LASER SCANNING SOLUTIONS CASE STUDY

BUILDING 12 REMODEL
MT. SAN ANTONIO COLLEGE

THE PROJECT

Building 12 was a dated, single story, 14,000 sf classroom and laboratory building, originally built in the 1950's. The project goal was to repurpose the building from a classroom / lab facility to support expended student services and Art Department offices.

The scope of work included replacement of all building systems (mechanical, electrical, plumbing, IT), new interior finishes, and structural strengthening and recladding of the existing building to integrate this 1950's structure with recently completed surrounding building and improvements.

3D HIGH DEFINITION LASER SCAN

Following demolition of the interior of Building 12, Tilden-Coil performed a 3D Laser scan and produced a point cloud model for use in coordinating the remodel scope of work.

Precise measurements and field conditions are collected in this point cloud. For example, many existing openings in the brick walls had to remain and be re-used by all MEP trades. Knowing the exact location and size of these openings was critical to overhead utility coordination. *View from the Point cloud model showing dimensions to building elements pictured above.*

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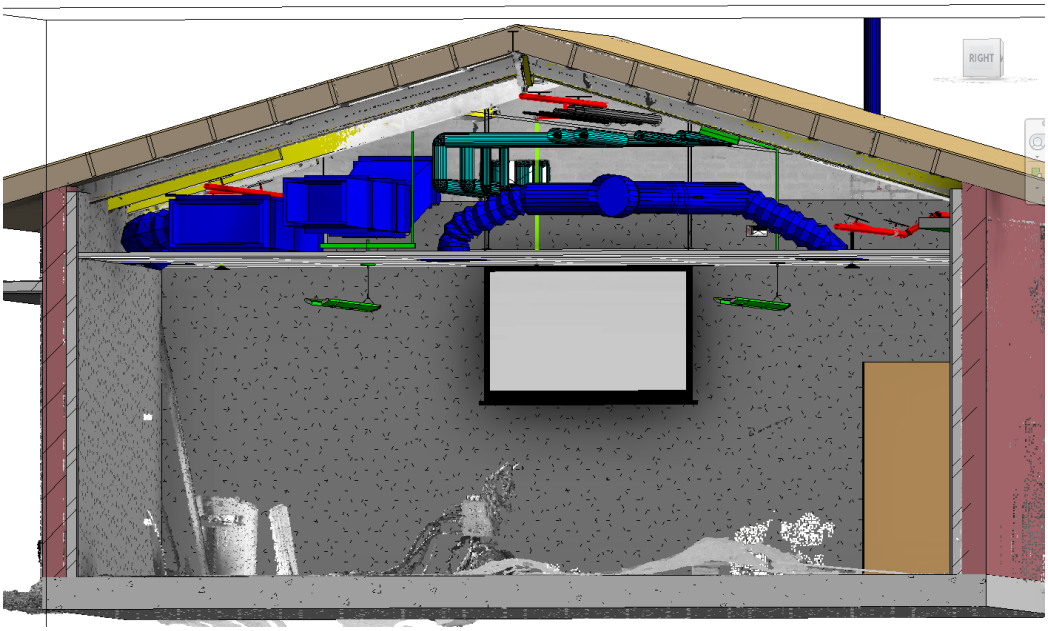


1. View of the final MEP coordination model with trades sharing openings. As you can see ceiling space was limited and precise coordination within BIM produced efficient pre-fabrication of ductwork and field installation

BIM Clash Matrix - **Bldg 12**

Mt. San Antonio College

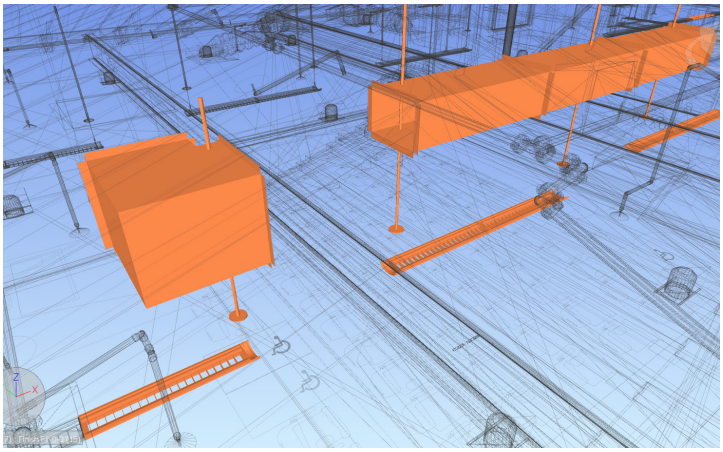
Tuesday, October 22, 2013

Resolved since last compacted:
0

Structure					
HVAC	59				
Fire	70	147			
Plbg	75	36	0		
Elec	56	44	51	125	
Bldg 12	Structure	HVAC	Fire	Plbg	Elec

Total Clashes Remaining:
663

2. Clash matrix showing resolved clashes between trades. This tool is used to track progress.



3. Light fixture coordination with duct work

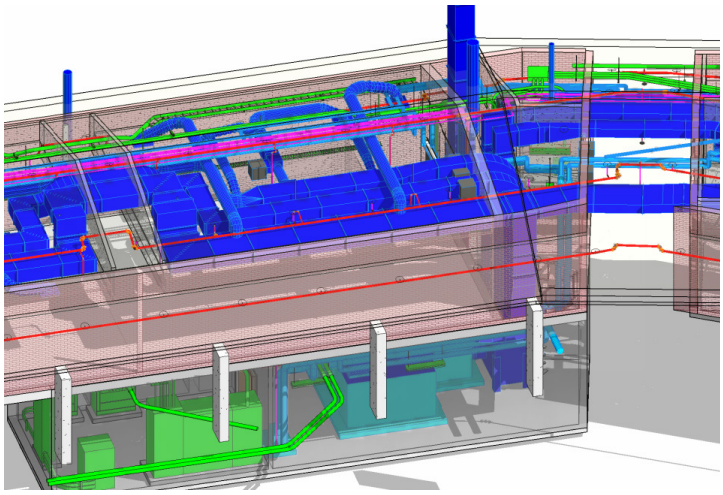
CLASH RESOLUTION

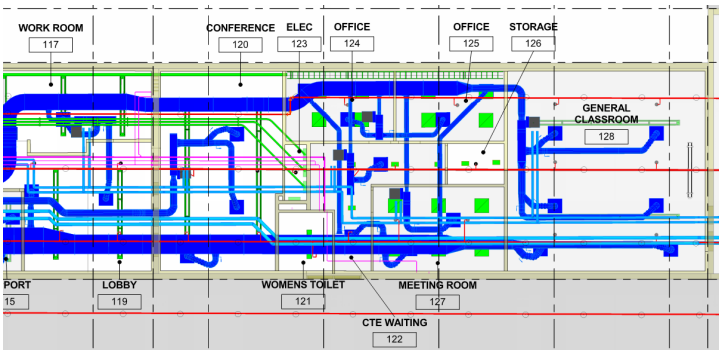
Tilden-Coil along with subcontractors produced 3D models of trade elements for clash detection and resolution prior to shop drawing approval. Once all major clashes were resolved shop drawings could be produced followed by fabrication and field installation. This clash resolution process provided numerous benefits to the construction process.

1. All trades have a clear and improved understanding for their scope of installation.

2. All trades have an opportunity to discuss any field installation challenges with our superintendent and can plan ahead for such challenges.

3. Potential delay issues are discovered early. For example, the pendant lighting fixtures have a specific DSA approved mounting method. Due to other trade elements or building constraints many of these mounting locations would need altering and approval. Locations such as these shown on the *Image 3 to the left* are found during clash detection and required a trapeze to span around the duct and connect the light fixture support to the structure. With the coordinated BIM we identified exactly how many of these occurred and provided specific information for approval to DSA and field inspectors.





4. Trade overlay drawing

TRADE OVERLAY DRAWINGS

Approved / Coordinated models were printed as 2d and 3d color overlay drawings for field staff to supervise the installation as it progresses.

These overlay drawings also facilitated detailed coordination meetings with other trades who were not involved in creating a model. For example, the stud framing subcontractor used the model to determine which walls would need to be topped out prior to installation of ductwork as it would prevent access once installed.

AS-BUILT SCAN AND MODEL

As construction progressed Tilden-Coil utilized our in-house 3D laser scanner to capture as-built conditions of overhead MEP utilities that were to be concealed behind ceilings. This enabled Mt. SAC to review building components within the point cloud model from a facilities management standpoint.

It also allows for creation of an as-built 3D model to be generated if desired that will benefit future re-design of the structure by architects and engineers. These as-built BIM models also integrate into numerous facilities management software available today.

5. As-Built Point Cloud model – Photo realistic view from scanner position

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