ADVENTURES in Cross-Laminated and Mass Timber Construction

Disclaimer: This presentation was developed by a third party and is not funded by WoodWorks or the Softwood Lumber Board.
The Radiator
Kaiser + Path
2015

Brock Commons
Acton Ostry Architects
Urban One Builders
2017

Tallest Mass Timber Structure in the United States … as of now
Every building starts with a hole in the ground - filled with concrete and steel.
Add a lateral structural system.
Radiator – ATS, shear walls and OSB floor diaphragm
Add a lateral structural system.

Guest Building –
Brock Commons – Concrete core
Add a lateral structural system.

Carbon 12 – BRB’s
Add a lateral structural system.

Canyons – ATS, shear walls
CLT diaphragm on load bearing walls
Connect the wood bits together.

Radiator – Bucket connectors
Connect the wood bits together.

Guest Building –
Brock Commons – two way CLT
Connect the wood bits together.

Carbon 12 – Ricon beam hangers and SDS Screws
Connect the wood bits together.

Canyons – Custom CLT connectors with SDS screws
Connect the wood bits together.

Typical CLT to CLT connection – The spline
The Other CLT.
Mass Plywood Panels
Show Me The Money.

AKA . . . Economic Adventures
Building Value vs Building Cost.

The Radiator and Carbon 12 Costs

**The Radiator**
Total Construction Cost = $175/sf (2015) = $190 *adjusted for 2020*
Mass Timber Construction Cost = $33/sf (2015) = $36 *adj for 2020*

**Carbon 12**
Total Construction Cost = Undisclosed
Hybrid Mass Timber / Steel Core Construction Cost = $42/sf (2017) = $44/sf *adj for 2020*

SOURCE: KGI Internal
Building Value vs Building Cost.

The Radiator and Carbon 12 Costs

**The Radiator**
Total Construction Cost = $175/sf (2015) = $190 adjusted for 2020

**Carbon 12**
Total Construction Cost = Undisclosed
Hybrid Mass Timber / Steel Core Construction Cost = $42/sf (2017) = $44/sf adj for 2020
Equal Concrete Structure Construction Cost = $41/sf adj 2020

**ADDS 10 WEEKS OF CONSTRUCTION TIME**
Brock Commons
Total Construction Cost = Undisclosed
Mass Timber Construction Cost = Undisclosed

Mass Timber Construction Duration =

18 FLOORS in 9 WEEKS

Building Value vs Building Cost.

Brock Commons Cost (time is money)
### Building Value vs Building Cost.

The Canyons – CLT vs Light Framing

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<tr>
<th>COST</th>
<th>VALUE</th>
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![Building Image]
Base Design – All CLT floor

- 5 ply 139V CLT panels at 10’ spans
- 5 ply 175E CLT panels at 20’ spans
- Drywall soffits where required to provide MEP chases (highlighted areas)

Building Value vs Building Cost.

The Canyons – CLT vs Light Framing
Partial Change to Light Framing

- Delete 139V CLT at 10’ spans save $320,000
- Savings in Plumbing save $49,600
- I-Joist framing at all 10’ spans add $223,200
- Additional soffits (frame/gwb/paint) add $179,200
- 3 weeks added general conditions add $48,800
- SUB TOTAL ADD $81,600
- 3 weeks added carrying costs add $60,000
- TOTAL BUILDING COST ADD $141,600

Building Value vs Building Cost.
The Canyons – CLT vs Light Framing

SOURCE: KGI Internal
Building Value vs Building Cost.

The Canyons – CLT vs Light Framing

Total Change to Light Framing

- Delete all CLT  save $1,194,500
- Savings in Plumbing  save $49,600
- I-Joist framing throughout  add $440,500
- Additional soffits (frame/gwb/paint)  add $344,000
- 5 weeks added general conditions  add $81,000

- **SUB TOTAL BUILDING COST SAVINGS** $378,600
- 5 weeks added carrying cost  add $100,000

- **TOTAL BUILDING COST SAVINGS** $278,600
Total Change to Light Framing

- **TOTAL BUILDING COST SAVINGS** save $278,600

Value Lost

- Ceiling height reduced 6” or building height decreased by 30”
- Potential to lose a floor. We are at max height limit.
- Loss of exposed wood ceilings.
- Lower lease rates
- Market differentiation

Building Value vs Building Cost.

The Canyons – CLT vs Light Framing
Total Change to Light Framing

- **TOTAL BUILDING COST SAVINGS** save $278,600

Value Lost

- $0.12 / sf apartment lease reduction (3 ½%)
- $7,668 / monthly gross rental income reduction
- $92,255 / year gross rental income reduction

Building Value vs Building Cost.

The Canyons – CLT vs Light Framing

SOURCE: KGI Internal
Total Change to Light Framing

- TOTAL BUILDING COST SAVINGS save $278,600

Value Lost

- $0.12 / sf apartment lease reduction (3 ½%)
- $7,668 / monthly gross rental income reduction
- $92,225 / year gross rental income reduction
- $1,752,843 value loss at sale (5.0% CAP, year 0)

Building Value vs Building Cost.

The Canyons – CLT vs Light Framing
Building Value vs Building Cost.

The Canyons – CLT WINS !!
thank you

www.kaiserpath.com

Concrete vs CLT Video: https://www.kaiserpath.com/why-wood