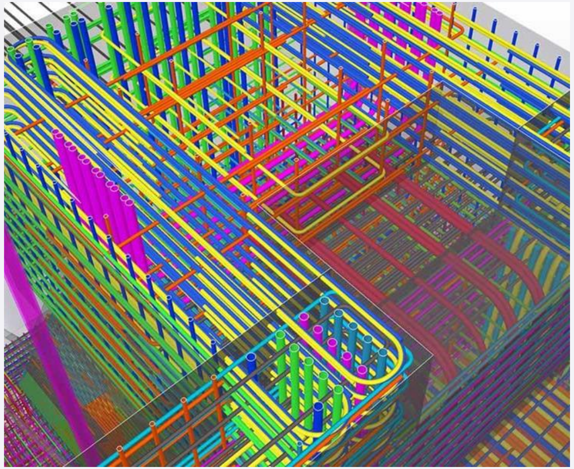
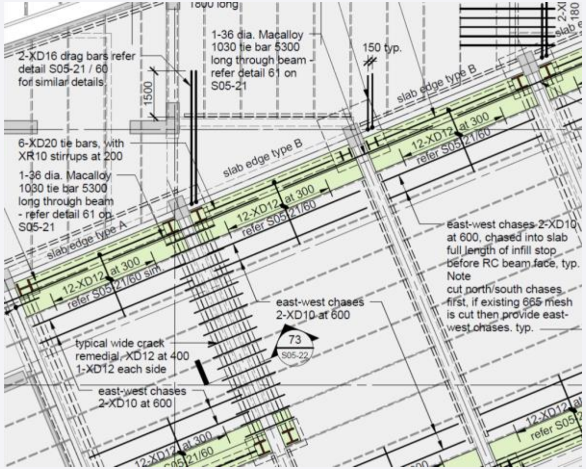
Trimble Connect AR/MR

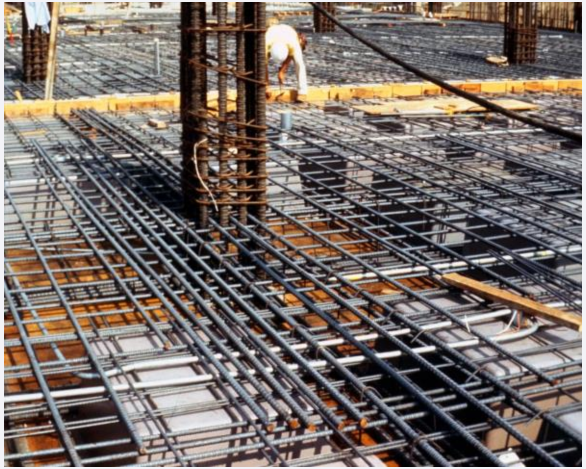
The “Data Disconnect”



We Design in 3D

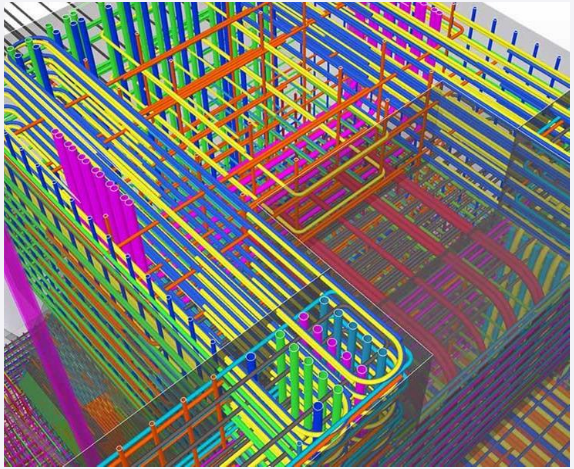


Communicate in 2D



Build in 3D

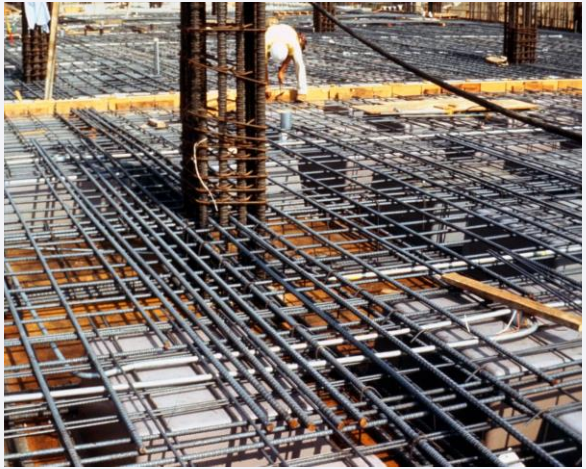
Connected & Content Enabled



We Design in 3D

Trimble Connect

Communicate in 3D



Build in 3D

Trimble Mixed Reality Software

A suite of connected tools for your jobsite

Connect

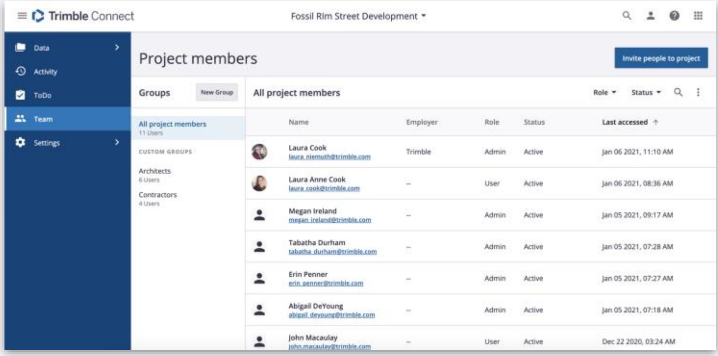
Connect AR

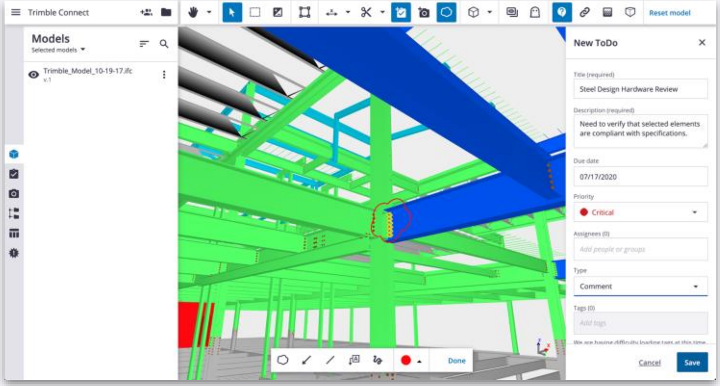
Connect MR

Trimble Connect

Collaboration made easy

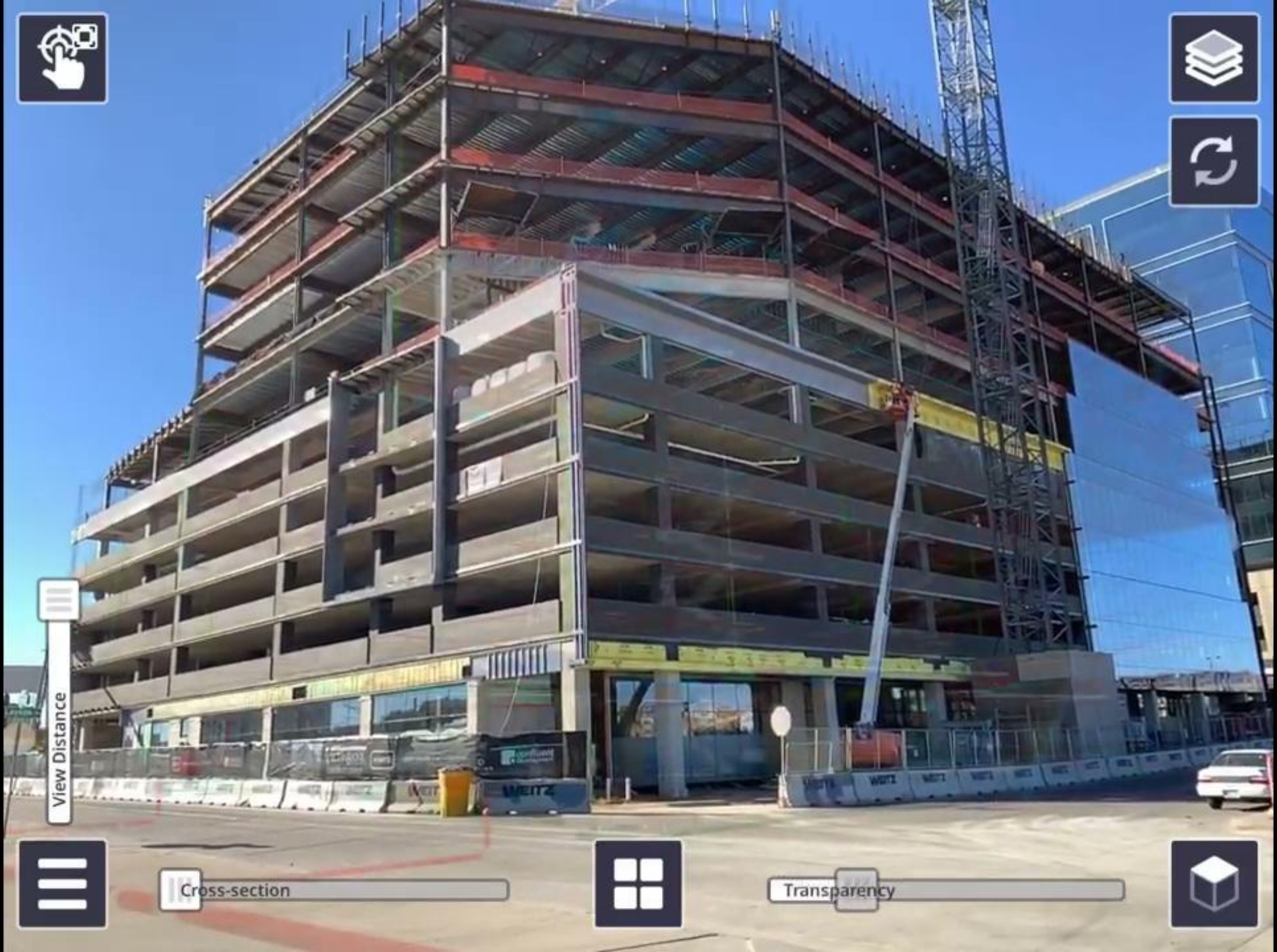
- Allow everyone on the project to **access**, **share**, **review**, and **comment** on data-rich building **models**, **in real-time**
- **Informed decision** making and enhancing project **efficiency**
- Mobile, Desktop, & Web interface
- Powered by **Amazon Web Services** (AWS), delivers the highest level of **security** through AWS best practices and compliance with industry-standard certifications such as ISO/IEC 27001:2013. [More here]





Trimble Connect AR

- **1:1 scale augmented reality view of your model**
- Specifically targeting AEC workflows:
  - Pre-construction coordination
  - Construction checking
  - Post-construction QA/QC
- A **step change in effectiveness** compared to traditional mobile model viewing or paper plans
- All AR enabled **iOS** and **Android** mobile devices supported
- Works on both **Phones** and **Tablets**


View Distance
Cross-section
Transparency
WEITZ

Trimble Mixed Reality Hardware

XR10 with HoloLens 2

Trimble Connect MR

- Heads up, hands free visualisation
- Additional installation and assembly workflows (4D sequencing)
- Enhanced safety - no obstruction or distraction (holographic)
- Ultimate solution for collaboration and remote sitewalks/reviews

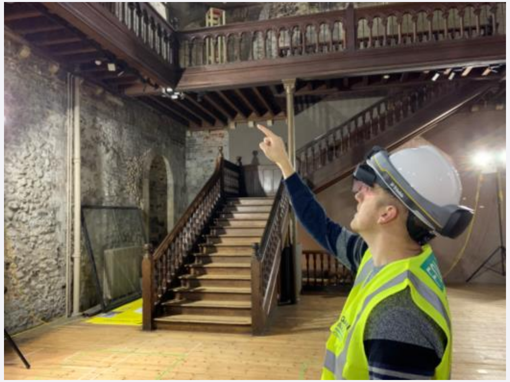
Site Ready Mixed Reality

XR10

Features

- All of the benefits of HoloLens 2, plus:
- Hard Hat impact/electrical protection:
  - ANSI/ISEA Z89.1-2014 Type 1, Class E (USA)
  - CSA Z94.1 (Canada)
  - EN 397:2012 + A1:2012 (European Union)
  - AS/NSZ 1801 (Australia / New Zealand)
  - GB2811-2017 (China)
  - JIS T 8131:2015 (Japan)
- Intrinsic safety:
  - UL Class I, Div II: ANSI/UL 60079-0 (International)
  - *No ATEX (EU intrinsic standard)
- Visor Basic Impact Certifications
- Mobilus bone-conduction Bluetooth headset for audio-out up to 115dB
- Industry standard accessory mounts (for earmuffs, chin straps, etc.)
- 180° flip-up visor
- Improved drop resistance


Your model has been automatically adjusted to perform better on HoloLens.
In some cases, it may appear sparse. You can use the Section Box tool to refine and optimize the model to a particular area of interest.

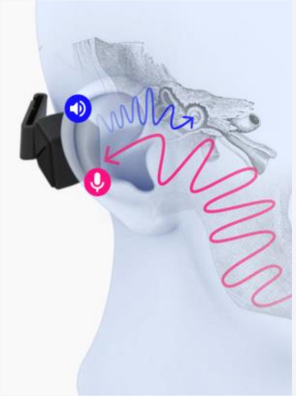


XLwerks projects a bright future for mixed reality with Trimble XR10

JANUARY 13, 2021

Enabling Audio Onsite

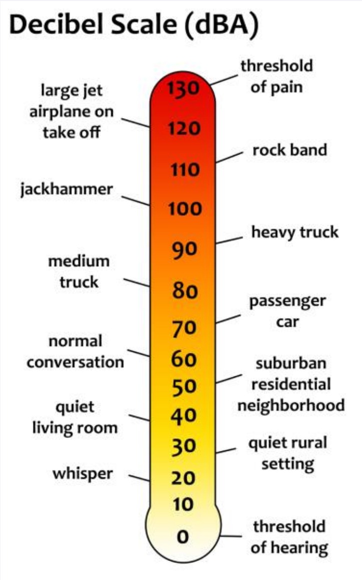
Mobilus Labs - MobiWAN TR




mobilus labs

Enabling Audio Onsite

- Audio Out:
  - mobiWAN_TR, by Mobilus Labs
    - Custom-built for XR10
    - Bone-conductive audio behind ears
    - Compatible with earplugs/earmuffs
    - Integrates into hardhat suspension
    - Connects to XR10 via Bluetooth
    - 6-hours continuous playback (80% vol)
    - Spoken word audible up to 115 dB
- Audio In:
  - 5-array microphone built in to lens
    - 3 mics for ambient noise-cancelling
    - 2 mics beamformed to user's mouth
    - Spoken word understood up to 90 dB



mobilus labs

Prefabrication

Guided Assembly & Installation

Install Verification

FAQs

Supported Devices

Trimble Connect AR runs on iOS & Android mobile devices:

Android

- powered by the **Android** operating system version **9.0 and later** that are supported by the Google AR technology. There are over 400 devices which are Google AR Services compatible.
- Refer to the list that Google maintains to check if your device is supported: https://developers.google.com/ar/devices

iOS

- powered by **iOS 13 and later**, from **iPhone 6s and later** and **iPad (2017) and later**.

Model Formats

- IFC (2x3), IFC ZIP (.ifcZIP), IFC XML (.ifcXML)
- DWG (.dwg - AutoCAD 2013 and below)
- TRB
- SKP
- RVT (Revit 2019 and later)*
- Tekla (.tekla)
- NWC, NWD

* Revit files can be added to the project on the project page in Trimble Connect for Windows, or using the Trimble Connect for Revit add-in.

Data Prep Tips

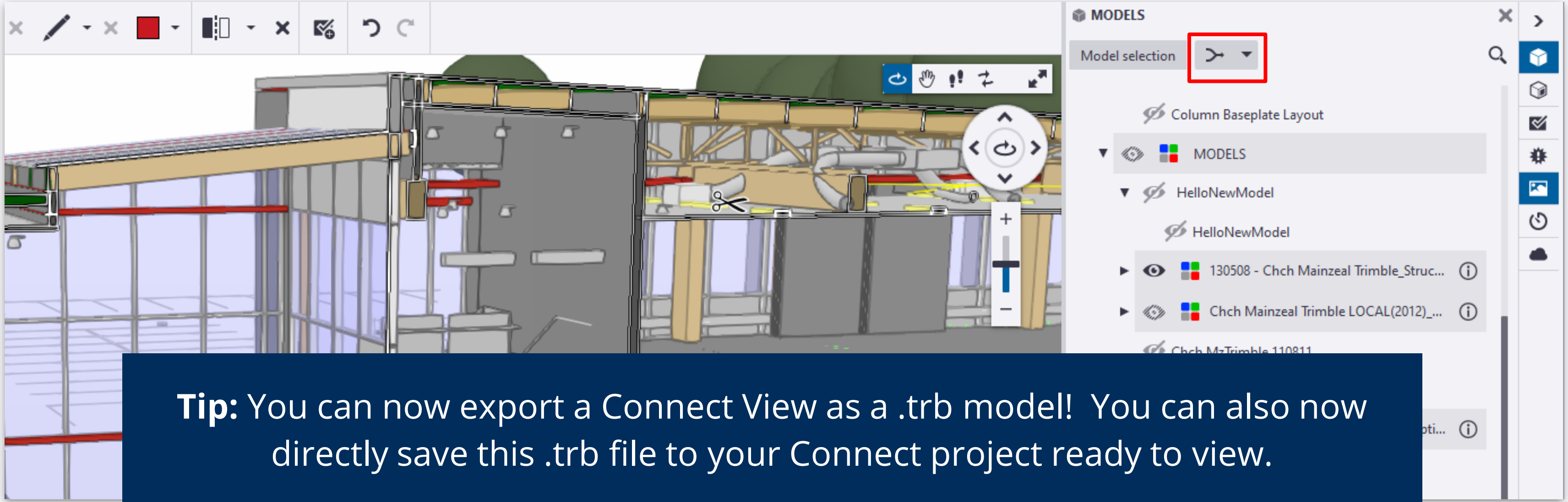
Model Complexity

Connect AR features a powerful 3D visualization engine that allows it to **load and display large and complex models,** reducing the burden in terms of data preparation.

- When visualizing especially large models, small objects at a distance will not be rendered - they will ‘pop in’ as you approach.
- There are still limitations on how much data can be rendered at any given time; this limit is dependent on the device you are using. The more modern a device is, and especially the quantity of RAM, will be the governing factor.
- **File size can often be deceptive** - e.g. a **2Gb Revit model may compress down to a 125Mb NWC file**

Model Management

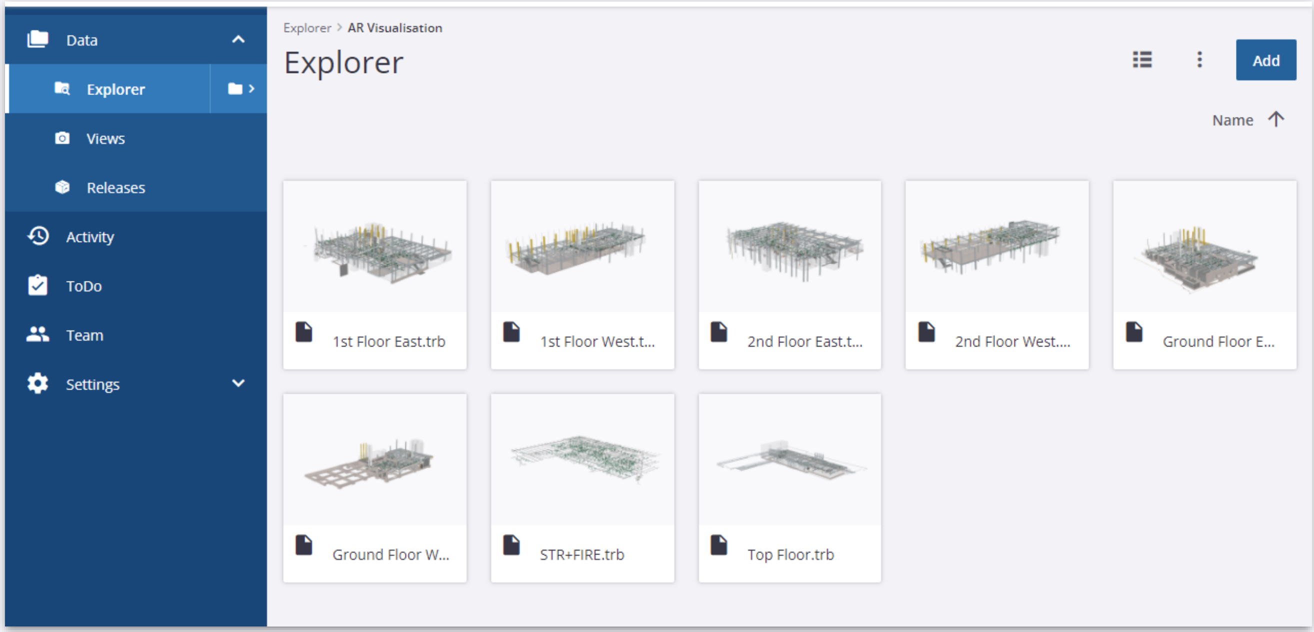
Trimble Connect for Windows is a powerful tool for creating federated, or filtered model views. Once the desired settings have been applied you can easily create a .TRB model file that can be viewed in Connect AR



Tip: You can now export a Connect View as a .trb model! You can also now directly save this .trb file to your Connect project ready to view.

Model Management

While model segmentation is not typically required for performance reasons, it can still be helpful as a way to manage what data is visible in a specific area.

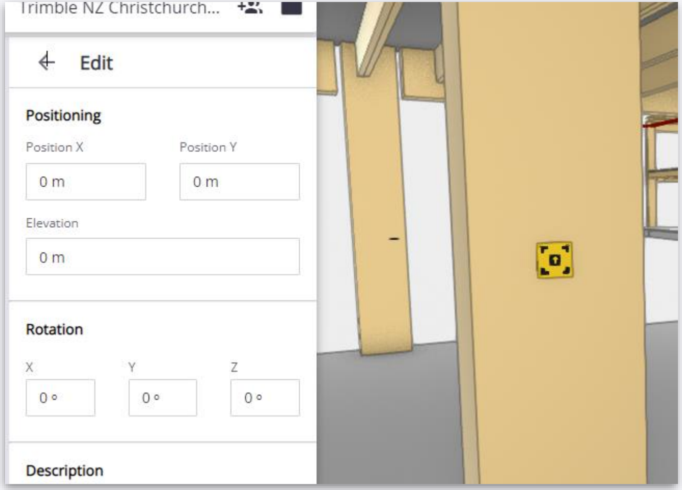


QR Marker Tips

Establishing a QR Marker Network

The Connect AR application has been developed with the intent that a network of Markers is established around the construction site. Once this network is established, any field user can easily use the app and position the model without requiring extensive training.

- Load models directly from Marker
- Automatic placement of models using Markers
- Easy re-calibration of model placement to combat drift
- Markers are compatible with Connect on the XR10



We recommend to work within **10 to 15 meters** of a QR Marker


Building Excellence
Building Excellence

Marker Placement Guidelines

- Markers must be installed on a flat, vertical or horizontal surface.
- The markers should be flat, and securely fastened on all four corners.
- Any wrinkles or curvature of the marker may adversely impact model alignment.
- The markers can be laminated to provide protection from water / dampness.

Feature Overview

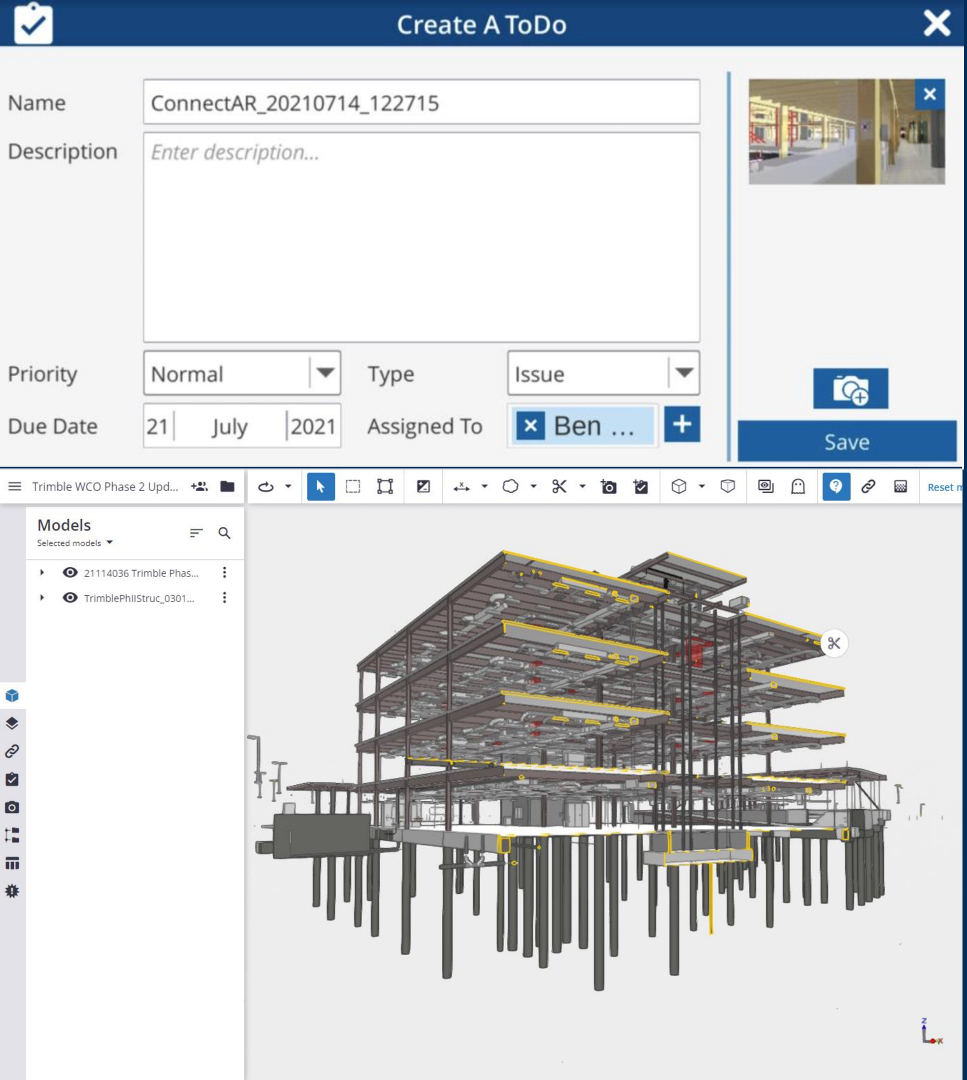
Feature Overview

Model Placement

Position AR models on your job site with QR markers

Visualization Tools

Explore accurately positioned **models** in their real **world context** with Transparency, Cross Section & Fish Bowl tools



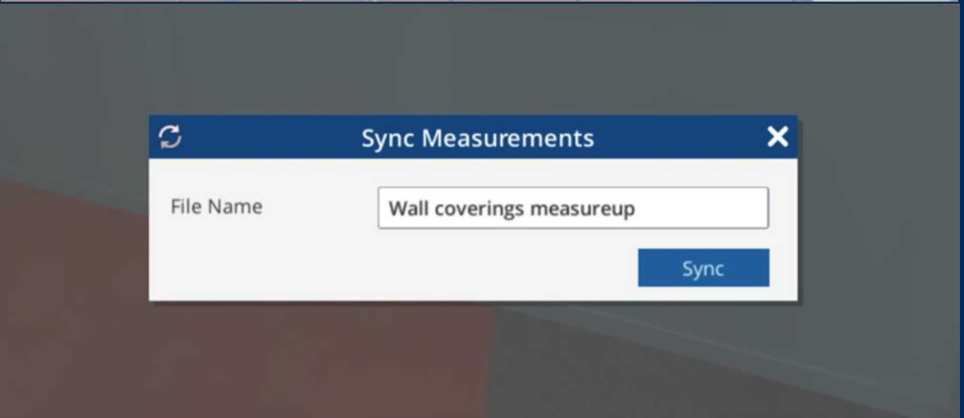
Feature Overview

Capture ToDo's

Capture and **share** your augmented reality view to **communicate identified issues**

Connect Integration

Manage models and collaborate with your team with Trimble Connect



Feature Overview

Measurements

Measure and record progress and as-built information, including positions, lengths and areas

Offline Support

Work offline then sync your data to Trimble Connect

Case Study

Miron Construction

- **Role:** General Contractor
- **Use Case:** Installation verification
- **Problem?:** Sub-contractors not installing MEP equipment per the coordinated design

*"It is easy to set up on the front end and has paid off exponentially in the field because it works like it is supposed to work," **-Sam Tijan, Virtual Construction Specialist I Miron***

Miron Construction

- By viewing the 3D model as an overlay on the real site, issues can be easily identified
- Once identified, issues can be visually conveyed to sub contractors immediately on site

"The intriguing thing is we can validate these processes very easily when we overlay the model. We can see the pipes lined up in the model with what is actually being assembled in the field. Prior to having this tool, we didn't have a way to convey this visually to our contractors." ***-Kacie Hokanson, Virtual Construction Specialist I Miron***

Questions?