



BUILDING 2019
INNOVATION

National Institute of
BUILDING SCIENCES

CONFERENCE & EXPO

Add Lasers to your Workflow!

An Intro to Point Clouds

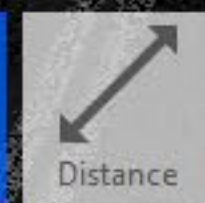
Kyle Barker, AIA NCARB

Associate at MERGE Architects (Boston, MA)





x: - m y: - m z: - m

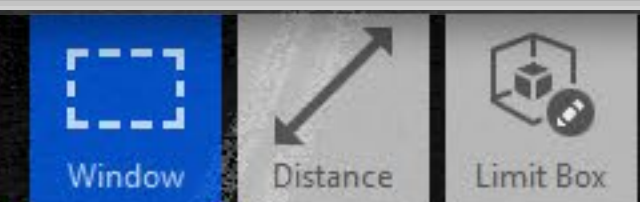


LEFT





x: - m y: - m z: - m



LEFT

Cambridge.rcs Properties

General

Security

Details

Previous Versions

Cambridge.rcs

Type of file: Autodesk ReCap Scan (.rcs)

Opens with: Autodesk ReCap Applic Change...

Location: P:\17257_Harvard Square Theater\01_Admin\F_Su

Size: 21.2 GB (22,795,438,083 bytes)

Size on disk: 21.2 GB (22,795,440,128 bytes)

Created: Saturday, July 29, 2017, 10:34:38 AM

Modified: Wednesday, May 03, 2017, 8:53:50 PM

Accessed: Saturday, July 29, 2017, 10:34:38 AM

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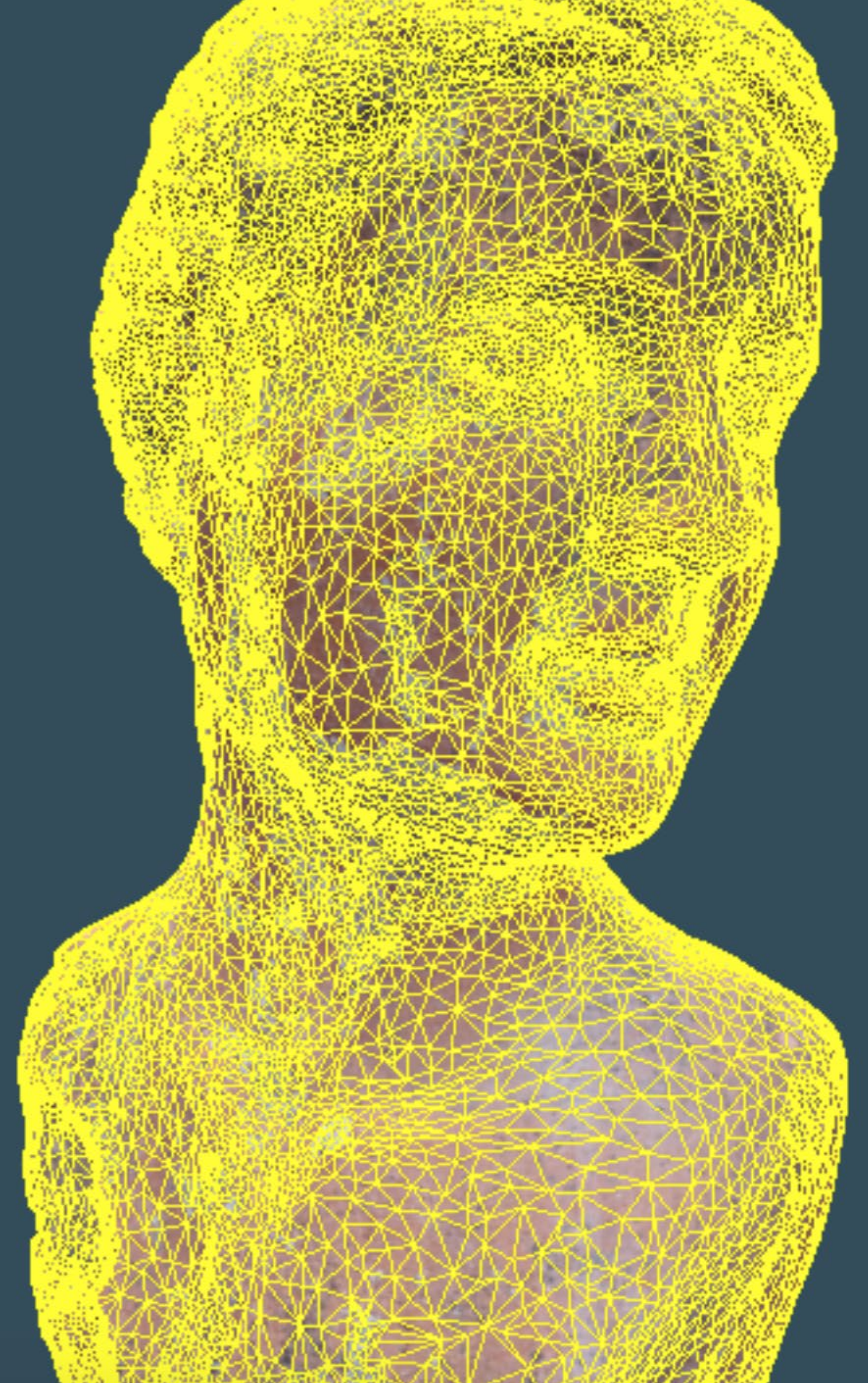
OK Cancel Apply





WHAT IS IT?

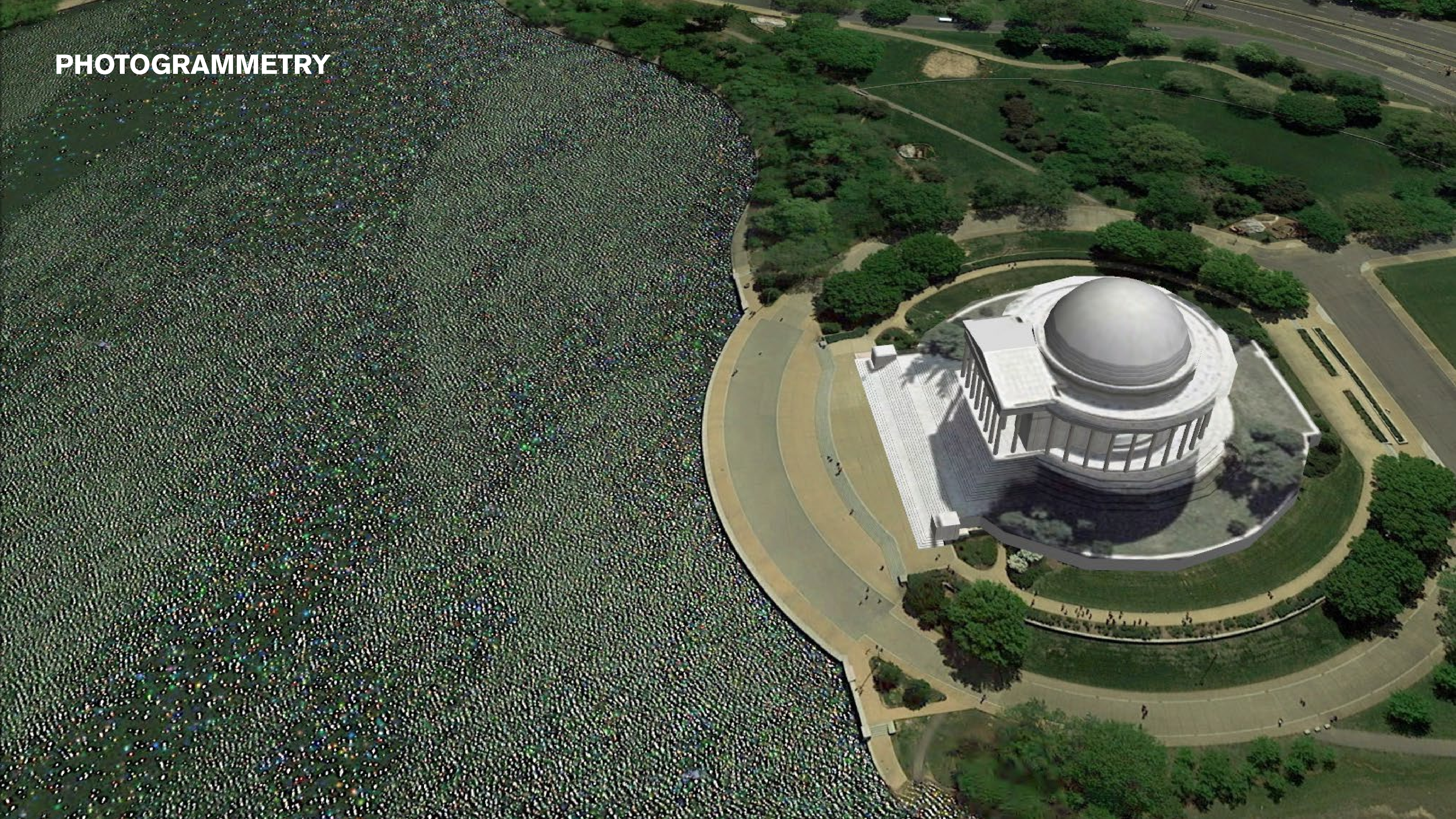
PHOTOGRAMMETRY



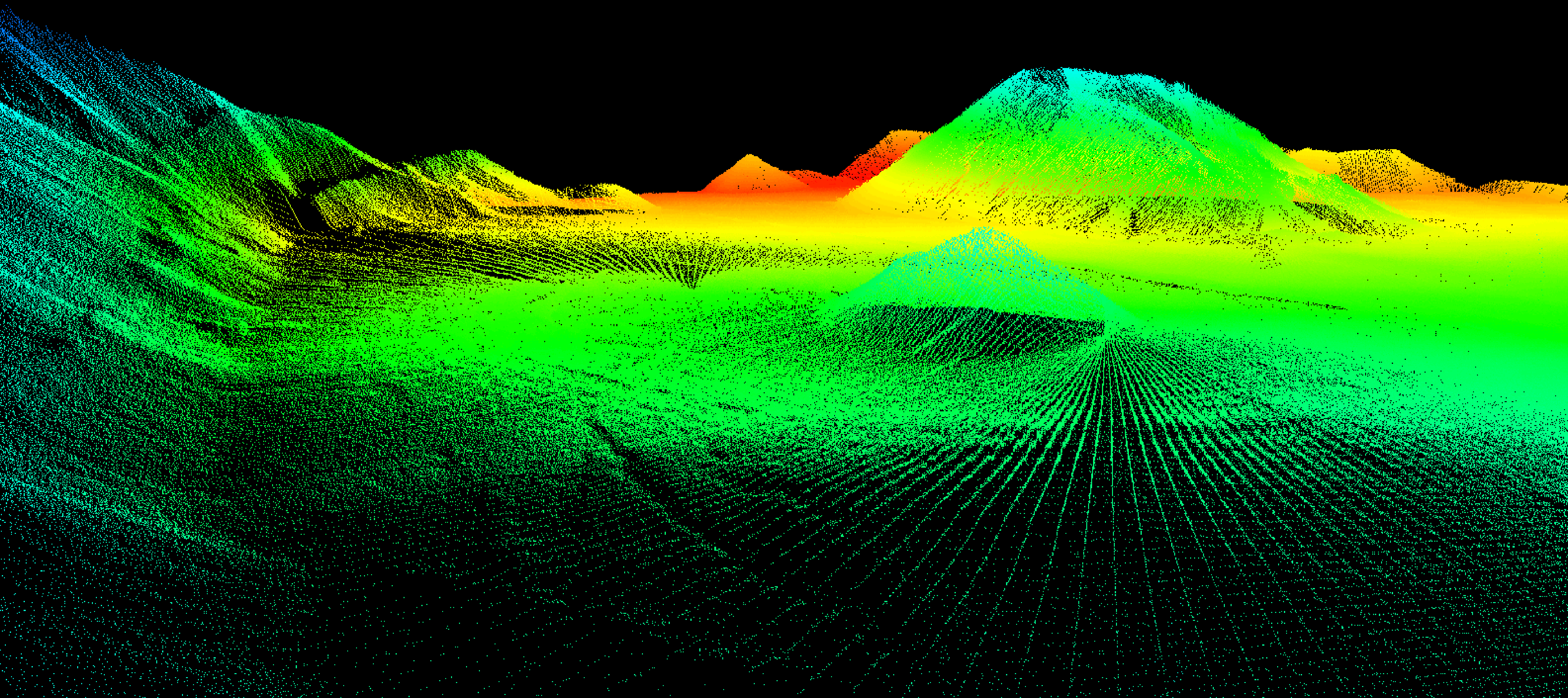
PHOTOGRAMMETRY



PHOTOGRAMMETRY



LIDAR



LIDAR



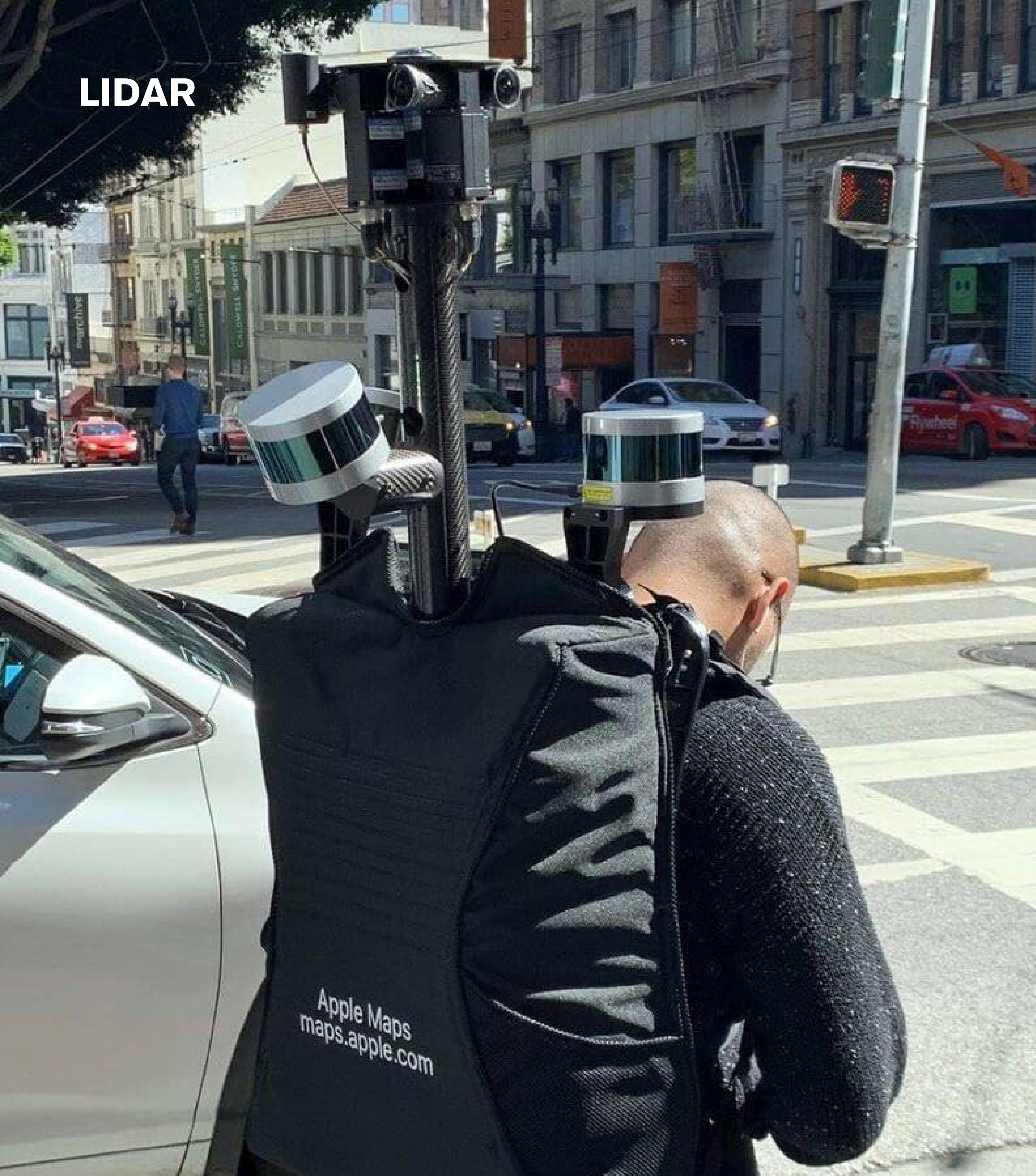
LIDAR



LIDAR



LIDAR



HOW DO YOU DO IT?



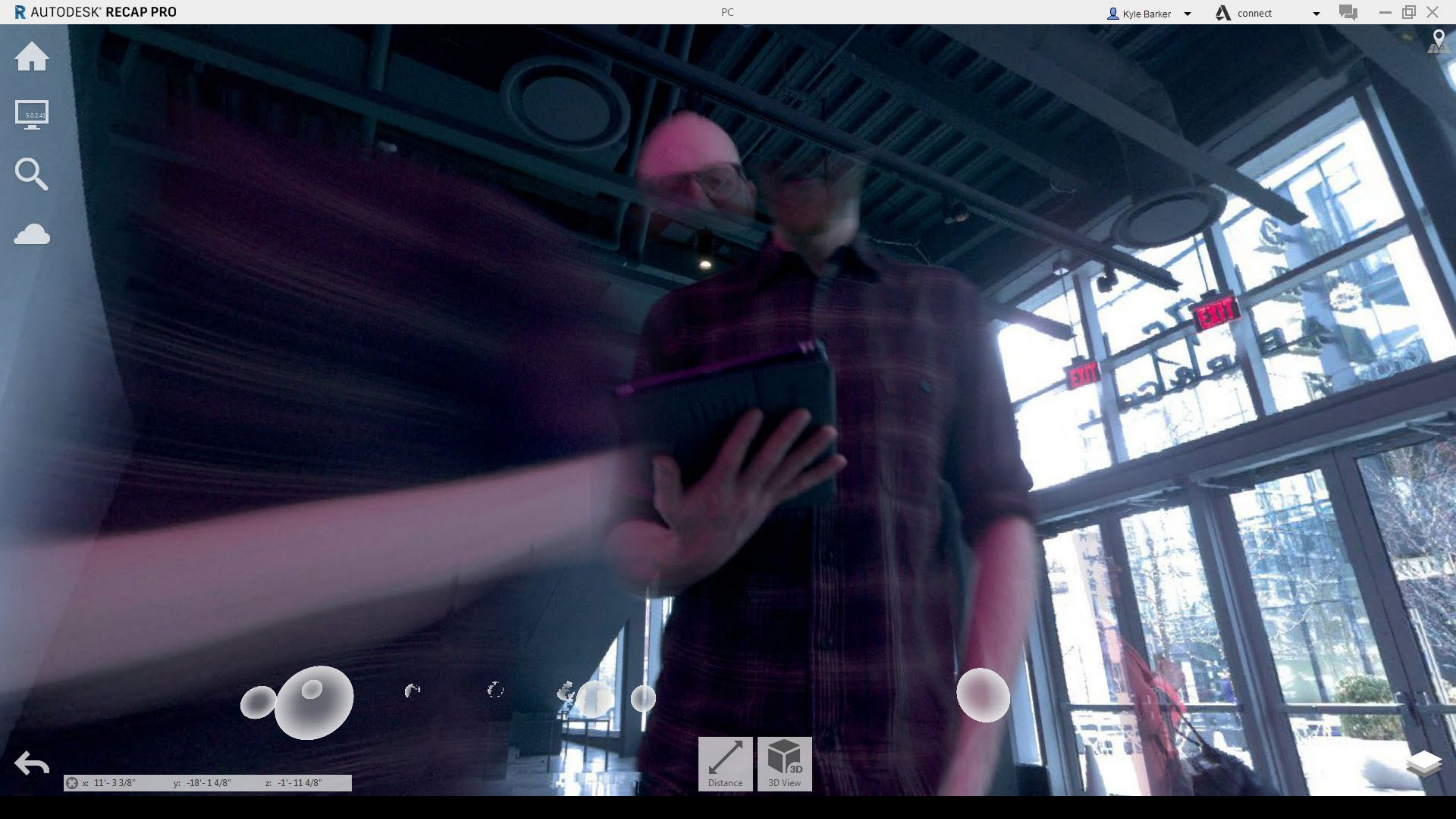
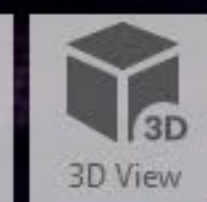
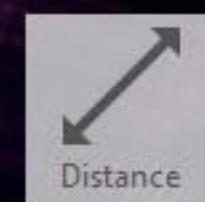








x: 11'-3 3/8" y: -18'-1 4/8" z: -1'-11 4/8"





Scans

Scan Group 1

Away 12

Away 10

Away 9

Away 7

Away 6

Away 5

Away 4

Away 3

Away 2

Away 1





Scans

Scan Group 1

Away 12

Away 10

Away 9

Away 7

Away 6

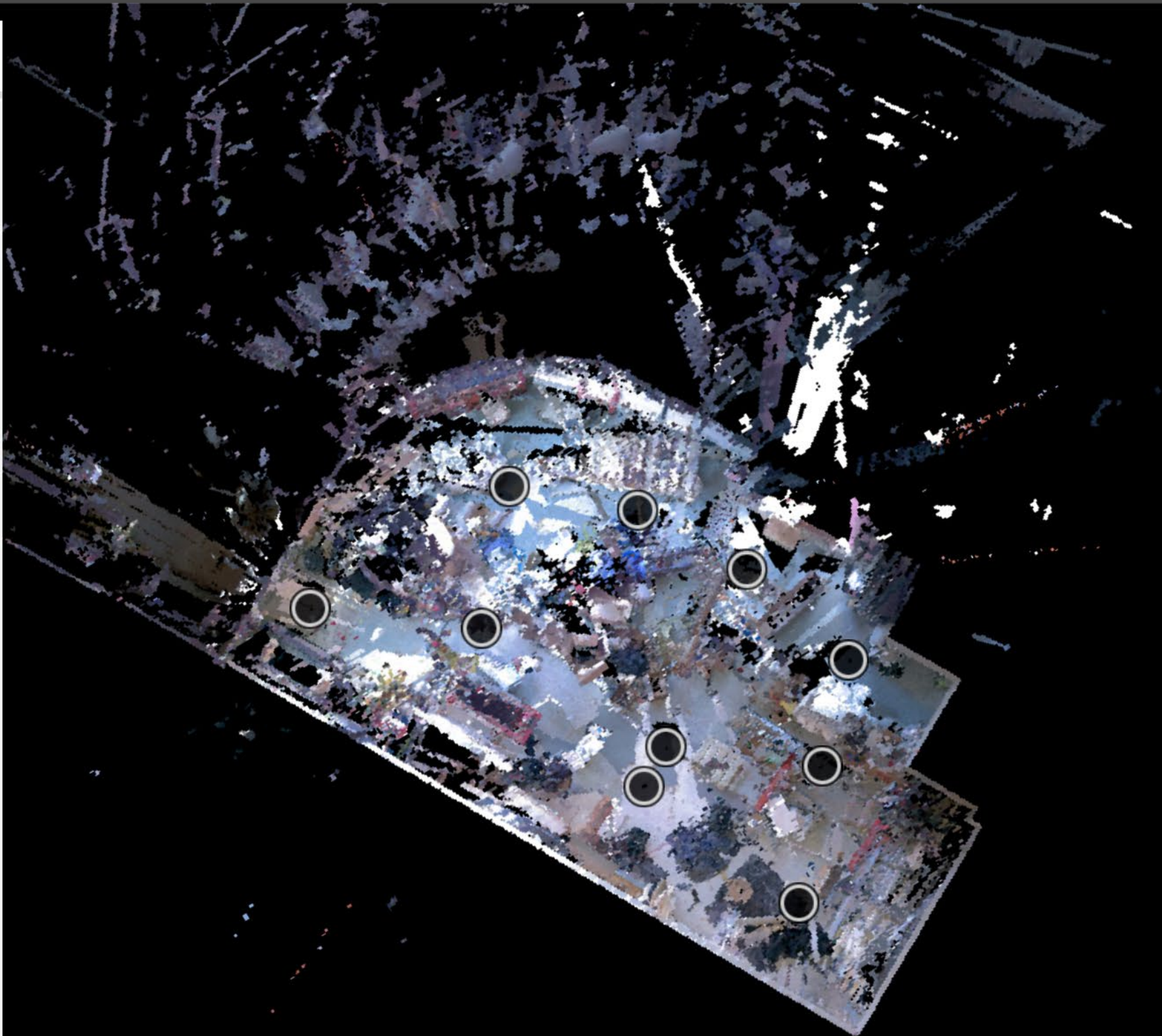
Away 5

Away 4

Away 3

Away 2

Away 1



RealView



Display

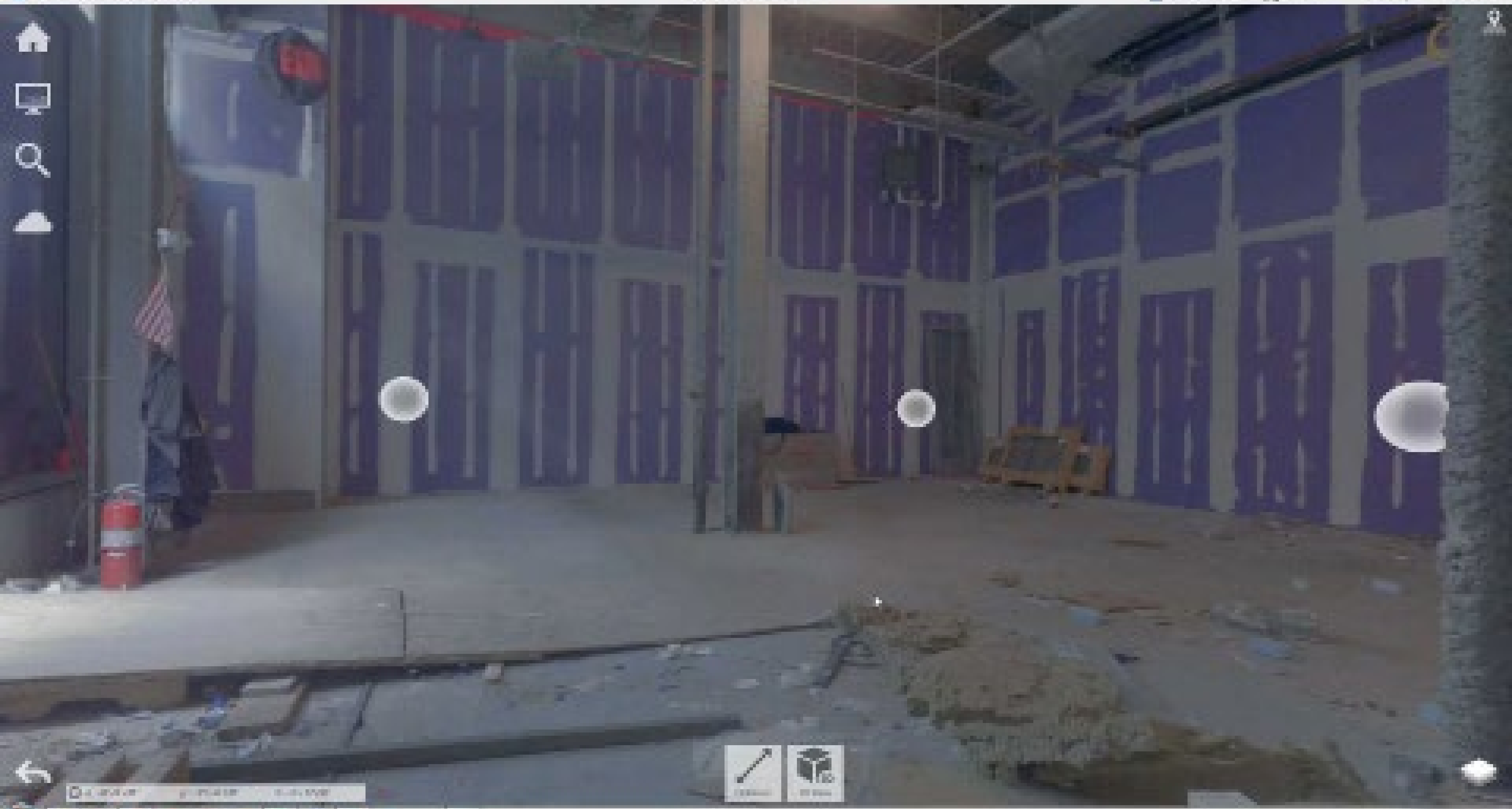


Tools

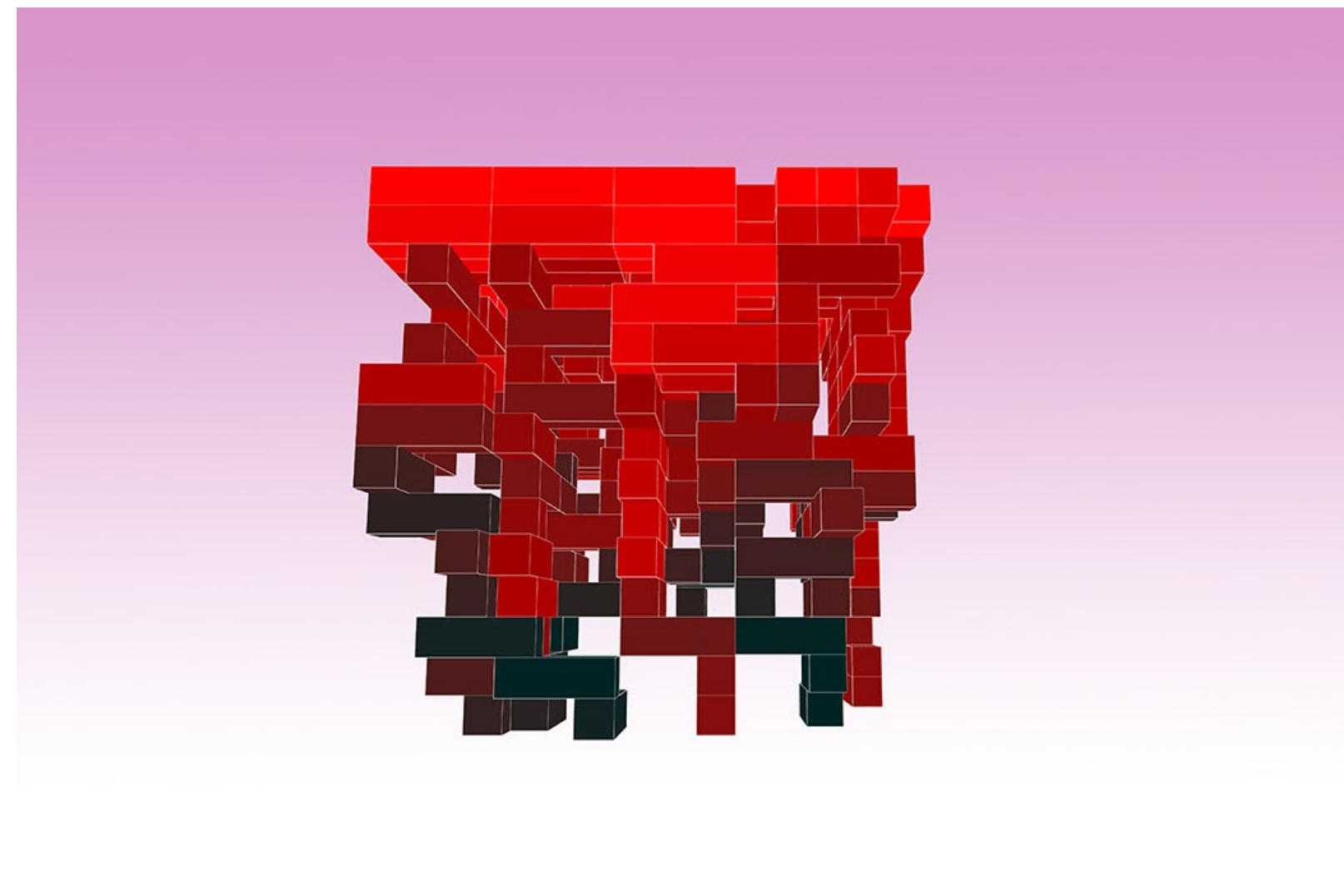
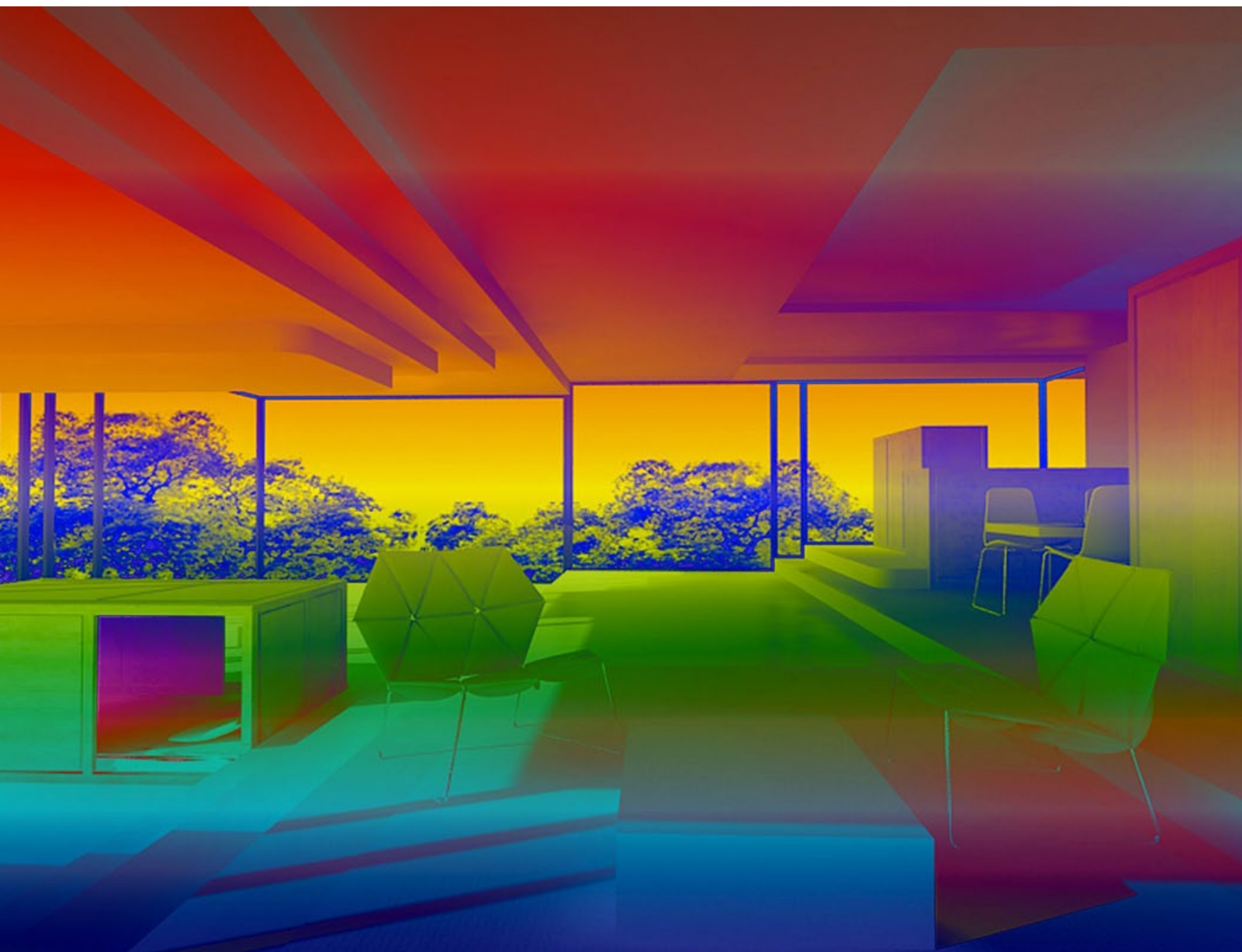
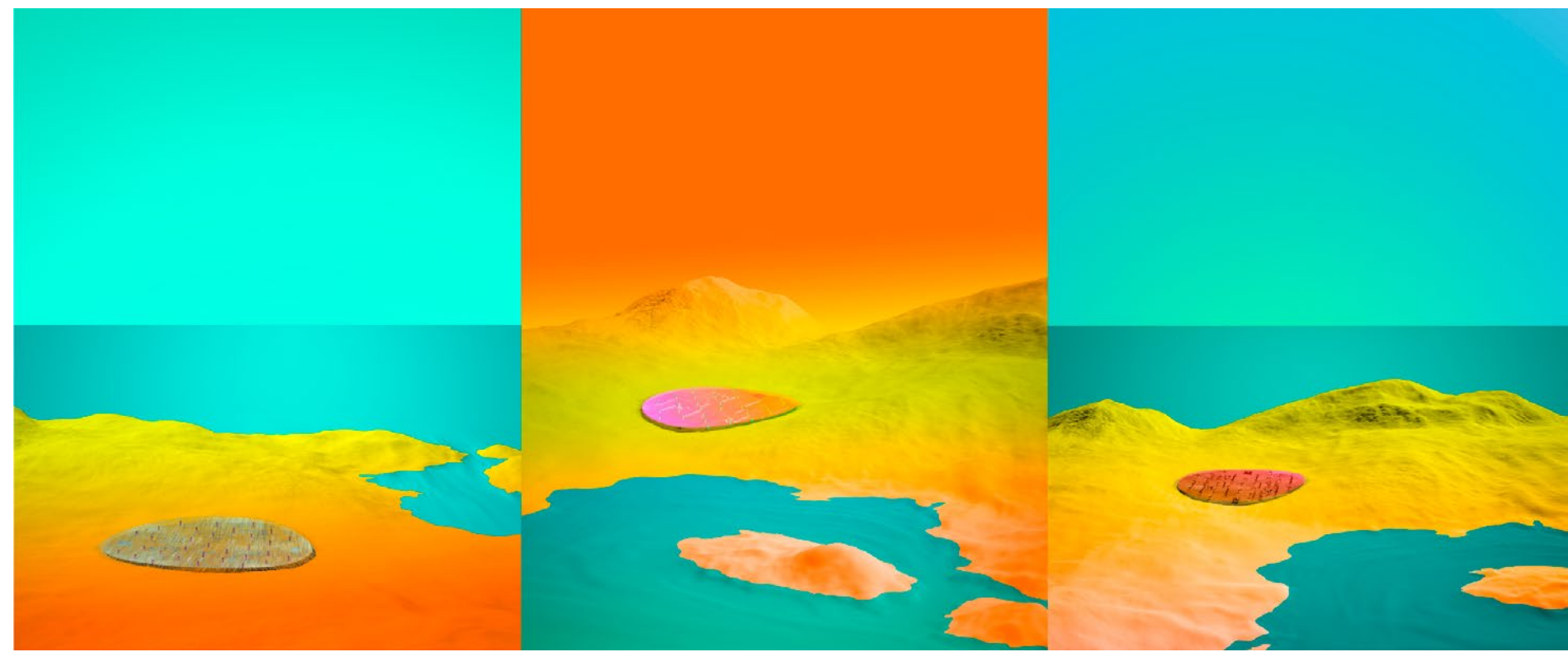


Share Scan









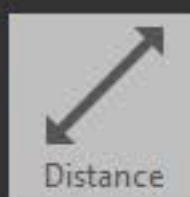
Clockwise from Top Left: Jennifer Bonner / MALL, Sam Ghantous, Amid.Cero9, LADG, MOS, Philippe Rahm

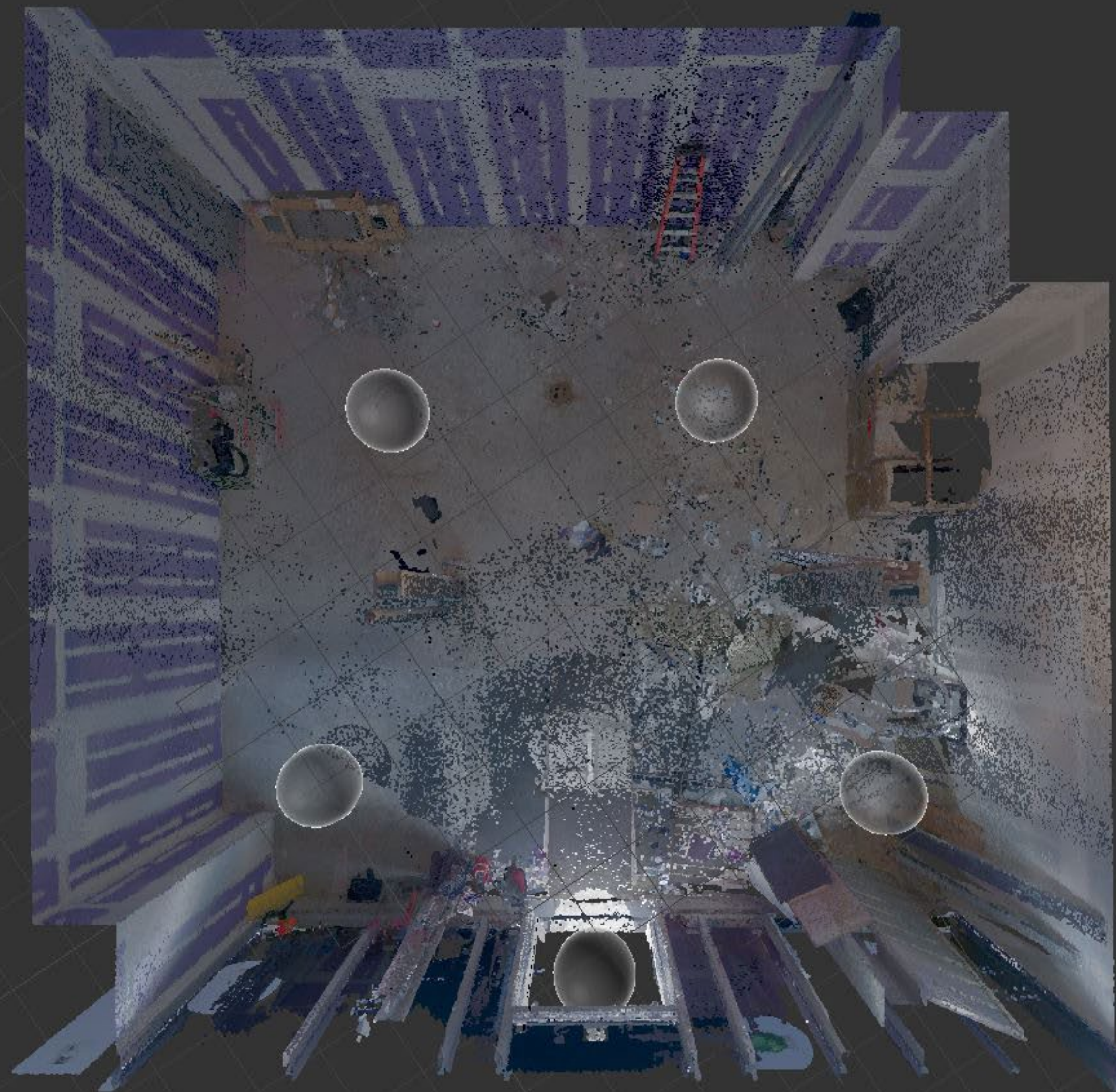






x: - y: - z: -





x: - y: - z: -

Window

Distance

Limit Box

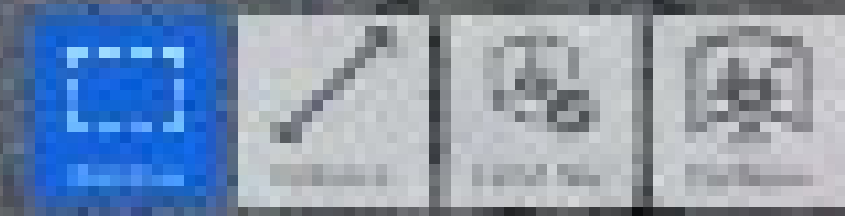
Unclip All

RealView





0:00:00 0:00:00 0:00:00





x: - y: - z: -



Autodesk Revit 2018.2

Type a keyword or phrase

File Architecture Structure Systems Insert Annotate Analyze Massing & Site Collaborate View Manage Add-Ins Revit Express Tools Modify

Modify Select Link Revit Link IFC Link CAD DWF Markup Decal Point Cloud Coordination Model Manage Links Import CAD Import gbXML Insert from File Image Manage Images Load Family Load as Group Load from Library

Properties

3D View
MERGE 3D View

3D View: 3D - BLK Axor Edit Type

Graphics

View Scale	3/8" = 1'-0"
Scale Value 1:	32
Detail Level	Medium
Parts Visibility	Show Both
Visibility/Graph...	Edit...
Graphic Display...	Edit...
Discipline	Architectural
Show Hidden L...	By Discipline
Default Analysi...	None
Sun Path	☐

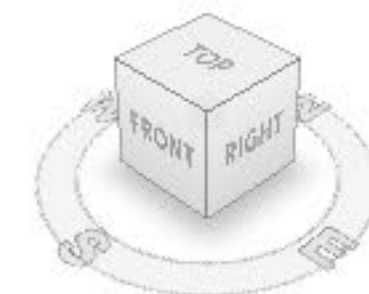
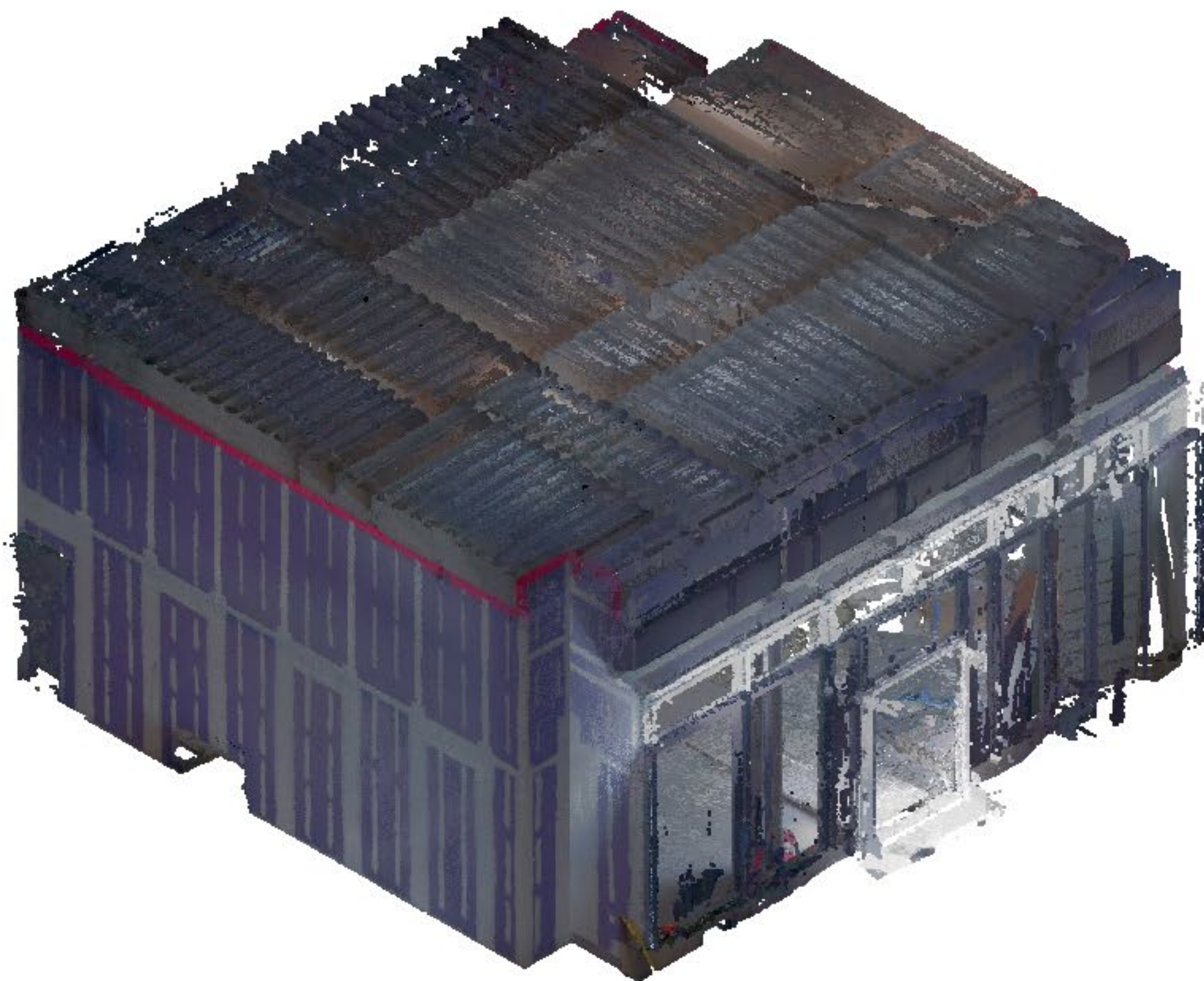
Extents

Crop View	☐
Crop Region Vi...	☐
Annotation Crop	☐
Exp Clip Active	☐

Properties help Apply

Project Browser - OutdoorVoices_klb52...

- Views (all)
- Legends
- Schedules/Quantities (all)
- Sheets (Discipline)
- Families
- Groups
- Revit Links



3/8" = 1'-0"

Click to select, TAB for alternates, CTRL adds, SHIFT unselects.

General (Not Editable)

:0

Main Model

☐ Editable Only

0

Properties

Section
MERGE Building Section
BLK

Section: SECTION B Cop Edit Type

Color Scheme ... Background

Color Scheme <none>

Default Analysis... None

Sun Path

Extents

Crop View ☒

Crop Region Vi... ☐

Annotation Crop ☐

Far Clipping Clip without line

Far Clip Offset 5' 0"

Scope Box None

Identity Data

View Template MERGE Section B

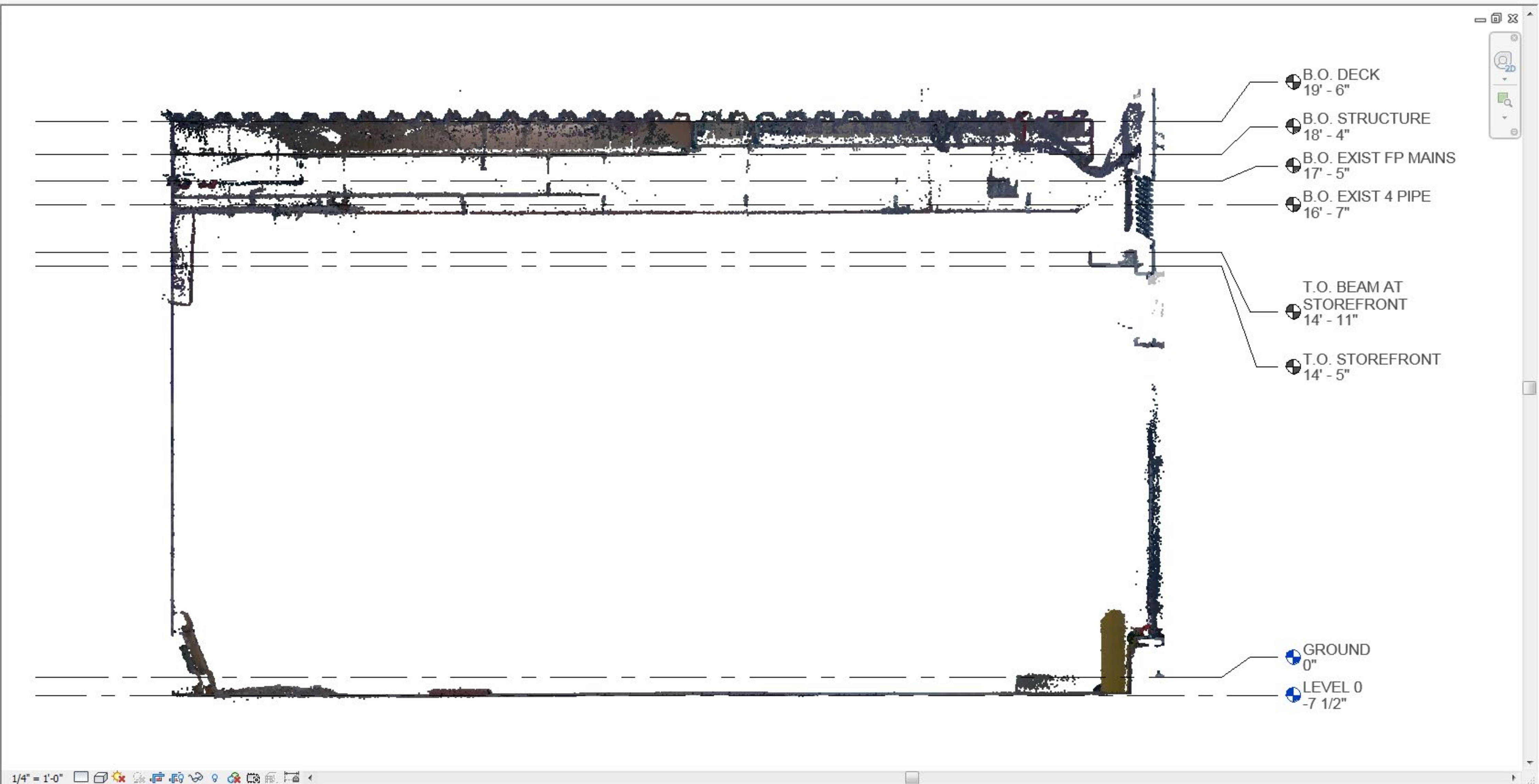
View Name SECTION B Copy1

Dependency Independent

Properties help Apply

Project Browser - OutdoorVoices_klb52...

- Views (all)
- Legends
- Schedules/Quantities (all)
- Sheets (Discipline)
- Families
- Groups
- Revit Links



Properties

Floor Plan MERGE BLK

Floor Plan: LEVEL 1 - BL Edit Type

Extents

Crop View	☒
Crop Region Vi...	☐
Annotation Crop	☐
View Range	Edit...
Associated Level	GROUND
Scope Box	None
Depth Clipping	No clip

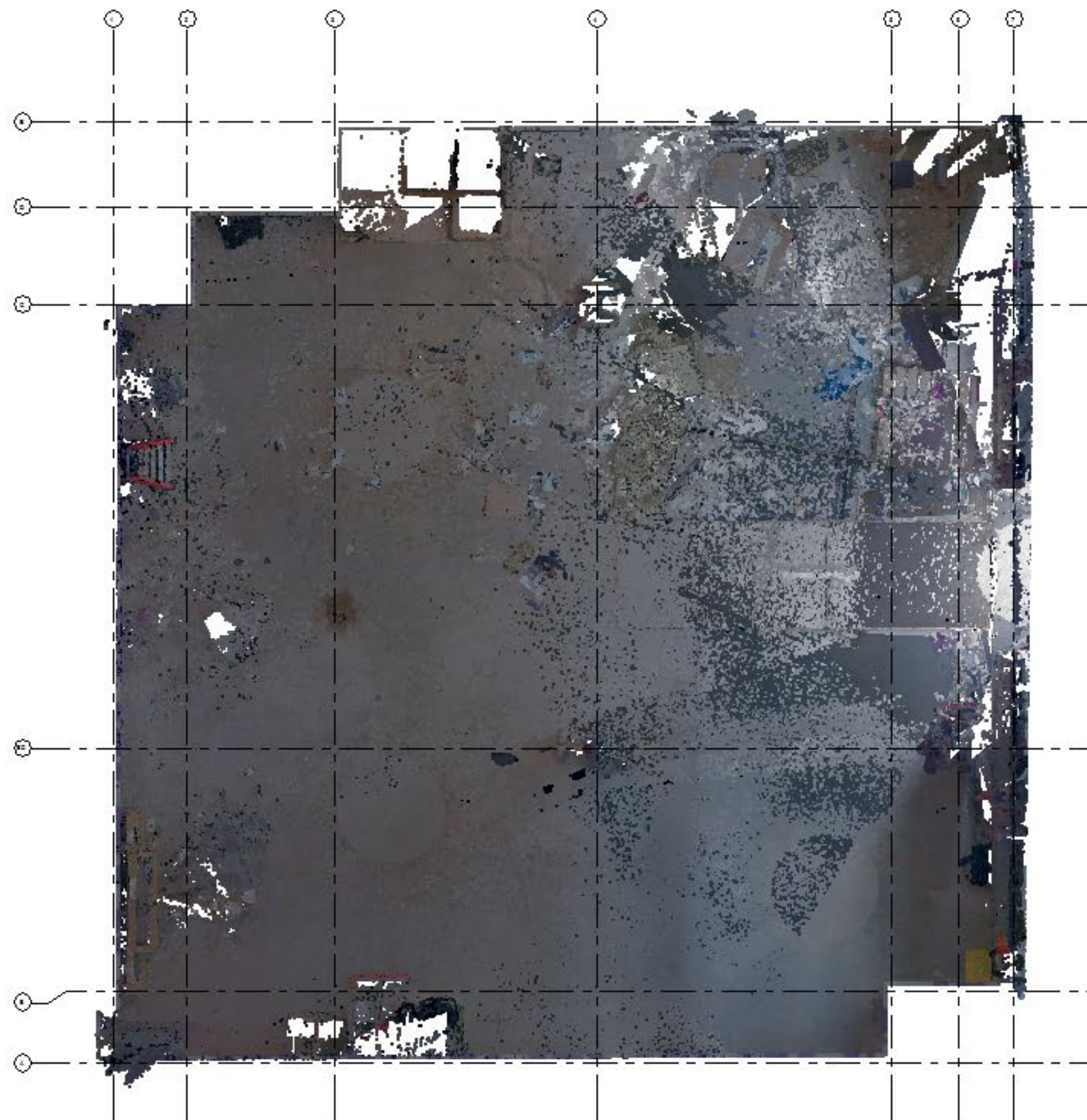
Identity Data

View Template	Merge BLK
View Name	LEVEL 1 - BLK
Dependency	Independent
Title on Sheet	
Referencing Sh...	
Referencing De...	

Properties help Apply

Project Browser - OutdoorVoices_klb52...

- Views (all)
- Legends
- Schedules/Quantities (all)
- Sheets (Discipline)
- Families
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- Revit Links



Autodesk Revit 2018.2

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File Architecture Structure Systems Insert Annotate Analyze Massing & Site Collaborate View Manage Add-Ins Revit Express Tools Modify

Modify Select

Link Revit Link IFC Link CAD DWF Markup Decal Point Cloud Coordination Model Manage Links Import CAD Import gbXML Insert from File Image Manage Images Load Family Load as Group Load from Library

Properties

Floor Plan MERGE BLK

Floor Plan: LEVEL 1 - BL Edit Type

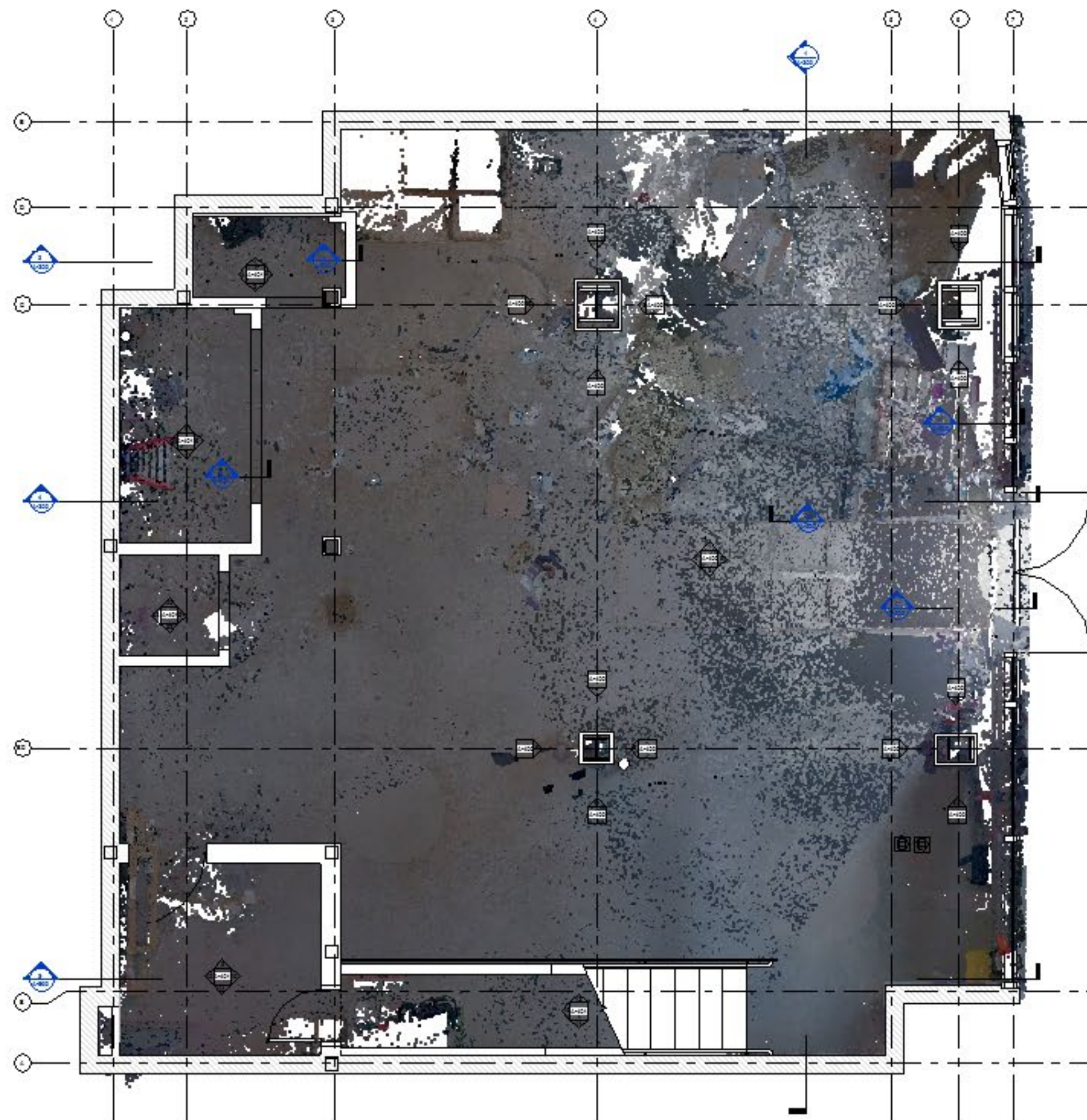
Graphics

View Scale	3/8" = 1'-0"
Scale Value 1:	32
Display Model	Normal
Detail Level	Coarse
Parts Visibility	Show Original
Visibility/Graph...	Edit...
Graphic Display...	Edit...
Orientation	Project North
Wall Join Display	Clean all wall joins
Discipline	Architectural
Show Hidden L...	By Discipline
Color Scheme ...	Background
Color Scheme	<none>
System Color S...	Edit...
Default Annot...	None

Properties help Apply

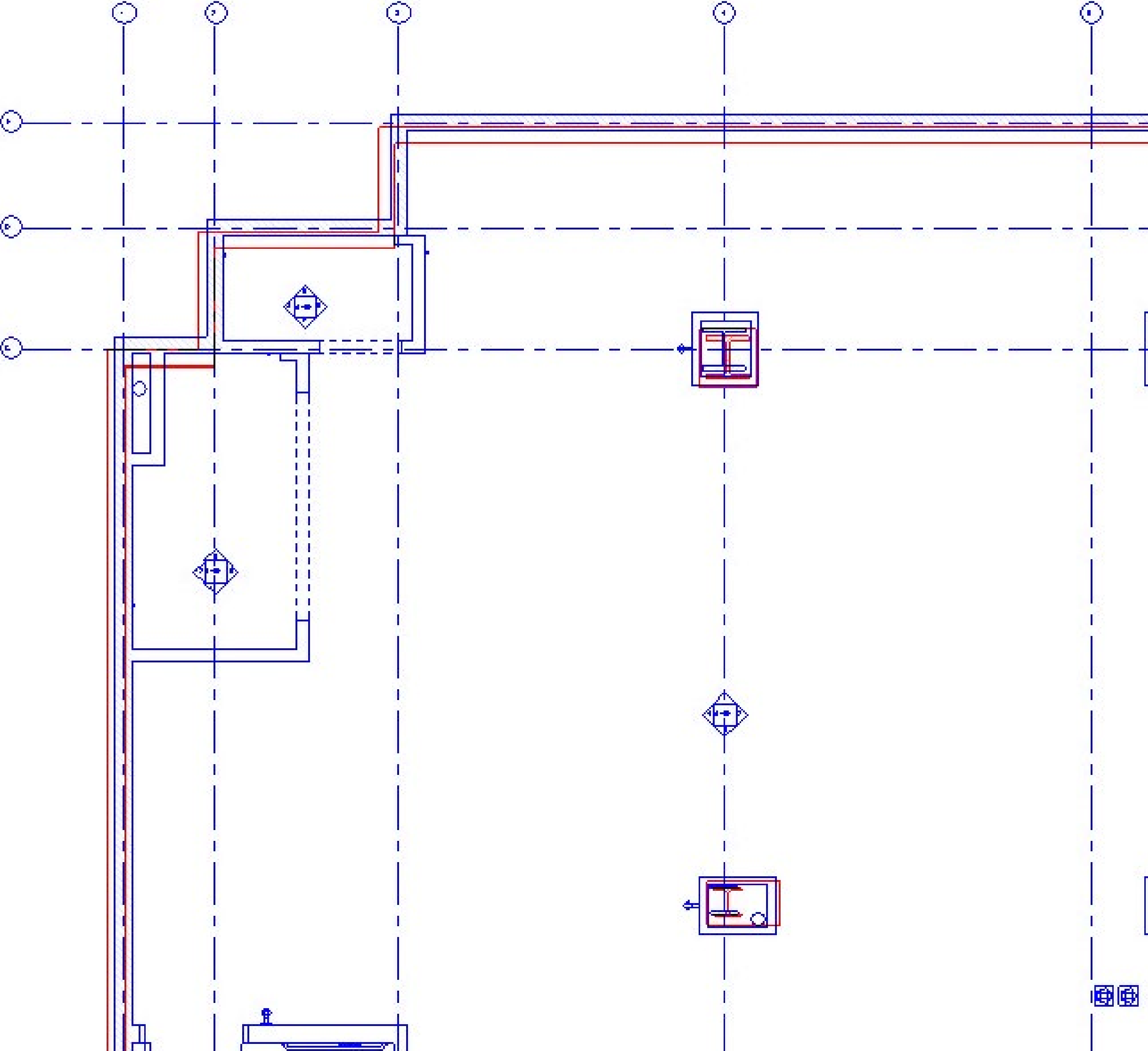
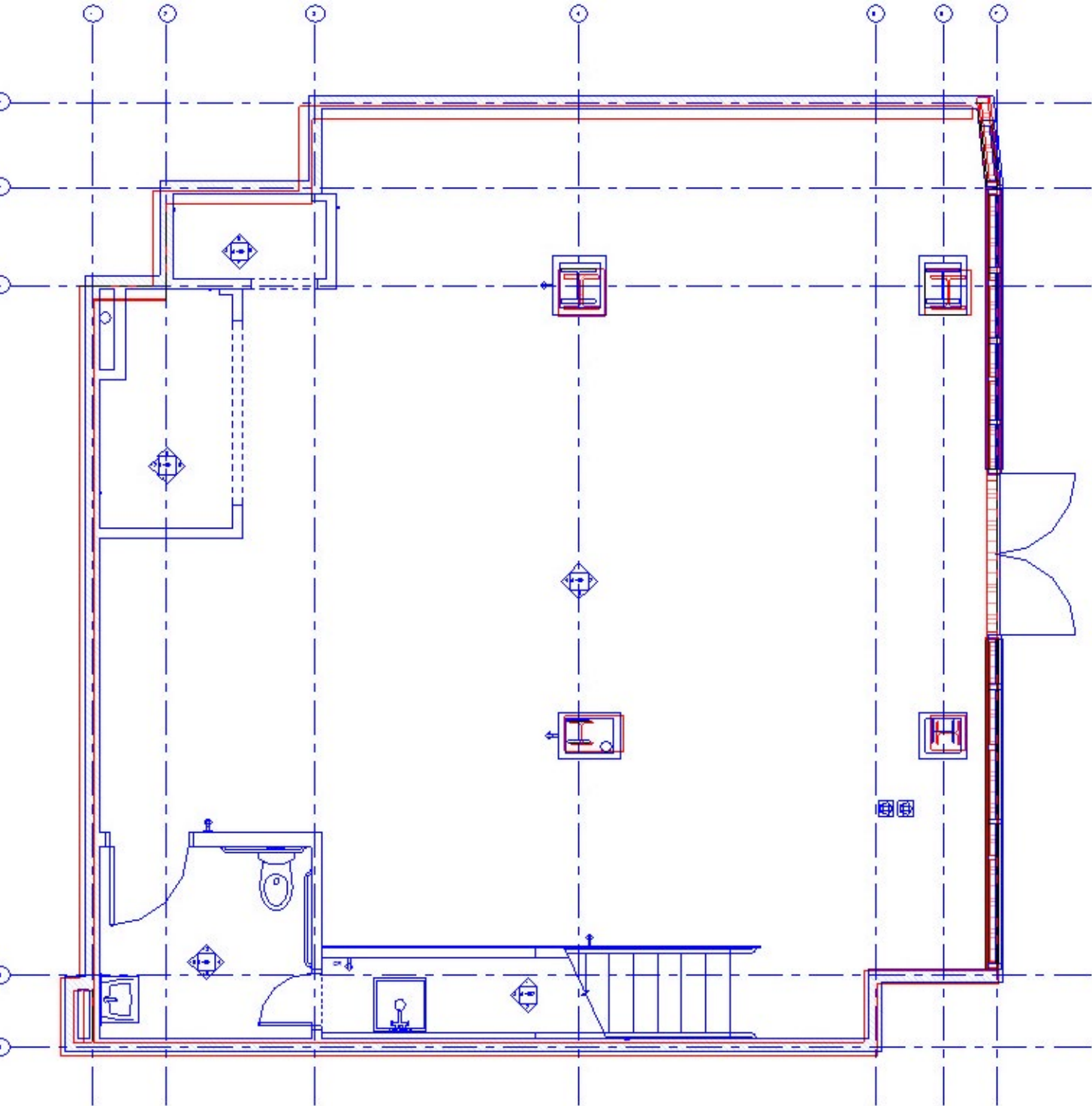
Project Browser - OutdoorVoices_klb52...

- Views (all)
- Legends
- Schedules/Quantities (all)
- Sheets (Discipline)
- Families
- Groups
- Revit Links



WHAT'S GOOD ABOUT IT?

ACCURATE



PERSUASIVE

MERGE

Kyle Barker <kyle@mergearchitects.com>

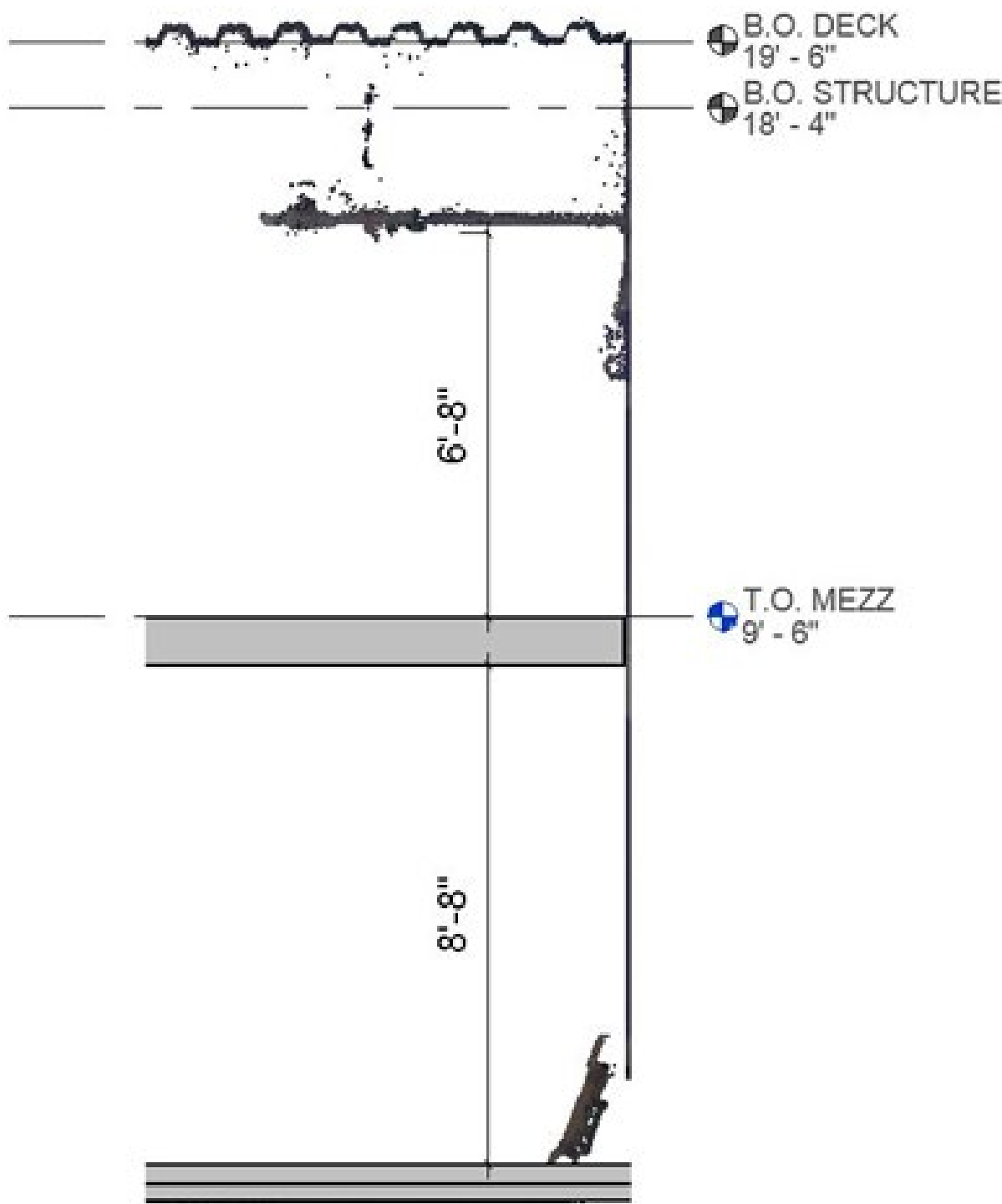
Boston_SD Deliverable

Kyle Barker <kyle@mergearchitects.com> Thu, Feb 22, 2018 at 1:11 PM
To: [REDACTED]
Cc: [REDACTED]

Hi All,

The screenshot below shows the pipes above the mezzanine (the top of the image is the back wall of the space). Unfortunately, they are further from the rear wall than we thought (there is approx 20" clear between the new wall of the mezzanine and the start of the pipes). All of them are 16'-3" AFF. Dave will have to follow up with the GC to determine the feasibility of moving them, but this may suggest that it's best to leave the mezzanine at 9'-6".

Best,
Kyle



PERSUASIVE

MERGE

Kyle Barker <kyle@mergearchitects.com>

Boston_SD Deliverable

Kyle Barker <kyle@mergearchitects.com>

Thu, Feb 22, 2018 at 1:11 PM

To:

Cc:

Hi All,

The screenshot below shows the pipes above the mezzanine (the top of the image is the back wall of the space). Unfortunately, they are further from the rear wall than we thought (there is approx 20" clear between the new wall of the mezzanine and the start of the pipes). All of them are 16'-3" AFF. Dave will have to follow up with the GC to determine the feasibility of moving them, but this may suggest that it's best to leave the mezzanine at 9'-6".

Best.

MERGE

Kyle Barker <kyle@mergearchitects.com>

Boston_SD Deliverable

Thu, Feb 22, 2018 at 4:50 PM

To:

Cc: Kyle Barker <kyle@mergearchitects.com>

Team,

Thanks for looking into this for us. We would like to put this to bed and move on, so we will keep the Mezzanine height at 9'-6" a.f.f..

Thanks again!

██████████

[REDACTED]
[REDACTED]
[REDACTED]



REASSURING

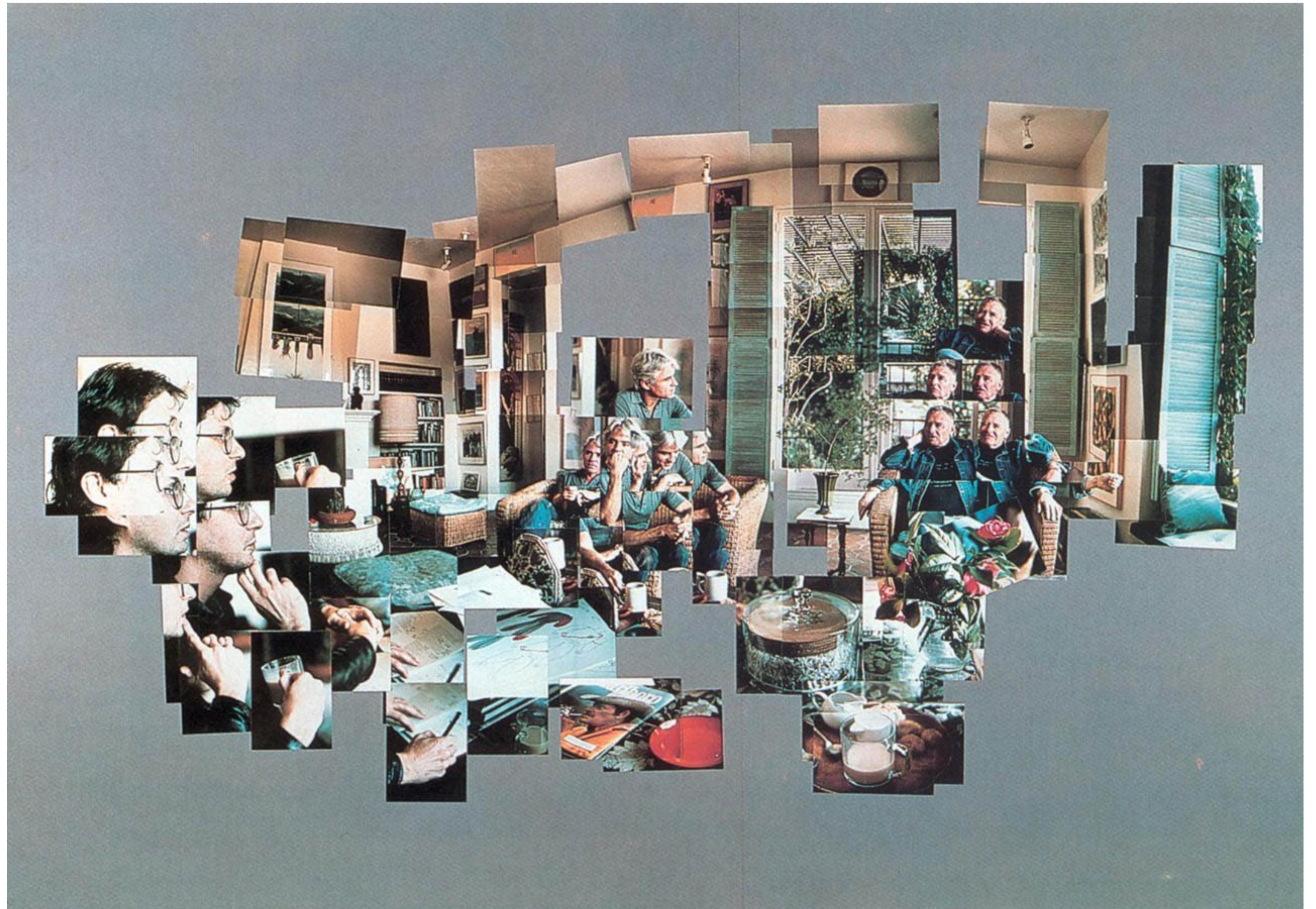


Rem Koolhaas / OMA, Venice Biennale 2014: Elements of Architecture

REASSURING



EASY



David Hockney, *Christopher Isherwood Talking to Bob Holman, Santa Monica (1983)*

WHAT'S NEXT?

NEW BUSINESS

 AIA® Document B101™ – 2007

Standard Form of Agreement Between Owner and Architect

AGREEMENT made as of the _____ day of _____
in the year _____
(In words, indicate day, month and year.)

BETWEEN the Architect's client identified as the Owner:
(Name, legal status, address and other information)

This document has important
legal consequences.
Consultation with an attorney is
encouraged with respect to its
completion or modification.

and the Architect:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

§ 5.4 The Owner shall furnish surveys to describe physical characteristics, legal limitations and utility locations for the site of the Project, and a written legal description of the site. The surveys and legal information shall include, as applicable, grades and lines of streets, alleys, pavements and adjoining property and structures; designated wetlands; adjacent drainage; rights-of-way, restrictions, easements, encroachments, zoning, deed restrictions, boundaries and contours of the site; locations, dimensions and necessary data with respect to existing buildings, other improvements and trees; and information concerning available utility services and lines, both public and private, above and below grade, including inverts and depths. All the information on the survey shall be referenced to a Project benchmark.

The Owner and Architect agree as follows.

NEW REPRESENTATION



NEW REPRESENTATION

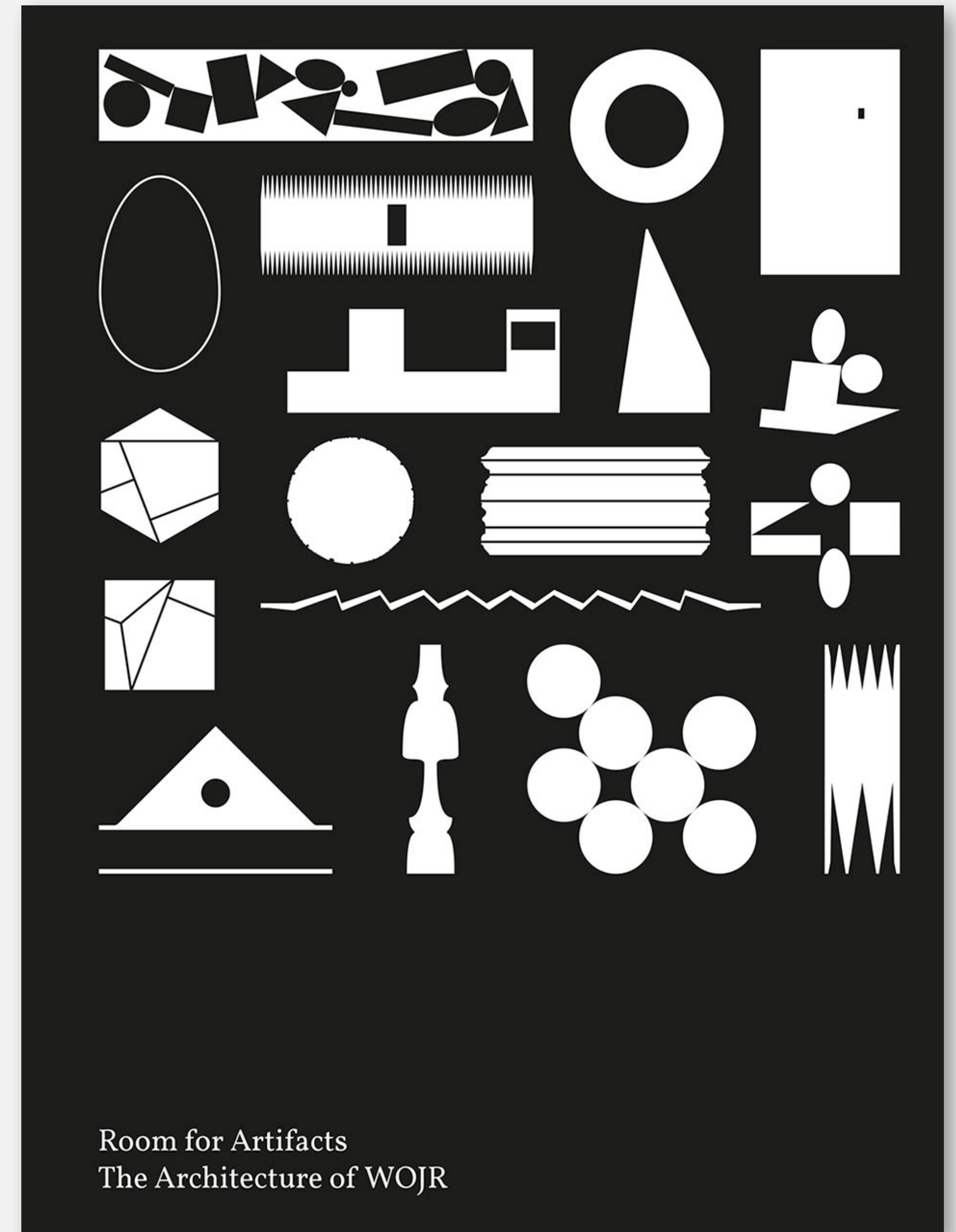


NEW REPRESENTATION



NEW REPRESENTATION

“[We draw] architecture as edges.
The edge is a mode of description
that privileges a given condition’s
formal and material order...the
edge prompts decisiveness in a
way that other modes do not.”



NEW REPRESENTATION



Daniel Castor, *Jellyfish Tempietto*

NEW REPRESENTATION



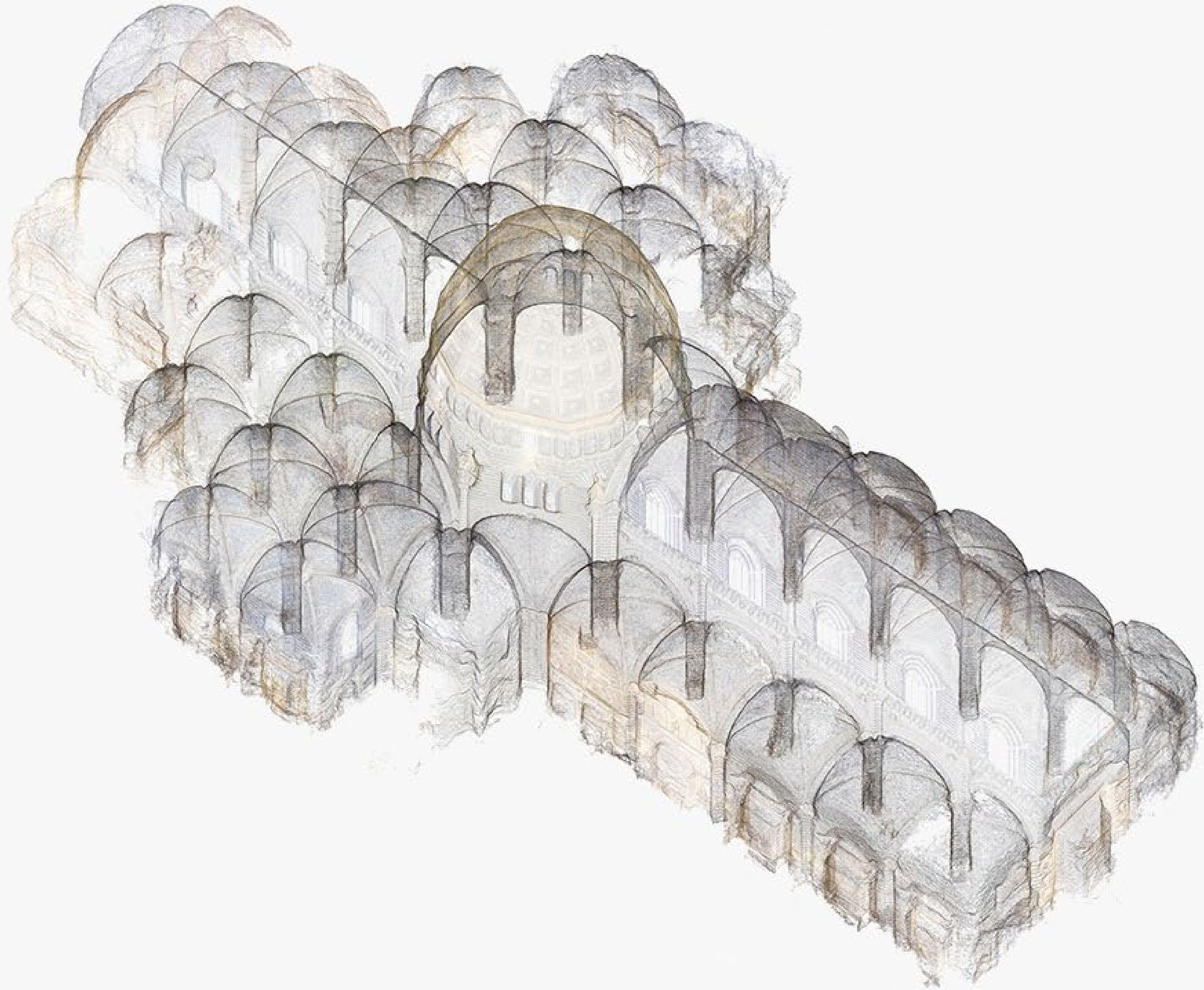
Yasmin Vobis / ULTRAMODERNE, *Color Space*

NEW REPRESENTATION



Yasmin Vobis / ULTRAMODERNE, *Color Space*

NEW REPRESENTATION



Yasmin Vobis / ULTRAMODERNE, *Color Space*

NEW REPRESENTATION



Brett Beyer, *Aerial Interior*

NEW REPRESENTATION



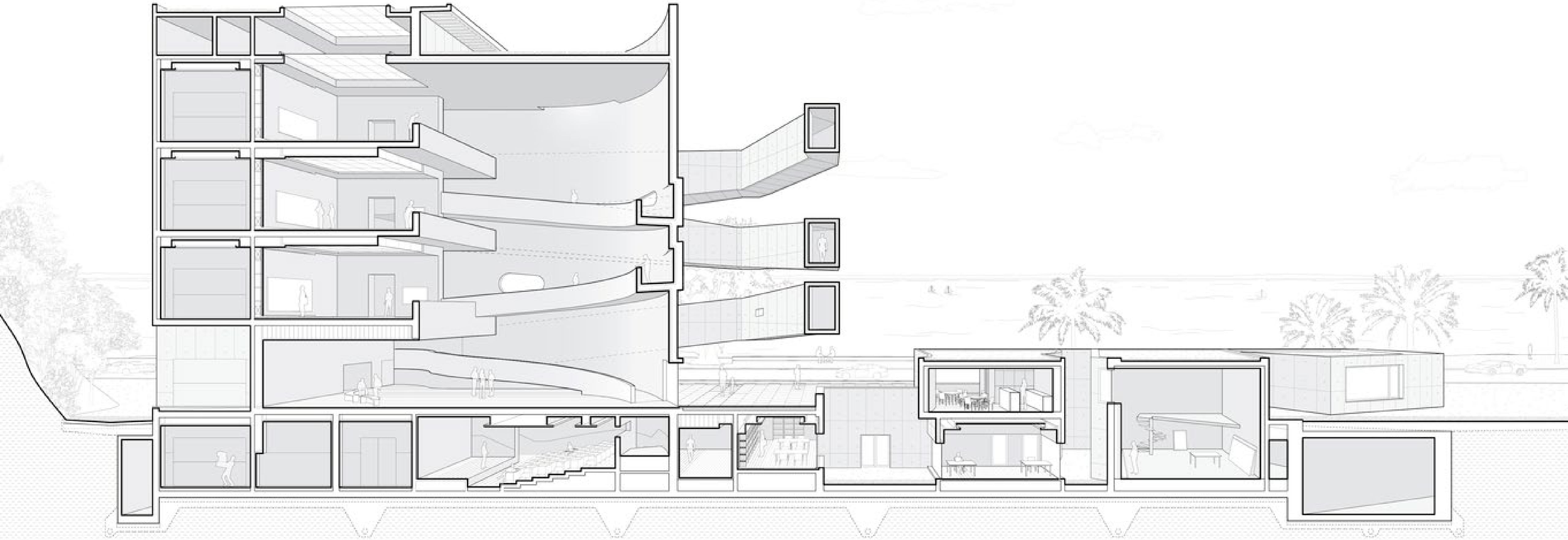
Brett Beyer, *Aerial Interior*

NEW REPRESENTATION

Brett Beyer, *Aerial Interior*



NEW REPRESENTATION



Lewis.Tsurumaki.Lewis, Drawing of Alvaro Siza's Fundação Iberê Camargo from *Manual of Section*

NEW REPRESENTATION



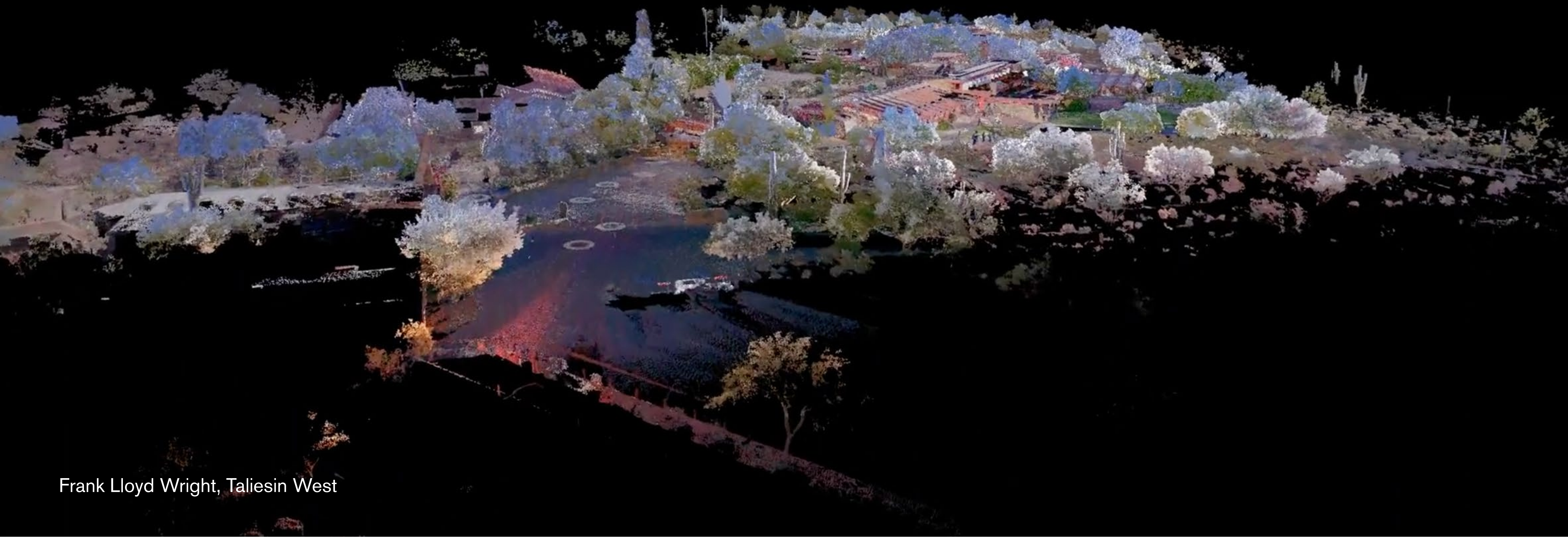
Atelier Bow Wow, Studio / House from *Graphic Anatomy*

NEW REALITY



Frank Lloyd Wright, Taliesin West

NEW REALITY



Frank Lloyd Wright, Taliesin West

NEW REALITY



Frank Lloyd Wright, Taliesin West

NEW REALITY

Louis Kahn, National Assembly Building of Bangladesh



NEW REALITY



Appolodorus of Damascus, Pantheon

NEW REALITY: MY PARTIAL WISH LIST

514NE Architects	BIG	Frank Lloyd Wright	Jorn Utzon	NP2F Architectes	Sergison Bates
6a Architects	Buckminster Fuller	Frei Otto	Kengo Kuma	Norman Foster	Shigeru Ban
Aarhov Frick	Buchner Brundler	Giancarlo de Carlo	Kenzo Tange	Office KGDVS	Sigurd Lewerentz
Abalos & Herreros	Carlo Scarpa	Gigon Guyer	Kevin Roche	OMA / Rem Koolhaas	Site Specific
Adolf Loos	Caruso St. John	Go Hasegawa	Lacaton & Vassal	Oscar Niemeyer	SITE / James Wines
Ai Weiwei	Charles & Ray Eames	Gordon Bunshaft	Le Corbusier	Otto Wagner	Smiljan Radic
Aires Mateus	Chevalier Morales	Grafton Architects	Leong Leong	Paul Rudolph	Snohetta
Alberto Kalach	Christ & Gantenbein	Harry Weese	Lina Bo Bardi	Paulo Mendes De Rocha	SO-IL
Aldo Rossi	Christian Kerez	Heneghan Peng	Lorcan O’Herlihy	Pascal Flammer	Sou Fujimoto
Aldo Van Eyck	Daniel Burnham	Henri Labrouste	Louis Kahn	Peter Eisenman	Steven Holl
Alejandro Aravena	David Chipperfield	Henry Cobb	Louis Sullivan	Peter Markli	Studio Gang
Alison & Peter Smithson	Donald Judd	Herman Hertzberger	Luis Barragan	Peter Zumthor	Sverre Fehn
Allied Works	DS+R	Herzog & De Meuron	MAIO	Pezo Von Ellrichshausen	TAC / Walter Gropius
Alvar Aalto	Eduardo Souto de Moura	H.H. Richardson	Mansilla+Tuñón	Philip Johnson	Tadao Ando
Alvaro Siza	Edward Durell Stone	HHF Architects	Marcel Breuer	PRODUCTORA	Taller Hector Barroso
Amid.Cero9	Edward Larrabee Barns	Hugh Stubbins	Mario Botta	Rafael Moneo	Tatiana Bilbao
Andrea Palladio	Eero Saarinen	I.M. Pei	Mecanoo	RCR Architectes	Thomas Phifer
Antoni Gaudi	Eliel Saarinen	James Stirling	Michelangelo	REX	Toyo Ito
Assemble	Emilio Abasaz	JAJA Architects	Mies Van der Rohe	Rob Kennon	Valerio Olgiati
Balkrishna Doshi	Ensamble	Jean Nouvel	Minoru Yamasaki	Ricardo Bofill	Venturi & Scott Brown
Barkow Leibinger	Erik Gunnar Asplund	Jean Prouve	MOS Architects	Richard Neutra	Wallace Harrison
Barozzi Veiga	Fala Atelier	John Pawson	Moshe Safdie	Richard Rogers	Walter Netsch
Baumschlager Eberle	Felix Candela	John Hejduk	NADAAA	SANAA	Wiel Arets
Ben Waechter	Food New York	John Portman	Neri & Hu	Sean Godsell	Xaveer De Geyter
Bernard Tschumi	Francesco Borromini	Junya Ishigami	Neutelings Riedijk	Selgascano	Zaha Hadid





NEW WORKFLOW



Minority Report (2002)



BUILDING 2019
INNOVATION

National Institute of
BUILDING SCIENCES

CONFERENCE & EXPO

Add Lasers to your Workflow!

An Intro to Point Clouds

Kyle Barker, AIA NCARB

Associate at MERGE Architects (Boston, MA)