LCC for BIM User Manual - v1.0.15

1 LCC for BIM Description

💡 **LixelCyberColor (LCC) Studio employs a photorealistic 3D rendering method based on 3D Gaussian Splatting (3DGS) technology. LCC models offer superior visual quality with efficient processing, proving to be a popular choice by professionals over mesh and photogrammetry methods.**

🥖 **LCC for BIM** is a BIM modeling tool powered by **3DGS (3D Gaussian Splatting)** technology that connects Revit with LCC (Lixel CyberColor) models, which combine LiDAR and visual data to create detailed 3D scenes. The software enables efficient reverse modeling through real-time synchronization, AI-assisted modeling tools, and semantic point cloud overlay for precise BIM creation.

Spatial Recognition (Only supported when using the LCC Revit Plugin)

Key Features:

1. **LCC-Revit Real-Time Integration**
   - Links Revit and LCC Viewer for instant BIM model updates.
2. **AI Modeling**
   - Creates levels, walls, doors, and windows quickly using three methods:
     - **Draw** by selecting points in 3DGS models
     - Fine-tune using **Canvas**
     - **One-Click Modeling** with AI, where components will be automatically identified in LCC during reconstruction, and seamlessly carried over to Revit.
3. **Issue Tracking**

a. Supports the synchronization between Revit and the camera in LCC viewer, enabling you to quickly identify and locate issues during modeling.

4. **Point Cloud Overlay**
    - Overlays semantic point cloud data with BIM models for precise detail editing in a selected area.

2 Version and Copyright Notice

2.1 Version Description

Software Version:Lixel CyberColor for Revit V1.0.15

Supported Revit Versions: 2025

Version Release Date: May 20, 2025

This manual covers LCC for BIM V1.0.15 version. Other versions may have different features and operations. Please check your software version before use.

2.2 Trademark Information

Lixel ®, XGRIDS Lixel ®, Lixel CyberColor ™, Lixel ® ™ are registered trademarks of Shenzhen XGRIDS Innovation Technology Co., Ltd. Other trade names, company names and brand names mentioned in this document may be the trademark property of their holders.

2.3 Copyright Notice

Thank you for using LCC for BIM. We offer modeling and drawing functions based on LCC 3DGS models created using Lixel devices. We welcome any comments and suggestions on the improvement of our software, training and documentation. If you have any inquiries, please contact your authorized XGRIDS distributor or email us at enterprise@xgrids.com

The copyright of the LCC for BIM product manual is owned by Shenzhen XGRIDS Innovation Technology Co., Ltd. The dissemination of this document must comply with the terms of the LCC Studio User Licensing Agreement. Shenzhen XGRIDS Innovation Technology Co., Ltd. reserves the right of final interpretation rights and may modify content without notice.

Copyright © XGRIDS Technology Co., Ltd

Document updated: May 20, 2025

3 Software Installation

3.1 Installation Package Download

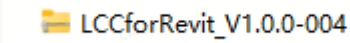
Get the software installation package from your sales representative, authorized agent, or the Autodesk official marketplace.

3.2 Recommended Installation Environment

- **Operating System:** Windows 10 /11 Professional or Home Edition
- **Hardware Requirements:**
  - **CPU: No strict minimum requirement. Recommended level (2017 or newer):**
    - Intel i7 8700K or better
    - AMD R7 1700X or better
  - **GPU**: Based on VRAM needs, recommended cards include:
    - Server: V100 (16GB VRAM), A10 (24GB VRAM), A100 (48GB VRAM)
    - Desktop: 2080Ti (11GB VRAM), 3060 (12GB VRAM), 4080 (16GB VRAM), 3090 (24GB VRAM), 4090 (24GB VRAM)
    - Laptop: 3080Ti (16GB VRAM), 4080Ti (16GB VRAM)
  - **Recommended Setup:**
    - CPU: Intel i7 8700K
    - GPU: Graphics card 3070 or better
    - Memory: 64GB

3.3 Installation

1. LCC for BIM comes as an exe file for easy installation as a plugin.
2. Double-click the file to start automatic installation.



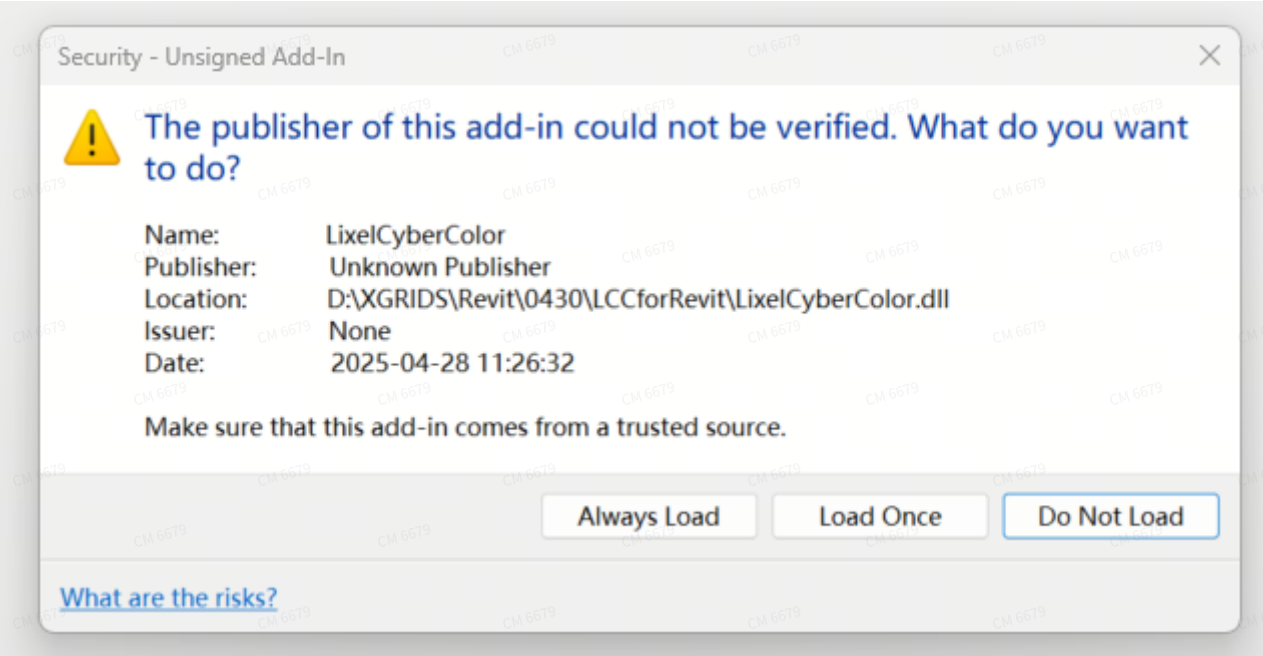
Plugin

LCC2RCP	2024/12/11 16:11	文件夹	
UI	2024/12/11 16:11	文件夹	
Viewer	2024/12/11 16:11	文件夹	
lcc.log	2024/12/11 17:54	文本文档	196 KB
LixelCyberColor.dll	2024/12/11 16:11	应用程序扩展	229 KB
RevitAPI.dll	2024/12/11 16:11	应用程序扩展	33,155 KB
RevitAPIUI.dll	2024/12/11 16:11	应用程序扩展	2,830 KB
XGrids.LCC.addin	2024/12/11 16:11	ADDIN 文件	1 KB

Directory

After installation:

1. **Launch Revit**
   - LaunchRevit. If asked "The publisher of this add-in could not be verified. What do you want to do?", select "Always Load".



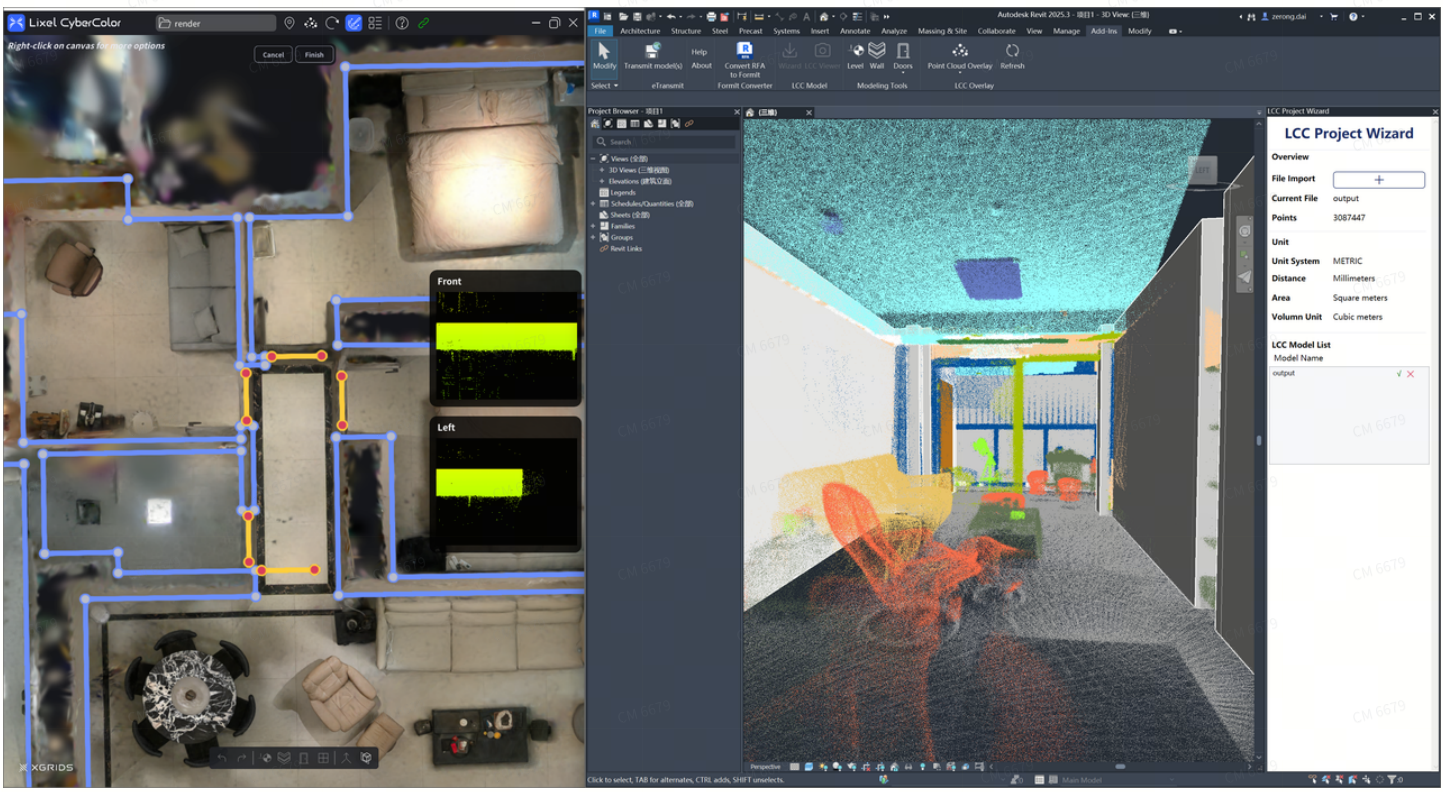
2. **Installation Complete**

- The plugin is now installed and ready to use.

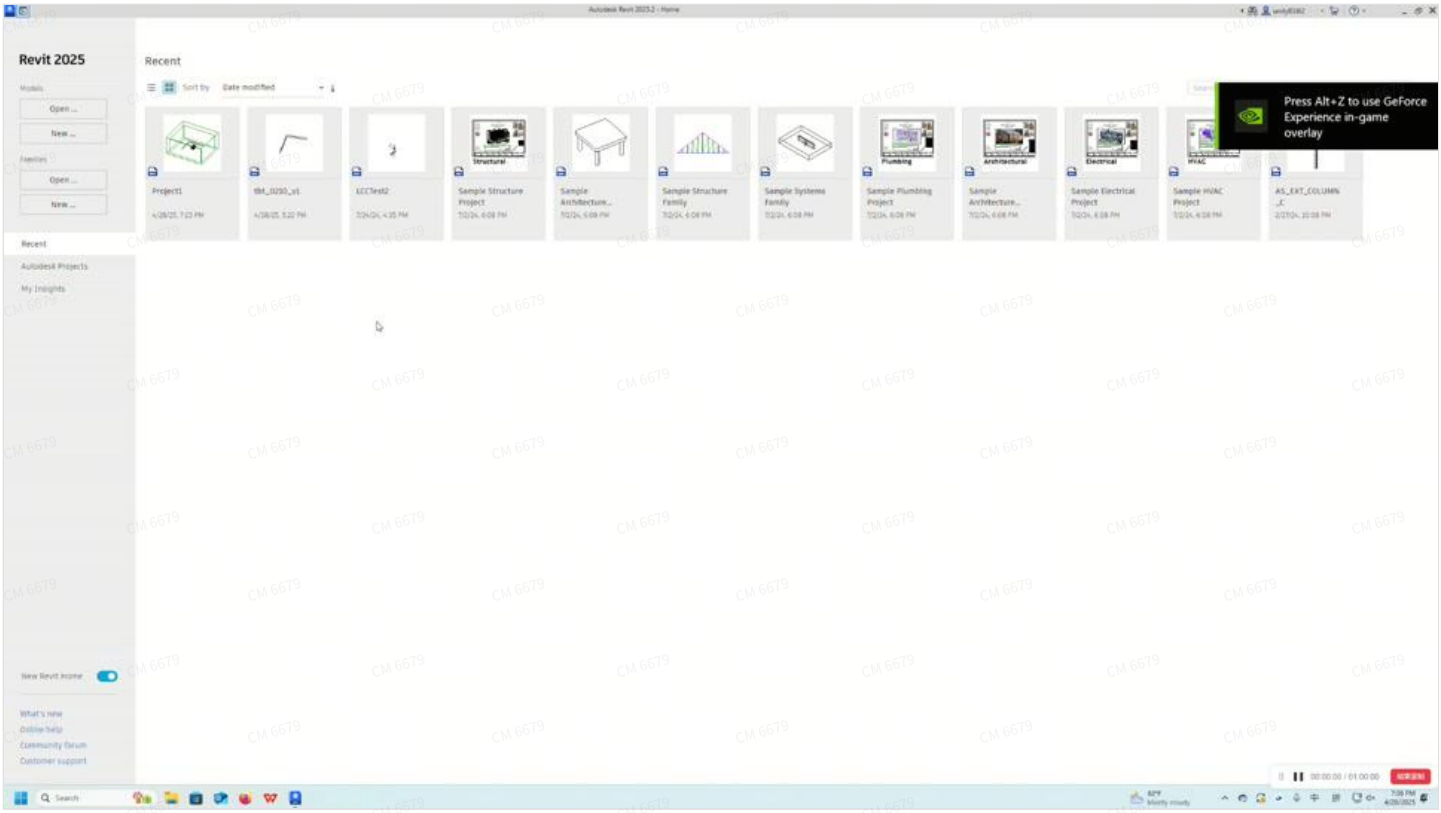
4. Features Overview

4.1 Modules and Function Overview

Module	Description
LCC Model	Core entry point for importing, managing, and viewing LCC models in Revit.
Modeling Tools	Create BIM components (levels, walls, doors, windows) quickly using AI-assisted tools, simplifying BIM processes.
LCC Overlay	View LCC semantic point clouds on top of existing BIM models for precise comparison and modeling.
Support	Access user manuals and forums for help using the software.
View Switching	Toggle between 3DGS model view and point cloud view in LCC Viewer
Sync	Match views between Revit and LCC viewer camera to spot modeling issues quickly
Filter	Control which layers and elements are visible in both LCC and BIM models.



4.2 Demonstration Videos



5 Feature Description

5.1 LCC Model

The **LCC Model** module The LCC Model module connects Revit and LCC models efficiently. It helps you import, manage, and view models for BIM reverse modeling.

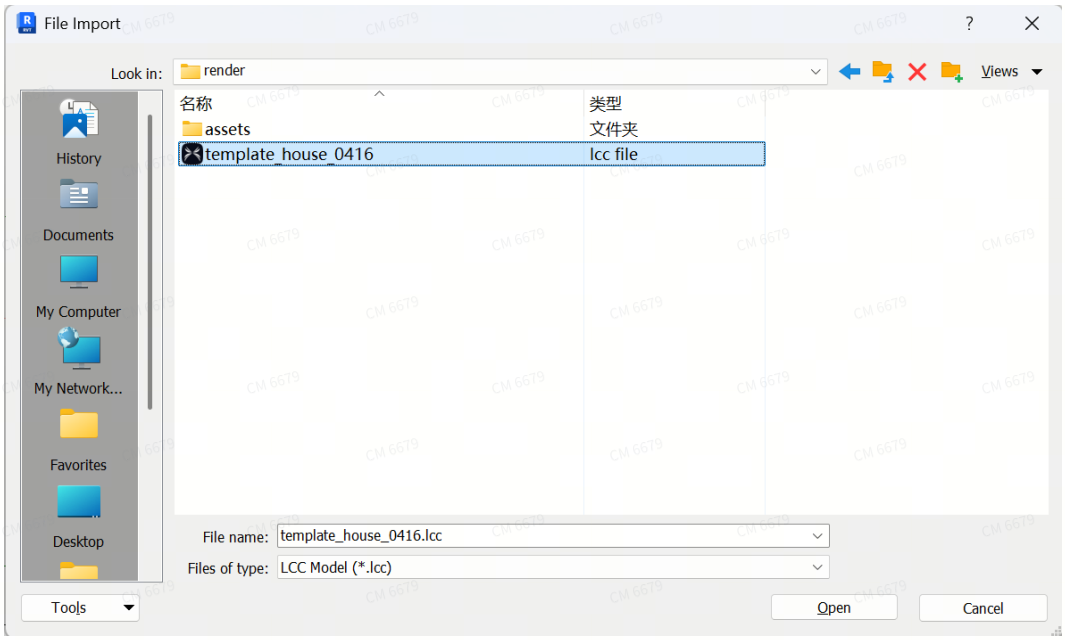
5.1.1 LCC Project Wizard

The **LCC Project Wizard** helps you import and manage LCC models:

1. **Launch Wizard**
   - Go to the top menu bar in Revit
   - Click the LCC Model tab
   - Click [Wizard]
   - The wizard appears in the right panel
2. **Load LCC Model Files**
   - Click the **+** button to open the "Select File" dialog and load an LCC model file (e.g., `meta.lcc`).



LCC project wizard



Select *.lcc file

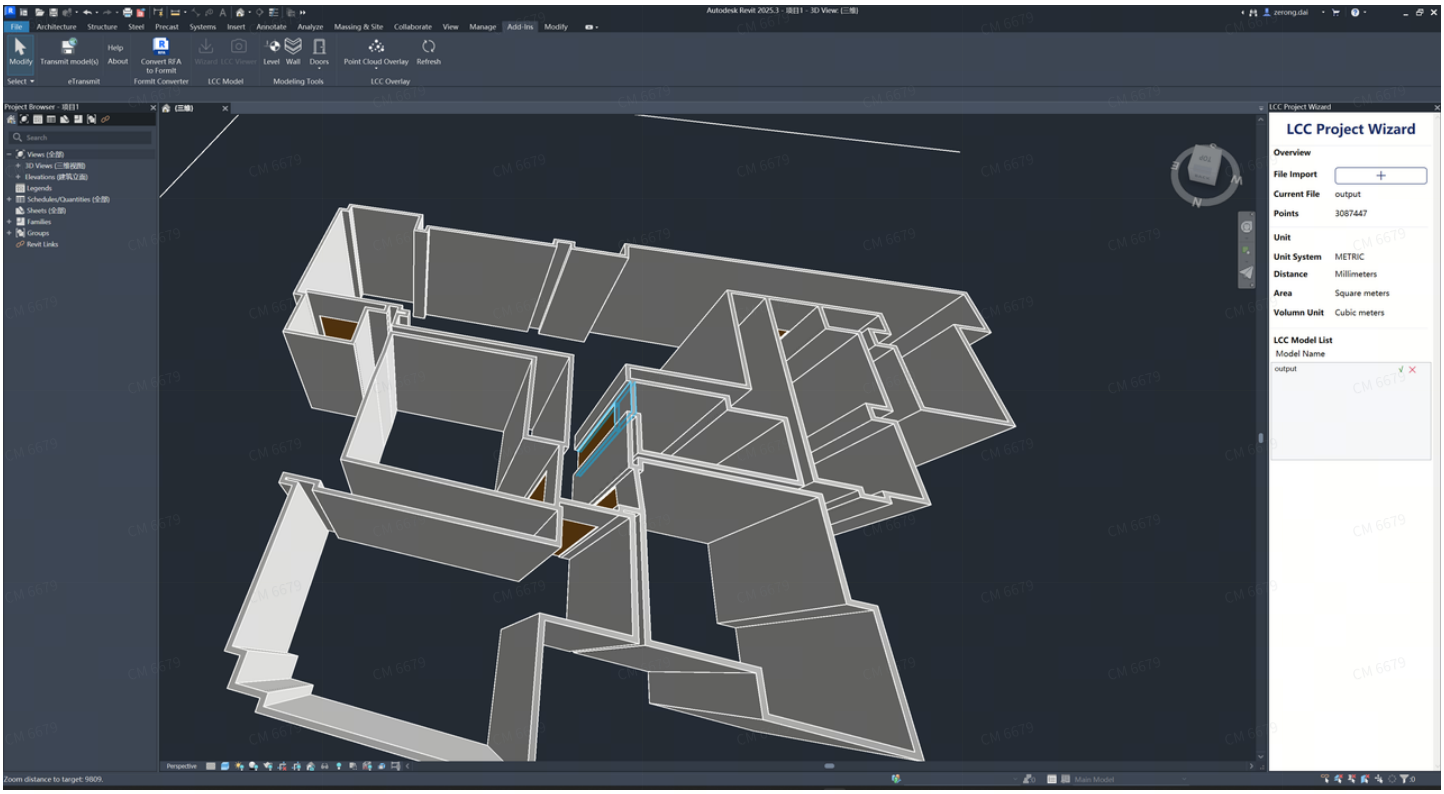
3. View File Information

After loading, you'll see:

- **File Preview**: Recent file path, file name, and the number of points.
- **Unit**: Measurement unit (matches your Revit project)
- **LCC Model File List**: Shows loaded models and their status(currently, only the most recent LCC model file is displayed).

4. Manage LCC Model Files

- Select a file in the **LCC Model File List** to see options.
- **Remove** or **Reload** as needed.
- Check status indicators (loading, successful, failed)



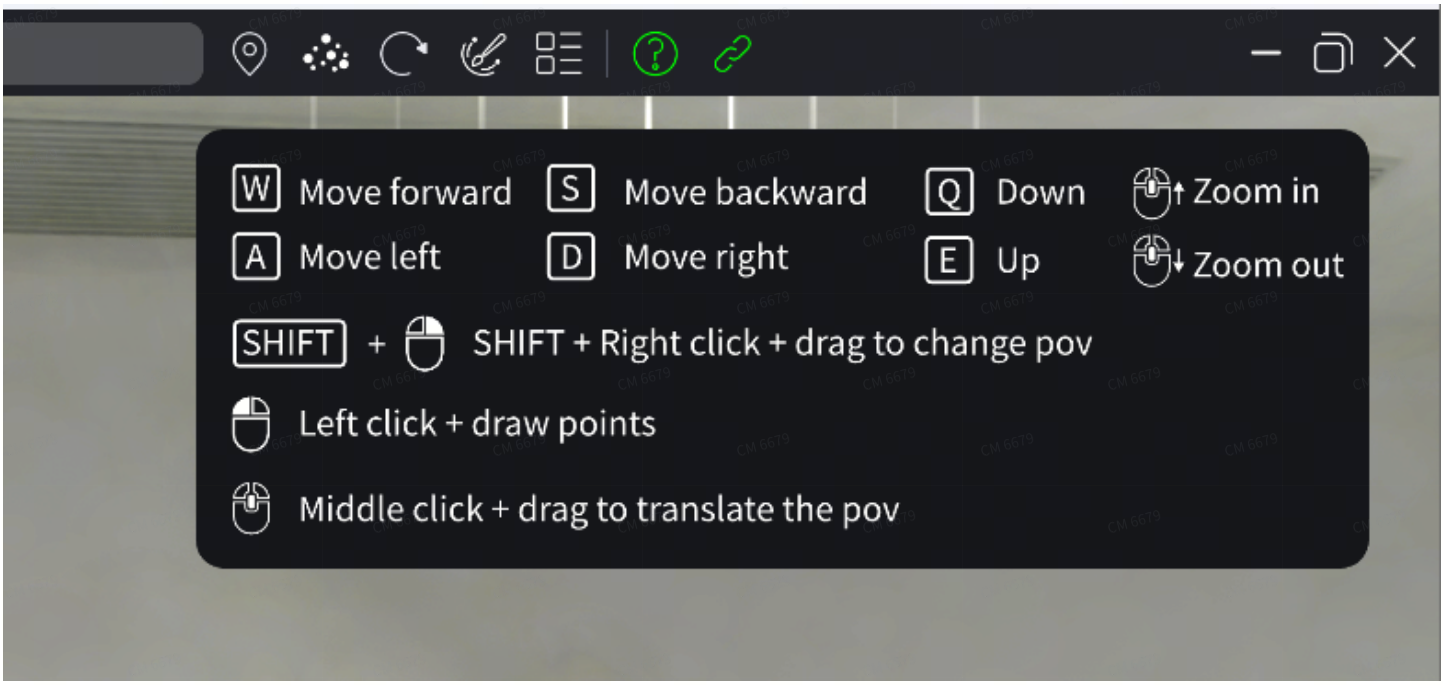
5.1.2 LCC Viewer

LCC Viewer displays LCC models and syncs with Revit in real-time:

1. **Auto Pop-up**
   - LCC Viewer opens automatically after loading an LCC model
   - The [Viewer] button turns active.
2. **Connection Status**
   - Look for **[Connected]** in green at the top of LCC Viewer
   - If disconnected, it shows **[Disconnected]** and will try to reconnect
3. **Synchronization Between LCC Model and BIM Model**
   - Click **[Sync]** to show Revit models in LCC Viewer
   - Works both ways:
     - Revit to LCC: Update models in Revit, then click **[Sync]**
     - LCC to Revit: Adjust model in LCC Viewer, then click **[Sync]**

4. **Immersive Navigation Controls**
   - Hover over [Guide] to see these controls:
     - **W / A / S / D:** Move forward, left, backward, or right
     - **Q / E**: Move up or down

- **Mouse wheel:** Scroll up to zoom in, scroll down to zoom out
- **Left click:Draw points** (only when **[Draw]** mode is active)
- **Middle click + drag: Pan view**
- **SHIFT + left mouse: Rotate view**



Navigation controls

5.2 Modeling Tools

The Modeling Tools help you create BIM elements: (levels, walls, doors, windows) quickly from LCC models. You can use three methods:

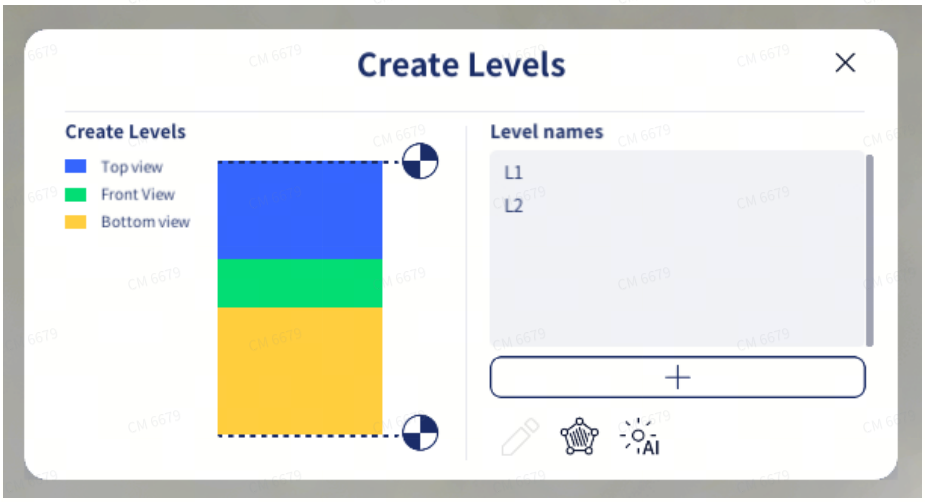
1. **Draw:** Pick specific points in the 3D space
2. **Canvas:** Adjust elements using multiple views
3. **One-click Modeling:** Use Spatial Recognition results for automatic creation

5.2.1 Creating Levels

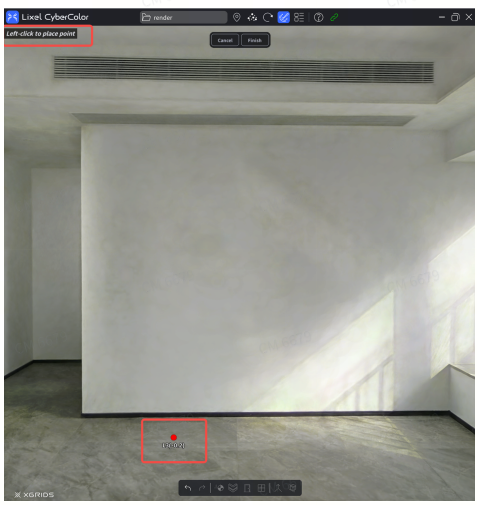
5.2.1.1 Draw

1. **Check Connection**
   - Ensure **[Connected]** shows in green in LCC Viewer
2. **Launch Level Tool**
   - In Revit's 3D view, click **[Modeling Tools]** in the top toolbar
   - Click **[Level]**
   - The **[Create Level]** window appears

3. **Create Top Level**
    - Click [+] in [**Level Name**]
    - Type **"Top"**
    - Go to LCC Viewer
    - Navigate to the ceiling
    - Click [**Draw**]
    - Click on the ceiling (point turns green)
    - Return to Revit
    - Click [**Finish**] (point turns red and level appears)
4. **Create Bottom Level**
    - Click [+] in [**Level Name**] again
    - Type "Bottom"
    - In LCC Viewer, click [**Draw**]
    - Click on the floor
    - Return to Revit
    - Click [**Finish**]



Popup for creating levels

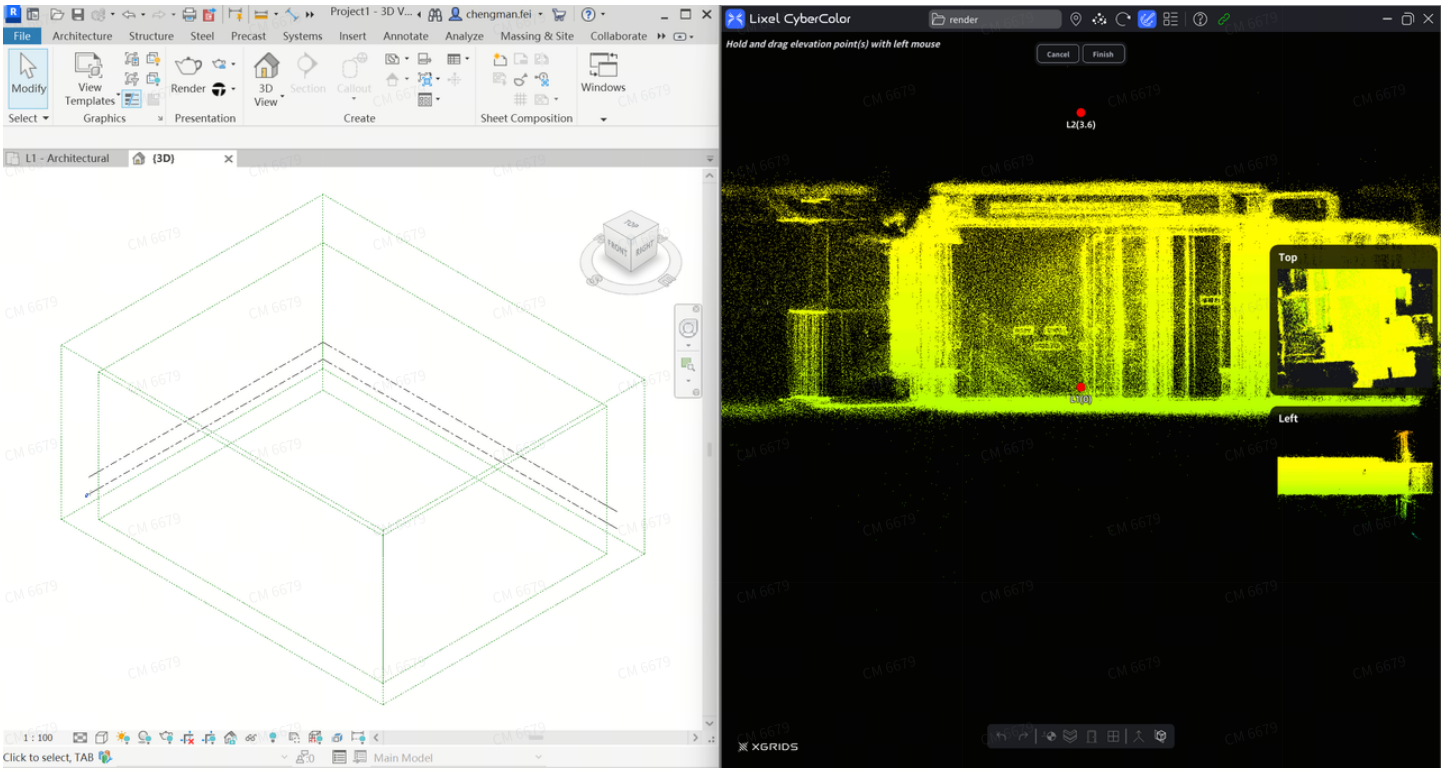


Draw level points

5.2.1.2 Canvas

To adjust AI-created levels:

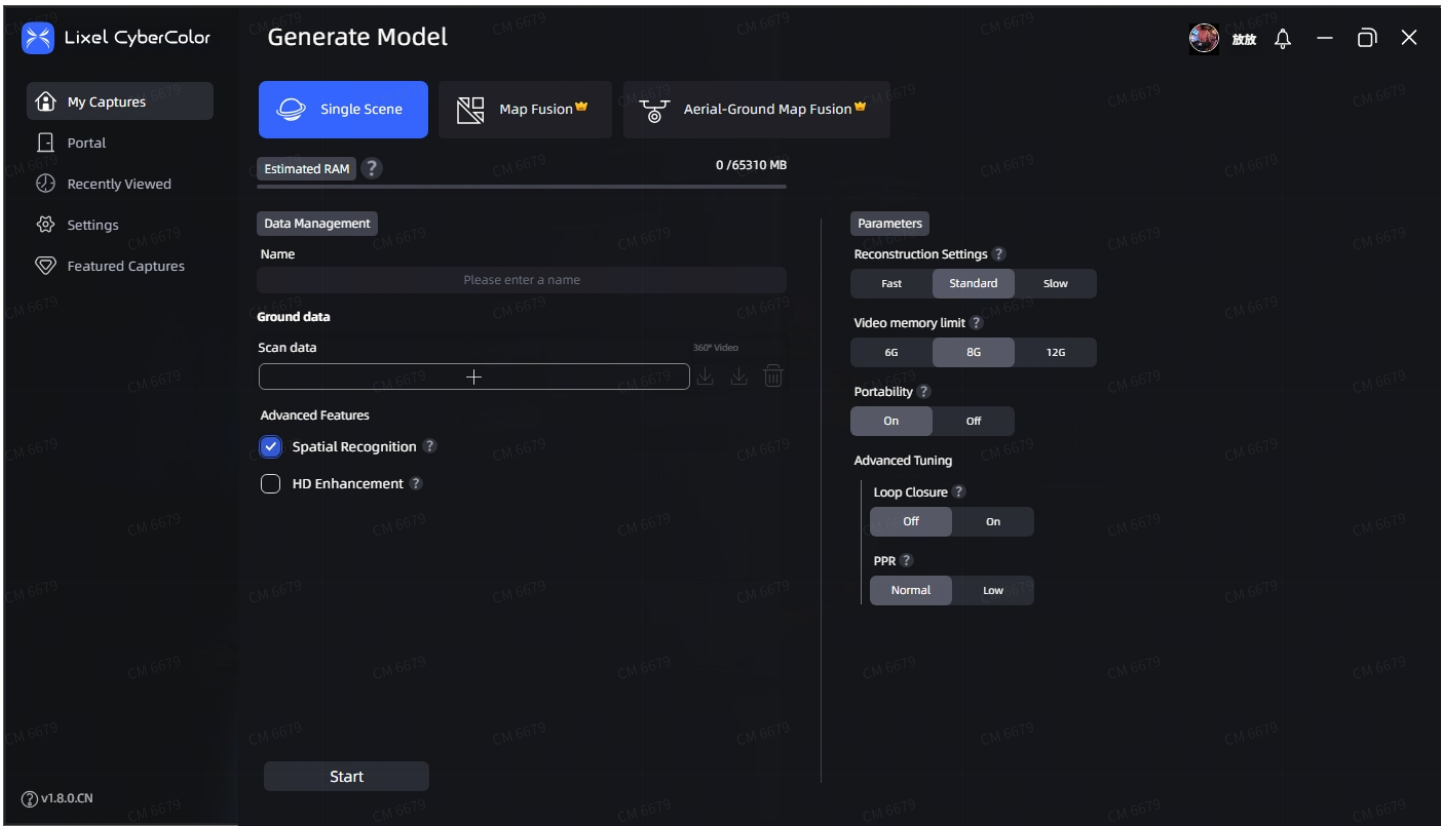
1. Make sure Revit is not in edit mode
2. Click [**Canvas**]
3. View the LCC point cloud from multiple angles
4. Drag level points in the side view to match actual levels



5.2.1.3 One-Click Modeling

Use Spatial Recognition to create levels automatically:

1. When toggled on in LCC Studio, Spatial Recognition analyzes indoor scans to find floors and ceilings
2. It adds semantic data to the LCC model
3. When enabled, levels are pre-identified during reconstruction
4. Click the One-Click option in the Revit plugin to create levels instantly in the correct positions



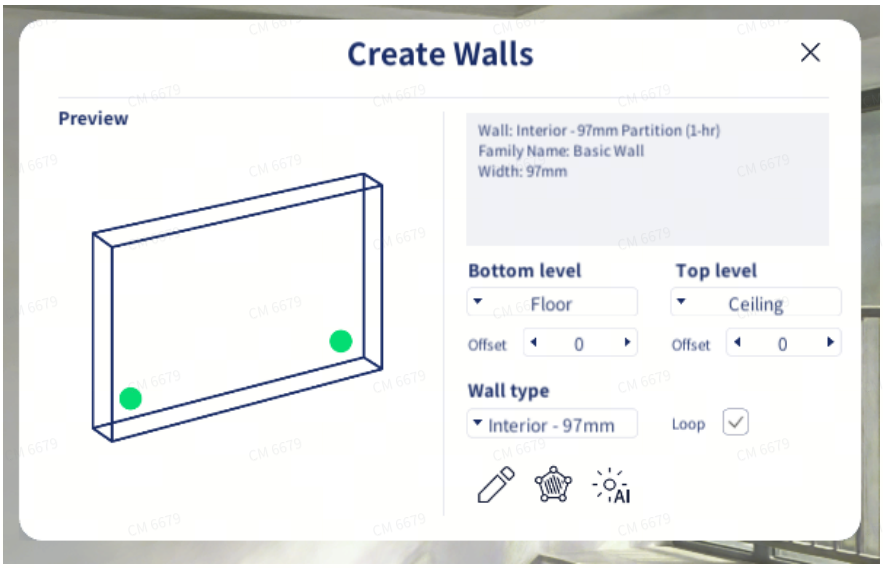
Spatial Recognition in LCC Studio

5.2.2 Creating Walls

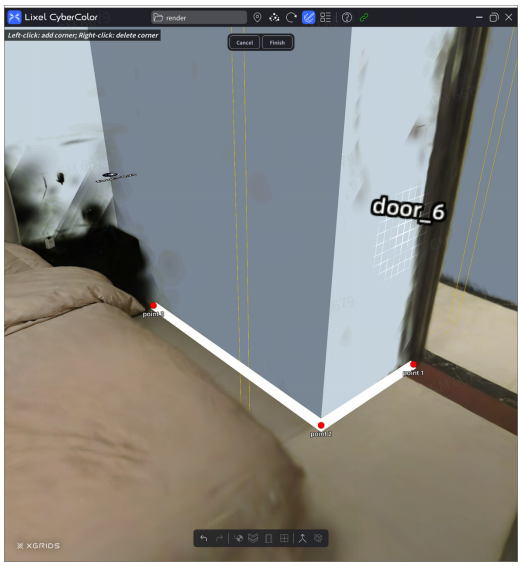
5.2.2.1 Draw

Create walls by defining their boundaries:

1. Launch Wall Tool
    - In Revit's 3D view, click **[Modeling Tools]**
    - Click **[Wall]**
    - The **[Create Wall]** window opens
2. Set Parameters
    - Select "Bottom" and "Top" levels
    - Choose a wall type from the dropdown menu
3. Draw Wall
    - In LCC Viewer, click **[Draw]**
    - Click turning points along the wall path (points turn green)
    - Return to Revit
    - Click **[Finish]** to create the wall (points turn red)



Popup for creating walls



Draw turning points

5.2.2.2 Canvas

1. **Access Canvas**

- Click **[Canvas]** in Revit (when not in edit mode)
- This opens LCC point cloud with multiple views

2. **Edit Wall Segments**

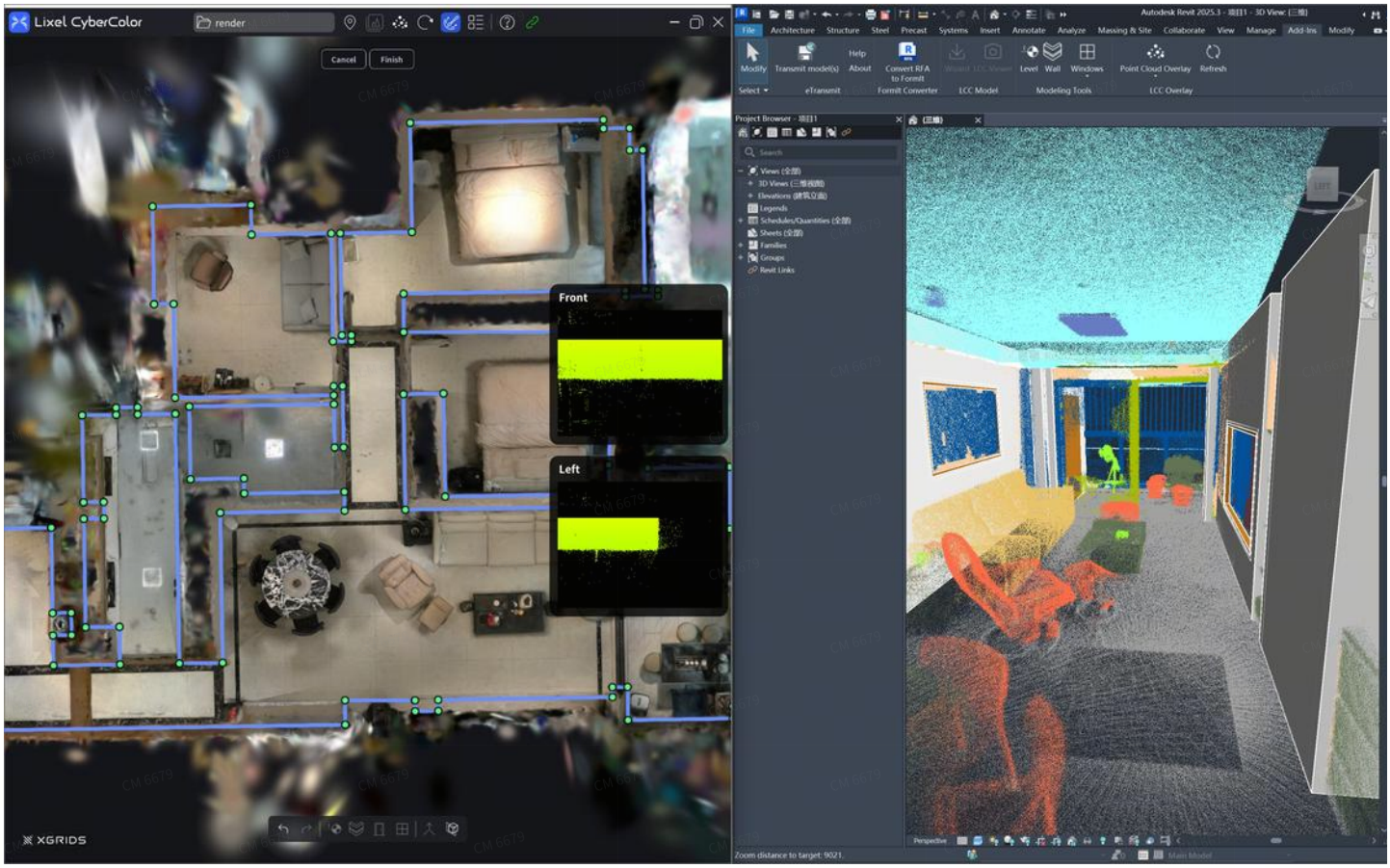
- Hover over any wall segment and right-click
- Options in the popup menu:
  - **Insert Node**: Add control point, then drag to adjust
  - **Delete Node**: Remove unnecessary points
  - **Exit Editing**: Save changes and return

3. **Wall Simplification**

- Fixes AI-generated walls with problems (double lines, jagged edges)
- Automatically creates clean, continuous wall lines for interior design

4. **Wall Slicing**

- Use for walls that don't match actual heights (sloped roofs, stepped ceilings)
- In side view, crop wall tops or bottoms for precise 3D matching



5.2.2.3 One-Click Modeling

Use Spatial Recognition to create walls automatically:

1. Spatial Recognition uses AI to identify wall positions within LCC during reconstruction
2. In Revit, use one-click creation to make walls
3. Choose wall types (interior/exterior, thickness)

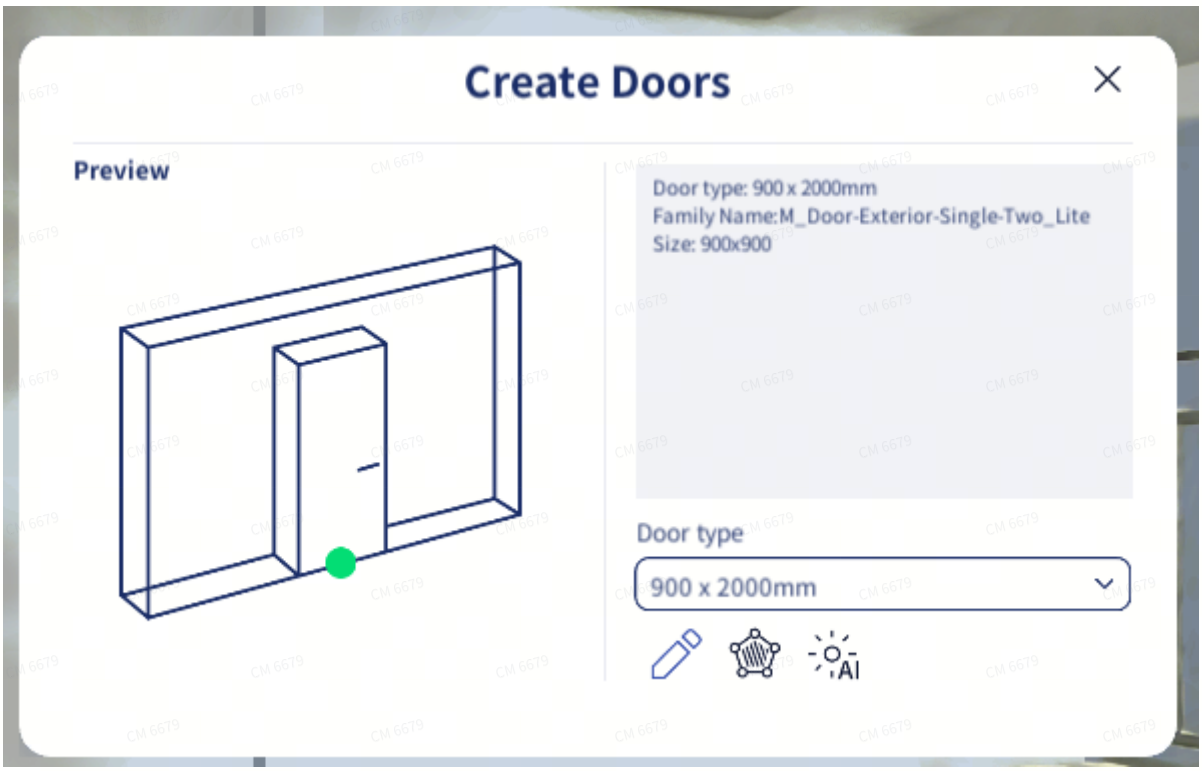
5.2.3 Creating Doors

5.2.3.1 Draw

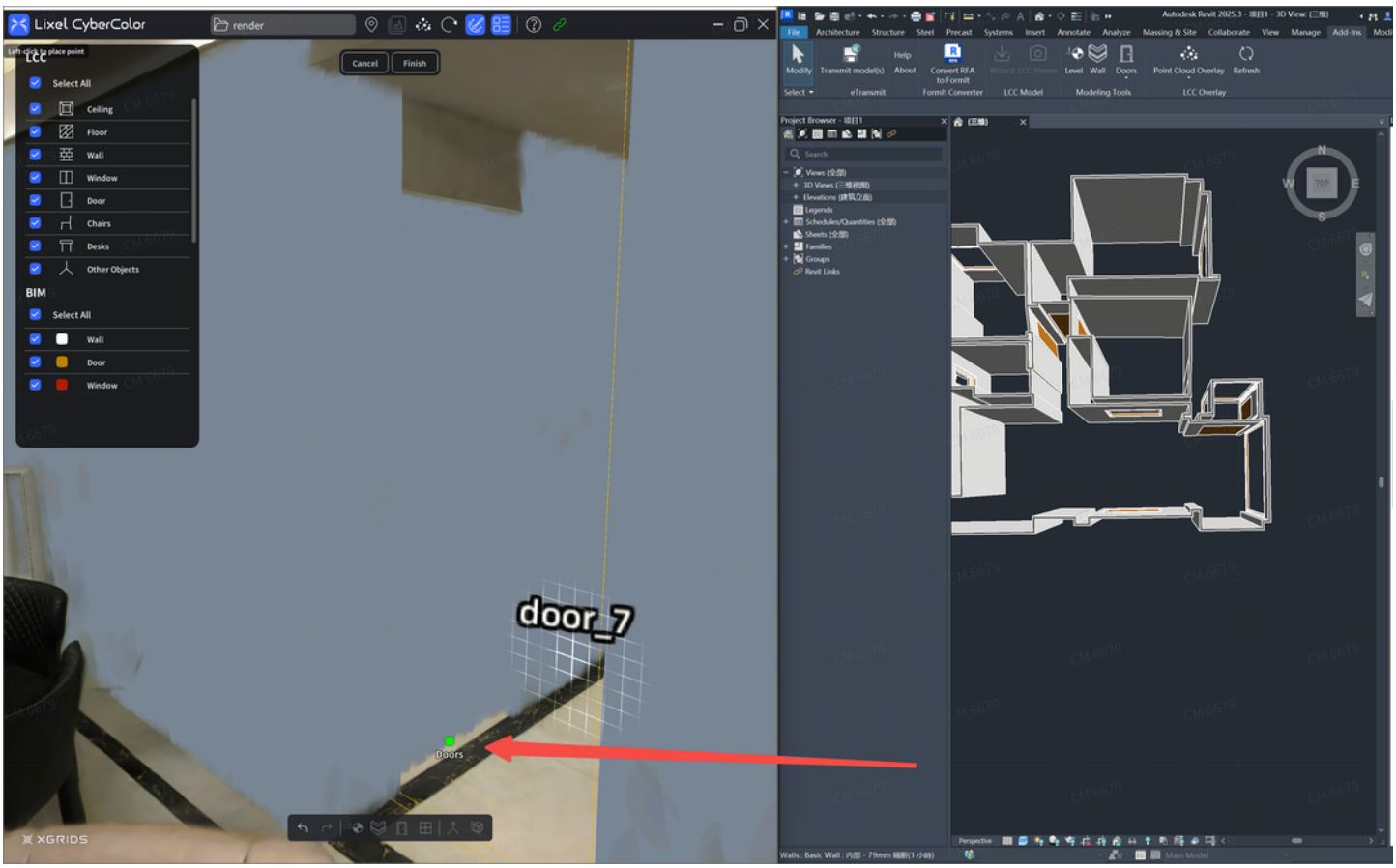
Create doors by selecting their location:

1. Launch Door Tool
   - In Revit's 3D view, click [**Modeling Tools**]
   - Click [**Door**]
   - The [**Create Door**] window opens
2. Choose Door Type
   - Select from the [**Door Type**] dropdown
3. Place Door
   - In LCC Viewer, click [**Draw**]

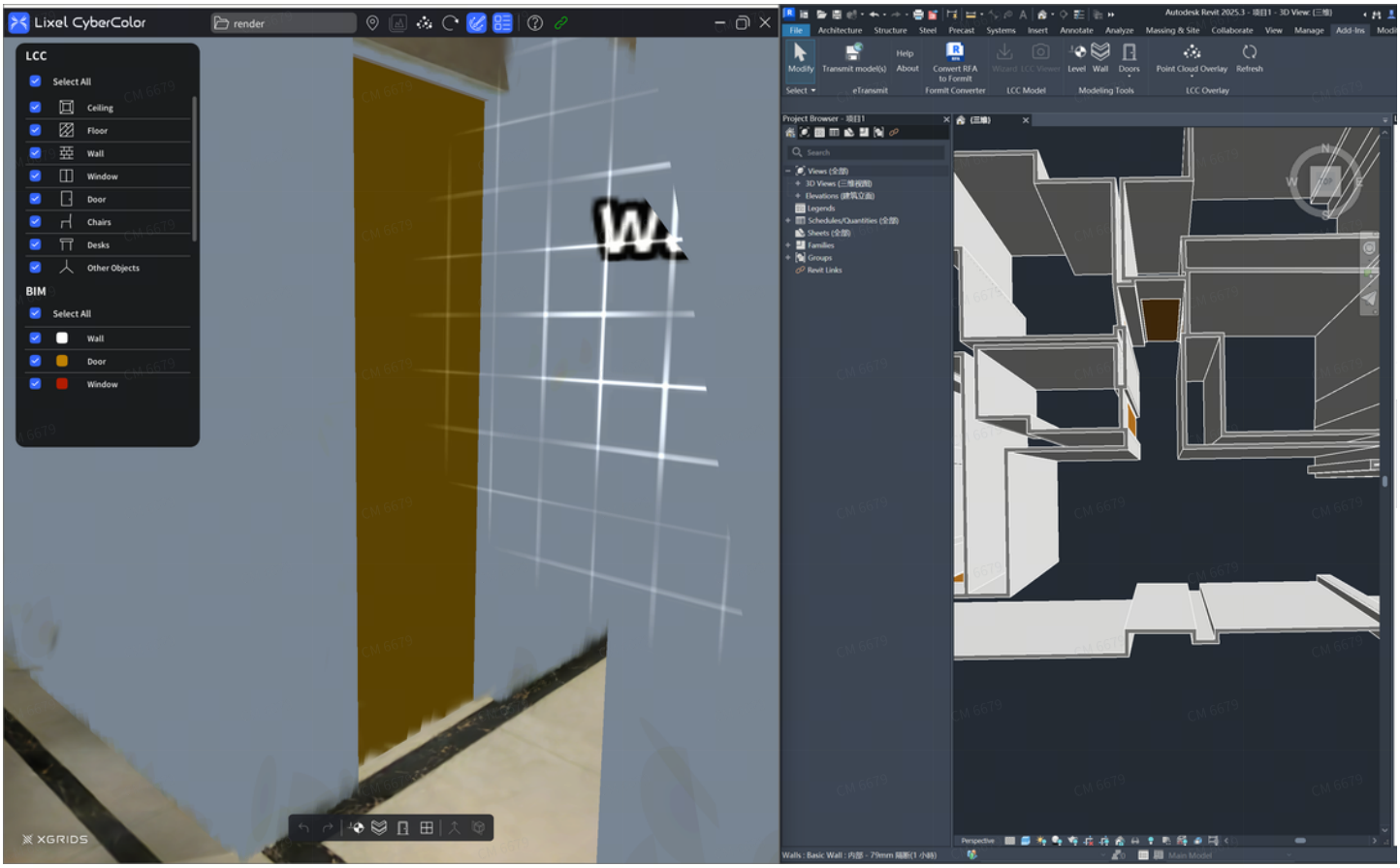
- Click the bottom center of the door
- Door orientation aligns automatically with the wall
- Return to Revit
- Click [**Finish**] to create the door



Popup for creating doors



Draw the bottom-center point of the door

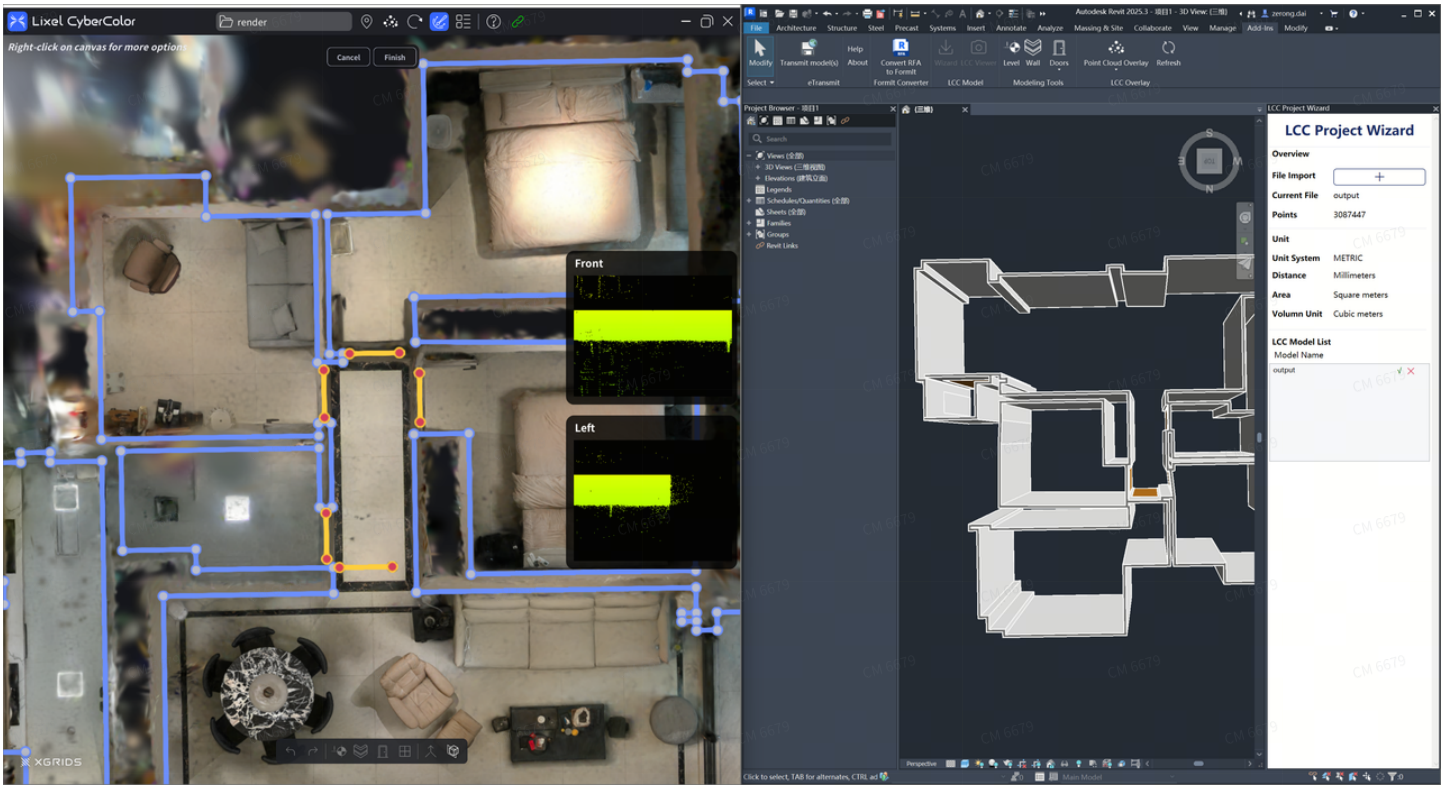


Synchronize the wall model with the LCC model

5.2.3.2 Canvas

To adjust AI-created doors:

1. Make sure Revit is not in edit mode
2. Click **[Canvas]**
3. Right-click near the door to show options:
    - **Door Frame Adjustment:** Fine-tune using point cloud
    - **Delete Door:** Remove incorrect doors
    - **Exit Editing:** Save changes



5.2.3.4 One-click Modeling

Use Spatial Recognition to create doors automatically:

1. Spatial Recognition identifies door locations and properties within the LCC model during reconstruction
2. In the Revit plugin, use one-click creation
3. Doors appear in the correct positions with proper parameters

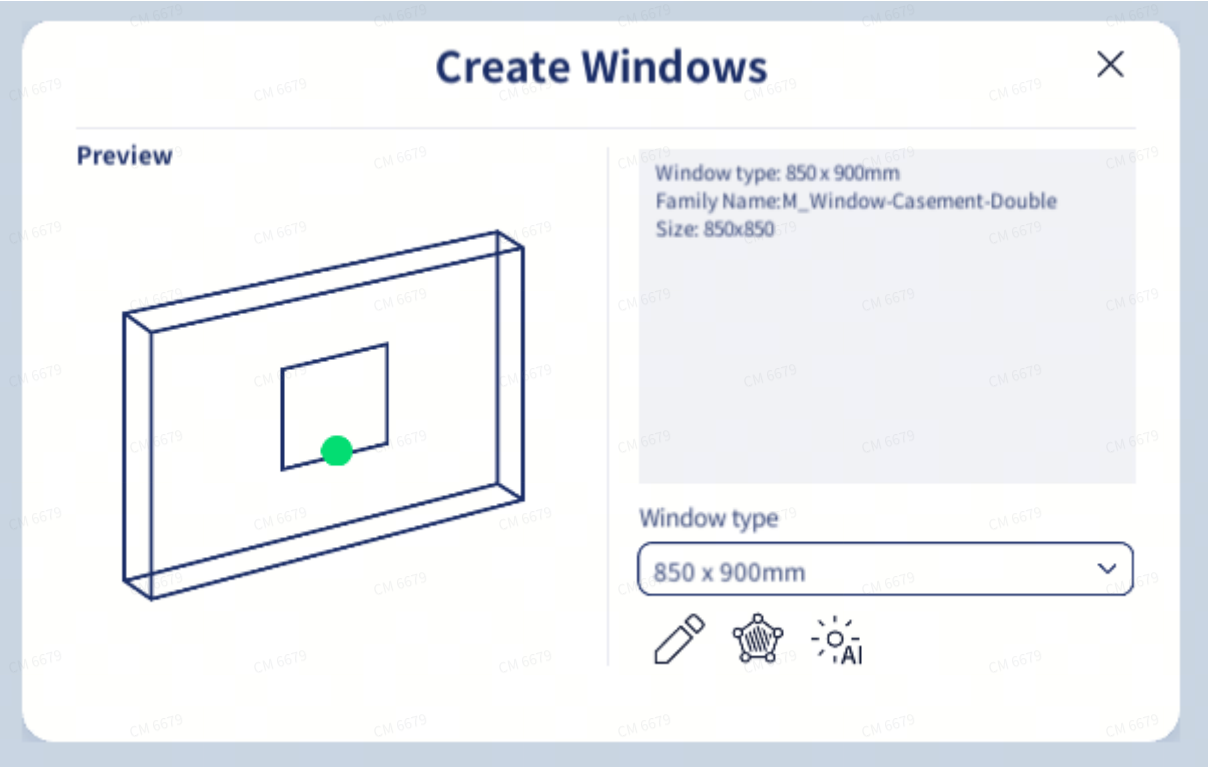
5.2.4 Creating Windows

5.2.4.1 Draw

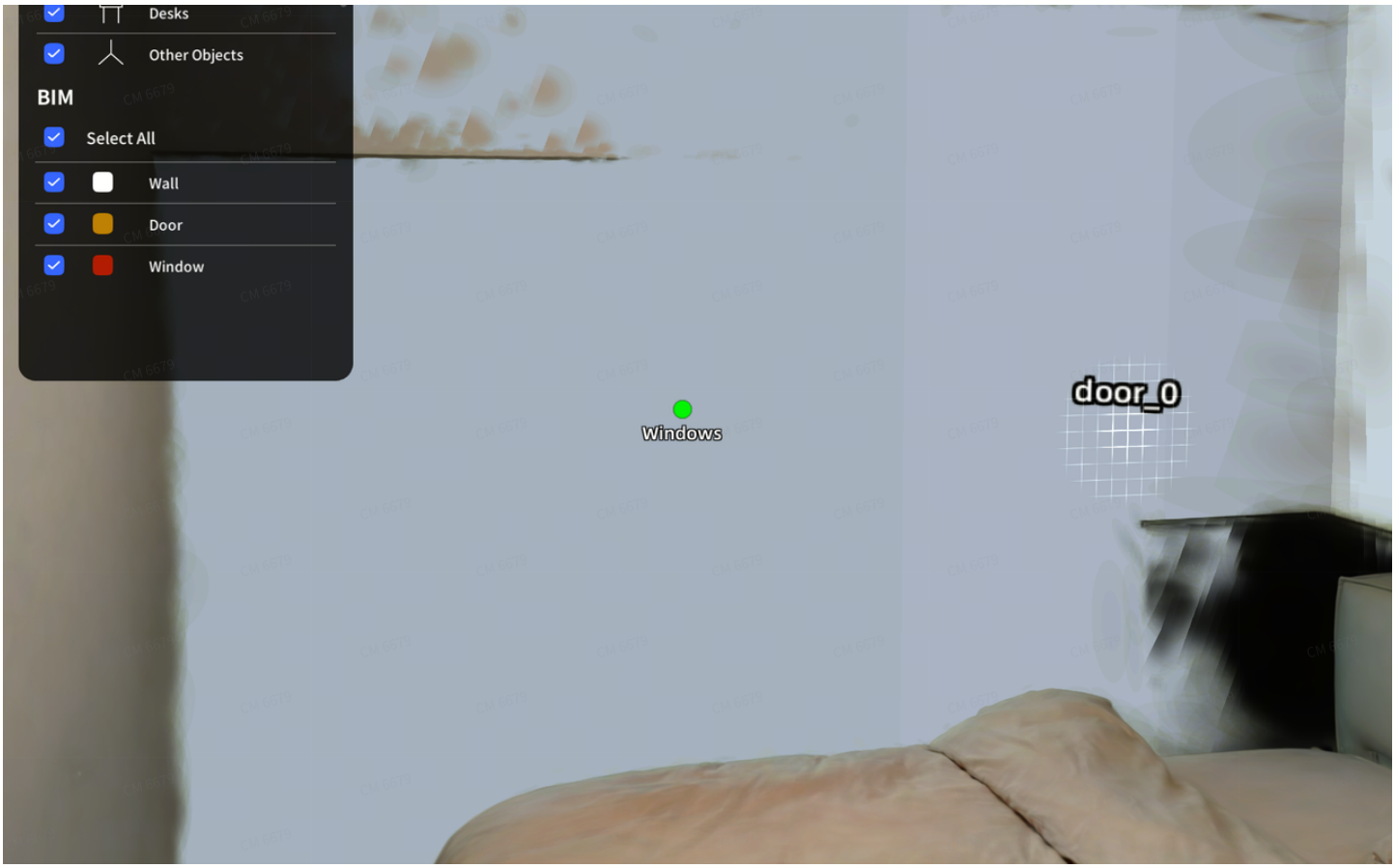
Create windows by selecting their location:

1. Launch Window Tool
   - In Revit's 3D view, click [Modeling Tools]
   - Click the **[Window]** dropdown
   - Select **[Window]**
   - The **[Create Window]** window opens
2. Choose Window Type
   - Select from the **[Window Type]** dropdown
3. Place Window
   - In LCC Viewer, click **[Draw]**

- Click the bottom center of the window
- Window size and orientation align with the wall automatically
- Return to Revit
- Click [**Finish**] to create the window



Popup for creating windows



Draw the bottom-center point of the window

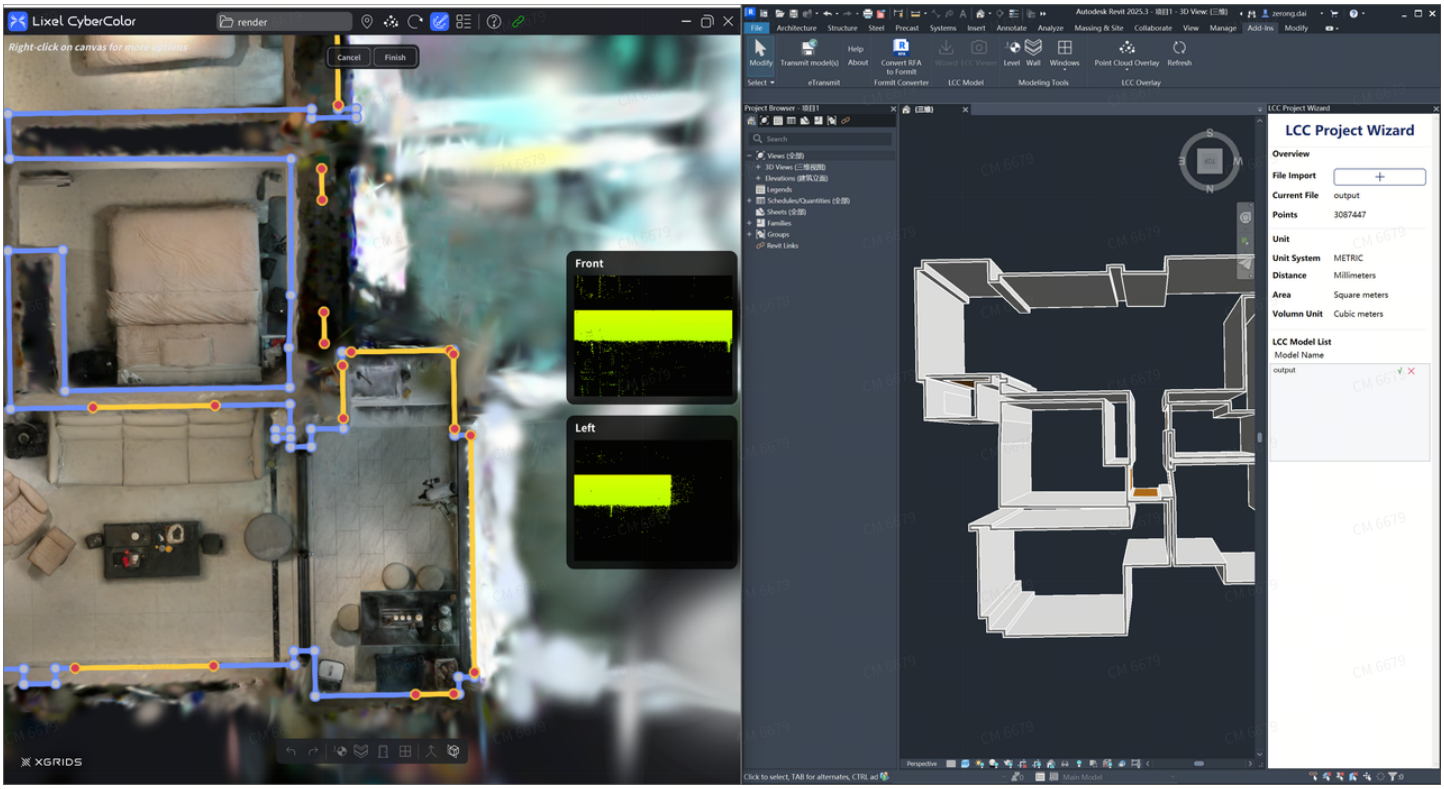


Synchronize the window model with the LCC model

5.2.4.2 Canvas

To adjust AI-created windows:

1. Make sure Revit is not in edit mode
2. Click **[Canvas]**
3. Right-click near the window to show options:
    - **Window Frame Adjustment:** Fine-tune using point cloud
    - **Delete Window:** Remove incorrect windows
    - **Exit Editing:** Save changes



5.2.4.3 One-click Modeling

Use Spatial Recognition to create windows automatically:

1. Spatial Recognition identifies window locations and sizes
2. This semantic data is embedded in the LCC model
3. In Revit, use one-click creation
4. Windows appear in the correct positions with proper sizes

5.3 LCC Overlay

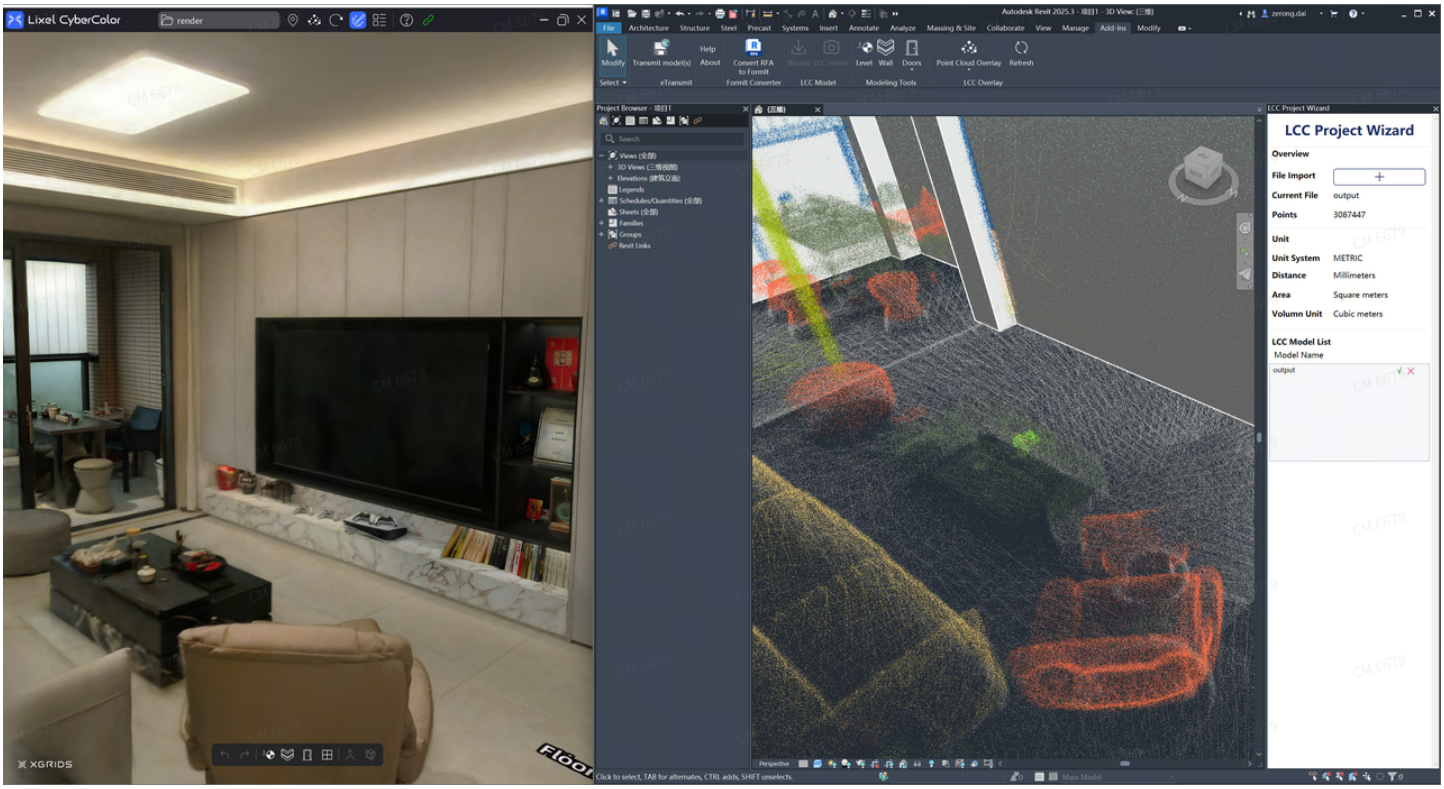
LCC Overlay shows point clouds with BIM models for accurate comparison:

- Note: Point clouds are locked during overlay and cannot be edited directly using Revit in the current version. Future updates may add more editing features.

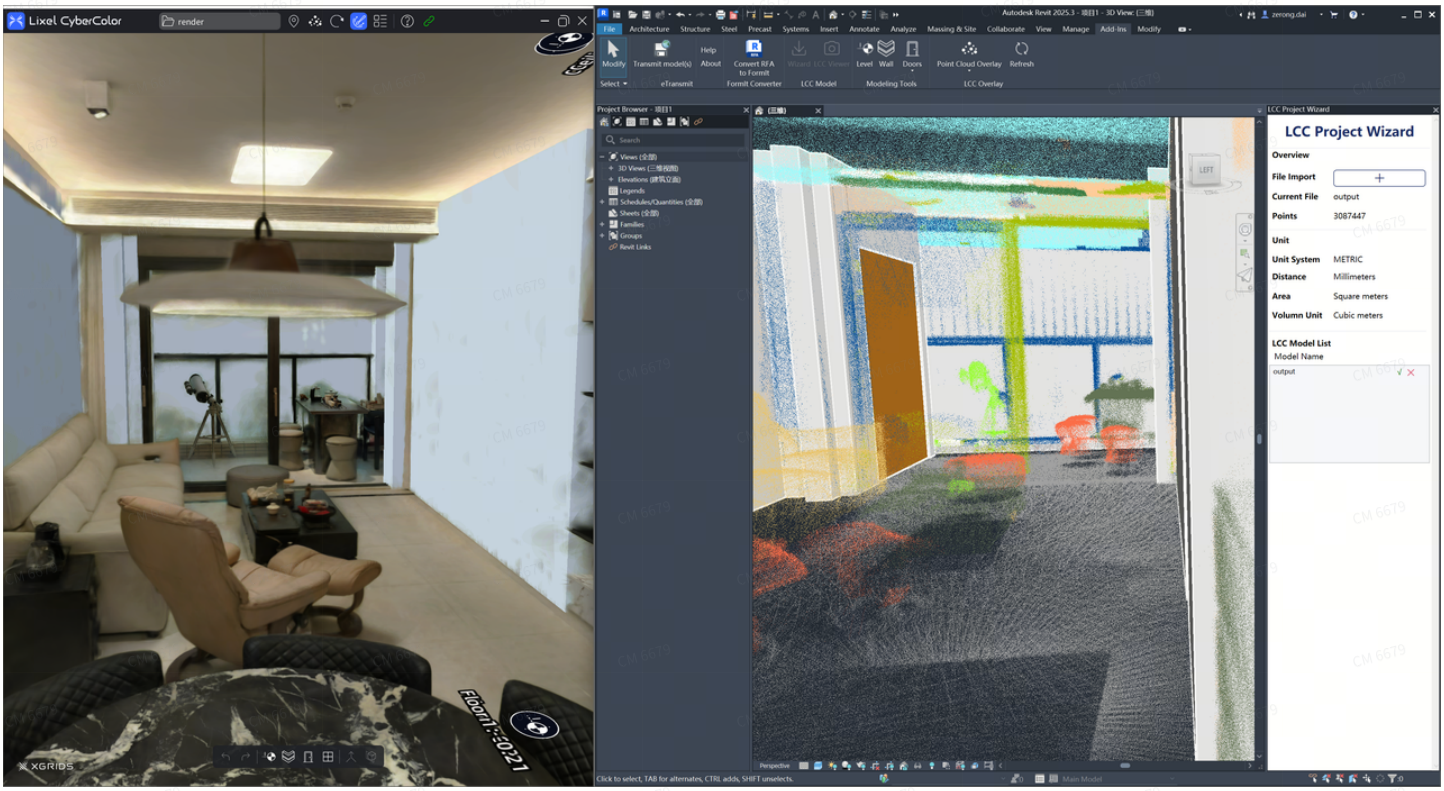
5.3.1 Rectangle Selection

Select point clouds in a specific area:

1. Go to the top toolbar in Revit
2. Click **[LCC Overlay]** then **[Point Cloud]**
3. Select **[Rectangle Selection]**
4. Drag in the 3D view to select an area
5. Point cloud appears in that area
6. Click **[Clear]** to remove the selection



Point clouds within the rectangle



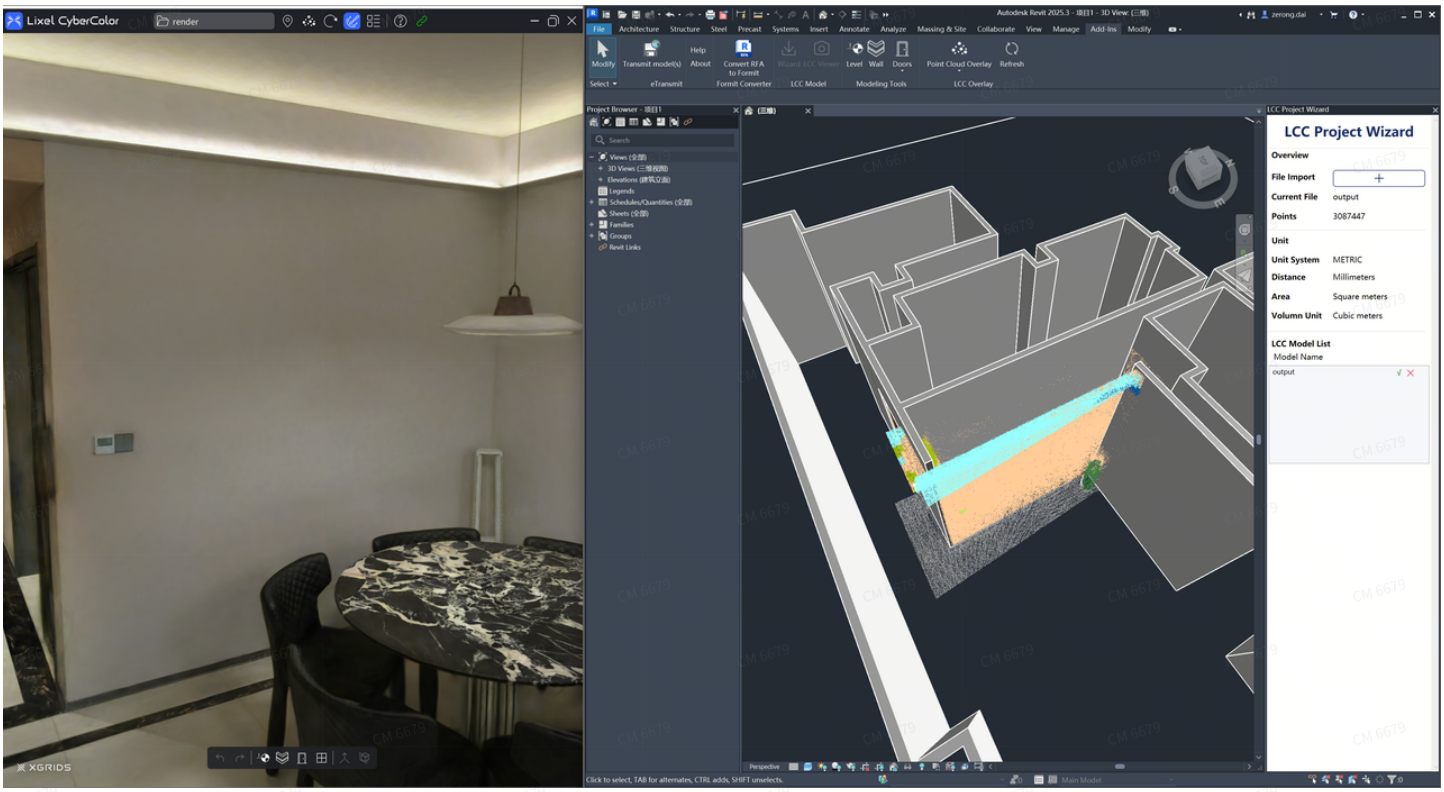
Adjust the view to fine-tune the model with the point clouds

5.3.2 Surface Selection

Select point clouds around model surfaces:

1. Go to the top toolbar in Revit
2. Click **[LCC Overlay]** then **[Point Cloud]**
3. Select **[Surface Point Cloud]**

4. Hover over a surface to preview point clouds
5. Click the surface to confirm selection
6. Click **[Clear]** to remove the selection

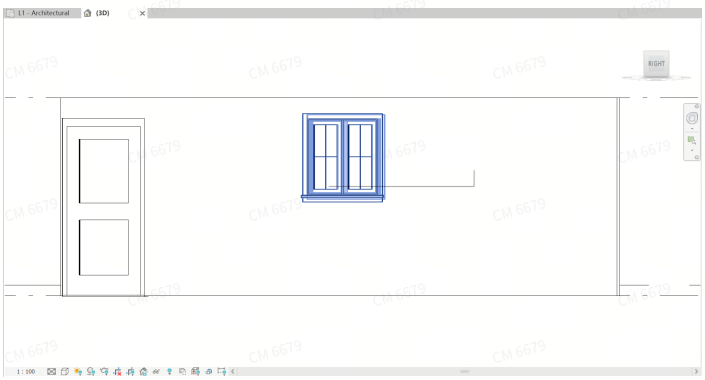


Point clouds around the wall surface

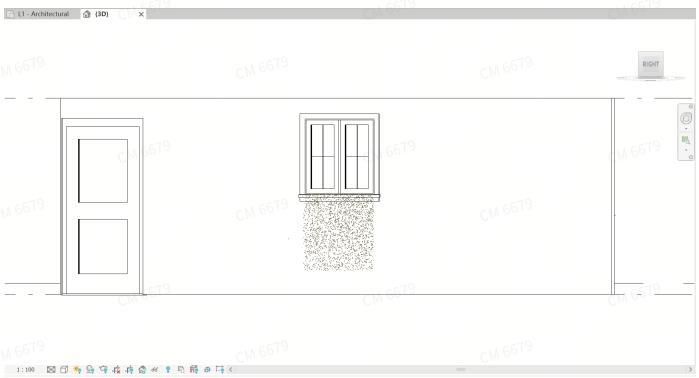
5.3.3 Component-Based Point Cloud Selection

Select point clouds around specific components:

1. Go to the top toolbar in Revit
2. Click **[LCC Overlay]** then **[Point Clouds]**
3. Select **[Points Around Component]**
4. Hover over a component to preview point clouds
5. Click the component to confirm selection
6. Click **[Clear]** to remove the selection



Select the window



Point clouds around the window

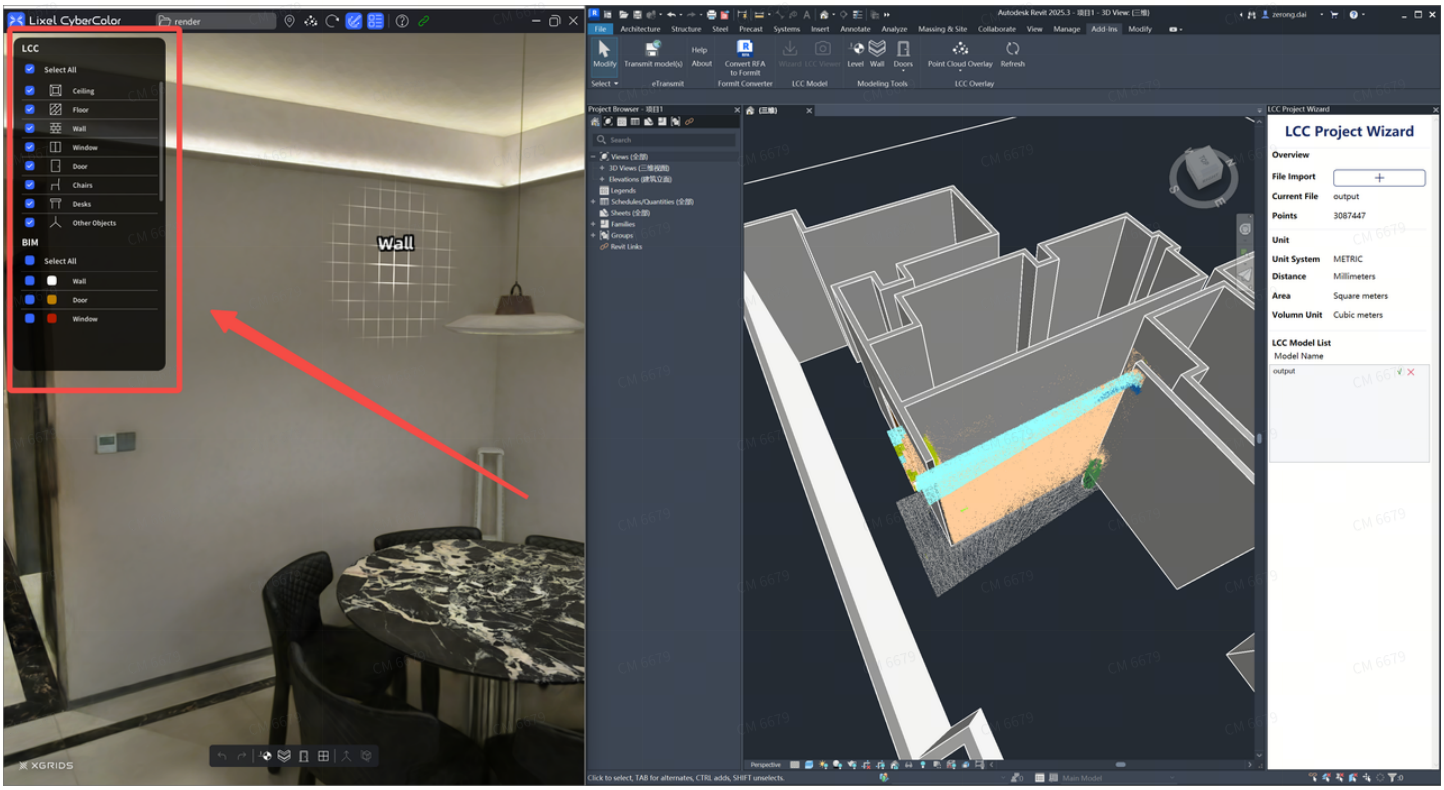
5.3.4 Clearing Point Cloud

Remove selected point clouds:

1. After using any selection method
2. Click **[Clear]**
3. Point clouds disappear from view
4. Original model view is restored

5.4 Filter Layer

Use filters to control which parts of the LCC point clouds and BIM models are visible. This helps with precise comparison and modeling.



The filter panel lets you:

1. Show/hide specific BIM elements
2. Show/hide point cloud sections
3. Toggle between different view modes
4. Compare models and point clouds side by side