



Review of the Hosmer Fire Hall

November 8, 2024 | Project # 2451-31070-11

Prepared for the Regional District of East Kootenay | Prepared
by McElhanney Ltd

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Your Challenge. Our Passion.

Our File: 2451-31070-11

November 8, 2024

Regional District of East Kootenay

Submitted via Email

Attention: Christina Carbrey, Protective Services Manager

Review of the Hosmer Fire Hall

On August 8th, 2024, McElhanney completed a field investigation of the Hosmer Fire Hall and Community Hall. This investigation was performed by Ben Hansen, a senior structural Engineer-in-Training, from the Cranbrook McElhanney office. Michael Hockley, Fire Chief for the Elk Valley & South Country Fire Services, and Kenley Barros, Building Supervisor for the RDEK were present for the investigation. A second field review was performed on October 17th, 2024, also by Ben Hansen with the assistance of a local electrician. It is our understanding that the purpose of these reviews is to provide structural, electrical and mechanical recommendations and insights to assist the RDEK in deciding as to whether expanding the existing fire hall or building a new hall would be the best option for the community.

The following is a breakdown of our review including the following key points; basic fire separation assessment, structural review, electrical review, mechanical review, opportunities for expanding the fire hall, and cost estimation review.

At McElhanney, we take great pride in being a part of the Cranbrook and Fernie communities and being in the East Kootenay Region for over 15 years. We understand the importance of community and the need for reliable emergency service facilities such as the Hosmer Fire Hall. We look forward to continuing to work together towards a brighter future for the Regional District of East Kootenay.

Sincerely,
McElhanney Ltd.

PERMIT TO PRACTICE

McElhanney Ltd.

PERMIT NUMBER: 1003299

Engineers and Geoscientists of BC

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1. Executive Summary

Following a site investigation of the building and review of the provided documents McElhanney has performed a high-level assessment of the existing building's structural capacity, evaluated options for expanding the existing fire hall and performed a cost assessment of the required remedial works in comparison to building a new fire hall.

Provided documentation shows the existing building was first constructed around 1983 and has been added onto at least 3 times since.

The fire separation assessment found that the building does not meet building code requirements in relation to both internal fire separation between the community hall and fire hall sections of the building as well as spatial separation requirements of the east and south building faces.

The structural assessment of the fire hall evaluated three main areas:

1. An estimate of the capacity of the lateral force resisting system.
2. Analysis of the observable structural components of the building for gravity loads.
3. A general review of observable structural aspects from the field investigation and review of the provided documents.

Our structural review of the Hosmer Fire Hall building revealed:

- The lateral force resistance system is likely insufficient.
- There are certain elements of the structure that have inadequate capacity for the required gravity loads.
- The framing of the guardrails on the two external stairways does not meet BC Building Code requirements.
- Portions of the existing structure do not have adequate frost protection.
- There is isolated water damage and minor framing issues present.

Our electrical review revealed:

- The existing electrical service for the building is at its limit. The installation of additional electrical equipment will require an upgrade to the existing electrical service.
- Several panels that were installed in the 1980's are in poor condition and should be replaced.
- Several lights in the community hall were not operational. As these are fluorescent lights, it is recommended that the lights be replaced with LED equivalents. The existing emergency light in the community hall was also not operational and should be replaced.

Our mechanical review revealed:

- A sprinkler system must be installed as per NFPA 13 for adequate fire protection. A fire alarm system and smoke detectors are also to be installed along with the sprinkler system.
- The HVAC System in the truck bays needs to be upgraded to include a make up air unit, exhaust fan, vehicle exhaust system, gas alarm system and controls.
- Install HRVs in the Fire Hall, meeting room, office, and other areas to meet ASHRAE 62.1 and install HEPA filtration Towers in the meeting room and fire hall.



- Install a commercial ventilation system to the kitchen which includes an exhaust hood, fire suppression system and a make up air unit.

To evaluate the options for expanding the existing building, we reviewed the relevant RDEK Building Bylaw for zoning, site coverage, and setbacks. Due to setback requirements, the required space for vehicle access to onsite parking, and the presence of an existing foundation, there is little opportunity for making additions to the existing building. It should be noted that the foundation of the old structure is possibly of heritage or historical significance. The best option for adding capacity to the fire hall would be build a separate building at the rear of the property.

A cost estimate of the noted scope of remedial works plus an additional 2-bay building was performed and compared to the estimated cost of completely new building of equivalent capacity built to modern firehall standards. This cost estimate shows the cost of remediating/renovating the existing building to be around 56%-69% of the cost of a new building.

2. Provided Documents

The following documents were provided by the RDEK and form the basis of our review in combination with the results of our field investigation.

1. "Engineering Inspection & Report" by CMG Engineering Services Corporation (CMG) – dated 4 April 2024
2. "Limited Scope HMBI Report" by CMG – dated 5 April 2024
3. "Energy Survey Report" by CMG – dated 25 April 2024
4. "Hosmer Volunteer Fire Department Proposed Addition" drawings by Westar Engineering, dated January 1985, with attached "Hosmer Volunteer Fire Department Proposed Layout Drawing" by BC Coal, dated May 1983.
5. "Hosmer Fire Hall" drawings for 2 bay addition by Pace Design & Drafting – dated 7 June 2024
6. Sketches for the kitchen addition, author and date unknown

2.1. SUMMARY OF BUILDING ADDITIONS

Based on the provided documents it is understood that the Hosmer Fire Hall/Community Center has been added to several times over the years. The building first existed as a 32' x 54' community hall (see Area A in Figure 1 below), built around 1983, onto which the original 2-bay 32' x 40' fire hall (Area B) was added around 1985. Around 2004 another addition was made with an additional 32' x 46' space for 2 additional bays for the firehall and a 16' x 48'-2" wing to the community hall (Area C). An approximately 12'-2" x 24' storage/office addition (Area D) was made to the side of the original firehall which was not shown on the



drawings from 2004 but is present in satellite imagery from December 2005. A 12' x 14' kitchen addition (Area E) was made the rear of the community hall, which was the last addition. It is unclear when the kitchen addition was made, however, satellite imagery from December 2005 does not show it. Finally, a 20ft Sea Can and patio area are attached to the site of the community hall (Area F). These were present in the December 2005 satellite imagery.



Figure 1 – Approximate map of building additions (photo courtesy of Google Earth)

Please note true north vs. project north in Figure 1 above. For simplicity, the report will refer to directions relative to project north e.g. the front (south-southwestern) face will be referred to as the south end of the building.

3. Fire Separation Review

3.1. INTERNAL FIRE SEPARATIONS

Our fire separation analysis of the building was done to the requirements of the British Columbia Building Code 2024 (BCBC), this should be taken as a basic review to be confirmed by an architect. It should be noted that no fire suppression systems were present in either the fire hall or community hall.

Based on the occupancies, the BCBC would likely classify the community hall as an A2 assembly occupancy and the fire hall as an F3 low-hazard industrial occupancy. Between these occupancies the BCBC requires a fire separation. The fire separation would apply to all walls, doors, windows, penetrations, and floor assemblies between occupancies such as the storage room above the fire hall meeting area. As an illustrative point the walls and floor assembly would need a minimum 1-hour fire resistance rating (FRR) and doors a minimum 45-minute FRR.

In reviewing the wall between the two occupancies we found no evidence of the wall being fire rated. The drawings for the original addition do mention a double layer of drywall but does not specify Type X (fire resistant) gypsum board. The drawings for the newer addition also make no mention of fire separation design of the walls. There is a single door between the community hall and fire hall, however, it appears to be a standard, non-fire rated door and does not feature an automatic closer.

3.2. SPATIAL SEPARATIONS

To meet BCBC requirements for spatial separation, any exposed building face with unprotected openings (non-rated doors and windows) within a certain distance of a property line must be fire rated.

To calculate the limiting distance for the south and east sides of the building we must first consider BCBC Sentence 3.2.3.1.(8), a limiting distance equal to half of the actual limiting distance (based off the lot line distance of 7.5m) must be used where fire department response time is estimated to be greater than 10 minutes, and any storey is not sprinklered which is the case here. Since this is a volunteer fire hall, it is not unreasonable to assume that the response time for members would be greater than 10 minutes, and in that time critical equipment may have been compromised. With this consideration the limiting distance is 4m (rounded up from $7.5\text{m} / 2$).

Without doing a full analysis we can determine that the east side of the building has an exposed face of over 150m^2 and with a limiting distance of 4m BCBC requires less than 13% unprotected openings per BCBC Table 3.2.3.1-B. This requirement is likely met, however in Table 3.2.3.7, a wall with between 10% and 25% unprotected openings requires a minimum 1-hour FRR and non-combustible cladding, neither of which are present here.

Similar to the east side, the south side of the building has an exposed face of over 100m^2 and with a limiting distance of 4m BCBC requires less than 18% unprotected openings and a minimum 1-hour FRR and non-combustible cladding. Again, neither of which are present here. With the overhead doors on the east side, two in use and two boarded up, likely more than 18% of the exposed face is unprotected.

4. Structural Review

McElhanney performed a high-level desktop review of the structural capacity of the existing building. This review covered three main areas:

1. An estimate of the capacity of the lateral force resisting system.
2. Analysis of the observable structural components of the building for gravity loads.
3. A general review of observable structural aspects from the field investigation and review of the provided documents.

Overall, it was noted that, aside from apparent water damage to the roof over the attached office/storage room and stairway at the south-eastern corner of the building, the condition of the building structurally appeared to be acceptable. No significant damage or deterioration was noted, nor was noticeable deflection in any spanning structural members observed.

Our structural analysis of the building was done to the requirements of the British Columbia Building Code 2024 (BCBC) with evaluation to the requirements of Part 4 (post-disaster), Part 4 (normal importance) and Part 9. The difference between these designations is that the climatic design loads (snow, wind, and seismic loading) that the building must be designed for can be higher depending on the building's classification. Typically, a fire hall would be considered a post disaster building, which would mean it would be designed with a higher factor of safety to try to ensure the building remains operable and safe, even in emergency situations. However, in the definition of post-disaster buildings in Section 1.4.1.2. of Division A of the BCBC, fire halls fall into a category of building that may be exempted from the post-disaster classification by the authority having jurisdiction, in this case the building department of the RDEK. In our experience, while McElhanney cannot recommend it, older fire halls are often exempted from the post-disaster classification and built to either standard Part 4 requirements, or the requirements of Part 9, which typically applies to standard residential type buildings.

The following loads were used in our analysis:

- Assumed Dead Load of standard wood framing = 0.7 kPa (15 psf)
- Snow Load Parameters:
 - $S_s = 4.5$ kPa (94 psf)
 - $S_r = 0.2$ kPa (4.2 psf)
 - $C_w = 1.0$
 - $C_s = 1.0$
 - $C_a = 1.0$, apart from the north-eastern patio area where $C_a = 1.44$ max.
 - $C_b = 0.8$ for Part 4 (normal and post-disaster) or 0.55 for Part 9
 - $I_s = 1.0$ for Part 4 (normal) or 1.25 Part 4 (post-disaster), doesn't apply to Part 9
- Wind Load Parameters:
 - 1 in 50 year wind pressure = 0.40 kPa (8.4 psf)



- $C_e = 0.915$
 - $C_t = 1.0$
 - $I_w = 1.0$ for Part 4 (normal) or 1.25 Part 4 (post-disaster), doesn't apply to Part 9
- Seismic Design Parameters:
 - Assumed site class X_D
 - $S_a(0.2, X_D) = 0.411$
 - $S_a(0.5, X_D) = 0.365$
 - $S_a(1.0, X_D) = 0.211$
 - $S_a(2.0, X_D) = 0.108$
 - $S_a(4.0, X_D) = 0.0545$
 - $S_a(5.0, X_D) = 0.0218$
 - $PGA(X_D) = 0.165$
 - $PGV(X_D) = 0.177$
 - $I_E = 1.0$ for Part 4 (normal) or 1.5 Part 4 (post-disaster), doesn't apply to Part 9
- Live Loads:
 - Part 9 = 1.9 kPa (40 psf)
 - Part 4 = 4.8 kPa (100 psf)
 - The post disaster classification does not affect live loads.

4.1. LATERAL FORCE ESTIMATE

Typically, the lateral force resisting system for a wood framed building such as this would be a series of shear walls placed in key locations. The capacity of those shear walls would depend upon various factors such as the species of stud, the type of sheathing, the spacing and size of the nails from sheathing to studs and hold down anchors. However, without stripping the building down to the framing, many of these details cannot be confirmed. To perform this analysis, this office has assumed a potential layout of shear walls, based on the measured length of solid wall sections during the field investigation and has made a reasonable assumption for the capacity of shear walls that we would typically expect in a building such as this. This allows us to estimate the potential capacity of the lateral force resisting system which we can then compare to the calculated wind and seismic loads.

The results of this analysis were as follows:

- The capacity of the lateral force resisting system in the north-south direction could be reasonably assumed to be sufficient for Part 9 and Part 4 normal importance loading but insufficient for Part 4 (post-disaster) loading. The system being roughly 66% over capacity under post-disaster loading.
- The capacity of the lateral force resisting system in the east-west direction is more challenging to evaluate. Due to the height of the walls and short length of the walls between doors along the front (south) face of the building, it is not possible for there to be any shear walls that would not exceed the maximum allowable aspect ratio of 3.5:1 (height:width). We must therefore assume that the shear load that would be taken up along this wall line is instead supported at the next available,



A topographic map with green contour lines and some green shaded areas representing vegetation, serving as a background for the upper portion of the page.

internal shear walls. With these assumptions it was found that the system would be over capacity by roughly 64% under Part 9 loads, up to 277% under Part 4 post-disaster loads.

Overall, it is expected that the lateral force resisting system for the building would be insufficient for the required loads. It is expected that, if the existing fire hall would remain in use and need to be brought up to current building code requirements, extensive renovations to the lateral force resisting system would be required.

4.2. GRAVITY LOAD EVALUATION

McElhanney has performed an evaluation of select areas of the gravity load supporting structure. These gravity loads consist of: the weight of the structure itself (dead load); the weight of people or equipment moving about the floor (live loads); and/or the weight of snow on the roof (snow loads). Many elements of the gravity load supporting system could not be evaluated as they couldn't be observed and measured (e.g. the wall framing) or safely accessed (e.g. the roof framing of the main building and first fire hall addition). The framing that has been evaluated is as follows:

1. The modified queenpost trusses over the 2004 fire hall addition.
2. The monoslope trusses over the 2004 community hall addition.
3. The howe trusses over the original community hall building.
4. The framing of the roof structure over the stairway/office/storage addition at the south-eastern corner of the building.
5. The framing of the roof structure over the patio at the north-eastern corner of the building.
6. The framing of the storage mezzanine inside the firehall.
7. The framing of the beam and posts supporting storage room in the older section of the firehall. Please note that these structural elements were hidden but by measuring the finished width of the post and width and depth of the dropped beam we can estimate what the framing likely is based on our experience with similar structures in the past.
8. The posts supporting the opening between the original and new sections of the community hall.

The results of these evaluations have been summarised in Table 1 below.

It should be noted that a common issue observed with framing of multi-ply beams throughout the building was that splice points in the beam plies were occasionally located in the middle of the beam spans. Although common with older framing it is not considered acceptable by modern standards which require all beam splices to occur over supports. Analysis of the beams has assumed full capacity of all plies of the beams regardless.



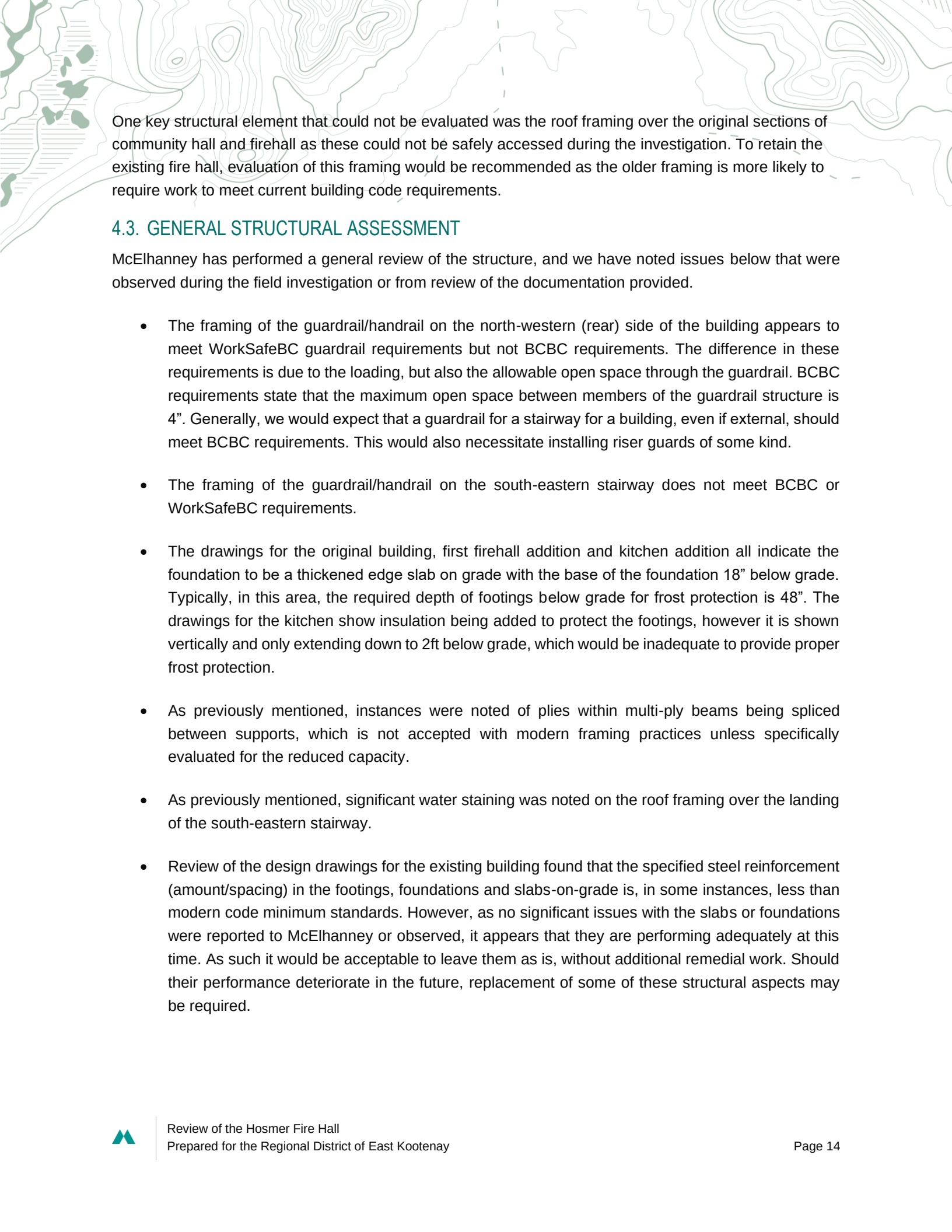
Table 1 - Gravity Load Assessment Results

Structural System	Part 4 – Post-disaster		Part 4 – Normal Importance		Part 9	
	Pass/Fail	Capacity	Pass/Fail	Capacity	Pass/Fail	Capacity
Fire Hall Modified Queenpost Trusses	Pass	55%	Pass	45%	Pass	34%
Community Hall Monoslope Trusses	Pass	47%	Pass	39%	Pass	29%
Community Hall Howe Truss	Pass	66%	Pass	54%	Pass	40%
S.E. Stairway Rafters	Fail	341%	Fail	277%	Fail	203%
S.E. Stairway Beam	Fail	208%	Fail	171%	Fail	127%
S.E. Stairway Posts	Fail	309%	Fail	254%	Fail	190%
N.E. Patio Rafters	Fail	141%	Fail	115%	Pass	69%
N.E. Patio Beam	Pass	88%	Pass	72%	Pass	40%
N.E. Patio Posts	Pass	82%	Pass	61%	Pass	28%
Fire Hall Mezzanine Joists	Pass	59%	Pass	59%	Pass	25%
Fire Hall Mezzanine Beam	Pass	51%	Pass	51%	Pass	24%
Fire Hall Mezzanine Posts	Pass	61%	Pass	61%	Pass	27%
Storage Room Beam	Pass	89%	Pass	89%	Pass	41%
Storage Room Posts	Pass	24%	Pass	24%	Pass	11%
Community Hall Posts	Fail	148%	Fail	124%	Pass	84%

Note: Capacity over 100% is taken as failing.

The results above show that the framing of the roof over the south-eastern stairway is insufficient to meet BCBC requirements and that the north-eastern patio rafters and community hall posts would only be acceptable under Part 9 loading. Were the existing fire hall to remain in use and need to be brought up to current building code requirements, it is expected that some elements of the structure would require reinforcing or replacement.



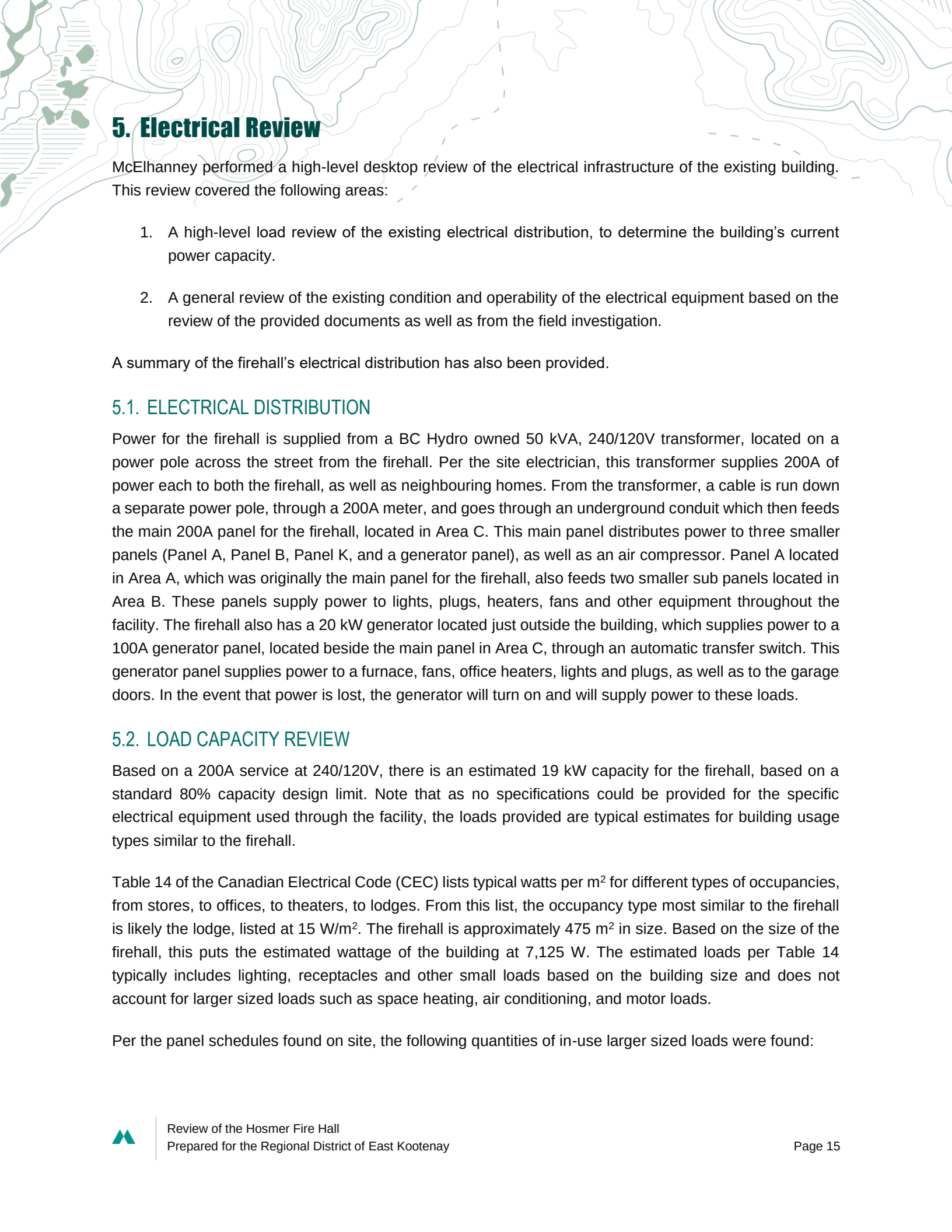
A decorative background image of a topographic map with green contour lines and some green patches representing vegetation, located in the upper left corner of the page.

One key structural element that could not be evaluated was the roof framing over the original sections of community hall and firehall as these could not be safely accessed during the investigation. To retain the existing fire hall, evaluation of this framing would be recommended as the older framing is more likely to require work to meet current building code requirements.

4.3. GENERAL STRUCTURAL ASSESSMENT

McElhanney has performed a general review of the structure, and we have noted issues below that were observed during the field investigation or from review of the documentation provided.

- The framing of the guardrail/handrail on the north-western (rear) side of the building appears to meet WorkSafeBC guardrail requirements but not BCBC requirements. The difference in these requirements is due to the loading, but also the allowable open space through the guardrail. BCBC requirements state that the maximum open space between members of the guardrail structure is 4". Generally, we would expect that a guardrail for a stairway for a building, even if external, should meet BCBC requirements. This would also necessitate installing riser guards of some kind.
- The framing of the guardrail/handrail on the south-eastern stairway does not meet BCBC or WorkSafeBC requirements.
- The drawings for the original building, first firehall addition and kitchen addition all indicate the foundation to be a thickened edge slab on grade with the base of the foundation 18" below grade. Typically, in this area, the required depth of footings below grade for frost protection is 48". The drawings for the kitchen show insulation being added to protect the footings, however it is shown vertically and only extending down to 2ft below grade, which would be inadequate to provide proper frost protection.
- As previously mentioned, instances were noted of plies within multi-ply beams being spliced between supports, which is not accepted with modern framing practices unless specifically evaluated for the reduced capacity.
- As previously mentioned, significant water staining was noted on the roof framing over the landing of the south-eastern stairway.
- Review of the design drawings for the existing building found that the specified steel reinforcement (amount/spacing) in the footings, foundations and slabs-on-grade is, in some instances, less than modern code minimum standards. However, as no significant issues with the slabs or foundations were reported to McElhanney or observed, it appears that they are performing adequately at this time. As such it would be acceptable to leave them as is, without additional remedial work. Should their performance deteriorate in the future, replacement of some of these structural aspects may be required.



5. Electrical Review

McElhanney performed a high-level desktop review of the electrical infrastructure of the existing building. This review covered the following areas:

1. A high-level load review of the existing electrical distribution, to determine the building's current power capacity.
2. A general review of the existing condition and operability of the electrical equipment based on the review of the provided documents as well as from the field investigation.

A summary of the firehall's electrical distribution has also been provided.

5.1. ELECTRICAL DISTRIBUTION

Power for the firehall is supplied from a BC Hydro owned 50 kVA, 240/120V transformer, located on a power pole across the street from the firehall. Per the site electrician, this transformer supplies 200A of power each to both the firehall, as well as neighbouring homes. From the transformer, a cable is run down a separate power pole, through a 200A meter, and goes through an underground conduit which then feeds the main 200A panel for the firehall, located in Area C. This main panel distributes power to three smaller panels (Panel A, Panel B, Panel K, and a generator panel), as well as an air compressor. Panel A located in Area A, which was originally the main panel for the firehall, also feeds two smaller sub panels located in Area B. These panels supply power to lights, plugs, heaters, fans and other equipment throughout the facility. The firehall also has a 20 kW generator located just outside the building, which supplies power to a 100A generator panel, located beside the main panel in Area C, through an automatic transfer switch. This generator panel supplies power to a furnace, fans, office heaters, lights and plugs, as well as to the garage doors. In the event that power is lost, the generator will turn on and will supply power to these loads.

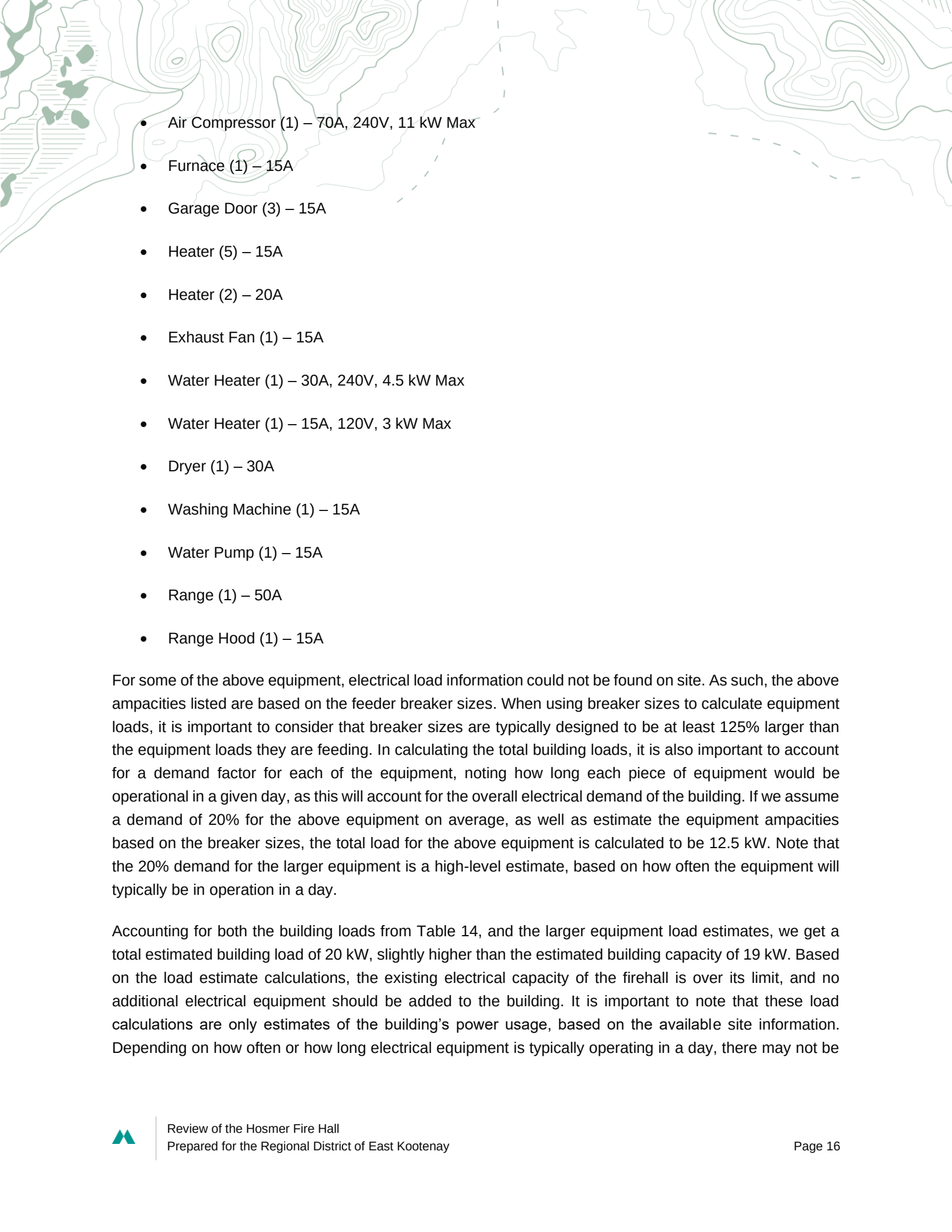
5.2. LOAD CAPACITY REVIEW

Based on a 200A service at 240/120V, there is an estimated 19 kW capacity for the firehall, based on a standard 80% capacity design limit. Note that as no specifications could be provided for the specific electrical equipment used through the facility, the loads provided are typical estimates for building usage types similar to the firehall.

Table 14 of the Canadian Electrical Code (CEC) lists typical watts per m² for different types of occupancies, from stores, to offices, to theaters, to lodges. From this list, the occupancy type most similar to the firehall is likely the lodge, listed at 15 W/m². The firehall is approximately 475 m² in size. Based on the size of the firehall, this puts the estimated wattage of the building at 7,125 W. The estimated loads per Table 14 typically includes lighting, receptacles and other small loads based on the building size and does not account for larger sized loads such as space heating, air conditioning, and motor loads.

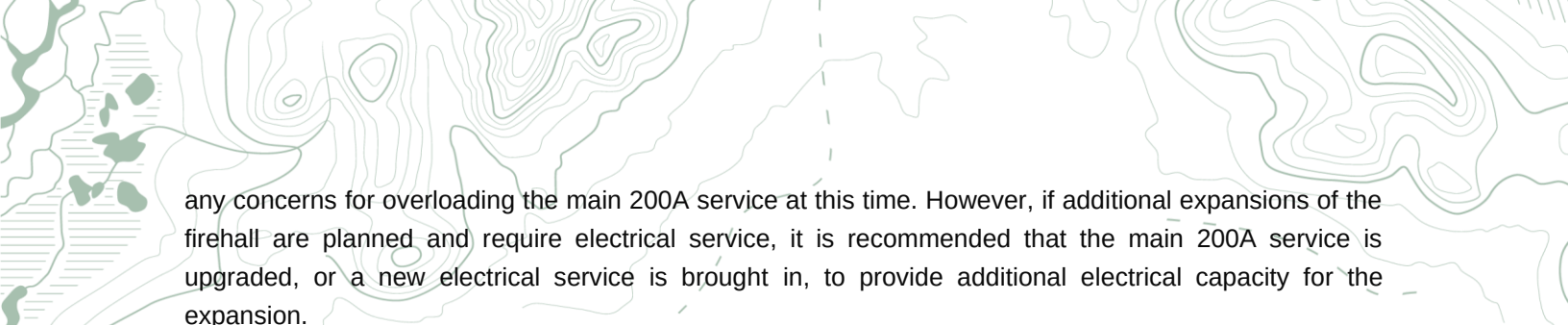
Per the panel schedules found on site, the following quantities of in-use larger sized loads were found:



- 
- A topographic map with green contour lines and some green shaded areas, serving as a background for the list.
- Air Compressor (1) – 70A, 240V, 11 kW Max
 - Furnace (1) – 15A
 - Garage Door (3) – 15A
 - Heater (5) – 15A
 - Heater (2) – 20A
 - Exhaust Fan (1) – 15A
 - Water Heater (1) – 30A, 240V, 4.5 kW Max
 - Water Heater (1) – 15A, 120V, 3 kW Max
 - Dryer (1) – 30A
 - Washing Machine (1) – 15A
 - Water Pump (1) – 15A
 - Range (1) – 50A
 - Range Hood (1) – 15A

For some of the above equipment, electrical load information could not be found on site. As such, the above ampacities listed are based on the feeder breaker sizes. When using breaker sizes to calculate equipment loads, it is important to consider that breaker sizes are typically designed to be at least 125% larger than the equipment loads they are feeding. In calculating the total building loads, it is also important to account for a demand factor for each of the equipment, noting how long each piece of equipment would be operational in a given day, as this will account for the overall electrical demand of the building. If we assume a demand of 20% for the above equipment on average, as well as estimate the equipment ampacities based on the breaker sizes, the total load for the above equipment is calculated to be 12.5 kW. Note that the 20% demand for the larger equipment is a high-level estimate, based on how often the equipment will typically be in operation in a day.

Accounting for both the building loads from Table 14, and the larger equipment load estimates, we get a total estimated building load of 20 kW, slightly higher than the estimated building capacity of 19 kW. Based on the load estimate calculations, the existing electrical capacity of the firehall is over its limit, and no additional electrical equipment should be added to the building. It is important to note that these load calculations are only estimates of the building's power usage, based on the available site information. Depending on how often or how long electrical equipment is typically operating in a day, there may not be

A decorative topographic map background with green contour lines and some green patches representing vegetation, located in the top left corner of the page.

any concerns for overloading the main 200A service at this time. However, if additional expansions of the firehall are planned and require electrical service, it is recommended that the main 200A service is upgraded, or a new electrical service is brought in, to provide additional electrical capacity for the expansion.

Accurate load data for the building can be provided by BC Hydro if requested, to definitively determine the building's current electrical usage.

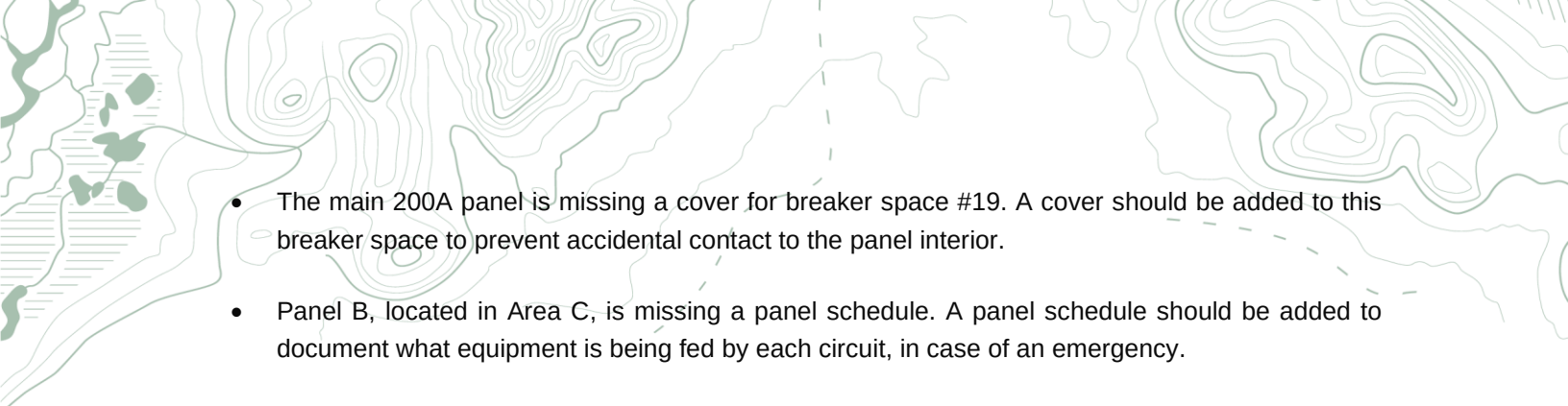
5.3. GENERAL ELECTRICAL ASSESSMENT

Overall, the visual assessment found that the majority of the electrical equipment was in fair to good condition. Receptacles and emergency lights were tested, and most were found to be properly wired and working. There were some pieces of electrical equipment that were found to be in poor condition and are recommended to be replaced. The poor condition electrical equipment, and other equipment that should be replaced are listed below:

- In Area A of the building, Panel A appears to be part of the original building installation in 1983. This panel is an older Stab-Lok panel from Federal Pacific, which has known issues of breakers being unable to trip during an electrical incident, resulting in electrical fires. The panel interior was also found to be in very poor condition, with animal droppings and debris found inside. Considering the age, condition, and model of the panel, it is recommended that this panel be replaced with a new 100A panel. Should the smaller panel be installed, the corresponding 150A feeder breaker from the main 200A panel will also need to be downsized to 100A.
- In Area B of the building, the 100A panel labelled "Big Panel A" appears to have been installed as part of the original Area B expansion in 1985. This panel is also an older Stab-Lok panel from Federal Pacific. Considering both the age and model of the panel, it is recommended that this panel be replaced with a new 60A or 100A panel.
- In Area A of the building, several of the ceiling lights and wall lights, which were identified as fluorescents, were not operational. Based on the condition and type of lighting installed, it is recommended that the existing fluorescent lights be replaced with LED equivalents in this area.
- In Area A of the building, the community hall on the west wall, there is an emergency light above the exit sign that is not operational. Per BC Building Code *Section 9.9.12.3 – Emergency Lighting*, emergency lighting is to be provided in principal routes providing access to exits in an open floor area, as well as in corridors used by the public. As the community hall is a public space that provides access to multiple exits, an emergency light is needed in this area. As such, this emergency light will need to be replaced, as there are no other emergency lights for the area.

Additionally, there were several maintenance items and other items of note that were found during the site assessment that should be addressed. A list of these items is provided below:



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- The main 200A panel is missing a cover for breaker space #19. A cover should be added to this breaker space to prevent accidental contact to the panel interior.
 - Panel B, located in Area C, is missing a panel schedule. A panel schedule should be added to document what equipment is being fed by each circuit, in case of an emergency.
 - In the transition area between Area A and Area B, there is a missing cover plate on a light switch in the corner. A cover should be added to this light switch to prevent accidental contact to the interior wiring.
 - In the kitchen area, there are a mix of 15A and 20A receptacles at the kitchen countertops. To avoid breaker tripping and other electrical issues, larger kitchen appliances should only be plugged into the 20A receptacles.

Note that during the site visit, we were unable to be fully assess the overall condition of the electrical wiring and cabling throughout the building. For the wiring and cables that were visible, these all appeared to be in good condition. However, cables that were routed through walls and rafters were not accessible and as such could not be assessed.

6. Mechanical Review

McElhanney conducted a comprehensive high-level desktop review of the HVAC (Heating, Ventilation, and Air Conditioning), sprinkler, and plumbing requirements of the existing building to assess compliance with current codes and standards. This review was essential to ensure the safety, efficiency, and comfort of the building's occupants. The specific areas covered in this review included:

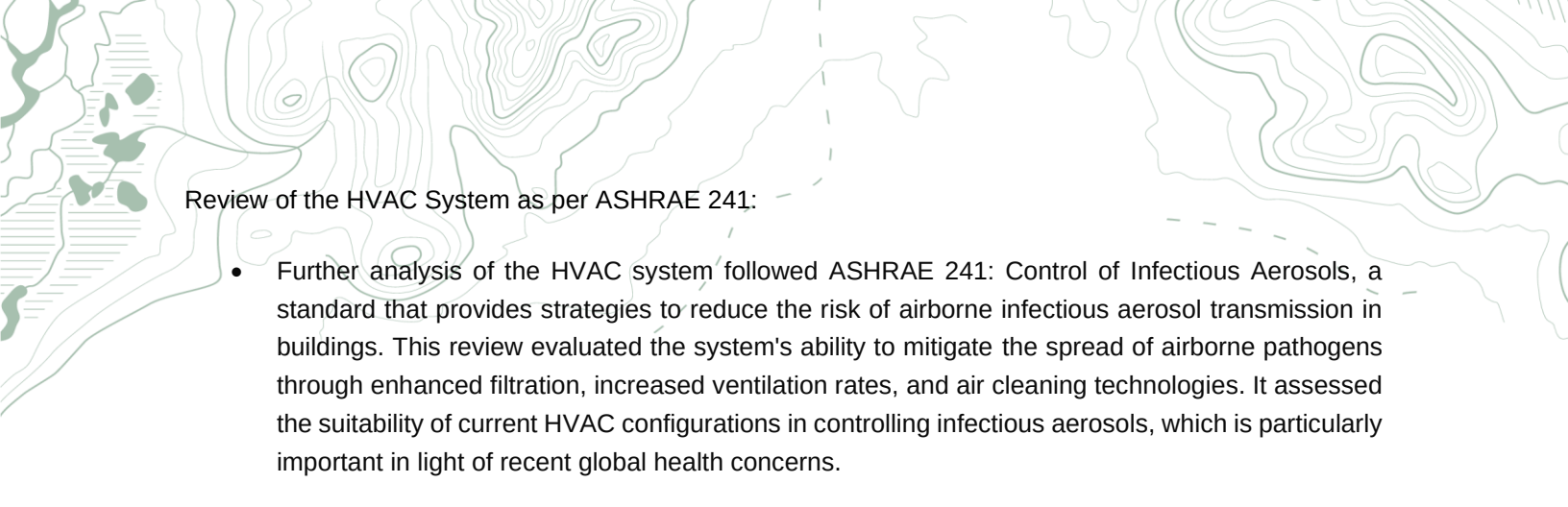
Review of the Sprinkler System as per NFPA 13:

- An evaluation of the building's existing sprinkler system was performed in accordance with NFPA 13: Standard for the Installation of Sprinkler Systems by the National Fire Protection Association (NFPA). This standard sets the criteria for the design and installation of automatic fire sprinkler systems to safeguard life and property from fire.

Review of the HVAC System as per ASHRAE 62.1:

- The HVAC system was examined based on ASHRAE 62.1: Ventilation for Acceptable Indoor Air Quality, which establishes minimum ventilation rates and indoor air quality guidelines necessary for occupant health and comfort. The review focused on ventilation effectiveness, including the distribution of outdoor air and control of indoor contaminants. It is aimed to verify that the HVAC system provides sufficient fresh air exchange and maintains indoor air quality within acceptable limits to enhance occupant well-being and productivity.





Review of the HVAC System as per ASHRAE 241:

- Further analysis of the HVAC system followed ASHRAE 241: Control of Infectious Aerosols, a standard that provides strategies to reduce the risk of airborne infectious aerosol transmission in buildings. This review evaluated the system's ability to mitigate the spread of airborne pathogens through enhanced filtration, increased ventilation rates, and air cleaning technologies. It assessed the suitability of current HVAC configurations in controlling infectious aerosols, which is particularly important in light of recent global health concerns.

Review of the Kitchen Ventilation System to NFPA 96:

- The kitchen ventilation system was reviewed against NFPA 96: Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations. This standard addresses the design, installation, operation, and maintenance of kitchen exhaust systems to prevent fire hazards associated with commercial cooking equipment.

Review of the Building Plumbing Requirements to the British Columbia Plumbing Code:

- An assessment of the building's plumbing systems was carried out in accordance with the British Columbia Plumbing Code, which included the review of the potable water supply, sanitary drainage, venting systems, and fixture requirements.

6.1. SPRINKLER SYSTEM

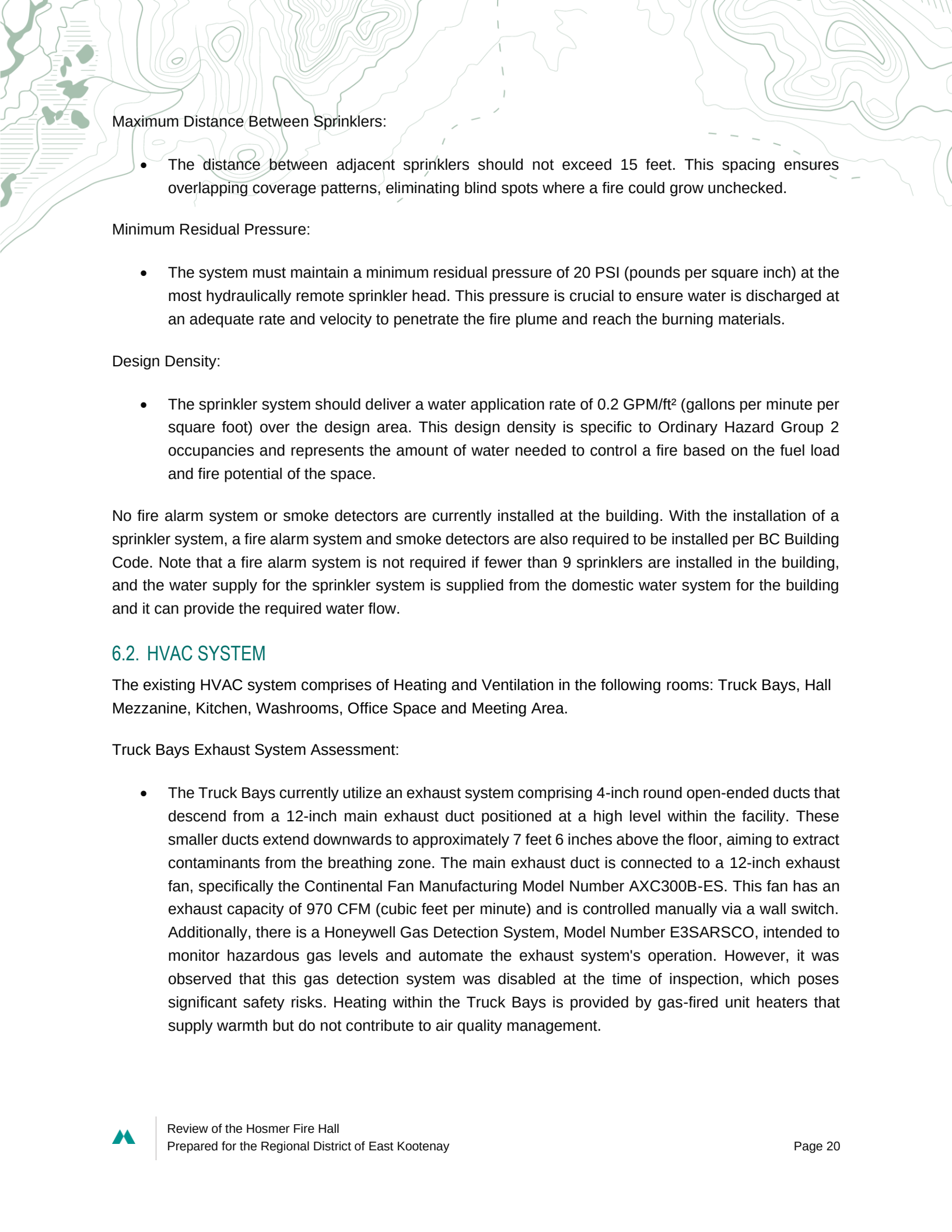
Upon thorough evaluation, it has been identified that the building currently lacks a sprinkler system installed in any of its rooms. Per NFPA 13 (2022 Edition): *Standard for the Installation of Sprinkler Systems*, sprinklers are required for buildings larger than 5000 square feet. As the building is just over 5000 square feet with the latest additions, a sprinkler system is now needed. As well, according to the NFPA 13, buildings classified under Ordinary Hazard Occupancy are required to have sprinkler systems that meet specific design criteria to ensure adequate fire protection and life safety.

To comply with these standards, the building would need the installation of a sprinkler system designed for Ordinary Hazard conditions, which typically pertain to environments with moderate quantities of flammable materials and potential for more severe fires. The key requirements for such a system include:

Individual Sprinkler Coverage:

- Each sprinkler head must cover a maximum area of 130 square feet. This limitation ensures that each sprinkler provides sufficient water discharge to effectively control or suppress a fire within its designated area.





Maximum Distance Between Sprinklers:

- The distance between adjacent sprinklers should not exceed 15 feet. This spacing ensures overlapping coverage patterns, eliminating blind spots where a fire could grow unchecked.

Minimum Residual Pressure:

- The system must maintain a minimum residual pressure of 20 PSI (pounds per square inch) at the most hydraulically remote sprinkler head. This pressure is crucial to ensure water is discharged at an adequate rate and velocity to penetrate the fire plume and reach the burning materials.

Design Density:

- The sprinkler system should deliver a water application rate of 0.2 GPM/ft² (gallons per minute per square foot) over the design area. This design density is specific to Ordinary Hazard Group 2 occupancies and represents the amount of water needed to control a fire based on the fuel load and fire potential of the space.

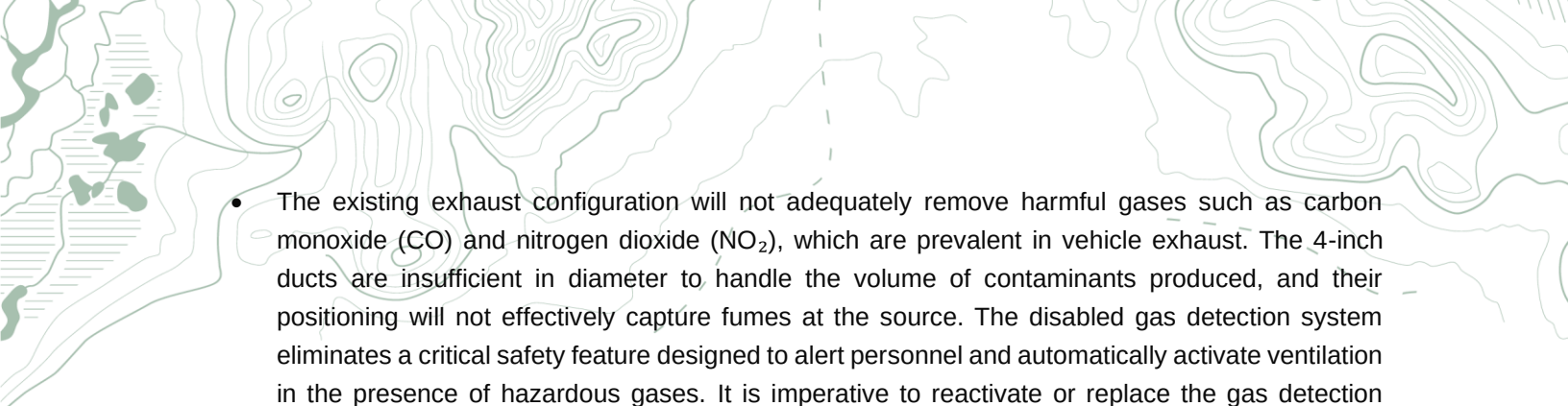
No fire alarm system or smoke detectors are currently installed at the building. With the installation of a sprinkler system, a fire alarm system and smoke detectors are also required to be installed per BC Building Code. Note that a fire alarm system is not required if fewer than 9 sprinklers are installed in the building, and the water supply for the sprinkler system is supplied from the domestic water system for the building and it can provide the required water flow.

6.2. HVAC SYSTEM

The existing HVAC system comprises of Heating and Ventilation in the following rooms: Truck Bays, Hall Mezzanine, Kitchen, Washrooms, Office Space and Meeting Area.

Truck Bays Exhaust System Assessment:

- The Truck Bays currently utilize an exhaust system comprising 4-inch round open-ended ducts that descend from a 12-inch main exhaust duct positioned at a high level within the facility. These smaller ducts extend downwards to approximately 7 feet 6 inches above the floor, aiming to extract contaminants from the breathing zone. The main exhaust duct is connected to a 12-inch exhaust fan, specifically the Continental Fan Manufacturing Model Number AXC300B-ES. This fan has an exhaust capacity of 970 CFM (cubic feet per minute) and is controlled manually via a wall switch. Additionally, there is a Honeywell Gas Detection System, Model Number E3SARSCO, intended to monitor hazardous gas levels and automate the exhaust system's operation. However, it was observed that this gas detection system was disabled at the time of inspection, which poses significant safety risks. Heating within the Truck Bays is provided by gas-fired unit heaters that supply warmth but do not contribute to air quality management.

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- The existing exhaust configuration will not adequately remove harmful gases such as carbon monoxide (CO) and nitrogen dioxide (NO₂), which are prevalent in vehicle exhaust. The 4-inch ducts are insufficient in diameter to handle the volume of contaminants produced, and their positioning will not effectively capture fumes at the source. The disabled gas detection system eliminates a critical safety feature designed to alert personnel and automatically activate ventilation in the presence of hazardous gases. It is imperative to reactivate or replace the gas detection system to ensure continuous monitoring and protection of occupants. Upgrading the exhaust system to meet current standards is also recommended to enhance air quality and comply with occupational safety regulations.

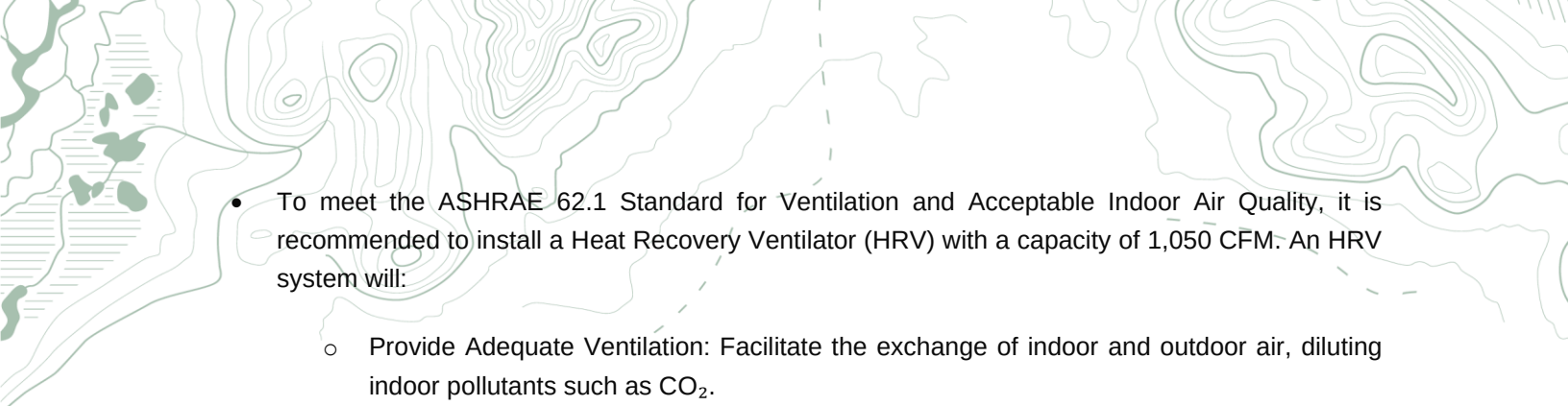
HVAC Requirements and Recommendations for Truck Bays:

- The Truck Bays are divided into two separate areas, collectively covering 2,000 square feet. Given the nature of the operations, housing and maintaining vehicles that emit exhaust fumes, the following HVAC system recommendations are essential to ensure a safe working environment.
- Exhaust Ventilation: A 1,500 CFM Exhaust Fan: A fan of this capacity with both high and low extraction points is necessary to effectively remove airborne contaminants from different elevations within the space.
- Vehicle Fume Extraction System: A 3,000 CFM system that connects directly to the vehicles' exhaust outlets is required. This direct connection ensures immediate capture of exhaust fumes at the source, preventing them from entering the indoor air.
- Makeup Air Supply: A two speed Makeup Air Unit, capable of supplying 1,500 CFM at low speed and 3,000 CFM at high speed should be installed. This unit will operate continuously at low speed to maintain baseline ventilation and switch to high speed when needed.
- Control Systems - Automatic Operation: The makeup air unit should automatically increase to high speed when the vehicle fume extraction system is engaged or if gas monitoring detects hazardous levels such as activation at gas concentrations exceeding 0.1 PPM for NO₂ or 35 PPM for CO. In the event of elevated gas levels, the system enters a purge mode where the makeup air unit operates at high speed and the exhaust fan and fume exhaust system are both initiated, and an alarm is triggered to alert occupants.

Fire Hall HVAC Evaluation:

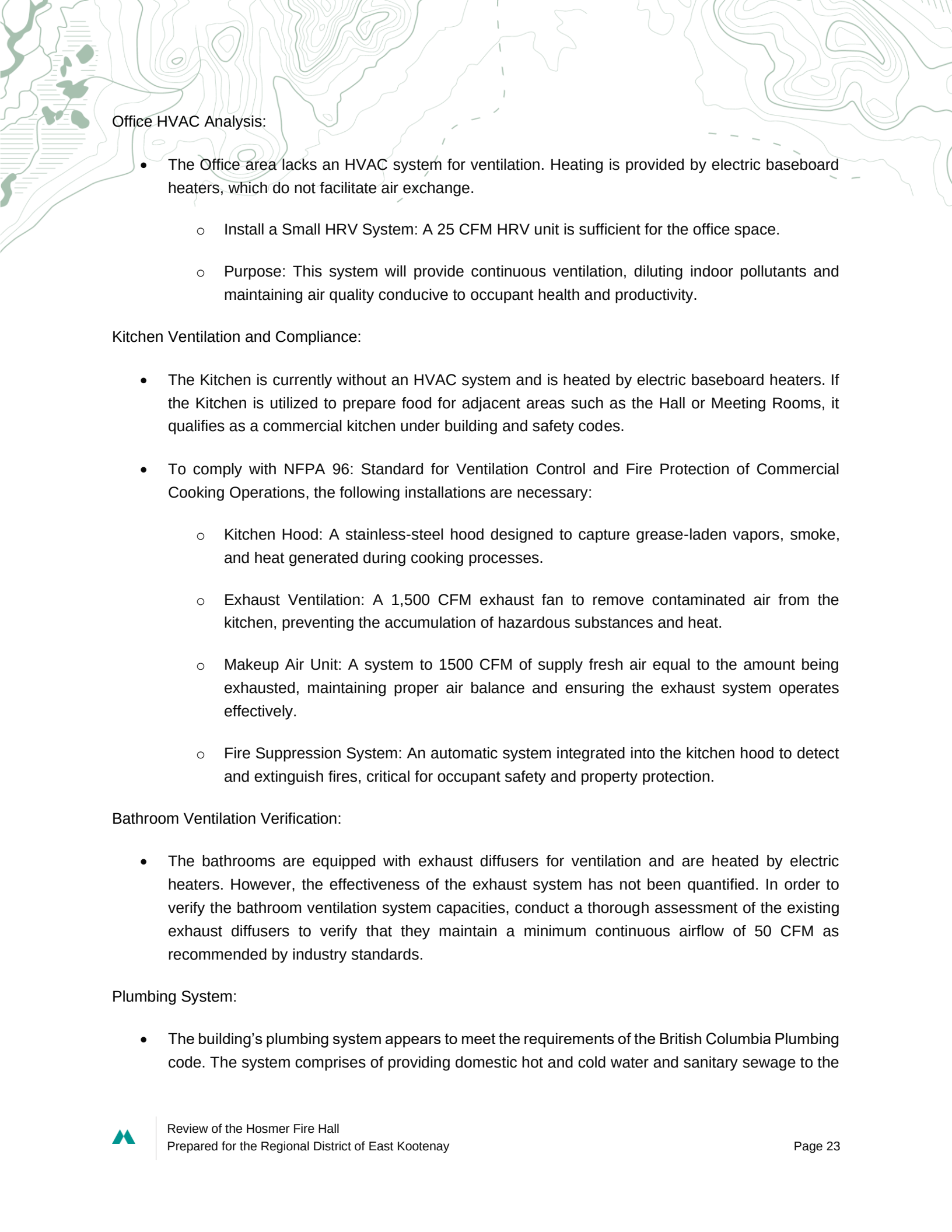
- The Fire Hall currently lacks an HVAC system dedicated to ventilation. Heating is provided by gas fired radiant panels, which offer efficient warmth but do not address air exchange or indoor air quality.



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- To meet the ASHRAE 62.1 Standard for Ventilation and Acceptable Indoor Air Quality, it is recommended to install a Heat Recovery Ventilator (HRV) with a capacity of 1,050 CFM. An HRV system will:
 - Provide Adequate Ventilation: Facilitate the exchange of indoor and outdoor air, diluting indoor pollutants such as CO₂.
 - Enhance Energy Efficiency: Recover heat from exhausted air, reducing energy consumption for heating.
 - To further improve occupant health, especially in light of concerns regarding airborne infectious diseases, the installation of HEPA (High-Efficiency Particulate Air) filtration towers is advised that will meet the following:
 - Deployment Strategy: Activate HEPA towers when occupancy exceeds 20 individuals.
 - Capacity Requirement: A 1,000 CFM HEPA tower is needed for every additional 20 occupants.
 - Benefits: HEPA filtration captures airborne pathogens, reducing the risk of disease transmission among personnel.

Meeting Room Ventilation Assessment:

- The Meeting Room is currently being used as a storage space and does not have an HVAC system for ventilation, and heating is supplied by electric baseboard heaters. This setup does not provide fresh air exchange or pollutant dilution.
- To achieve acceptable indoor air quality per ASHRAE 62.1 standards, the following is recommended:
 - Install an HRV System: A unit with a capacity of 500 CFM will ensure sufficient ventilation for the space.
 - Benefits: This will dilute exhaled CO₂ and other indoor contaminants, improving comfort and cognitive function among occupants.
 - HEPA Filtration: Similar to the Fire Hall, HEPA towers should be used when the occupancy exceeds 20 people.
 - Deployment Plan: A 1,000 CFM HEPA tower for every additional 20 occupants will help reduce airborne pathogens.



Office HVAC Analysis:

- The Office area lacks an HVAC system for ventilation. Heating is provided by electric baseboard heaters, which do not facilitate air exchange.
 - Install a Small HRV System: A 25 CFM HRV unit is sufficient for the office space.
 - Purpose: This system will provide continuous ventilation, diluting indoor pollutants and maintaining air quality conducive to occupant health and productivity.

Kitchen Ventilation and Compliance:

- The Kitchen is currently without an HVAC system and is heated by electric baseboard heaters. If the Kitchen is utilized to prepare food for adjacent areas such as the Hall or Meeting Rooms, it qualifies as a commercial kitchen under building and safety codes.
- To comply with NFPA 96: Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations, the following installations are necessary:
 - Kitchen Hood: A stainless-steel hood designed to capture grease-laden vapors, smoke, and heat generated during cooking processes.
 - Exhaust Ventilation: A 1,500 CFM exhaust fan to remove contaminated air from the kitchen, preventing the accumulation of hazardous substances and heat.
 - Makeup Air Unit: A system to 1500 CFM of supply fresh air equal to the amount being exhausted, maintaining proper air balance and ensuring the exhaust system operates effectively.
 - Fire Suppression System: An automatic system integrated into the kitchen hood to detect and extinguish fires, critical for occupant safety and property protection.

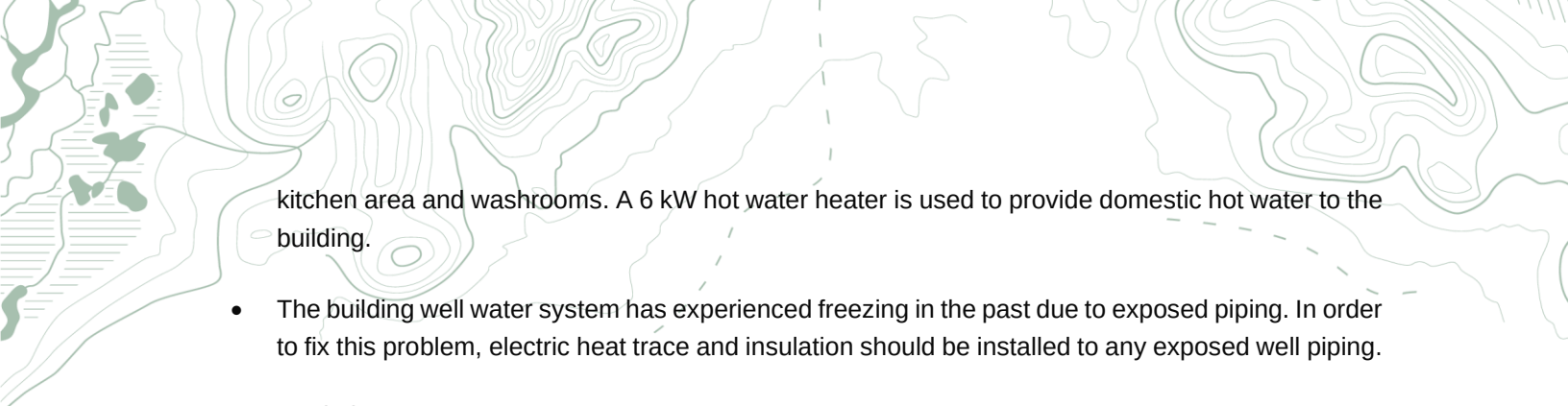
Bathroom Ventilation Verification:

- The bathrooms are equipped with exhaust diffusers for ventilation and are heated by electric heaters. However, the effectiveness of the exhaust system has not been quantified. In order to verify the bathroom ventilation system capacities, conduct a thorough assessment of the existing exhaust diffusers to verify that they maintain a minimum continuous airflow of 50 CFM as recommended by industry standards.

Plumbing System:

- The building's plumbing system appears to meet the requirements of the British Columbia Plumbing code. The system comprises of providing domestic hot and cold water and sanitary sewage to the





kitchen area and washrooms. A 6 kW hot water heater is used to provide domestic hot water to the building.

- The building well water system has experienced freezing in the past due to exposed piping. In order to fix this problem, electric heat trace and insulation should be installed to any exposed well piping.

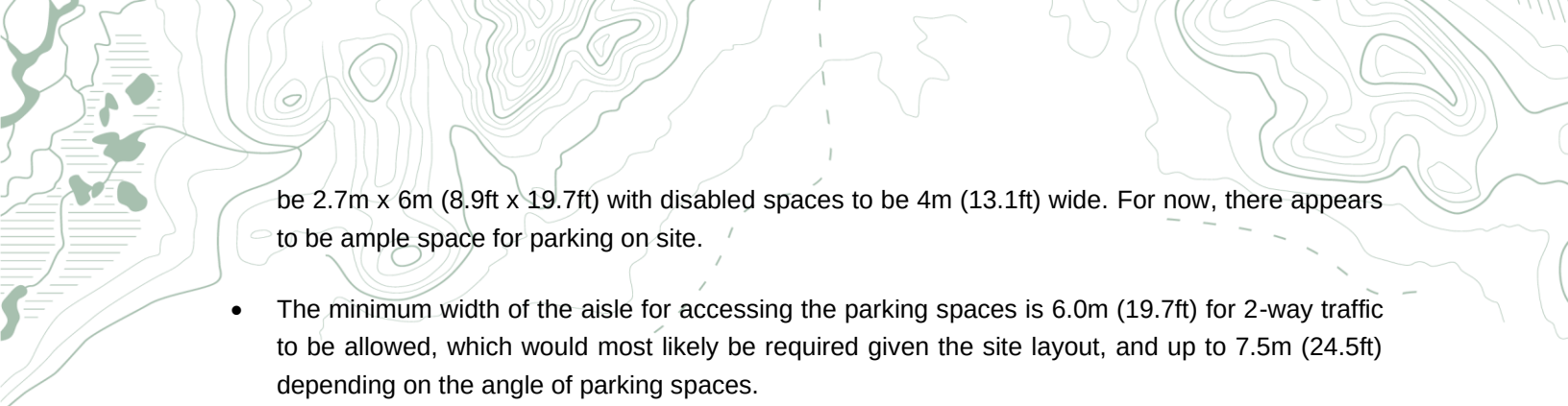
Recommendations:

- A sprinkler system must be installed as per NFPA 13 for adequate fire protection. A fire alarm system and smoke detectors are also to be installed along with the sprinkler system.
- The HVAC System in the Truck Bays needs to be upgraded to include a Make Up Air unit, Exhaust Fan, Vehicle Exhaust system, Gas Alarm System and Controls.
- Install HRVs in the fire hall, meeting room, office, and other areas to meet ASHRAE 62.1 and install HEPA filtration towers in the meeting room and fire hall.
- Install a commercial ventilation system to the kitchen which includes an exhaust hood, fire suppression system and a make up air unit.

7. Expansion Opportunities

To determine what opportunities are present for expansion of the existing fire hall, McElhanney started by reviewing the relevant bylaw requirements and restrictions. This building falls under the Elk Valley Consolidation Zoning Bylaw No. 829 (1990) and is zoned as PG-1. Some of the notable requirements from the bylaw are as follows:

- The maximum height of a building is 10.0m (32.8ft). Currently the peak of the building is approximately 7.4m (24.33ft) high.
- The maximum parcel coverage is 60%. Currently the building occupies approximately 17% of the parcel.
- The setback requirements from all property lines are 7.5m (24.6ft). While the main sections of the building were, according to design documentation, located 25ft from the nearest property line, it is likely that sections of the building, such as the south-eastern office/storage extension, violate this setback requirement.
- The requirement for off-street parking is 1 space per 35m² of building area. This totals 16 spaces, one of which would need to be a parking space for persons with disabilities. These spaces do not necessarily need to be on building's parcel of land, however, reviewing the nearby area it does not appear that there would be a suitable location for off-site parking. Standard parking spaces are to

A topographic map with green contour lines and some green shaded areas representing vegetation, serving as a background for the top portion of the page.

be 2.7m x 6m (8.9ft x 19.7ft) with disabled spaces to be 4m (13.1ft) wide. For now, there appears to be ample space for parking on site.

- The minimum width of the aisle for accessing the parking spaces is 6.0m (19.7ft) for 2-way traffic to be allowed, which would most likely be required given the site layout, and up to 7.5m (24.5ft) depending on the angle of parking spaces.
- One 9m x 3.5m (29.5ft x 11.5ft) loading bay space is also likely required, depending on usage of the community hall.

It was noted also by Mr. Hockley, during the investigation, that at the south-western corner of the property there is a foundation for an old building which may be of historical/heritage significance. The exact nature of this foundation and the rules surrounding it would require further investigation, but for the purposes of the analysis McElhanney has assumed that it cannot be removed or altered.

Given the above notes and the nature of the existing structure it is believed that opportunities for expansion of the existing fire hall are limited. The building cannot be added onto on the southern or eastern sides due to setback requirements. The location of the 'heritage foundation' and the required width of the aisle for parking access leaves very little space into which the building could expand in the western direction. And adding onto the northern end of the structure is of limited use as this is the community hall side of the building. The most effective option for providing increase fire hall capacity would be a separate new structure towards the north-western side of the property. However, this option presents its own challenges. Having the equipment, vehicles and crew of the fire hall split between separate buildings isn't practical. Additionally, due to the attached community hall, having to navigate people and vehicles present for the community hall may hinder the fire crew's ability to respond to an emergency from the new rear structure. Refer to Figure 2 for a site map with notes regarding these points.

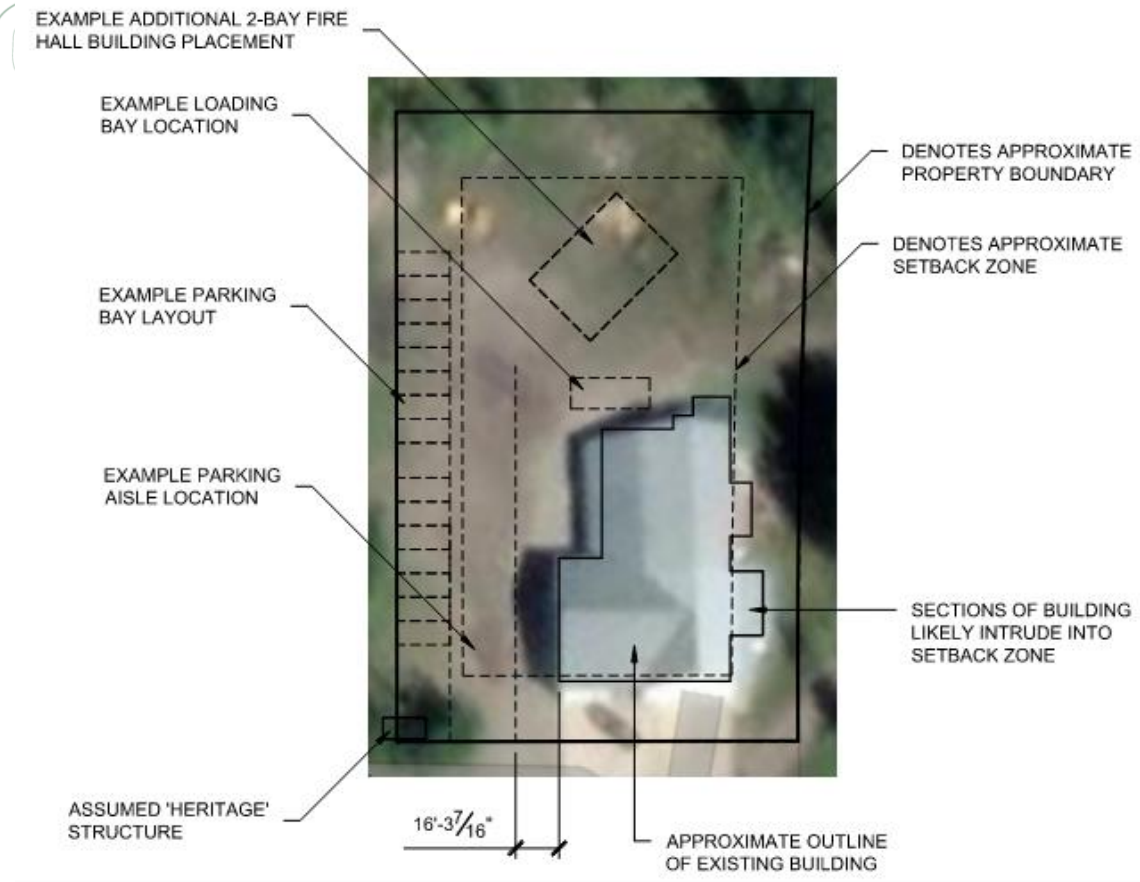


Figure 2 - Expansion options map

8. Cost Estimate Review

McElhanney has prepared a Class C cost estimate (expected margin of error $\pm 25\text{-}40\%$) analysing options for both replacing and retaining the existing fire hall. This cost estimate has been compared to the estimate provided by CMG in their "Engineering Inspection & Report". The cost estimates can be found listed in Table 2 below. The table has been divided into four sections as outlined:

Section A lays out the expected costs of various options to rebuild or replace the building. CMG listed a replacement cost for the building, which might also be described as the insurable value of the existing building. This value would be indicative of rebuilding the building to its existing state. McElhanney has provided costs for various options of new builds to current standards as we believe comparing the costs of remedial works to brand new building(s) is more helpful in the context of the current decision facing the RDEK. Generally, the cost of building a new building would be higher than replacing a building to the existing state. Please note that the estimated costs for new buildings provided are for the building only and costs for purchase of a new property and/or demolition of the existing building are not included.

Section B looks at the repair and maintenance works noted as being required in the next 10 years in the CMG report. Generally, we found the estimated costs by CMG to be reasonable although on the low end of expected values. Their numbers are likely accurate for a larger urban center where competition and ease of procurement keeps costs lower. Our upper estimate generally adds a 15-50% contingency cost, to account for unexpected added costs, plus a 25% remote location markup. While some works can be performed and sourced locally in Hosmer/Fernie, it is likely that other works will need to be performed or sourced from Cranbrook or Lethbridge/Calgary.

Section C provides cost estimates for additional structural or key safety items that McElhanney identified during our review. It should be noted that this should not be considered an exhaustive list of required works, further investigation (e.g. of the roof framing over the original section of the firehall) may reveal added items requiring remediation. Additionally, items have been costed on an individual repair basis. There is possibly the opportunity for cost savings if the design and carrying out of multiple remedial works is grouped together.

Section D provides cost estimates for the specified electrical upgrades as noted in Section 5 above.

Section E provides cost estimates for the specified mechanical upgrades as noted in Section 6 above.

Section F provides cost estimates for optional items that while not considered essential, would be needed to bring the existing building closer in aesthetics/comfort/performance to a new build.

In reviewing estimated costs, it is important to make the distinction between required code upgrades if the decision to renovate is made and upgrades that come with modern fire hall / community hall construction. As an example, although modern fire hall walls aren't typically constructed with basic timber framing this does not mean that basic timber framing would violate any code requirements. Required code upgrades includes items such as a sprinkler system, a fire separation between the fire hall and community hall, or fire rated walls related to lot line spatial separation.

Table 2 - Cost Estimate

Item	Cost Estimates		
	CMG Estimate	McElhanney Low	McElhanney High
A – Building Replacement Options			
Build additional 2-bay building on site	-	\$441,600	\$736,000
Build new fire hall (with 2 added bays)	-	\$2,650,000	\$3,533,000
B – CMG Noted Repair/Maintenance Works			
Remove peeling lead paint from west bay door	\$5,000	\$5,000	\$7,190
Hazardous materials management plan	\$2,800	\$2,800	\$4,030
Assess and rebuild north-east awning beams and columns	\$5,000	\$5,000	\$7,500

Assess and replace south-east stairway columns	\$5,000	\$5,000	\$7,500
Replace older sections of roof	\$47,250	\$47,250	\$67,920
Resurface flatwork	\$9,000	\$9,000	\$12,940
Replace old distribution piping	\$8,000	\$8,000	\$14,000
Replace electric baseboard heaters	\$3,500	\$3,500	\$5,030
Replace ceiling mounted unit heaters in fire hall	\$6,000	\$6,000	\$8,630
Replace wall mounted natural gas heater	\$2,000	\$2,000	\$2,880
Replace septic tank	\$6,000	\$6,000	\$8,630
Replace wiring in old sections of building	\$6,400	\$6,400	\$12,000
TOTAL	\$105,950	\$105,950	\$158,230
C – Additional Structural/Fire Separation Repair/Maintenance Works			
Replace south-east stairway guardrail	-	\$6,500	\$9,000
Replace south-east stairway beams and reinforce/replace rafters	-	\$6,500	\$10,000
Replace/upgrade rear stairway guardrail	-	\$5,500	\$12,000
Reinforce north-east patio rafters	-	\$6,500	\$10,000
Reinforce/replace community hall posts	-	\$10,000	\$15,000
Retrofit lateral force resistance system	-	\$30,000	\$55,500
Retrofit internal fire separations between fire hall and community hall	-	\$24,000	\$36,000
Retrofit external fire separation requirements	-	\$24,000	\$36,000
Restore/replace fit and finishes (drywall/painting/cladding)	-	\$67,300	\$154,600
TOTAL	-	\$180,300	\$337,600
D – Additional Electrical Repair/Maintenance Works			
Replace Panel A	-	\$1,500	\$2,500
Replace “Big Panel B”	-	\$1,500	\$2,500
Replace Area A lighting with LEDs	-	\$2,500	\$3,500
Replace Area A emergency light	-	\$500	\$1,000
Service upgrade for additional building	-	\$30,000	\$40,000
TOTAL	-	\$36,000	\$49,500
E – Additional Mechanical Repair/Maintenance Works			
Installation of a Sprinkler System	-	\$45,000	\$70,000
Installation of a Fire Alarm and Smoke Detector System	-	\$25,000	\$50,000
10,500 CFM ERV c/w Ducting	-	\$20,000	\$30,000



500 CFM ERV c/w Ducting	-	\$15,000	\$25,000
80 CFM ERV c/w Ducting	-	\$3,000	\$5,000
3000 CFM Make Up Air Unit	-	\$25,000	\$35,000
3000 CFM Exhaust Fan	-	\$1,500	\$2,500
1500 CFM Exhaust Extraction System	-	\$125,000	\$175,000
1000 CFM HEPA Filtration Towers (2)	-	\$6,000	\$10,000
TOTAL	-	\$265,500	\$402,500
F – Optional Repair/Maintenance Works			
Provide frost protection to older sections of building	-	\$30,000	\$50,000
Replace concrete aprons	-	\$27,000	\$36,000
Replace windows and doors	-	\$40,000	\$60,000
TOTAL	-	\$97,000	\$146,000

The items below were additional costs, associated with remediating/renovating the existing fire hall, provided by the client to be included as part of the cost comparison:

- From CMG's "Energy Survey Report" the grand total of recommended energy efficiency upgrades is \$113,780.
- Renovation of the existing fire hall would require that a temporary fire hall space be rented/setup for the crew to operate out of during the construction period. Estimated costs for this rental are between \$250,000 and \$500,000 depending on availability of rental spaces and duration of construction.

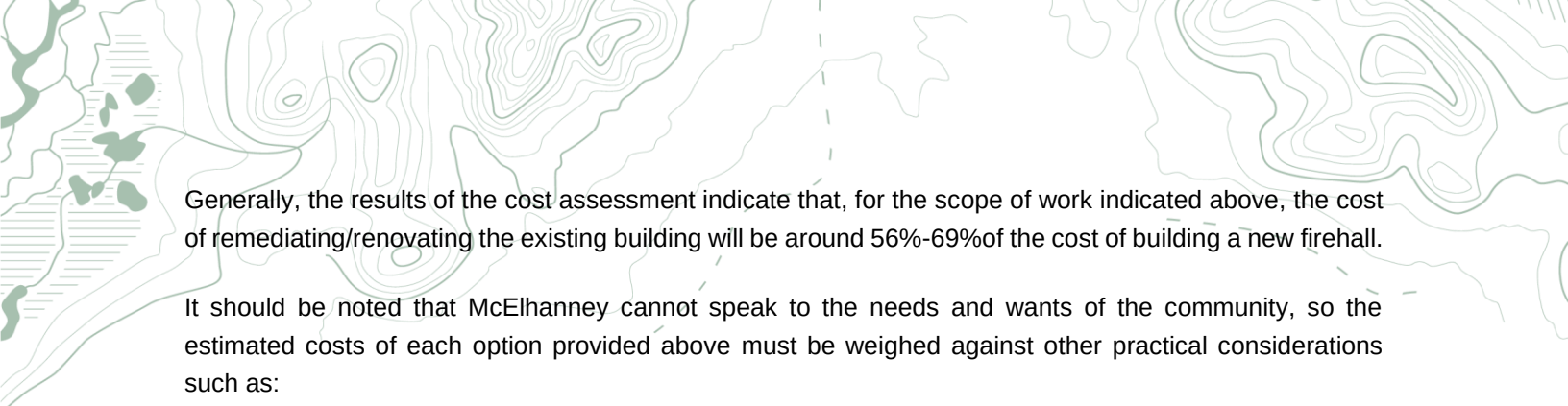
Table 3 below shows the estimated total cost summary. Compared are the two options under consideration:

1. To retain the existing fire hall, upgrading and remediating as necessary, and construct an additional 2-bay building at the rear of the existing property to provide additional capacity to the fire crew.
2. To build a brand-new fire hall building with equivalent capacity to the existing fire hall plus an additional 2 bays.

Table 3 – Total Cost Summary

Option	Low Estimate	High Estimate
Build additional 2-bay building on site plus remedial works	\$1,490,130	\$2,443,610
Build new fire hall (with 2 added bays)	\$2,650,000	\$3,533,000





Generally, the results of the cost assessment indicate that, for the scope of work indicated above, the cost of remediating/renovating the existing building will be around 56%-69% of the cost of building a new firehall.

It should be noted that McElhanney cannot speak to the needs and wants of the community, so the estimated costs of each option provided above must be weighed against other practical considerations such as:

- How feasible and effective will an additional building be on the current site given the dual use of the community hall?
- How long will an additional 2 bays be sufficient to meet the needs of the community? The current site will have very limited capacity to support further expansion beyond the additional 2-bay building, a new property may be able to better accommodate future requirements.

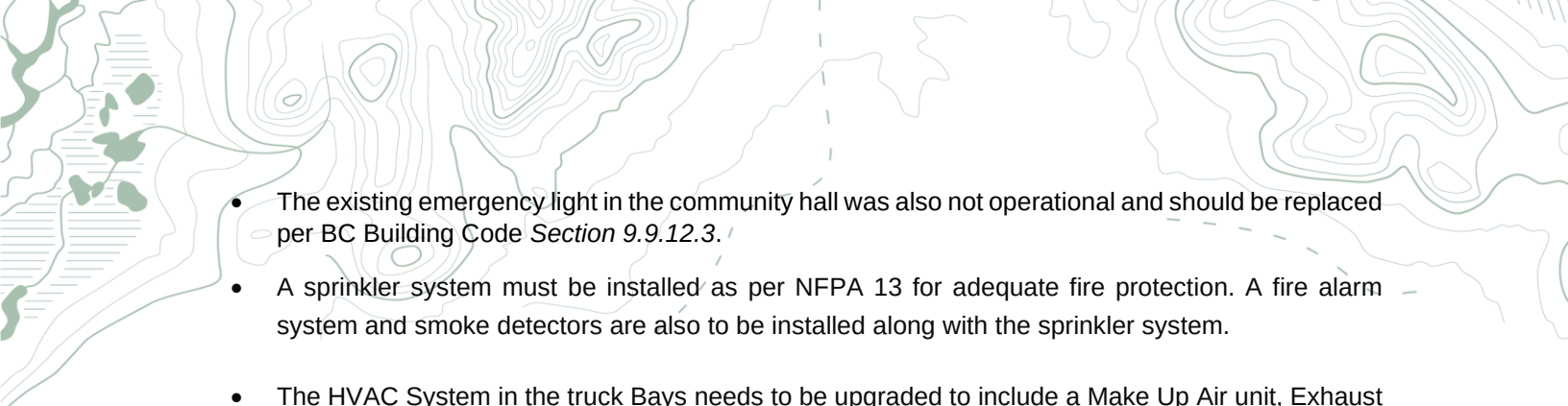
Finally, it should be noted that only the items as clearly noted above have been included in this cost estimate. It is understood that there have been issues in the past with the well-fed water system and the on-site septic field system. Evaluation or cost estimates for any remedial work regarding these items or any other items not noted above have not been included in this report. There may also be additional costs associated with a renovation that have not been included such as the cost of millwork. Administrative costs have also been excluded, it is assumed that these would be comparable for either the renovation or new build option.

9. Conclusions and Recommendations

Our review of the Hosmer Fire Hall building has shown the following:

- The internal fire separation does not meet building code requirements.
- The building does not meet the spatial separation requirements of the building code.
- The lateral force resistance system is likely insufficient.
- There are certain elements of the structure that have inadequate capacity for the required gravity loads.
- The framing of the guardrails on the two external stairways does not meet code requirements.
- Portions of the existing structure do not have adequate frost protection.
- There is isolated water damage and minor framing issues.
- The existing electrical service for the building is at its limit. The installation of additional electrical equipment will require an upgrade to the existing electrical service.
- Several panels that were installed in the 1980's are in poor condition and should be replaced.
- Several lights in the community hall were not operational. As these are fluorescent lights, it is recommended that the lights be replaced with LED equivalents.



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- The existing emergency light in the community hall was also not operational and should be replaced per BC Building Code Section 9.9.12.3.
 - A sprinkler system must be installed as per NFPA 13 for adequate fire protection. A fire alarm system and smoke detectors are also to be installed along with the sprinkler system.
 - The HVAC System in the truck Bays needs to be upgraded to include a Make Up Air unit, Exhaust Fan, Vehicle Exhaust system, Gas Alarm System and Controls.
 - HRVs should be installed in the fire hall, meeting room, office, and other areas to meet ASHRAE 62.1 and HEPA filtration towers should be installed in the meeting room and fire hall.
 - A commercial ventilation system should be installed in the kitchen which includes an exhaust hood, fire suppression system and a make up air unit.

In reviewing the bylaw for rules regarding the property, we found that there is limited opportunity for further additions to the existing building and that the only reasonable option for adding capacity to the fire hall would be build a separate building at the rear of the property.

A cost estimate shows that the remedial works are expected to cost around 56%-69% of the cost of a new building.

10. Closing

McElhanney has enjoyed working with the RDEK on this project and we hope to continue our working relationship in the future. McElhanney has committed to providing the staff, resources, and technical expertise following the EGBC structure and internal Quality Management System (QMS) to execute this project efficiently and accurately. Should you have any questions, or require clarification, please contact the undersigned.

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Appendices

APPENDIX A - SITE PHOTOS



Photo 1 - Front (south-western) elevation of building



Photo 2 - Rear (north-eastern) elevation of building



Photo 3 - South-eastern entry way over office/storage addition. Water damage to roof framing



Photo 4 - South-eastern stairway roof beams, posts and guardrail require replacement.



Photo 5 - Attached sea-can and patio at north-eastern corner of building



Photo 6 - North-eastern patio roof framing



Photo 7 - North-eastern patio beam and post framing



Photo 8 - Rear entry stairs



Photo 9 - Fire hall mezzanine



Photo 10 - Fire hall mezzanine framing



Photo 11 - Fire hall main bays in most recent addition



Photo 12 - Older fire hall bay



Photo 13 - Fire Hall meeting area under storage room



Photo 14 - Access door between fire hall and community hall is not fire rated

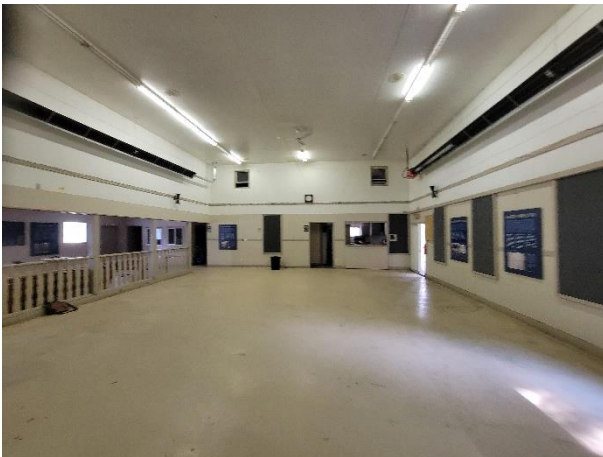


Photo 15 - Community hall



Photo 16 - Community hall gallery



Photo 17 - Storage room over fire hall meeting area



Photo 18 - Post and beam line in community hall



Photo 19 - Community hall kitchen



Photo 20 - Monoslope trusses over community hall addition



Photo 21 - Modified queenpost trusses over fire hall addition



Photo 22 - Modified queenpost trusses over fire hall addition



Photo 23 - Howe trusses over the original community hall building



Photo 24 - Panel A



Photo 25 - "Big Panel B"



Photo 26 - Truck bay existing ventilation



Photo 27 - Office existing conditions



Photo 28 - Bathroom existing conditions

Contact

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