



West Kelowna Fire Rescue

Fire Service Needs for Complex Buildings

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Preparing West Kelowna Fire Rescue for Community Growth

Executive Summary:

Fires on higher floors of larger buildings represent an extraordinary challenge to fire departments. These are some of the most complex incidents a fire department will encounter.

In 2023, Council updated the West Kelowna Official Community Plan (OCP). The OCP proposes community growth in the form of more complex buildings. Policies in the plan call to support the requirements of the City's emergency response services necessary to accommodate and increase in density and heights. At the time the OCP was passed, Council directed the Fire Chief to bring forward a report that outlines how this policy can be met.

This plan contains 23 recommendations plus 7 staffing needs as a part of a framework to prepare WKFR for community growth. There are costs associated with the plan to protect the community as it grows. The largest factor is the staffing needs of the fire department and the ability to get the required number of emergency responders to a fire in an acceptable amount of time. Two options are presented for staffing that attempt to balance cost with risk.

A better prepared, staffed, trained, and equipped fire service also allows us to reciprocate service and better support our mutual aid partners, who we will count on during an emergency of our own.

Please note that costs outlined in this report are preliminary and will require further revision and refinement in cooperation with the finance department. Costs are outlined to provide an estimation of the order of magnitude of recommendations and options. Final approval of exact costs will need to be provided by Council as a part of the annual budget process.

Background:

Mid-rise buildings (4-6 stories) are constructed of combustible materials. They contain a very high density of residents, often built closely together with limited built-in fire protection. Fires in these buildings can spread quickly and be difficult to contain. High-rise buildings (> 6 stories) are built primarily of non-combustible construction and contain advanced fire suppression features and systems. However, they may hold hundreds of people above the reach of fire department aerial devices, often at long vertical travel distances, necessitating very different firefighting techniques.

Collectively, these buildings are known as "Complex Buildings".

The purpose of this plan is to outline West Kelowna Fire Rescue (WKFR) needs as the community continues to grow and its buildings increase in complexity. West Kelowna is faced with the challenge of providing high quality service as the community grows while creating a safe environment for firefighters and the public, essentially balancing costs with risk.

Discussion:

Community growth represents a dual pronged challenge for the fire service:

- Drastic increase in number of mid-rise buildings (4-6 stories)
- Construction and occupancy of high-rise buildings (>6 stories)

Fires in these types of occupancies are considered “low-frequency, high-risk” events. They don’t happen often, but when they do – the consequences and risk to public and firefighter safety can be severe.

The fire service approach is slightly different for each, requiring different tactics, strategies, and equipment, however both require increased training, equipment, and manpower. In any case, WKFR will rely strongly on systems and construction materials in these being newly constructed buildings. This includes meeting all BC Building and Fire Code requirements that govern construction types (non-combustible), as well as special in building systems (firefighter elevators, fire pumps, fire sprinklers and in building announcements).

WKFR has established a 5-pillar framework which will support our community as buildings grow:

1. **Legislation and Agreements**
2. **Prevention**
3. **Systems and Equipment**
4. **Training**
5. **Human Resources**

Improving fire response service levels will increase public and firefighter safety by improving the effectiveness of the fire service but will come at an increased cost.

A better equipped, trained, and staffed fire service will benefit the community across many types of emergency incidents.

Challenge:

Fire department resource deployment in the community affects outcomes in three important areas: firefighter injury and death; civilian injury and death; and property loss. If fire department resources (both responding apparatus and personnel) are deployed in appropriate number in a timely manner to match the risk levels inherent to hazards in the community, the community will be far less vulnerable to negative outcomes in all three areas.

Regardless of the size or height of the burning structure, firefighters identify four priorities: life safety of occupants and firefighters, confinement of the fire, property conservation, and reduction of adverse environmental impact. Interdependent and coordinated activities of all firefighting personnel are required to meet these priority objectives.

Fires in complex buildings pose unique operational challenges to fire service response and represent a high hazard life safety scenario. Key challenges include the sheer scope and scale of conducting search and rescue operations, difficulty moving people and equipment vertically to the fire area, the size of the fire based on the time it takes to initiate firefighting operations and logistical management of the significant number of firefighters and equipment required to complete critical tasks. Once firefighters are operating above the reach of aerial devices, the only viable means of egress is the interior stairs; extra protection afforded by laddering the building is not possible.

Smoke spread is one of the most significant life hazard problems existing at the time of a fire in a high building. Improper maintenance, disabling or tampering with fire protection systems may also increase fire spread.

The most effective way to extinguish a fire in a complex building is by mounting an offensive attack as early as possible, because historically the best life safety tactic is extinguishing the fire. As the level of the fire floor gets higher, reliance on the pre-plumbed, vertically supplied water (standpipe) also increases.

Moving supplies and staff up multiple stories is an arduous task. If it is not properly managed, firefighters may be exhausted and unable to fight the fire or rescue trapped occupants. Additionally, joint use of stairways by firefighters moving upward and occupants attempting to evacuate may increase the overall evacuation time of the occupants, as well as delay the firefighters' efforts to begin critical tasks such as fire suppression or search and rescue operations.

We will rely upon our regional mutual aid partners to ensure a sufficient response to fires in complex buildings. It is likely the same can be said about their plans to respond to fires in complex buildings as well. Being fully prepared for this response allows us to meet this expectation and receive the same service in return.

Legislation:

The requirements of the BC Building Code (BCBC) are based on the assumption that firefighting capabilities are available in the event of a fire emergency.

The BCBC (*Notes to Part 3 – Firefighting Assumptions*) outlines that the responsibility for controlling the maximum size of building to be permitted in a municipality in relation to local firefighting capability rests with the municipality. The code acknowledges that this is, by necessity, a somewhat arbitrary decision and should be made in consultation with the local firefighting service, who should have an appreciation of their capability to fight fires.

The BCBC states that firefighting capability can vary from municipality to municipality. They go on to say that:

- Generally, larger municipalities have greater firefighting capability than smaller ones.
- Similarly, older, well-established municipalities may have better firefighting facilities than newly formed or rapidly growing ones.
- The level of municipal fire protection considered to be adequate will normally depend on both the size of the municipality (i.e., the number of buildings to be protected) and the size of buildings within that municipality.
- Since larger buildings tend to be located in larger municipalities, they are generally, but not always, favored with a higher level of municipal protection.

The public safety policies contained in the recently adopted City of West Kelowna Official Community Plan (OCP) further illustrate a commitment to ensuring that our emergency services are prepared to respond to added risk as our community grows:

- *(3.6.5.3-1) Support the capital, operational, and maintenance requirements of the City's emergency response services necessary to accommodate the potential increase in density and heights associated with the Urban and Neighbourhood Centres identified in the Growth Concept, as well as overall related population increases.*
- *(3.6.5.3-8) Consider the Fire Underwriters Survey implications and potential to limit or minimize impacts to insurance grading when considering development applications for*

multiple family residential, commercial, industrial, and low-density residential development.

The City of West Kelowna Fire and Life Safety Bylaw also governs several requirements for high buildings.

NFPA Standards governing the response to fires in high buildings are not adopted as a requirement in the City of West Kelowna.

Solutions:

WKFR proposes a five-pillar approach to addressing fire service needs for complex buildings. Each pillar is built upon a series of recommendations to better prepare the fire service and the community as it grows.

1. Legislation and Agreements

A review of applicable legislation has been conducted, including the BC Building Code, BC Fire Code, CWK Bylaw (WFN Law), Council Policy, as well as other influencing documents including the Official Community Plan and WKFR Operational Guidelines. Agreements with other emergency services were also reviewed, including the Regional Mutual Aid Agreement and the Interagency Agreement with BC Wildfire for deployment of provincial firefighting resources.

The following recommendations were identified:

Bylaw Updates

Recommendation #1: Review and amend the CWK Fire Prevention Bylaw #114 (and corresponding WFN Fire Prevention Law) to address issues created in complex buildings:

- Non-combustible construction
- Enhanced use of Fire Sprinklers
- BBQ's on sprinklered patios/decks
- Hoarding and density of storage
- In-building communications and equipment storage rooms
- Preplanning requirements (at development)
- Access for ongoing training
- Increased Fire Drill Frequency

Council Policy

Recommendation #2: Creation of Council Policy that encapsulates and endorses the fire service response to emergencies in complex buildings as outlined in this plan. This will serve to address risk and limit liability to the city as well as provide Council direction to the fire service.

WFN Service Agreement

Recommendation #3: WFN and the City should consider a mutually agreeable amendment to the service agreement that would add a definition of Structural Firefighting (*up to and including the 6th story*) and an additional cost allocation formula that would fully reflect each jurisdiction's fair share of costs associated with firefighting in complex buildings. This would permit each jurisdiction to grow

at its own pace, independent of the other, while still ensuring firefighting capability and apportioning costs fairly across jurisdictions based on their complex building inventory.

Auto Aid Agreement

Recommendation #4: Establish Automatic Aid agreements with City of Kelowna and District of Peachland to support the deployment strategy outlines in this plan. Automatic Aid agreements ensure that other fire service resources are sent right away in the case of an emergency in a complex building. The expectation would be that these agreements would be reciprocal and WKFR would offer the same level of service back.

The regional Mutual Aid agreement already serves to provide support from other nearby fire departments, however creating agreements with other fire services should be explored (Summerland, Penticton, Vernon, Kamloops). This would ensure access to additional resources to supplement the initial response.

WKFR Operating Guidelines

Recommendation #5: WKFR creates additional Operational Guidelines that relate to fire service preparations and response to emergencies complex buildings. These should encapsulate details from this plan and cover the following topics related to complex buildings:

- Deployment and Response (Dispatch Protocol)
- Strategies and Tactics
- Training Program and Standards
- Fire Prevention Program and Standards (Inspection Frequency)

2. Prevention

Preventing fires and other emergency situations before they happen is the most effective way to ensure the safety of firefighters and the occupants of complex buildings.

The following recommendations were identified:

Construction Type

Recommendation #6: WKFR and CWK explore options to exceed the requirements of the BC Building Code and mandate fire resistive measures, increased fire separations and/or non-combustible construction types above the 6th story of complex buildings. These measures (and others) would work to limit the spread of fire and smoke within the building.

Inspection Frequency

Recommendation #7: CWK Fire Inspection Council Policy should be amended to include a definition of “Complex Buildings” and a corresponding inspection frequency of (at minimum) once every 6 months for these building types. This will ensure compliance with all regulations as well as ongoing maintenance of critical systems.

Public Education

Recommendation #8: WKFR should deliver an enhanced program of public education to building owners, strata councils, management, and occupants of complex buildings. The program should include:

- Fire Drills and Evacuation
- Fire and Smoke Alarms
- In Building Announcements
- Fire Door Closure and Smoke Control measures
- Hoarding prevention

Plan Review and Construction Process

Recommendation #9: WKFR should set aside time and resources to ensure they are able to participate in a comprehensive plan review for all development submissions for complex buildings. WKFR staff should be involved at all stages of the construction process, including fire and life safety inspections and site visits. This will ensure that these buildings are constructed with the full knowledge, input, and satisfaction of the fire service.

Preplanning

Recommendation #10: WKFR should engage with the building developer to ensure that a comprehensive pre-fire plan is created prior to occupancy of any complex building. Pre-fire plans ensure that emergency responders have access to critical building information, instructions, and floor plans to support emergency response. These plans also contain location and instructions for specialized building systems.

Tactical Tours

Recommendation #11: WKFR should ensure that all staff are provided the opportunity to visit complex buildings during their construction to build an understanding of how they are built, construction materials, special building systems and training on how WKFR will respond. These tours can be coordinated and led by Fire Prevention and may involve emergency response drills for fire crews.

3. Systems and Equipment

Systems within complex buildings will be critical to providing the highest level of life safety. Equipment used by firefighters will compliment and work alongside these systems. Many of these systems and equipment will be new within the complex building environment and will be counted on as part of the development of these structures.

The following recommendations were identified:

Quint 32

A 'quint' is a fire apparatus that combines the equipment capabilities of a ladder truck and the water-pumping ability of a fire engine. As its name implies, it features five main tools to carry out firefighting functions, fire pump, water tank,

fire hose, aerial ladder device, and ground ladders. It provides enhanced functionality above a fire engine.

Recommendation #12: WKFR should design and build a made for West Kelowna solution to increase operational capabilities. This would take the form of a new 'Quint' fire apparatus deployed to Station #32 to provide rapid ladder access, rescue and aerial firefighting capability to the rapidly increasing number of mid-rise buildings in that area.

This recommendation was approved in early 2025 and Quint 32 is expected to be delivered in mid-2026.

Personnel Transport Vans

Alongside increasing numbers of paid on call staff as well as increased training comes the requirement to transport these personnel the scene of major emergencies and training events/practices.

Recommendation #13: WKFR should procure 2 15-passenger transport vans. These should be deployed to Station #33 (Rose Valley) and Station #34 (Glenrosa) to be made available for transport of personnel to training sessions and major emergencies.

This recommendation was approved in early 2025 and the vans are in the process of being placed into service.

Hoses / Nozzles

Recommendation #14: WKFR should ensure that a full and appropriate compliment of specialized fire hose and nozzles are placed on each frontline fire engine and spare truck. This specially designed equipment will ensure that crews are capable and effective of operating in the high building environment with equipment that is suited for the task, light and easily deployable.

This recommendation was approved in early 2025 and equipment has been ordered.

Equipment Rooms

Recommendation #15: The Fire Prevention Bylaw should be updated to ensure that for all complex buildings, there is a room or closet on every sixth floor above grade or above the main entrance lobby, that is dedicated and clearly identified as a "firefighting equipment" storage area. This area is to contain spare SCBA bottles, hoses, and nozzles such that initial responders will not have to carry this equipment with them during an emergency. It is to be installed and maintained at the expense of the building owner.

Radio Systems

Communications within complex buildings are often impaired due to construction types and distances involved. Lack of communications during an emergency is a safety issue and puts the lives of emergency responders at risk as well as impacts the effectiveness of operations.

Recommendation #16: The Fire Prevention Bylaw should be updated to ensure that the design and construction of new complex buildings shall provide reliable two-way radio communications for emergency responders inside the buildings to the outside. In building repeater systems are one example of solutions to ensure this criteria is met.

Firefighter Air Replenishment Systems (FARS)

The two crucial elements necessary for firefighters to fight any fire are water and air. While water standpipes are widely accessible for firefighting, allowing firefighters to have a reliable immediate water source, the same is not necessarily true for air. SCBA bottles must be carried up to the floor below the fire. FARS ¹is essentially a “standpipe for air” permanently installed within a building aimed to provide emergency personnel with instant access to replenish SCBA bottles.

Recommendation #17: WKFR should further investigate the use and practicality of FARS in high buildings. If found to be effective, the Fire Prevention Bylaw should be updated to mandate that the design and construction of new complex buildings shall provide for FARS systems.

In-building Announcements / Communications

Emergency responders will rely on the BC Building Code mandated in building communications systems that allow for 1 way audio communications to all residents within the occupancy.

Recommendation #18: WKFR should further investigate the use and practicality of video systems within common areas (hallways) of high buildings. These video streams would be viewable from the Fire Command post in the lobby and provide a visual indicator of fire conditions to emergency responders from a safe location. This would allow for planning prior to deployment to the fire floor.

Building Systems Maintenance

Systems within complex buildings will be critical to the life safety of the public and emergency responders as well as to addressing fire and smoke conditions. These systems will require ongoing and regular maintenance as per the BC Building and Fire Code.

Recommendation #19: Because of the critical importance of these systems, the Fire Prevention Bylaw should be updated to ensure that life safety and fire suppression systems within complex buildings are serviced on a more frequent basis than normally required and in alignment with regular fire inspections.

4. Training

Responding to incidents in complex buildings involves a new and different set of strategies and tactics. Emergency responders must train on these new methods.

The following recommendations were identified:

Strategies and Tactics

¹ [Analysis of Firefighter Air Replenishment Systems.pdf \(nfpfa.org\)](#)

Recommendation #20: WKFR should continue to support and build out its internal cadre of firefighters and chief officers that has been tasked to develop WKFR's strategies and tactics for fighting fires in complex buildings. These methods will be based in best practice from across the fire service and will be captured in WKFR Standard Operating Guidelines and the WKFR Complex Building Training Program syllabus.

Training Centre

Recommendation #21: WKFR should bring forward a capital budget request in 2024 to support the completion of the WKFR Fire Training Centre that was started in 2023. Phase 2 involves the paving of parking lot, installation of power and water/hydrant, concrete pads and props, lighting and interior doors and dividers. A single 40ft container will be added to increase flexibility for search and rescue.

This recommendation was approved in early 2025 and work is underway at the training centre, expected to be completed in 2025.

In-building Training Opportunities

Recommendation #22: During the development approval process for complex buildings, WKFR should work with City departments and building developers/owners to ensure that opportunities are made available for firefighter training within under-construction and newly occupied buildings. This may include the requirement for special provisions to allow firefighters to flow water within stairwells before and after occupancy.

Regional Fire Service Training

Recommendation #23: WKFR should work closely with other fire departments in the region to ensure that they have an appropriate level of training in common to respond and operate at emergencies within complex buildings. A standard system should be confirmed and employed. Some departments may not be capable of all roles and a system should be developed to work within those constraints.

5. Human Resources – see the attached “Human Resources and Deployment Analysis”

Deployment of firefighting resources and personnel is the primary line of defence when a fire occurs. The effectiveness of the fire department response (or consequences of the fire) will be largely influenced by the number of firefighters deployed and their arrival time.

The number of firefighters needed to combat a fire safely and effectively in a high building will be larger than other types of structural fires. WKFR proposes a capability-based incremental approach to assemble and deploy an effective firefighting force at the scene of a high building emergency.

The recommended approach is outlined in the attached “Human Resources and Deployment Analysis” where the following needs are identified and outlined:

No.	Title	Description	Status
1	3 rd On-Duty Fire Company	Two options for timing and costs	2026+ budget request
2	Assistant Fire Chief	Support administrative, planning, training, and response requirements.	Complete 2024
3	Rostering of Staff	Ensure response during off-duty hours, when required	2027+ budget request
3a	Training & Safety Officers	On-call pay evenings, weekends, stat holidays	2027+ budget request
3b	Second Chief Officer	On-call pay evenings, weekends, stat holidays	2027+ budget request
3c	Paid-On-Call Firefighters	On-call pay during times of low historical turnout	2027+ budget request
4	Recruit/Retain POC Firefighters	Achieve max strength of 70 (35 per station)	2025 budget request
5	Administrative Support	Support for Scheduling, Rostering (round out current .6FTE to full time)	Complete 2025

Progress to Date

The need to ensure our emergency services are well prepared for growth has been a core concept for as long as our community has existed. Mayor and Council have supported increases, new equipment and new facilities as growth continues.

Many initiatives are already in process or have been put in place, including:

- Increased Firefighter Staffing at Station #32 (4 on duty 24/7) – 2018
- Focus and staffing dedicated to preplanning - 2020
- Full time, dedicated Training Officer – 2022
- Increased flexible Firefighter Staffing – 2023/2025
- Training Centre – Phase 1 completed in 2023, Phase 2 ongoing in 2025
- Bylaw changes (access and preplanning) - 2023
- POC Program Enhancements and Wage Increases - 2022/2023/2024/2025
- Mutual Aid Agreement renewed - 2023
- Station #33 Reno – increased staffing capacity – 2025
- Additional Assistant Fire Chief – 2024
- Quint Fire Engine at Station #32 – approved 2025, delivery mid-2026
- High Rise Equipment purchase - 2025
- Personal Transport Vans - 2025
- Additional Administrative support - 2025
- Internal strategies, tactics and training development underway

Future Needs

The recommended addition of a 3rd Company of on-duty firefighters represents the largest outstanding cost and implementation component of the plan.

The WKFR resource allocation plan specifies the response of 5 WKFR companies, supported by additional mutual aid companies (2) to provide the required number of firefighters to an event.

Currently, WKFR is notionally only able to provide 4 companies – necessitating the need for one to be added.

The primary role of this company will be to perform rescue of occupants – so a timely arrival is critical. To ensure a more rapid response time – it is recommended this company be on duty 24/7 and consist of paid, professional firefighters. Under this option, Ten (10) additional firefighters are required to form a 3rd company with 2 firefighters on duty 24/7 to support the response to complex buildings. Additionally, over time, a further 2 firefighters on duty 24/7 will likely be required in future years as development continues and risk increases.

Two timeline options are presented, based upon two timeframes for eventual construction and occupancy above the 6th storey:

Timeline Option #1 (30-months)

A phased approach for the hiring of 10 additional firefighters could be implemented:

2026	2027	2028
4 firefighters	3 firefighters	3 firefighters

When combined with a need of up to 18 months of internal development, preparation and training would permit issuance of a building permit in mid-2027 and eventual occupancy above the 6th storey in mid 2028, assuming approval in January 2026. (30-month timeline)

	2026	2027	2028
	4 Firefighters	3 Firefighters	3 Firefighters
Firefighters - additional each year	463,172.74	357,800.94	368,534.97
Officers Premium	159,220.13	122,997.55	126,687.48
Total cost	\$ 622,392.87	\$ 480,798.49	\$ 495,222.44

Note: Additional one-time costs for equipment, training and onboarding of approx. \$20,000 per firefighter.

Timeline Option #2 (18-months)

Detailed examination of the permitting and building process presents another option for the hiring of additional firefighters. Upon issuance of a building permit (“trigger point”), all 10 of the additional firefighters could be hired at once and internal development, preparation and training would commence immediately. This would permit occupancy above the 6th storey at the same time that construction reached that point.

When combined with a need of up to 18 months of internal development, preparation and training would permit construction and eventual occupancy above the 6th storey in mid 2027 (18-month timeline)

	2026	2027	2028
	0 Firefighters	10 Firefighters	0 Firefighters
Firefighters - additional each year		1,192,669.80	-
Officers Premium		409,991.84	-
Total cost	\$ -	\$ 1,604,688.63	\$ -

Note: Additional one-time costs for equipment, training and onboarding of approx. \$20,000 per firefighter.

Timeline Option #2 presents less financial risk to the City, as hiring would not take place until after a building permit for a high building has been issued (“trigger point”).

The additional future needs relating to rostering would be required once construction on a high building progresses beyond the 6th storey.

Financial Implications

There are recommendations proposed within the plan (relating to legislation, policy, preventative actions and training) that do not have an associated cost or timeframe, other than staff time. The fire service will be working to implement these recommendations as time permits before the occupancy of complex buildings.

There are recommendations proposed within the plan (relating to human resources) that have future cost implications.

Costs provided in this plan are an estimation. Exact costs will be brought forward as a part of the annual budget process for Council review and approval.

As buildings are approved and construction commences, so should the items recommended in the plan. The target should be that additional recommendations are implemented prior to final occupancy of the first high building.

Financial implications of the additional firefighters are outlined above and depend on the timeline option.

Additional costs relating to future needs under the plan related to rostering are estimated to be ~\$350,000 and requests will come forward as a part of the annual budget process in future years once high buildings are under construction.

Over time, a further 2 firefighters on duty 24/7 will likely be required in future years as development continues and risk increases.