



Six Storey Wood-Frame Construction In the City of Calgary

**Presented by:
Marco Civitarese
Chief Building Official & Manager of
Building Regulations
The City of Calgary**

Six Storey Wood-Frame Construction

What we are going to cover:

- City of Calgary approach
- Available Documents
- Applying for a Variance
- Technical Requirements
- Issues
- Questions

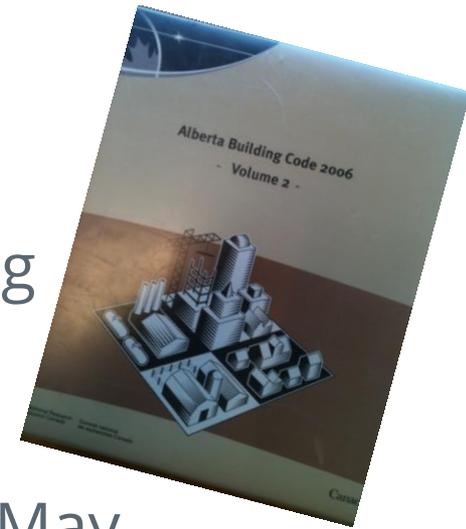




Six Storey Wood-Frame Construction

City of Calgary Approach

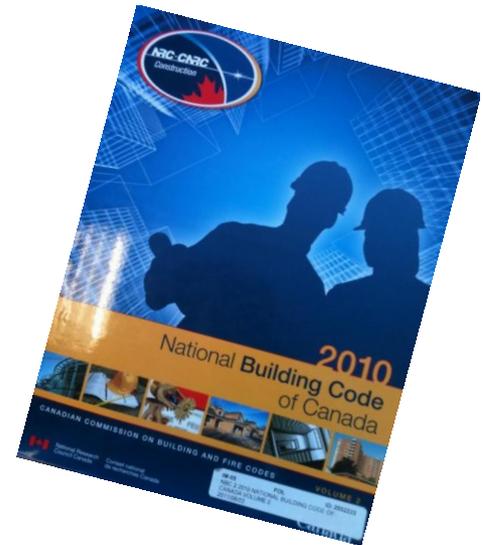
- Commitment to code development
- Considered variance to a 2006 ABC Building Permit because;
 - Requirements will be in 2014 ABC
- Considered code complying solution after May 1, 2015 if designed to 2014 ABC
- Collaborate with Development authority & BILD Calgary Region (formerly Canadian Home Builders' Association)



Six Storey Wood-Frame Construction

City of Calgary Approach

- Varying 2006 ABC articles
 - 3.2.2.45. for C occupancies OR
 - 3.2.2.52. for D occupancies
- Using new 2015 NBC articles
 - 3.2.2.50 for C occupancies OR
 - 3.2.2.57 for D occupancies
- Remaining new articles considered supporting articles to the 3.2.2. article varied





Six Storey Wood-Frame Construction

Available documents

- Six storey wood-frame variance review
- 2015 National Building Code with Calgary specifics
- Summary of Code changes for 2015 National Building Code
- Six storey wood-frame variance template
- Request for specific variance (example)

Six Storey Wood-Frame Construction

Applying for a Variance:

- Must know differences between current requirements and six storey changes
- Preliminary meeting with PD & CFD
- Complete & submit variance request form & supporting documentation at time of BP application





Six Storey Wood-Frame Construction

Applying for a Variance:

- Variance number will be assigned and referred to in the BP conditions
- Copy of documentation returned to applicant for availability on site



Six Storey Wood-Frame Construction

Technical Requirements

Design Element		ABC 2006	ABC 2006 Article	Proposed NBC 2015
Maximum Building Area Permitted - m ² (Sprinklered combustible building)	D, 1 Storey	14400	3.2.2.52	18000
	D, 2 Storey	7200	3.2.2.52	9000
	D, 3 Storey	4800	3.2.2.52	6000
	D, 4 Storey	3600	3.2.2.52	4500
	D, 5 Storey	Not permitted	n/a	3600
	D, 6 Storey	Not permitted	n/a	3000
	C, 1 Storey	7200	3.2.2.45	9000
	C, 2 Storey	3600	3.2.2.45	4500
	C, 3 Storey	2400	3.2.2.45	3000
	C, 4 Storey	1800	3.2.2.45	2250
	C, 5 Storey	Not Permitted	n/a	1800
	C, 6 Storey	Not Permitted	n/a	1500
Occupancy mixes	A2, D or E in a C Building	A2 – not permitted above 3 rd D, E – Not permitted above 4 th	3.2.2., 3.1.3.2.	Not permitted above 2 nd storey
	A2, E or F2/F3 in a D building	A2 – not permitted above 3 rd D, E – Not permitted above 4 th	3.2.2., 3.1.3.2.	Not permitted above 2 nd storey
	Storage Garage in a C building	Permitted below 5 th storey	3.2.2., 3.1.3.2.	Permitted below 3 rd storey
	Storage Garage in a D building	Permitted below 5 th storey	3.2.2., 3.1.3.2.	Permitted below 4 th storey
Fire resistance rating of floor		1 hour	3.2.2.45 & 52	1 hour
Fire resistance rating of roof		Not required for most buildings	3.2.2.45 & 52	1 hour
Max. Height to upper-most floor		9m above lowest exit level	3.2.1.8.	18m above 1 st storey floor
Maximum Height to top of combustible roof		No limit stated	n/a	25m above 1 st floor (can build NC roof above that height), class A above 25m
Applicable Sprinkler Standard		NFPA 13R if only C occupancy, otherwise NFPA 13	3.2.5.13.	NFPA 13 (unless 4 storeys or less then 13R for C)
Type of Wall Cladding		Dependent upon distance to adjacent building or property line	3.2.3.7.	Combustible for maximum 10% of each face. Non-combustible for remainder
Fire Fighting Access Streets		Access route (or street) to be within 15m of principal entrance	3.2.2.10.	25% of perimeter to be within 15m of a street
Minimum Emergency Power Supply		30 minutes	3.2.7.4.	60 minutes



Six Storey Wood-Frame Construction

Building Area

Midrise combustible construction
Physical building parameters

- New Article for Group C (3.2.2.50.) added to building blocks in NBC

No. of storeys	Maximum area, m ²
1	9 000
2	4 500
3	3 000
4	2 250
5	1 800
6	1 500

IBC-CBC

Design Element		ABC 2006	NBC 2015 ABC 2014
Maximum Building Area Permitted - m ² (Sprinklered combustible building)	D, 1 Storey	14400	18000
	D, 2 Storey	7200	9000
	D, 3 Storey	4800	6000
	D, 4 Storey	3600	4500
	D, 5 Storey	Not permitted	3600
	D, 6 Storey	Not permitted	3000
D= Business & Personal Services	C, 1 Storey	7200	9000
	C, 2 Storey	3600	4500
	C, 3 Storey	2400	3000
C= Residential	C, 4 Storey	1800	2250
	C, 5 Storey	Not Permitted	1800
	C, 6 Storey	Not Permitted	1500

Six Storey Wood-Frame Construction

Occupancy Mixes

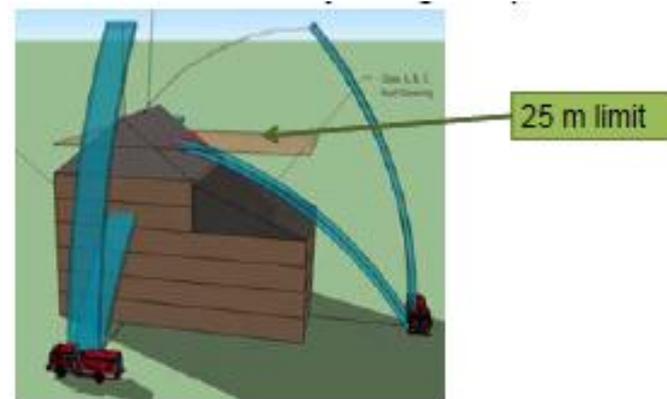
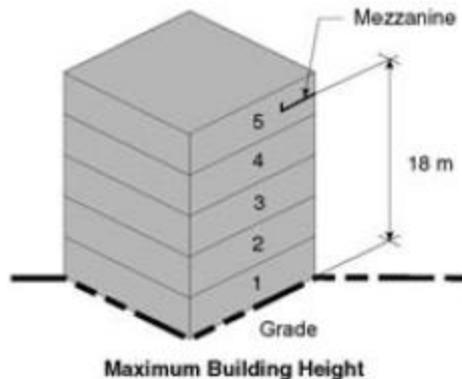


Design Element		ABC 2006	NBC 2015 ABC 2014
Occupancy mixes A2=Assembly/Restaurant E=Mercantile F= Industrial	A2, D or E in a C Building	A2 – not permitted above 3 rd D, E – Not permitted above 4 th	Not permitted above 2 nd storey
	A2, E or F2/F3 in a D building	A2 – not permitted above 3 rd D, E – Not permitted above 4 th	Not permitted above 2 nd storey
	Storage Garage in a C building	Permitted below 5 th storey	Permitted below 3 rd storey
	Storage Garage in a D building	Permitted below 5 th storey	Permitted below 4 th storey

Six Storey Wood-Frame Construction

Prevention of Fire Spread

Design Element	ABC 2006	ABC 2006 Article	Proposed NBC 2015
Fire resistance rating of floor	1 hour	3.2.2.45 & 52	1 hour
Fire resistance rating of roof	Not required for most buildings	3.2.2.45 & 52	1 hour
Max. Height to upper-most floor	9m above lowest exit level	3.2.1.8.	18m above 1 st storey floor
Maximum Height to top of combustible roof	No limit stated	n/a	25m above 1 st floor (can build NC roof above that height), class A above 25m
Applicable Sprinkler Standard	NFPA 13R if only C occupancy, otherwise NFPA 13	3.2.5.13.	NFPA 13 (unless 4 storeys or less then 13R for C)
Type of Wall Cladding	Dependent upon distance to adjacent building or property line	3.2.3.7.	Combustible for maximum 10% of each face. Non-combustible for remainder

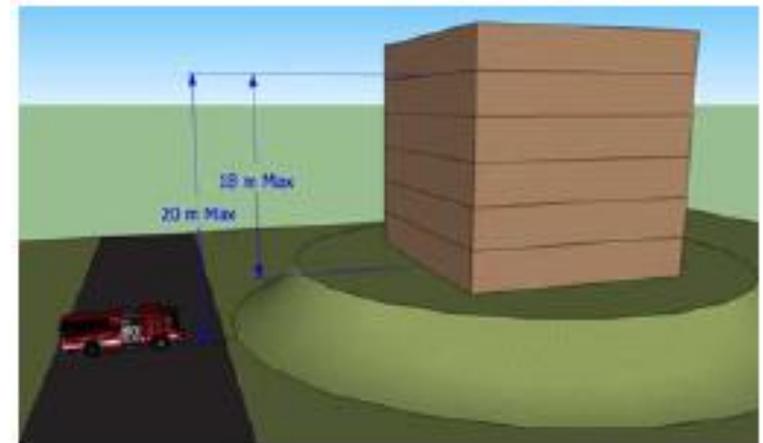


Six Storey Wood-Frame Construction

Prevention of Fire Spread

- *Building facing one street if not less than 25% of perimeter located within 15 m of street*

Design Element	ABC 2006	Proposed NBC 2015
Fire Fighting Access Streets	Access route (or street) to be within 15m of principal entrance	25% of perimeter to be within 15m of a street
Minimum Emergency Power Supply	30 minutes	60 minutes
Seismic Design	As per Part 4 of code	As per Part 4 of code + limit the use of and include safety factors for different forms of wood-based Lateral Force Resisting Systems
Maximum Building Height	9m above lowest exit level	Maximum 20m above access route to uppermost level



Six Storey Wood-Frame Construction

Technical Requirements

- AFC Specific to Six Storey
 - Access for fire fighting
 - Site identification
 - Progressive installation of standpipe





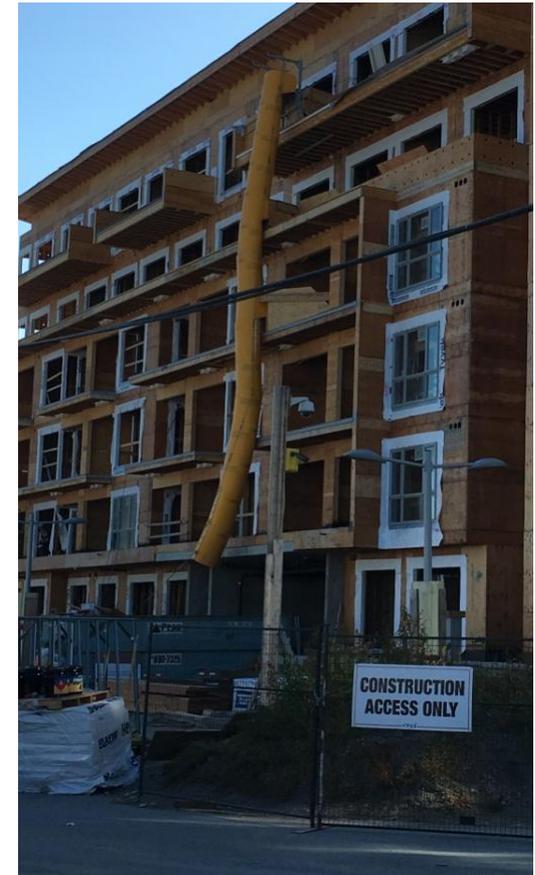
Six Storey Wood-Frame Construction

Technical Requirements

- AFC Specific to Six Storey
 - Disposal of combustible refuse
 - Water supply
 - Hydrant access & signage
 - Construction Access



www.shutterstock.com · 433803649





Six Storey Wood-Frame Construction

Technical Requirements

- AFC Specific to Six Storey
 - Site security
 - Watchman
 - Consult with CFD at the pre-application meeting with Planning and Development
 - Smoking restrictions



Six Storey Wood-Frame Construction

Technical Requirements:

- Some of the issues
 - Where in the City can they be built?





Six Storey Wood-Frame Construction

Technical Requirements:

- Some of the issues
 - Parking
 - Small site
 - Above ground floors
 - Framing to achieve energy efficiency
 - Framing not conducive to energy efficiency
 - Not all storeys wood



Six Storey Wood-Frame Construction

Technical Requirements:

- Some of the issues
 - Sound
 - All residential has acoustic issues
 - 2015 NBC sound requirements
 - Construction to drawings
 - Design changes not communicated

Six Storey Wood-Frame Construction

Technical Requirements:

- Some of the issues
 - Hybrid construction
 - Combustible in conjunction with other forms such as ICF





Six Storey Wood-Frame Construction

Technical Requirements:

- Some of the issues
 - Qualifications of contractors
 - Occupancy combinations
 - Using superimposing requirements versus 6 storey requirements (B occupancies)



Six Storey Wood-Frame Construction

Recommendations to AHJs:

- Plans Examinations
 - Look for the issues identified above
 - Site safety plan
 - Get copies of listed assemblies to be used
 - Development requirements conflicting with code:
 - Check that 25% of perimeter within 15m of a street
 - Height & cladding requirements can clash with development
 - Public Protection Site Safety Plan

Six Storey Wood-Frame Construction

Recommendations to AHJs:

- Inspections
 - Trades affecting shear walls
 - More frequently to start with
 - Inspections met weekly with contractors on site





Six Storey Wood-Frame Construction

Recommendations to AHJs:

- Inspections
 - Jointly with fire inspectors
 - at least at first to set the parameters and expectations for the fire code safety measures
 - Progressive installation of standpipe systems
 - Engineer reports
 - Ask for progress reports to know they are on site
 - Shear walls are a major concern to monitor

Six Storey Wood-Frame Construction

