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Little Actions
Insulation

Less Bad

Little Actions - Big Shifts

Building Energy Boston

03.23.26

#4
Little Actions
Air Barriers

BUILDINGENERGY BOSTON

More Good through Less Bad

Jim D'Aloisio, Klepper, Hahn & Hyatt
Jodi Smits Anderson, 2bGreener

Curated by Ken Neuhauser

Northeast Sustainable Energy Association (NESEA) | March 23, 2026

BUILDINGENERGY BOSTON

Please fill out an evaluation for this session

or: *nesea.org/eval*

Northeast Sustainable Energy Association (NESEA)

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INTROS AND CONTEXT

01. Jim and Jodi Show

02. Embodied Carbon and More

03. What If...

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Cement = approximately 8% of Global Emissions

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Easy-Peasy Tips:

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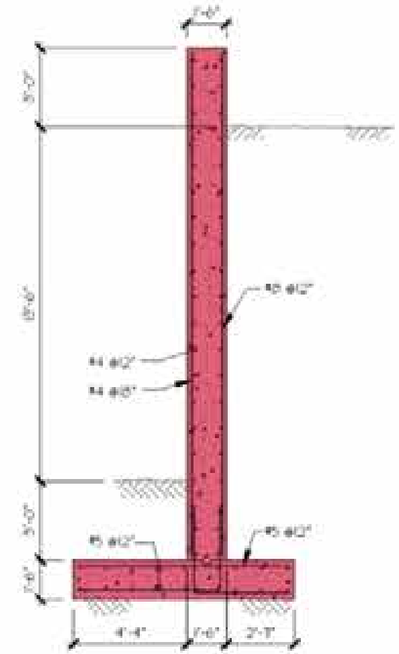
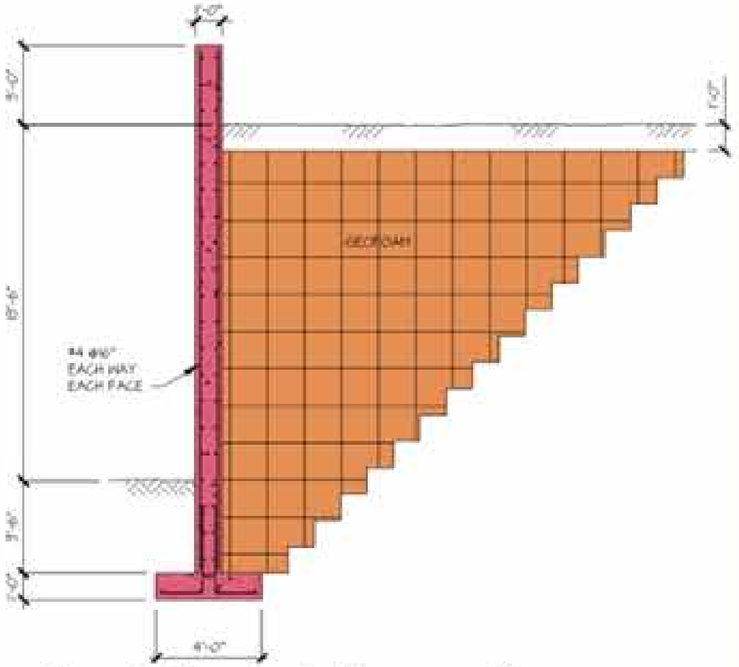
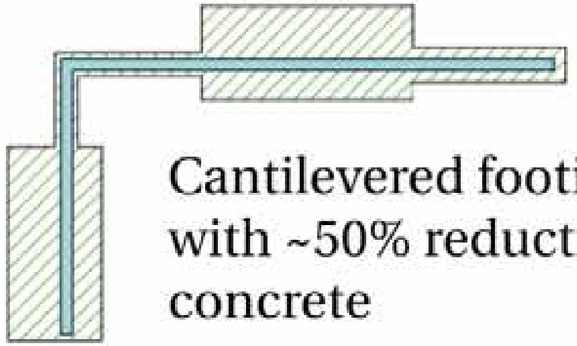


Typical retaining wall
w/ 42 cf/lf concrete



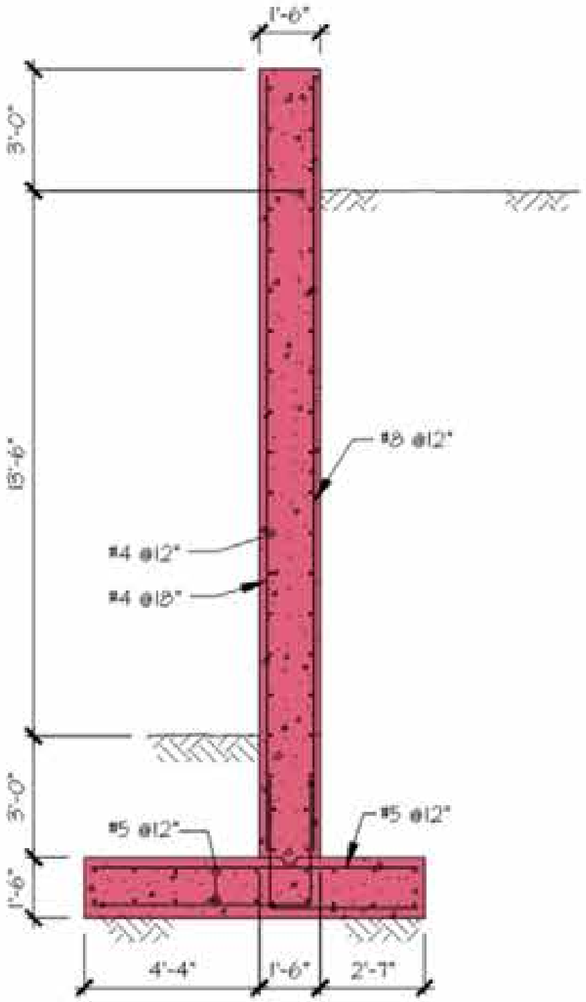
Geofill retaining wall
w/ 24 cf/lf concrete for
43% reduction!

Traditional footing



Cantilevered footing
with ~50% reduction of
concrete

Arched retaining
wall for the WIN!



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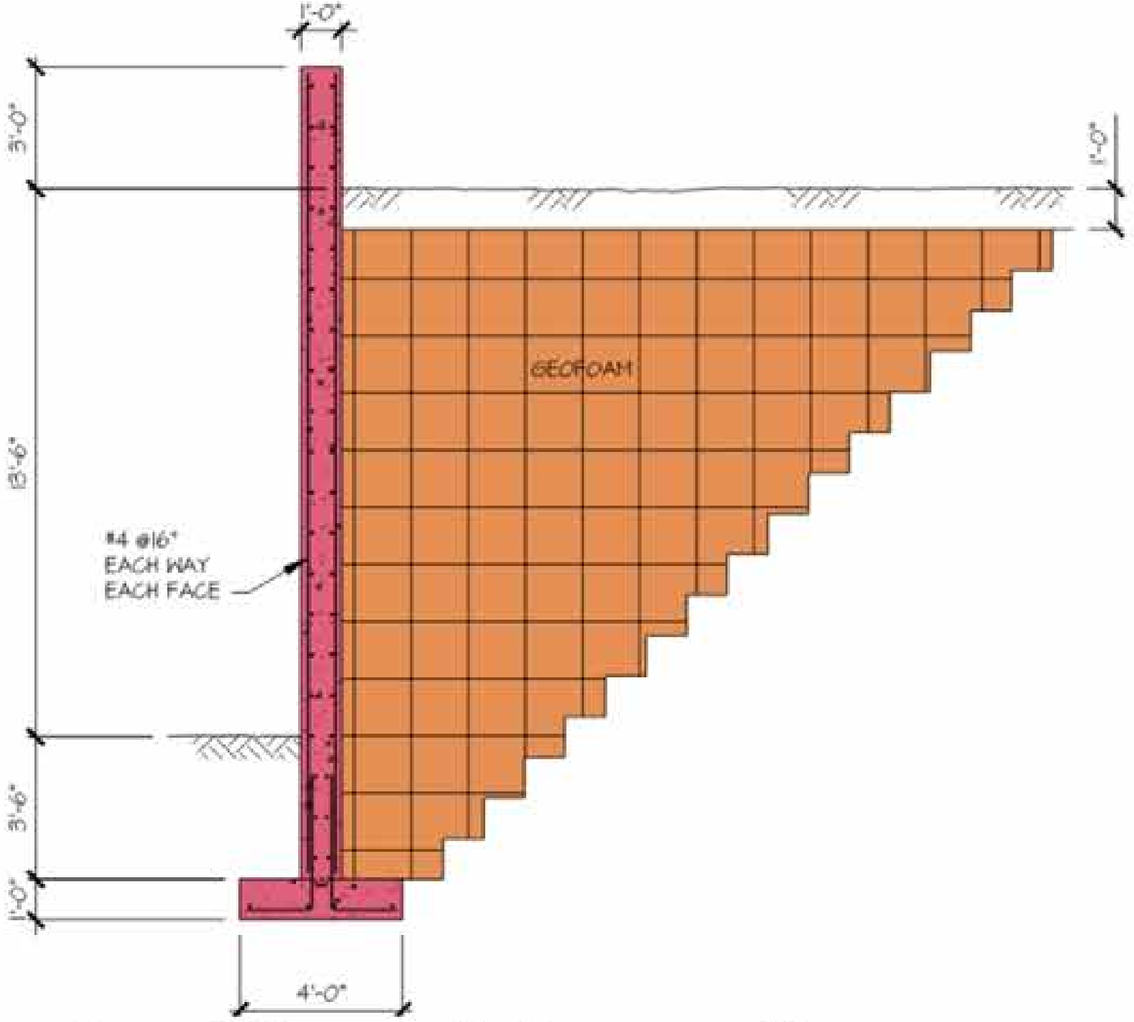

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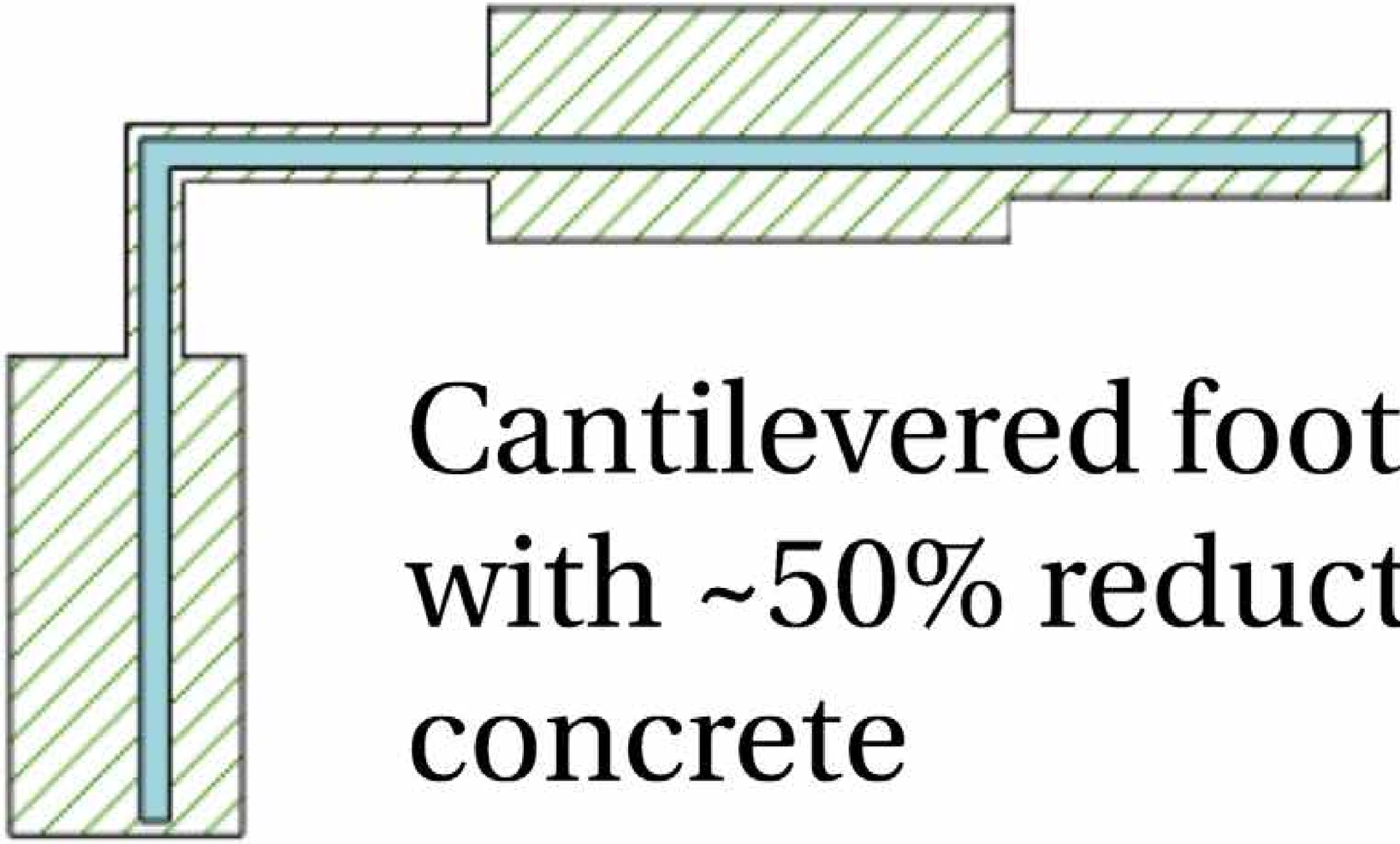

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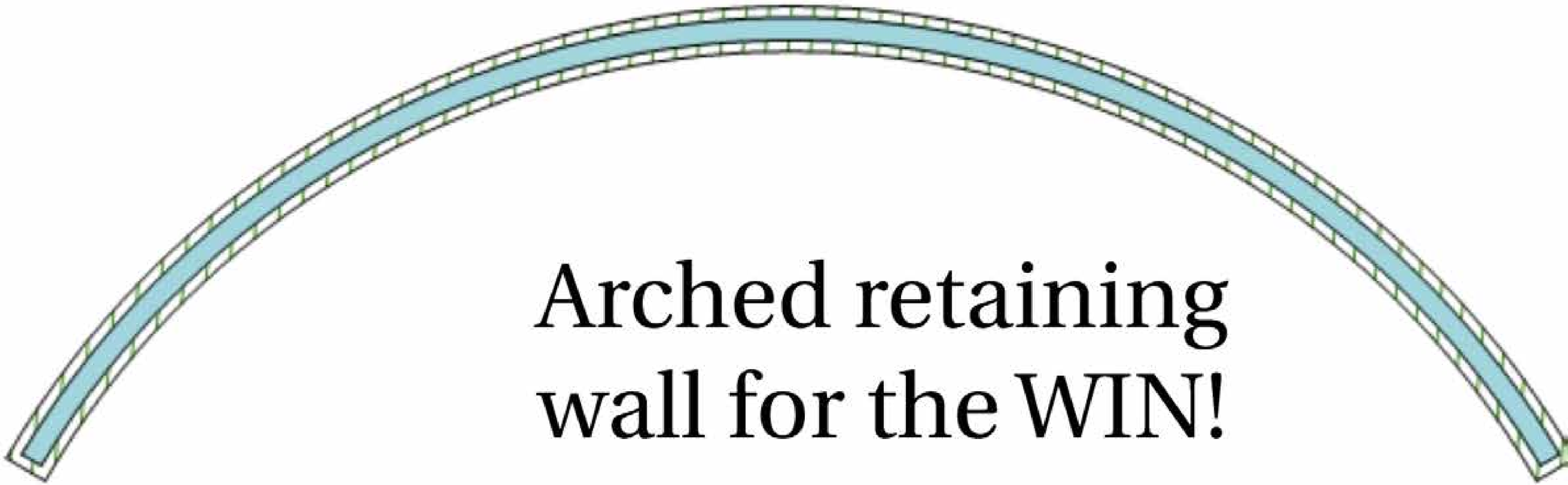

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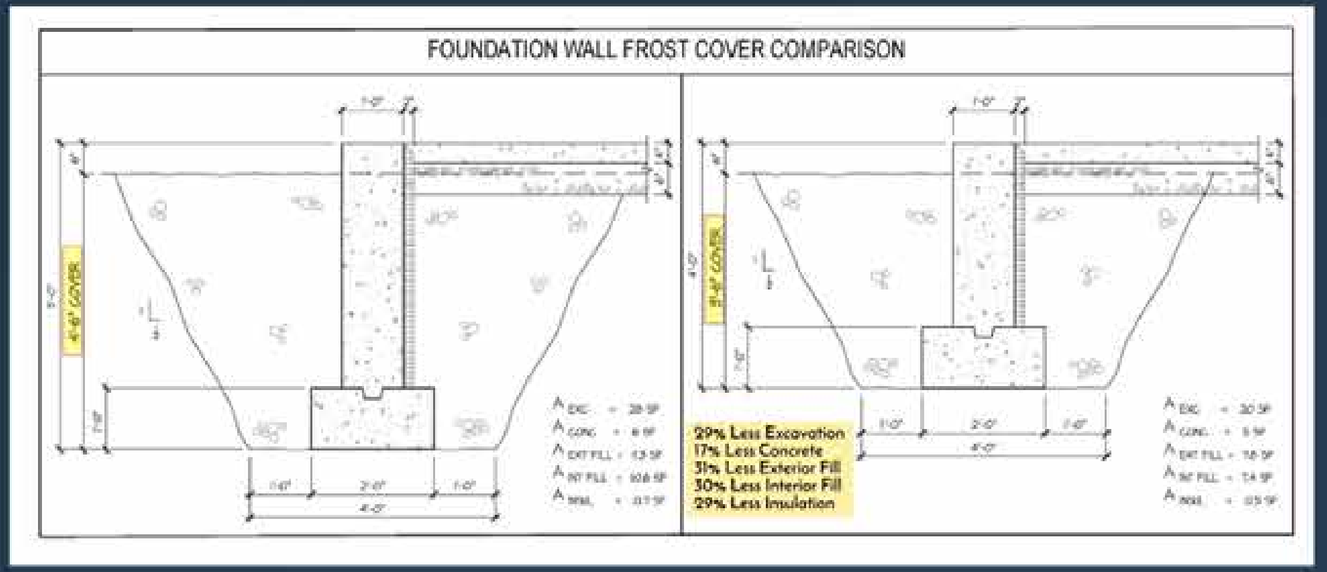
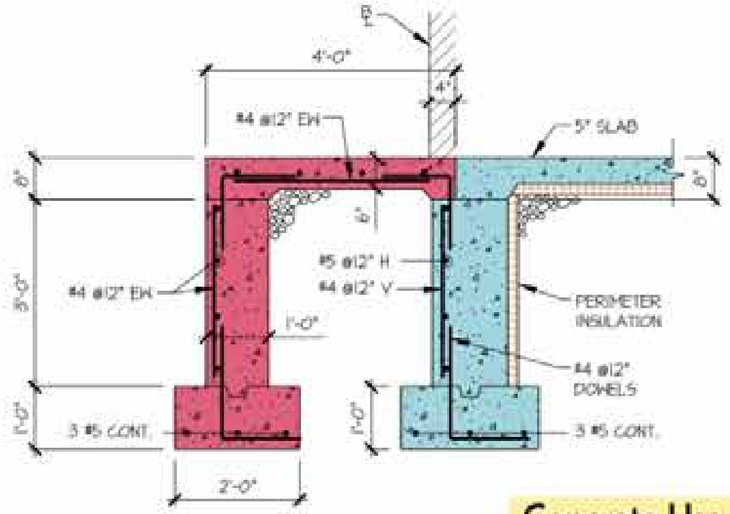
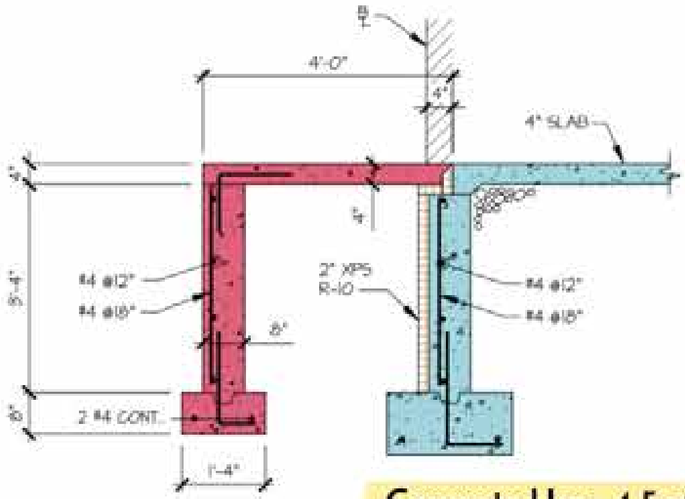




ENTRY SLAB - 1996 CONSTRUCTION

SCALE: 1/2" = 1'-0"

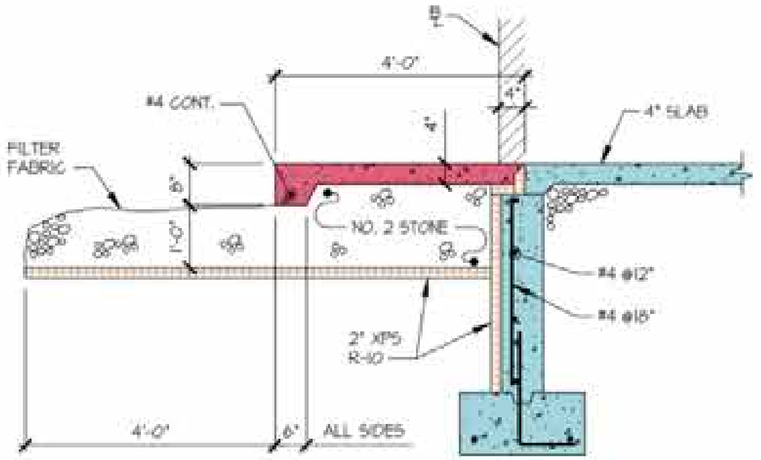
Concrete Use - 7 cf/ lf



ENTRY SLAB - OPTION 1

SCALE: 1/2" = 1'-0"

Concrete Use - 4.5 cf/ lf for 36% reduction

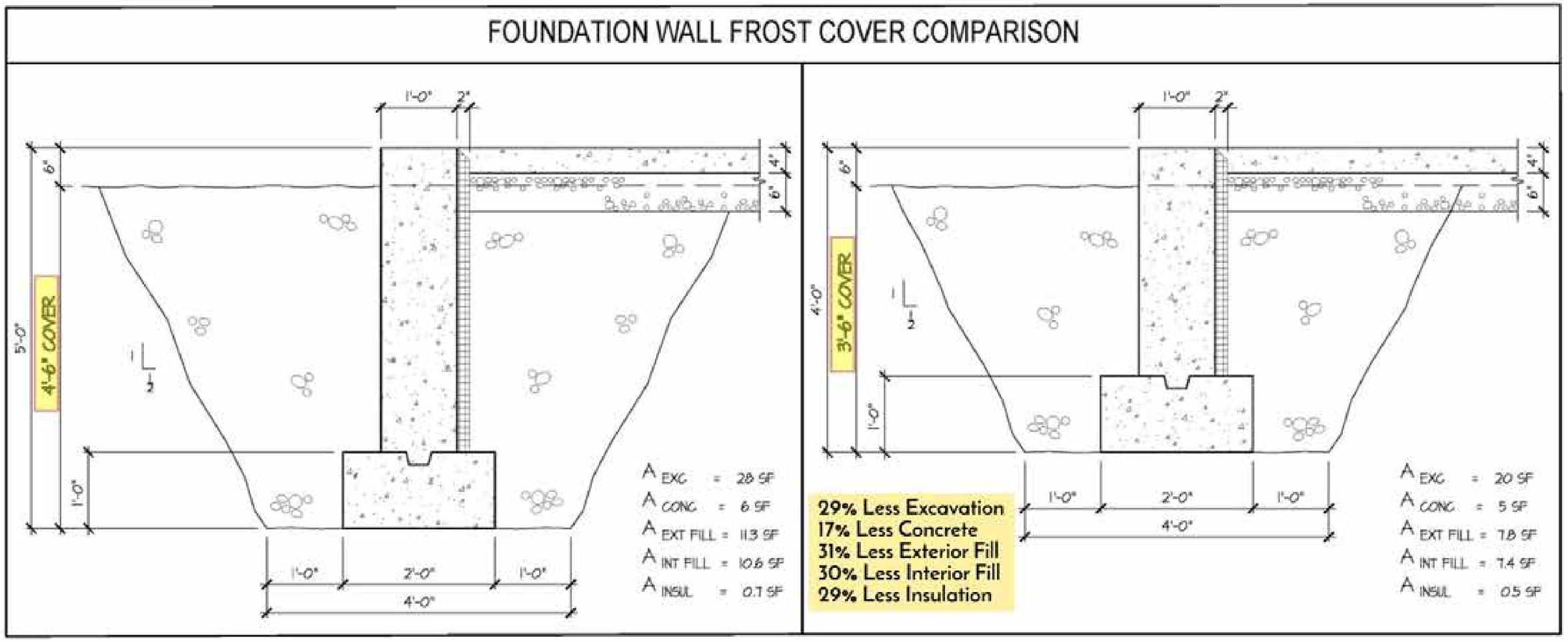


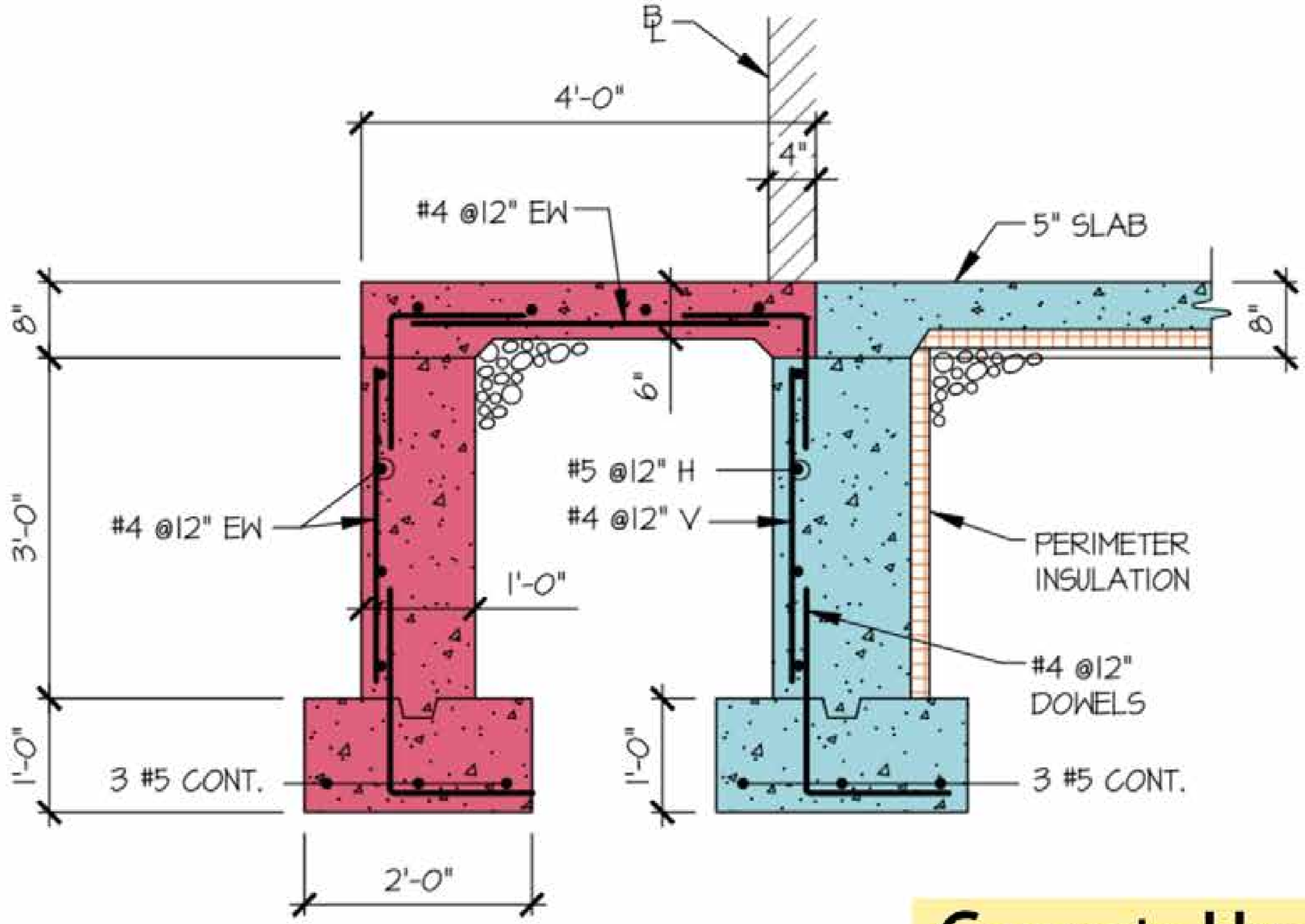
ENTRY SLAB - OPTION 2

SCALE: 1/2" = 1'-0"

Concrete Use - 1.5 cf/ lf for 79% reduction

FOUNDATION WALL FROST COVER COMPARISON





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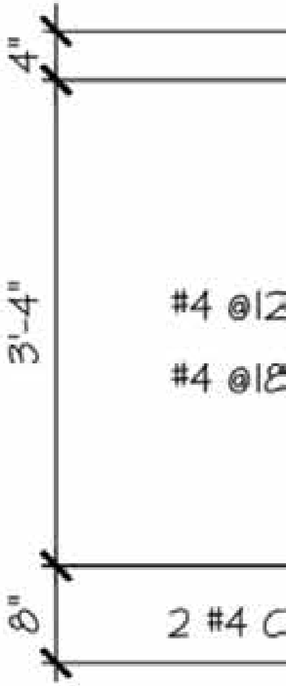
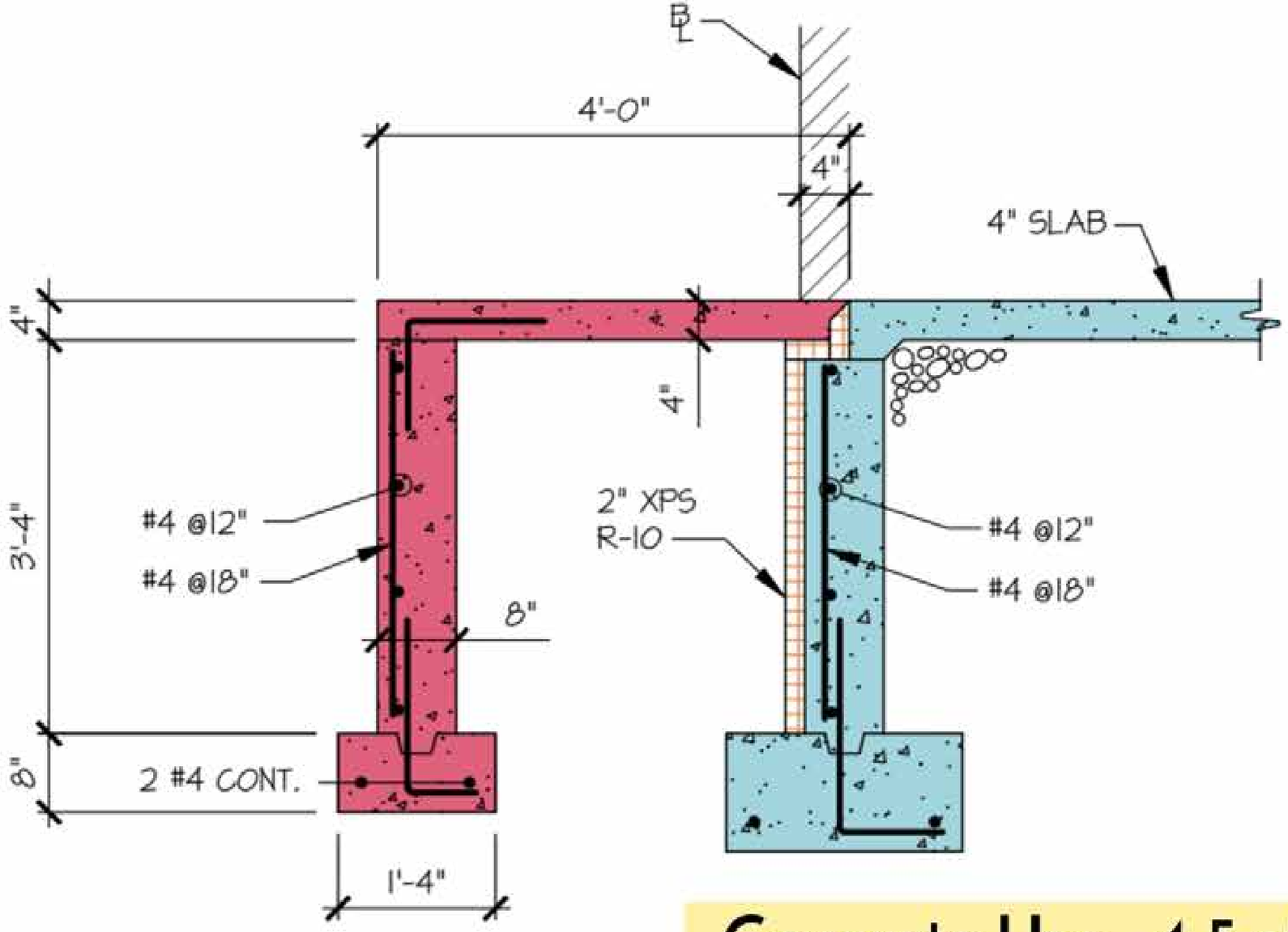


ENTRY SL

SCALE: 1/2" = 1



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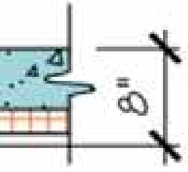

ER
ON

NT.

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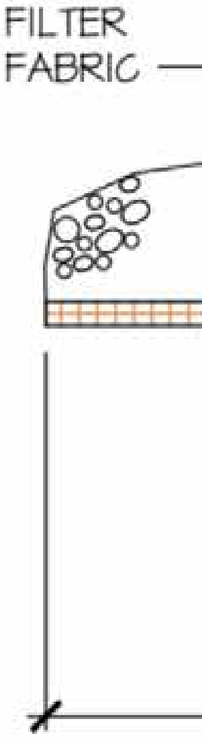
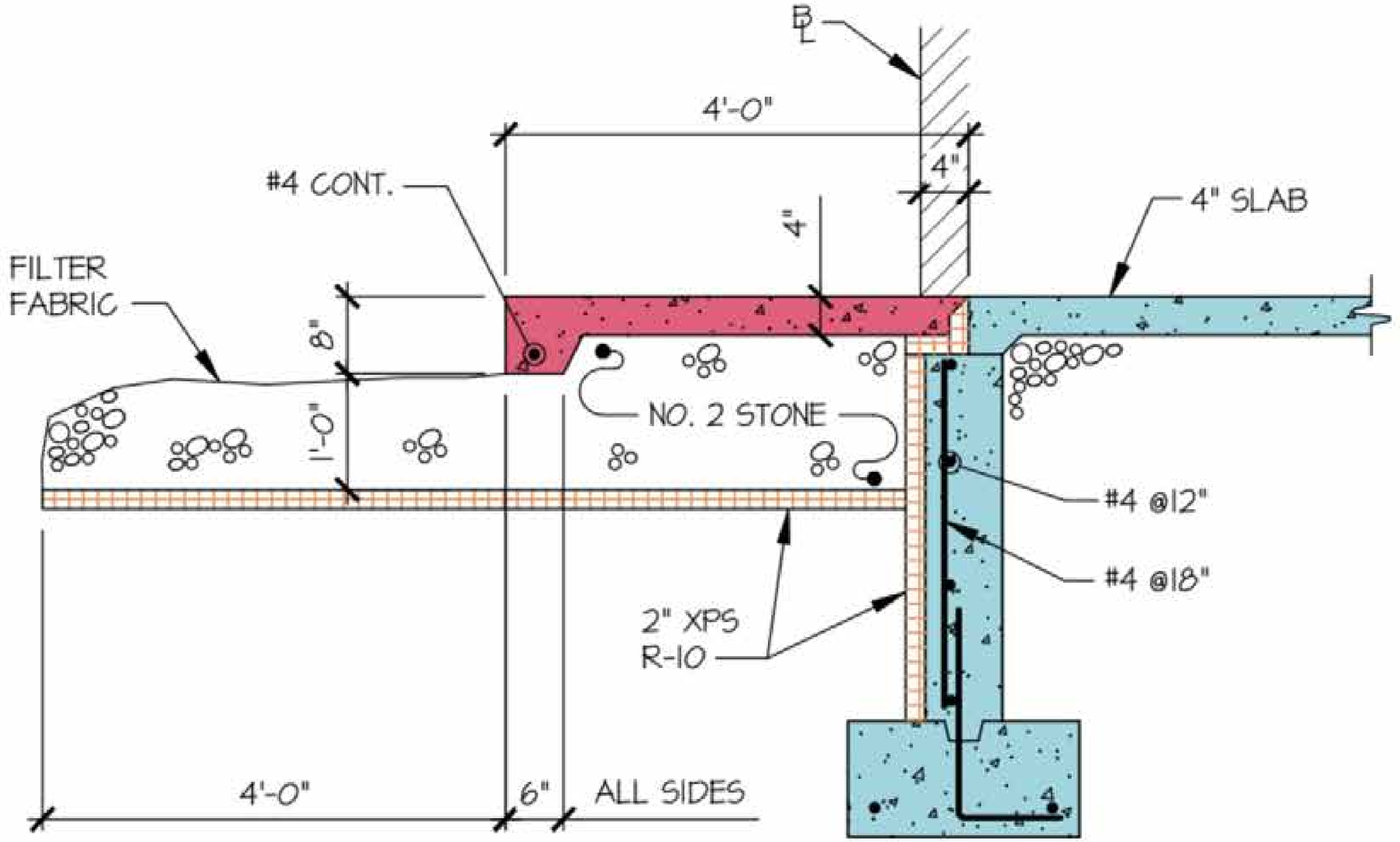
/ lf**



ENTRY

SCALE: 1/2



cf/ lf
on

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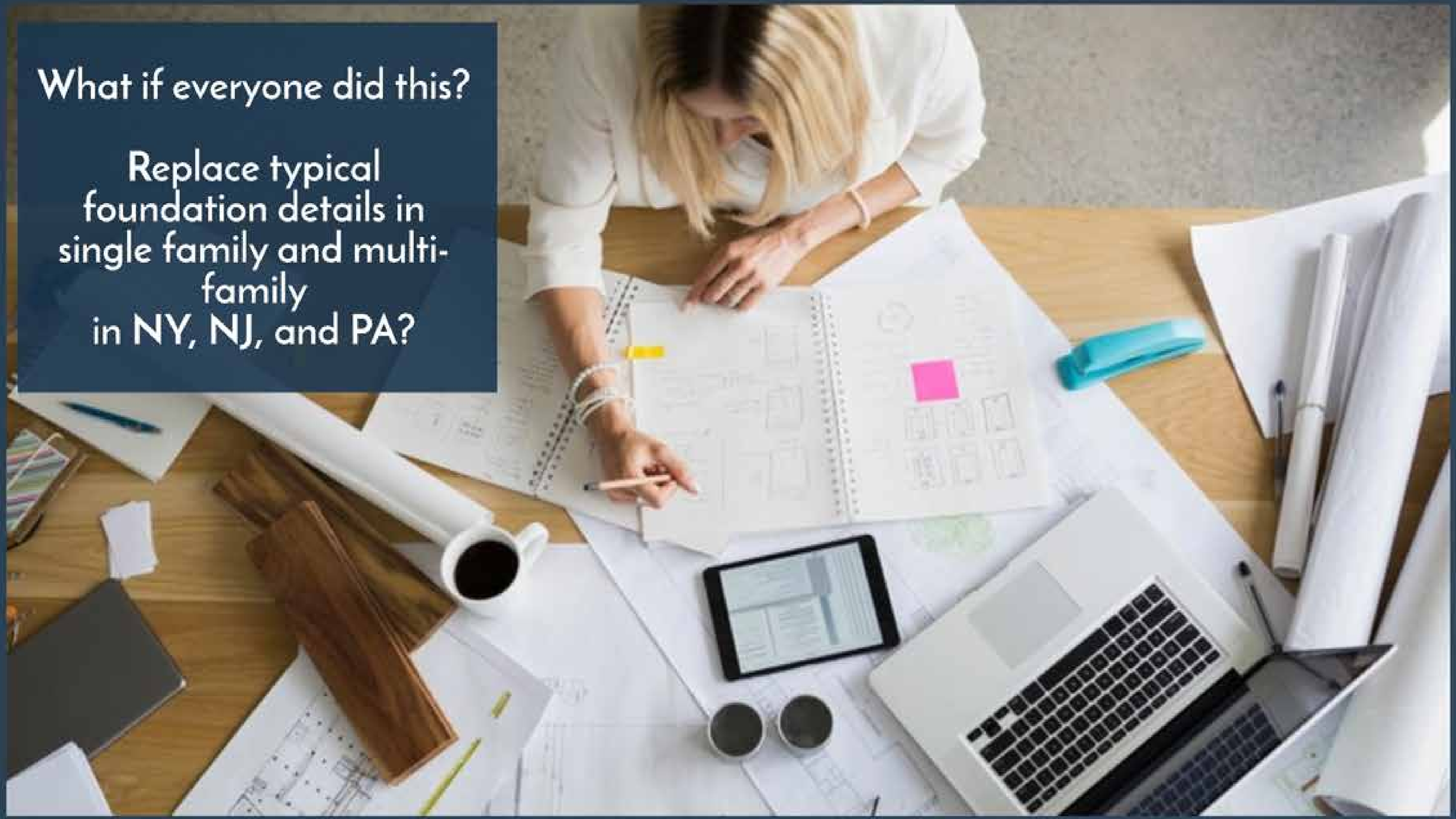
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Replace typical foundation details in single family and multi-family in NY, NJ, and PA?

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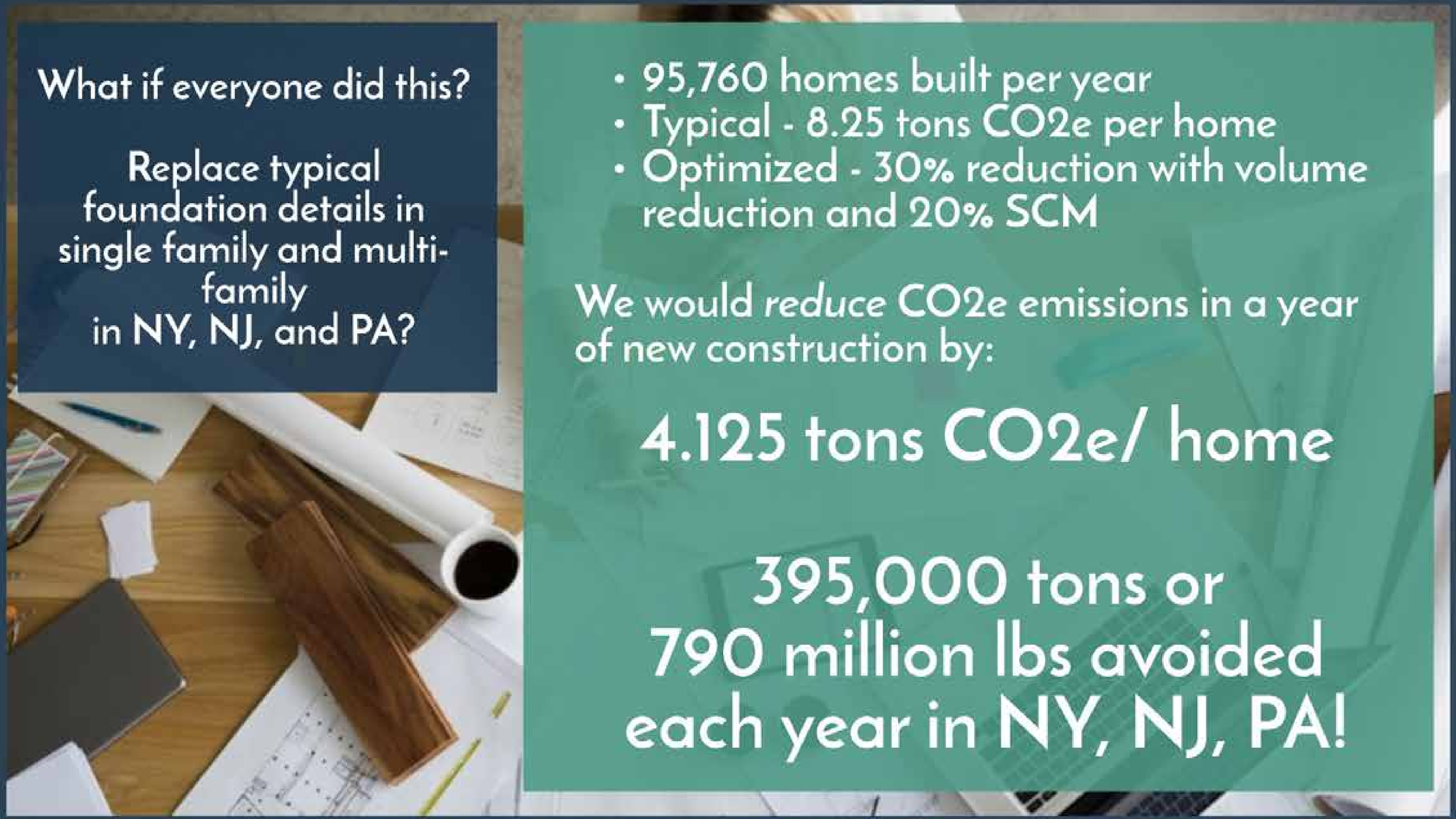
- Optimized - 30% reduction with volume reduction and 20% SCM

We would *reduce* CO_2e emissions in a year of new construction by:



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4.125 tons CO_2e/ home

395,000 tons or 790 million lbs avoided each year in NY, NJ, PA!

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03.23.26

#4
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Insulation Gaps

Insulation can be 15-26% of the embodied carbon in a single-family home.

Easy-Peasy Tips:

- Use biogenic insulation to reduce EC
- Don't forget knee-walls
- Understand how heat energy transfers (3 ways)
- Complete air barrier!

Wet

Good Intentions

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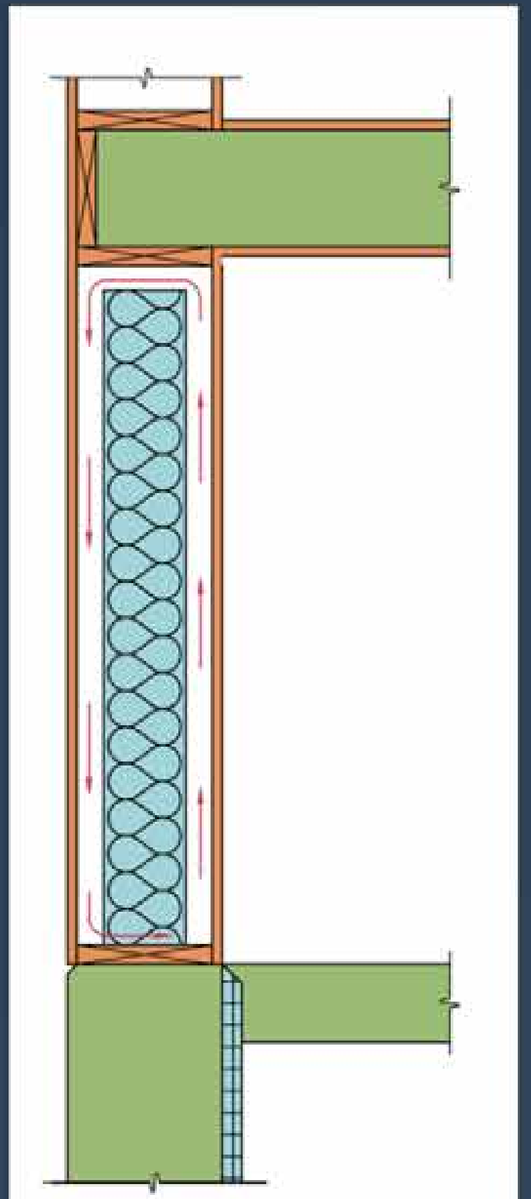
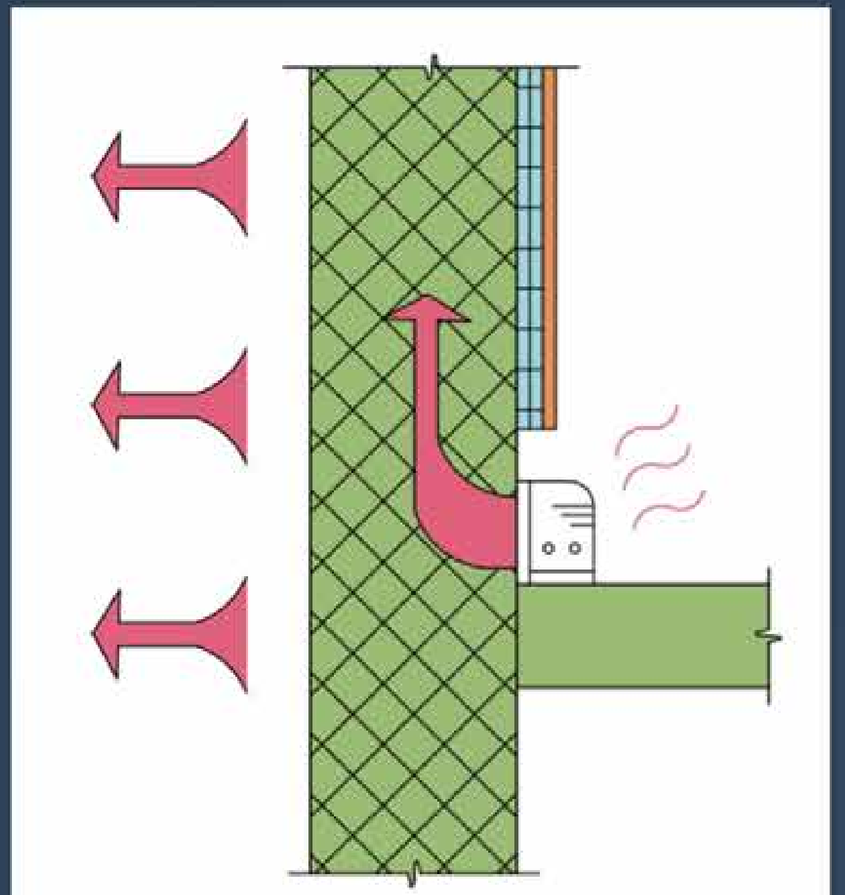
Adding insulation is NOT always good.

It's all in understanding how heat moves.



Convection



Conduction

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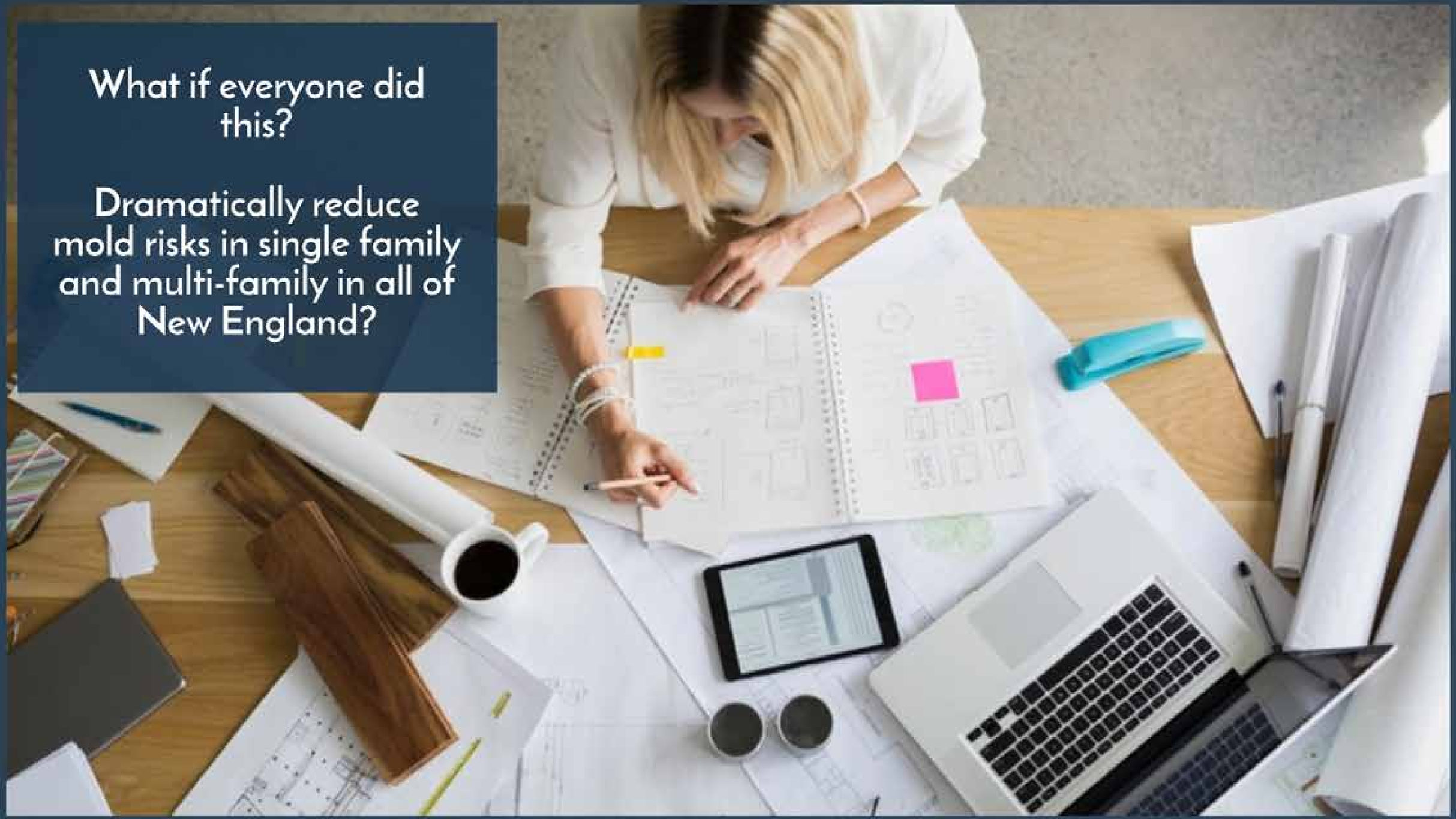
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Dramatically reduce mold risks in single family and multi-family in all of New England?

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- 1,367,000 housing starts nationally
- 30,240 in New England
- 47% of all homes have mold presence
- 4.6 million USA asthma cases yearly can be tied diectly to mold in homes

We could realistically *reduce* mold occurance in 70% of new homes, reducing asthma calls by:

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The Darker Side

Foam is proving to not be the fix-all, easy answer it seemed.

Issues:

- Traps moisture that can then rot wood
- Air-tightness is not permanent
  - Temps and differential movement release bond
- Lack of thermal and moisture capacity
- Offgases, is flammable, often very high GWP

Interactions

Rot

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- Use lower GWP foam (150 CO_2e) for 92.5% reduction

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203,962,500 tons CO2e

or down to

zero-ish CO2e with biogenic insulations

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Function is lost if the air barrier is not a complete and continuous system

Air Barriers

Ask Nature for Tips!

- Birds
- Flies
- Fish
- Spiders
- Dirt
- Mold

Make it Whole

Traps and Filters

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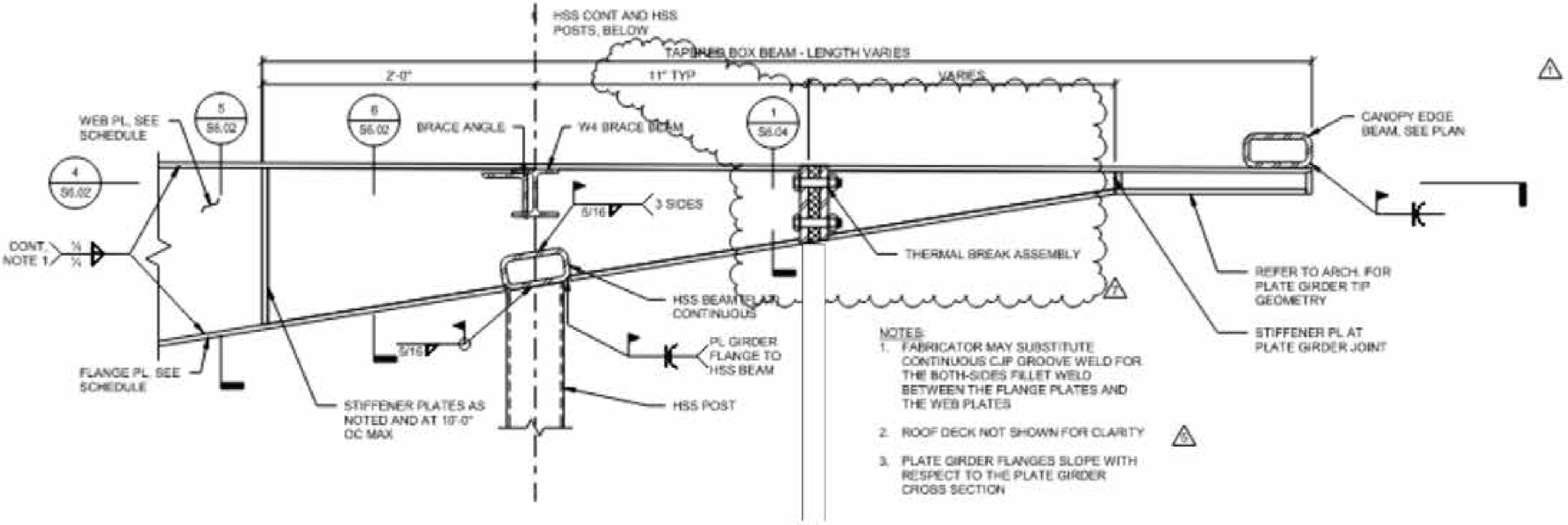
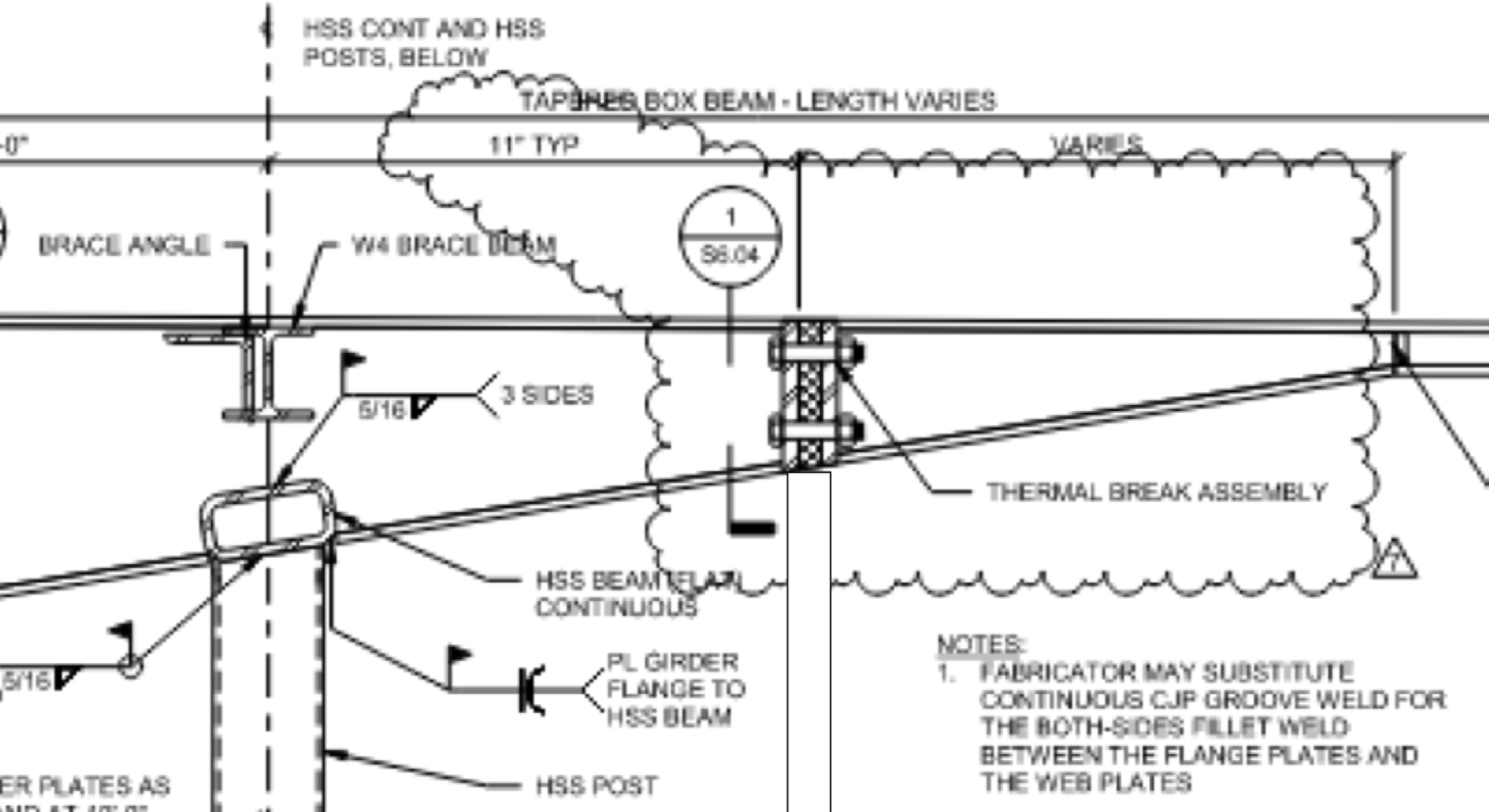
What If?

A BRIDGE TOO FAR



2 PLATE GIRDER END DETAIL

1 1/2" = 1'-0"


HSS CONT AND HSS POSTS, BELOW
TAPERED BOX BEAM - LENGTH VARIES
11" TYP
VARIES
BRACE ANGLE
W4 BRACE BEAM
1
S6.04
5/16
3 SIDES
THERMAL BREAK ASSEMBLY
HSS BEAM FLAP CONTINUOUS
PL GIRDER FLANGE TO HSS BEAM
HSS POST
NOTES:
1. FABRICATOR MAY SUBSTITUTE CONTINUOUS CJP GROOVE WELD FOR THE BOTH-SIDES FILLET WELD BETWEEN THE FLANGE PLATES AND THE WEB PLATES

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- 18,000 kWh per year for 2,150 sf electrified single family home (current tech)
- Conservative 20% reduction with complete air barrier and sealing

We would *reduce* energy use per year for one year of new home construction by:

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453,600,000 kWh - save $124.7 million/year

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#4
Little Actions
Air Barriers

Electrification for better occupant health and safety

Heating

Must do:

- ALWAYS determine actual heating load prior to replacement
- Insulate and seal first
- Keep furnace as back-up?
- Consider ASHP instead
  - (ccASHPs rule!)

HVACR

Cooking

What If?

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IT'S NOT ALL OR NOTHING

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FOOD PREP FOR HEALTH

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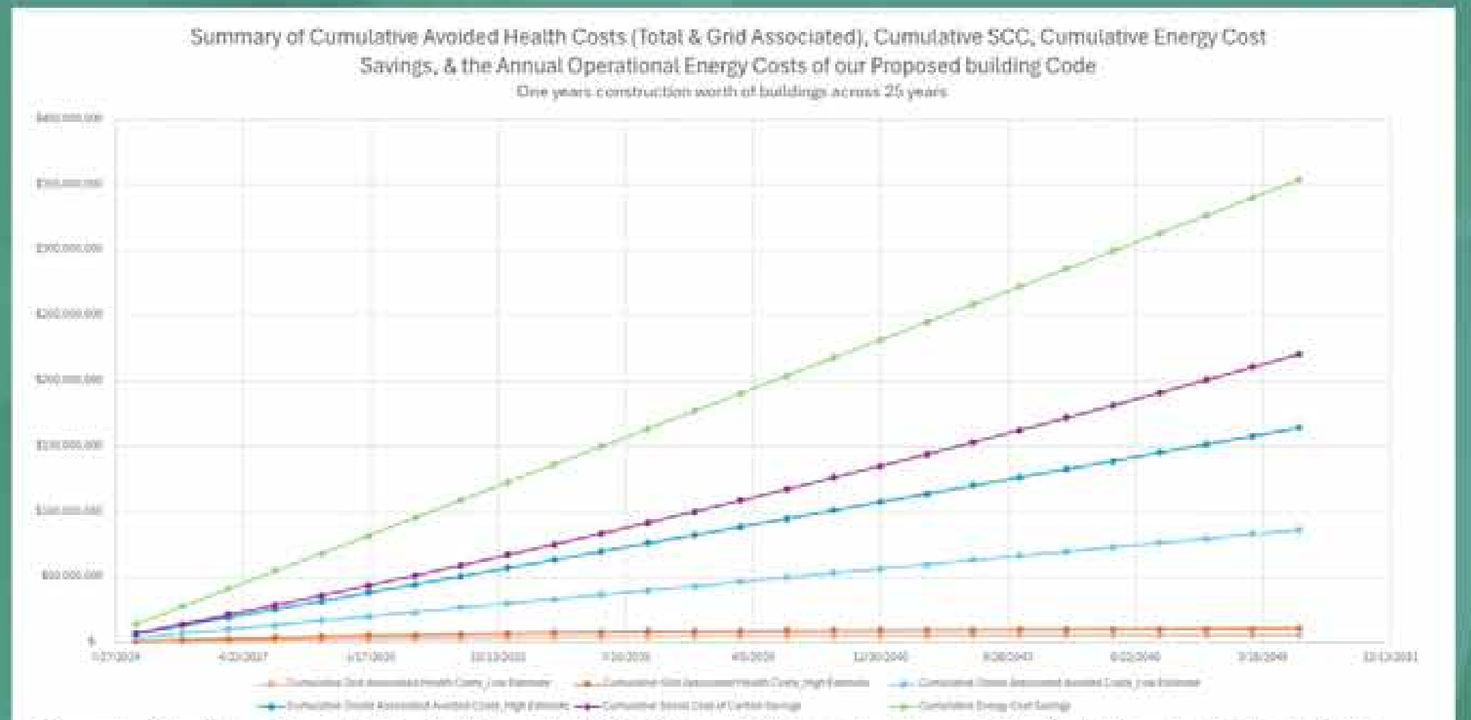


Figure 1. The Cumulative Health Cost Impact of One Year of NY construction activity: Grid Associated Health Costs and Onsite Associated health cost alongside the Cumulative Energy Cost Savings & Social Cost of Carbon Savings from 2025 to 2050.

What if everyone did this?

Fully electrified new single family and multi-family in NY state?

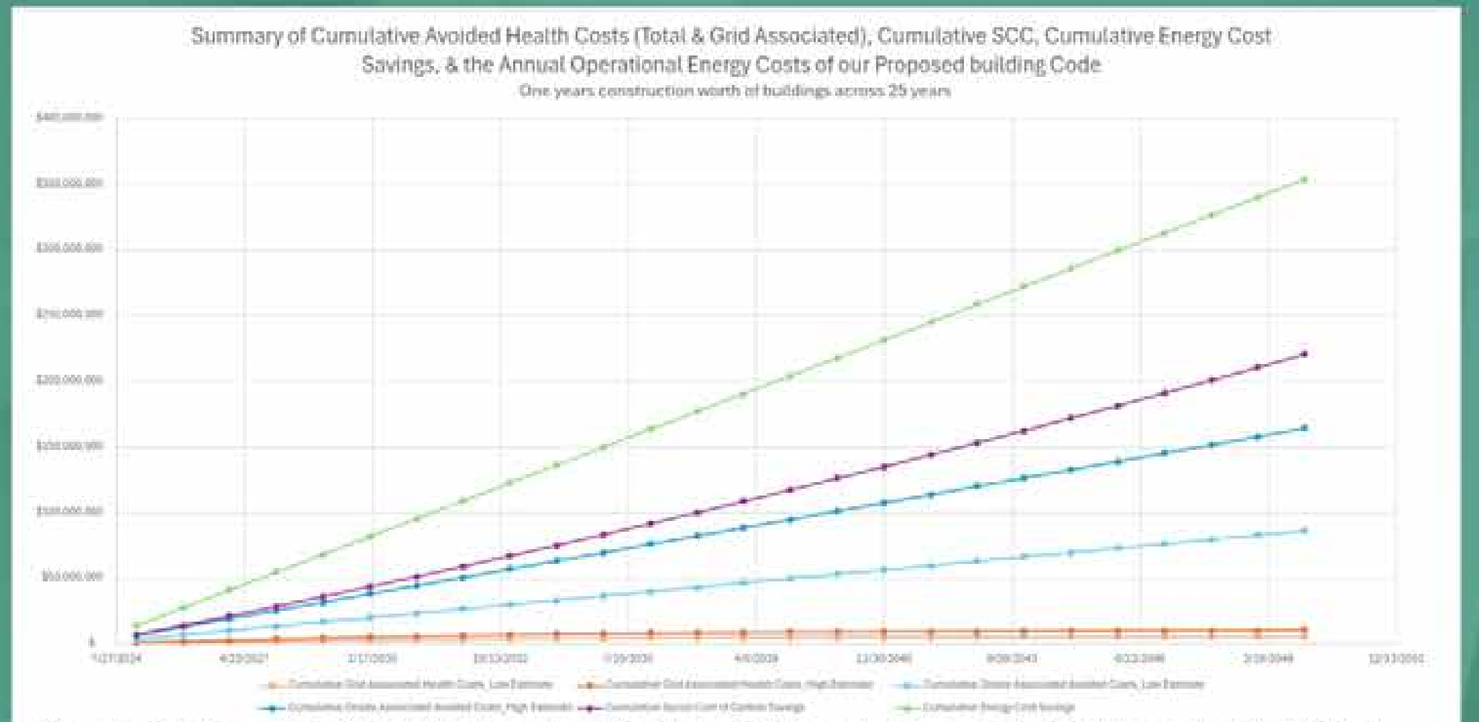
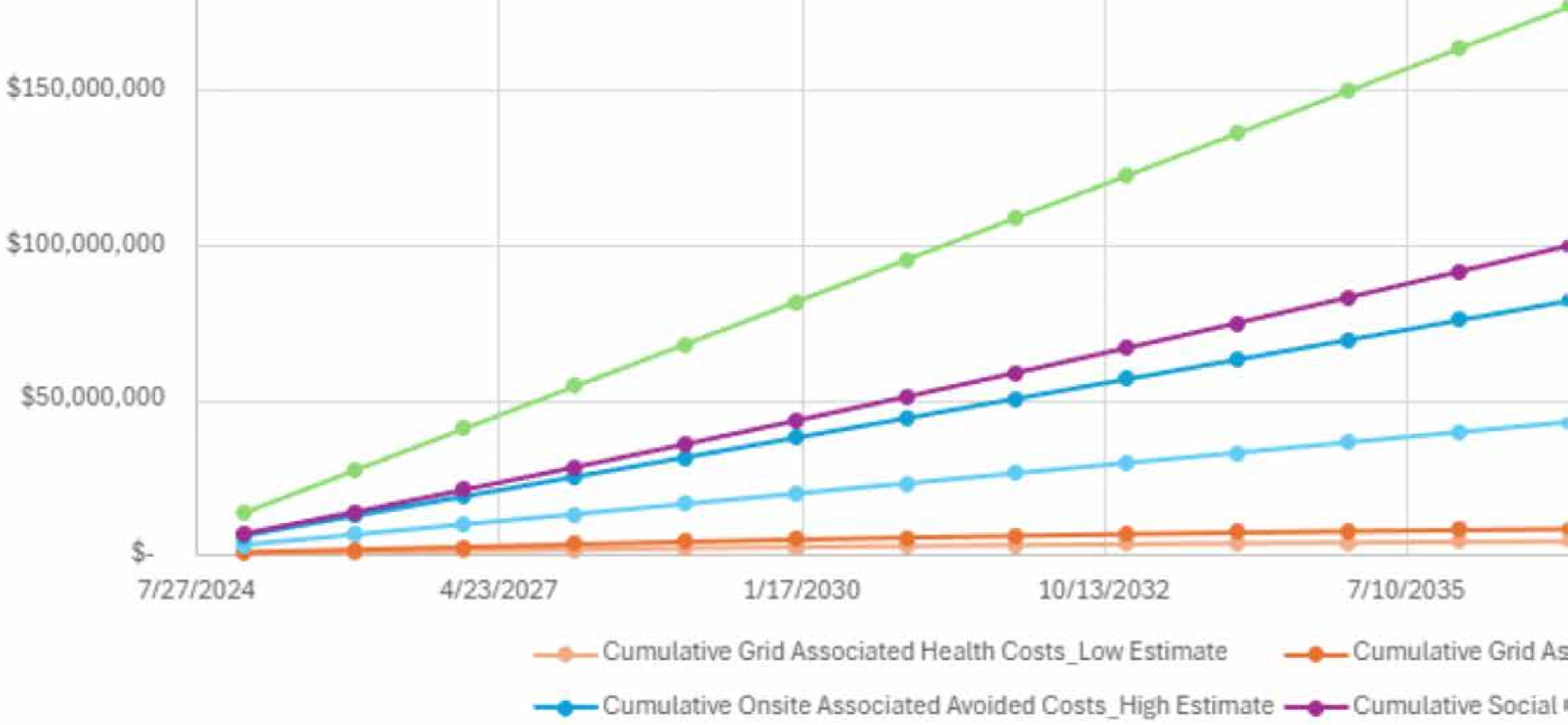


Figure 1. The Cumulative Health Cost Impact of One Year of NY construction activity: Grid Associated Health Costs and Onsite Associated health cost alongside the Cumulative Energy Cost Savings & Social Cost of Carbon Savings from 2025 to 2050.



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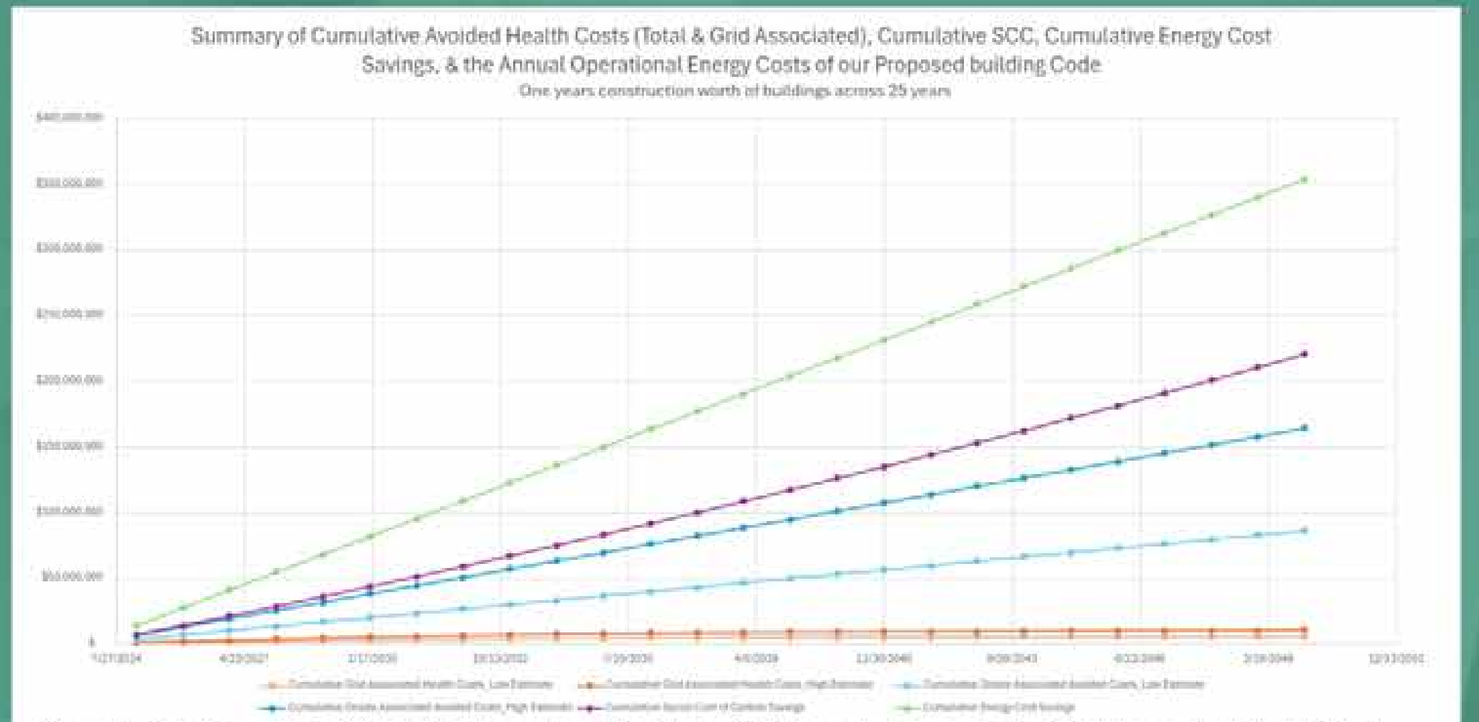

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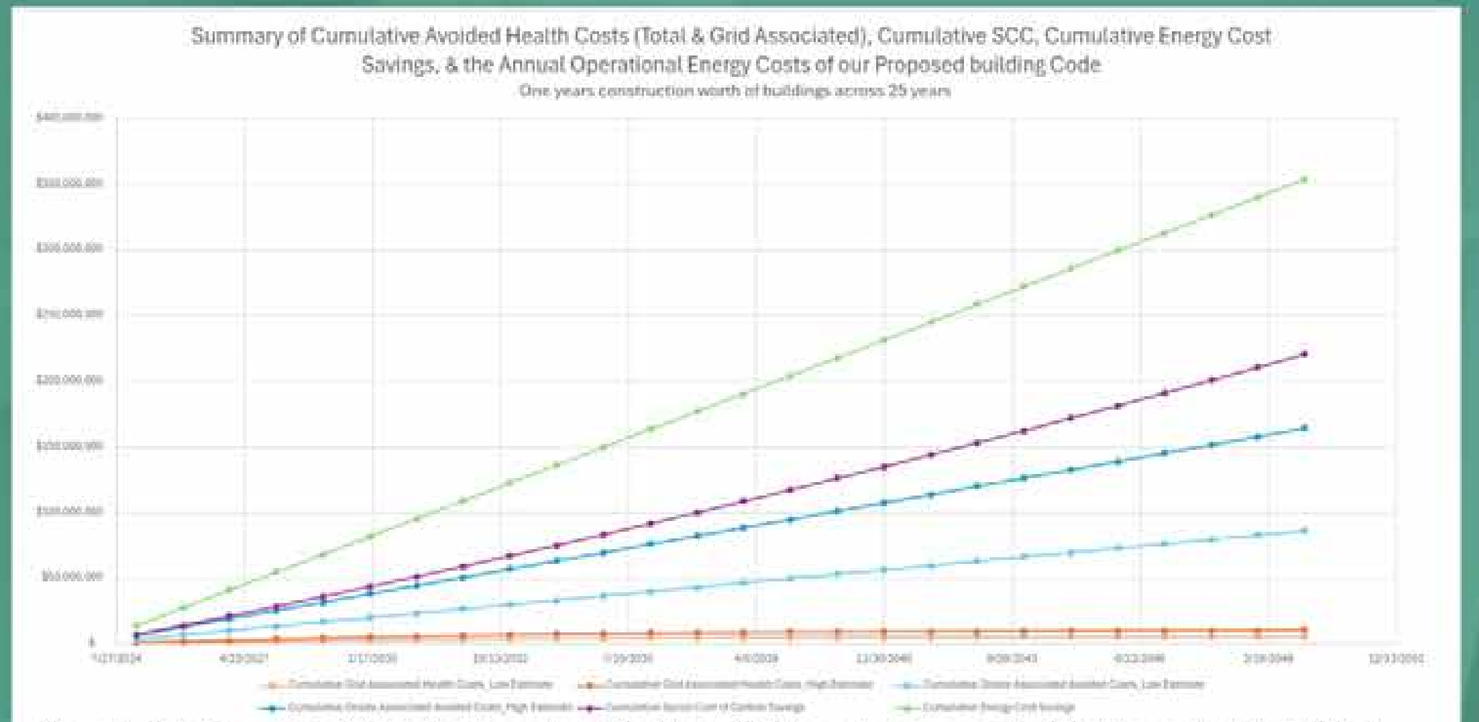

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ONE YEAR of electrified new multi-family and single family, *savings* aggregated over 25 years. Including: 1) societal health (climate), 2) on-site health care cost avoidance, and 3) energy cost savings

$730,000,000

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Electrification for better occupant health and safety

Heating

Must do:

- ALWAYS determine actual heating load prior to replacement
- Insulate and seal first
- Keep furnace as back-up?
- Consider ASHP instead
  - (ccASHPs rule!)

HVACR

Cooking

What If?

#1
Little Actions
Cement

#3
Little Actions
Foam

WHAT'S
NEXT

#5
Little Actions
Electrification

CONTEXT

#2
Little Actions
Insulation

Less Bad

Little Actions - Big Shifts

Building Energy Boston

03.23.26

#4
Little Actions
Air Barriers

BIG SHIFTS FROM SMALL STEPS

This one little thing doesn't make a difference.

I'm only one person, with a small firm

This is only one thing - but I have changed it, and you can too!

Look how much impact we can have, collectively.

How can we help each other get started?

TAKE STEPS

THANK YOU

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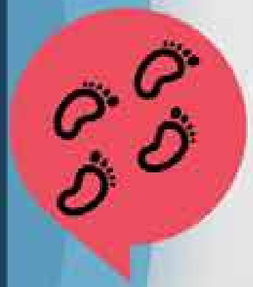

TAKE STEPS

THANK YOU

SMALL

01.

- Pick one thing you can do
- **Do it**

02.

- Track it and the data
- Refine it
- Brag about it
- **Celebrate its story**

03.

- Pick the next thing you can do
- **Do it**

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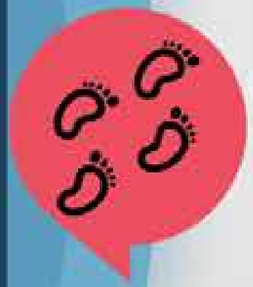

TAKE STEPS

THANK YOU

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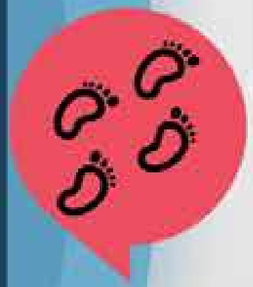

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