



This issue

Measured Building Survey as
an aid to Restoration Project

Site/Project:

Lynch's Castle
Conservation Project

Industry:

Private Sector

Client:

AIB Bank

Location:

Galway City

Site Type:

Medieval Tower House

Deliverables:

3D Laser Scan survey
2-D output drawings
3-D models

Benefits:

Cost Effective
Quick turnaround
Non contact – remote
survey
Unparalleled accuracy and
detail
Detailed CAD output

Detailed digital archive.
Value added applications
such as production of
scaled 3D models

Introduction

Lynch's Castle is one of Galway's iconic buildings located centrally within the city representing one of the finest surviving examples of an urban tower-house dating to the 16th century. This stone block built structure contains on its façade a series of very detailed ornamental carvings, hood moldings and detailed panels.

Previous conservation works of the structure had involved the use of abrasive cleaning of the façade of the building resulting in the "washing out" of some elements of the stone work. An up to date building survey at "stone-by-stone" level of detail as well as a detailed survey of the decorative panels was required by the National Monuments Service (Ireland) to provide both detailed 2D scaled drawings of the building and also provide information for a base-line survey of the current condition of the building and its historic features. This information was used for both archival and stone conservation purposes with high resolution scaled photography and 3D models of each of the decorative panels augmenting the laser scan survey to provide the facility to re-construct existing stone detail in the future..

Measured Building Survey

The main building survey consisted of a 3D laser scan survey of the entire external façade of the building using a Leica C10 laser scanner to collect a sub centimeter accurate 3-dimensional measured survey of the building and each of its constituent building blocks. This was augmented by a photogrammetric survey of each of the detailed panels using a fixed lens high resolution digital camera.

The survey was carried out with one operator and assistant over a period of 1 day within the confines of a busy city center street scape.



Lynch's Castle, Galway



Photogrammetric Survey



Scanning of external elevation

Applications:

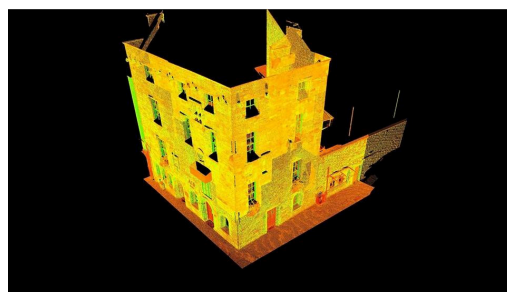
Invaluable aid to heritage management and conservation

Complete and unique archive

CAD Analysis & Output

The completely registered 3D point cloud scans were imported into CAD software for interrogation and visualization analysis, and to generate accurate scaled stone by stone 2D plan and elevation drawings. CAD standard measuring tools were used to make multiple point to point measurements analysis and interpretation and the digitization of 2D scale stone-by-stone drawings. 2-D scaled drawings were available within 1 week of completed on site works.

The photogrammetric survey was post processing using accurate measurement information from the 3D laser scan and processed using Structure From Motion (SfM) software to produce a 3D point cloud of each of the decorative panels and moldings from which further 3D models were produced. Scaled high resolution 2D images which could be imported into CAD for measurement, visualisation and digitising were also supplied for digital archive purposes.

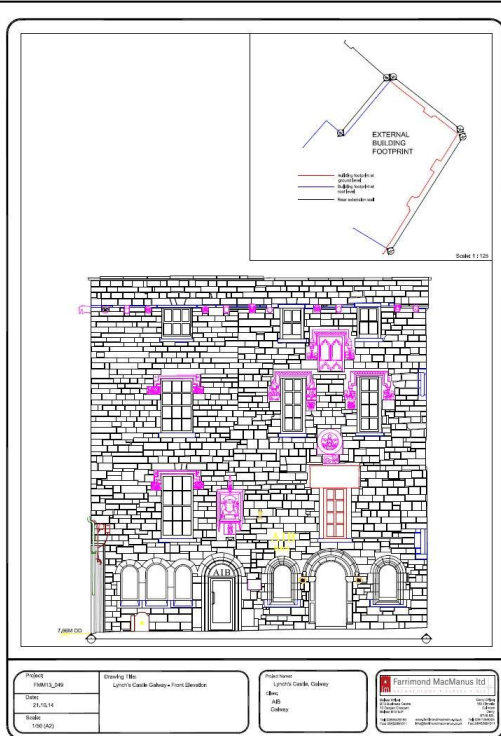


Laser Scan 3D Point Cloud



Slice through the vertical plane the front elevation of the building

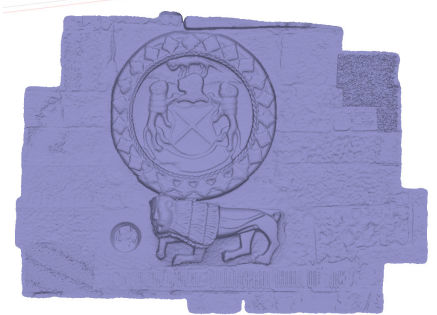
Not only does the scan provide very accurate information on the geometry of the building, the scaled stone by stone drawings allow for very detailed annotation of drawings with respect to stone conservation. The production of the 3D digital models also allows for accurate reproduction of the decorative panels either through 3D printed models or to aid in stone conservation works.



Building front elevation



3D RGB Point Cloud from digital photography



3D Model of crest panel