CREATE TO

CreateTO
61 Front Street West
Union Station, East Wing, 3rd Floor
Toronto, ON M5J 1E5

416 981 3889
createto.ca
@_CreateTO

Briefing Note

To:	Brooke Marshall, Caroline Samuel, Emilia Floro, John Duncan, Kristina Reinders, Rong Yu, Shayna Stott
From:	Arash Oturkar, Gabriella Sicheri, Kevin D'Souza, Kimberly Lam
Cc:	David MacMillan
Date:	October 3, 2023
Re:	Lessons Learned from the Mass Timber Pilot Program

INTRODUCTION

This briefing note is in response to the stakeholder consultation of the Mid-Rise Buildings Performance Standards directed in PH4.7 "Mid-Rise Buildings Rear Transition Performance Standards Review & Draft Update" on June 1, 2023. CreateTO is providing a summary of the commentary on lessons learned from the Mass Timber Pilot Program to-date that was shared with City Staff on July 18, 2023.

BACKGROUND

The Mass Timber Pilot Program (the "Pilot") will bring new affordable rental housing to the City-owned site at 1113-1117 Dundas St. W. (Dundas Street West and Ossington Avenue), currently operating as a Toronto Parking Authority parking lot. CreateTO, in partnership with the City's Environment and Climate Division, the Housing Secretariat, and City Planning, have advanced the Pilot Program opportunity to assess the feasibility of developing new housing using mass timber construction. This 100-home project – the first of its kind in Toronto – will take a new climate action approach to delivering affordable housing using mass timber and other low-carbon materials for building construction. The development is being designed to the highest tier of Toronto Green Standard Version 4. To reach this tier, the development will see no on-site fossil fuel use, maximize on-site renewable electricity, and use mass timber and other low-carbon materials as much as possible. As a result, this building will be near net-zero greenhouse gas emissions.

Through the Pilot, it is anticipated that a scalable, affordable and market housing delivery model will be developed that can be replicated on other City-owned sites across Toronto. The

Pilot program focuses primarily on mid-rise development and presents an opportunity to rapidly scale up the supply of affordable housing in Toronto.

A team of consultants, listed below, were retained in an exercise to demonstrate the approaches taken to deliver cost-effective, affordable housing that maximizes the use of mass timber to reduce embodied carbon and achieve near net-zero operational carbon emissions:

- Architect
- Structural Engineer
- Mechanical, Electrical and Plumbing Engineer
- Fire and Code Consultant
- Energy Modelling and Life Cycle Carbon Consultant
- Cost Consultant

In addition, several City partners were included in the creation and design of this Pilot:

- Environment and Energy
- City Planning
- Urban Design

LESSONS LEARNED

Starting on February 3, 2022, several working group meetings were held with CreateTO, City partners, and consultants over the span of 1.5 years. These meetings resulted in several key findings and lessons learned from mid-rise mass timber development.

Concept proposed by CreateTO (Left) and concept proposed by City Planning staff (Right)

Previous concept iterations considered City staff comments, as well as setbacks and stepbacks that were consistent with the Mid-Rise Performance Standards, and the following impacts were discovered:

1. Mid-rise mass timber typology requires a modular, box-like built-form with minimal to no stepbacks. The benefits of a modular, box-like built-form include key parameters that were required to meet the objectives of the Program, including:
    - Modularity/Adaptability;
    - Structural simplicity; and
    - Diversity of unit types on a standardized grid (i.e. stacked cross-laminate timber unit bays with consistent spans);

2. A standardized, box-like built-form is necessary to achieve the cost-efficiency and expeditious construction timeline with mass timber construction. As the mass timber material is pre-fabricated off-site, the simplicity in building design and a standardized floor plate grid in mass timber construction is a key factor to providing innovative development/construction solutions for sustainable affordable housing delivery. The method of construction that can deliver this built-form will be highly efficient, cost-effective, less impactful, and expeditious - all resulting in cost savings. Additional stepbacks in the built-form would impact the standardized floor plate grid, resulting in a lower floor plate efficiency, higher construction costs and ultimately, fewer affordable housing units;

3. This built-form provided the appropriate density to achieve a total of 100 units across both the main building and rear (laneway) building. The 100-unit threshold was deemed crucial for site operation by a non-profit entity as advised by the Housing Secretariat.

4. As priorities are given to achieving the highest Tier of the TGS, there is:

    a. No below-grade parking and a prioritization to supply the full requirement of permanent and temporary bike parking;
    b. Reduction in embodied carbon by eliminating below-grade concrete structures; and
    c. The incorporation of geothermal systems.

    With no below-grade space available for bike parking and a geothermal mechanical room, competition for at-grade space was large and priority was given to accommodate the above priorities while maximizing non-residential and amenity spaces (interior and exterior).

5. With the challenges of accommodating uses at-grade, servicing cannot be accommodated in the interior of the building. Site-specific attention is required to achieve creative solutions for servicing (i.e. location of loading spaces and garbage storage).

6. Green roofs can also be a challenge depending on the nature of equipment required on the roof to support geothermal.

In collaboration with City Staff, a final design concept was developed that included:

- One 5-metre front yard stepback;
- No additional stepbacks on the upper floors; and
- No rear yard setback.

These concessions granted several opportunities for the Pilot, including:

1. Achieving the optimal floor plate efficiency to maximize the number of affordable housing units;
2. Achieving sustainability targets (Toronto Green Standards Version 4, Tier 3); and
3. Cost-effectiveness through development and construction innovations.

CONCLUSIONS

To summarize, the following lessons learned from this Pilot are the key drivers in achieving replicability and scalability for sustainable affordable housing development across the City:

1. Built-Form:
    a. Simplicity of design.
    b. Replicable floor plates.
    c. Minimal building stepbacks.
    d. Permissive heights/densities that enable financially sustainable unit counts (100 units for a typical mid-rise building).

2. Ground Floor Uses and Constraints
    a. Flexibility in accommodating ground floor uses, particularly when sites are to be serviced by geothermal energy.
    b. Site servicing considerations.

As we look forward to working with our City partners on future city-building initiatives, we hope these lessons may be taken into consideration for other opportunity sites.

APPENDIX A:

DECISION HISTORY

On May 11, 2022, City Council adopted Item PH33.7 "Delivering Affordable Rental Housing at 1113-1117 Dundas Street West", which authorized the Mass Timber Affordable Housing Pilot Program and funding requirements to assess the viability of mass timber as an approach to expeditiously deliver housing in a high-quality form that achieves near-zero Green House Gas emissions for City-owned site at 1113-1117 Dundas Street West (Car Park #204). http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2022.PH33.7

On June 20, 2022, The Board of Directors of CreateTO adopted Item RA32.5 "Integrating a Climate Action Approach to City Real Estate Decisions - Mass Timber Pilot Program" which outlined the goals and objectives of the Mass Timber Pilot Program and requested CreateTO staff to report back with an update at the completion of the initial due diligence phase. https://secure.toronto.ca/council/agenda-item.do?item=2022.RA32.5

On March 6, 2023, The Board of Directors of CreateTO adopted Item RA3.2 “Integrating a Climate Action Approach to City Real Estate Decisions - Mass Timber Pilot Program - Progress Update” which outlined the conclusions from the Mass Timber Pilot Program analysis and requested CreateTO staff to report back with an update on the business case of mass timber building for 1113-1117 Dundas Street West as well as suitable real estate assets for mass timber construction of affordable housing in the first quarter of 2024. https://secure.toronto.ca/council/agenda-item.do?item=2023.RA3.2