION: STRUCTURAL SYSTEMS

4.1 Main Arena (Previous Reviews)

Multiple structural assessments/surveys have been conducted on the arena superstructure since some roof truss tension chord roof splitting was identified and addressed by Rene J. Bourcet in 1987.

A detailed structural survey was conducted by Associated Engineering (B.C.) Ltd. In 1988. Their design reviews of the roof trusses identified a number of deficiencies in the construction of the roof trusses. Subsequent repairs were conducted to address these issues which likely resulted in the previous tension chord splitting. These upgrades were undertaken in two phases in 1989/1990 and 1996.

As part of these upgrades the following were provided:

- The primary and secondary roof trusses and connections.
- Upgrading of the tension ties through addition of 35mm Dywidag tension rods to the timber tension ties.
- Provision of lateral bracing for end walls.
- The heel connection between the roof trusses and the concrete bearing wall.
- Addition (1996) of steel strong-backs to the wall pilasters supporting the roof trusses.

Also noted as part of these studies was the assumption that the roof decking was to be smooth (23% snow load reduction) and that the roof was not to contain obstructions that would prevent snow from sliding off the roof. To not replace the roof decking to accomplish this would result in significant overstress of the roof trusses under some conditions.

It was also concluded that the lateral support provided in the east-west direction propping of the concrete wall pilasters by the sloped bleacher support beams was inadequate.

Also identified was the under-design of the sloped concrete beams supporting the bleacher seating. This was addressed through the addition of steel HSS posts as designed by Rene J. Bourcet in 1989.

An updated structural condition survey was conducted by Associated Engineering(B.C.) Ltd. in 2013. It noted that the slippery roof assumed in design had still not been implemented and that the current design snow load for the unbalanced condition was 6 % greater than provided for in the previous roof upgrade. They further state that this small variance is not a concern.

On the basis of past performance of the structure under lateral wind loading conditions they stated that the previously determined inadequacies did not appear to be a concern. Upgrading was not required. Lateral performance should be adequate.

Further issues noted in this follow up review were:

- No significant change in the roof trusses since 1996 with the exception of a split in the top chord members of truss #3 between grid lines E and F. This has yet to be repaired (33% reduction in capacity).
- There has been some loosening of the 35mm tension ties and it is suggested that this be monitored every 5 years. Some re-torquing was performed.
- Some possible overstress of the T-beam supporting the speakers was identified and this has yet to be provided.

4.2 Main Arena (Current Review)

The metal material on top of the roof has yet to be replaced with a slippery surface material. This is a concern due to the roof being unable to shed snow as assumed in the design and construction upgrades to the roof.

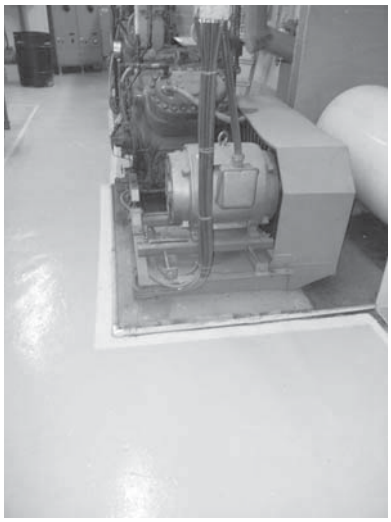
The roof condition appears to be unchanged since the latest report by Associated Engineering Ltd.

A number of cracks were visible in the perimeter concrete walls of the arena. Some are very small shrinkage cracks while others are a little wider. These occur at various points along the building perimeter and are not concentrated in the regions of maximum heave of the ice rink slab. No significant concrete spalling or corrosion are visible in these locations although these can be seen from both the interior and exterior of the building.

The ice arena slab has been subject to significant heave as note by the survey records and according to arena staff has a very substantial longitudinal crack. This was not visible as the ice was in place during our review.

The concrete slab on grade present in the remainder of the building is discontinuous from the ice rink slab as seen above. Bare ground is visible adjacent to the header trench. Due to the lack of existing building drawings it is not possible to determine the relationship between the header trench, sloped concrete bleacher beam foundations and the ice rink slab. The leak in the refrigeration piping and the repair two years ago are a concern for longevity of the slab due to its age.

The slab on grade in the remainder of the building appears to be in good condition. Although some minor cracking is visible in some of the equipment housekeeping pads and / or foundations. It is not possible to confirm the status at this time as no structural drawings are available.



4.3 Two Story Southern and One Story Northern Additions

The 1988 study by Associated Engineering Ltd. Identified that roof joists and their wall connections for the northern addition are inadequate for the for the design snow loads.

The southern 1979 addition appears to be in good condition. There is no significant differential settlement or wall cracking visible. There is also no visible sign of rot or distress in the wood frame walls, roof or floor.

5.0 CONCLUSIONS

Although there have been some issues with the roof of the arena over the last 27 years it appears that many of these issues have now been addressed.

The cracks in the perimeter concrete walls appear to be stable and not a concern at this time.

The truss remediation appears to be largely effective with the exception of truss number 3 (between grid lines E and F) which is exhibiting some cracking in the top chord resulting in a 33% reduction in capacity.

The T-beams supporting the speakers still require upgrading or relocation of the speakers.

The requirement for a slippery roof material on the main roof has not been met. Providing this will meet the upgrade design requirement of a 23% reduction in snow loading.

The ice arena slab has significant heave and a significant longitudinal crack. It is unknown if any reinforcement is present beyond what the steel refrigeration piping provides.

The roof joists and wall connections for the north one story addition are deficient for snow drift.

6.0 RECOMMENDATIONS

A new slippery roof surface should be provided for the main arena. This work should be undertaken within a 2 to 5 year period.

The cracking in the top chord of truss number 3 (between grid lines E and F) should be repaired within 1 to 2 years maximum.

The torquing of the tension rod upgrades should be reviewed every 5 years in conjunction with a general review of the condition roof framing elements (trusses, etc.).

The T-beams supporting the speakers need to be reviewed and upgraded or the speakers relocated. This should be addressed in a 2 to 5 year period.

The cracks in the perimeter concrete walls appear to be stable and should be grouted so that water infiltration does not result in concrete spalling or corrosion of the wall reinforcing. This should be addressed in a 1 to 2 year period.

The concrete ice arena slab should be replaced. We have discussed this with the refrigeration consultant and agree that it is recommended to replace this within 2 years.

The roof joists and wall connections for the north one story addition should be upgraded for snow drift. This should be addressed in a 2 to 5 year period.

7.0 LIMITATION OF LIABILITIES

This report was prepared by CWMM Consulting Engineers Ltd. for the account of Bruce Carscadden Architect Inc.. The material in it reflects CWMM's best judgment in the light of the information available to it at the time of preparation. Any use which a third party makes of this report, other than for the specific purpose stated in the first paragraph of this report, or any reliance on or decisions made on it, are the responsibility of such third parties.

CWMM Consulting Engineers Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made, or actions based, on this report.

Report prepared by:

CWMM Consulting Engineers Ltd.

David MacKinnon
14/02/20

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. G. MACKINNON

per: David MacKinnon, P.Eng., M.Eng.
Principal

smith & andersen falcon engineering
mechanical report

MECHANICAL FACILITY ASSESSMENT REPORT

FOR: VERNON CIVIC ARENA
OUR PROJECT NUMBER:
14022.001.E.801
DATE:
2014-02-03

S + A Falcon

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Vancouver

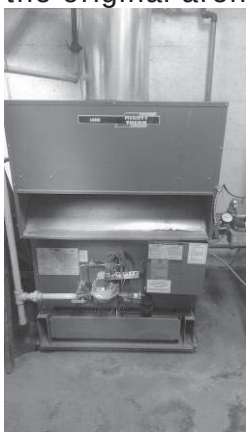
System or component	Excellent	Good	Fair	Poor	Action	Immediate needs	Capital Reserves
MECHANICAL							
Plumbing			X				
Fire sprinklers							
HVAC				X			

1. MECHANICAL SUMMARY:
the Vernon Civic Arena facility includes a rink, dressing rooms, washrooms, office space and a concession. There is a combination of integrated and stand-alone systems. The original rink has gas hydronic heating to the dressing rooms and washrooms and has had more recently had gas radiant tube heaters added for bleacher comfort. The hot water for the change rooms, washrooms and Zamboni is supplied from a boiler and storage tank plant in the north mechanical room. The south end addition is not integrated into the boiler plant and each zone is served by roof top units and a separate hot water system for the dressing rooms, washrooms and concession.

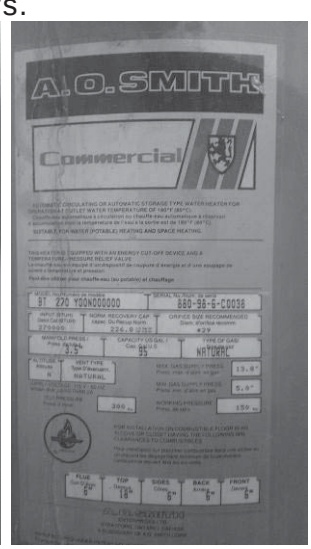
It is an older mechanical system that is essentially the same as it was when upgraded and expanded in 1979. Small renovations and equipment updates of the system have grown and evolved as the needs and resources arose. With some equipment nearing its life span and some equipment well beyond there are options to proceed depending on the intent of the facility and the resources available to replace and repair vs. remove and upgrade.

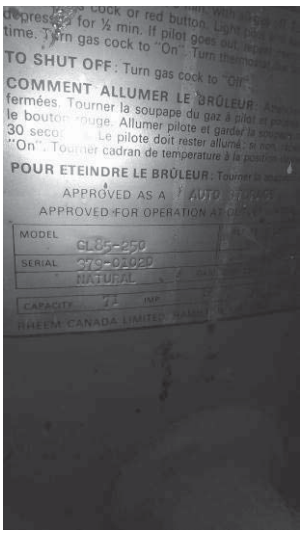
2. Description of mechanical systems

- Water entry is on North end of the building into the Mechanical room. Cross contamination certification up to date.
- Domestic Hot Water by gas boiler with three storage tanks for the two dressing rooms and washroom groups at the north of the original arena



- Additional gas hot water tanks in the expansion on the south end of the building serving the four additional dressing rooms, the concession above and the additional washroom groups and janitor room upstairs.



  - o A.O. Smith appears to be installed in 1998
  - o Ruud may be an original from 1979

- Change rooms and showers with assorted fixture packages
- Washroom plumbing fixtures include urinals, toilets, lavatories
- Change room plumbing fixtures include urinals, toilets, lavatories and showers

2.1. General comments

- Open combustion gas fired equipment is very inefficient.
- Insulation is missing or in poor repair throughout
- General repair of plumbing required

- Leak on hot water system

- Galvanized pipe used throughout facility
- Custom fixtures used

2.2. Recommendations/Observations:

Low flow plumbing fixtures and insulation can help reduce domestic hot water loads/consumption. A review of the recirculation design should be completed and options to shorten dead-leg lengths thereby reducing the risk of standing water at dangerous temperatures. If a renovation of the facility is planned then contingency for a full upgrade to the plumbing system up to current code requirements will be required. Combining this work with the HVAC upgrades that would be required would lower the cost of mobilization estimated within each line item. The cost estimates are very rough ranges based on a visual inspection of the facility and its equipment and all presented costs should be confirmed by a cost consultant.

Location / Reference	Recommendation	LIFE SAFETY & MAINTENANCE*	2-5 YEARS	LONG RANGE
2.2.1 Washrooms and dressing rooms	all fixtures should be updated to low-flow		$5k – 8k	
2.2.2 Plumbing	contingency should be made to repair insulation, plumbing and remove the galvanized pipe		$3k- 5k	
2.2.3 West Washrooms serving the Zamboni area	Immediate attention is recommended on the plumbing as shown in 2.1. It needs to be repaired/replaced and installed to industry standards. It is at risk of failure due to a lack of proper installation practices.	$1.5k - 2k		
2.2.4 South Mechanical Room	Replace gas fired domestic hot water tanks with sealed combustion condensing units to improve efficiency.			
2.2.5 North Mechanical Room	Replace gas fired boilers with sealed combustion condensing units to improve efficiency			$40k – 60k
2.2.6 North Mechanical	Leak on domestic hot water storage manifold as shown in picture for	$500 - 1.5k		

Room	2.1.			
2.2.7 Dressing Rooms	Replace damaged water closets.	$500 - 1.5k		

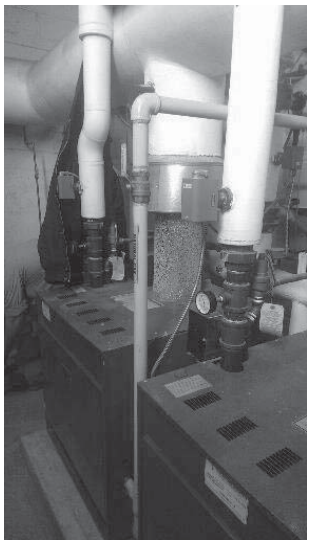
2.3. Limitations of mechanical inspection

Water line sizing was not reviewed or analysed in the scope of this report.

3. Heating, ventilation & air-conditioning systems

3.1. Description of HVAC systems

- Gas entry is on the north end and supplies the boiler plant in the north mechanical room.
- There are two boilers that provide heat to the hydronic loop in the original arena dressing rooms, washrooms and maintenance/service rooms.
  - The system is comprised of two older draft boilers and assorted styles of hydronic unit heaters throughout the areas served

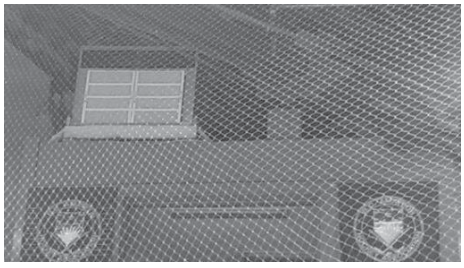



  - Boiler 1
    - Burnham K808NEI–L20
    - 462 MBTUH in / 369 MBTUH out = 80%
    - Manufactured in 11/2000
  - Boiler 2
    - Burnham P808NEI–L20
    - 462 MBTUH in / 369 MBTUH out = 80%
    - Manufactured in 03/1999
  - Hydronic force flow units

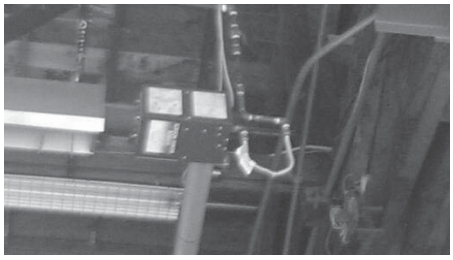



- Natural ventilation through roof hoods over the ice
- Washrooms and dressing rooms have independent exhaust fans


- De-humidification is supplied by two units at the northwest and southwest corners

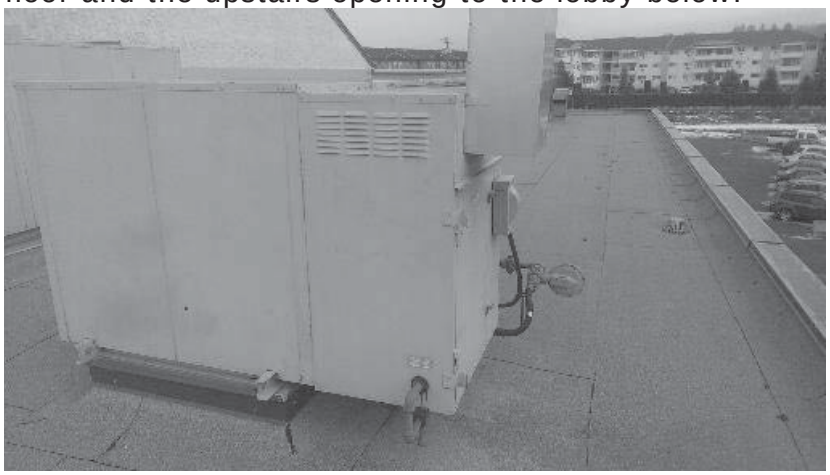


- Direct combustion power vented gas-fired tube heaters and gas-fired radiant ceramic panels have been added for the stands




- Vestibules have electric force flow heaters in the south addition
- The south addition has an Eng. Air DJ40 MUA unit that serves the second floor.

  - This unit was manufactured in 2005.
  - Indirect gas fired modulating burner
  - 400MBTUH in / 312MBTUH out 78% efficiency
- The south addition has an Eng. Air DJ20 unit that serves first floor and the upstairs opening to the lobby below.



  - This unit was manufactured in 2005.
  - Indirect gas fired modulating burner
  - 200MBTUH in / 158MBTUH out 79% efficiency

- Boiler plant controls are installed in the mechanical room.

3.2. General comments

- Open combustion gas fired equipment is very inefficient.
- Insulation is missing or in poor repair throughout
- Engineered Air Roof top units have a remaining life span of 10 – 15 years.
- Heating loop boilers have a remaining life span of 5 – 10 years
- Ventilation requirements for washrooms and dressing rooms to meet new code requirements may not be met with current design.

3.3. Recommendations/Observations:

The current HVAC system is very simple and working to the demands and expectations of this older venue with its defined use. Everything is being maintained and serviced and replacements of equipment are being made as required. Essentially the system is working and can continue working in this context. However, if it were to be brought to code now it would require a re-engineered approach to develop the scope and provide rough costing estimates. Ventilation is the largest component to be evaluated and specifically we can see issues with the current system in the dressing rooms.

Location / Reference	Recommendation	LIFE SAFETY & MAINTENANCE*	2-5 YEARS	LONG RANGE
3.3.1 Arena seating	radiant heater shields to be repaired and inspected for adequate bracing	$3k – 5k		
3.3..2 North dressing rooms	Exhaust Fan is not running smoothly, service/maintenance should be performed. Replacement anticipated	$2k – 2.5k		
3.3.3	All exhaust fans should		$15k -20k	

Dressing rooms and washrooms	be reviewed for life span and replacement strategy to be implemented. New equipment and ducting size may increase to meet Ashrae 90.1 requirements.			
3.3.4 North Mechanical Room	Replace gas fired boilers with sealed combustion condensing units to vastly improve efficiency. All radiant dispersion units to be reselected and upgraded to allow for a lower loop temperature range. Engineering of loop size will be required			$80k - 120k

3.4. Limitations of HVAC inspection

Detailed review of ducting and equipment sizing not completed.
Air balancing report not performed to evaluate actual operation of units.

4. Energy Savings

4.1. General Review

There is potential for large energy savings for this building. The equipment and system review identifies the age and efficiency ratings of the existing system. In the scope of this review this information will be summarized and recommendations to consider for alteration, replacement and redesign will be presented. Review of energy consumption, current billing, energy modeling and detailed redesign options are outside of the scope of this report.

Standard energy savings measures for any building are to replace old inefficient equipment, install controls and update the building envelope. This building has several issues that are inherent to the current equipment and design causing comfort issues and is not beneficial to energy consumption.

4.2. Recommendations

Looking at the entire system holistically we are rejecting large amounts of heat from the ice and simultaneously heating the space. There are redesign options to consolidate and proved symbiotic synergies available to reduce the overall operating costs of the system.

The greatest payback will be to replace the boilers as indicated. This can reduce the actual energy consumption by up to 40%. A full redesign of the boiler heating systems would be able to operate at lower temperatures with new terminal units that should be replaced as well.
Low flow plumbing fixtures and insulation can help reduce domestic hot water loads/consumption. A review of the recirculation design should be completed and options to shorten dead-leg lengths thereby reducing the risk of standing water at dangerous temperatures.

smith & andersen falcon engineering electrical report

S+A FALCON
Smith+Andersen Falcon Engineering Ltd.

210 - 1715 Dickson Avenue Kelowna British Columbia V1Y 9G6
250 762 9993 f 250 861 3290 smithandandersenfalcon.com

ELECTRICAL FACILITY ASSESSMENT REPORT

FOR:

VERNON CIVIC ARENA

OUR PROJECT NUMBER:

14022.001.E.801

DATE:

2014-02-03

1. INTRODUCTION

1. The service of S+A Falcon were obtained to review the existing electrical systems of the Vernon Civic Arena.

2. This report is based on a visual site review on January 22, 2014. No as-builts or maintenance manuals were available for review and no destructive inspection or testing was performed.

2. SERVICE AND DISTRIBUTION

1. The incoming service to the building is rated 600A-480 volts 3 phase 3 wire and is fed overhead from a BC Hydro transformer bank located on a pole to the NE of the building.

2. The main service consists of a 600A main switch, current/potential transformer cabinet for utility metering (one meter for the whole building), and a sub-distribution section c/w two switched – 1@200A for the lighting transformer loads and 1@400A for the refrigeration motor control center (MCC).

3. The MCC and Lighting load distribution are located in the refrigeration plant room. From this location, there are connections to electrical distribution panels located throughout the facility as well as the equipment within the roo for the refrigeration plant loads.

4. The distribution equipment is manufactured by ITE. The panels are near breaker capacity with limited space for any new breakers. According to the maintenance representative, breakers are readily available for any new breakers replacement.

5. Panel schedules have been edited many times and it is uncertain if they are up to date. A thorough review should be conducted to confirm information is current.

3. LIGHTING

1. Lighting for the ice area consists of suspended metal reflector metal halide luminaires c/w clear metal halide lamps. These have remote ballasts which are located in the ceiling space above the sound room. The lighting in the bleacher area consists primarily of suspended industrial style fluorescent luminaires c/w T12 lamps. Lighting in ‘back of house’ areas utilizes fluorescent T12 strips and the office areas are either surface or recessed fluorescent troffers. Lighting in the areas other than the ice area itself consists primarily of T12 lamps. According to the maintenance personnel, as lighting fails, it is replaced on an ‘as needed’ basis with newer T8 technology.

2. Light levels in the current configuration appear to be adequate for the ice area, but the sitting area and support rooms appear inadequate although no light meter readings were taken to review compliance with IES (Illuminating Engineering Society) standards.

3. Lighting control consists of line voltage switches.

4. Exterior lighting consists of small wattage high intensity discharge (HID) wall packs over the main entrance/exit doors. There are some additional decorative incandescent luminaires around the exterior as well.

4. EMERGENCY LIGHTING

1. Battery packs with integral and remote heads are installed in corridors, at the top walking aisle of the arena area and at exits. The layout generally does not meet the minimum code requirements for egress. Additional units are required.

2. Illuminated exit signs in the arena are installed at exits in conformance with code. There are some exit signs around the perimeter of the arena for direction to the exits. Additional exit signs should be considered for better coverage of the space to ensure proper egress routing. All AC lamps were older style incandescent which have relatively short lamp life and higher energy consumption than modern LED style lamps. Consideration should be given to upgrading exit signs to LED style when they need to be replaced or repaired.

5. BRANCH CIRCUITRY

1. Since there is no code rule mandating the number of receptacle outlets in commercial buildings the outlet layout in this facility is not problematic unless it has been identified by users of the building as a concern. The panels/load centres generally do not have spare breaker spaces for additional devices to be installed.

2. Branch circuitry appears to consist mainly within conduit runs and some NMD90 cable. Wiring appears to be properly installed and in conformance with current codes

3. It is likely that some cables have been abandoned and replaced with new cables in several areas over the years of maintenance and tracing the circuiting would be difficult. Testing should be conducted to review the actual loading on the panels and to confirm the actual spare breaker capacity.

6. FIRE ALARM

1. The existing fire alarm system consists of an Edwards Quick Start panel c/w an exterior mounted remote annunciator panel. Fire alarm pull stations are located at the exit doors as well as at each bell location in the main arena. These are not required by code, but they do serve as an access for quicker activation of the fire alarm system.

2. Smoke detectors have not been installed at the top of stairwells.

3. The audibility of the bells should be reviewed to confirm adequate coverage. Although there appears to be adequate coverage in the main arena, there may be other areas that do not have proper audibility.

S+A FALCON

4. There is no audible bell in the condenser room below the chiller. A bell should be added in this room.

7. TELECOMMUNICATIONS

1. Existing communications wiring enters the building at the northeast corner. The telephone system appears to be adequate for present usage but could be reviewed and a possible upgrade considered pending future use/load.

8. RECOMMENDATIONS

1. Lighting within the arena area appears acceptable for the usage and does not require to be replaced at this time. The existing T12 lighting should be replaced. This can be done as it presently is being replaced on an 'as needed' basis or possible capital funding could allow for a complete upgrade. Cost-approx. $5,000.00.

2. The electrical system in this facility, while generally aged appears to be sufficient for the present use of the building. The existing service would have to be reviewed for capacity if additional loads (for example HVAC) were to be added. If the system were to operate as-is with no additional loads, the existing system could remain with no modifications. An infrared scan should be done for all distribution equipment to ensure there is no overloading on circuits and that all panel connections remain sound. Cost - approx. $2,500.00.

3. The emergency lighting system should be thoroughly checked and repairs made as required. Additional emergency lighting should be added to allow for proper illumination of the access to exits. Cost – approx. $2,000.00.

4. Minor revisions to the fire alarm would be required to add bells where audibility is minimal. Pull stations at the bell locations in the arena area could be removed as not required by code. The system would need to be re-verified. Cost – approx. $1,500.00.

peak environmental
hazardous materials report

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HAZARDOUS AND REGULATED MATERIALS PRE-RENOVATION ASSESSMENT REPORT

VERNON CIVIC ARENA

3003 - 37th Avenue
Vernon, BC

Prepared for:

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Prepared by:

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951 Pinewood Place
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File: 2446 Vernon Civic Arena R01

Report Date: February 28, 2014

On-site survey for this February 28, 2014 report was completed on January 24, 2014. All observations and conditions herein are respective to this / these date(s) and to dates listed in the Revision History

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Report Revision History

Version	Issue Date	Survey Date	Change Description	Submitted by
1	02/28/2014		Initial Report	Peak Environmental Ltd.
2	03/03/2014		Site Drawings Added	Peak Environmental Ltd.

1.0 EXECUTIVE SUMMARY

1.1 PROJECT SCOPE

Peak Environmental Ltd. was retained by Regional District North Okanagan to perform an assessment and review of Vernon Civic Arena for asbestos-containing building materials. The purpose of this survey was to collect samples of building materials to determine their asbestos content, identify and record locations, calculate potential for future damage and provide quantities, remediation cost estimates and a prioritized abatement schedule associated building occupant risk related to asbestos containing materials. The asbestos assessment was further conducted to satisfy the requirements outlined in the WorkSafeBC Occupational Health and Safety Regulation with regard to 6.6(1) Assessments and Classifications.

In addition to the list of asbestos-containing materials, an inventory of non-asbestos materials was also compiled in order to provide a record showing that all building materials were investigated for asbestos content. Obvious non-containing materials (*eg*. wood, metal, ceramic, concrete, *etc.*) were excluded from this inventory.

A visual inspection was performed for other possible hazardous and regulated materials including PCB (within electrical equipment), mercury (within electrical equipment), lead-based paint, ozone depleting substances, and potentially toxic, flammable or explosive materials (required in Part 20.112 of the WorkSafeBC Occupational Health and Safety Regulation).

This is an un-occupied building survey, and as such, destructive sampling methods were used in order to confirm locations and extents of concealed asbestos applications. Coring was carried out on flooring applications where underlying layers of flooring were suspected.

New additions or completely renovated sections (1990 or later) of buildings are not considered at risk for asbestos-containing materials and therefore were not included in the survey.

Please refer to 2.0 Project Scope for a list of inclusions and exclusions for this Scope of Work.

Asbestos-containing building materials identified within the facility are noted on the attached summary sheets, spreadsheets and drawings. These documents should be reviewed to ascertain the exact location of asbestos applications (to the extent possible) within this building or buildings on this site. Other hazardous materials are documented by type in the body of this report.

The findings are presented in two parts: Part 1 - Asbestos-containing building materials, and Part 2 - Other hazardous and regulated materials.

1.2 RESULTS AND RECOMMENDATIONS

1.2.1 Results

ASBESTOS-CONTAINING AND SUSPECT MATERIALS IDENTIFIED IN VERNON CIVIC ARENA:

Applications containing asbestos:

- Soft grey insulating cement on hot water heating pipe fittings located randomly throughout the original construction building only;
- Vinyl floor tile located randomly throughout the original construction building only;
- Pipe flange gaskets located randomly throughout the original construction building only;

Suspects applications that were not analyzed:

- No additional suspect asbestos materials were found

Potential:

Concealed asbestos containing building applications may be present. If suspect materials are encountered, samples should be collected and analyzed for asbestos content prior to disturbance. The following materials may be present in the building, but were not located or identified due to inaccessibility, live electrical or mechanical systems, building occupancy or requirement for breaching building membrane**:**

Floor leveling compound	HVAC Duct mastic
Pipe flange gaskets	Fire doors
Window putty	Boiler/tank insulation (internal)
Mortar (fire brick or other refractory materials)	Chimney liner (internal)
Vermiculite insulation which may be within concrete block walls concealed beneath newer covering or enclosing materials	Glues and adhesives (eg. under flooring, glue up ceiling tile)
Electrical insulation (wire insulation, arc insulating pads)	

OTHER HAZARDOUS OR REGULATED MATERIALS IDENTIFIED IN VERNON CIVIC ARENA:

PCB

- Based on the age of the building and the observed lighting present within the building, PCB containing fluorescent light ballasts are located throughout the building

Mercury

- Mercury containing high voltage lighting is located on the perimeter exterior of the building
- Mercury containing fluorescent light tubes are located throughout the building

Lead Based Applications

- Lead based paint applications were identified on structural steel members and components located throughout the original construction portion of the building

Ozone Depleting Substances

- Refrigerators, freezers, wall mounted air conditioner units, HVAC units were identified and suspected of containing CFC based refrigerants

Toxic, Flammable or Explosive Materials

- No toxic, flammable or explosive materials were identified during this survey

Biological Contaminants

- No biological contaminants were identified during this survey

1.2.2 Recommendations for Asbestos-containing Applications

Identified asbestos containing materials must be removed prior to demolition or renovation activities which may impact those materials, creating a risk of worker exposure to airborne asbestos fibres. Asbestos containing materials and removal risk classifications are provided in the drawings included in Appendix B and the spreadsheet included in Appendix D.

Any work of disturbing, dislodging or removing asbestos or potentially asbestos contaminated material must be performed in following the requirements of Part 6 of British Columbia Occupational Health and Safety Regulation (BC Reg. 296/97, as amended by BC Reg. 312/2003) and the Exposure Control Plan created for this site. Site specific work procedures must be created for each instance where asbestos removal is required or there is a potential of disturbing asbestos containing applications. Once removed, asbestos containing material must be transported and disposed of in accordance with the federal Transportation of Dangerous Goods Act and Regulations and Section 40 of the BC Ministry of Environment Hazardous Waste Regulation

1.2.3 Recommendations for other Hazardous and Regulated Materials

Identified hazardous and regulated materials requiring removal prior to building demotion are outlined in Appendix D.

PCB

- Inspect all fluorescent light ballasts for manufacture name and serial number and determine if PCB's are present See Environment Canada's booklet on 'Identification of Lamp Ballasts Containing PCBs' for identification whether a ballast contains a PCB capacitor.

Mercury

- Collect mercury vapour lighting (high voltage lights and fluorescent light tubes) for vapour recycling at Nu-Life Industries.

Lead Based Applications

- Removal of lead paint from structural steel members and components is only required where to facilitate renovation work.

Ozone Depleting Substances

- Collect all refrigerant devices for refrigerants collection and disposal by a qualified mechanical contractor in accordance with Provincial and Federal regulations.

All created waste materials are to be disposed of in accordance with Part 6 — Management of Specific Hazardous Wastes as outlined in the BC Ministry of Environment Waste Management Act Special Waste Regulation [includes amendments up to B.C. Reg. 109/2002].

PART I - ASBESTOS CONTAINING BUILDING MATERIALS

2.0 PROJECT SCOPE

Peak Environmental Ltd. was retained by Regional District North Okanagan to perform an assessment and review of Vernon Civic Arena for asbestos-containing building materials and other hazardous or regulated materials as required in Section 20.112 of the WorkSafeBC Occupational Health and Safety Regulation. The purpose of this survey was to identify, record locations, provide quantities, remediation cost estimates and associated building occupant risk regarding asbestos-containing materials located within the building. The following list defines the scope and exclusions of this Project:

2.1 Scope of Work

A. Provide a complete Materials Inventory for all building materials which might be suspected of containing asbestos

B. Collect and analyze bulk samples of all building materials suspected of containing asbestos and other hazardous or regulated materials as outlined in Section 20.112 of the WorkSafeBC Occupational Health and Safety Regulation

C. Document all locations of confirmed asbestos containing applications (provided in a list format and marked on a floor plan)

D. Provide an approximate cost of abatement (where the extent of the application can be ascertained). Where the extent of the application cannot be determined without the use of destructive sampling methods, the application is listed, but without estimated abatement costs

E. Provide a recommended removal schedule, and removal risk classification based on material types and risks of abatement worker exposure

F. Submit a Report detailing the results and recommendations of the asbestos inventory survey

2.2 Exclusions to Project Scope

A. The survey was limited to fixed building(s) included in the scope of work for this project. Unless noted otherwise, portables, sheds and underground systems on the grounds are not part of this survey

B. Unless noted otherwise, roofing materials are excluded as per exemptions listed in the AHERA Inspection Requirements

C. Attic, ceiling, and crawl spaces, including pipe chases and mechanical tunnels are included in this survey to the extent that the space is accessible without the need for destructive sampling or confined entry procedures

D. New construction additions or renovations (1990 or later) are excluded from this survey

E. Areas / applications inaccessible without some form of destruction, include, but are not limited to:
   i. packing and gasketing materials in heating boiler, HVAC ventilation and air-conditioning systems, domestic hot and cold water and hot water heat piping systems
   ii. mastic and mastic glues associated with weatherproofing or concealed beneath flooring materials
   iii. fire doors
   iv. inaccessible pipes and pipe fittings

v. inaccessible spaces where access was not readily observed
vi. concealed vermiculite insulation within concrete block walls concealed beneath newer building finishes

F. This report does not provide an abatement Risk Assessment as per Part 6.6 Assessment and classification or Exposure Control Plan as per Part 6.3 Exposure Control Plan as outlined in the WorkSafeBC Occupational Health and Safety Regulation.

3.0 RECOMMENDATIONS FOR USING THIS ASBESTOS INVENTORY REPORT

3.1 WHO SHOULD USE THIS REPORT

3.1.1 Maintenance and Operations Staff

- Maintain an awareness of the location, risk level and management requirements of all asbestos-containing materials in the facility
- Ensure that the asbestos inventory is updated subsequent to the removal of any asbestos-containing material
- Ensure that custodial staff are aware of the location of any asbestos-containing material
- Execute all activities for asbestos applications which are recommended for in-place management, including monitoring of the application's condition for any changes
- Effect and coordinate all recommended removal activities
- Ensure that all contractors working in the vicinity of any asbestos application are aware of the application (have the contractor sign the Contractor Sign-off Sheet), and arrange for the removal or other recommended abatement method of any asbestos-containing material that could be damaged by the contractor's activities

3.1.2 Custodial Staff

- Maintain an awareness of asbestos-containing applications within the facility, and of any special care or procedure required to handle (or avoid) these applications
- Immediately report any visible changes or damage to asbestos-containing materials to facility manager

3.1.3 Contractors

- Review this report and be aware of any asbestos-containing and other hazardous or regulated materials located in areas where construction/demolition/renovation activities are to be carried out to ensure their work activities will not impact or otherwise disturb identified materials, creating a risk of exposure to themselves or other adjacent workers.
- Sign the Contractor Sign-off Sheet at the end of this Report

4.0 METHODOLOGY

4.1 MATERIALS INVENTORY

A complete inventory was carried out to record any materials which might be suspected of containing asbestos. The intent of this inventory is to assure staff and contractors that all visible and accessible materials have been inspected and identified as asbestos-containing or non-containing. New application ceiling tiles, vinyl flooring applications and stucco identified as being circa 1990 or newer, were considered to be non-asbestos with no verification samples collected, but were included in the inventory (as non-containing). Materials obviously not asbestos-containing (*eg*. Fiberglass, wood, metal, ceramic, concrete, *etc.*) were excluded from the inventory.

4.2 ASBESTOS-CONTAINING MATERIALS

4.2.1 Building Inspection

Based on site observations and information provided by the client, it is concluded that the building is of Circa 1940's construction with one 1980 addition to the Southend of the strcuture. All conclusions based on age related hazardous or regulated materials are based on this age of building construction.

This is an occupied building survey, and as such, samples of suspect asbestos-containing building materials were collected from areas in a manner minimizing damage to finished. Please refer to the individual building applications (Section 7.2.2) for additional details pertaining to the specific material.

All accessible spaces of the facility were entered and inspected unless specified in Appendix A as inaccessible spaces.

i. Materials suspected of containing asbestos were then determined to be friable or non-friable. WorkSafeBC's proposed amendments define friable as 'asbestos-containing material that is crumbled or powdered or can be crumbled or powdered by hand pressure'

ii. 'Homogeneous areas' were identified for each suspect application. A homogeneous area is defined as an area containing material that is 'uniform in texture, colour, date of application, and identical in every other way'

iii. Each suspect application was then placed into one of the following categories as defined by AHERA:

Surfacing Material: defined as material that is sprayed on, trowelled on, or otherwise applied to surfaces (structural members, walls, ceilings, etc.) for acoustical, decorative, fireproofing, or other purposes

Thermal System Insulation: defined as material applied to pipes, fittings, boilers, breeching, tanks, ducts, or other interior structural components to prevent heat loss or gain, or water condensation, or for other purposes

Miscellaneous: defined as materials which do not fall into the above two categories - typically ceiling tiles and flooring applications

iv. A physical assessment was then carried out for each suspect application to determine:
- condition
- potential for future disturbance

The above listed assessments were then used to rank each suspect application for removal priority or abatement category.

Inaccessible applications which should be considered prior to demolition or renovation activities are listed separately in this report (*eg*. packing and gasketing, *etc.*).

Drywall Taping Compound, Plaster and Stipple Ceiling Texture

Representative samples were collected and analyzed for asbestos content for each of these applications identified in the building. For any facility where multiple samples of an application returned both asbestos-containing and non-asbestos results, all similar applications should be considered asbestos-containing. In order to prevent the possible release of asbestos fibres into the ambient air, additional samples should be analyzed prior to beginning work which may impact any application which returned inconsistent asbestos-content results.

For any facility having pre-1990 additions or renovations, representative sampling was carried out in each addition/renovation area that was of a different age from the rest of the facility (homogeneous area). Post 1990 additions/renovations were not included in the survey.

Vinyl Flooring and Ceiling Tiles

Samples of vinyl flooring and ceiling tiles were collected based on visible size, color and pattern. Flooring and ceiling tile applications with the same surface coloring and patterns were considered a homogeneous application throughout the building. Representative samples of each unique application were collected and analyzed for asbestos content.

Vermiculite Insulations

Where present, concrete block wall cavities were cored and attic spaces were inspected for the presence of vermiculite insulation and where located a minimum of three (3) homogenized representative samples were collected and analyzed from each area were vermiculite insulation was identified to determine their asbestos content.

Some vermiculite materials are known to have been exfoliated (heat treated to cause the vermiculite to “pop” increasing its size). Where identified, differing sizes or forms of vermiculite were identified and treated as differing applications.

Known Asbestos-Containing Materials

Visual identification of some materials was performed. Materials such as pre-1978 insulating cements, corrugated paper pipe insulation, asbestos pipe and cement boards are known to contain asbestos. If these materials were identified, they were noted as being asbestos-containing and no verification samples were collected.

Suspect Asbestos-Containing Materials

Visual identification and sample collection of all other materials suspected of containing asbestos was performed for this project. A list of visually assessed materials is included at the end of the spreadsheet included in Appendix D.

Building Finishes and Membranes

Unless otherwise noted, no sampling of building finishes or membranes was performed where sample collection would cause or create a leak or irreversible damage to the building, building finishes or systems. Examples of materials which are suspect but not sampled in order to avoid destruction or degradation of the building finish or membrane include (but are not limited to) roofing membranes and exterior stucco. If stucco samples were collected for this assessment, samples were only collected where the material was already crumbled or damaged.

4.2.2 Laboratory Analysis

Collected samples were sent to an accredited laboratory for analysis where they were analyzed using Polarized Light Microscopy (PLM) in accordance with the NIOSH 9002 method which specifies a level of detection (LOD) of 1% or less to determine asbestos content. As outlined in WorkSafeBC's proposed amendments, all materials containing 0.5 percent or greater of asbestos, and vermiculite insulation containing any asbestos, shall be considered to be asbestos-containing.

4.2.3 Reporting and Removal Priority Classification

All reference to 'friable' materials in this report includes applications designated as having High or Moderate friability. 'Low' friability is synonymous with 'non-friable'.

Removal priorities are determined utilizing an Asbestos Management Index (AMI) score which is calculated based on a matrix of multiple criteria including several factors including the visibility of the asbestos application, its condition, the ease of access to the material, its location relative to the public and condition altering factors such as vibration, potential for future damage and the friability of the asbestos containing material.

Classification used in Appendix D are as follows:

Priority	AMI Score	Definition
Immediate	49 or greater	Application should be removed immediately (as soon as possible) because there is a distinct possibility of fibre release. The application should be abated or the area restricted (as specified for the particular application) till the time of abatement
1	40 to 48	Remove within one year due to the application's condition, location or the surrounding area's use; damage to the application is probable. The application should be abated or the area restricted (as specified for the particular application) until the time of abatement
2	36 to 47	Remove in conjunction with proposed building renovations or maintenance
3	< 35	Removal is only required prior to renovation or demolition activities

5.0 BUILDING OCCUPANT EXPOSURE RISK AND WORKER PROTECTION REQUIREMENTS

Any work that may disturb or potentially disturb asbestos containing or contaminated materials must be performed following the requirements outlined in the Regional District North Okanagan Exposure Control Plan created for this site. Where such plan does not exist, site specific work procedures as outlined in Part 6.8 of

the OHS Regulation must be created for each instance where there is a potential of disturbing asbestos containing applications.

Highly friable asbestos-containing materials, such as insulating cements, ceiling textures, mechanical insulation, vermiculite insulation and asbestos paper products pose the greatest risk of exposure to building occupants as they are easily crumbled by hand releasing airborne asbestos fibres when damaged or exposed. Low -friable materials, such as vinyl flooring and cement asbestos board pose a lesser risk as they are not easily crumbled by hand and must be broken or mechanically abraded to release asbestos fibres.

There is an increased risk of asbestos fibre release if asbestos applications are disturbed through demolition, renovation or maintenance activities that will abrade the material releasing asbestos fibres into the ambient air. There would also be an elevated risk of asbestos exposure through dry burnishing of vinyl floor sheeting or tile applications. Dry burnishing activities should not be performed on asbestos floor applications.

Moderate and highly friable asbestos applications located in un-controlled locations such as corridors or washrooms, or where located adjacent to air movement equipment or found to be in poor or damaged condition, have been prioritized for abatement. Any such applications located in areas where control and access is limited are scheduled for phased removal (Appendix D).

All remaining low-friable asbestos applications have been scheduled for removal in conjunction with planned building renovation or maintenance work, which may impact and damage the asbestos applications. It is important to remember that low or moderately friable asbestos containing materials can pose a risk of exposure if they are damaged or disturbed through maintenance or renovation activities which could break or pulverize the asbestos materials, releasing asbestos fibres into the ambient air. A material classified as being non-friable can be easily re-classified as friable through such activities.

All asbestos applications identified in this report should be routinely inspected to ensure their condition has not deteriorated, resulting in the exposure of the asbestos application. Damaged and exposed asbestos applications should be immediately removed by a qualified asbestos abatement contractor.

6.0 Areas of Restricted Entry Due to Poor Condition Asbestos Applications

Identified crawlspace areas have loose and damaged asbestos insulation present on piping and within dirt surfaces. Access to crawlspace areas should be restricted to persons equipped and trained in moderate risk asbestos work procedures.

7.0 Remedial Work

- Removal of all asbestos containing materials identified in this building is required prior to building demolition. Remove all asbestos applications identified in way of pending demolition, renovation or maintenance activities which could disturb asbestos applications, creating a potential risk of exposure to airborne asbestos fibres. Refer to the spreadsheets included in Appendix D for a list of identified asbestos containing materials which require removal prior to building demolition.

PART II - OTHER HAZARDOUS AND REGULATED MATERIALS

8.0 BACKGROUND

The Scope of Work for this project included the following regulated materials:

8.1 PCB

PCBs are known to cause cancer in humans and were primarily used as cooling oils in electrical equipment. Such equipment included fluorescent light ballasts and electrical transformers. Use of PCBs was banned in 1979.

8.2 MERCURY

Mercury is known to cause poisoning in humans through the inhalation of vapours, ingestion of contaminated materials or skin absorption through direct contact with the liquid.

8.3 LEAD BASED PAINT

Lead was a common additive in exterior and hard wearing paint applications until 1979. Lead was used to prolong the shelf life of paint and to increase its flexibility and durability to wear and weather. Exposure to airborne lead and lead ingestion can lead to lung and brain damage and learning disabilities in children.

8.4 TOXIC, FLAMMABLE OR EXPLOSIVE MATERIALS

Toxic, flammable or explosive materials can include pesticides, herbicides, waste oil, fuel and other hydrocarbon based fluids.

8.5 OZONE DEPLETING SUBSTANCES

Includes equipment containing Freon or chlorofluorocarbons such as air conditioners, refrigerators, deep freezers. Note: An inventory of HVAC units was not included in this survey. Any refrigerants within HVAC units are to be identified and removed by a qualified mechanical contractor prior to building demolition.

9.0 METHODOLOGY

Regulated materials were identified through visual inspection. The building and surrounding area were also inspected for any toxic, flammable or explosive materials.

Interior and exterior paint surfaces were tested with the use of “Lead Check Kits” which indicate through a change in swab colour from white to pink if lead is present in concentrations above 600 mg/kg. Hard wearing and exterior paint surfaces typical for lead paint were tested.

No detailed inspection for the presence of CFC or other regulated refrigerants was conducted. However, a number of refrigerators were found in the building. Removal of these devices for reuse or proper destruction should be performed prior to building demolition.

No inspection for underground storage tanks was performed to ascertain potential soil contamination from spillage during tank filling, or a leakage from the tank or supply / return lines. Any contaminated soil encountered during tank excavation must be collected and remediated as required by the Ministry of Environment.

10.0 RESULTS

The purpose of this survey was to determine the presence of regulated materials located within all accessible areas of the building prior to proposed building demolition or renovation activities.

Through visual identification, testing and sample analysis, asbestos, hazardous and regulated materials have been located as follows:

PCB

- Based on the age of the building and the observed lighting present within the building, PCB containing fluorescent light ballasts are located throughout the building

Mercury

- Mercury containing high voltage lighting is located on the perimeter exterior of the building
- Mercury containing fluorescent light tubes are located throughout the building

Lead Based Applications

- Lead based paint applications were identified on structural steel members and components located throughout the original construction portion of the building

Ozone Depleting Substances

- Refrigerators, freezers, wall mounted air conditioner units, HVAC units were identified and suspected of containing CFC based refrigerants

Toxic, Flammable or Explosive Materials

- No toxic, flammable or explosive materials were identified during this survey

Biological Contaminants

- No biological contaminants were identified during this survey

11.0 DISCUSSION

11.1 PCB

The use of PCB cooling oils was discontinued in 1979. Fluorescent light ballasts were inspected for serial numbers, manufacturers and production dates to ascertain if they contained PCB capacitor cooling oil. T-8 style light fixtures were not inspected as they utilize High Efficiency non-PCB ballast.

The Federal Regulations SOR/2008-273 provide standard for handing, storage and the disposal of PCB containing equipment under the Canadian Environmental Protection Act of 1999. Part 5 of the WorkSafeBC Occupational Health and Safety Regulation deals with PCB containing materials in the workplace.

11.2 MERCURY

Mercury was typically used in wall-mounted thermostats to act as the activation switch. Mercury vapour was also utilized in high voltage electrical lighting and pressure differential monitors in HVAC units. Part 5 of the WorkSafeBC Occupational Health and Safety Regulation deals with mercury in the workplace.

11.3 LEAD BASED PAINT

Lead was utilized in paint to act as a stabilizer to extend its shelf life and increase its durability once painted on a surface. Paint surfaces were tested with the use of "Lead Check Kits" which indicated through a change in swab colour from white to pink if lead is present. Through testing of painted surfaces, lead paint was identified on surfaces indicated in the Results section.

Inorganic lead applications are regulated through Section 6.59 through 6.69 of the WorkSafeBC Occupational Health and Safety Regulation. This section applies to any workplace where a worker, through renovation or demolition activities, may be exposed to potentially hazardous levels of inorganic lead. Where conditions may arise that may result in the release of potentially hazardous levels of lead dust, an exposure and control plan must be implemented to ensure worker safety is maintained.

As defined through the U.S. EPA Housing and Urban Development Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (2012 Edition), a lead containing paint coating applied between 1978 and August 13, 2009 with a lead concentration of 0.06 percent (600 ppm) (600mg/kg) by weight is to be considered a lead containing application. Furthermore as suggested by the U.S. Occupational Safety and Health Administration (OSHA), the improper removal of lead paint containing 600 mg/kg lead, results in airborne lead concentrations that exceed half of the exposure limit. This would trigger the requirement for an Exposure Control Plan and safe work procedures. It is further suggested that lead concentrations as low as 90 mg/kg may present a risk to pregnant women and children.

Toxicity Characteristic Leaching Procedure (TCLP) testing of positively identified lead paint applications is typically required to determine if the painted applications are classified as a special waste as outlined in the Ministry of Environments Special Waste Act. For this project, no TCLP testing was performed.

11.4 OZONE DEPLETING SUBSTANCES

As outlined in the 1998 Montreal Protocol, member signatories are to take appropriate measures to protect human health and the environment against adverse effects resulting or likely to result from human activities which modify or are likely to modify the ozone layer.

The requirement for the removal and destruction of ozone depleting substances is governed under the Canadian Environmental Protection Act, 1999.

12.0 RECOMMENDATIONS

PCB

- Where removal is required to facilitate renovation or demolition activities, inspect all fluorescent light ballast for manufacture name and serial number and determine if PCB's are present See Environment Canada's booklet on 'Identification of Lamp Ballasts Containing PCBs' for identification whether a ballast contains a PCB capacitor.

Mercury

- Where removal is required to facilitate renovation or demolition activities, collect mercury vapour lighting (high voltage lights and fluorescent light tubes) for vapour recycling at Nu-Life Industries.

Lead Based Applications

- Lead paint identified within this facility is limited to red primer on structural steel and components. Removal of lead paint is only required where cutting or grinding of structural steel is required to facilitate renovation work.
- Any work that may create lead debris or airborne lead dust levels in access of fifty percent (50%) of the WorkSafeBC Exposure limit for Inorganic Lead will require the creation and implementation of a Lead Exposure Control Plan to mitigate worker exposure to lead dust and contaminated materials.
- Where removal is required to facilitate renovation or demolition activities, collect and containerize identified lead paint applications and conduct TCLP lead leachate tesing of waste materials to determine if the waste is found to be in excess of BC Ministry of Environment Special waste criteria of 5 mg/L for treatment. Treatment and or disposal at the Swan Hills Treatment Center in Alberta will be required. Lead painted materials with TCLP results less than 5 mg/L or where the total concentration of "scrapped" dry paint is below 5kg can be disposed of as "treated" wood at an approved landfill.

Ozone Depleting Substances

- Where removal is required to facilitate renovation or demolition activities, collect all refrigerant devices for refrigerants collection and disposal by a qualified mechanical contractor in accordance with Provincial and Federal regulations.

Toxic, Flammable or Explosive Materials

- Where removal is required to facilitate renovation or demolition activities, collect and containerize labeled and unlabeled material for classification, disposal and or recycling by NewAlta or Sumas Environmental Services or other qualified hazardous wastes handler.

13.0 HAZARDOUS AND SPECIAL WASTE REGULATIONS AND GUIDELINES

13.1 PROVINCIAL OCCUPATIONAL HEALTH AND SAFETY REGULATIONS

Workplace health and safety is regulated in British Columbia by WorkSafeBC under the Workers' Compensation Act (effective April 15, 1998), as amended by the Workers' Compensation (Occupational Health and Safety) Amendment Act (effective October 1, 1999) inclusive of Part 3 Division 3, Sections 115 to 124 General Duties of Employers, Workers and Others and Part 5.54 Exposure Control Plan. The Act defines the general duties and obligations of the employer, employees and others at the work site.

Specific actions and work practices are outlined in the WorkSafeBC Occupational Health and Safety (OHS) Regulation for specific work practices. The OHS Regulation contains legal requirements that must be met by all workplaces under the inspection jurisdiction of WorkSafeBC. Asbestos is governed by Section 6 - Substance Specific Requirements, specifically Section 6.1 through 6.32 and by Section 20 - Construction, Excavation and Demolition, specifically Section 20.112 Hazardous materials.

WorkSafeBC has published Safe Handling of Asbestos, A Manual of Standard Practices. This manual outlines basic information on asbestos and asbestos products, health hazards requirements for worker protection, safe work procedures and principles that should be followed in selecting the most suitable technique for the safe abatement of asbestos-containing materials. This document provides a guide to current practices which are to be followed in the Province of British Columbia

13.2 Environmental Regulations

In British Columbia, environmental matters pertaining to production and disposal of waste generally fall under the jurisdiction of the Ministry of Environment (MoE), pursuant to the Waste Management Act (RSBC) 1996, as amended October 1997. The waste regulation under the Waste Management Act relating to hazardous building materials is the Special Waste Regulation (SWR), BC Regulation 63/88.

The Hazardous Waste Regulation BC Reg. 63/88, OC 268/88, including amendments up to BC Reg. 319/2004) established by the MoE, outlines the requirements for the storage, transportation, treatment, recycling and disposal of hazardous wastes in the Province of British Columbia. The regulation outlines the materials and criteria to be used to characterize waste as hazardous.

Ozone Depleting substances are regulated under Environment Canada under the Canadian Environmental Protection Act's Chlorofluorocarbon Regulations (SOR/90-127), Ozone-depleting Substances Regulations (SOR/94-408) and Ozone depleting Substances Products Regulations (SOR/90-584)

13.3 Transportation of Hazardous or Regulated Waste

The transportation of hazardous wastes is governed under the Federal Transportation of Dangerous Goods Act and Regulations which outline the requirements for storage, handling, and transportation of regulated products and waste.

14.0 Limitations of this Report

This report is for the purpose of identifying asbestos containing materials located within this building and assigning specific removal priority associated with building occupant risk to exposure to asbestos materials located within this building. While this assessment was conducted with the utmost detail and diligence, there may exist instances where asbestos containing applications are present in the building but not identified through this report. Pursuant to Section 20.112 Hazardous Materials in the OHS Regulation, a project specific detailed pre-renovation assessment for asbestos and other hazardous or regulated materials should be conducted prior to any work of salvage, cutting, damaging or demolishing, in part or in whole, building finishes, components, machinery, equipment, buildings or structures.

Site conditions and building construction may have not permitted the complete inspection of some void spaces. These spaces may contain asbestos applications not identified in this report. Any suspect materials located within void spaces should be inspected and/or tested to determine if they are asbestos-containing.

There was limited inspection of sub-flooring applications located beneath carpeting and vinyl flooring materials, occurring only where lifting the covering flooring / carpet would not result in damage. Furthermore, such sub-flooring inspections were only triggered by anecdotal information from staff regarding the presence of a sub-floor, or where there was a visible difference in flooring levels that prompted further investigation. Where a second layer of vinyl flooring material was discovered, samples were collected to determine their

asbestos content. No inspection of sub-flooring applications was performed once a structural member was discovered (i.e. wood or concrete). There is a possibility that subsequent asbestos flooring applications, not identified in this report, may be located beneath carpeting, false floors or a covering layer of non-asbestos flooring. Any suspect materials sandwiched between multiple flooring layers should be inspected or tested to determine if they are asbestos-containing.

Any quantities listed in these documents are estimates only. Peak Environmental Ltd. accepts no liability for inaccurate or misleading quantities listed in these documents.

Stephen Ferguson, AScT.
President
AHERA Building Insp. Cert:
(State of MT) CABIR-12-018
Cell:250-862-0971
steve@peakenvironmental.ca

2446 - Vernon Civic Arena R01 Hazardous and Regulated Materials Assessment 2/28/2014

APPENDIX A
ASBESTOS-CONTAINING MATERIALS SUMMARY & CONTRACTOR SIGN OFF SHEET

The following asbestos applications have been identified within Vernon Civic Arena. The attached asbestos location drawings and spreadsheets should be reviewed for the exact location of all known asbestos applications within this facility (to the extent possible).

APPLICATIONS CONTAINING ASBESTOS:

- Asbestos containing drywall taping compound applications located on perimeter walls in this building

SUSPECT APPLICATIONS:

- No suspect asbestos containing materials were found

INACCESSIBLE AREAS:

- No identified inaccessible areas were noted in this building

POTENTIAL ASBESTOS MATERIALS:

Concealed asbestos containing building applications may be present. If suspect materials are encountered, samples should be collected and analyzed for asbestos content prior to disturbance. The following materials may be present in the building, but were not located or identified due to inaccessibility, live electrical or mechanical systems, building occupancy or requirement for breaching building membrane**:**

[DELETE FROM THE FOLLOWING TABLE THAT WHICH DOES NOT APPLY]

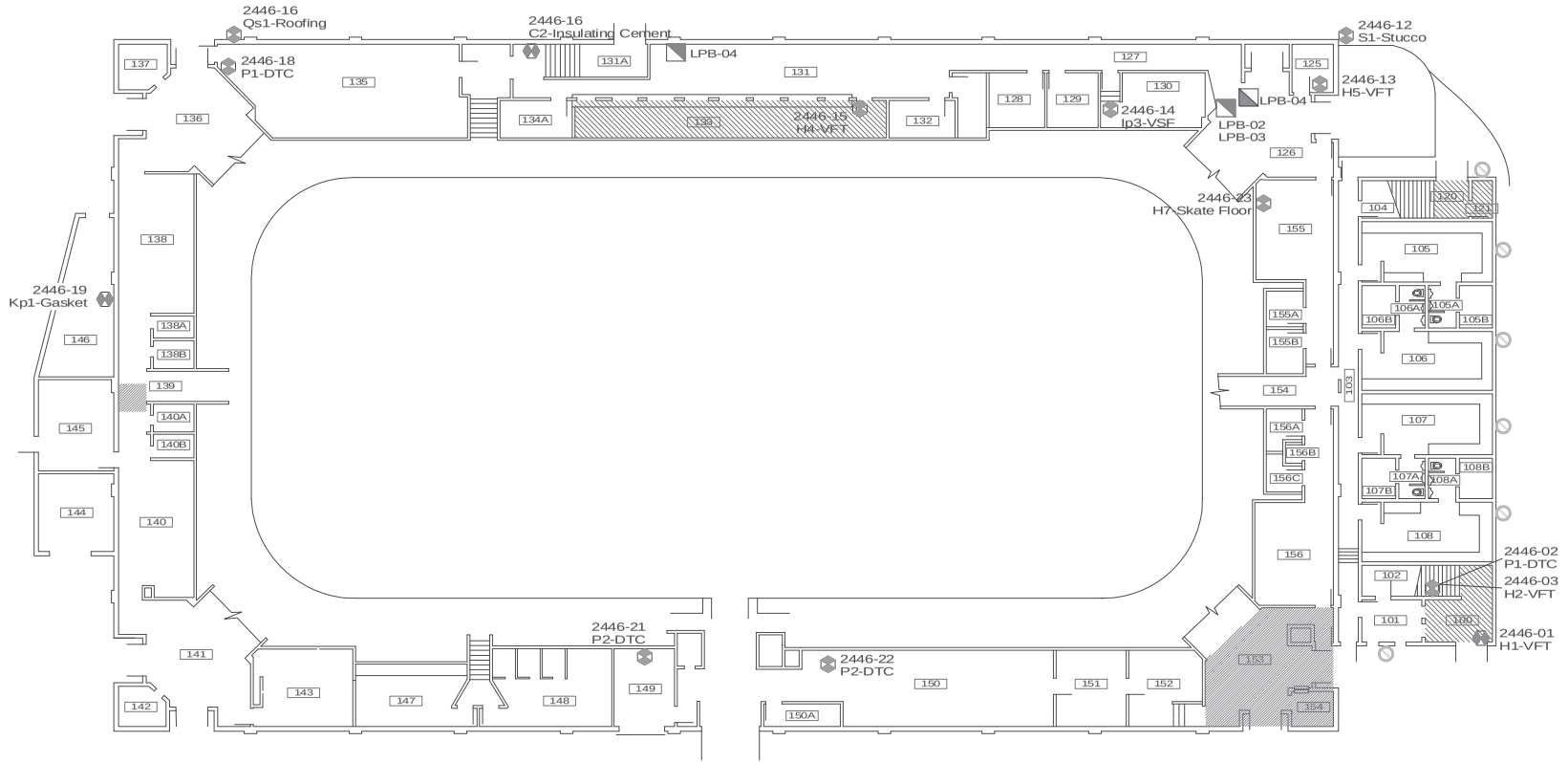
Floor leveling compound	HVAC Duct mastic
Pipe flange gaskets	Fire doors
Window putty	Boiler/tank insulation (internal)
Mortar (fire brick or other refractory materials)	Chimney liner (internal)
Vermiculite insulation which may be within concrete block walls concealed beneath newer covering or enclosing materials	Glues and adhesives (eg. floor tile or sheeting glues)
Electrical insulation (wire insulation, arc insulating pads)	Tar and gravel roofing, roof felts, tar patching compounds and membranes

CONTRACTOR SIGN OFF SHEET

By signing below, you acknowledge that you have been informed as to the location of all known and suspected asbestos applications and other hazardous and regulated materials located within the facilities on this site. You the contractor will make every effort to direct your work duties so as to NOT disturb known hazardous and regulated applications. If through your work these applications are to be disturbed or have been inadvertently disturbed, it is your responsibility to inform the maintenance staff who will then direct the clean-up or the removal of such applications in way of your proposed renovation work.

COMPANY NAME	SIGNATURE	DATE

APPENDIX B
ASBESTOS LOCATION DRAWINGS



PEAK ENVIRONMENTAL LTD.
951 Pinewood Place
Kelowna, BC V1Z 3G7
1-877-518-PEAK (7325)
info@peakenvironmental.ca

Project No.: 2446

Drawing:
VERNON CIVIC ARENA

MAIN FLOOR LEVEL

3003 - 37th Avenue
Vernon, BC

Title:
ASBESTOS CONTAINING BUILDING MATERIAL LOCATIONS

Owner:
REGIONAL DISTRICT NORTH OKANAGAN

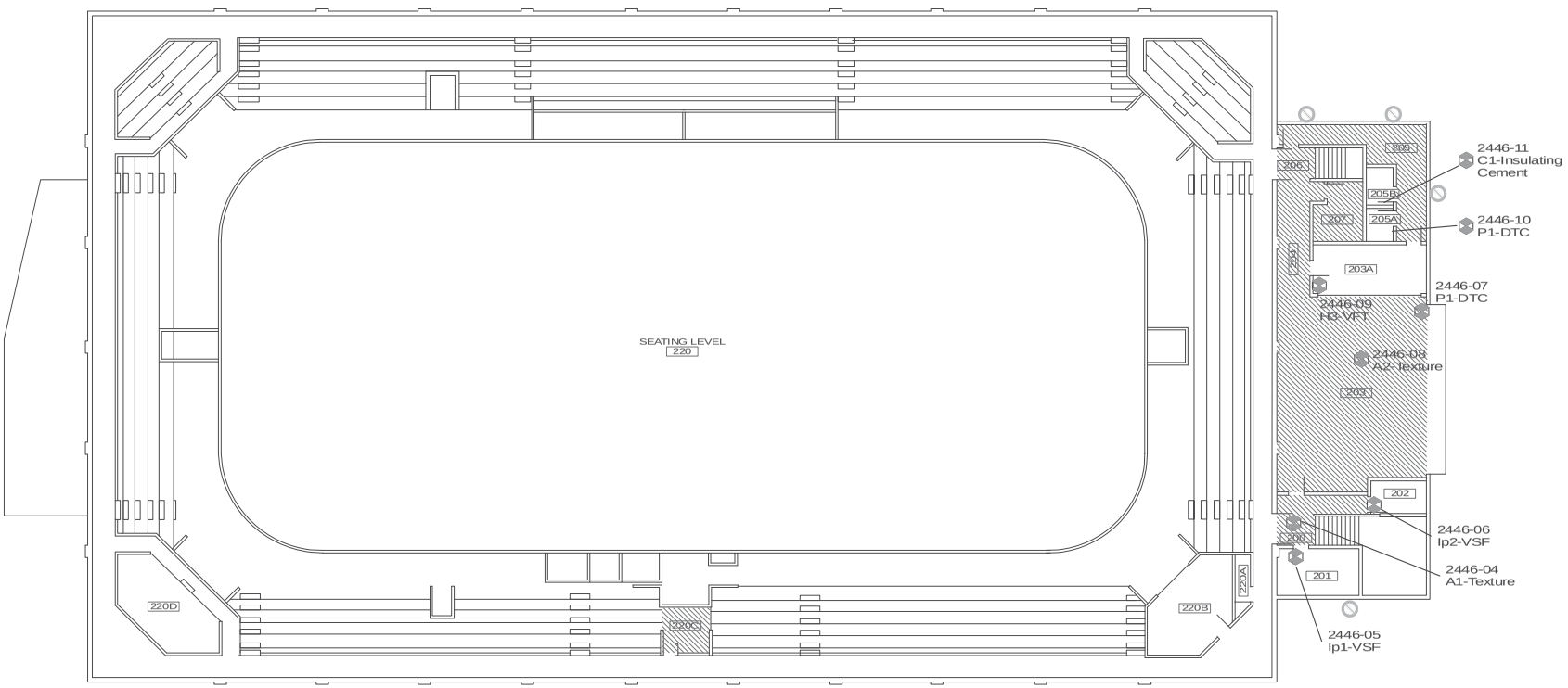
9848 Aberdeen Road
Coldstream, BC V1B 2K9

Legend:

- CONTAMINATED CRAWLSPACE NO ACCESS PERMITTED
- EXPOSED ASBESTOS FLOORING
- LEAD BASED PAINT SAMPLE POSITIVE
- LEAD BASED PAINT SAMPLE NO LEAD DETECTED
- BORE HOLE LOCATION WITH VERMICULITE
- BORE HOLE LOCATION WITH NO VERMICULITE
- ASBESTOS BULK SAMPLE NUMBER AND MATERIAL
- NON-ASBESTOS BULK SAMPLE NUMBER AND MATERIAL

Date: 03.03.2014
Revision:
Scale: 1 : 300
Drawn by: S.Ferguson

DRAWING NUMBER
3446 ASB1-1



PEAK ENVIRONMENTAL LTD.
951 Pinewood Place
Kelowna, BC V1Z 3G7
1-877-518-PEAK (7325)
info@peakenvironmental.ca

Project No.: 2446

Drawing:
VERNON CIVIC ARENA

UPPER FLOOR LEVEL

3003 - 37th Avenue
Vernon, BC

Title:
ASBESTOS CONTAINING BUILDING MATERIAL LOCATIONS

Owner:
REGIONAL DISTRICT NORTH OKANAGAN

9848 Aberdeen Road
Coldstream, BC V1B 2K9

Legend:

- CONTAMINATED CRAWLSPACE NO ACCESS PERMITTED
- EXPOSED ASBESTOS FLOORING
- LEAD BASED PAINT SAMPLE POSITIVE
- LEAD BASED PAINT SAMPLE NO LEAD DETECTED
- BORE HOLE LOCATION WITH VERMICULITE
- BORE HOLE LOCATION WITH NO VERMICULITE
- ASBESTOS BULK SAMPLE NUMBER AND MATERIAL
- NON-ASBESTOS BULK SAMPLE NUMBER AND MATERIAL

Date: 03.03.14
Revision:
Scale: 1 : 309
Drawn by: S.Ferguson

DRAWING NUMBER
3446 ASB2-

APPENDIX C
ANALYTICAL SAMPLE RESULTS

PACIFIC EHS - RECORD OF ANALYSIS

Report Number:	10427-22084	**Reference:**	Job 2446, Reg. Dist. N. Okanagan
Client:	Peak Environmental	**Report Date:**	06-Feb-14
Address:	Vernon Civic Arena	**Contact:**	Steve Ferguson
	Vernon BC		

Please find enclosed our laboratory's results for the bulk sample(s) submitted to our office for identification.

Sample examination was conducted in accordance with the NIOSH 9002 analytical method using polarized light microscopy and dispersion staining techniques.

A result of 'Asbestos–Not detected' means no asbestos fibres were detected. When asbestos is detected, the minimum quantitation limit is 1%. Levels of asbestos present but below 1% based on visual estimation will be described as TRACE.

This test report relates only to the items tested and any extrapolation by the client of the results is the responsibility of the client. For samples not collected by Pacific EHS, the accuracy of locations and material(s) is the responsibility of the client. Samples will be disposed of after one month, unless we are instructed otherwise.

If asbestos products are identified in this report they should be remediated safely in accordance with the requirements of Part 6.0 of the Worksafe B.C. Occupational Health and Safety Regulation. In general this will require the completion of a Risk Assessment (Part 6.6.1) completed by a "Qualified Person" as defined in Part 6.1.

- A result of 'Asbestos–Not detected' means no asbestos fibres were detected;
- When asbestos is detected, the minimum quantitation limit is 1%;
- Levels of asbestos present but below 1% based on visual estimation will be described as TRACE.

PACIFIC EHS - RECORD OF ANALYSIS

Report Number: 10427-22084

Client Name: Peak Environmental

Reference: Job 2446, Reg. Dist. N. Okanagan

Amended Report: 06-Feb-14

Address: Vernon Civic Arena, Vernon

Sampled By: Peak Environmental

Date Sampled: 24-Jan-14

Date Analyzed: 06-Feb-14

Analyst: EC

NO.	SAMPLE INFORMATION	LAYER	ASBESTOS	OTHER MATERIALS
10427-22084-001	Vinyl floor tile 2446-01 Entry vestibule 100	Hard beige vinyl 98% Black mastic 2%	YES - Chrysotile 1% Not Detected	Non-Fibrous 99% Non-Fibrous 99%, Cellulose 1%
10427-22084-002	Drywall Joint Compound 2446-02 Entry vestibule 100	Paint 20% White chalky mix 80%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100%
10427-22084-003	Vinyl floor tile 2446-03 Entry vestibule 100	Beige vinyl 100%	Not Detected	Non-Fibrous 100%
10427-22084-004	Texture 2446-04 2nd floor / Vestibule 200	Paint 20% White chalky mix 80%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 95%, Cellulose 5%
10427-22084-005	Sheet vinyl flooring 2446-05 Office 201	Clear vinyl sheet 45% Foam core 20% White fibrous layer 35%	Not Detected Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100% Cellulose 70%, Non-Fibrous 30%
10427-22084-006	Sheet vinyl flooring 2446-06 Male washroom 202	Clear vinyl sheet 40% Foam core 20% White fibrous layer 40%	Not Detected Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100% Cellulose 60%, Non-Fibrous 40%

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PACIFIC EHS - RECORD OF ANALYSIS

Report Number: 10427-22084

Client Name: Peak Environmental

Reference: Job 2446, Reg. Dist. N. Okanagan

Amended Report: 06-Feb-14

Address: Vernon Civic Arena, Vernon

Sampled By: Peak Environmental

Date Sampled: 24-Jan-14

Date Analyzed: 06-Feb-14

Analyst: EC

NO.	SAMPLE INFORMATION	LAYER	ASBESTOS	OTHER MATERIALS
10427-22084-007	Drywall Joint Compound 2446-07 Concession 203	Paint 20% White chalky mix 80%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 93%, Cellulose 7%
10427-22084-008	Texture 2446-08 Concession 203	Paint 20% White chalky mix 80%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100%
10427-22084-009	Vinyl floor tile 2446-09 Kitchen 203A	Hard orange vinyl 95% Black mastic 5%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100%
10427-22084-010	Drywall Joint Compound 2446-10 Custodial 205A	Paint 10% White chalky mix 90%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100%
10427-22084-011	Insulation 2446-11 Mechanical 205B Cement	Beige fibrous layer 100%	Not Detected	Non-Fibrous 70%, Cellulose 30%
10427-22084-012	Stucco 2446-12 South exterior	Paint 10% White chalky mix 90%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100%

Analyzed in accordance with NIOSH METHOD 9002 – ASBESTOS (BULK) BY PLM AIHA BAPAT Lab #185672

Pacific EHS A Total Safety Company ...to ensure the safe Wellbeing of Workers Worldwide

- A result of 'Asbestos–Not detected' means no asbestos fibres were detected;
- When asbestos is detected, the minimum quantitation limit is 1%;
- Levels of asbestos present but below 1% based on visual estimation will be described as TRACE.

AIHA Proficiency Analytical Testing Programs, LLC
BAPAT Lab #185672

PACIFIC EHS - RECORD OF ANALYSIS

Report Number: 10427-22084

Client Name: Peak Environmental

Reference: Job 2446, Reg. Dist. N. Okanagan

Amended Report: 06-Feb-14

Address: Vernon Civic Arena, Vernon

Sampled By: Peak Environmental

Date Sampled: 24-Jan-14

Date Analyzed: 06-Feb-14

Analyst: EC

NO.	SAMPLE INFORMATION	LAYER	ASBESTOS	OTHER MATERIALS
10427-22084-013	Vinyl floor tile 2446-13 Ticket office 125	Grey vinyl 65% Black fibrous layer 35%	Not Detected Not Detected	Non-Fibrous 80%, Synthetic 20% Non-Fibrous 55%, Cellulose 45%
10427-22084-014	Sheet vinyl flooring 2446-14 Office 130	White vinyl sheet 40% Foam core 20% White fibrous layer 40%	Not Detected Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100% Cellulose 70%, Non-Fibrous 30%
10427-22084-015	Vinyl floor tile 2446-15 Storage 133	Hard white vinyl 95% Black mastic 5%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100%
10427-22084-016	Insulation 2446-16 Storage 131 Cement	Grey fibrous layer 100%	YES - Chrysotile 30%	Non-Fibrous 70%
10427-22084-017	Roofing 2446-17	Orange pebble layer 20% Black fibrous tar 80%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 70%, Cellulose 30%
10427-22084-018	Drywall Joint Compound 2446-18 Chiller 135	Paint 20% White chalky mix 80%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100%
10427-22084-019	Gasket 2446-19 Storage 145 Flange	Grey fibrous layer 100%	YES - Chrysotile 40%	Non-Fibrous 60%

Analyzed in accordance with NIOSH METHOD 9002 – ASBESTOS (BULK) BY PLM AIHA BAPAT Lab #185672

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- Levels of asbestos present but below 1% based on visual estimation will be described as TRACE.

AIHA Proficiency Analytical Testing Programs, LLC
BAPAT Lab #185672

PACIFIC EHS - RECORD OF ANALYSIS

Report Number: 10427-22084

Client Name: Peak Environmental

Reference: Job 2446, Reg. Dist. N. Okanagan

Amended Report: 06-Feb-14

Address: Vernon Civic Arena, Vernon

Sampled By: Peak Environmental

Date Sampled: 24-Jan-14

Date Analyzed: 06-Feb-14

Analyst: EC

NO.	SAMPLE INFORMATION	LAYER	ASBESTOS	OTHER MATERIALS
10427-22084-020	Drywall Joint Compound 2446-20 Storage 149	White chalky mix 90% Paper 10%	Not Detected Not Detected	Non-Fibrous 100% Cellulose 100%
10427-22084-021	Drywall Joint Compound 2446-21 Workshop 150	Paint 20% White chalky mix 80%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100%
10427-22084-022	Flooring 2446-22 Change room 155 Skate floor	Paint 20% Black fibrous tar 80%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 85%, Cellulose 15%
10427-22084-023	Stucco 2446-23 Exterior	Paint 10% White cementitious mix 90%	Not Detected Not Detected	Non-Fibrous 100% Non-Fibrous 100%

Total Number of Samples: 23

Report Reviewed By: Karen Soothill

Analyzed in accordance with NIOSH METHOD 9002 – ASBESTOS (BULK) BY PLM AIHA BAPAT Lab #185672

Pacific EHS A Total Safety Company ...to ensure the safe Wellbeing of Workers Worldwide

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AIHA Proficiency Analytical Testing Programs, LLC
BAPAT Lab #185672

APPENDIX D
PRIORITIZED ASBESTOS ABATEMENT SCHEDULE AND HAZARDOUS MATERIALS INVENTORY

ASBESTOS CONTAINING BUILDING
MATERIALS INVENTORY AND ABATEMENT BUDGET ESTIMATES

BUILDING AND FUNCTIONAL AREA		MATERIAL		ASSESSMENT										ABATEMENT				
ROOM #	ROOM DESCRIPTION	CODE	DESCRIPTION	VIS	CONDITION	HEIGHT	AIR or VIBRATION	ENCLOSED SPACE	ACCESSIBLE TO PUBLIC	FRIABILITY	FUTURE DAMAGE POTENTIAL	QUANTITY	UNIT	RATE	COST	REMOVAL PRIORITY	AMI SCORE	FOOT NOTE
VERNON CIVIC ARENA																		
	ASBESTOS CONTAINING BUILDING MATERIALS																	
	MAIN FLOOR																	
100	Entry Lobby	H1	Vinyl Floor Tile	Vis	Fair	L	N	N	High	Low	Mod	175	SF	$ 3.75	$ 656.25	3	35	
120	East Entry Vestibule/S	H1	Vinyl Floor Tile	Vis	Poor	L	N	N	High	Low	Mod	60	SF	$ 3.75	$ 225.00	1	45	
121	Ticket Office	H1	Vinyl Floor Tile	Vis	Good	L	N	N	High	Low	Low	40	SF	$ 3.75	$ 150.00	3	26	
131	Storage	C2	Cement Pipe Fitting	Vis	Fair	L	N	N	High	High	High	4	FTG	$ 118.75	$ 475.00	IMM	65	
133	Storage	H1	Vinyl Floor Tile	Vis	Poor	L	N	N	High	Low	Mod	515	SF	$ 3.75	$ 1,931.25	1	45	
138	Change Room	C2	Cement Pipe Fitting	Con	Poor	H	N	N	Mod	High	High	2	FTG	$ 118.75	$ 237.50	IMM	58	
139	Vestibule	C2	Cement Pipe Fitting	Vis	Poor	L	N	N	High	High	High	4	FTG	$ 118.75	$ 475.00	IMM	75	
140	Change Room	C2	Cement Pipe Fitting	Con	Poor	L	N	N	High	High	High	4	FTG	$ 118.75	$ 475.00	IMM	73	
140	Change Room	C2	Cement Pipe Fitting	Vis	Good	L	N	N	High	High	High	1	FTG	$ 118.75	$ 118.75	IMM	60	
143	Trainer Room	C2	Cement Pipe Fitting	Vis	Poor	L	N	N	High	High	High	3	FTG	$ 118.75	$ 356.25	IMM	75	
145	Boiler Room	Kp1	Pipe Gasketing	Encl	Good	L	N	N	Low	Mod	Low	4	Unit	$ 93.75	$ 375.00	3	12	
146	Storage	Kp1	Pipe Gasketing	Encl	Good	L	N	N	High	Mod	Low	3	Unit	$ 93.75	$ 281.25	3	26	
149	Storage	C2	Cement Pipe Fitting	Vis	Poor	L	N	N	High	High	High	1	FTG	$ 118.75	$ 118.75	IMM	75	
150A	Electrical	C2	Cement Pipe Fitting	Vis	Poor	H	N	N	Low	High	High	10	FTG	$ 118.75	$ 1,187.50	IMM	56	
152	Storage	C2	Cement Pipe Fitting	Con	Poor	H	N	N	Low	High	Mod	6	FTG	$ 118.75	$ 712.50	1	44	
155	Change Room	C2	Cement Pipe Fitting	Vis	Poor	L	N	N	High	High	High	6	FTG	$ 118.75	$ 712.50	IMM	75	
	Throughout	N1	itary Pipe Roving / Pac	Encl	Good	H	N	N	Low	High	Low		Unit	$ 18.75	$ -	3	22	
	Southwest Crawlspace	C2	Cement Pipe Fitting	Vis	Poor	L	Y	Y	High	High	High	60	FTG	$ 118.75	$ 7,125.00	IMM	85	
	North Crawlspace	C2	Cement Pipe Fitting	Vis	Poor	L	Y	Y	High	High	High	60	FTG	$ 118.75	$ 7,125.00	IMM	85	
	UPPER FLOOR																	
200	Vestibule	H1	Vinyl Floor Tile	Vis	Poor	L	N	N	High	Low	Mod	135	SF	$ 3.75	$ 506.25	1	45	
203	Concession	H1	Vinyl Floor Tile	Vis	Poor	L	N	N	High	Low	Mod	1340	SF	$ 3.75	$ 5,025.00	1	45	
204	Corridor	H1	Vinyl Floor Tile	Vis	Good	L	N	N	High	Low	Low	195	SF	$ 3.75	$ 731.25	3	26	
205	Storage	H1	Vinyl Floor Tile	Vis	Poor	L	N	N	High	Low	Mod	305	SF	$ 3.75	$ 1,143.75	1	45	
206	Vestibule	H1	Vinyl Floor Tile	Vis	Good	L	N	N	High	Low	Low	60	SF	$ 3.75	$ 225.00	3	26	
207	Washroom	H1	Vinyl Floor Tile	Vis	Good	L	N	N	High	Low	Low	130	SF	$ 3.75	$ 487.50	3	26	
220C	Control Booth	H1	Vinyl Floor Tile	Vis	Good	L	N	N	High	Low	Low	100	SF	$ 3.75	$ 375.00	3	26	
	Throughout	N1	itary Pipe Roving / Pac	Encl	Good	H	N	N	Low	High	Low		Unit	$ 18.75	$ -	3	22	

ASBESTOS CONTAINING BUILDING
MATERIALS INVENTORY AND ABATEMENT BUDGET ESTIMATES

BUILDING AND FUNCTIONAL AREA		MATERIAL		ASSESSMENT										ABATEMENT				
ROOM #	ROOM DESCRIPTION	CODE	DESCRIPTION	VIS	CONDITION	HEIGHT	AIR or VIBRATION	ENCLOSED SPACE	ACCESSIBLE TO PUBLIC	FRIABILITY	FUTURE DAMAGE POTENTIAL	QUANTITY	UNIT	RATE	COST	REMOVAL PRIORITY	AMI SCORE	FOOT NOTE

VERNON CIVIC ARENA

IMMEDIATE ABATEMENT COSTS $	18,406.25
PRIORITY 1 RECOMMENDED ABATEMENT COSTS $	9,543.75
PRIORITY 2 RECOMMENDED ABATEMENT COSTS $	-
PRIORITY 3 RECOMMENDED ABATEMENT COSTS $	3,281.25
TOTAL ASBESTOS ABATEMENT COSTS FOR THIS FACILITY (Excluding sanitary piping bell and spigot packing)	**$ 31,231.25**

PCB CONTAINING ELECTRICAL EQUIPMENT

Light ballasts-identification	380	unit	$	10.00	$ 3,800.00
Light ballasts (disposal assuming 75% of identified contain PCB)	290	unit	$	15.00	$ 4,350.00

COSTS FOR REMOVAL AND DISPOSAL OF PCB CONTAINING ELECTRICAL EQUIPMENT	$ 8,150.00

MERCURY CONTAINING ELECTRICAL EQUIPMENT

Mercury vapour lighting	30	unit	$	15.00	$ 450.00
Mercury fluorescent light tubes	750	unit	$	1.50	$ 1,125.00

COSTS FOR REMOVAL AND DISPOSAL OF MERCURY CONTAINING ELECTRICAL EQUIPMENT	$ 450.00

LEAD BASED PAINT

Red primer on structural steel and bracing (removal only required where cutting of lead painted structure steel is reuqired)

COSTS FOR REMOVAL AND DISPOSAL OF LEAD BASED PAINT	$ -

OZONE DEPLETING SUBSTANCES

Various refrigerators, coolers and air conditioning units	12	unit	$	100.00	$ 1,200.00

COSTS FOR REMOVAL AND DISPOSAL OF OZONE DEPLETING SUBSTANCES	$ 1,200.00

TOXIC, FLAMMABLE OR EXPLOSIVE MATERIALS

No Toxic, flammable or explosive materials were observed in the building

COSTS FOR REMOVAL AND DISPOSAL OF TOXIC, FLAMMABLE OR EXPLOSIVE MATERIALS	$ -

PEAK ENVIRONMENTAL LTD.
250-862-0971 / 1-877-518-7325 (PEAK) Toll Free

ASBESTOS CONTAINING BUILDING
MATERIALS INVENTORY AND ABATEMENT BUDGET ESTIMATES

BUILDING AND FUNCTIONAL AREA		MATERIAL		ASSESSMENT										ABATEMENT				
ROOM #	ROOM DESCRIPTION	CODE	DESCRIPTION	VIS	CONDITION	HEIGHT	AIR or VIBRATION	ENCLOSED SPACE	ACCESSIBLE TO PUBLIC	FRIABILITY	FUTURE DAMAGE POTENTIAL	QUANTITY	UNIT	RATE	COST	REMOVAL PRIORITY	AMI SCORE	FOOT NOTE
VERNON CIVIC ARENA																		
TOTAL ESTIMATED REGULATED MATERIALS ABATEMENT BUDGET ESTIMATE FOR THIS BUILDING															***$ 9,800.00***			

GENERAL NOTES:

1 Abatement costs are based on individual applications. Prices will vary depending upon timing and scope of work. It is recommended that revised budget numbers be prepared once an abatement scope of work is ascertained.

2 Functional area numbers are representative of the survey drawings provided with this report and may not indicate actual room numbers.

3 Only known and visible asbestos materials are listed. There is a distinct possibility that asbestos materials may be present in wall, ceiling and floor void spaces not identified in this report. Any materials located in void spaces should be sampled for asbestos content prior to disturbance.

4 This is an occupied building assessment for asbestos containing materials. No sampling of building membrane materials was conducted where such sampling could breach the water tightness of the building. Additionally, applications routinely sampled prior to building demolition were not assessed during this inspection; concealed flooring applications beneath flooring or sub-flooring covering materials where coring would be required to identify these concealed materials, were not sampled. A pre-demolition assessment should be performed prior to building demolition.

FRIABILITY
HIGH (easily crumbled by hand)
MOD (not easily crumbled by hand)
LOW (tool or implement required to disturb)

CONDITION
GOOD (no visible signs of disturbance)
FAIR (visible signs of disturbance, no debris noted on ground)
POOR (delamination/deterioration evident/imminent, may have debris on ground)

HEIGHT
L - Low application height less than 10' from floor
H - Low application height greater than 10' from floor

ACCESSIBILITY TO PUBLIC
LOW (controlled, infrequent access; out of hand reach)
MOD (controlled access or out of hand reach)
HIGH (uncontrolled access and within hand reach)

VIS (VISIBILITY)
Vis - Application is exposed and visible
Con - Application is concealed but accessible beneath covering materials
Encl - Application is enclosed and inaccessible (such as asbestos paper backing on vinyl floor sheeting is enclosed beneath a covering layer of vinyl)

UNITS
SF - Square Foot
Unit - Per unit
FTG - Fitting or Pipe Elbow
LF - Linear Foot

REMOVAL PRIORITY
IMM AMI SCORE 49 OR GREATER - Immediate removal recommended. There is a distinct possibility of asbestos fibre release
1 AMI SCORE 40 TO 48 - Remove within one year due to this application's condition, location or surrounding area's use; damage is probable.
2 AMI SCORE 36 TO 39 - Manage in place or removal in conjunction with proposed building renovations or maintenance is recommended
3 AMI SCORE LESS THAN 36 - Manage in place or removal prior to renovation or demolition activities is recommended

ENCLOSED SPACE
An area of limited or restricted access due to height, restrictions of movement or areas where created dusts could be retained within the space for an extended period of time due to limited air movement

BUILDING AND FUNCTIONAL AREA		MATERIAL		ASSESSMENT										ABATEMENT				
ROOM #	ROOM DESCRIPTION	CODE	DESCRIPTION	VIS	CONDITION	HEIGHT	AIR or VIBRATION	ENCLOSED SPACE	ACCESSIBLE TO PUBLIC	FRIABILITY	FUTURE DAMAGE POTENTIAL	QUANTITY	UNIT	RATE	COST	REMOVAL PRIORITY	AMI SCORE	FOOT NOTE

VERNON CIVIC ARENA

SURVEYED MATERIALS DESCRIPTIONS AND SAMPLE NUMBERS

	MATERIAL	*VISUAL DESCRIPTION - ASSESSED LOCATION*	*SAMPLE No.*	*SAMPLE RESULT AND ASBESTOS CONTENT*
ASSESSED AND SUSPECT ASBESTOS CONTAINING APPLICATIONS				
A1	Stipple Texture	Stipple Texture - Vestibule 200	2446-04	Non Asbestos
A2	Stipple Texture	Large Bump Stipple Texture - Concession 203	2446-08	Non Asbestos
B1	Pipe Insulation	Straight Run Fiberglass with Paper Wrap on Piping	Not Sampled	Known Non-Asbestos Application
C1	Cement Pipe Fitting	Grey Insulating Cement on Pipe Fittings - Mechanical 205B	2446-11	Non Asbestos
C2	Cement Pipe Fitting	Grey Insulation Cement on Pipe Fittings - Storage 131	2446-16	**Chrysotile Asbestos 30%**
E1	Exhaust Breeching	Foil Faced Fiberglass Insulation on Duct - Office 201	Not Sampled	Known Non-Asbestos Application
E2	Exhaust Breeching	Fiberglass Insulation on Exhaust Breach from Boiler - Boiler Room 145	Not Sampled	Known Non-Asbestos Application
C1	Ceiling Panel	12"x12" Textured and Pinholed Staple -Up Compressed Cellulose - Control Room 220C	Not Sampled	Known Non-Asbestos Application
C2	Ceiling Panel	1'x2' Smooth Faced Staple-up Compressed Cellulose Tile - Ticker Office 125	Not Sampled	Known Non-Asbestos Application
C3	Ceiling Panel	4'x'8 Smooth Faced Staple-up Compressed Cellulose - Trainers Room 143	Not Sampled	Known Non-Asbestos Application
C4	Ceiling Panel	12"x12" Texture Faced Staple-up Compressed Tile - Workshop 150	Not Sampled	Known Non-Asbestos Application
C5	Ceiling Panel	2'x4' Cross-directional Fissures with Large and Small Pinholes Compressed Cellulose - Maintenance Office 151	Not Sampled	Known Non-Asbestos Application
H1	Vinyl Floor Tile	12"x"12 Brown with Off-white, Dark Brown and Yellow - Entry Lobby 100	2446-01	**Chrysotile Asbestos 1%**
H2	Vinyl Floor Tile	Tan with Off White Stair Tread - Entry Vestibule 100	2446-03	Non Asbestos
H3	Vinyl Floor Tile	12"x"12 Pink with Off-white, Dark Brown and Yellow - Kitchen 203A	2446-09	Non Asbestos
H4	Vinyl Floor Tile	12"x12 Cream - Storage 133	2446-15	Non Asbestos
H5	Vinyl Floor Tile	9"x9" Grey and Tan Checkered Tar Paper Backed - Ticket Office 125	2446-13	Non Asbestos
H6	Vinyl Floor Tile	4'x8' Black Rubber Tile - Change room 138	Not Sampled	Known Non-Asbestos Application
H7	Vinyl Floor Tile	Plank Skate Flooring - Change room 155	2446-22	Non Asbestos
I1	Vinyl Sheet Flooring	Tan Marmoleum - Concession 220D	Not Sampled	Known Non-Asbestos Application
I2	Vinyl Sheet Flooring	Grey with Dark Grey Wave Pattern - Stairwell 131A	Not Sampled	Known Non-Asbestos Application
Ip1	Paper Backed Flooring	Cream with Brown Splotch Square Tile Pattern - Office 201	2446-05	Non Asbestos
Ip2	Paper Backed Flooring	Cream, Grey and Brown Rectangular Tile Pattern - Male washroom 202	2446-06	Non Asbestos
Ip3	Paper Backed Flooring	Cream and Brown Square Pattern - Office 130	2446-14	Non Asbestos
Kp1	Pipe Gasketing	Pipe flange gaskets - Storage 146	2446-19	**Chrysotile Asbestos 40%**
N1	Sanitary Pipe Packing	Sanitary Pipe Roving - Upper Arena 220	Not Sampled	**Suspect Asbestos**
P1	Drywall Tape Comp.	White Drywall Taping Compound - Entry Vestibule 100	2446-02	Non Asbestos
P1	Drywall Tape Comp.	White Drywall Taping Compound - Concession 203	2446-07	Non Asbestos
P1	Drywall Tape Comp.	White Drywall Taping Compound - Custodial 205A	2446-10	Non Asbestos

ASBESTOS CONTAINING BUILDING
MATERIALS INVENTORY AND ABATEMENT BUDGET ESTIMATES

BUILDING AND FUNCTIONAL AREA		MATERIAL		ASSESSMENT										ABATEMENT				
ROOM #	ROOM DESCRIPTION	CODE	DESCRIPTION	VIS	CONDITION	HEIGHT	AIR or VIBRATION	ENCLOSED SPACE	ACCESSIBLE TO PUBLIC	FRIABILITY	FUTURE DAMAGE POTENTIAL	QUANTITY	UNIT	RATE	COST	REMOVAL PRIORITY	AMI SCORE	FOOT NOTE

VERNON CIVIC ARENA

SURVEYED MATERIALS DESCRIPTIONS AND SAMPLE NUMBERS

	MATERIAL	*VISUAL DESCRIPTION - ASSESSED LOCATION*	*SAMPLE No.*	*SAMPLE RESULT AND ASBESTOS CONTENT*
ASSESSED AND SUSPECT ASBESTOS CONTAINING APPLICATIONS				
P2	Drywall Tape Comp.	Beige Drywall Taping Compound - Chiller 135	2446-18	Non Asbestos
P2	Drywall Tape Comp.	Beige Drywall Taping Compound - Storage 149	2446-20	Non Asbestos
P2	Drywall Tape Comp.	Beige Drywall Taping Compound - Workshop 150	2446-21	Non Asbestos
Qs1	Roofing Shingle	Red Tar Shingle - Arena Roof	2446-17	Non Asbestos
Qs1	Roofing Shingle	Grey Roll-on Tar Sheeting - Roof	Not Sampled	Known Non-Asbestos Application
S1	Exterior Wall Stucco	Rough Finish Stucco - Exterior South	2446-12	Non Asbestos

ASSESSED AND SAMPLED LEAD BASED PAINT APPLICATION MATERIAL DESCRIPTION	**SAMPLE NUMBER**	**SAMPLE RESULTS**
Blue on Wood Soffit - Exterior South	LBP-01	No Lead Detected
Grey Wood Wall - Vestubule 126	LBP-02	No Lead Detected
White Steel - Vestibule 126	LBP-03	No Lead Detected
Red Primer on Steel - Vestibule 126	LBP-04	**Lead Present**
Yellow on Wood Door Frame - Storage 133	LBP-05	No Lead Detected
White with Yellow Undercoat on Wood Wall - Storage 131	LBP-06	No Lead Detected

PEAK ENVIRONMENTAL LTD.
250-862-0971 / 1-877-518-7325 (PEAK) Toll Free

APPENDIX E
ROOM BY ROOM ANCILLARY INFORMATION

ROOM BY ROOM INVENTORY

Building Name: Vernon Civic Arena Date: 1/24/2014 (mm/dd/\yyyy) ANCILLARY INFORMATION

TB-Tack Board / GWB-Gypsum Wall Board / BW-Brick Wall / CBW-Concrete Block Wall / Car-Carpet / Conc-Concrete / STR-Structure / WD-Wood / FRP-fibreglass reinforced plastic

All applications are below accessible below 8 foot height unless otherwise noted as (h)-high for applications above 8' or as being (at)-Application concealed above T-bar ceilings / (af)-concealed above fixed ceilings / (uc)-concealed beneath carpeting / (uv)-concealed beneath vinyl sheeting / (ul)-concealed beneath laminate flooring /

Application quantities are shown in Brackets (50) - All applications are in good condition unless noted as ... (p) poor or (

Yellow highlighting indicates asbestos application

RED indicates immediate action asbestos applicati

Room No.	Room Name	Visible Floor Layer	Second Floor Layer	Third Floor Layer	North Wall	East Wall	South Wall	West Wall	First Visible Ceiling	Second Ceiling	Third Ceiling	Mechanical Piping	Pipe Fitting	Mechanical Ducting	Other
GROUND FLOOR															
100	Entry Lobby	H1/H2			P1	P1/CBW	P1/CBW	P1/CBW	A1 on P1						
101	Office	Car	Conc		CBW	CBW	-	CBW	P1						
102	Storage	Conc			CBW	CBW	P1	CBW	P1						
103	Corridor	H6			Conc	CBW	CBW	CBW	P1						
104	Custodial	Conc			CBW	CBW	P1	CBW	P1						
105	Change room	H6			CBW	CBW	CBW	CBW	WD						
105A	Washroom	H6			CBW	CBW	CBW	CBW	WD						
105B	Shower	H6			CBW	CBW	CBW	CBW	WD						
106	Change room	H6			CBW	CBW	CBW	CBW	WD						
106A	Washroom	H6			CBW	CBW	CBW	CBW	WD						
106B	Shower	H6			CBW	CBW	CBW	CBW	WD						
107	Change room	H6			CBW	CBW	CBW	CBW	WD						
107A	Washroom	H6			CBW	CBW	CBW	CBW	WD						
107B	Shower	H6			CBW	CBW	CBW	CBW	WD						
108	Change room	H6			CBW	CBW	CBW	CBW	WD						
108A	Washroom	H6			CBW	CBW	CBW	CBW	WD						
108B	Shower	H6			CBW	CBW	CBW	CBW	WD						
120	East Entry Vestibule/Stairwell	H1(P)/H2(f)			-	P1/CBW	CBW	CBW	A1 on P1						
121	Ticket Office	H1			CBW	CBW	CBW	CBW	P1						

ROOM BY ROOM INVENTORY

Building Name: Vernon Civic Arena Date: 1/24/2014 (mm/dd/\yyyy) ANCILLARY INFORMATION

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Room No.	Room Name	Visible Floor Layer	Second Floor Layer	Third Floor Layer	North Wall	East Wall	South Wall	West Wall	First Visible Ceiling	Second Ceiling	Third Ceiling	Mechanical Piping	Pipe Fitting	Mechanical Ducting	Other
125	Ticket Office	H5			WD	WD	WD	WD	G2						
126	Vestibule	WD			WD	WD	WD	WD	WD/G2						
127	Corridor	WD			WD	WD	WD	WD	WD						
128	Washroom	Conc			Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	WD						
129	Washroom	Conc			Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	WD						
130	Office	Ip3			P1	P1	P1	P1	G2						
131	Storage	Conc			P1/WD	P1/WD	WD	WD	G2				C2(4,L,F)		
131A	Stairwell	I2			-	Wd/A2on P1	P1	P1	A2 on P1						
132	Storage	Conc			WD	WD	WD	WD	WD						
133	Storage	H1(P)			WD	WD	WD	WD	WD						
134	Storage	Conc			WD	WD	WD	WD	WD						
135	Chiller room	Conc			P1	Conc	P1	P1/WD	WD						
136	Vestibule	WD			WD	WD	WD	WD	WD						
137	Electrical Room	Conc			WD	WD	WD	WD	Conc						
138	Change Room	H6			WD	WD	WD	WD	WD				C2(1,P,Concl		
138A	Shower	Ceramic Tile			Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	WD						
138B	Washroom	Conc			Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	WD						
139	Vestibule	H6			WD	Conc	-	Conc	Conc				C2(4,P,L)		
140	Change room	H6			Conc	WD	WD	WD	WD				C2(4,P,L, at)(1,L)		
140A	Shower	Ceramic Tile			Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	WD						

ROOM BY ROOM INVENTORY

Building Name: Vernon Civic Arena Date: 1/24/2014 (mm/dd/\yyyy) ANCILLARY INFORMATION

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Room No.	Room Name	Visible Floor Layer	Second Floor Layer	Third Floor Layer	North Wall	East Wall	South Wall	West Wall	First Visible Ceiling	Second Ceiling	Third Ceiling	Mechanical Piping	Pipe Fitting	Mechanical Ducting	Other
140B	Washroom	H6			Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	WD						
141	Vestibule	WD			WD	WD	WD	WD	WD						
142	Storage	WD			GWB	WD	WD	GWB	WD						
143	Trainer's Room	H6			WD	WD	WD	WD	G3			B1	C2(3,P,L)		
144	Storage	WD			Wd	CBW	Conc	WD	P2						
145	Boiler Room	WD			CBW	CBW	CBW	CBW	WD			B1			Kp1(4)
145A	Storage	Conc			WD	WD	WD	WD	WD						
146	Storage	Conc			CBW	WD	Conc	CBW	Wd						Kp1(3)
147	Male Washroom	Conc			WD	WD	WD	WD	WD						
148	Female Washroom	Conc			WD	WD	WD	WD	WD						
149	Storage	Conc			P2	P2	Conc	Conc	P2				C2(1,L,P)		
150A	Electrical Room	Conc			Conc	GWB	GWB	Conc	Str				C2(10,H,P)		
150	Workshop	Conc			P2	P2	P2/WD	P2/WD	G4						
151	Maintenance Office	Car	Conc		WD	WD	WD	WD	G2/G5	G3					
152	Storage	Conc			WD	WD	WD	WD	G2				C2(6,af,P)		
153	Vestibule	WD			WD	WD	WD	WD	WD						
153A	Ticket Office	WD			WD	WD	WD	WD	G3						
154	Vestibule	H6			-	Conc	WD	Conc	WD						
155	Change room	H7			WD	WD	WD	WD	WD				C2(6,L,P)		
155B	Washroom	H7			Ceramic Tile on	Ceramic Tile on	WD	WD	WD						

ROOM BY ROOM INVENTORY

Building Name: Vernon Civic Arena Date: 1/24/2014 (mm/dd/\yyyy) ANCILLARY INFORMATION

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Room No.	Room Name	Visible Floor Layer	Second Floor Layer	Third Floor Layer	North Wall	East Wall	South Wall	West Wall	First Visible Ceiling	Second Ceiling	Third Ceiling	Mechanical Piping	Pipe Fitting	Mechanical Ducting	Other
155A	Shower	Ceermaic tile			Ceramic Tile on	-	Ceramic Tile on	Ceramic Tile on	WD						
156	Change room	H7			WD	WD	WD	WD	WD						
156A	Washroom	H7			WD	WD	WD	WD	WD						
156B	Custodial	WD			WD	WD	WD	WD	WD						
156C	Washroom	H7			Ceramic Tile on	Ceramic Tile on	Ceramic Tile on	Ceramic Tile on							
	Southwest Crawlspace	Dirt			Str	Str	Str	Str	Str			B1	C2(60,L,F)		
	North Crawlspace	Dirt			Str	Str	Str	Str	Str			B1	C2(60,L,F)		
SECOND FLOOR															
200	Vestibule	H1(F)			P1	P1	P1	P1	A1 on P1						
201	Office	Ip1(F)	Conc		Conc	P1	P1	P1	A1 on P1					E1(af)	
202	Male Washrooms	Ip2(F)	Conc		WD on P1	WD on P1	WD on P1	WD on P1	P1						
203	Concession	H1(P)	Conc		P1	P1	P1	P1	A2 on P1						
203A	Kitchen	H3			P1	P1	P1	P1	P1						
204	Corridor	H1	Conc		P1	P1	P1	-	A2 on P1						
205	Storage	H1(P)	Conc		P1/Conc	P1	P1	P1	P1					E1(af)	
205A	Custodial	H4	Conc		P1	P1	P1	P1	P1						
205B	Mechanical Room	Conc			P1	P1	P1	P1	P1			B1	C1(10,P,L)		
206	Vestibule	H1			P1	P1	P1	P1	A1 on P1						
207	Female Washroom	H1	Conc		WD on P1	WD on P1	WD on P1	WD on P1	P1						
220	Arena Upper Level	WD			Conc/Str	Conc/Str	Conc/Str/ GWB	Conc/Str							N1

ROOM BY ROOM INVENTORY

Building Name: Vernon Civic Arena Date: 1/24/2014 (mm/dd/\yyyy)

ANCILLARY INFORMATION

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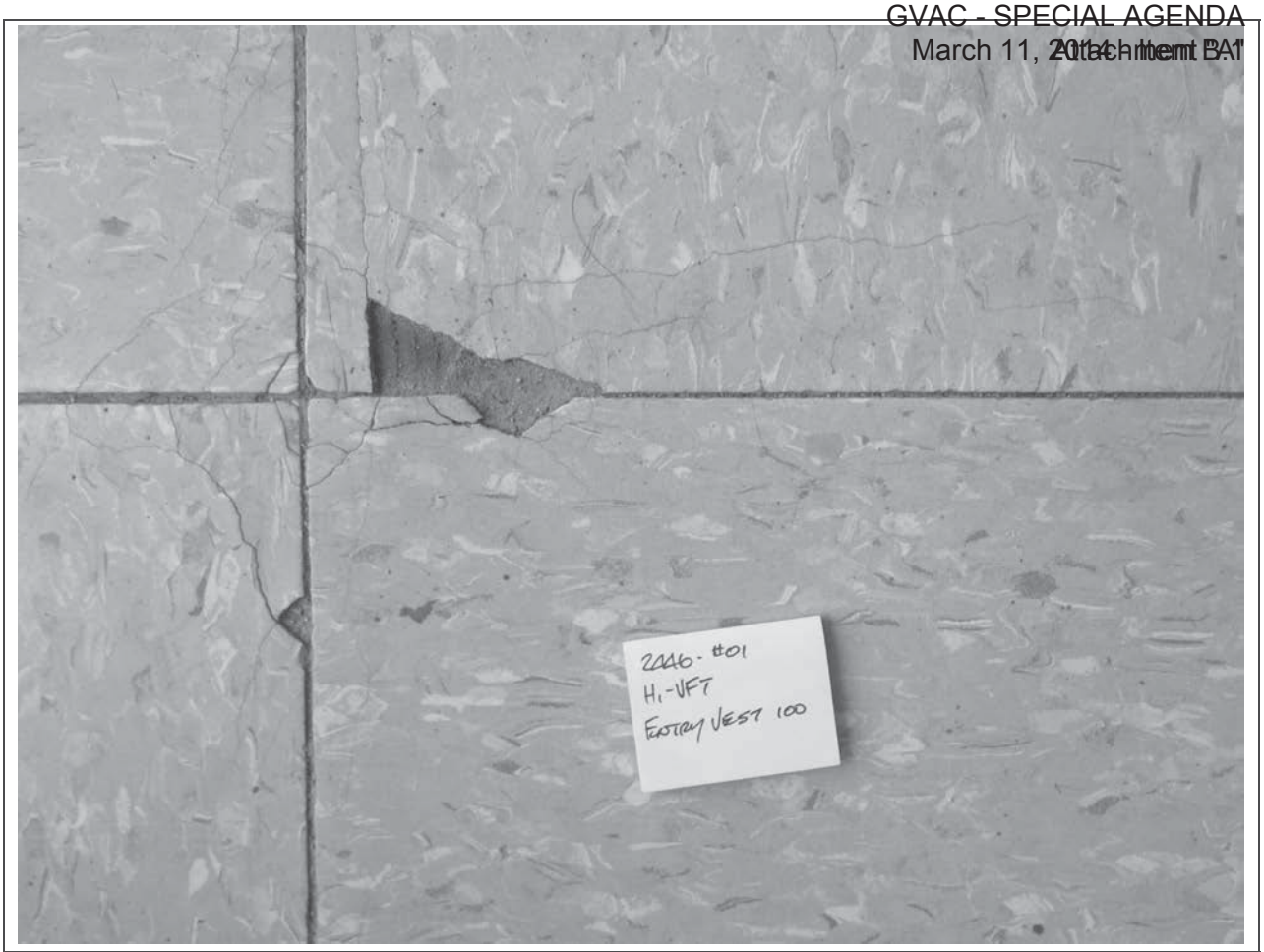
RED indicates immediate action asbestos applicati

Room No.	Room Name	Visible Floor Layer	Second Floor Layer	Third Floor Layer	North Wall	East Wall	South Wall	West Wall	First Visible Ceiling	Second Ceiling	Third Ceiling	Mechanical Piping	Pipe Fitting	Mechanical Ducting	Other
220A	Custodial	Car	WD		P1	P1	P1	P1	A1(P) on P1(P)						
220B	Activity Room	Car	WD		P1	P1	P1	P1	A2 on P1						
220C	Control Booth	H1			WD	WD	WD	WD	G1						
220D	Concession	I1			WD	WD	WD	WD	WD						
EXTERIOR															
	Exterior				S1/CBW	S1/CBW	S1/CBW	S1/CBW							
	Addition Roof														Qs1
	Arena Roof														Qs2

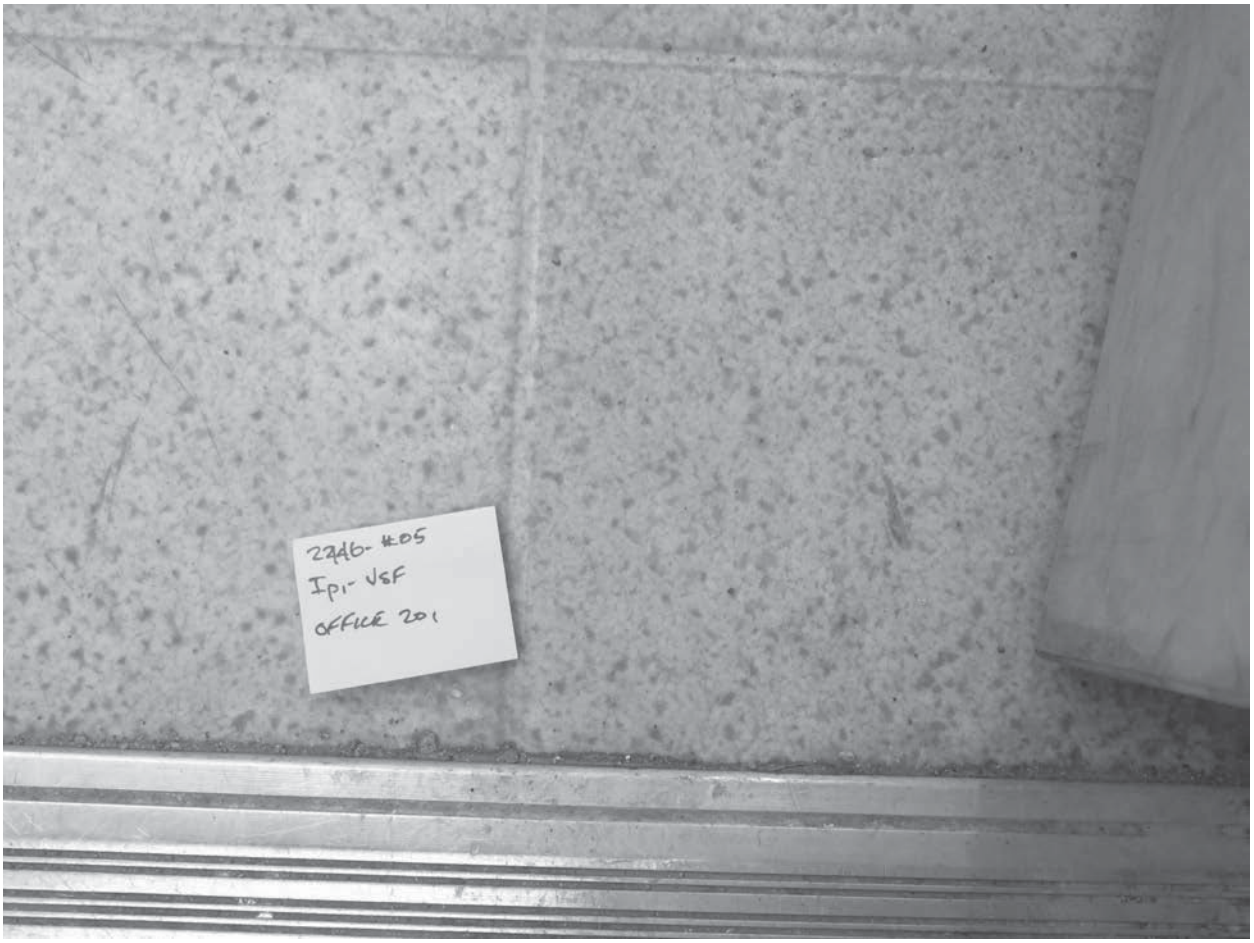
APPENDIX F
SITE PHOTOGRAPHS



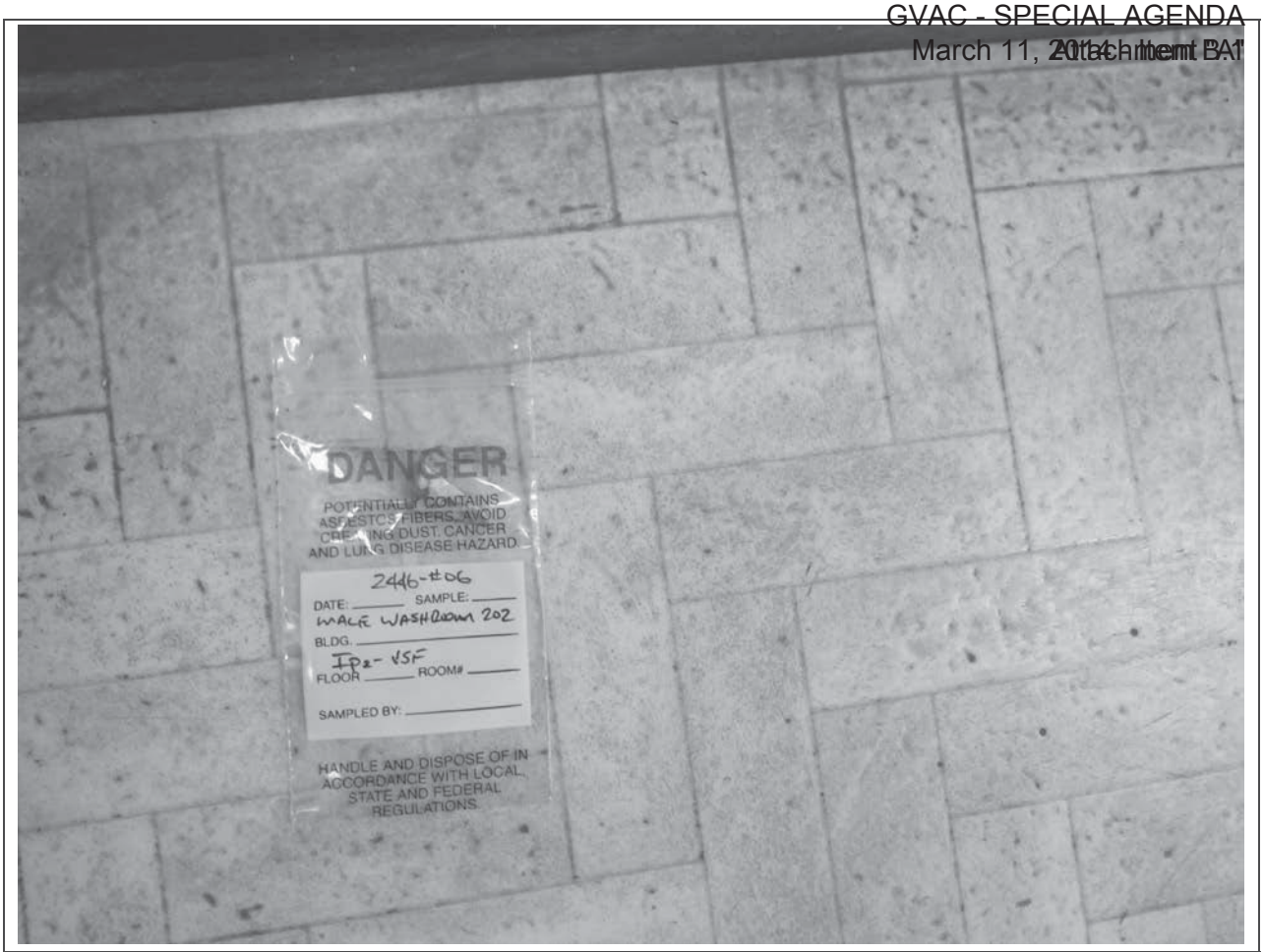
Picture No. 1: Sample 1 – (H1) Asbestos Floor Tile

Picture No. 2: Sample 2 – Non-Asbestos Drywall Tape Compound (typical)

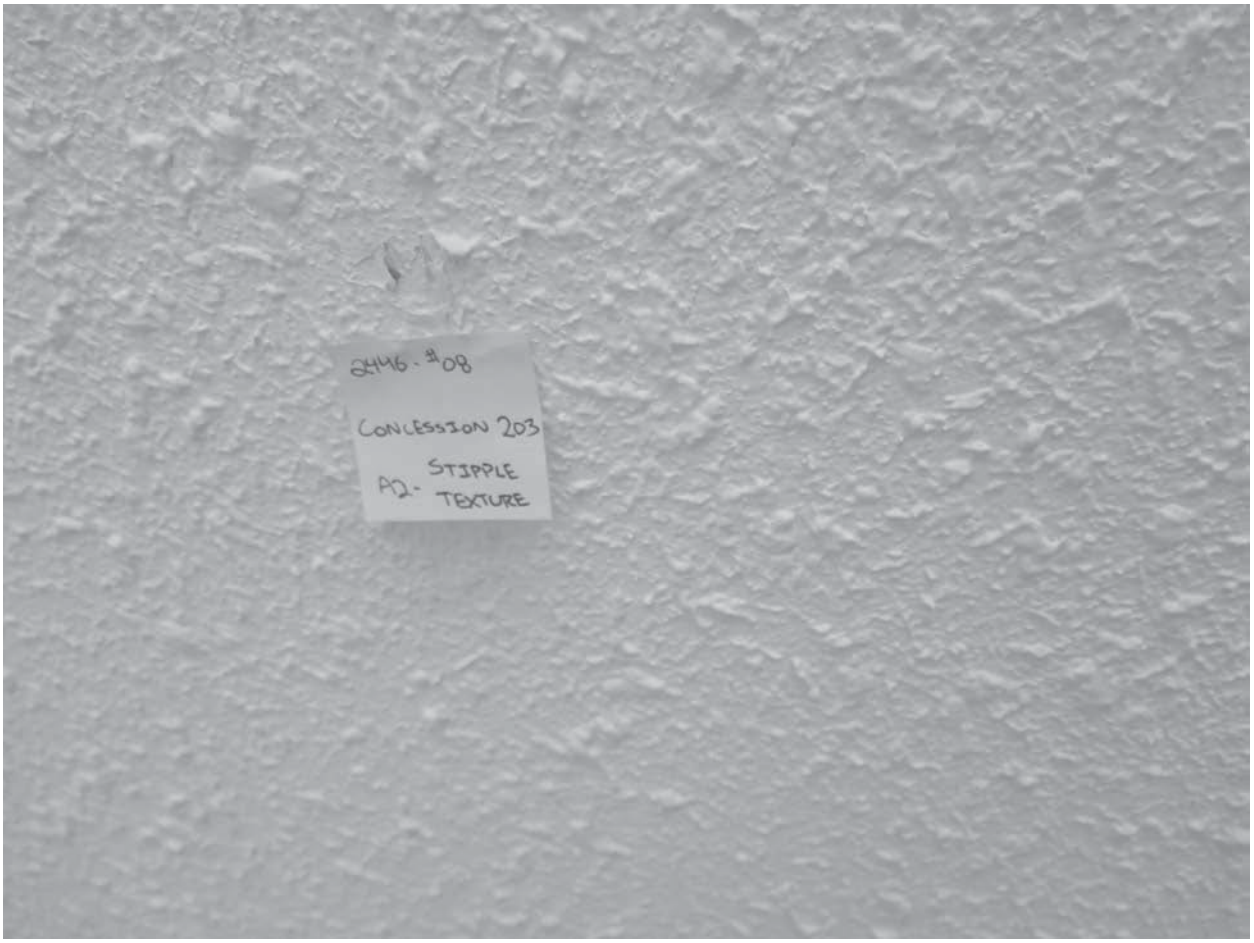
Picture No. 3: Sample 4 – Non Asbestos Ceiling Texture



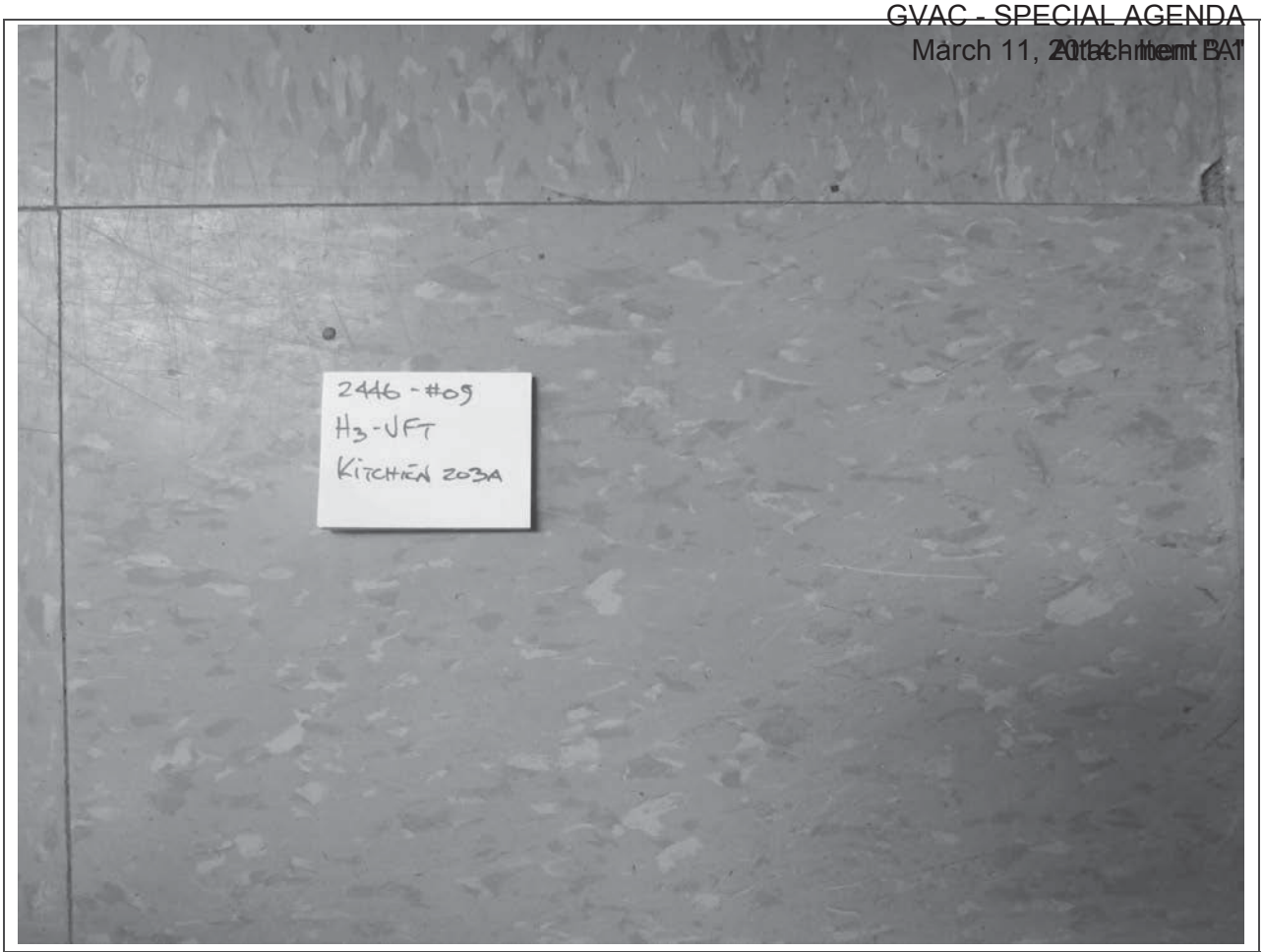
Picture No. 4: Sample 5 – Non Asbestos Floor Sheeting



Picture No. 5: Sample 6 – Non Asbestos Floor Sheeting

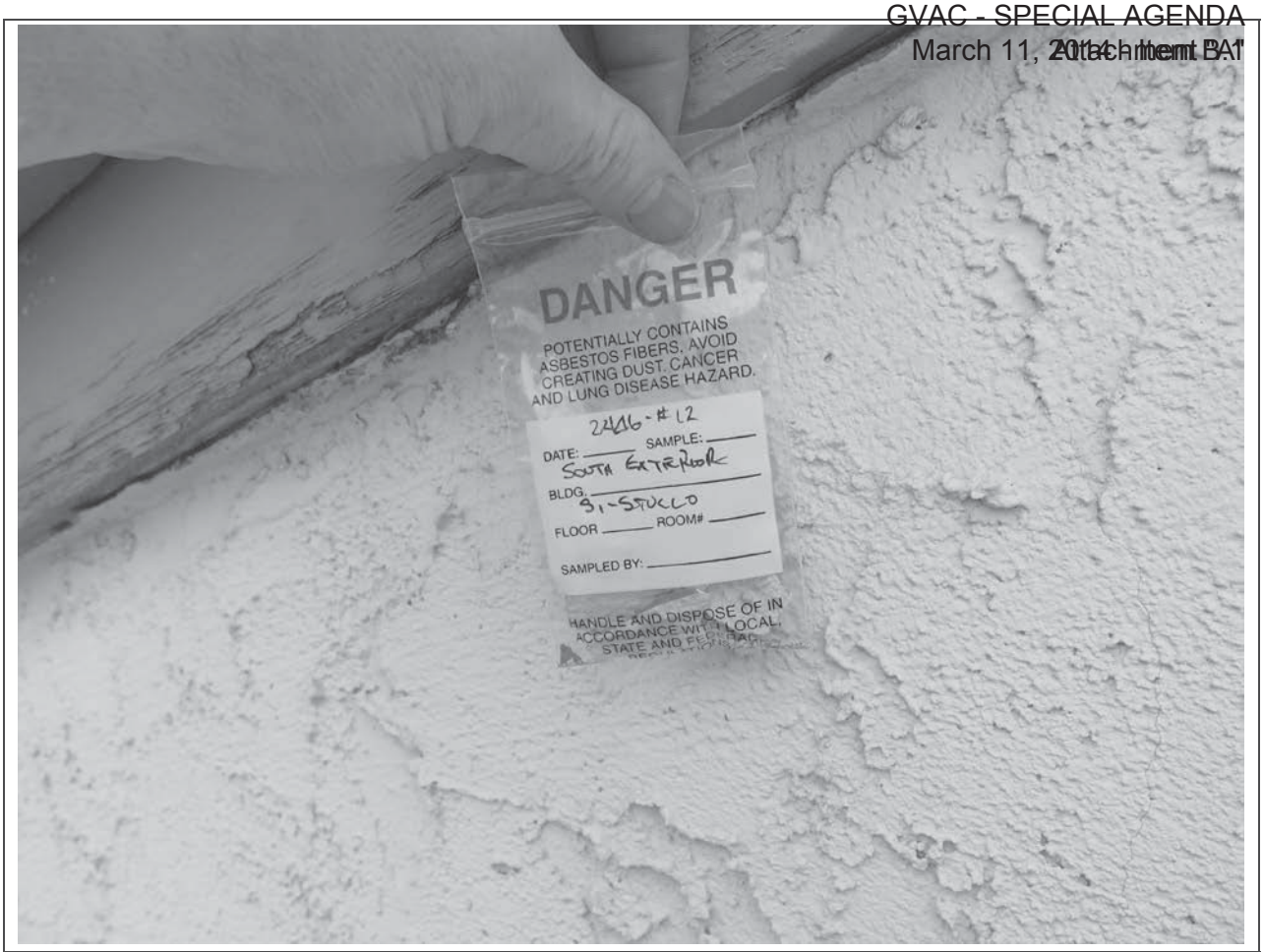


Picture No. 6: Sample 8 – Non Asbestos Ceiling Texture



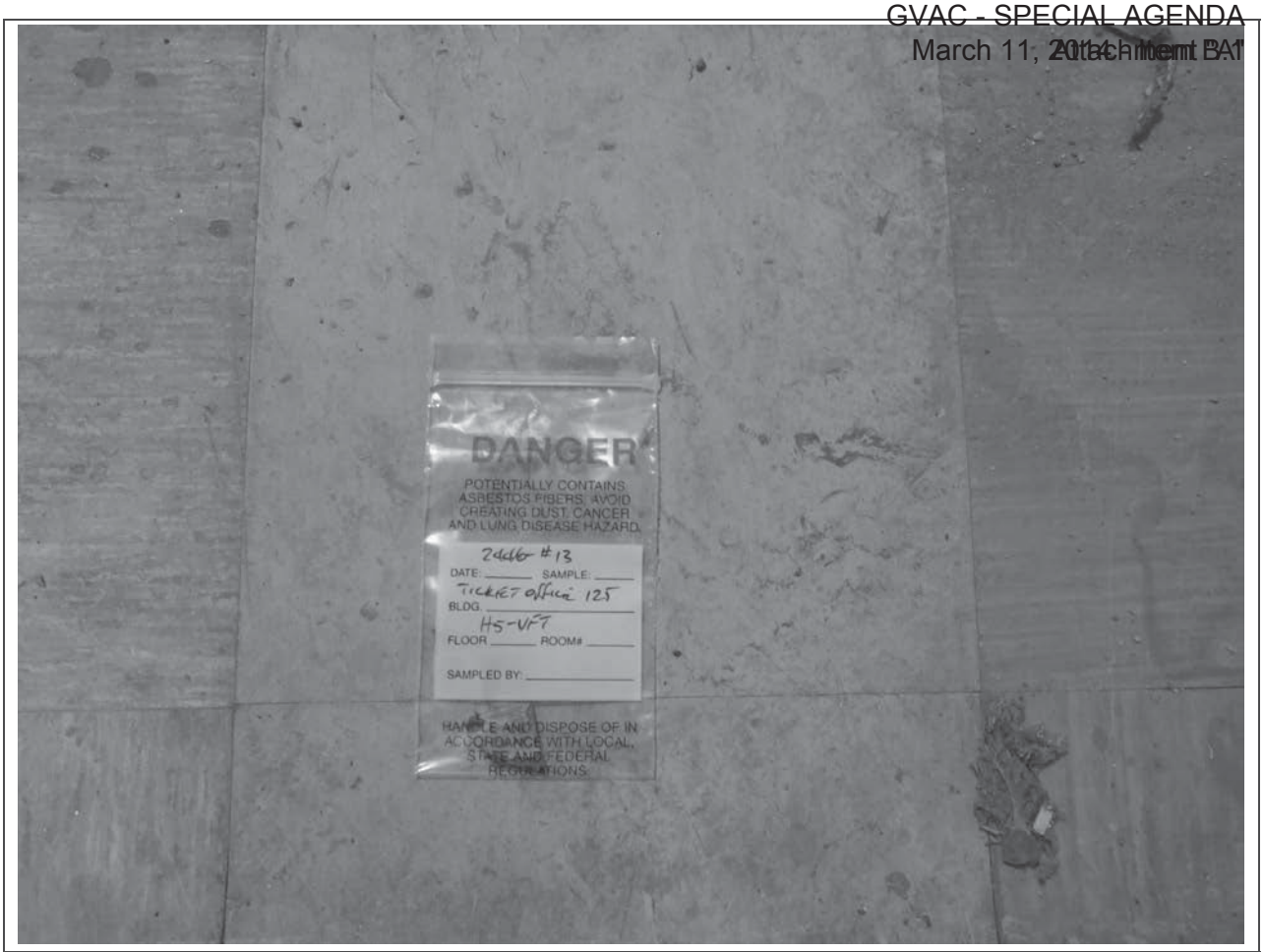
Picture No. 7: Sample 9 – Non Asbestos Floor Tile

Picture No. 8: Sample 11 – Non Asbestos Pipe Fitting Insulation (South Addition)



Picture No. 9: Sample 12 – Non Asbestos Exterior Stucco

Picture No. 10: Suspect Asbestos Cast Iron Sanitary Pipe Bell and Spigot Packing

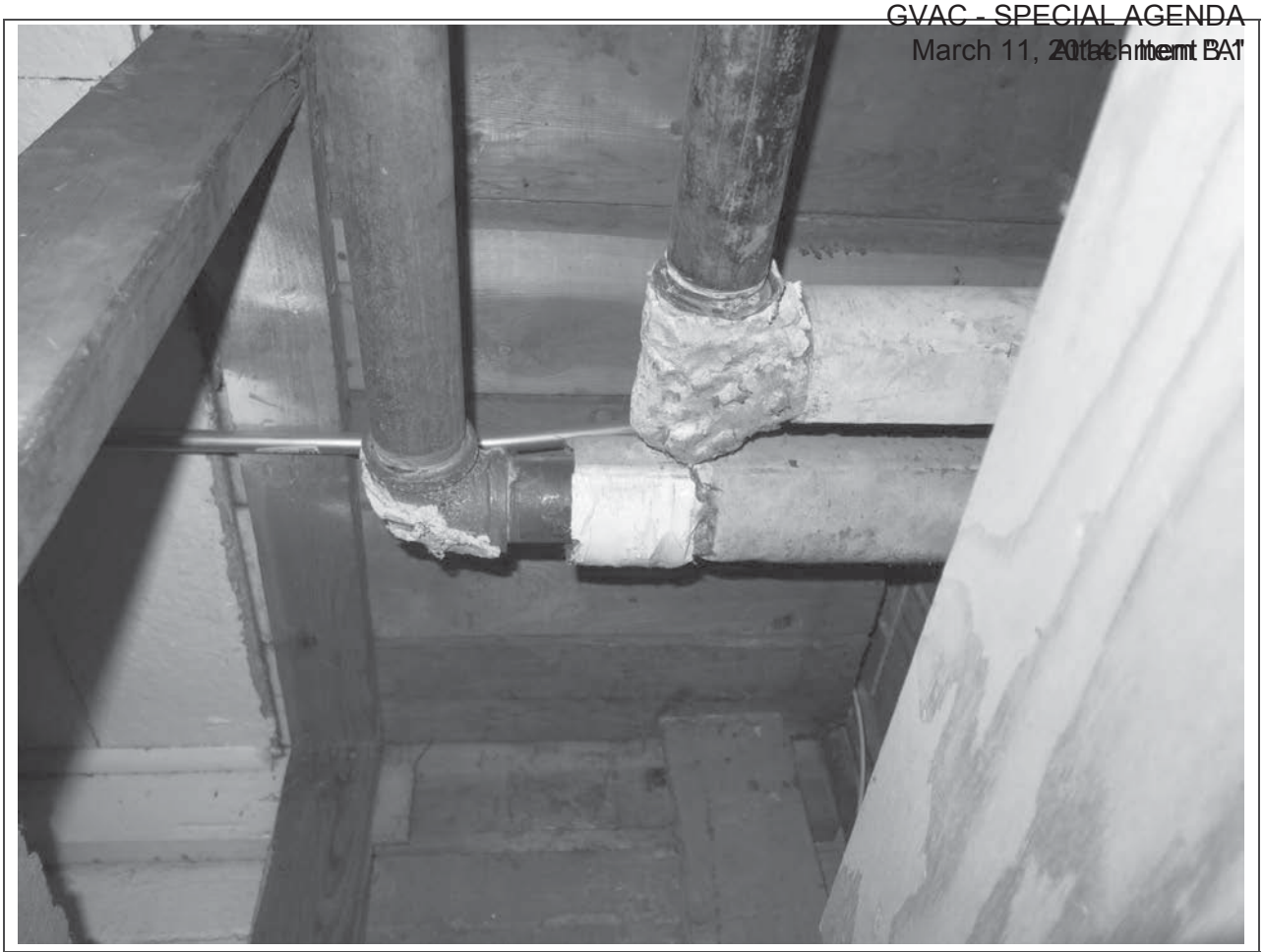


Picture No. 11: Sample 12 – Non Asbestos Floor Tile

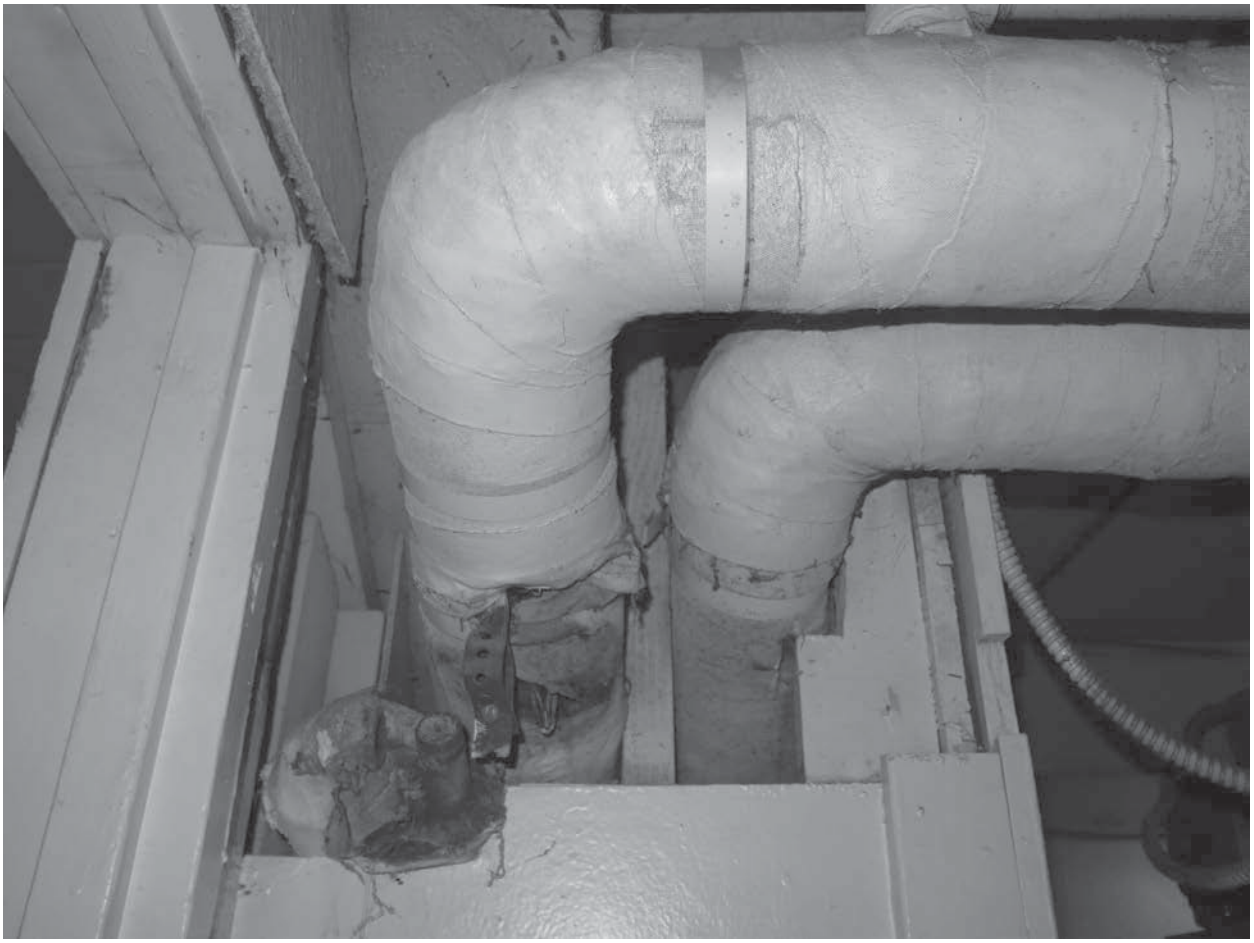
Picture No. 12: Sample 14 – Non Asbestos Floor Sheeting

Picture No. 13: Sample 15 – Non Asbestos Floor Tile

Picture No. 14: Sample 16 – Asbestos Containing Cement on Hot Water Heat Pipe Fitting



Picture No. 15: Poor Condition Asbestos Insulating Cement (typical)



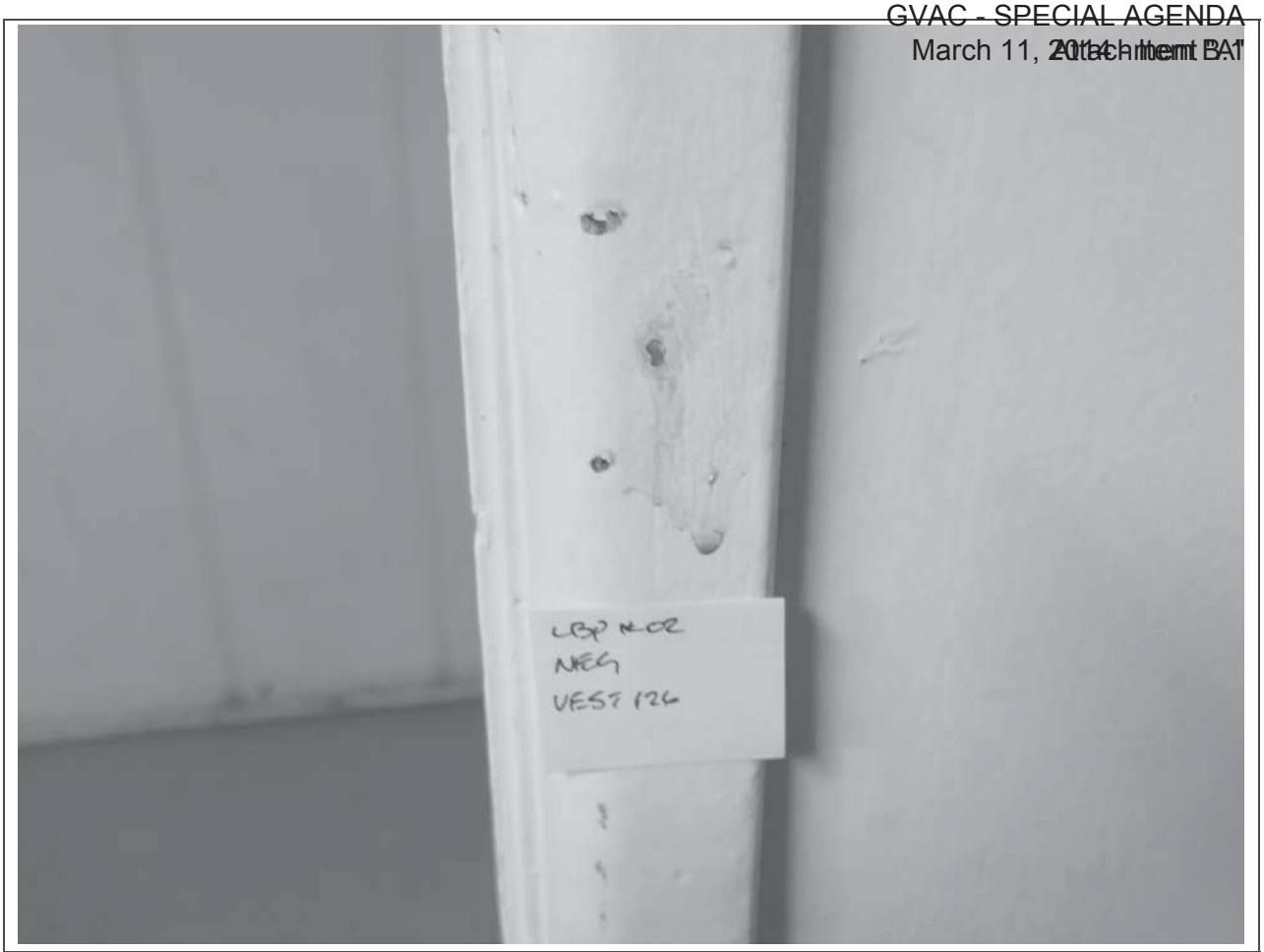
Picture No. 16: Good Condition Asbestos Insulating Cement (typical)

Picture No. 17: Sample 19 – Asbestos Pipe Flange Gasket

Picture No. 18: Sample 21 – Mon Asbestos Skate Flooring

Picture No. 19: Asbestos Insulating Cement on Hot Water Heating Lines in North Crawlspace

Picture No. 20: LBP #01 – Negative Exterior Blue Soffit Paint



Picture No. 21: LBP #2 – Non Lead White Door Trim Paint

Picture No. 22: LBP #3 – Non Lead Exterior Building Structure Paint

Picture No. 23: LBP #05 – Beige Interior Door Frame Paint

Picture No. 24: LBP #6 – Interior White Wood Paneling Paint

facility condition assessment chart

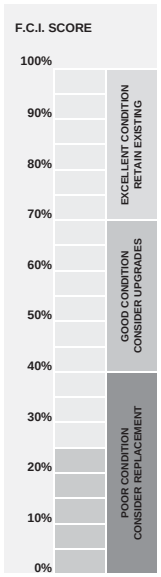
Facility Condition Index (F.C.I.)

Vernon Civic Arena

constructed 1937
age 76

% of Total Replacement Cost	Replacement Value		Replacement Component Life	Component Age	*Wear Factor	Remaining Component Life	Value remaining	Value remaining
		ARCHITECTURAL						
10%	$1,456,000	Exterior walls	75	76	50%	37	49%	$718,293
2%	$291,200	Exterior Windows	40	76	45%	6	15%	$42,224
1%	$145,600	Exterior Doors	35	76	40%	5	13%	$19,136
1%	$145,600	Interior Windows	40	76	100%	0	0%	$0
1%	$145,600	Interior Doors	35	76	40%	5	13%	$19,136
7%	$1,019,200	Roofs	40	76	100%	0	0%	$0
6%	$873,600	Interior Partitions	40	76	40%	10	24%	$209,664
3%	$436,800	Stairs and Guards	40	76	100%	0	0%	$0
2%	$291,200	Floor Finishes	20	76	25%	1	5%	$14,560
2%	$291,200	Specialties & Fixtures	25	76	100%	0	0%	$0
2%	$291,200	Dasher Boards	40	76	100%	0	0%	$0
1%	$145,600	Seats/Bleachers	30	76	20%	15	49%	$71,829
0%		Elevator						
3%	$436,800	Wall and Ceiling Finishes	25	76	20%	10	39%	$171,226
41%	**$5,969,600**	**Sub Total**						
		STRUCTURE						
6%	$873,600	Concrete foundations	75	76	50%	37	49%	$430,976
2%	$291,200	Concrete slab-on grade	50	76	50%	12	24%	$69,888
20%	$2,912,000	Superstrucutre	50	76	30%	27	54%	$1,584,128
28%	**$4,076,800**	**Sub Total**						
		MECHANICAL						
9%	$1,310,400	HVAC	20	76	25%	1	5%	$65,520
4%	$582,400	Plumbing	25	76	30%	2	9%	$51,251
0%		Pool Filtration						
0%		Sprinkler						
13%	**$1,892,800**	**Sub Total**						
		ELECTRICAL						
5%	$728,000	Distribution	25	76	30%	2	9%	$64,064
2%	$291,200	Lighting	20	76	25%	1	5%	$14,560
1%	$145,600	Fire Alarm	15	76	15%	4	24%	$34,944
8%	**$1,164,800**	**Sub Total**						
		REFRIGERATION						
4%	$582,400	Refrigerated Ice Slab	25	74	100%	0	0%	$0
6%	$873,600	Refrigeration Mechanical	20	74	100%	0	0%	$0
10%	**$1,456,000**	**Sub Total**						
100%	**$14,560,000**	**Total Replacement Value = 36,400 SF x $400/SF****			**F.C.I. Score**	**25%**	**$3,581,399**	**Value Remaining**

Date: 2013 2018 2023 2028 2033 2038 2043 2048 2053 2058 2063 2068 2073 2078 2083
Life: 1-5 6-10 11-15 16-20 21-25 26-30 31-35 36-40 41-45 46-50 51-55 56-60 61-65 66-70 71-75



***Wear Factors**
0% - New or As-New Condition (all life expectancy remaining)
50% - Better than expected for Age (more life expectancy remaining than might be normally expected at this age)
100% - As Expected Aging (life expectancy is on schedule)
150% - Worse than expected for age (less life expectancy remaining than might normally be expected at this age)
NR - Worn out, broken, needs replacement, non-existing (end of life expectancy)

F.C.I. is a measure of remaining value of a building and is calculated by adding individual component replacement costs corrected for relative wear.
F.C.I. = SUM((%Total Replacement Cost *Per Component*) x (Value Remaining *Per Component*))

**$400/SF is based on concrete wall structure with long span wood trusses and is an estimate of total construction cost including soft costs.

bruce carscadden ARCHITECT inc.

Essential to our work is a *respect for place* that grows out of an understanding of a specific site, climate, and historical and community context.

We are committed to an architecture that embodies the aspirations of its community and returns to its occupants a healthier environment.