Which Way to Go … New or Renovate?

EAC's BETTER BUILDING SERIES

19Nov2020

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Can I Renovate?

Perhaps

- Enough floor area?
- Adequate structure to meet Code?
- Suitable functions e.g.: workshop, garage, office?
- Decent orientation?
- Accessible?
- Safe removal of hazardous material?
- Possible addition required

Maybe not

- Too small
- Poor orientation
- Poor position on site
- Contamination
- Inadequate site area for addition

Addition?

- ☐ Challenge to connect assemblies
- ☐ Involves new construction
- ☐ Out or Up?

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New Build Pros and Cons

Pros

- Allows optimal orientation
- Healthful materials
- Reduced labour cost?
- Ease of higher levels of insulation
- Eliminate problem areas (damp basement? radon? thermal bridging?)
- Easy to incorporate accessibility

Cons

- Higher initial environmental impact
- Higher waste
- Higher material cost

AGNS

Art Gallery of Nova Scotia current building not big enough.

Limited climate control for archiving precious artifacts.

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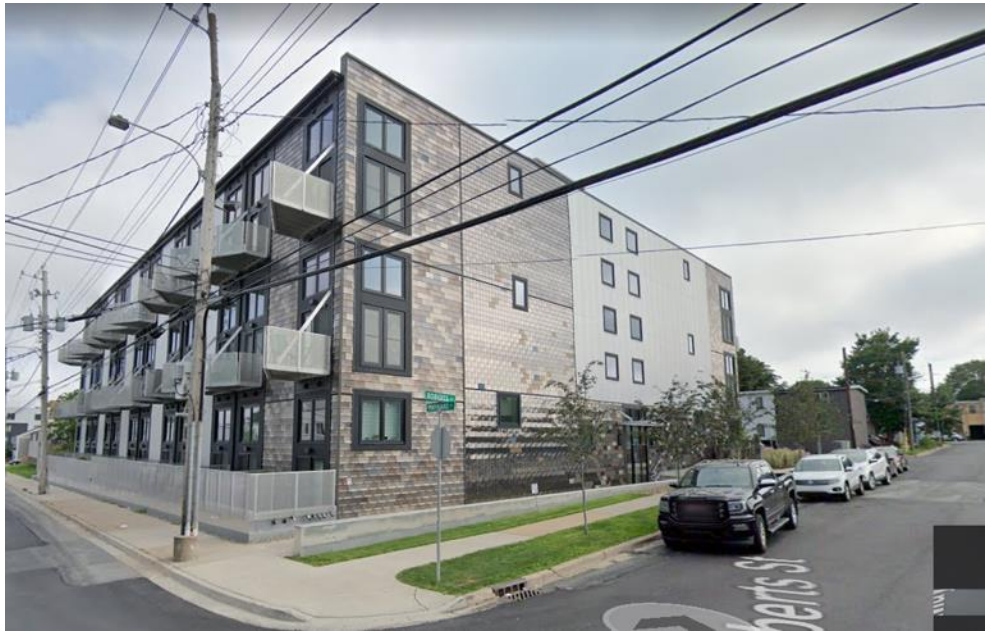
Q Lofts

Residential condo in commercial-industrial part of Maynard Street.

LEED for Homes Platinum certification pursued.

Increased population density.



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JL Ilsley High School

Ongoing repairs, costly to operate.

#jliprobs

Changes in technology, programs, population.

Exploration to assess reusing the existing gym determined that costly structural upgrades would be required, in addition to losing access to the gym for one school year.

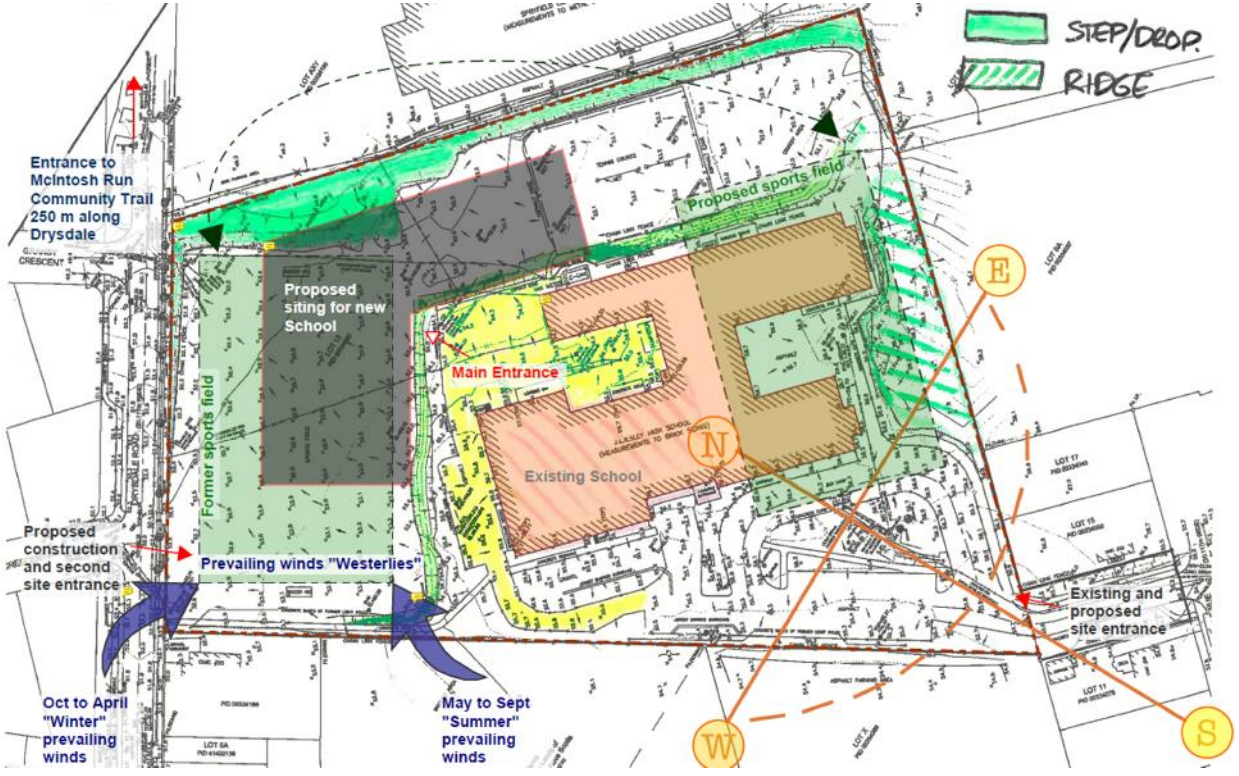
Much-needed repairs at J.L. Ilsley creating more problems for aging school

By Rebecca Lau · Global News
Posted December 4, 2015 6:12 pm · Updated December 4, 2015 7:19 pm

HALIFAX – Much-needed renovations a
that were meant to improve
for students.

"They now have a staircase down because of fumes – gasoline fumes."
TWEET THIS

The 44-year-old
long list of proble
pairs for months now. The
roof, asbestos and falling ceiling tiles.



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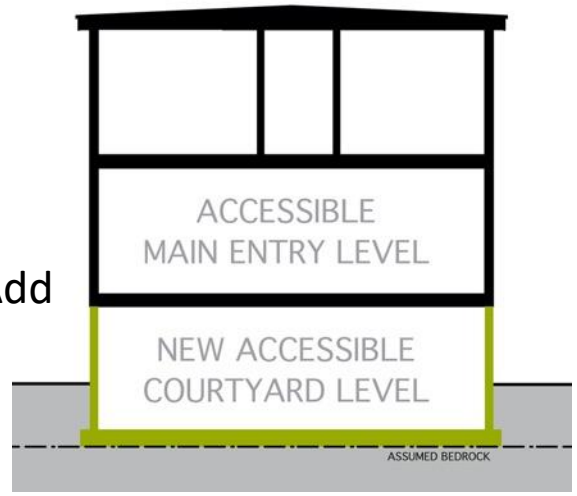
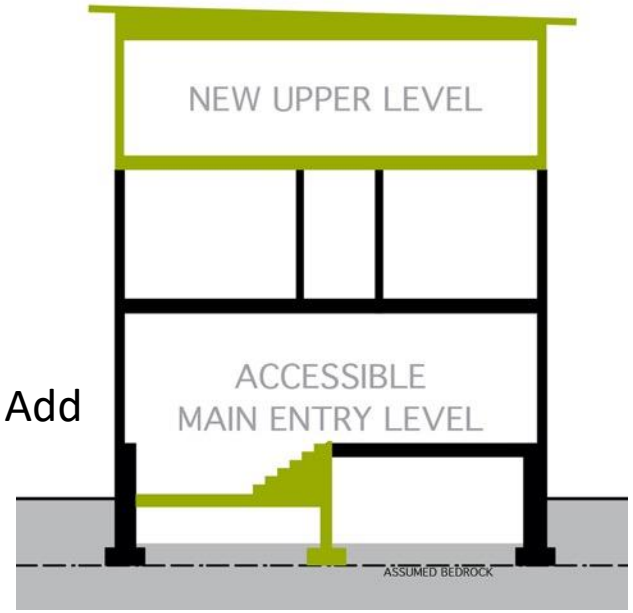
Ecology Action Centre

Dig and Add



Lift and Add

Split and Add



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Green Decision Matrix

Goals were verified from RFP

- Energy Security – **9.2**
  - Greenhouse / Ozone Emissions
  - Renewable Energy
- Indoor Environment – **9.2**
  - Natural Ventilation
  - Low-Emitting, Healthy Materials
  - Thermal Comfort and Control
  - Maximize Daylight
- Materials and Resources – **8.8**
  - Durability
  - Embodied Energy

Energy Security	10	9	7	10	9	10	9.2		#1 - Highest Category (tie)
Embodied Energy	8	8		6	8	8	7.6	7.0	
Greenhouse/Ozone Emissions	10	8	8	10	10	10	9.3	8.6	Insulation upgrade throughout?
Renewable Energy	10	10	10	7	7	9	8.8	8.1	PV & solar thermal on roof/wall
Performance Testing	9	7		8	6	7	7.4	6.8	
Energy Star Appliances	9	5	9	5	5	5	6.3	5.8	
Operational Cost	8	7	9	9	9	8	8.3	7.6	

Materials and Resources	10	8	8	5	9	9	8.2		#3 Category
Durability	9	7	10	10	6	10	8.7	7.1	Simple palette, durable.
Ease of maintenance	8	7	8	9	4	7	7.2	5.9	
Certifications (FSC, Floorscore, Greenguard, etc.)	10	3	5	8	2	6	5.7	4.6	
Construction Waste Management Divert 75%	8	6	4	2	8	7	5.8	4.8	
Resource Reuse / Salvaged Materials	8	5	6	3	7	8	6.2	5.0	
Embodied Energy	9	10		7	9	8	8.6	7.0	Local, durable, recycled, recyclable
Recycled or Recyclable Content	8	6	7	4	5	8	6.3	5.2	
Natural Materials	8	6	3	6	3	7	5.5	4.5	
Local/Regional Materials, maximize local content	9	8	9	5	10	7	8.0	6.5	

Indoor Environment	10	10	10	8	7	10	9.2		#1 - Highest Category (tie)
Improve Ventilation - Mechanical	1	7	6	8	2	7	5.2	4.7	
Natural Ventilation - Operable Windows	10	10	7	7	10	9	8.8	8.1	New windows/upgrades
Low-Emitting, Healthy Materials	8	8	10	6	9	8	8.2	7.5	IEQ - Living Building Ch. List
Lighting Controls	5	4	4	5	6	6	5.0	4.6	
Thermal Comfort and Control (Temperature and Hur	10	9	9	10	4	10	8.7	7.9	Occupant control with new mech.
Maximize Daylight	10	8	8	9	8	10	8.8	8.1	New windows/upgrades
Views	5	5	5	4	0	5	4.0	3.7	

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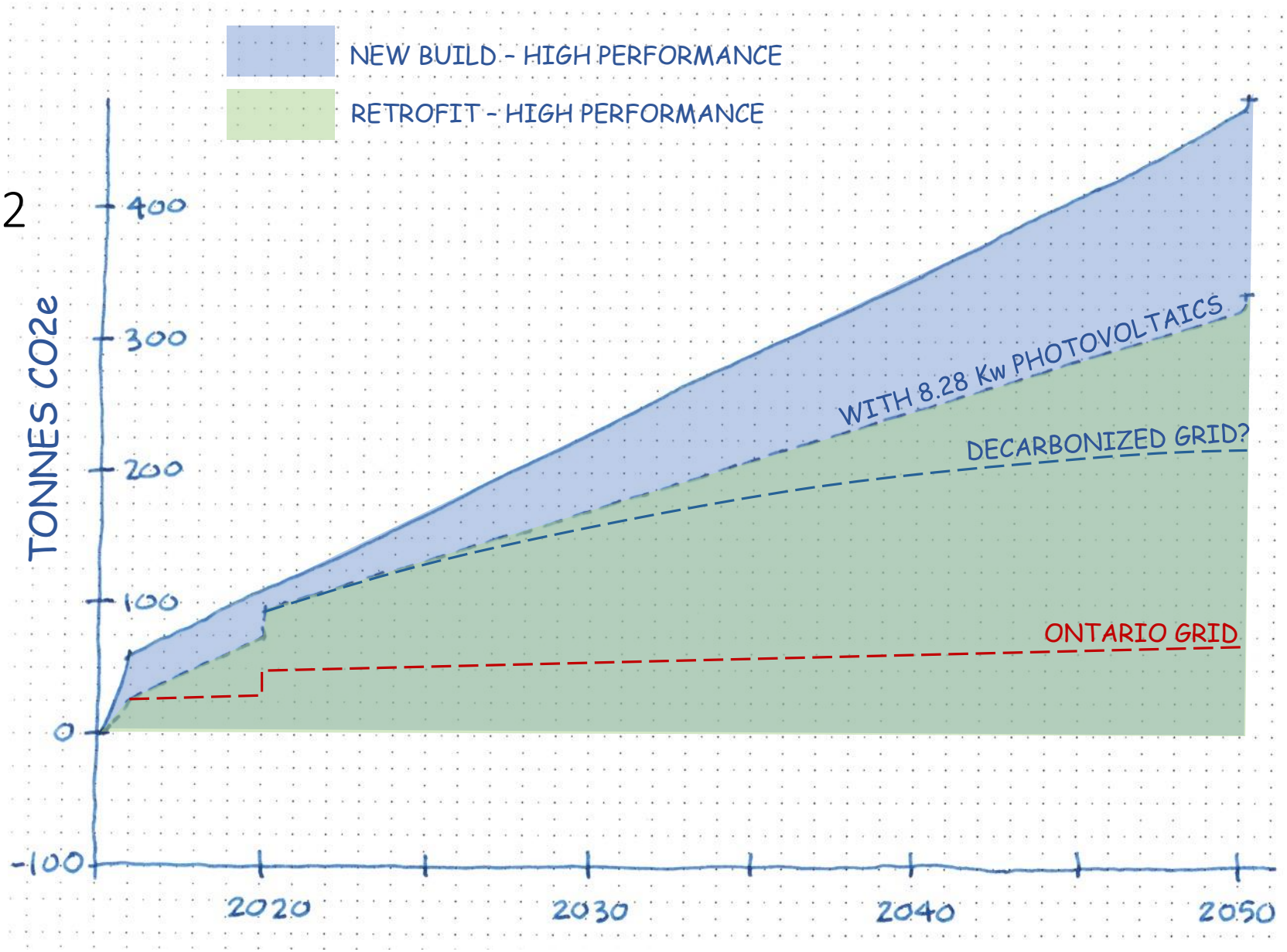
EAC – Embodied + Operational CO_2

Project	Unit	PRODUCT (A1 to A3)	PV Panels	CONSTRUCTION PROCESS (A4 & A5)	USE (B2, B4 & B6)	END OF LIFE (C1 to C4)	BEYOND BUILDING LIFE (D)
EAC New	kg CO2 e	**45,402**	**-**	**9,361**	**1,632**	**3,802**	**(22,800)**
EAC Retrofit	kg CO2 e	**18,256**	**17,098**	**4,290**	**1,632**	**3,802**	**(22,800)**



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Oxford & Cork

1940's Sobey's Grocery store in growing west-end neighbourhood

Building occupies most of site

Douglas-fir heavy timber construction

Brick cladding good condition

Addition of second storey efficient directly on building perimeter and structural grid.

Orientation ideal to gain passive solar energy.

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North-end Halifax

North Halifax production of pre-fab floor panels. Public Archives of Nova Scotia, 1941

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Post-WWII prefab

North and West-end Halifax house assembly of pre-fab panels. Public Archives of Nova Scotia, 1941

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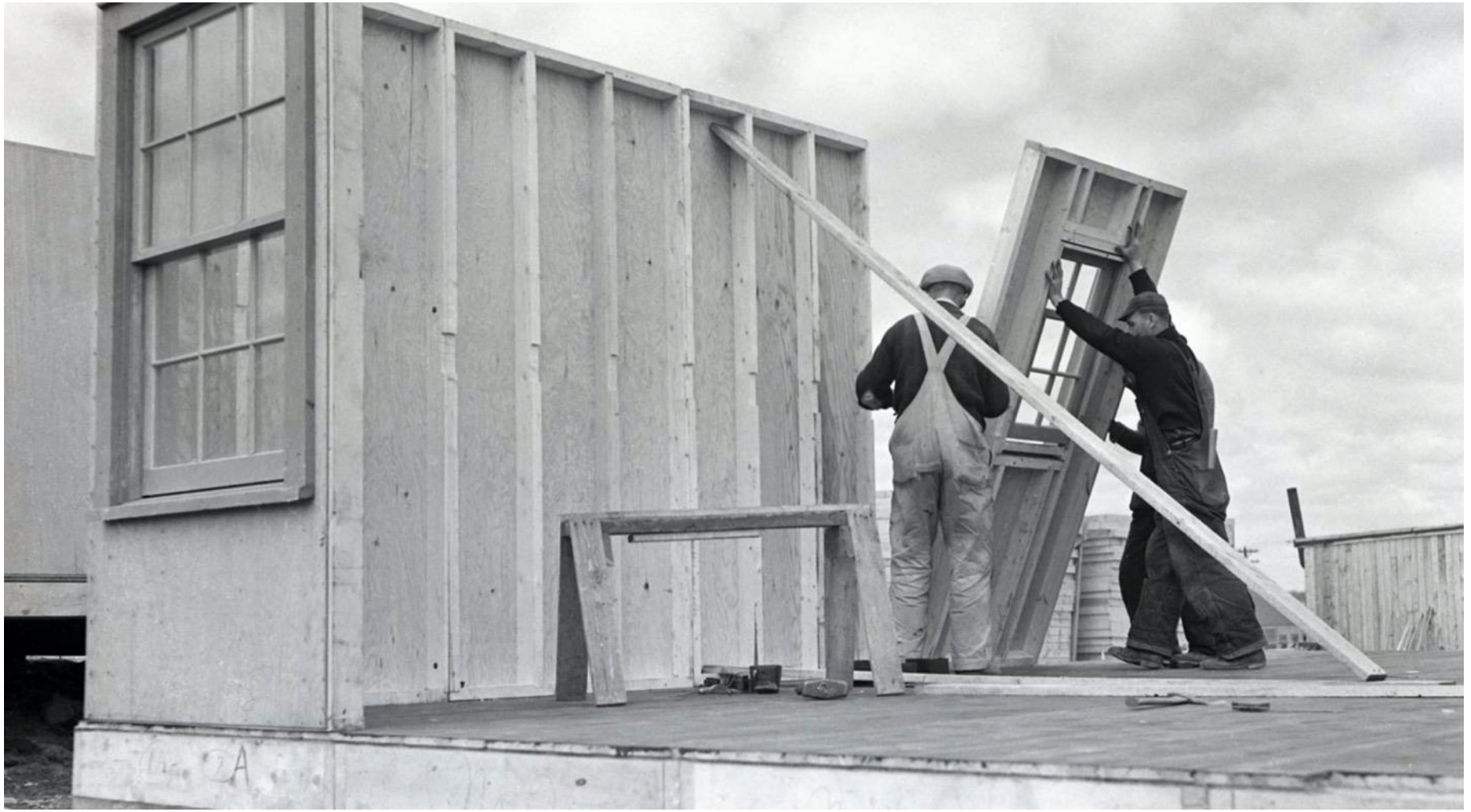
Post-WWII prefab



North and West-end Halifax house assembly of pre-fab panels. Public Archives of Nova Scotia, 1941

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Post-WWII prefab

Floor panel installation (including finished hardwood). Public Archives of Nova Scotia, 1941

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Post-WWII prefab

War-time Halifax house construction. Public Archives of Nova Scotia, 1941

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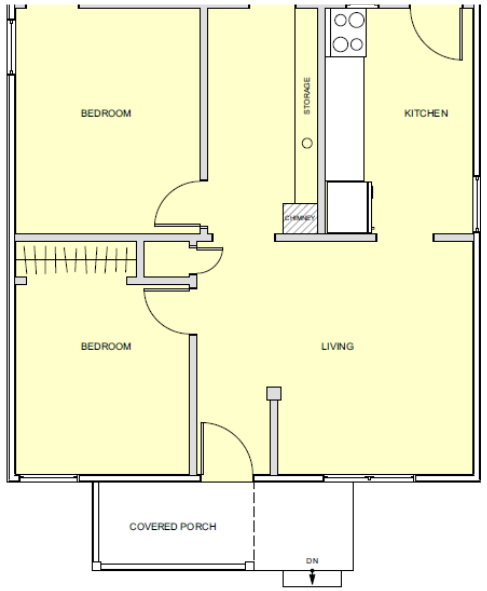
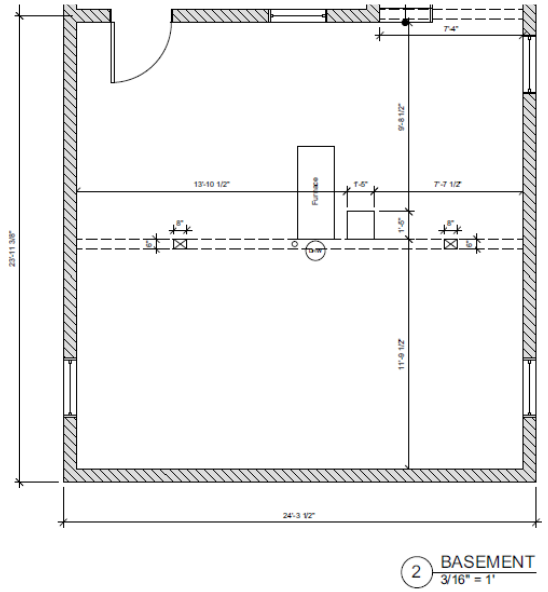
Typical 1-storey





Original footprint

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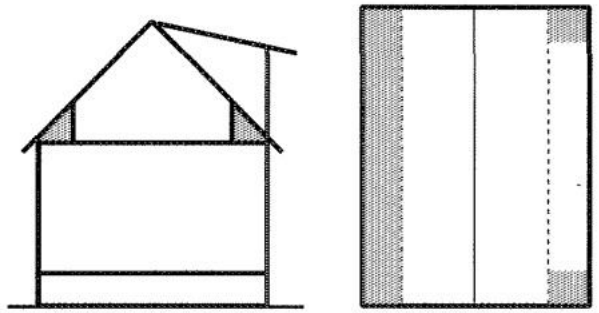
RENOVATING DISTINCTIVE HOMES

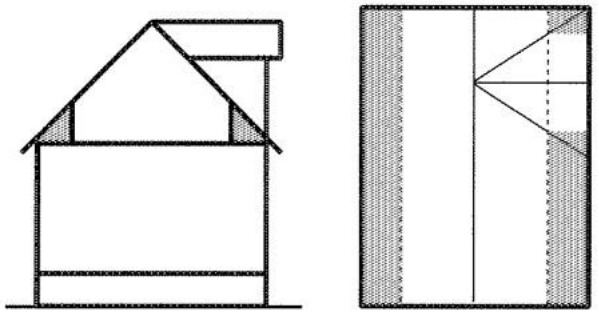
1 1/2 Storey Post-War Homes

CMHC SCHL

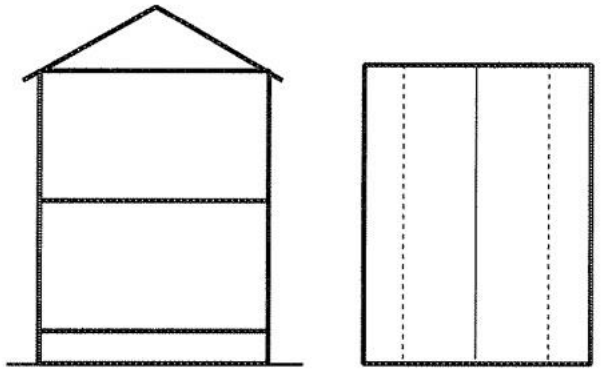
HOME TO CANADIANS
Canada



Shed Dormer



Gable Dormer



Full Second Storey

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Retrofit vs. New Construction?

Pro:

- Embodied carbon (CO_2) in wood-frame assembly
- Able to reuse foundation in most cases
- Able to reuse main floor framing in most cases
- Can clear span a second storey structure on 1st floor exterior walls
- Avoid total demolition expense (and tonnes of waste)

Con:

- Large lots are able to have higher density (larger) structure
- Not open concept layout
- May have asbestos siding shingles
- May have paper batt insulation (challenging to remove)
- Most are not accessible
- Partial demolition expense
- Roof, wall and foundation require insulation upgrade
- No garage

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Liverpool St.

Renovated house (centre) with new entry and roof, updated kitchen, bath, windows, envelope upgrade

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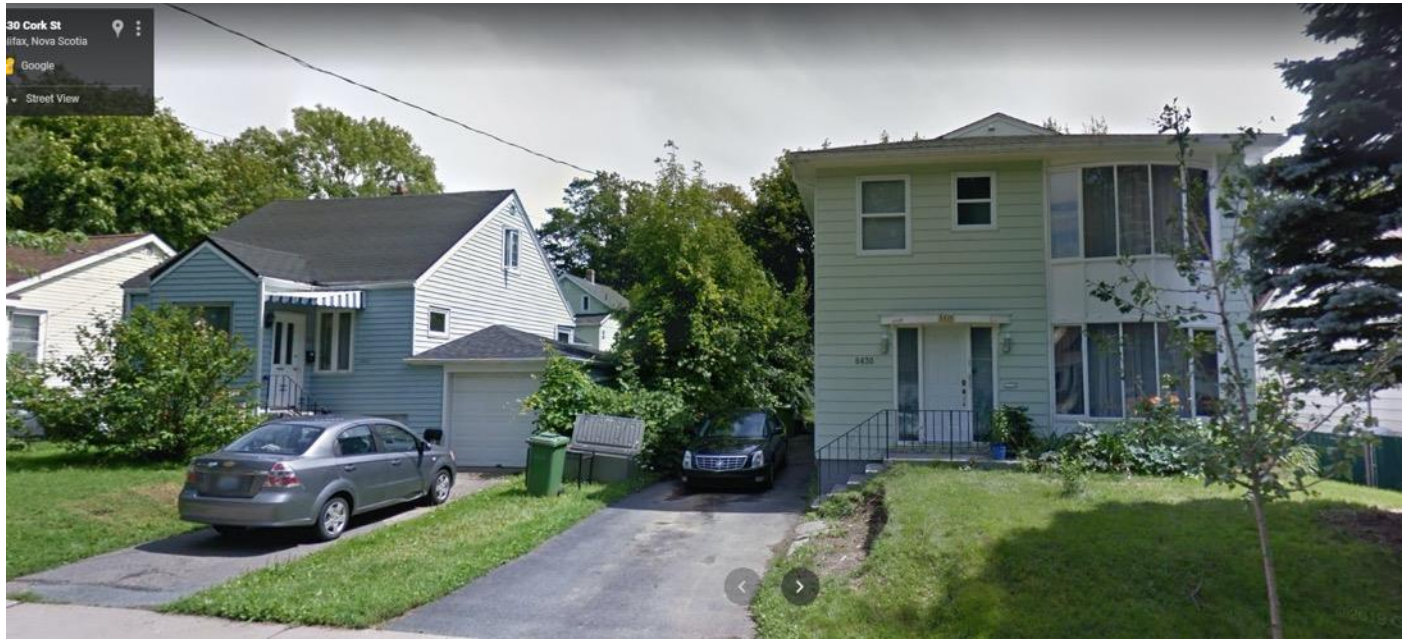
Cork St. Addition

2nd floor addition (left) built on existing house and garage.

Rear addition (right) new windows, cladding, insulation, entry.



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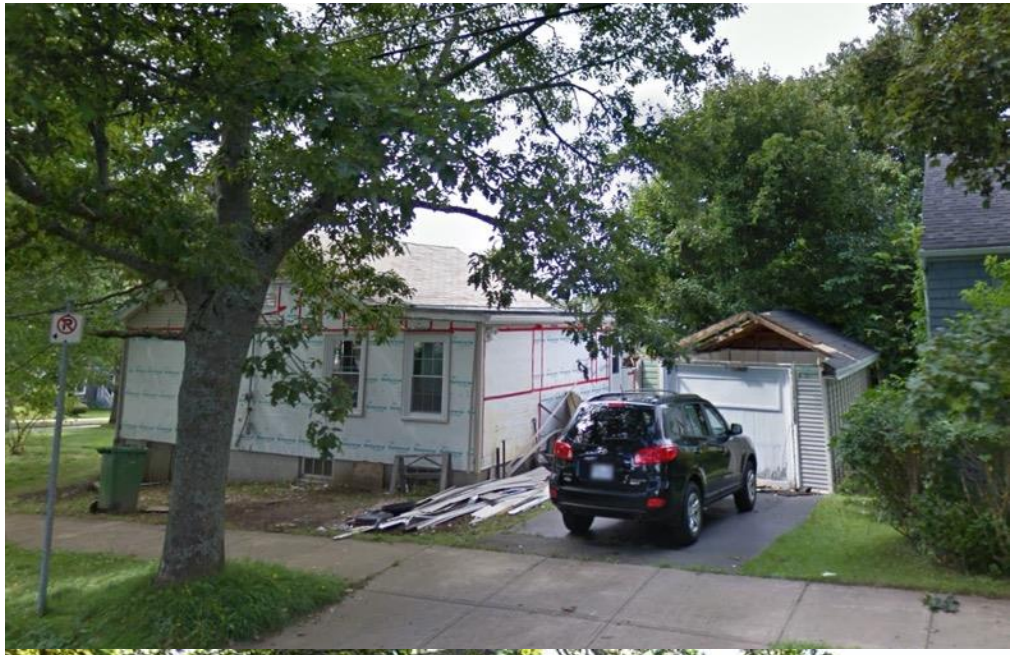
Liverpool St.

War-time house foundation and main floor renovated with new second floor addition.



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Liverpool St.

New house (left) built on existing foundation + expansion

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Cork St. Demolition

No ability to have a garage in existing house.

Full demolition and new construction.

Higher density on site.

Choice of insulation results in higher global warming impact.

Street front facing north with majority of windows on north.

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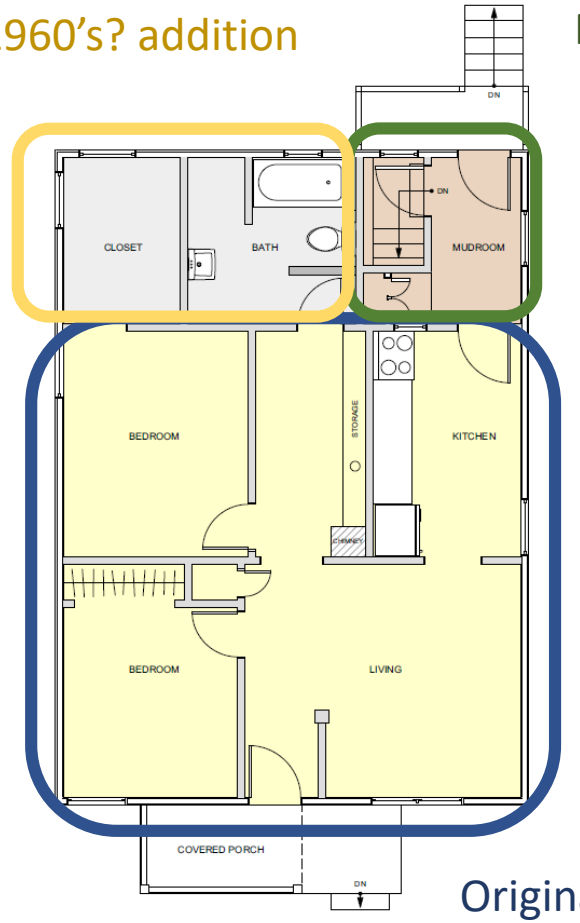
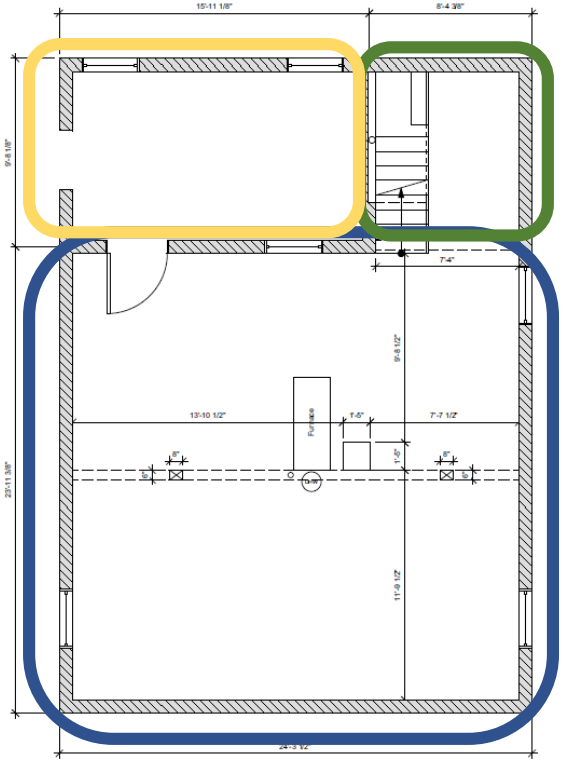
“Little House” Case Study

1960’s? addition



Permanent foundation



Original footprint

2 BASEMENT
3/16" = 1'

16 DEC 2019
LIVERPOOL
HALIFAX
NOVA SCOTIA

Project No.
1934

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“Little House - 2021”

Maintain existing foundation (limited ability to fully insulate basement to PH levels).
Maintain main floor framing.
Add full second storey addition.
Passive House deep energy retrofit/addition.
Possible back yard suite. Phase 2.

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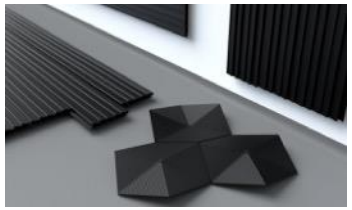
Carbon-sequestering materials

- Wood framing/structure
- Wood fibre insulation
- Wool
- Cork
- Rice hulls
- Hemp OSB
- Straw bale
- Straw SIPs
- Hempcrete
- Mycelium insulation
- Cellulose insulation
- “ReWall” sheathing
- ByFusion "ByBlocks“
- CarbonCure blocks/ concrete



CC BY 2.0 A bunch of materials with low upfront carbon emissions / Lloyd Alter

https://www.treehugger.com/green-architecture/

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Thank you! Questions?

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