Vienna House Innovative Affordable Housing Demonstration Project

Integrated Design Process Workshop No. 2

VIENNA HOUSE

BC HOUSING RESEARCH CENTRE

BC HOUSING
RESEARCH CENTRE

BC Housing's Research Centre works in collaboration with housing sector partners to foster excellence in residential construction and find innovative solutions for affordable housing in British Columbia. Sharing leading-edge research, advances in building science, and new technologies encourage best practice. The Research Centre identifies and bridges research gaps to address homelessness, housing affordability, social housing challenges and the needs of distinct populations. Mobilizing knowledge and research expertise helps improve the quality of housing and leads to innovation and adoption of new construction techniques, Building Code changes, and enhanced education and training programs. Learn more about the Research Centre at www.bchousing.org. Sign up to receive the latest news and updates at www.bchousing.org/subscribe.

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Acknowledgments

Commissioned by BC's Forestry Innovation Investment Ltd., the findings and recommendations in this report are based on the information and feedback provided by participants in the workshops. These workshops are Integrated Design Process (IDP) charrettes being conducted to identify opportunities and establish the direction for achieving project goals for the Vienna House project with the guidance of the City of Vancouver, in partnership with BC Housing and the Vancouver Affordable Housing Agency.

Authors

This report was prepared by SCIUS Advisory.

Disclaimer

Contents

Summary

The cities of Vancouver and Vienna, Austria signed a Memorandum of Cooperation in early 2018 to rapidly advance green-building innovation in their respective cities. As a cornerstone of this collaboration, each city is developing a low-carbon, affordable housing project. Through these two projects, city staff, the project teams and industry experts in the two cities will exchange knowledge and experiences.

The City of Vancouver, in partnership with BC Housing and the Vancouver Affordable Housing Agency, is developing a high performance, mid-rise, social housing project in Vancouver that is at the early design stage.

Forestry Innovation Investment, in partnership with BC Housing, is funding four Integrated Design Process (IDP) charrettes with building experts and policymakers from the City of Vienna and the City of Vancouver. This process identifies opportunities and establishes the direction for achieving project goals for the Vienna House project in Vancouver, B.C. IDP is a method for realizing high performance buildings that contribute to sustainable communities. It is a collaborative process that:

- Focuses on the design, construction, operation and occupancy of a building over its complete life cycle.
- Is designed to allow the client and other stakeholders to develop and realize clearly defined and challenging functional, environmental and economic goals and objectives.
- Consists of a multi-disciplinary design team that includes or acquires the skills required to address all design issues flowing from the objectives.
- Proceeds from "whole building system" strategies working through increasing levels of specificity to realize more optimally integrated solutions.

A second workshop was added to the four IDP workshops slated to take place between June 2020 and March 2021 for the following reasons:

1. The original plan was to host full day face to face workshops but travel restrictions have meant that the workshop have to be hosted online which has meant that the structure has changed and the duration has been shortened.
2. BC Housing and the Project Steering Committee requested a second pre-RFP workshop to finalize the procurement pathways prior to bringing the project design team on board.

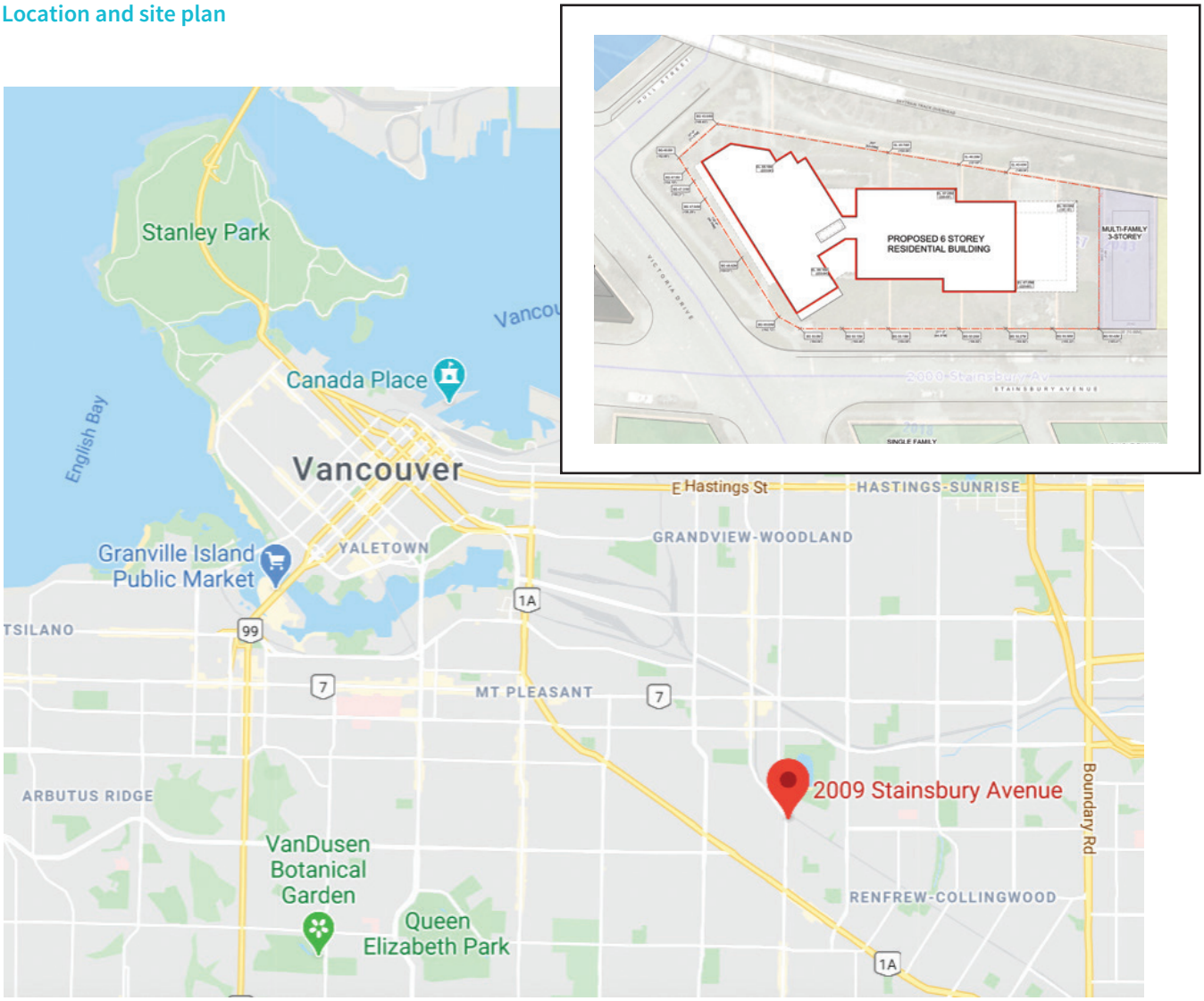
The second workshop was held on August 27, 2020 and consisted of 23 participants working together over Adobe Connect, an online conference platform, and was facilitated by SCIUS Advisory Inc. and Light House Sustainable Building Centre. The workshop brought together the owner group — comprising BC Housing, Vancouver Affordable Housing Agency (VAHA) and More Than a Roof Housing Society — with industry experts to discuss the project delivery approach, goals and criteria for the RFP process and to dig deeper into how to embed a culture of innovation into the project team. It was a tight, hands-on ideas exchange designed to equip the Project Steering Committee with the information necessary to take the next steps to hiring the project team for Vienna House. In particular, it focused on developing a procurement path that:

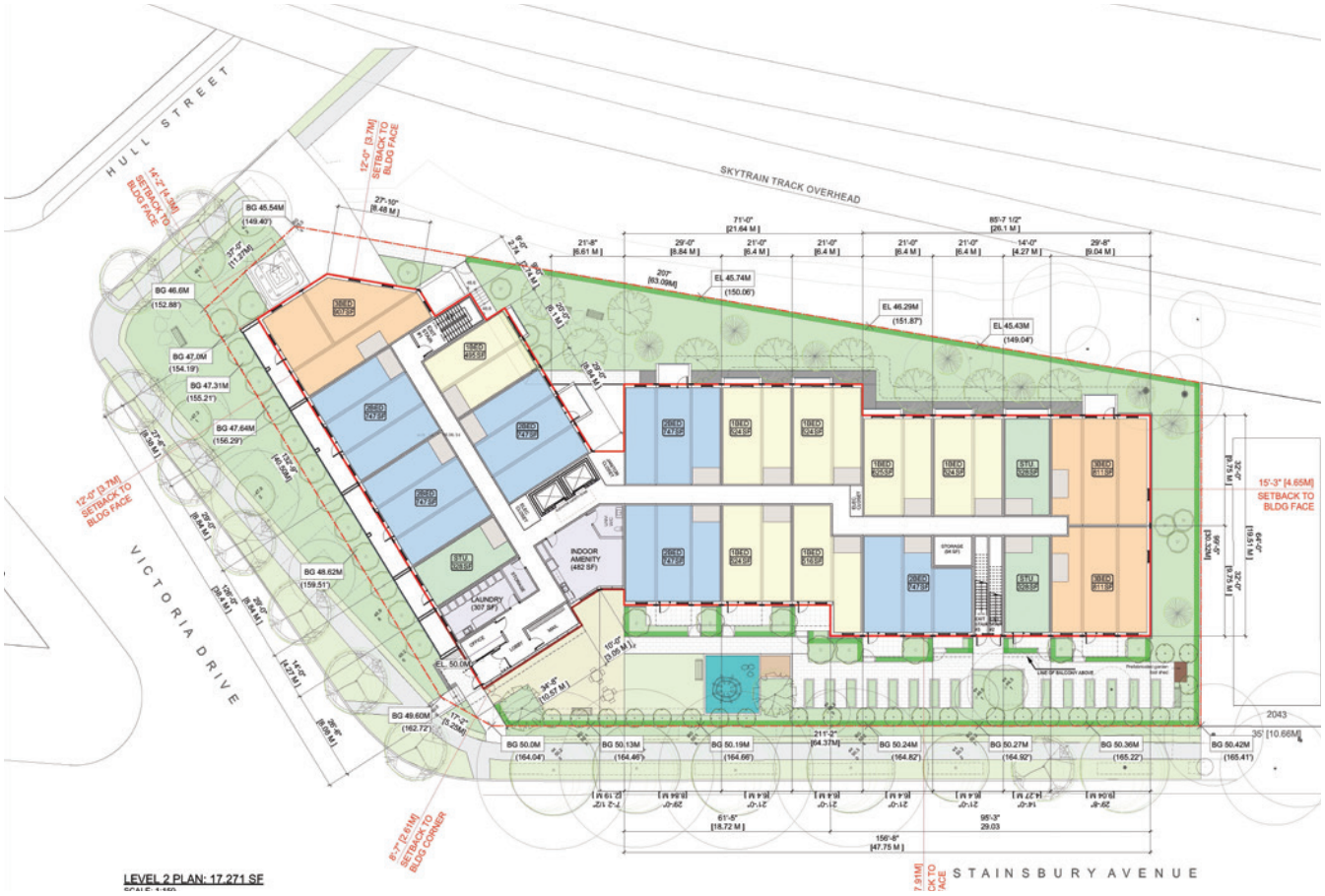
- Is commercially oriented and will generate valid responses given B.C.'s competitive market environment.
- Enables Vienna House to serve as a best practice demonstration project to industry.
- Informs the proposed research program so that it not only supports the project team but also offers the opportunity to proliferate beneficial innovation within BC Housing.

Project Context

The project is located at 2009 - 2037 Stainsbury Avenue (at the intersection with Victoria Drive) in Vancouver. Vienna House will be a six-storey social residential building with 106 rental units. Our vision is to demonstrate affordable, climate resilient, near-zero-emission (operational and embodied) housing through the exploration of different procurement models, prefabrication processes and community integration approaches. The rezoning process is underway and the operator, More Than A Roof Housing Society, is onboard. There is a particular focus on state-of-the-art wood structural and envelope systems.

Location and site plan




HULL STREET
VICTORIA DRIVE
STAINSBURY AVENUE
SKYTRAIN TRACK OVERHEAD
INDOOR AMENITY (482 SF)
LAUNDRY (307 SF)
LEVEL 2 PLAN: 17,271 SF

Project Objectives

The project objectives are to provide an affordable social housing project that contributes to market transformation, improving availability, affordability of energy efficient and/or low-carbon building solutions.

The key focus areas, defined by BC Housing, VAHA and City of Vancouver, include:

1. **Low-Carbon, Affordable Housing**: The Vienna House project aims to achieve the lowest possible carbon emissions, while keeping the building affordable. The strategies adopted in this project are intended to be replicable in future affordable housing projects in Vancouver and the B.C. Lower Mainland. During the design process, the team will analyze the affordability of various energy reduction goals and choose the ones that best fit the project's need and budget.

2. **Resilient Design**: The impact of rapidly changing climate is already being experienced in all countries around the world. Authorities and industry leaders are exploring the ways in which buildings can be designed to adapt to these changes. Vienna House will explore solutions for a resilient design by considering future climate and post-disaster requirements in its design process. This project will demonstrate innovative mechanical system solutions to maintain thermal comfort in this social housing project in the face of climate change.

3. **Procurement Innovation**: To succeed in achieving the project's complex goals, City of Vancouver and BC Housing are committed to incorporating innovative procurement methods. To do so, all the partners' procurement staff will participate in the development process. Additionally, North American and Viennese experts will be consulted to identify the best alternative contracting methods for setting targets and creating commitments.

4. **Knowledge Transformation**: While the local experts will design and build the project, experts from Vienna will offer their experience in delivering affordable low-carbon housing in a large scale. Potential areas of contribution could include advice on: request for proposals, advanced building components, alternative approaches to mechanical heating, ventilation and air condition systems (HVAC), and envelope design.

Preparing for the Workshop

Normally, IDP charrettes are conducted in a highly collaborative fashion with the entire project team face to face in a large meeting space over the best part of a day. Due to travel restrictions arising from the COVID-19 pandemic, the Adobe Connect platform was used, and due to time zone differences between Vancouver and Vienna, only three hours were possible in one session.

Most of the participants had attended the first workshop and were familiar with Adobe Connect. They had access to those supporting documents. Those who were not in attendance for the first workshop but expressed interest were provided with the links and background information.

Participants were provided with a briefing package ahead of time which included the agenda, list of attendees, and a link to architectural drawings. Slides from the presentations were shared following the workshop.

Pre-RFP Workshop

The second Vienna House Workshop brought together 23 participants primarily consisting of the owner group (BC Housing, VAHA and More Than a Roof) with industry experts to discuss the project delivery approach, goals and criteria for the RFP process and to dig deeper into how to embed a culture of innovation into the project team. It was an ideas exchange designed to equip the Project Steering Committee with the information necessary to hire the project team for Vienna House.

The workshop featured information sharing through six presentations followed by a facilitated discussion to focus on the procurement path.

Presentation	Speaker
Innovation In Affordable Housing for BC Housing Projects	**Sadia Afrin** BC Housing
Project Delivery Practices in Vienna	**Oliver Sterl** Rüdiger Lainer + Partner Architekten ZT GmbH
Project Update – Vienna House	**Melvin Lee** BC Housing
Digitization Benefits – Role of BIM	**Scott Chatterton** AEOS Consulting **Geraldine Rayner** SummitBIM
Construction Support Systems	**Mark Taylor** Mark Taylor Construction Advisory Services
Framing the Questions – Optimizing the Practices	**Chauncey Bell** Harvester Academy

Information Sharing

Presentations were delivered from two experts in Vienna from the City of Vienna, the architect for Vancouver House in Vienna, the architect for Vienna House in Vancouver and an innovative turnkey housing provider in B.C.

SADIA AFRIN
Manager, Commissioning Construction Services, BC Housing

BC Housing develops, manages and administers a wide range of subsidized housing options across the province. It works with the ministry responsible for housing to address critical gaps across the housing continuum, which range from emergency shelter and rent assistance in the private market to affordable home ownership. BC Housing is the largest developer in B.C. and the capital investment and project management teams are dealing with dozens of new projects across the province at any given time while maintaining its deep commitment to sustainable development and balancing affordability.

Feedback from these projects offer important insights into the business case, opportunities and challenges associated with delivering innovative housing solutions.

Sadia Afrin discussed the increased costs and schedule changes resulting from change orders and poor coordination in some BC Housing projects, and how a pilot project using BIM and IPD is shifting involvement by team members to an earlier phase, increasing coordination. The intent is to break down silos, utilize a shared data set, reduce RFIs and streamline the construction phase.

Currently, increased costs due to changes later in projects must be absorbed by the owners, which creates issues for BC Housing because of their affordability criteria. Designs are traditionally CAD based, but are static layouts and cross sections and are not correlated between different trades teams. Changes in design are costly and introduce risk of inaccuracy.

Pilot projects using BIM and IPD have recently been introduced, with a goal to create more consensus on decisions, reduce conflicts through clash detection, and reduce change orders. They are excited to be using these methods as they have been successful in other markets and are expected to be the way of the future.

OLIVER STERL
Managing Director, Rüdiger Lainer + Partner

Oliver Sterl gave us an update on Vancouver House in Vienna. BIM is an essential component of that project, as is the early collaboration of team members to ensure a good design.

The Vancouver House project delivery process uses a juried competition for the developer.

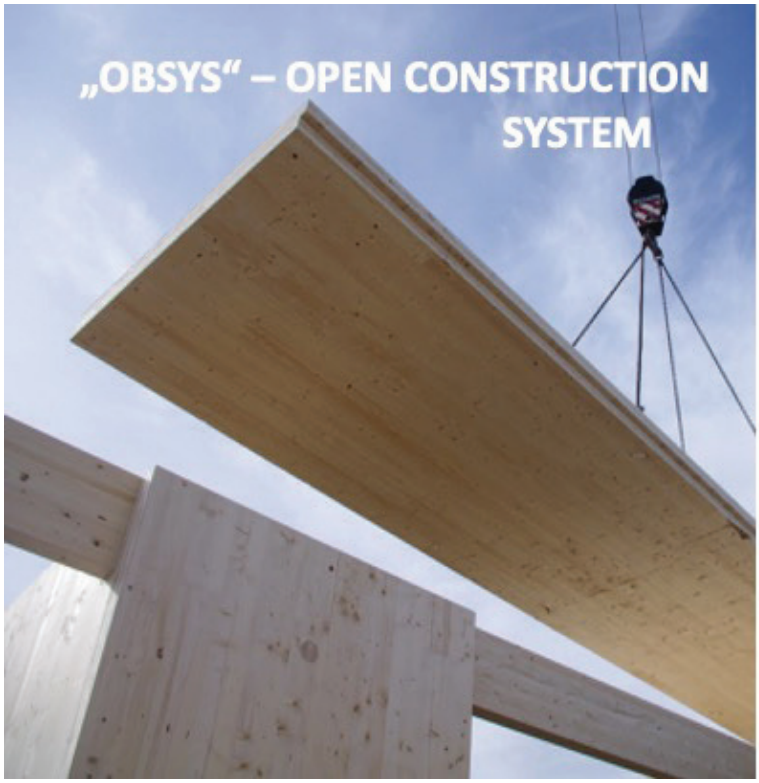
Project intent:

- social sustainability
- ecologically worthwhile
- innovative
- smart housing program
- subsidized housing
- affordable living
- calculation of building costs and rental fee

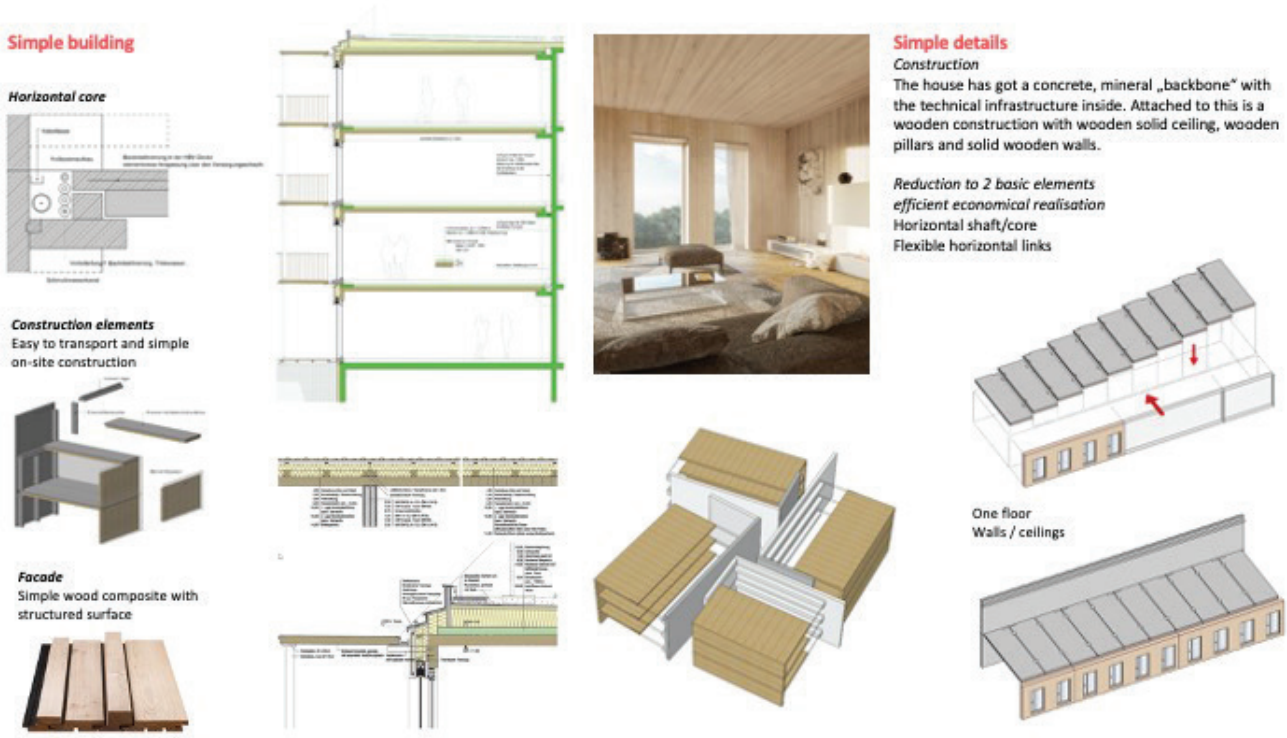
Criteria of judging

- economy
- social sustainability
- architecture
- ecology

Phase 1	Work order submitted	Work order reviewed	Work order assigned
Phase 2	Scope development	Cost estimate timeline	Develop schedule
Phase 3	Solicit bids	Award contracts	Construction
Phase 4	Furniture and equipment installation	Move and occupy	Close-out


„OBSYS“ – OPEN CONSTRUCTION SYSTEM


CLT
RIBBED CEILING
BSH CEILING
WOODEN BOX CEILING
3D-ACOUSTIC CEILING
WOOD-CONCRETE COMPOSITE CEILING
CONCRETE BACKBONE

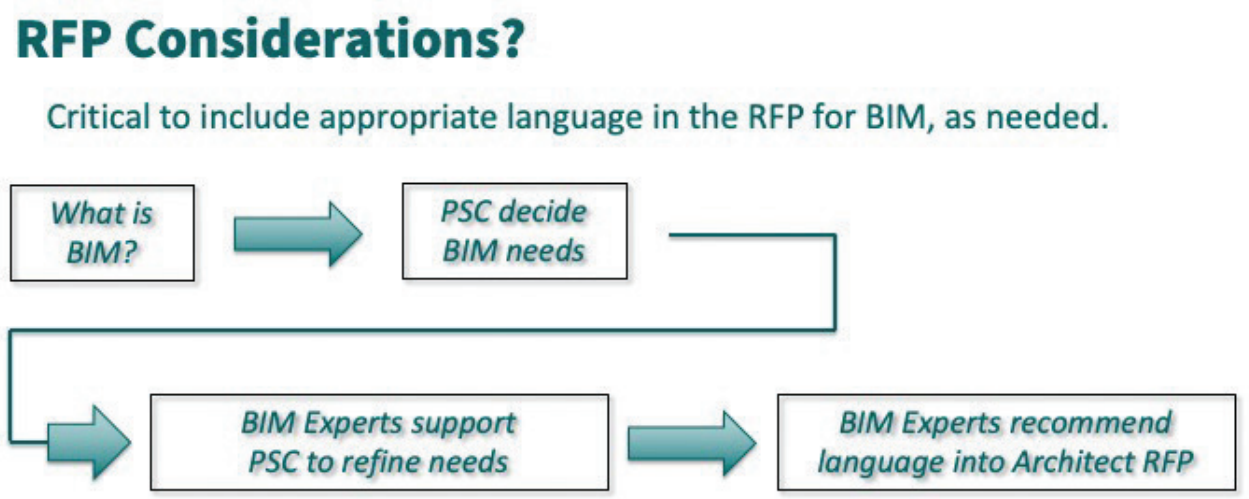

Simple building
Horizontal core
Construction elements
Easy to transport and simple on-site construction
Facade
Simple wood composite with structured surface
Simple details
Construction
The house has got a concrete, mineral „backbone“ with the technical infrastructure inside. Attached to this is a wooden construction with wooden solid ceiling, wooden pillars and solid wooden walls.
Reduction to 2 basic elements
efficient economical realisation
Horizontal shaft/core
Flexible horizontal links
One floor
Walls / ceilings

MELVIN LEE
Development Manager, BC Housing

Melvin Lee updated us on the current status of Vienna House, and shared that he is looking to provide the Project Steering Committee with clarity on the BIM scope of services, value added, and existing resources that are available.

Progress to Date

- Review of legal agreements
- Identified and exploring compatibility of other funding programs
- MTAR has engaged a Development Consultant
- Identified a list of Architects for consideration
- Identified a preferred Project Delivery Method
- Initiated RFP documents for an Architect



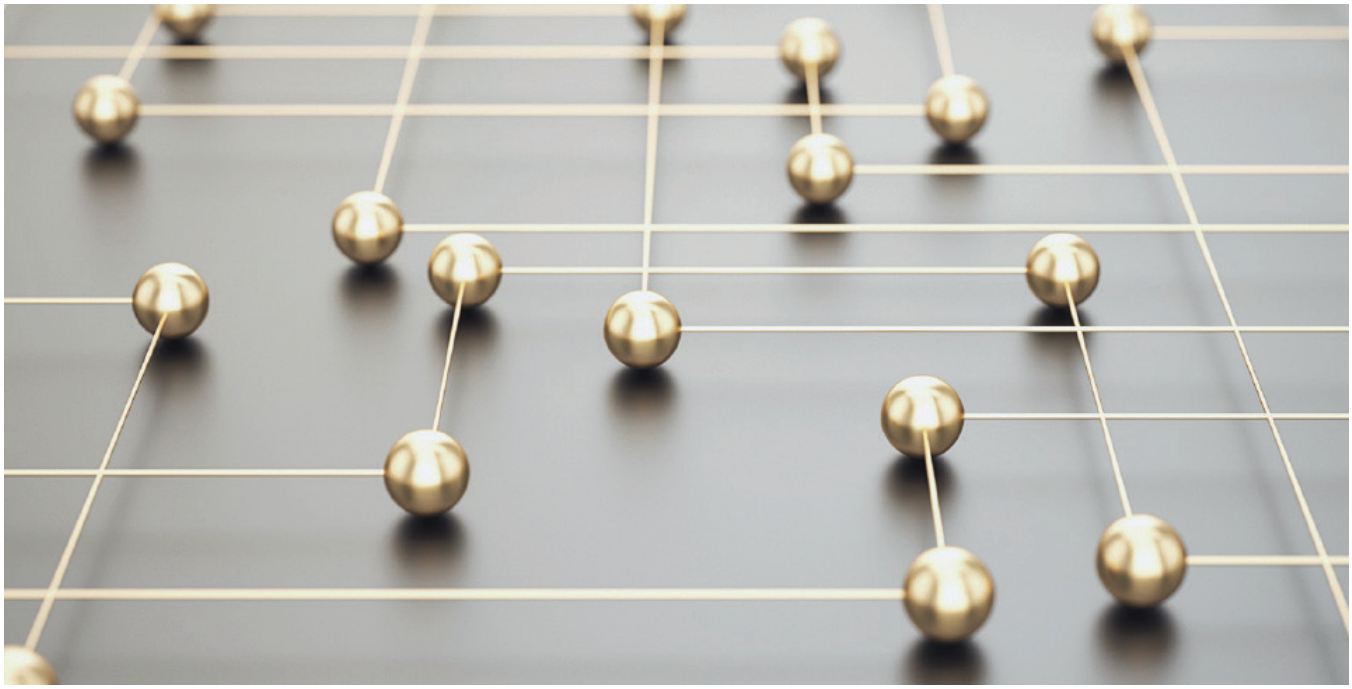
SCOTT CHATTERTON
AEOS Consulting

GERALDINE RAYNER
Summit BIM

Scott Chatterton and Geraldine Rayner gave us an overview of BIM. They explained that BIM is not just a new CAD, but adds another dimension. It can provide familiar views based on user requests, but any changes that are input will affect the data and be updated in other views. BIM requires a change of workflow or process, but allows for automation and streamlining. They will be available to BC Housing as subject matter experts to guide and advise the team.

Benefits of BIM:

- Improves Efficiency
- Reduces Errors
- Accurate Data
- Spatial Awareness
- Accountability
- Trust
- Risk Management
- Coordination
- Estimating
- Prefabrication
- Data Reuse
- On Time and On Budget



MARK TAYLOR
CEO, Mark Taylor Construction Advisory Services

Mark Taylor discussed his experiences with IPD, sharing how getting everyone involved early and establishing project goals is a key to success. It can reduce risks at later phases. He believes Vienna House is a unique showcase project that some contractors will be eager to work on.

He provided a few pointers / suggestions for BC Housing from a procurement perspective regarding BIM:

1. BC Housing should have some clear expectations of the construction manager (CM) during the pre-construction process and how they will use BIM – they shouldn't just be a budgeting service. The CM should be using BIM to help plan the site sequencing and logistics, and to identify potential problem/conflict areas in the design and fix them before it is tendered to trades. The CM should be expected to work in the model itself, not just look at the outputs of others.

2. BIM isn't new to the Design Community (it seemed strange to me that BC Housing saw it as new on their projects) – in fact I was on a call the other week where the architect (and their sub-consultants) almost refused to work in anything but BIM! It certainly isn't used to its full potential by all parties though (which is where involving trades earlier in the design process will be beneficial – increases the chance of prefabrication, and reduces "double handling" of modelling work by both the consultant and the trade). The challenge is normally around liability for the model. Often the consultants will want a waiver signed by contractors before they will hand a model off for them to use. This kind of defeats the purpose of the "one central point of truth" or the Golden Thread as Scott and Geraldine showed it this morning. I would suggest that BC Housing should address that up front and make that clear in the architect's RFP that the expectation is that they will work in a shared model along with everyone else, and everyone takes collective responsibility for the data it includes. That is easier to do in an IPD delivery method, but I'm sure there can be some suitable wording developed for the designer / CM scenario.

3. As early key trade involvement is critical, BC Housing might want to discuss this in the CM RFP and actually make it a question they have to answer – how will the CM engage these trades early, and on what basis to ensure that the overall cost model for the project is maintained.

CHAUNCEY BELL
Harvester Academy

Chauncey Bell discussed the concept of coordination waste and how changing the language of the process can enable innovation. He detailed the following characteristics as core to the problem:

- Everything is missing, broken, or in the way of work progressing. Every mistake begins with conversations that are missing, poorly conducted, with the wrong participants, or the equivalent.
- When we look carefully at large enterprises, we find staggering quantities of coordination waste, from communicative incompetence, mistrust, misunderstandings, the costs of chasing and expediting, slippery, insincere, and unfulfilled promises, missing, ill-formed and sloppy requests, missing offers, layers of supervision called into existence by historic failures, the forgetfulness of commitment, and cognitive blindness to how work gets done in human enterprise.
- Coordination waste dwarfs all other categories of wastes, including for example, the 7 Lean Wastes.
- Management, leadership, and building new practices.
- Listening, inventing futures and value.
- Constructing ourselves to play the game.
- New structures for observing action, designing and bringing actions, practices, and worlds.
- Producing value and power in enterprises.

Presentations

Links to the presentations provided to participants can be found here.

Presentation	Presenter	Link for Download
Innovation in Affordable Housing for BC Housing Projects	Sadia Afrin	
Project Delivery Practices in Vienna	Oliver Sterl	Link
Project Update - Vienna House	Melvin Lee	Link
Digitization Benefits - Role of BIM	Scott Chatterton Geraldine Rayner	Link
Construction Support Systems	Mark Taylor	
Framing the Questions - Optimizing the Practices	Chauncey Bell	Link

Additional reference: BIM for Owners

Other supporting files from Workshop 2 are available in a shared Dropbox folder.

Appendix 1: Workshop Agenda

IDP Workshop No. 2 Agenda

Thursday August 27, 2020 Vancouver: 8:30 – 11:30am PST Vienna: 5:30 – 8:30pm GMT+2

Time	Item	Facilitator
8:00 – 8:30 Voluntary	**Doors Open** › Join early to test your settings	Helen Goodland **SCIUS** Sarah Radi **Light House**
8:30 – 8:40	**Welcome** › Workshop overview › Rules of the road	Helen Goodland, **SCIUS** Sarah Radi, **Light House**
8:40 – 8:55	**Innovation in Procurement** › Overview of BC Housing's approach to delivering innovation in affordable housing projects › Experiences with current and previous projects (e.g. BIM)	Sadia Afrin **BC Housing**
8:55 – 9:25	**Project Delivery Processes - Leading Practices from Vienna** › Project delivery processes in Vienna - lessons for Vancouver	Oliver Sterl **Rüdiger Lainer + Partner Architekten ZT GmbH**
9:25 – 9:30 9:30 – 9:45	**Project Update** › Vienna House progress so far › Issues for consideration ahead of the RFP being issued **Digitization Benefits - Role of BIM** › Benefits and risks of BIM to owners › Framing the requirements in the RFP	Melvin Lee **BC Housing** Scott Chatterton **AEOS Consulting** Geraldine Rayner **SummitBIM**
9:45 – 10:00	**Construction Support Systems** › Project delivery approach and implications of BIM › How to keep delivery options open	Mark Taylor **Mark Taylor Construction Advisory Services**

Time	Item	Facilitator
10:00 – 10:30	**Framing the Questions - Optimizing the Practices** › How to enable innovation and deliver construction projects better	Chauncey Bell **Harvester Academy**
10:30 – 11:15	**Facilitated Discussion** › Discussion of RFP processes and implementation of innovative and collaborative approaches › Use of bids for a fixed contract amount and maintain the project on a budget	Helen Goodland **SCIUS Advisory**
11:15 – 11:30	**Commitments and Next Steps** › Date of next meeting – fall › Final comments	

Appendix 2: Participant List

Name	Position / Expertise	Organization
Denisa Ionescu	Research Centre	BC Housing
Melvin Lee	Development Manager	BC Housing
Remi Charron	Research Centre	BC Housing
Ren Bai	Construction Services	BC Housing
Sadia Afrin	Construction Services	BC Housing
Cindy Moran	Research Centre	BC Housing
Casey Wickham	Operator/Owner	More Than A Roof
Lee-Anne Michayluk	Operator/Owner	More Than A Roof
Mark Simpson	Project Manager	VAHA
Heather Oland	Senior Development Manager	VAHA
Chris Higgins	Planning, Urban Design and Sustainability	City of Vancouver
Jim Lowood	Contracting Specialist	City of Vancouver
Andrew Matterson	Supply Chain Management	City of Vancouver
Graham Plant	Development Consultant	CPA Development
Experts from Vienna		
Oliver Sterl	Architect of the Vancouver House, Mass Timber Expert	Rüdiger Lainer + Partner Architekten ZT GmbH
Subject matter experts		
Scott Chatterton	BIM, Digital Strategy	AEOS Consulting
Geraldine Rayner	BIM FM and Digital Hand-over	Summit BIM
Mark Taylor	CEO	Mark Taylor Construction Advisory Services
Chauncey Bell	Chair and Chief of Design	Harvester Academy
Research, facilitation and support		
Helen Goodland	Workshop Co-facilitator	SCIUS
Sarah Jones	Adobe Connect Hosting	Light House

Name	Position / Expertise	Organization
Devarsh Bhonde	Researcher	UBC
Kelly Walsh	Documentation and Reporting	SCIUS

Appendix 3: Documents List

All listed documents are available on Dropbox.

Project Delivery Practices in Vienna - Oliver Sterl Presentation - Rüdiger Lainer + Partner
Project Update - Vienna House - Melvin Lee - BC Housing
Digitization Benefits - Role of BIM - Geraldine Rayner and Scott Chatterton
Framing the Questions - Optimizing the Practices - Chauncey Bell - Harvester Academy
BIM for Owners - Autodesk

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