Inspect Smarter, Build Better®

John Kiedrowski **B.A., B.A. (Hon), M.A. (Criminology), CRM, FNHP, OCAP ®**

President

www.3drbi.com

3D REMOTE BUILDING INSPECTIONS

overview

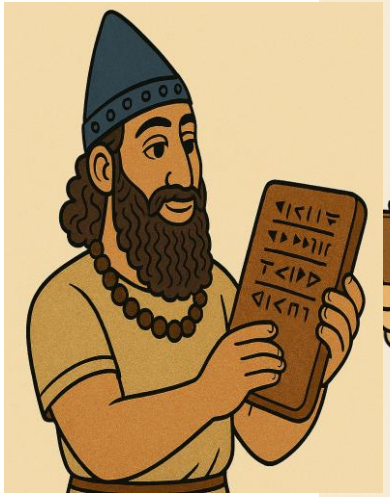
- Current situation
- What is a 3D camera
- How does it work
- Why 3D cameras for inspections
- 3DRBI platform
- Benefits
- Questions

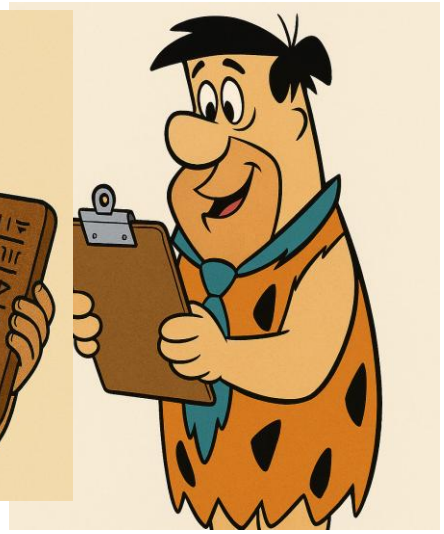
Quote from Steve Jobs on innovation

“Some people say give the customers what they want, but that's not my approach. Our job is to figure out what they're going to want before they do. I think Henry Ford once said, 'if I'd ask customers what they wanted, they would've told me a faster horse.' People don't know what they want until you show it to them. That's why I never rely on market research. Our task is to read things that are not yet on the page.”

Evolution of Building Inspectors

+2000 BC → Today





This makes no sense?

Imagine

- The Street View Car with a camera system on the roof collecting 360 imagery on the street
- The trekker with a back walking up mountains or down narrow streets.
- Rather than driving on the streets, the car or trekker goes into your house.
- Google Street View, but inside buildings—and much more detailed

Imagine no more

- Leading the way as using 3D reality capture on an inspection planform
- Camera imagery reconstructs a 3D environment
- 3D imagery enables inspectors to see the building and conduct measurements where needed.
- 3D imagery captures construction information needed for document.

Why 3D camera for inspections?

- Substantial costs savings
  - Travel and accommodation costs
  - Construction delay
  - Additional costs for homeowner (renting longer than plan, storage fees, extending construction loans or bridge financing, stress)
- Efficiency and productivity increases
- Ensure building code inspections for each stage
- Provide inspections for renovations
- Documentation of the construction stages
- Addresses spatial memory
- Biases toward contractors

How it works

- Need a 3D camera and a tripod
- Need cell phone/tablet for app
- Sign into 3DRBI account
- Take video and upload (internet not required)
  - Generally, takes 2 hours for capture to be reviewed
- Inspector reviews 3D imagery
  - Provides comments on video and sends back
- Completes an inspection report with comments from videos
- Send report
- Communication with contractor if needed

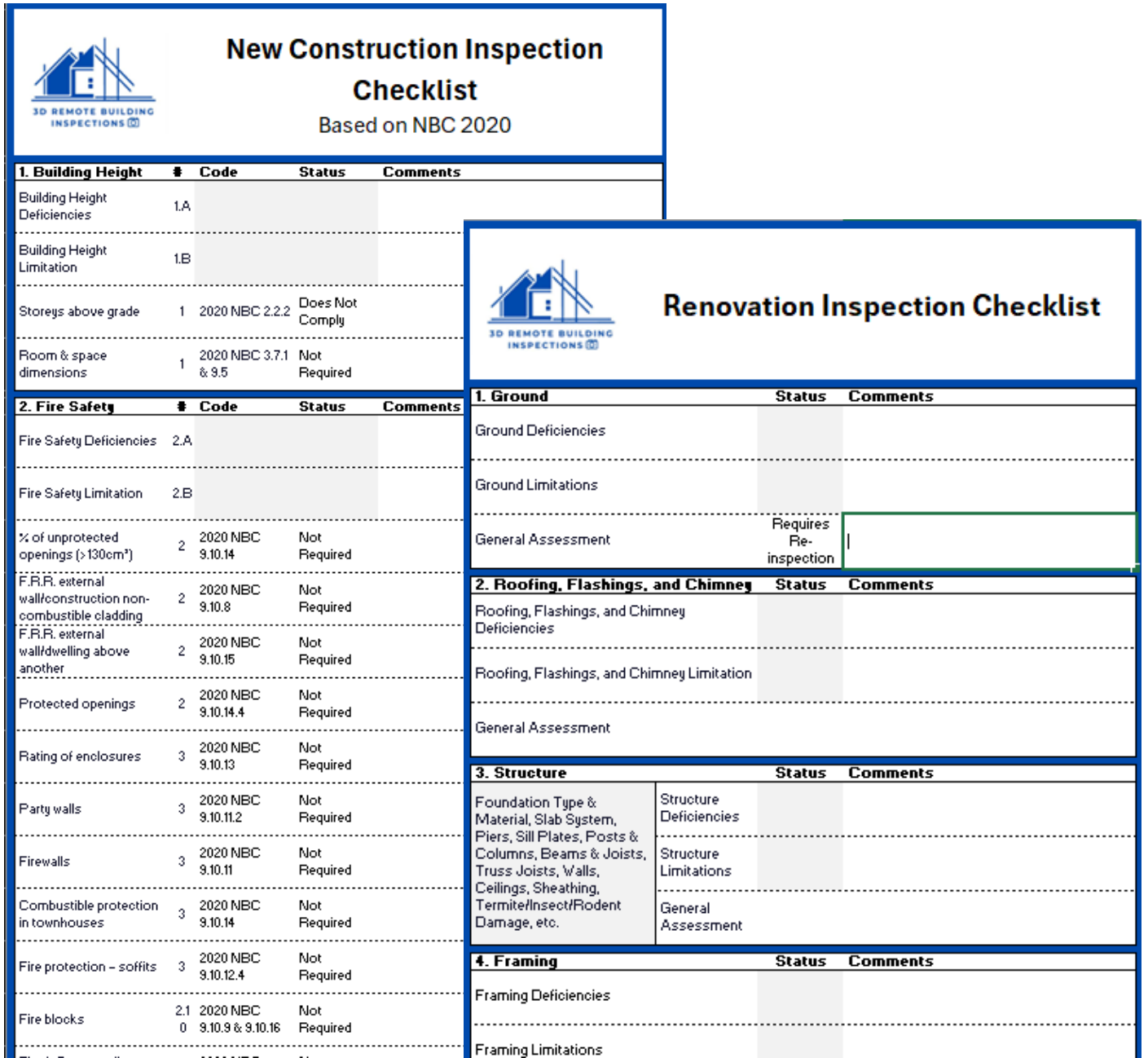
Camera Equipment

- Ricoh Theta Z1 52 GB
- Lens cap (important to keep on when not using)
- Tripod
- Cable
- Keep shipping boxes!
- 3drbi provides support on how to use the camera

Inspection Checklist and Report

The checklists contains two parts:

- **Project details:** information related to the property, along with the general info of both requester and inspector.
- **Inspection checklist:** necessary items that need to be assessed by the inspectors according to the National Building Code (NBC) Part 9. Note: this section will be updated regularly to cover other aspects of inspections.



New Construction Inspection Checklist

Based on NBC 2020

1. Building Height	#	Code	Status	Comments
Building Height Deficiencies	1.A			
Building Height Limitation	1.B			
Storeys above grade	1	2020 NBC 2.2.2	Does Not Comply	
Room & space dimensions	1	2020 NBC 3.7.1 & 9.5	Not Required	

2. Fire Safety	#	Code	Status	Comments
Fire Safety Deficiencies	2.A			
Fire Safety Limitation	2.B			
% of unprotected openings (>130cm²)	2	2020 NBC 9.10.14	Not Required	
F.R.R. external wall/construction non-combustible cladding	2	2020 NBC 9.10.8	Not Required	
F.R.R. external wall/dwelling above another	2	2020 NBC 9.10.15	Not Required	
Protected openings	2	2020 NBC 9.10.14.4	Not Required	
Rating of enclosures	3	2020 NBC 9.10.13	Not Required	
Party walls	3	2020 NBC 9.10.11.2	Not Required	
Firewalls	3	2020 NBC 9.10.11	Not Required	
Combustible protection in townhouses	3	2020 NBC 9.10.14	Not Required	
Fire protection – soffits	3	2020 NBC 9.10.12.4	Not Required	
Fire blocks	2.10	2020 NBC 9.10.9 & 9.10.16	Not Required	

Renovation Inspection Checklist

1. Ground	Status	Comments
Ground Deficiencies		
Ground Limitations		
General Assessment	Requires Re-inspection	

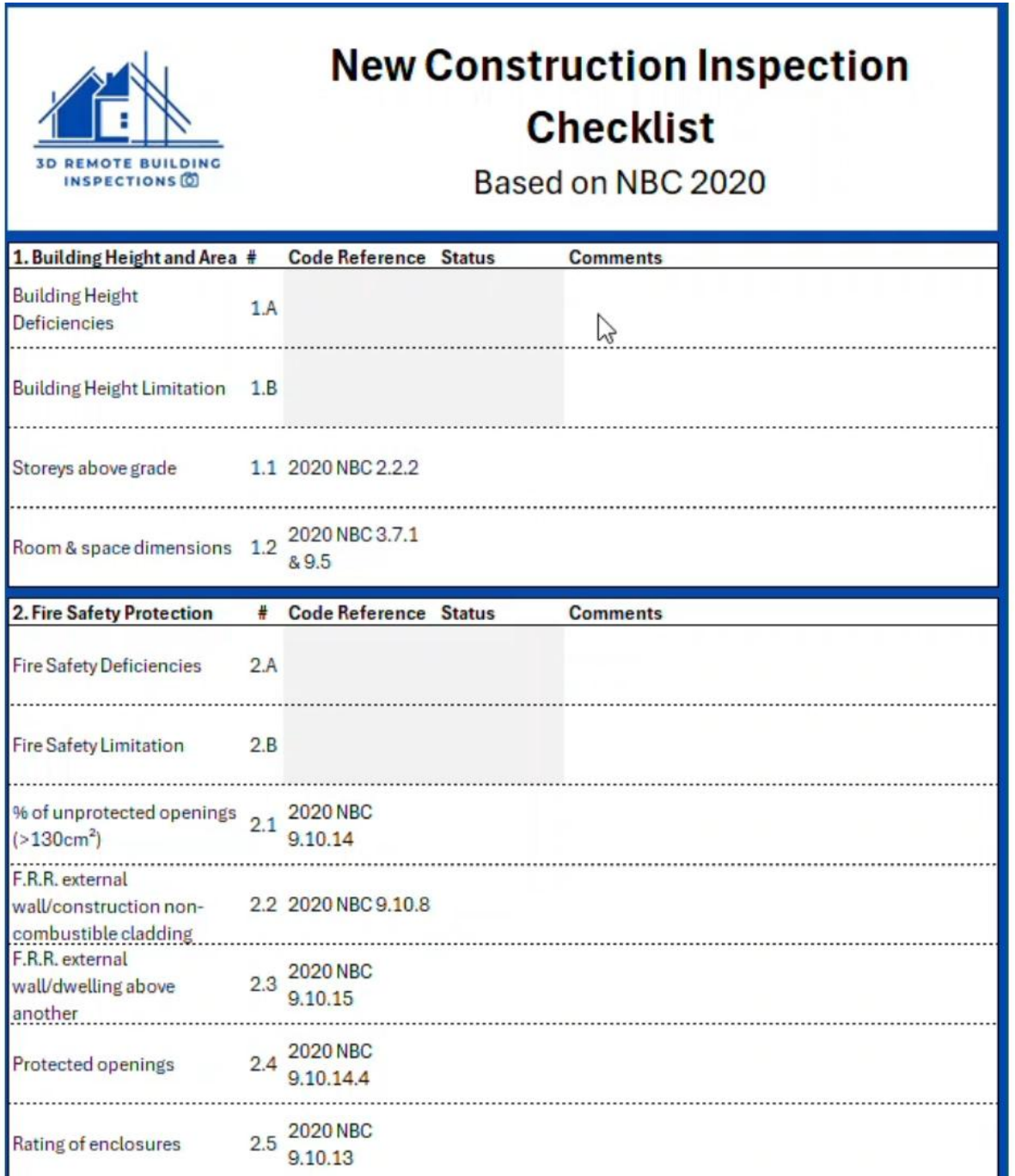
2. Roofing, Flashings, and Chimney	Status	Comments
Roofing, Flashings, and Chimney Deficiencies		
Roofing, Flashings, and Chimney Limitation		
General Assessment		

3. Structure		Status	Comments
Foundation Type & Material, Slab System, Piers, Sill Plates, Posts & Columns, Beams & Joists, Truss Joists, Walls, Ceilings, Sheathing, Termite/Insect/Rodent Damage, etc.	Structure Deficiencies		
	Structure Limitations		
	General Assessment		

4. Framing	Status	Comments
Framing Deficiencies		
Framing Limitations		

Inspection Checklist and Report

A hierarchy of pre-defined checklist sections and their detailed items based on NBC 2020



3D REMOTE BUILDING INSPECTIONS

New Construction Inspection Checklist

Based on NBC 2020

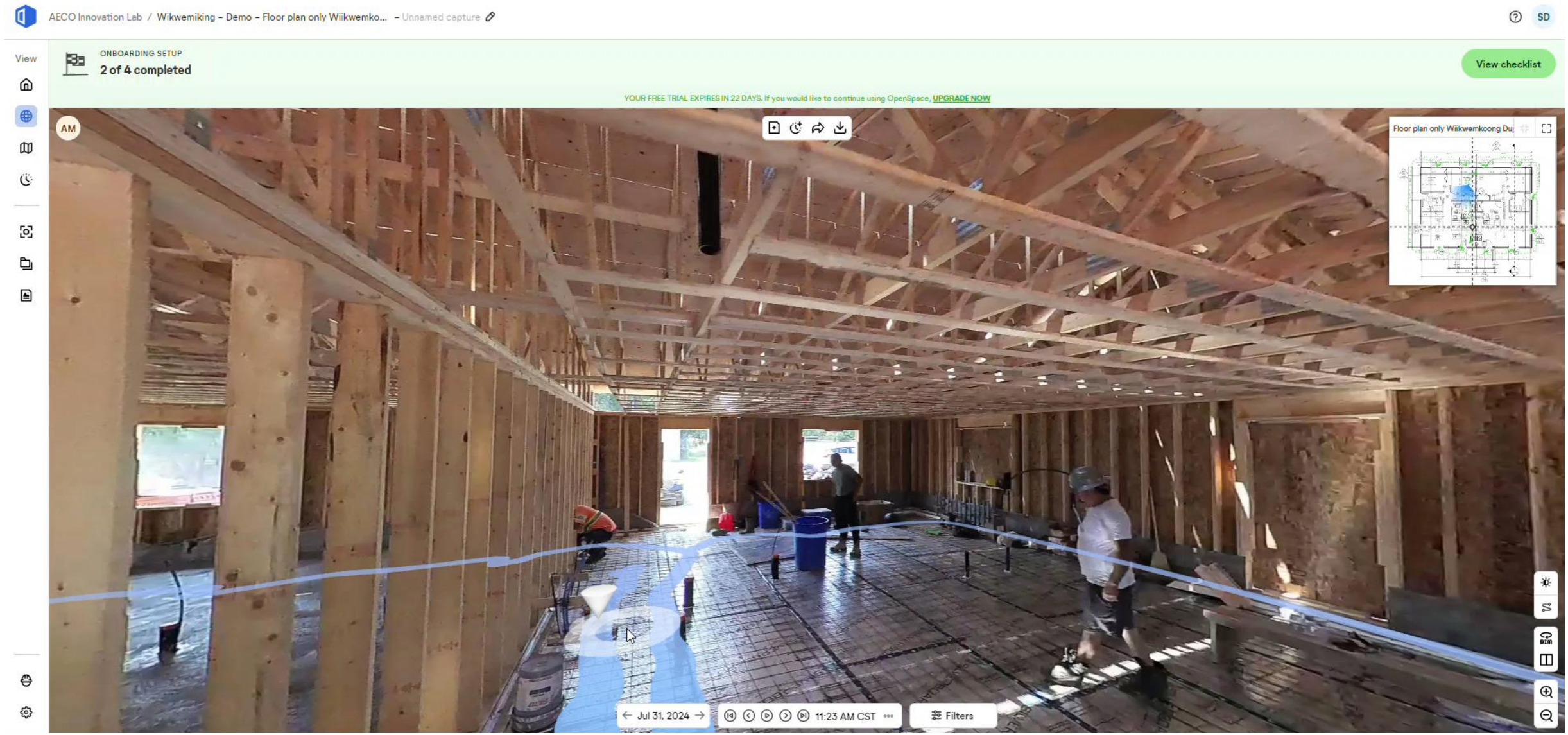
1. Building Height and Area	#	Code Reference	Status	Comments
Building Height Deficiencies	1.A			
Building Height Limitation	1.B			
Storeys above grade	1.1	2020 NBC 2.2.2		
Room & space dimensions	1.2	2020 NBC 3.7.1 & 9.5		

2. Fire Safety Protection	#	Code Reference	Status	Comments
Fire Safety Deficiencies	2.A			
Fire Safety Limitation	2.B			
% of unprotected openings (>130cm^2)	2.1	2020 NBC 9.10.14		
F.R.R. external wall/construction non-combustible cladding	2.2	2020 NBC 9.10.8		
F.R.R. external wall/dwelling above another	2.3	2020 NBC 9.10.15		
Protected openings	2.4	2020 NBC 9.10.14.4		
Rating of enclosures	2.5	2020 NBC 9.10.13		

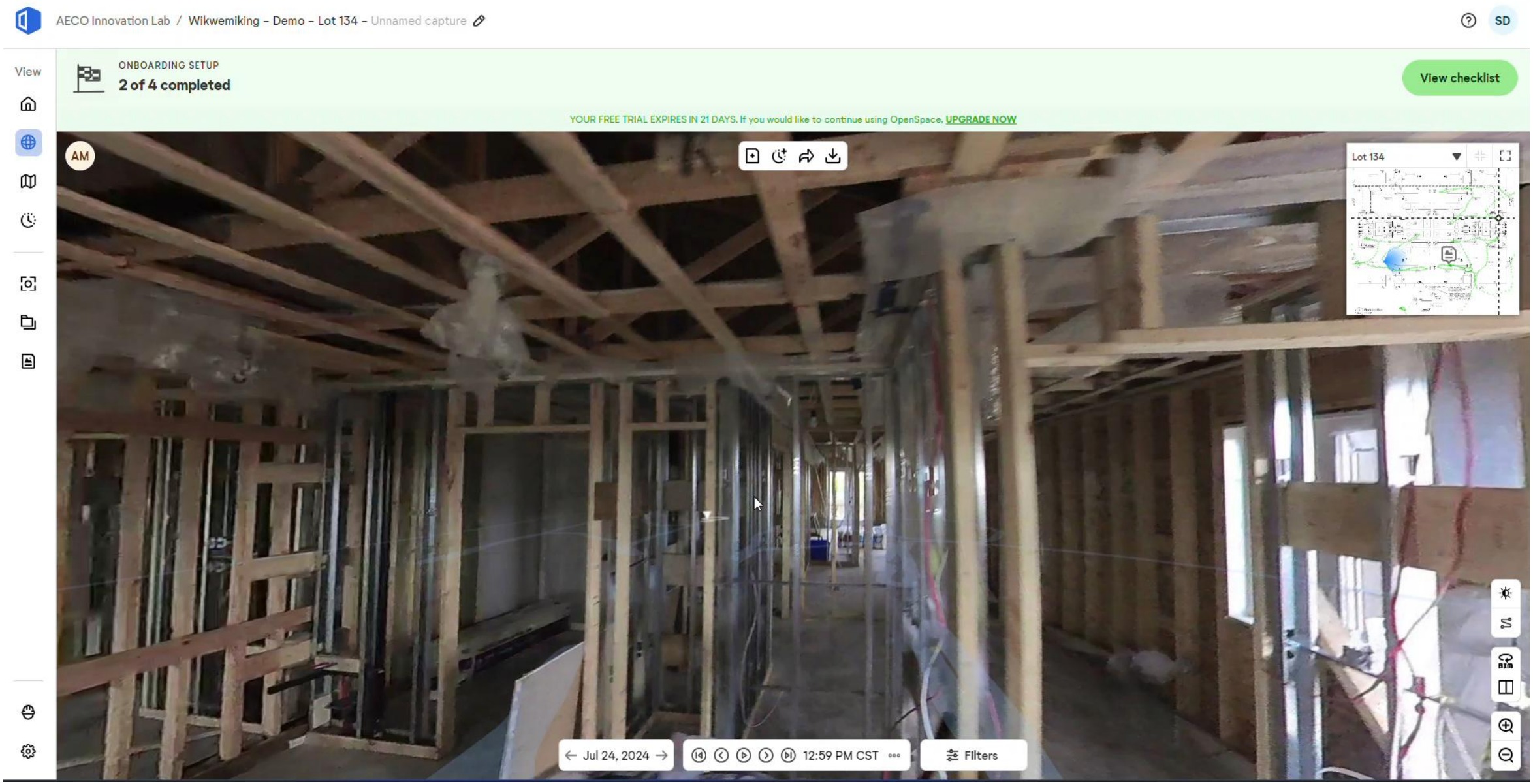
Physical vs Virtual Visual Inspections

- Pilot studies - 6 physical inspections were conducted. Same buildings a VVI conducted. Third party reviewed both reports. The same points identified in physical inspection were identified in VVI.
- VVI identified other items; able to share with his colleague for additional comments.
- Substantial savings from using VVI versus physical inspection – approximately 60% savings.
- Documentation in 3D versus 2D pictures.
- Efficiencies in completing the inspection reports. Comments made on video downloaded onto inspection report
- Created a manual for person for taking 3D image. Do not need to be a contractor or inspector.

3D Reality Capture (3DRC) in practice



3D Reality Capture (3DRC) in practice




White sheet-615M.png
CAPTURE ERROR
Sep 17, 2024
8:42 AM CST
Filters

3D Reality Capture (3DRC) in practice

3D Captures and Municipal/Town Inspections (1)

- Have contractor/site manager take 3D captures
- Contractor purchase camera
  - Ricoh Theta Z1 51GB (lens cap, tripod) approx. $1,500
  - Insta360x5 $765.00
- 3DRBI provides the training both for contractor and inspector
- Have a user manual on how to take 3D captures
- Have manual on use of 3D cameras, storage etc
- Municipality can select which inspection stage requires physical inspection versus a VVI.

3D Captures and Municipal/Town Inspections (2)

- Enter inspection information on 3DRBI Platform
  - Name, location, etc.
  - Housing/planning department receives 3D captures.
- Provides comments
- Upload data to your own platform.
- Municipality owns data

Pricing

- Each inspection stage $1,250.00 (plus taxes).

Client /municipalities provides their own inspection services.

- 3DRBI provides training to person providing 3D Capture and support
- 3DRBI provides training to reviewer of 3D capture and support
- Help with data management
- Follow up inspections use 2D captures (cellphone)

Construction Delays

- Construction delays can result from materials, rescheduling, and labour shortages; they worsen when the inspection system cannot keep pace.
- BC has roughly 480 municipal building officials, yet the province is planning 40,000 new homes.
- Capacity bottlenecks which slows down approvals.
- Inspection delays can cost approx. $1,000 per day in labour, equipment and financing.

Capacity

- Limited resources and capacity
  - Estimated to build 40,000 over 5 yrs for 10 municipalities.
  - This means there will be approximately 280,000 inspection stages.
  - Each inspector would need to handle 400 to 580 extra inspections.
- Labour intensive, time consuming, costly and often inefficient because of travel time to and from job site.
- Reliance on conventional 2D methods such as paper-based walking around with a clipboard to make notes is becoming inefficient and time consuming.

Benefits of 3DRBI

- Lower cost and travel fees
- Expands access to inspections
- Reduces construction delays
- Increases inspection frequency
- Training tool for inspectors and contractors
- Supports permitted renovations
- Records construction progress
- Enables electronic reporting
- Stores data
- Addresses privacy concerns

Current Inspections (if time permits)

- https://can.openspace.ai/orgs/Mil6bGkBRLG3SUxHY3LSog/groups

Conclusions

- Game changer on how building inspections will be conducted.
- This is the future!

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Contact 3DRBI

info@3drbi.com

+1 (833) 280-3185

John@3drbi.com

(613) 851 2056

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