NCID

A DVANCED
C ONSTRUCTION
I NFORMATION
D EVELOPMENT

Heritage

Information

Modelling

VICTORIA PEAK FIRE STATION

Introduction

Objective

This study is to develop a Heritage Information Modeling (HIM) prototype for the Victoria Peak Fire Station (VPFS) to help the heritage conservation and facility management of Historic assets managed by ArchSD. It is a pilot project for the adoption of HIM. The process of HIM shall be or will be applicable to other heritage projects of similar nature.

HIM Framework

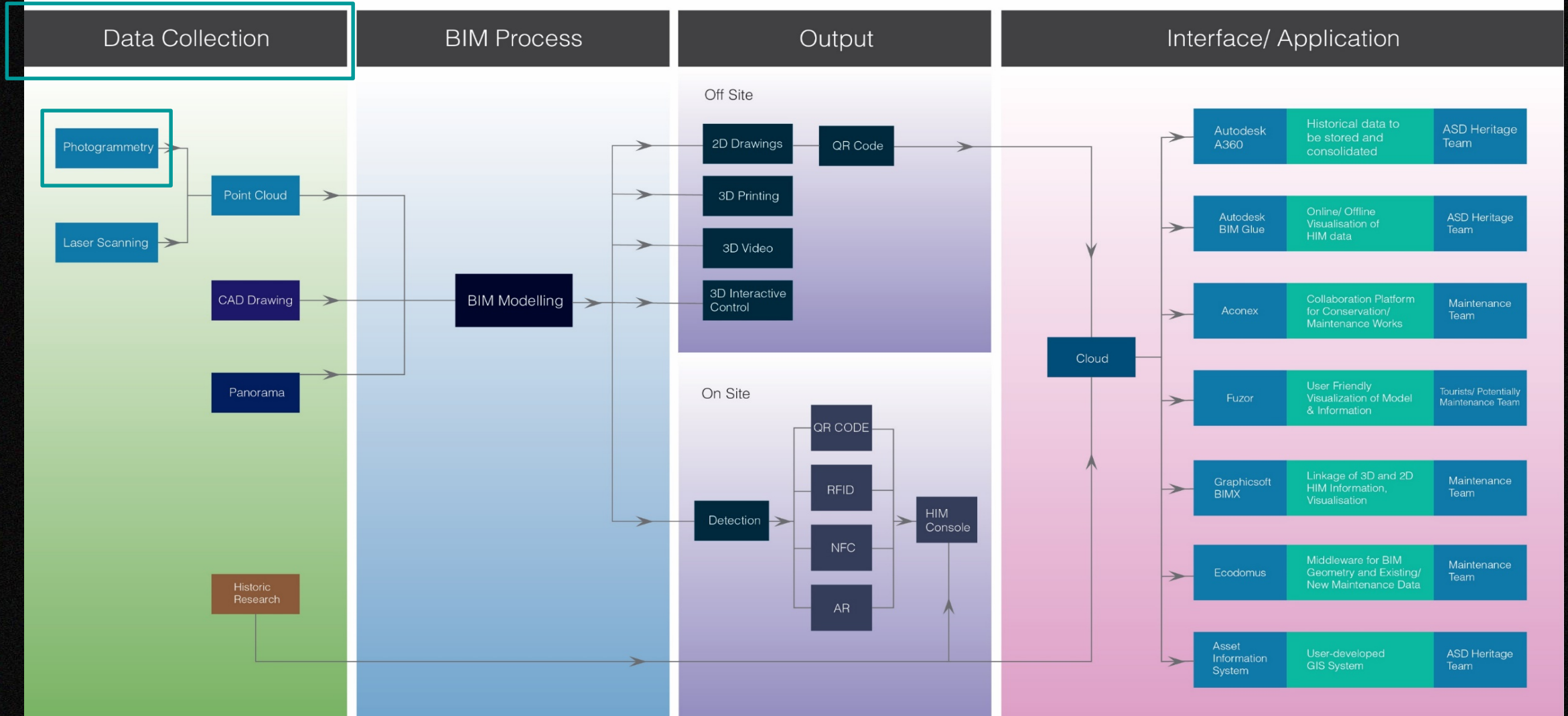HIM consists of 4 progressive layers or process:
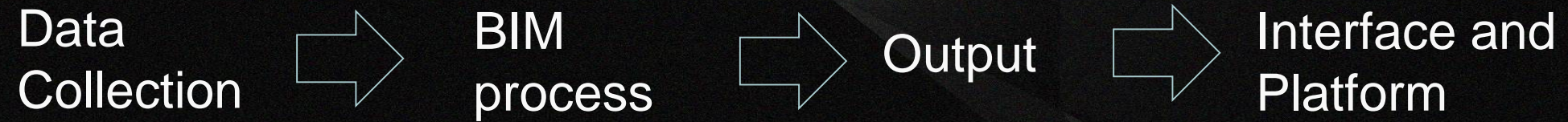
Data Collection → BIM process → Output → Interface and Platform

Data Collection

HIM Framework

Heritage Information Modelling Framework

Aerial Photogrammetry

Data Collection
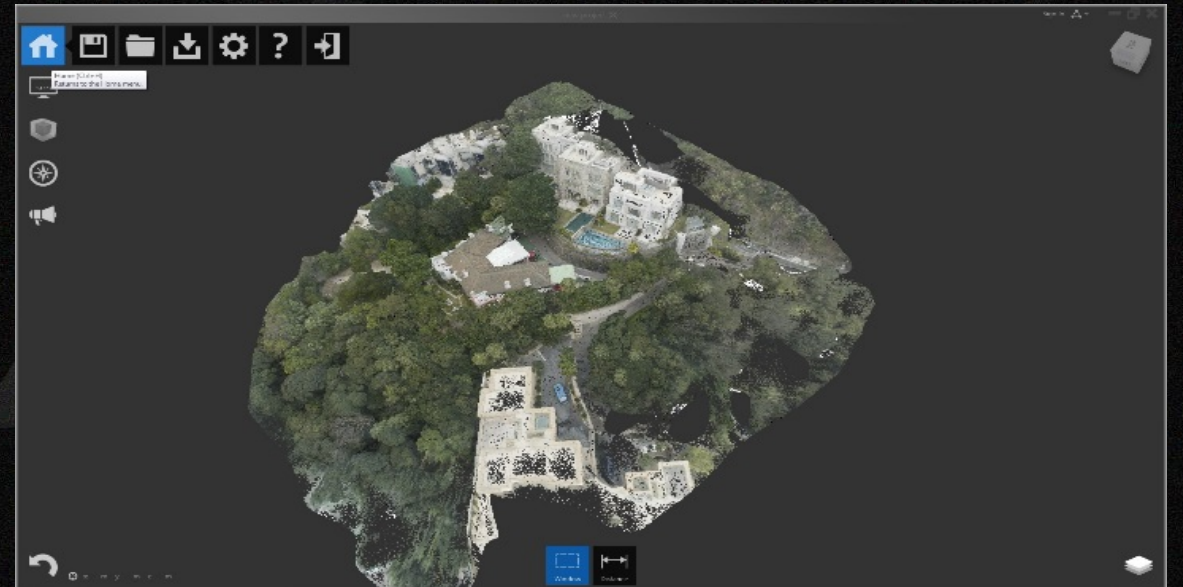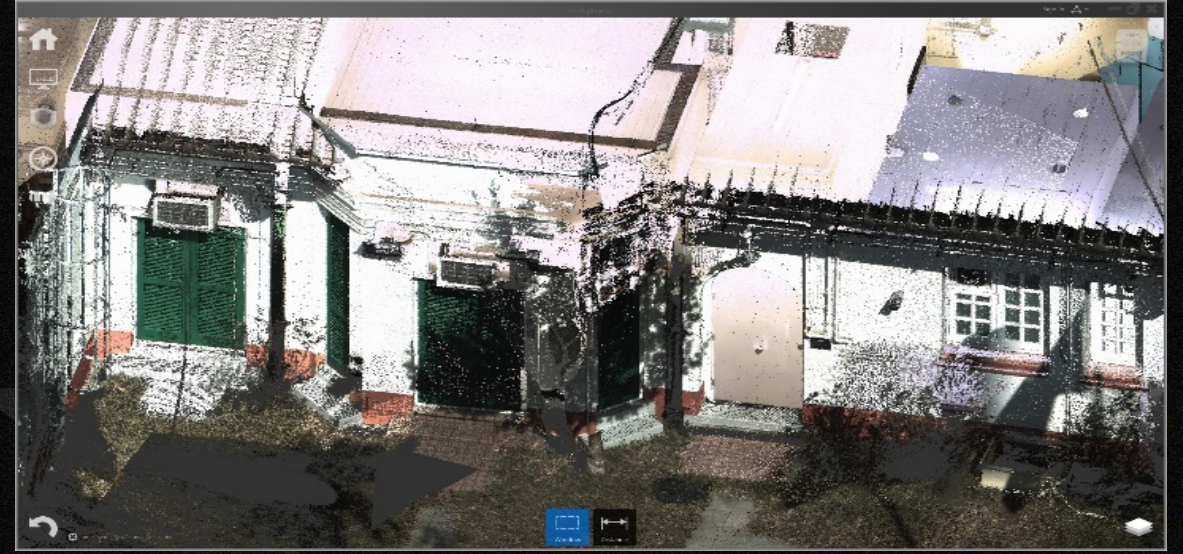
Aerial Photogrammetry

Close Range Photogrammetry

A branch of photogrammetry in which more point cloud data were generated at a closer range than the aerial photogrammetry but shooting with hand held cameras
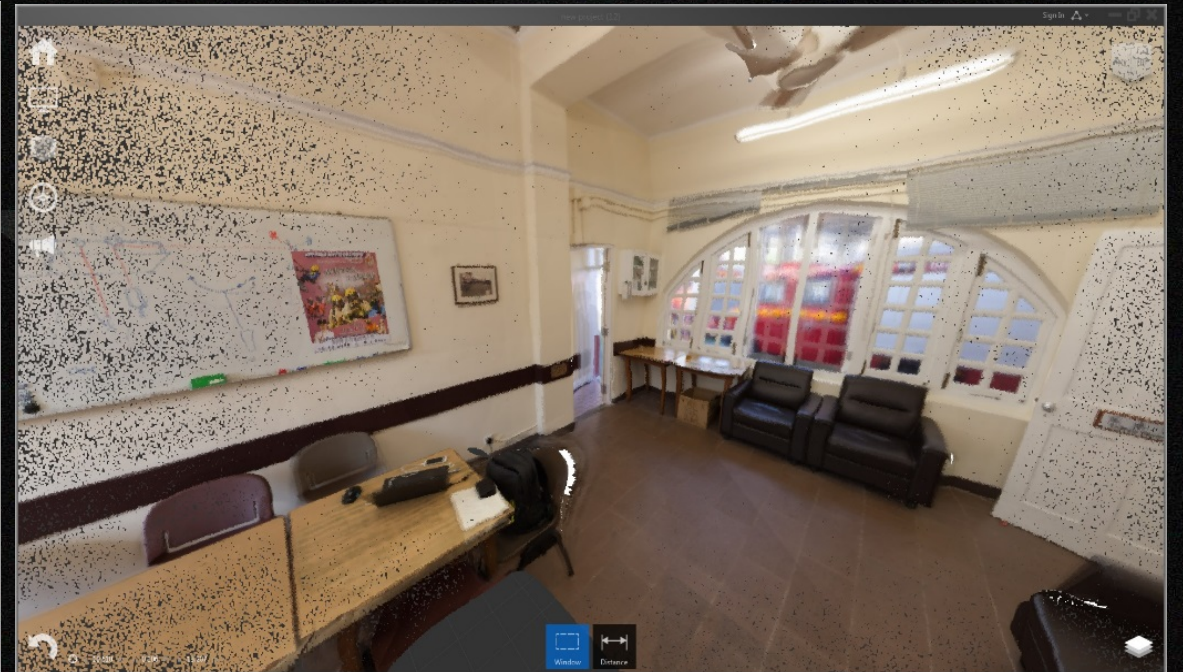

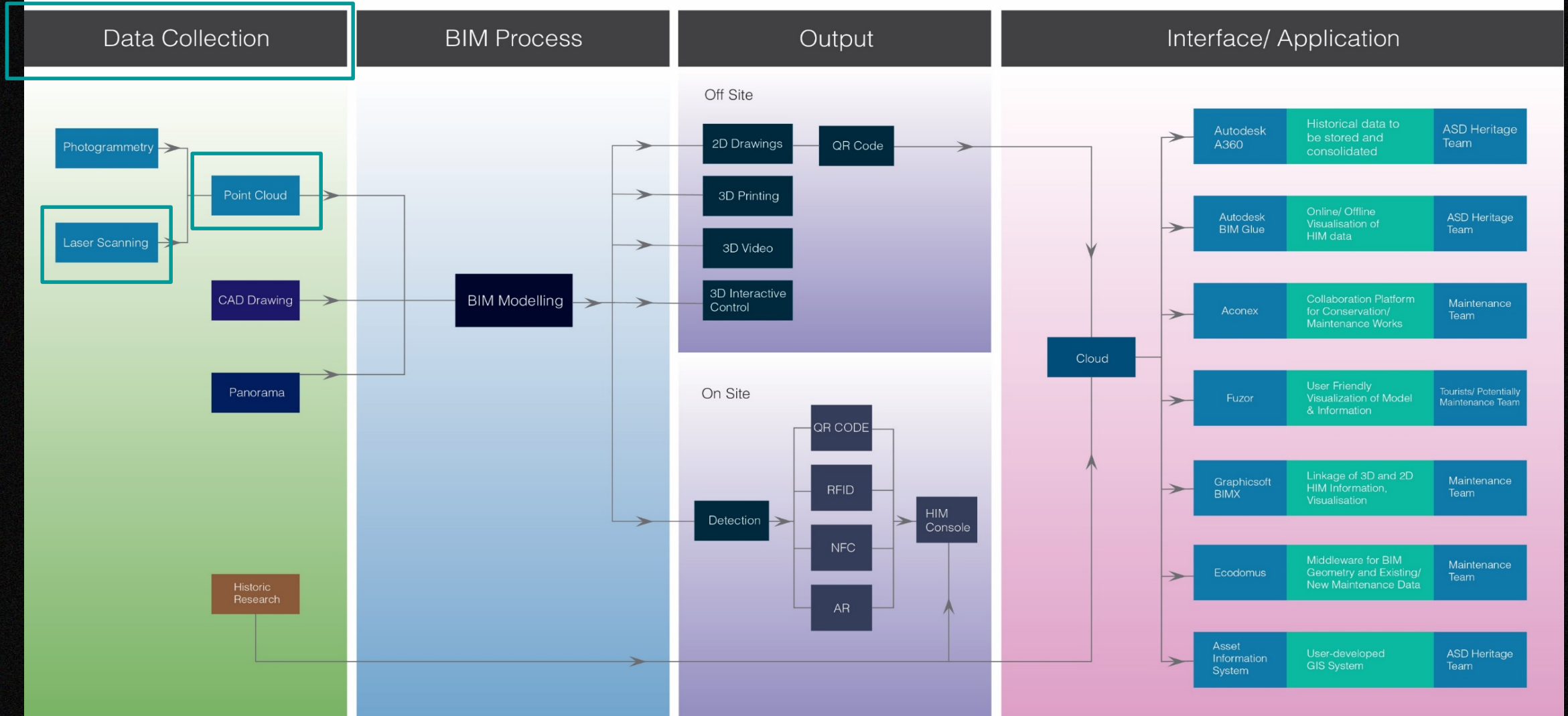
Real

Real

Close Range Photogrammetry

Point Cloud

Point Cloud

HIM Framework

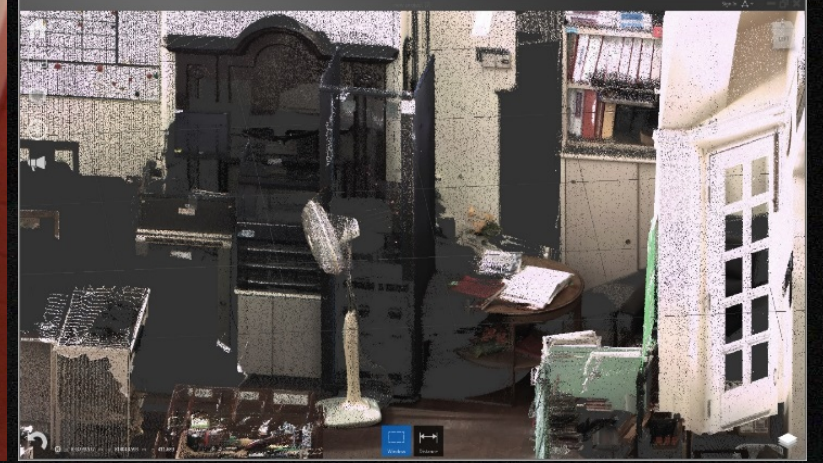Heritage Information Modelling Framework

Laser Scanning & Point Cloud
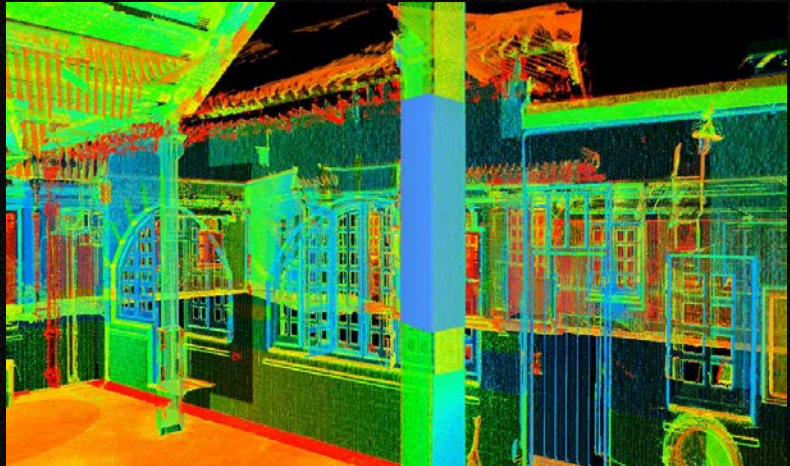
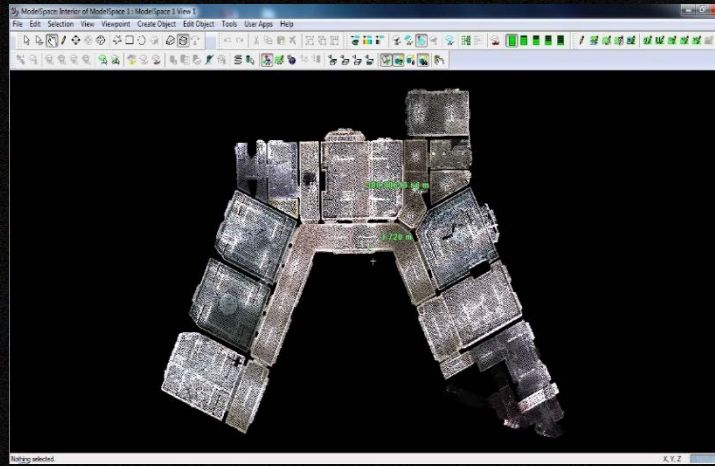Collecting accurate dimensions of the existing environment
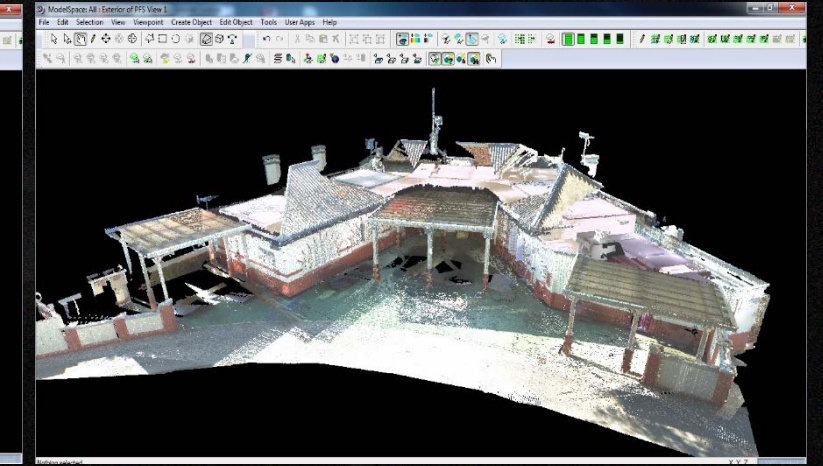

Laser Scanner

Laser Scanner

Point Cloud

Laser Scanning

Point Cloud

Point Cloud

HIM Framework

Heritage Information Modelling Framework

As Built CAD Drawings

HIM Framework

Heritage Information Modelling Framework

| Data Collection | BIM Process | Output | Interface/ Application |
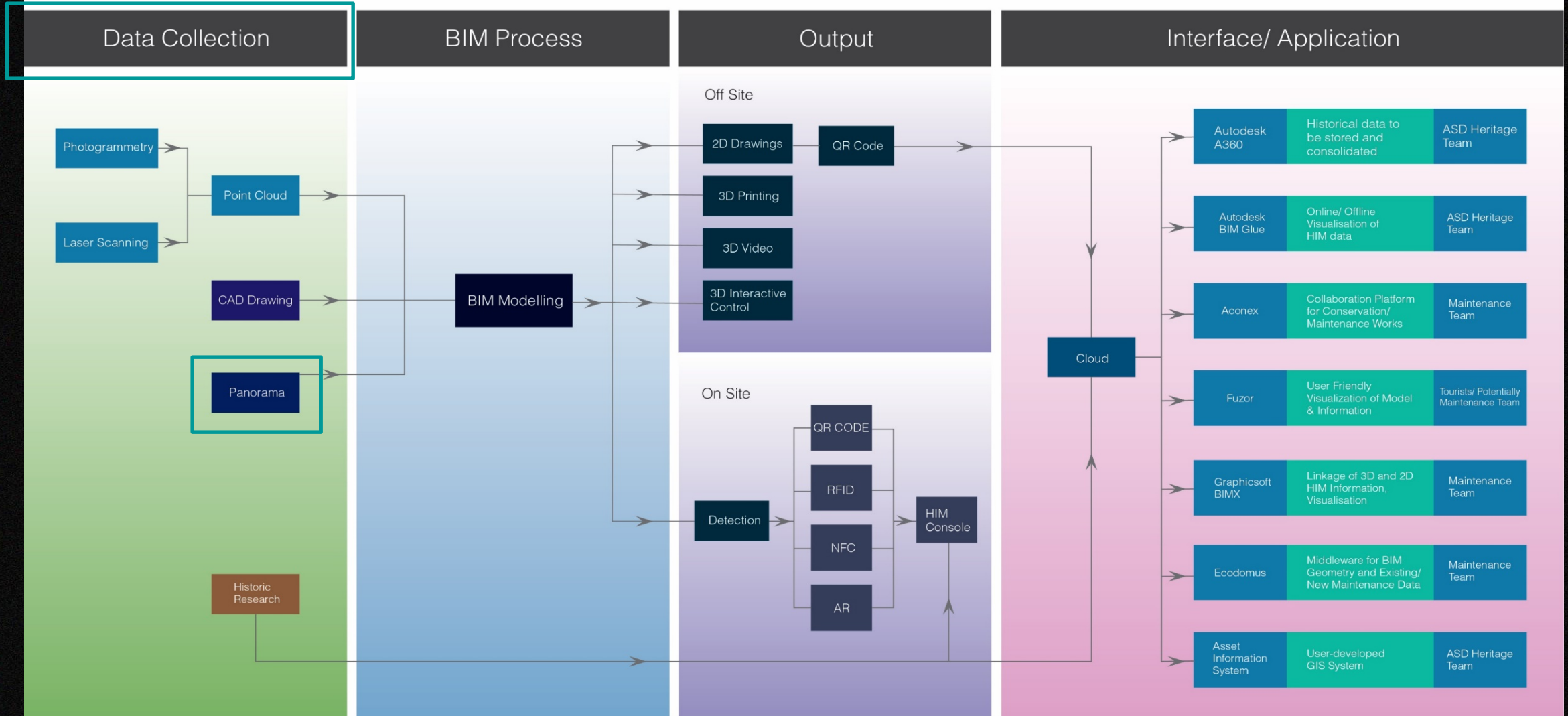
Panorama

BIM Process

HIM Framework

Heritage Information Modelling Framework

BIM Process and Check List for HIM

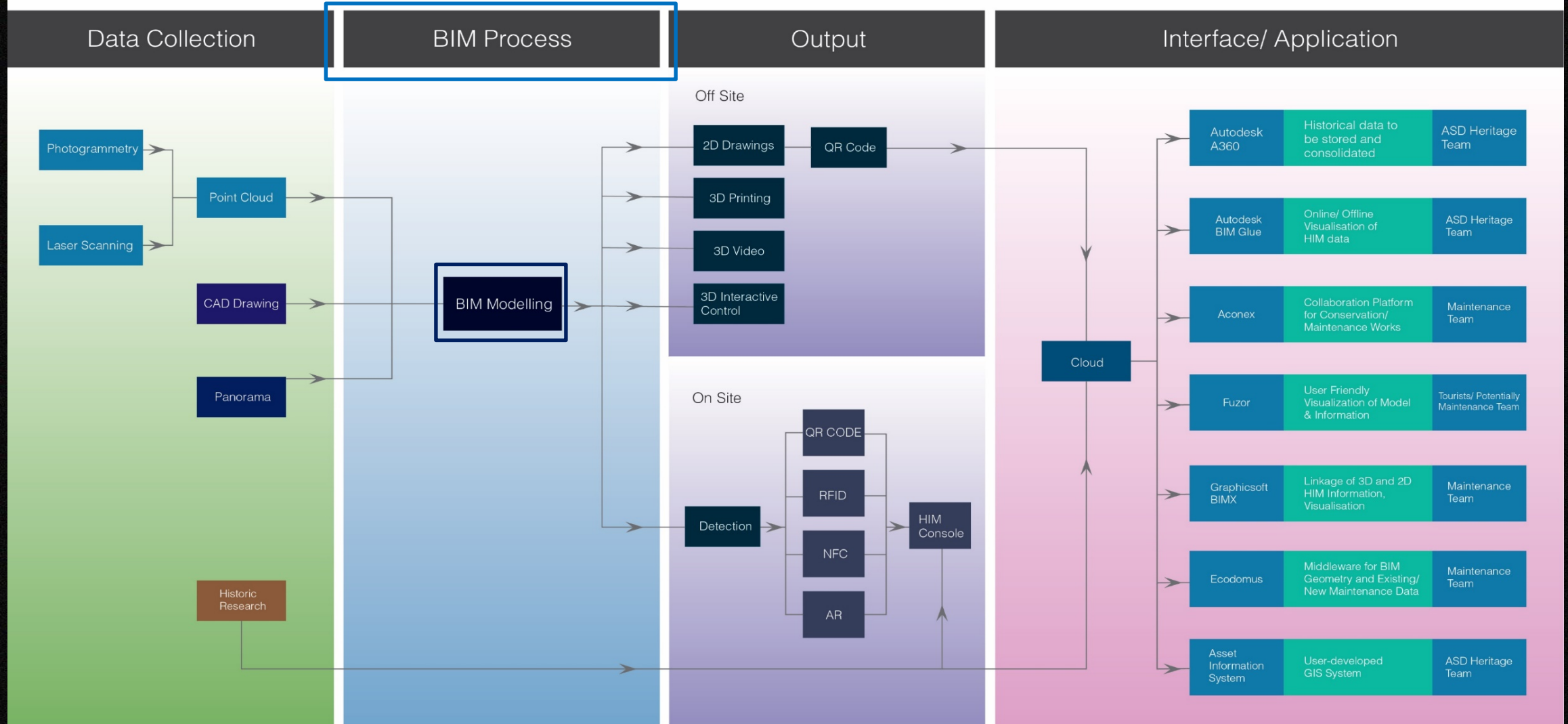BIM Process involves the building up of BIM elements from point cloud files, CAD information and the supplement of panorama and site photos. The common point of all data collection methods is the reference of existing geometry information. As illustrated in the HIM framework, all data collected will be integrated manually in revit for BIM process

- GIS data including Co-ordinations and Points

- 3D Spatial Data (3D-BIT00) Maps from Lands Department

- Tree Survey Plan

- Breaking up of Files

- Timeline (phase setting)

- CAD reference

- Point Cloud from Aerial Photogrammetry

- Point Cloud from Close Up Photogrammetry

- Point Cloud from Laser Scanning

- Reference from Panorama

- Materials and colour

- Product Catalogue

- O&M information/record

- Aerial photos of district in past years

- District maps of heritage in past years

- Any records of renovation inside(past CAD, Documents to mark up all changes)

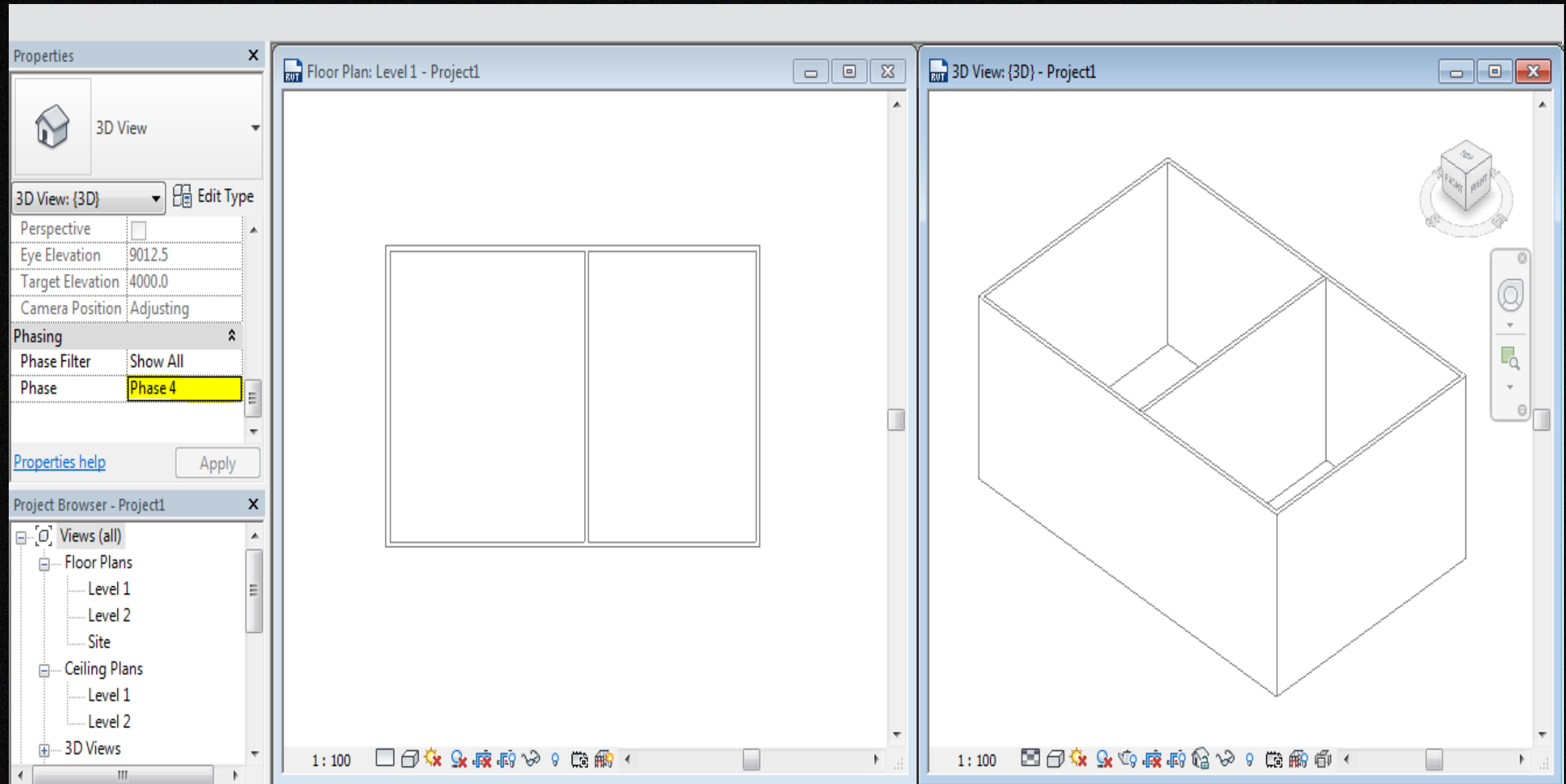- Defining CDEs from heritage report

NCID
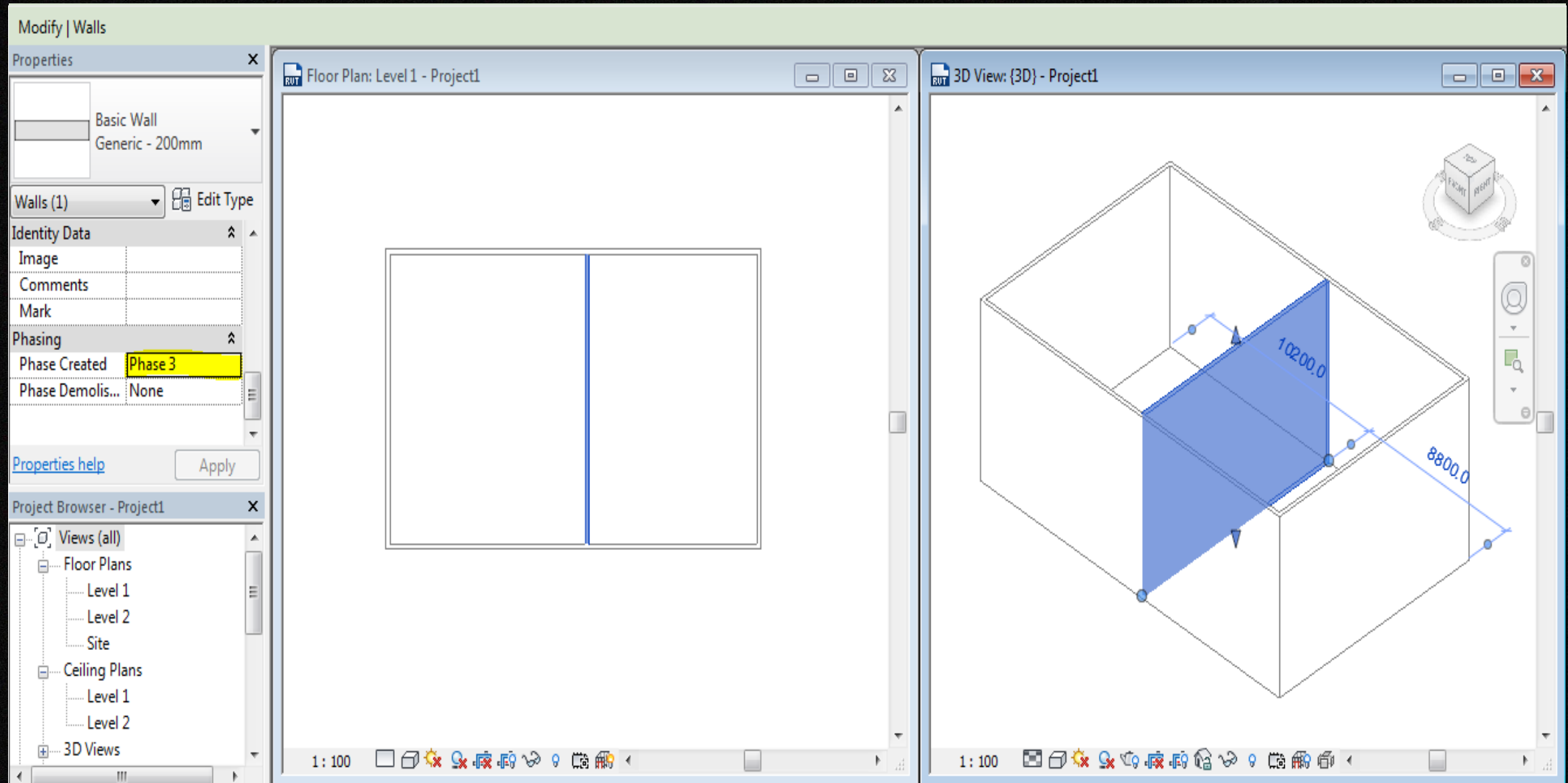
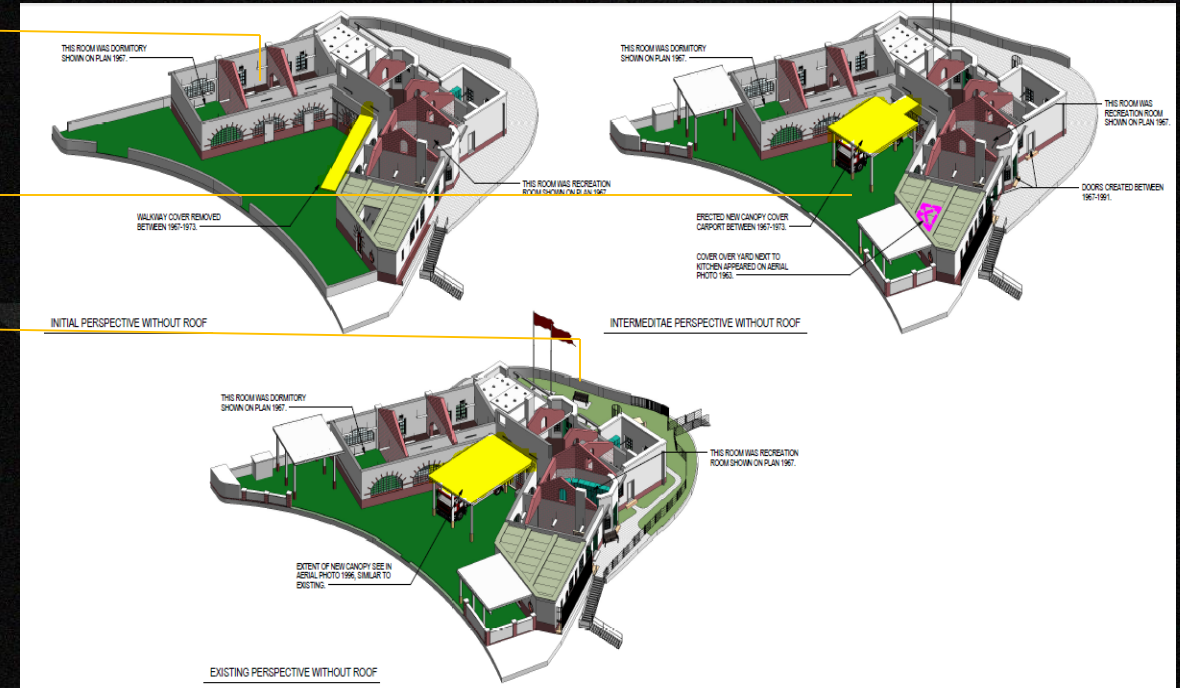# Timeline - Phasing

Timeline - Phasing

Phasing

Initial Stage – Original School configuration

Intermediate Stag**e** -1967 when the School was

converted to a Fire Station

Existing Stage – the current status as it stands

Phase 1 = Phase 1 (Initial)

Phase 2 = Phase 1 + Phase 2

Phase 3 = Phase 1 + Phase 2 + Phase 3

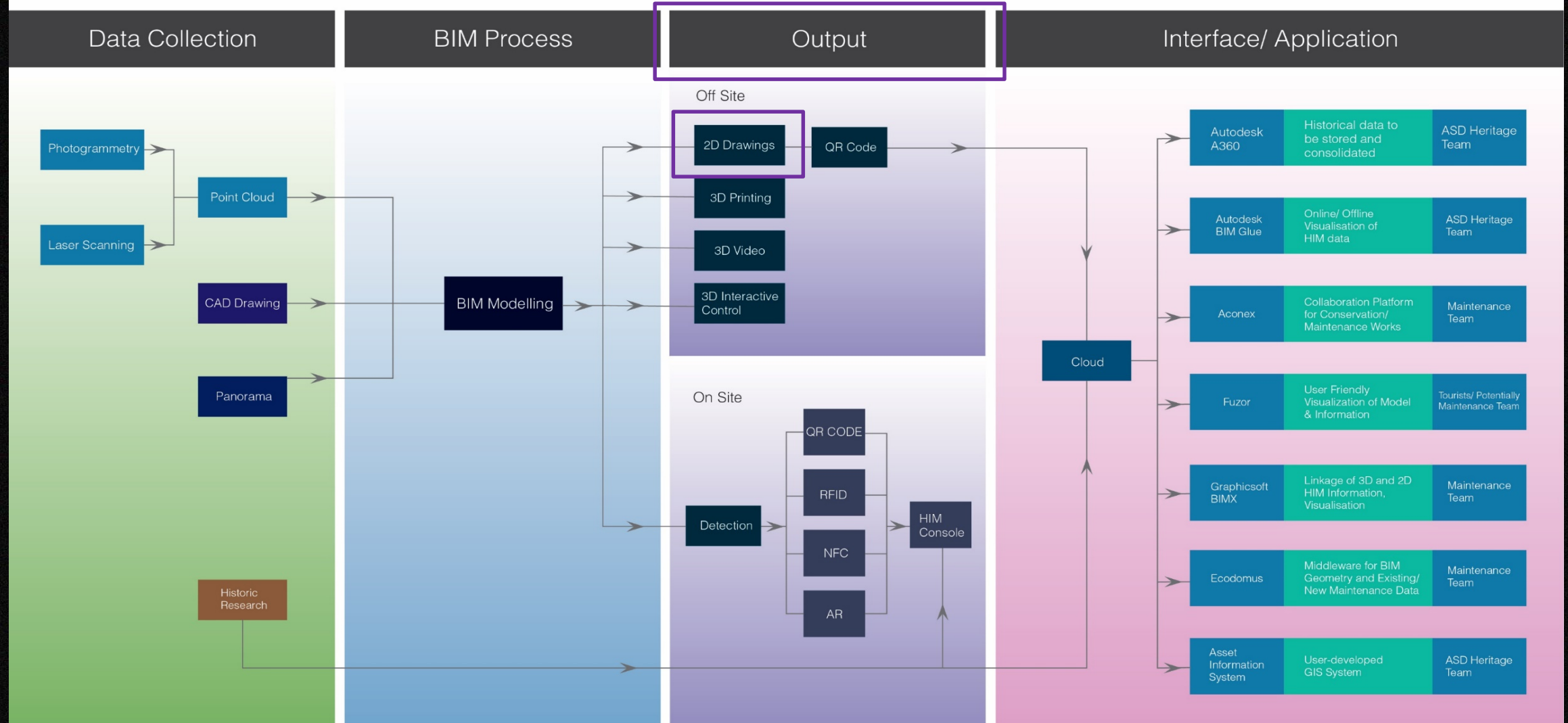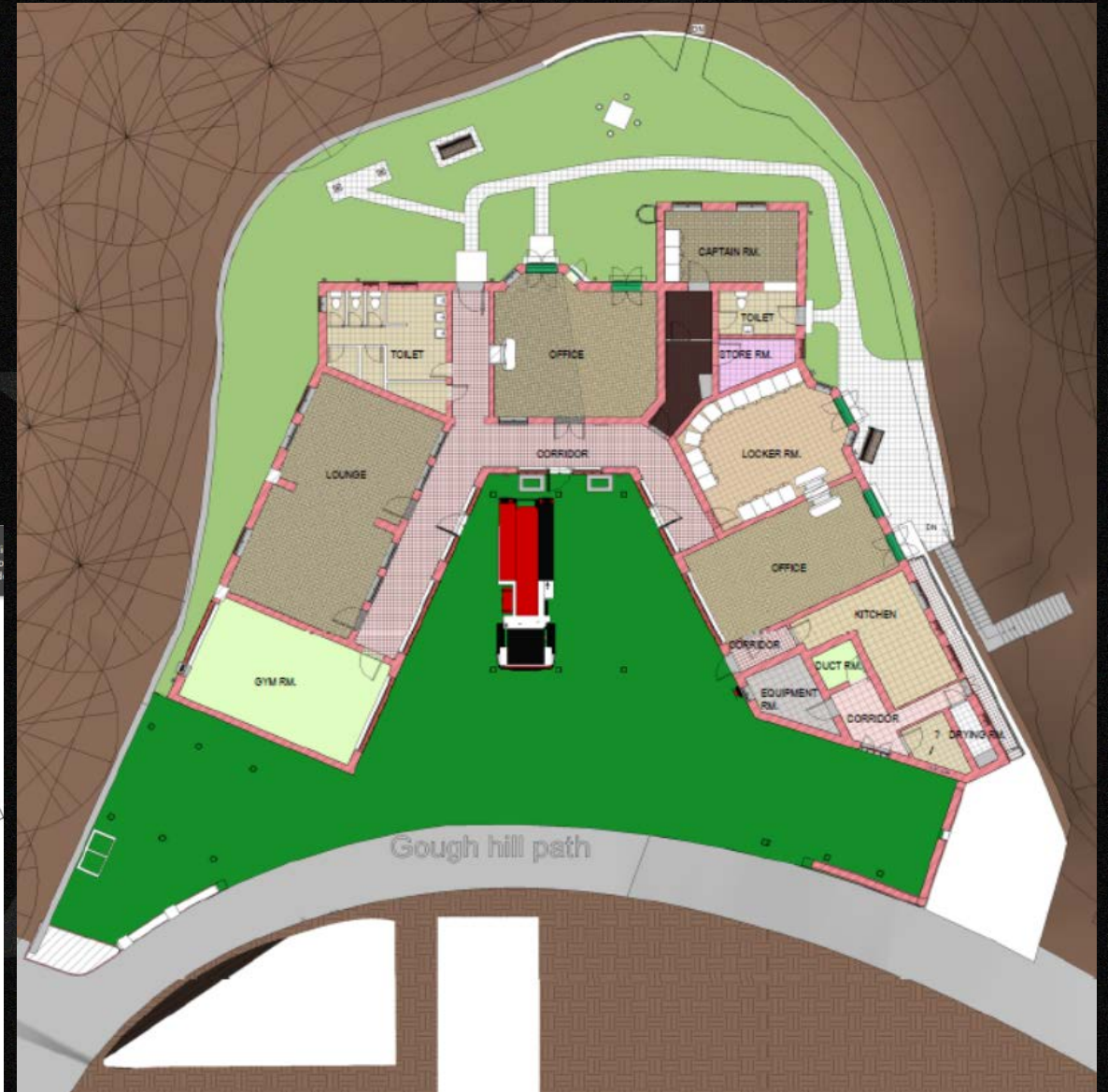Phase 4 = Phase 1 + Phase 2 + Phase 3 + Phase 4

HIM Framework
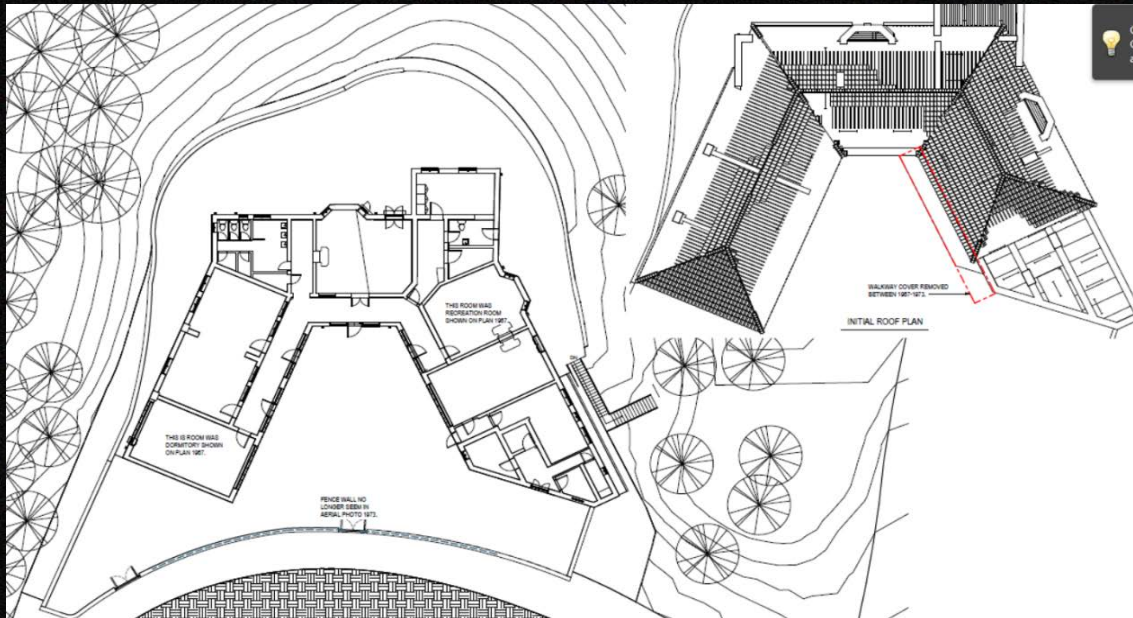
Heritage Information Modelling Framework

Output (Off-site) 2D Drawings

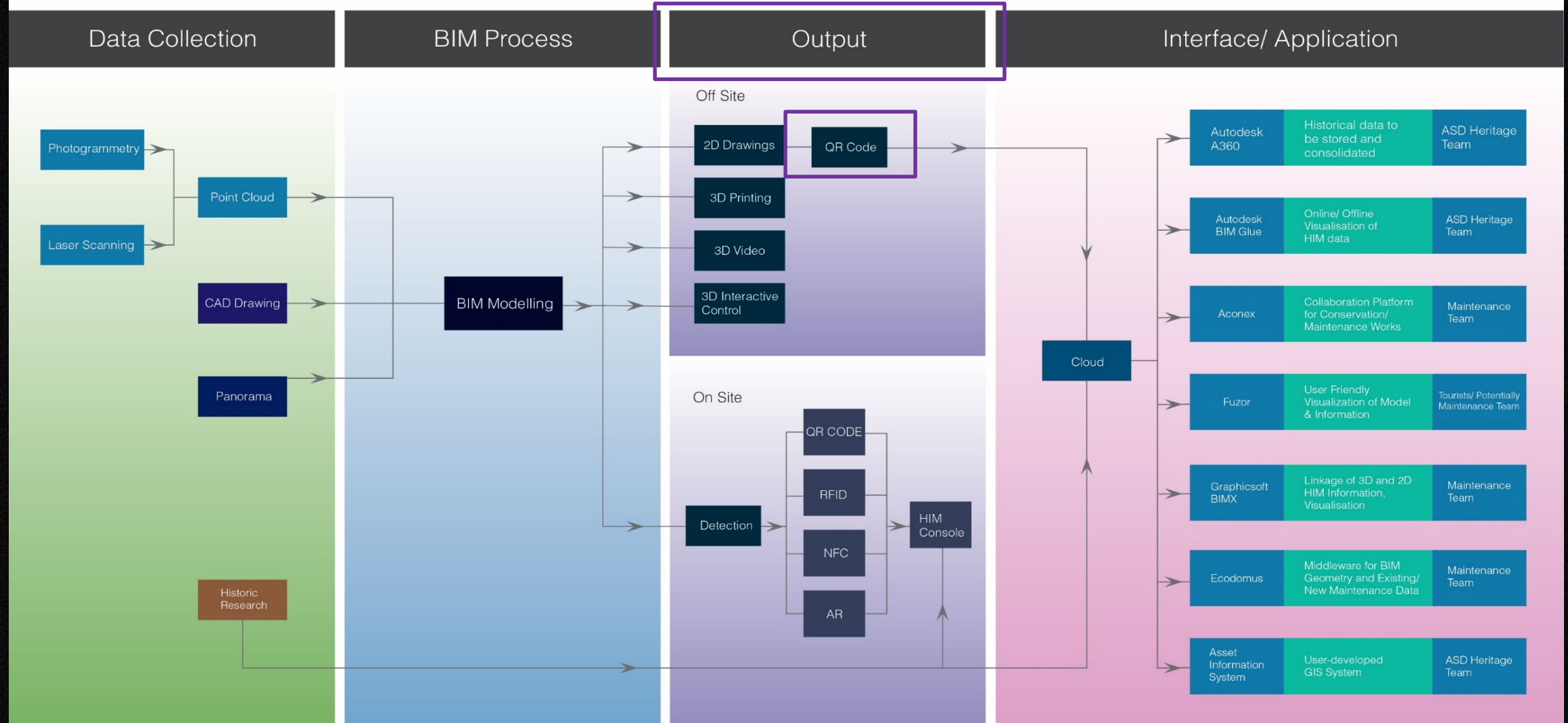Production of traditional drawings

HIM Framework

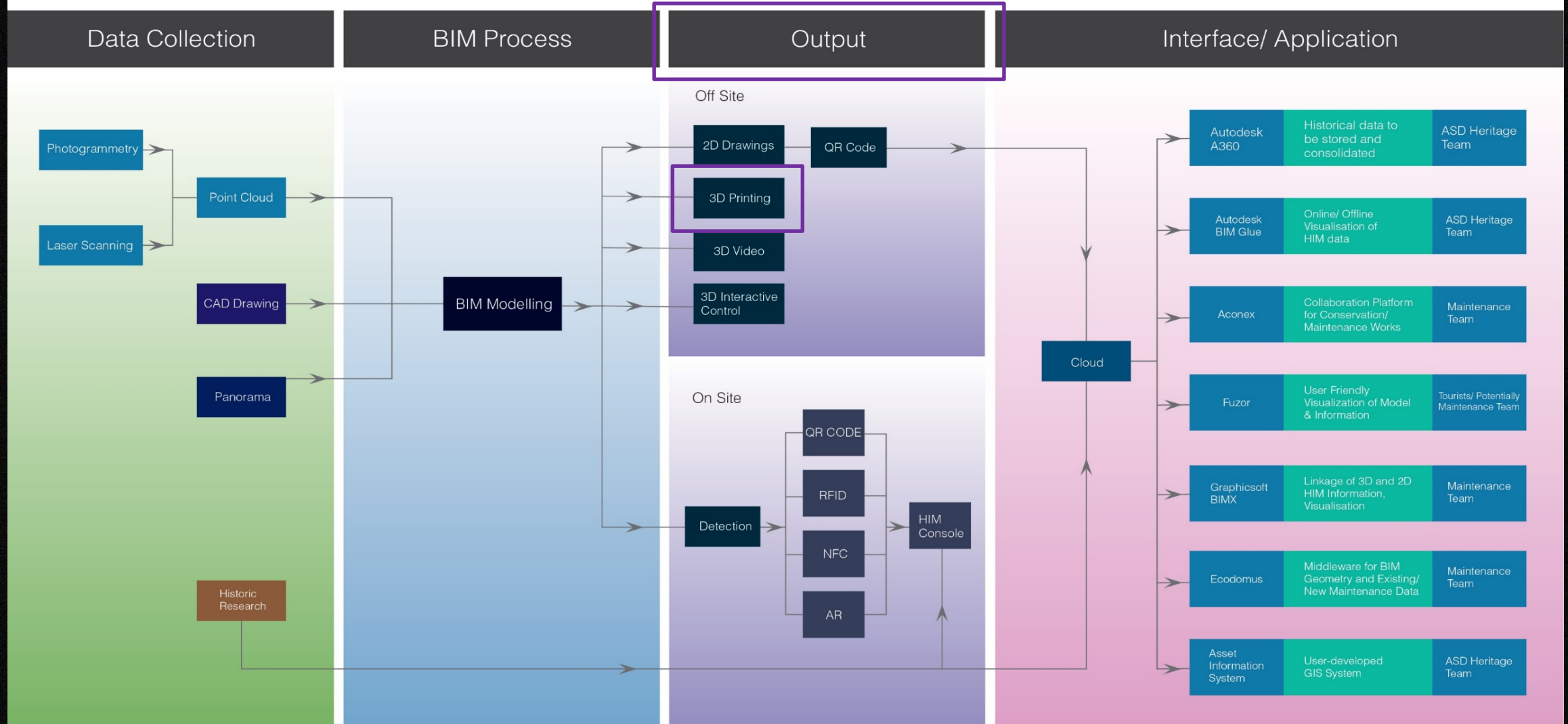Heritage Information Modelling Framework

Output (Off-site) QR Code on Drawings
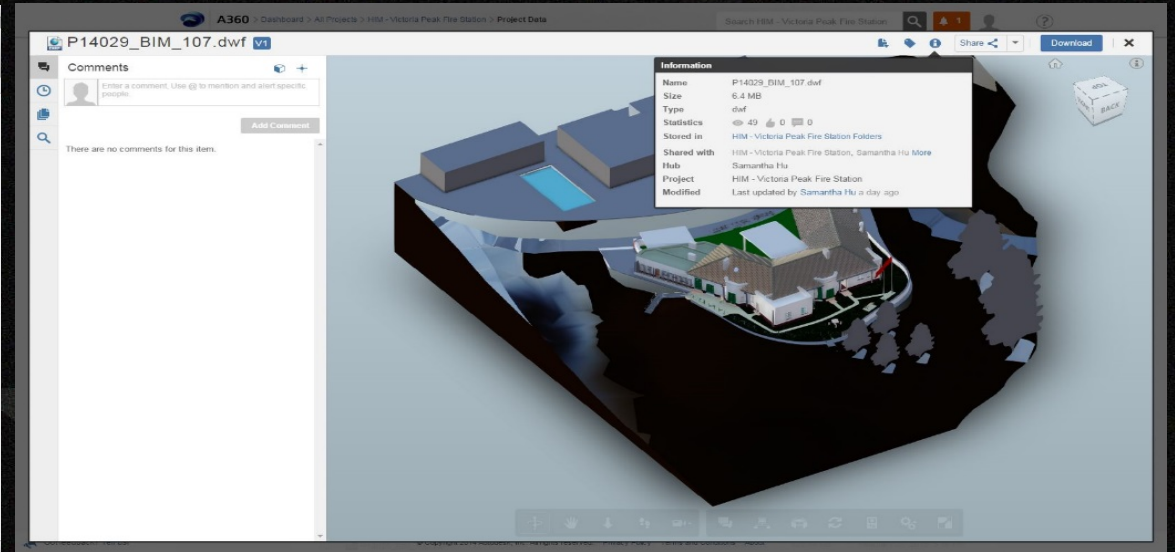
HIM Framework

Heritage Information Modelling Framework

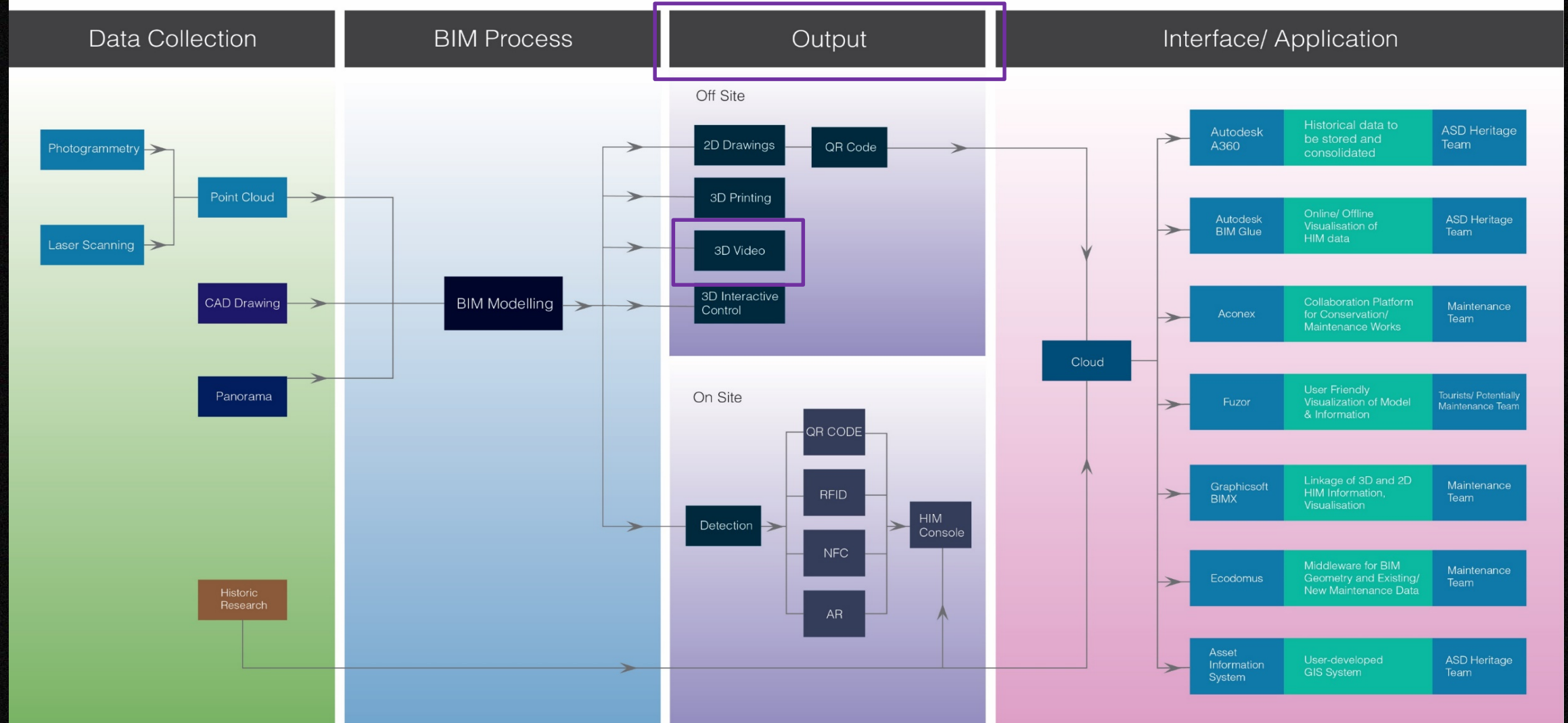# Output (Off-site) Renderings

Output (Off-site) 3D Drawings

Exploded Axonometric Diagram

Utilities
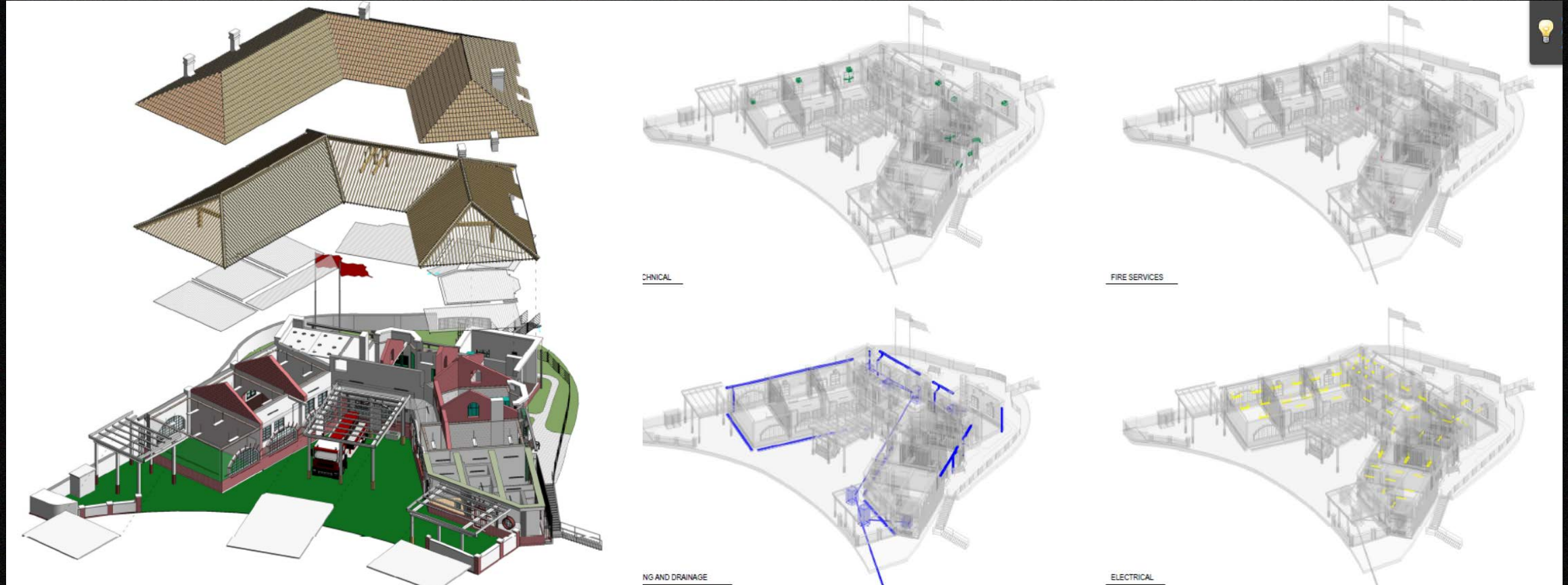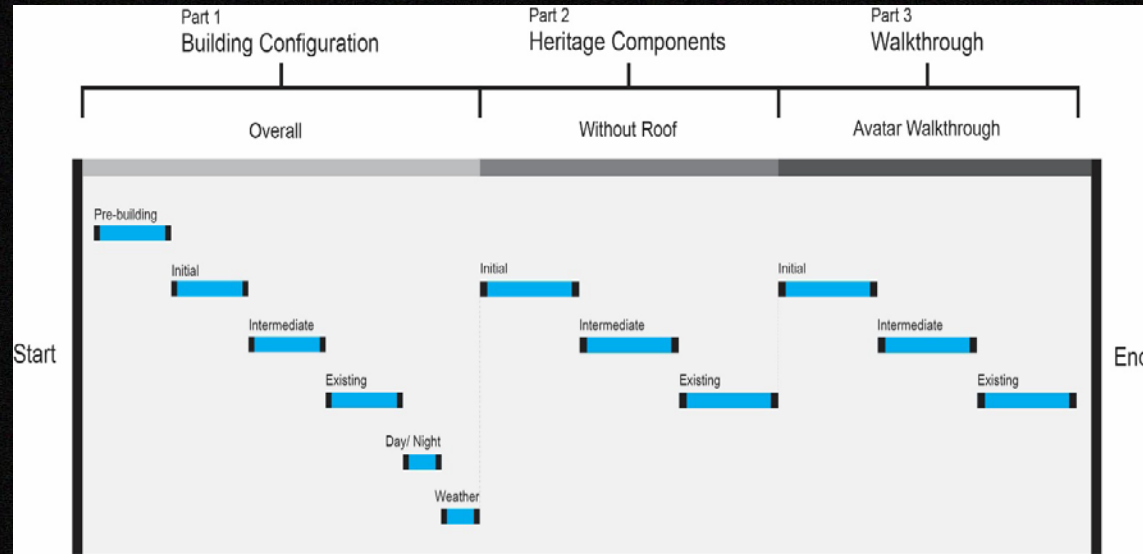
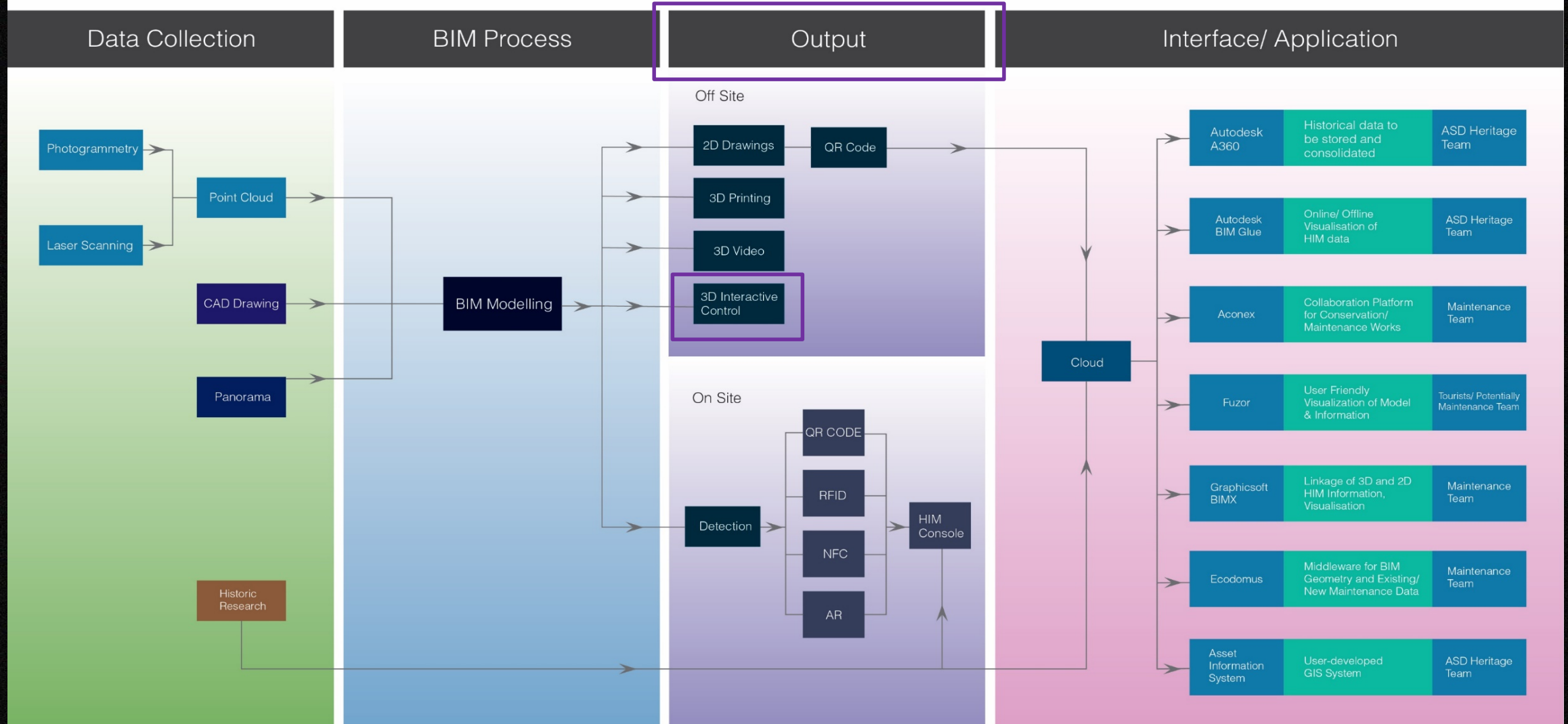# HIM Framework

Heritage Information Modelling Framework

Output (Off-site) 3D Video
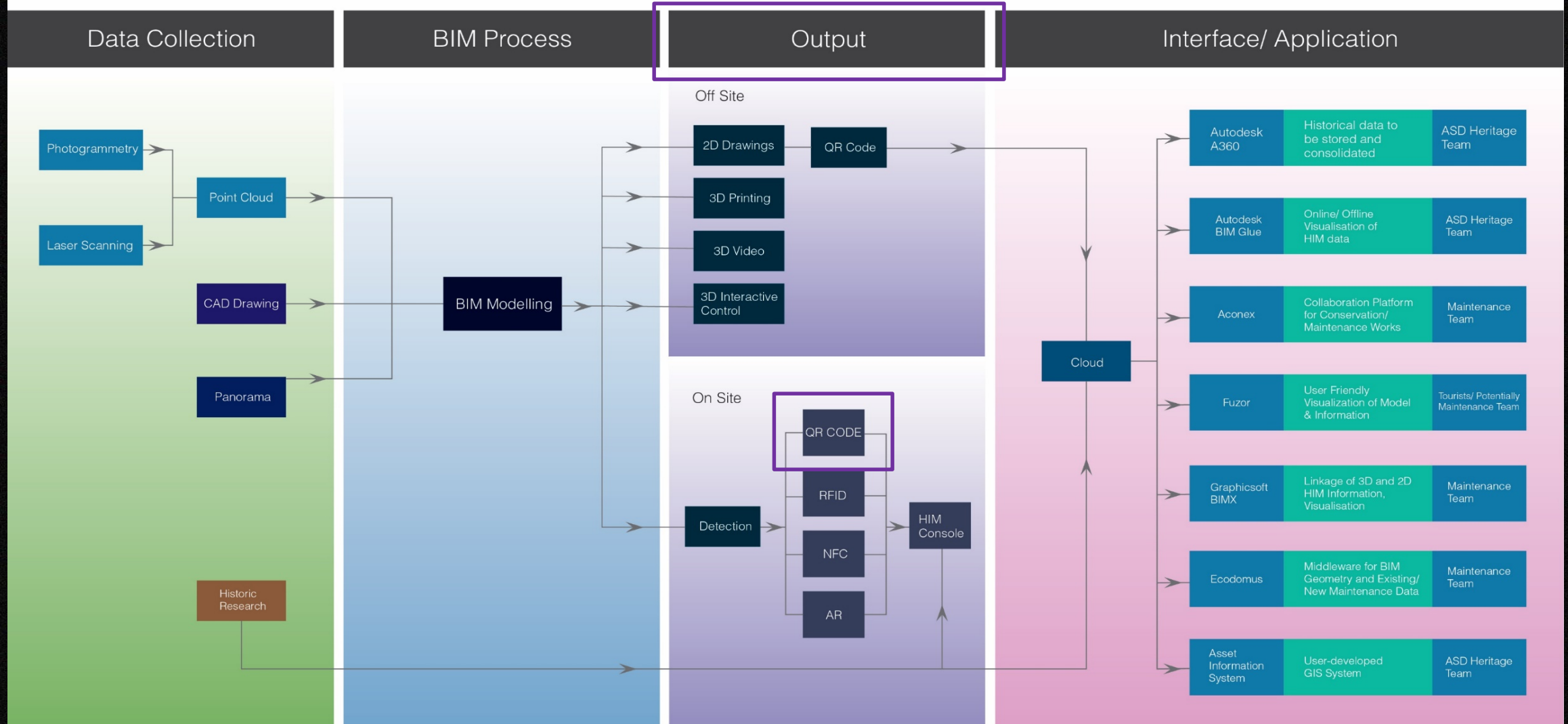
HIM Framework

Heritage Information Modelling Framework
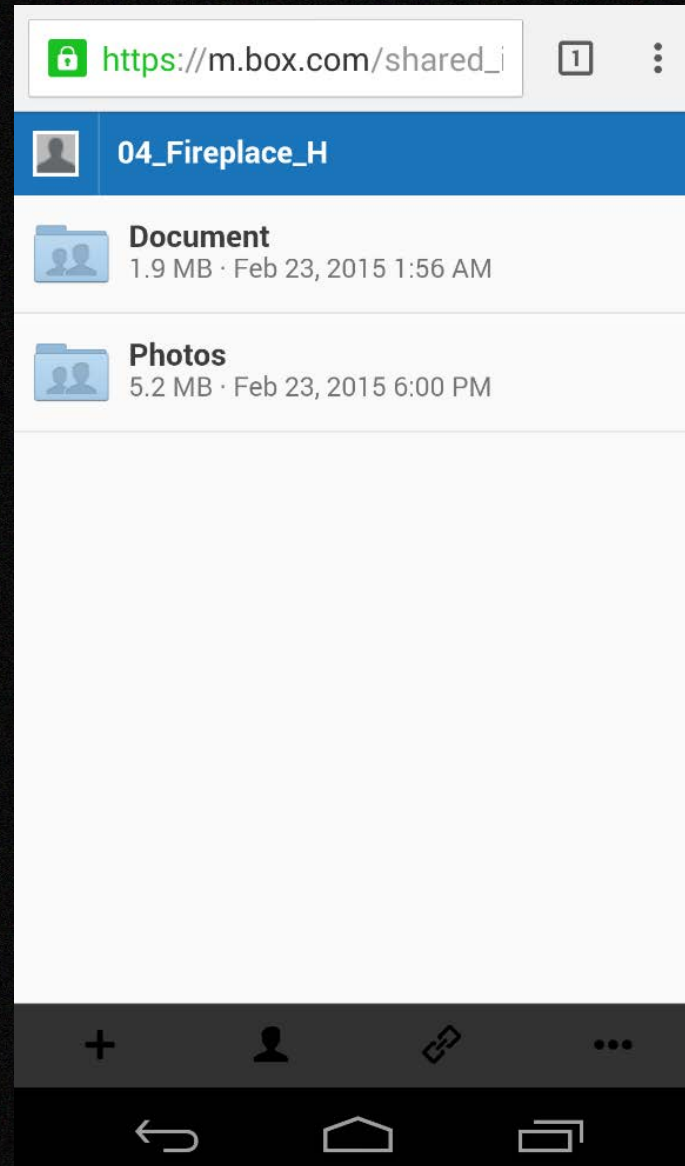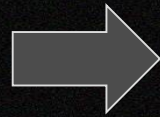
Output (Off-site) 3D Interactive Tool - Fuzor
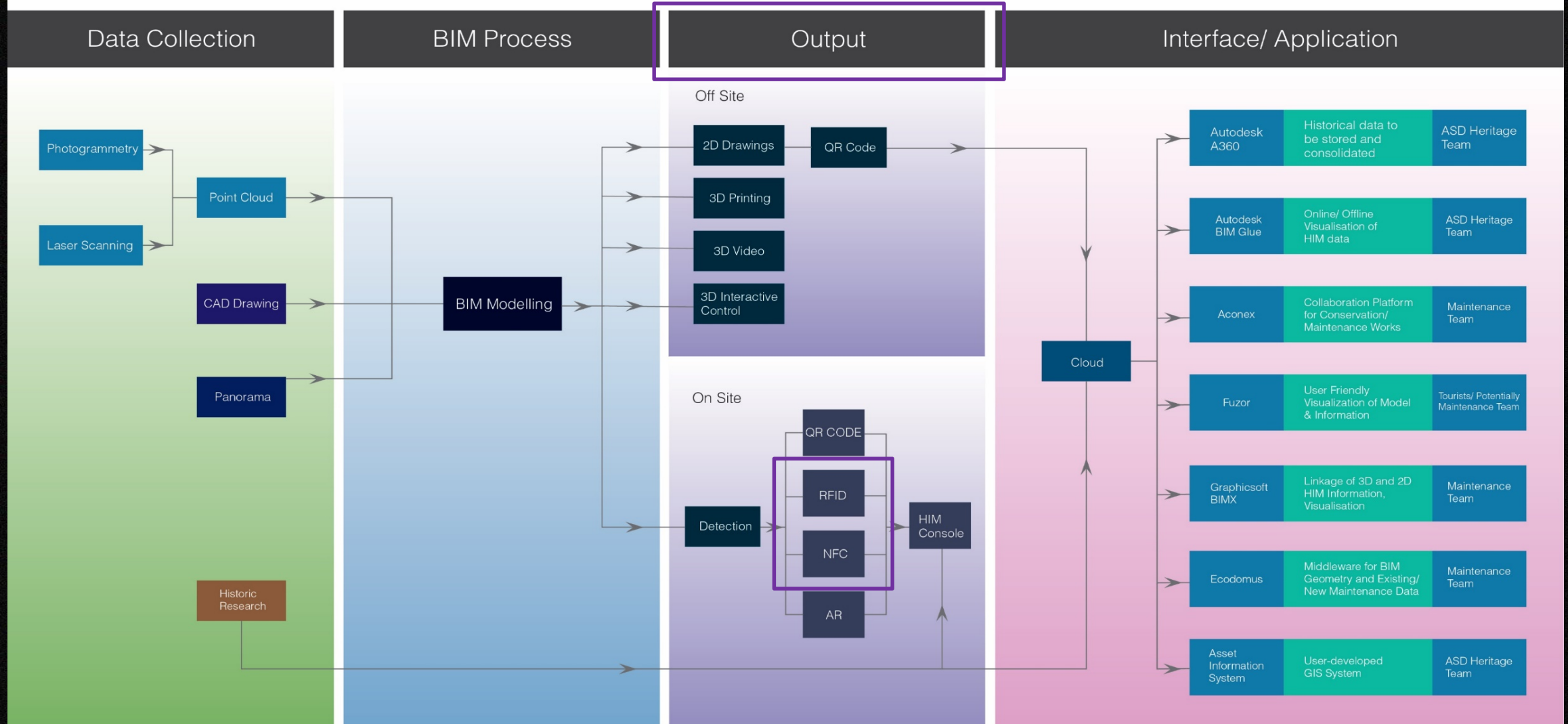
HIM Framework

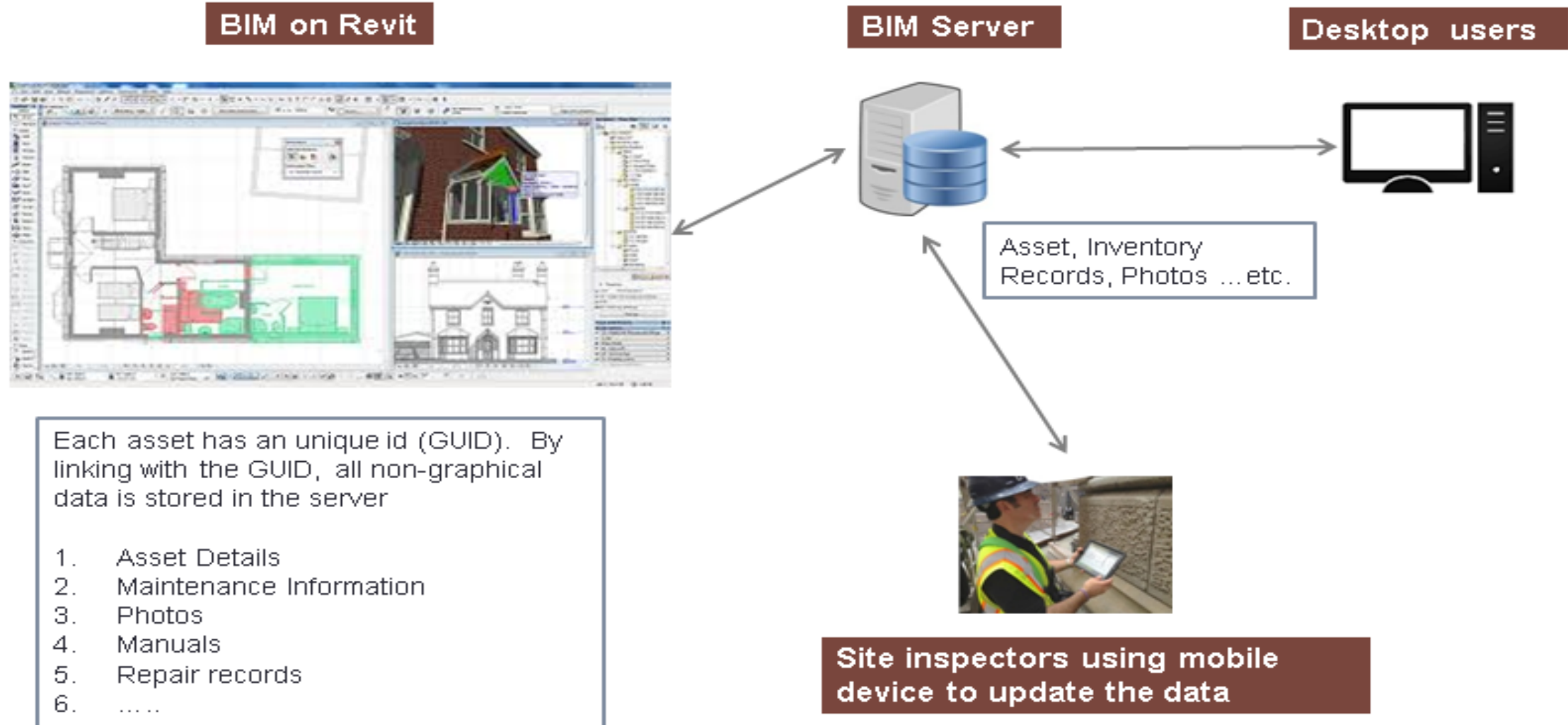Heritage Information Modelling Framework

Detection - QR Code
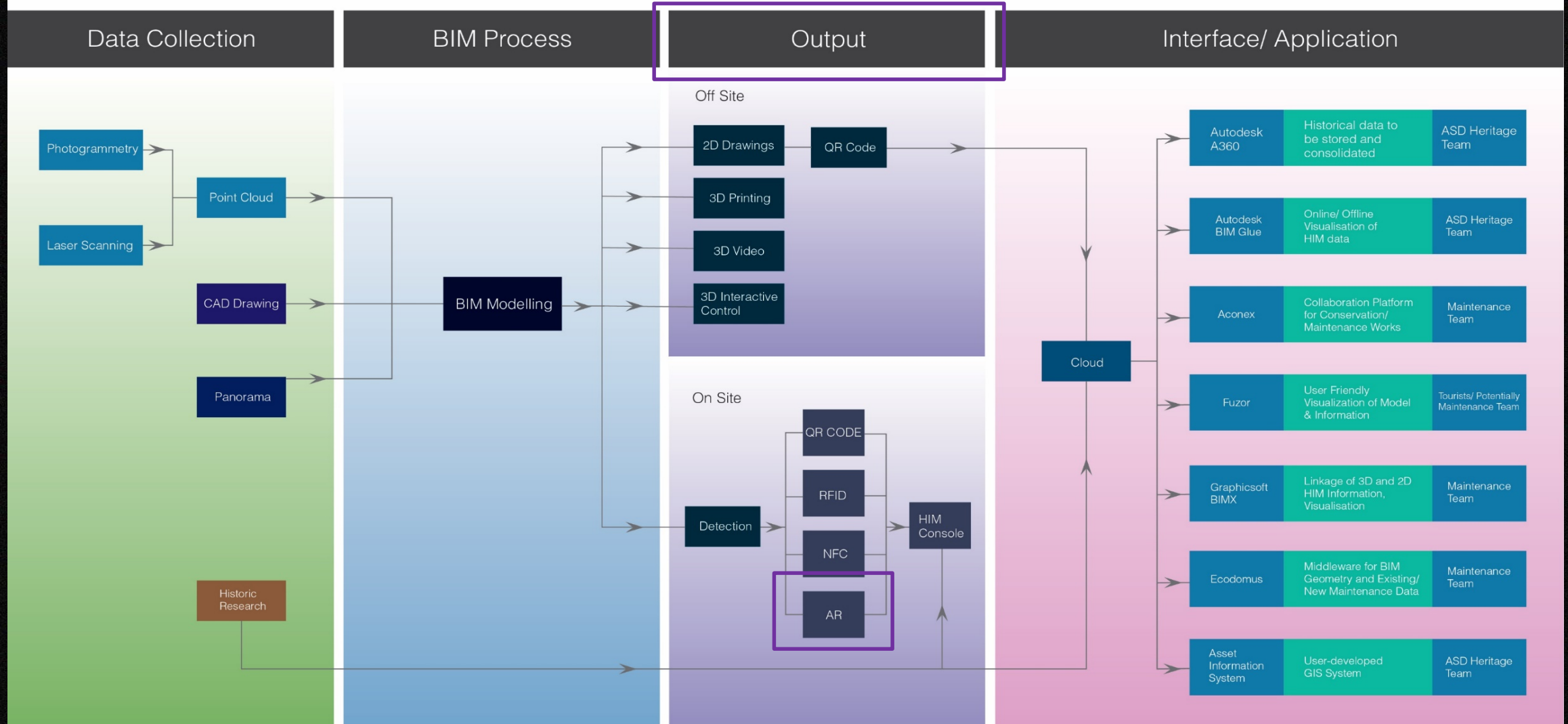
HIM Framework

Heritage Information Modelling Framework

Detection - RFID and NFC

BIM on Revit

BIM Server

Desktop users

Asset, Inventory Records, Photos ...etc.

Each asset has an unique id (GUID). By linking with the GUID, all non-graphical data is stored in the server

1. Asset Details
2. Maintenance Information
3. Photos
4. Manuals
5. Repair records
6. .....

Site inspectors using mobile device to update the data

HIM Framework

Heritage Information Modelling Framework

Detection - Augmented Reality

Microsoft Kinect ONE

Google Project Tango
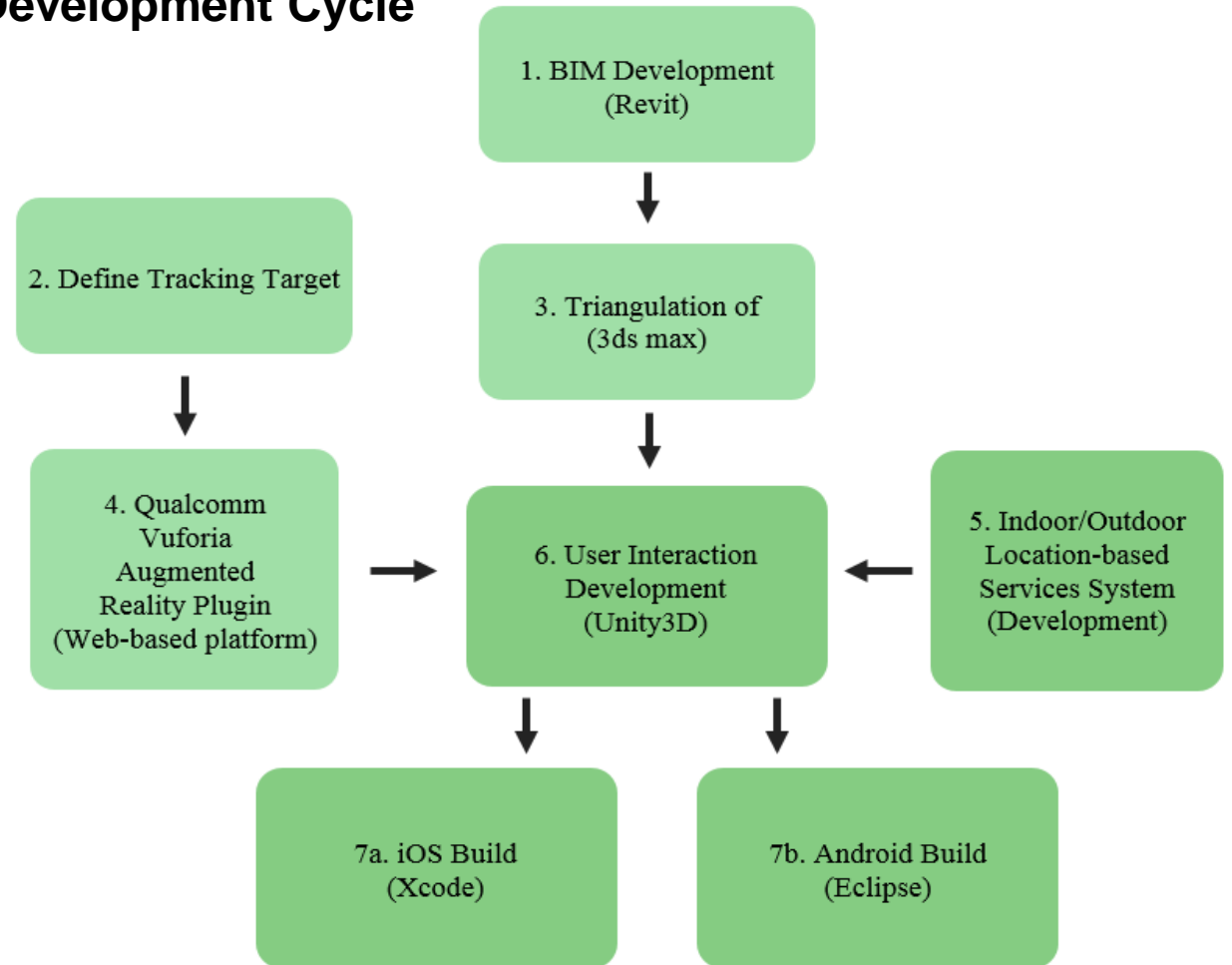
Microsoft Hololens

Development Cycle

1. BIM Development (Revit)

2. Define Tracking Target

3. Triangulation of (3ds max)

4. Qualcomm Vuforia Augmented Reality Plugin (Web-based platform)

5. Indoor/Outdoor Location-based Services System (Development)

6. User Interaction Development (Unity3D)

7a. iOS Build (Xcode)

7b. Android Build (Eclipse)

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Detection - Augmented Reality

Implementation

Capturing the site GIS data for best viewing area

Screen capture

Future possibilities of prototyping

Simulate and map non-existing

groups of buildings / environment

for users' vision (outdoor)

Building Maintenance Applications using Augmented Reality 3D Tracker

HIM Framework

Heritage Information Modelling Framework
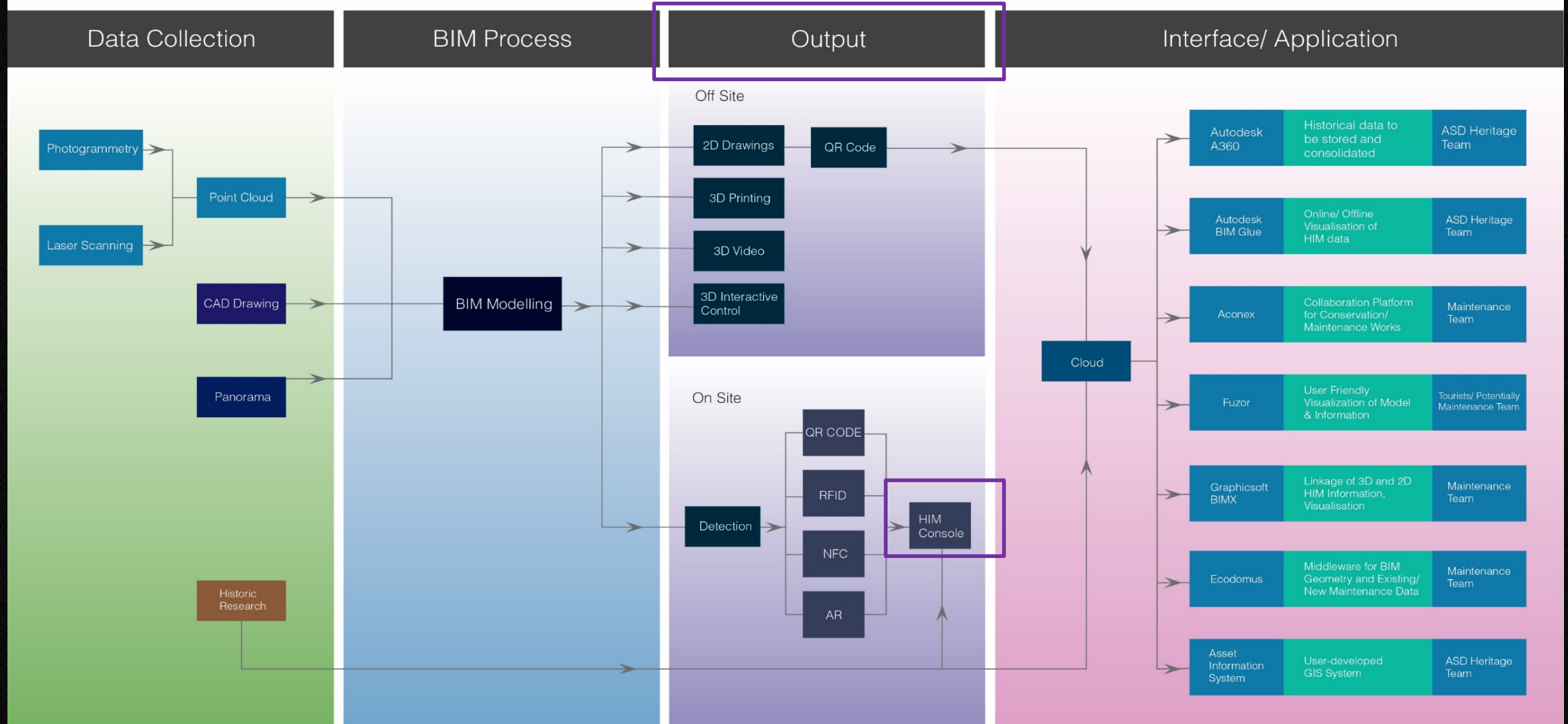
Detection HIM Console

Login Page

Detection HIM Console

3D View Page (1963)

3D View Page (1986)
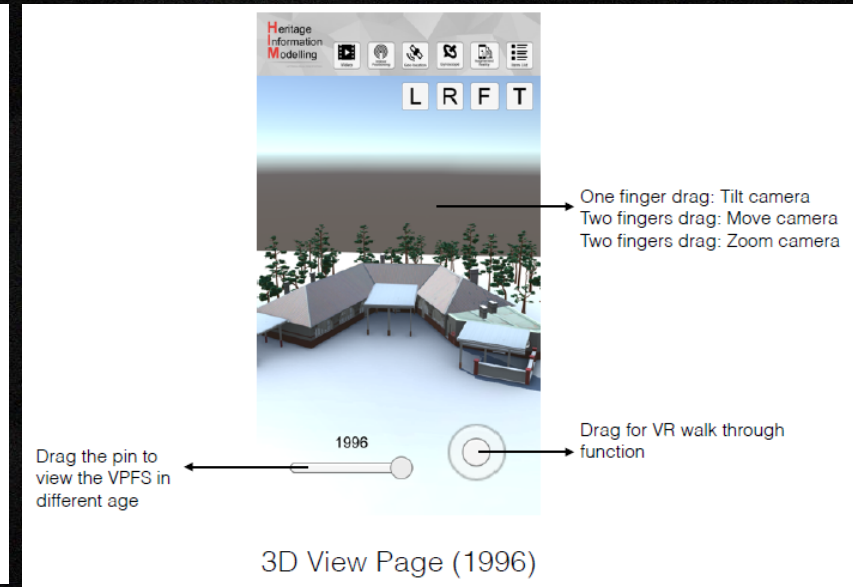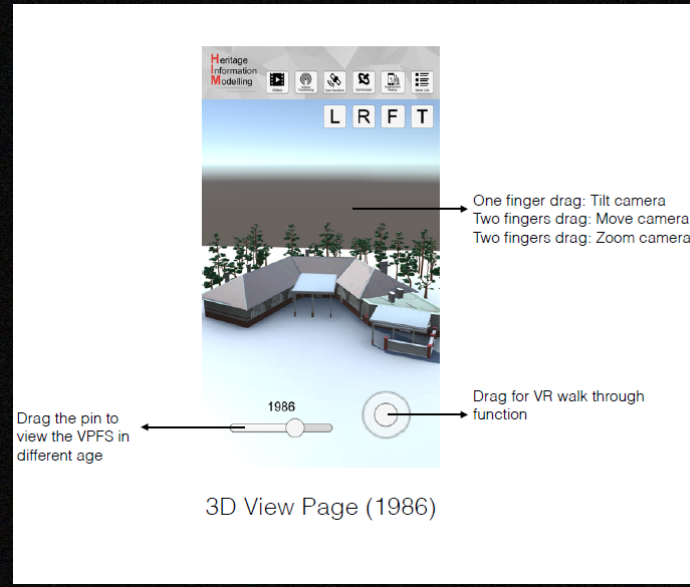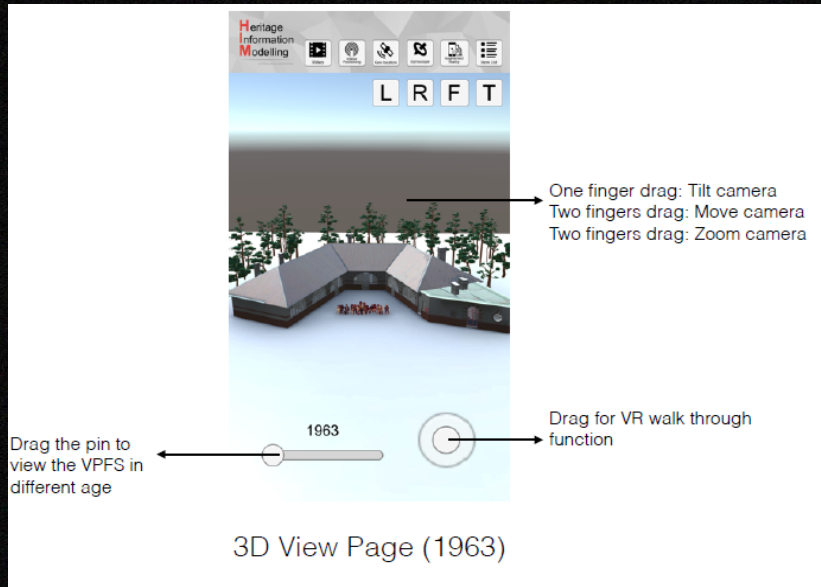
3D View Page (1996)

Detection HIM Console
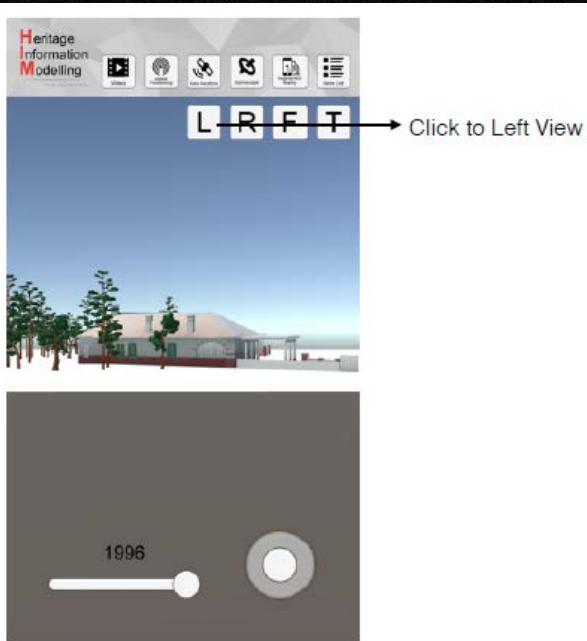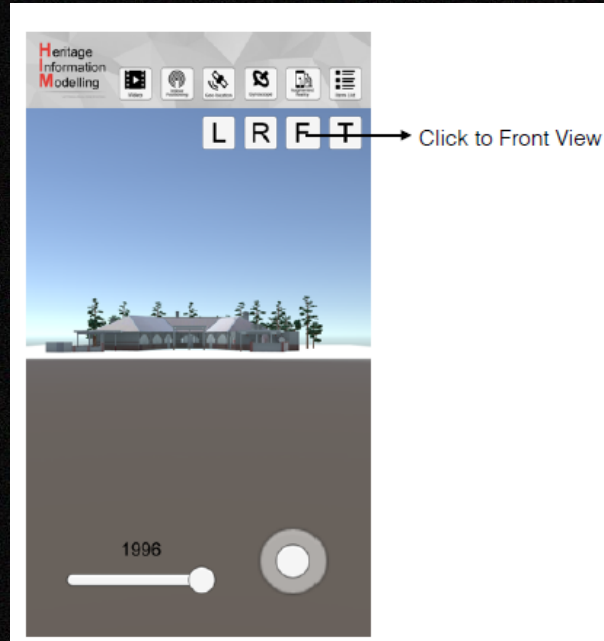
3D View Page (Left)

3D View Page (Front)
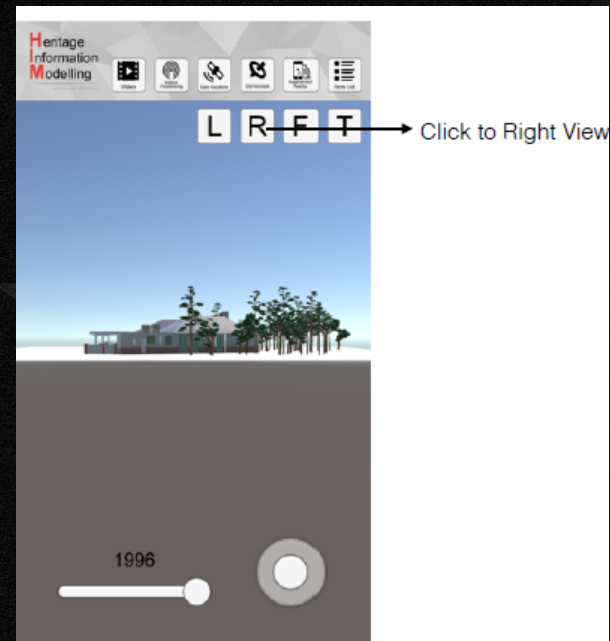
3D View Page (Right)
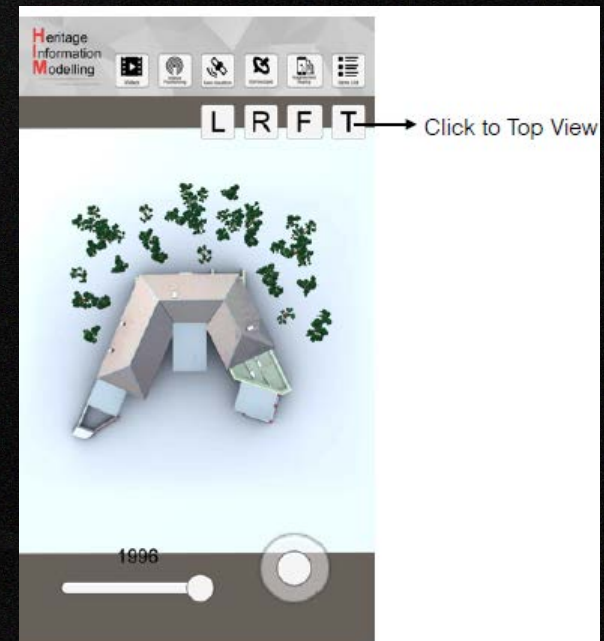
3D View Page (Top)

Detection HIM Console

Camera mapping with the iBeacon signal

Indoor positioning mode
Current camera located by indoor positing system (iBeacon)

Drag the pin to view the VPFS in different age

VR walk through function locked, indoor positioning override the camera movement control

3D View Page (Indoor positioning mode)

Historical item list

FIREPLACE

LOW_ARCH WINDOW

BRICK WALL W/ CIRCULAR ARCH

BAY WINDOW

BRASS PLAGUE

OLD HANGING LIGHT

Click to view item detail (multimedia)

OLD ALARM BELL

FLUORESENT LAMP

FIRE EXTINGUISHER

ROOF AND CHINESE TILES

SITE CHANGE

Historical Item List Page

Detection HIM Console

Camera mapping with the iBeacon signal

Click on the dot to view historical / maintenance details

VR walk through function locked, indoor positioning override the camera movement control

Drag the pin to view the VPFS in different age

3D View Page (Indoor positioning mode)

Back to Item List Page

Back to 3D Page

Photo album

Item Name: FIREPLACE
Manufacturer:
Brandname:
Model:
Key Dimension:
Key Material:
Inspection Date: 2015-09-04T02:58:4
4.000Z
Product Catalog: 1

Click to open Document in PDF viewer

Assest Information Page (Admin login ONLY)

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Detection HIM Console
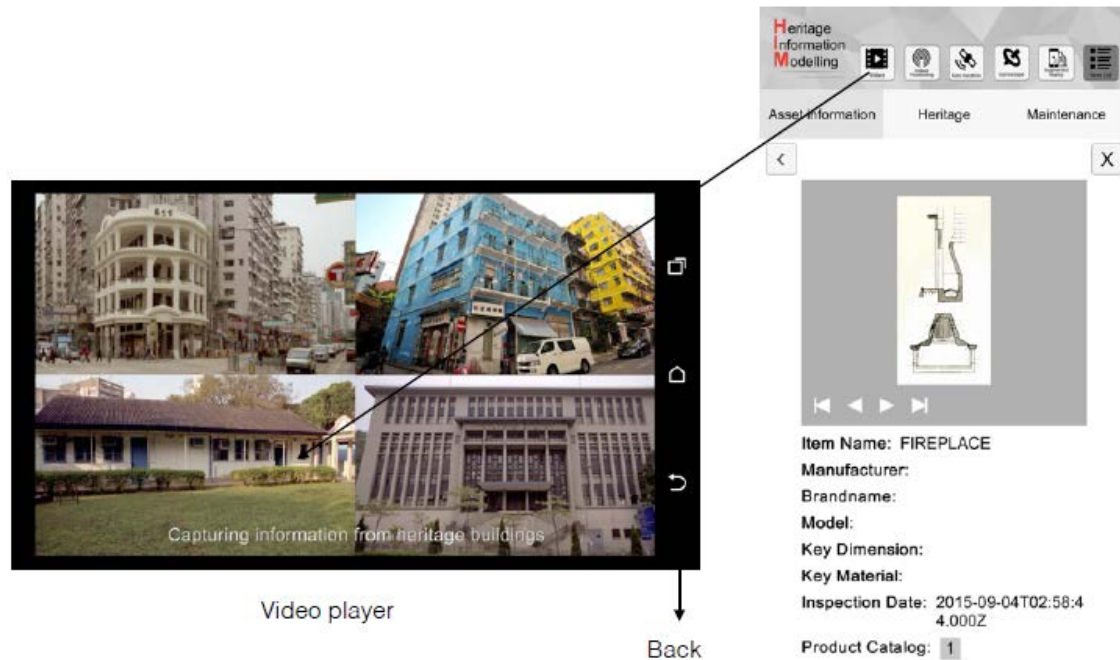
Video Player Page

Old Light Switch Page

Detection HIM Console

PDF / Document Page
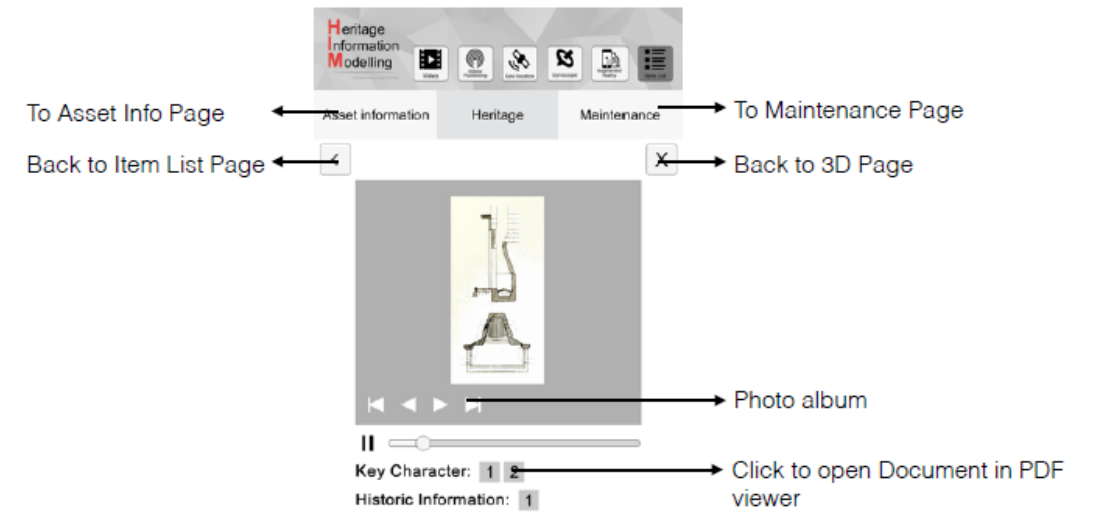
Heritage Information Page (Admin and Visitor)

Detection HIM Console

Fireplace Page

Recognition Sample

Low Arch Window

Old Alarm Bell

QR Code

Cloud
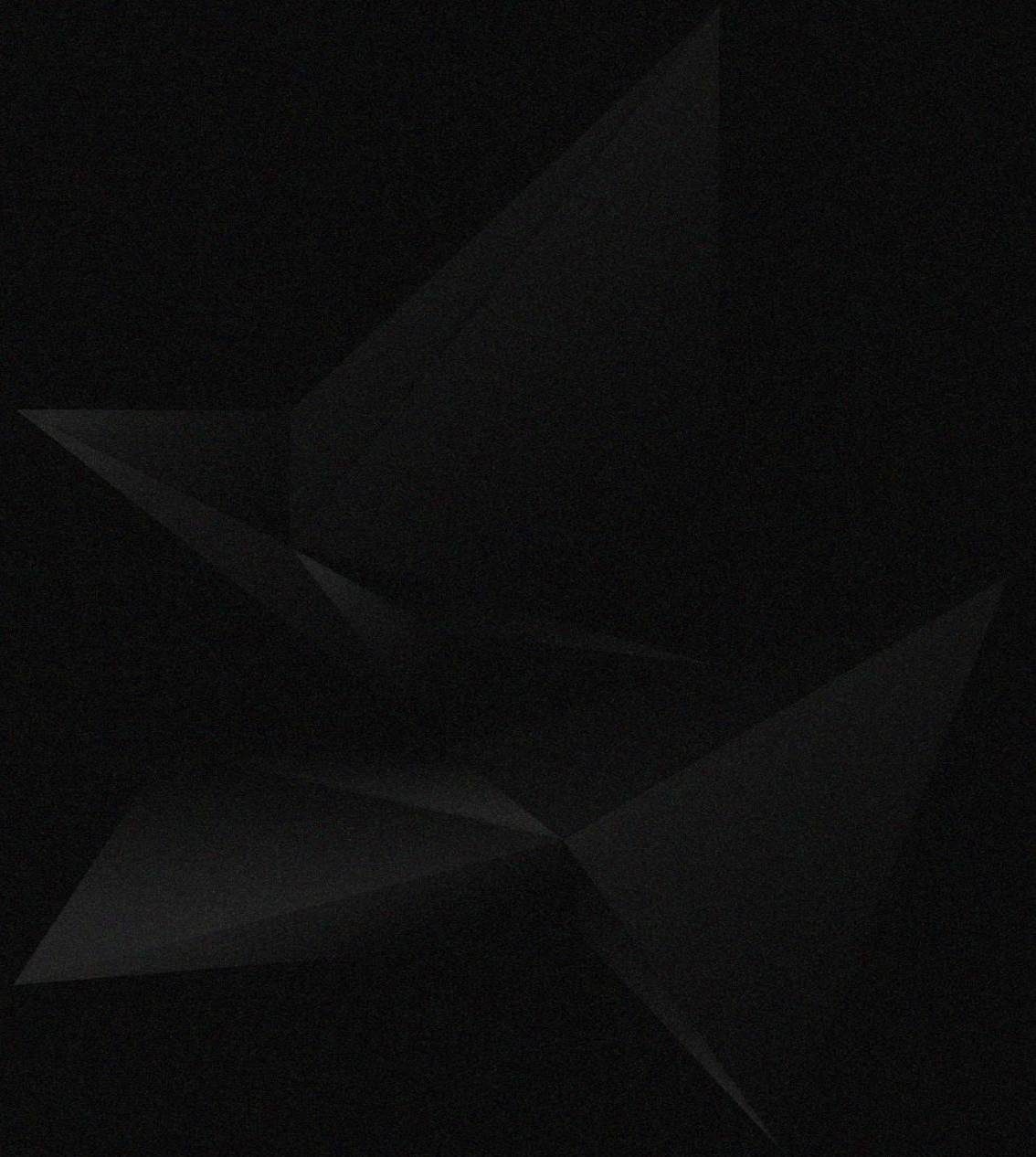
HIM Framework

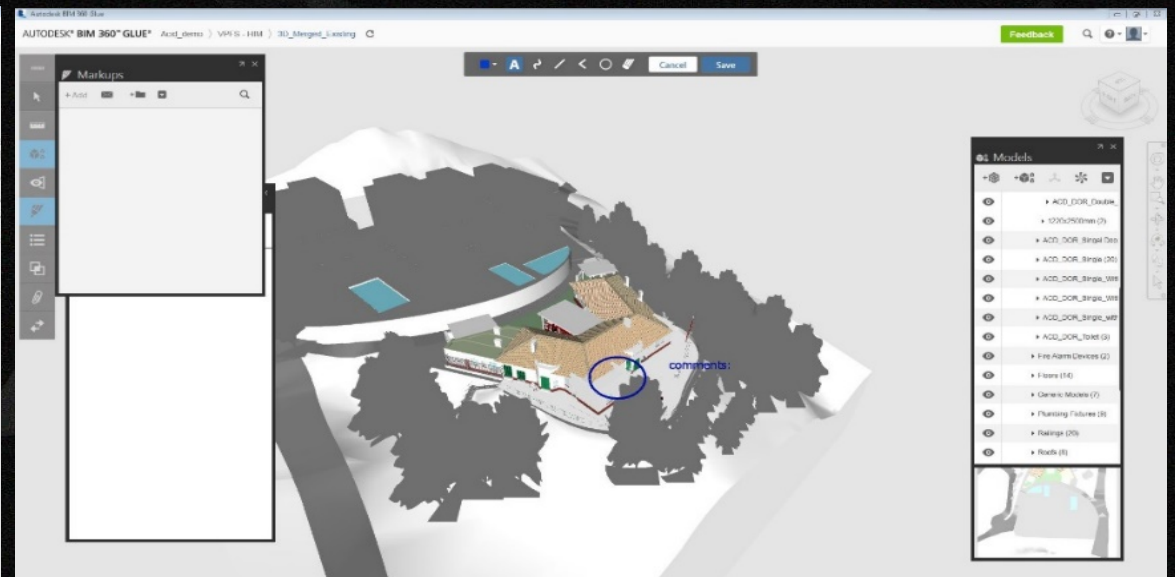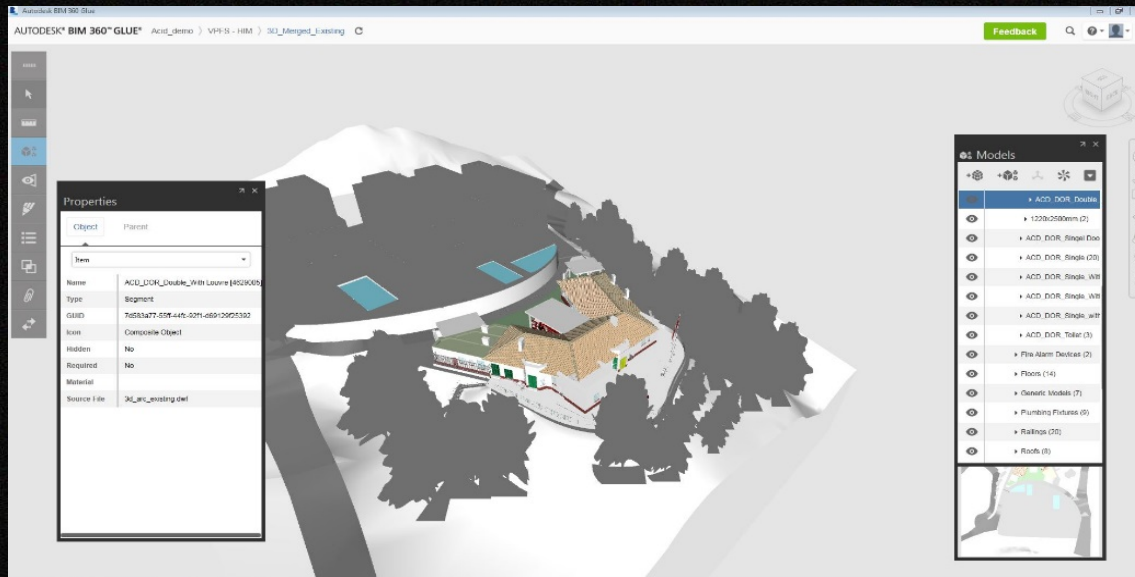Heritage Information Modelling Framework
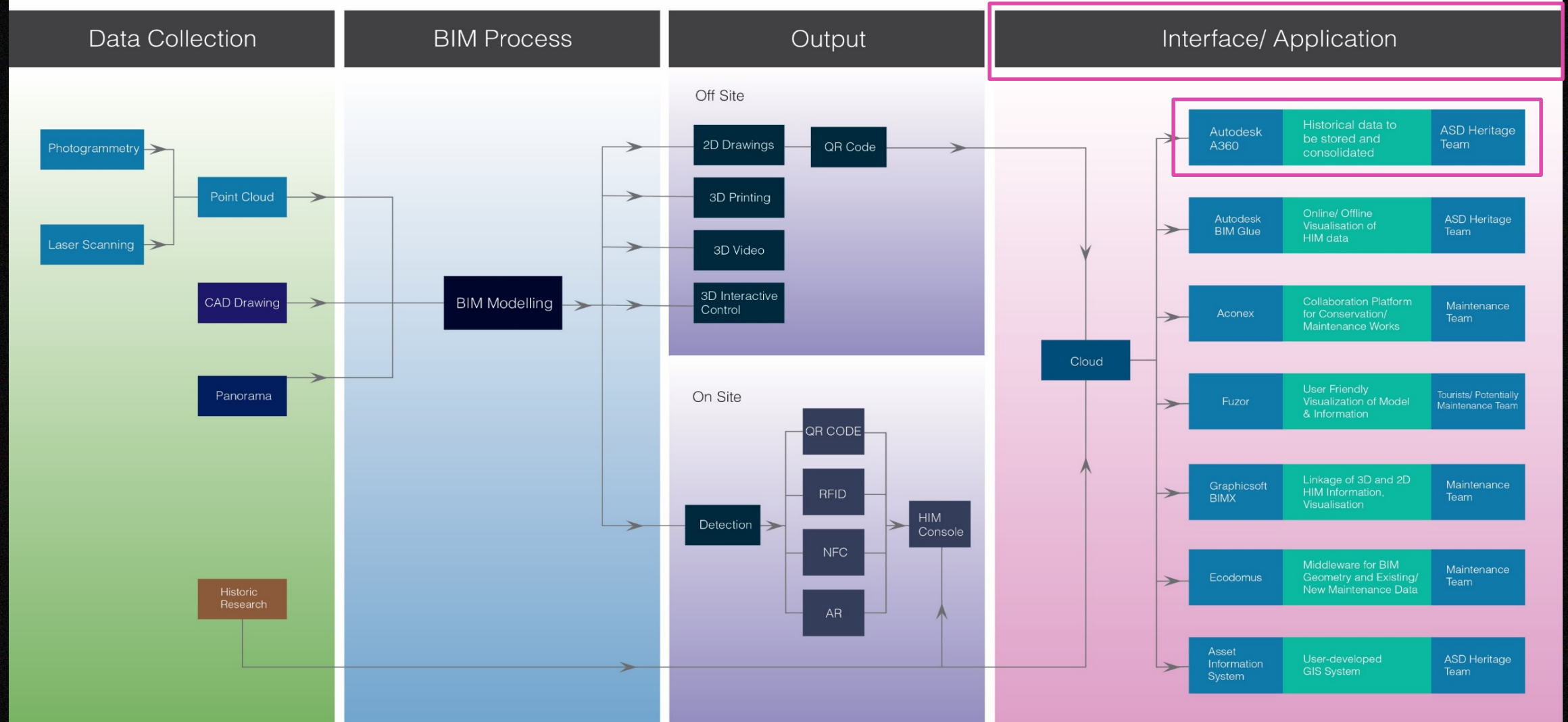
Cloud – Autodesk 360 / Design Review
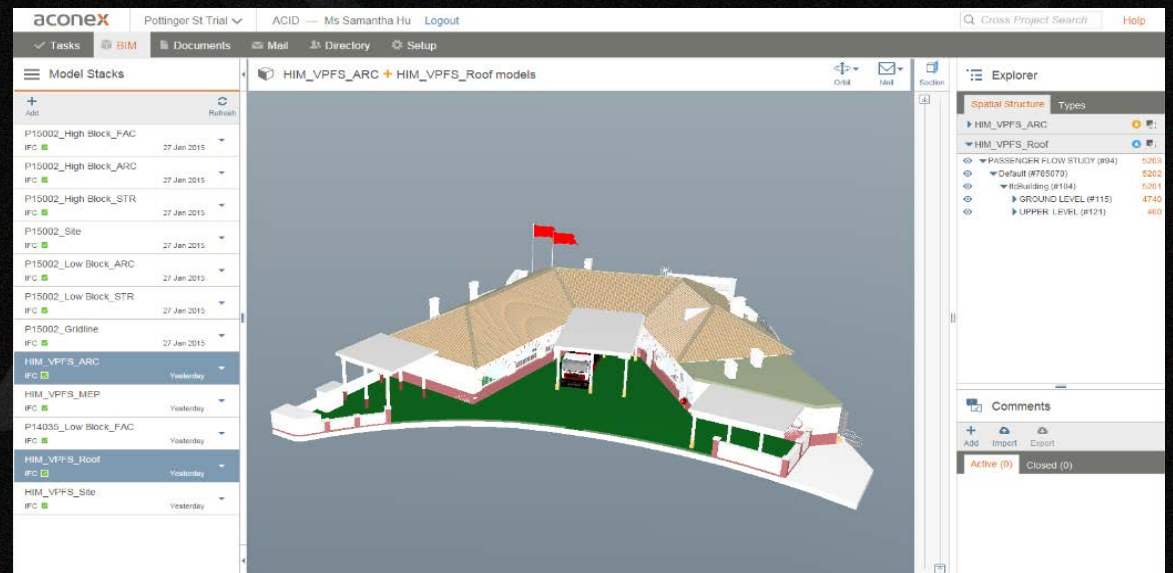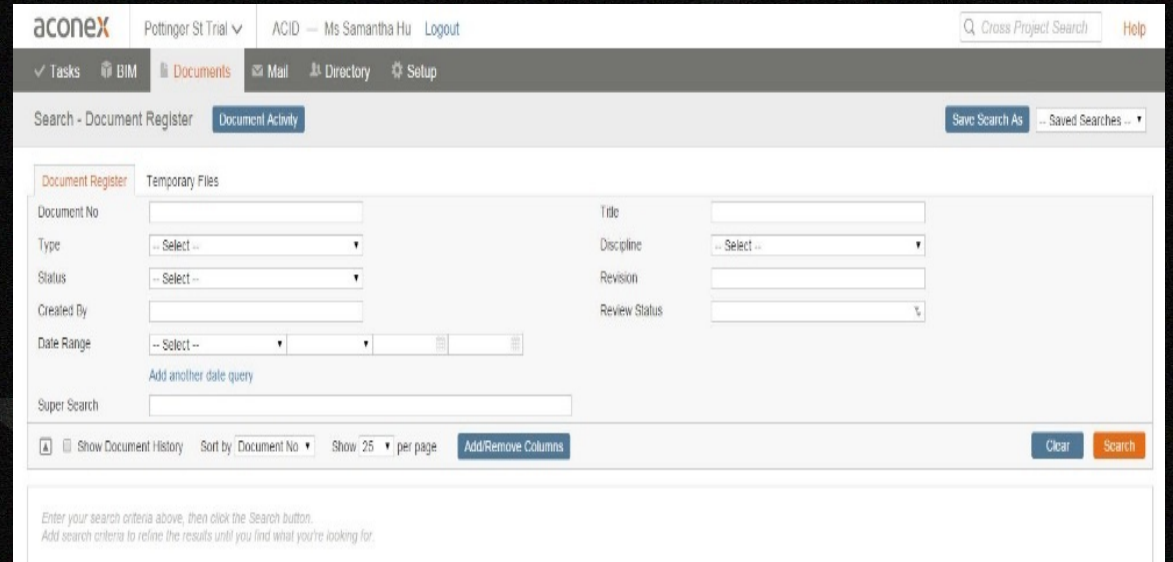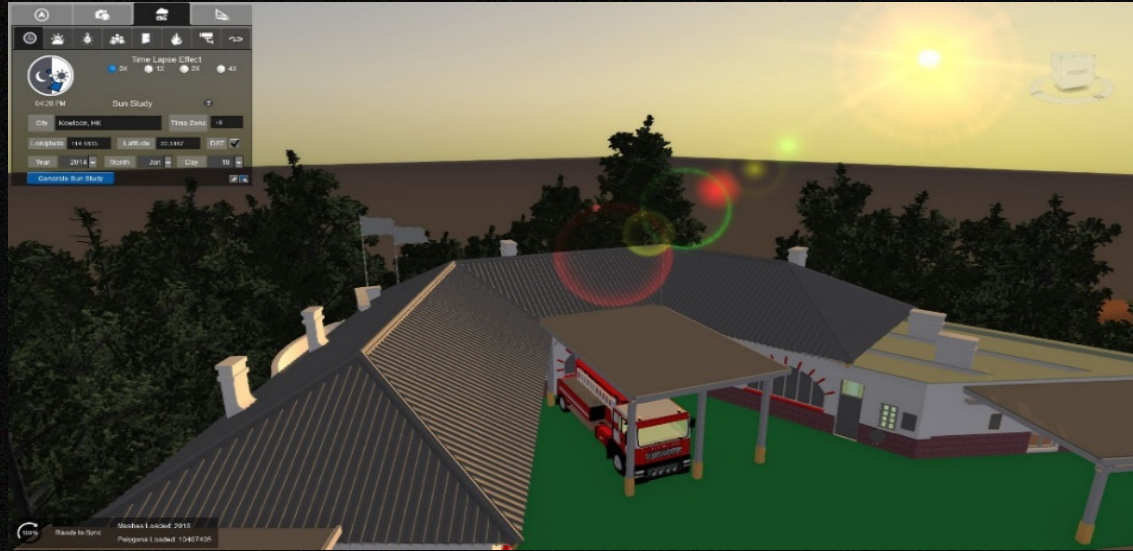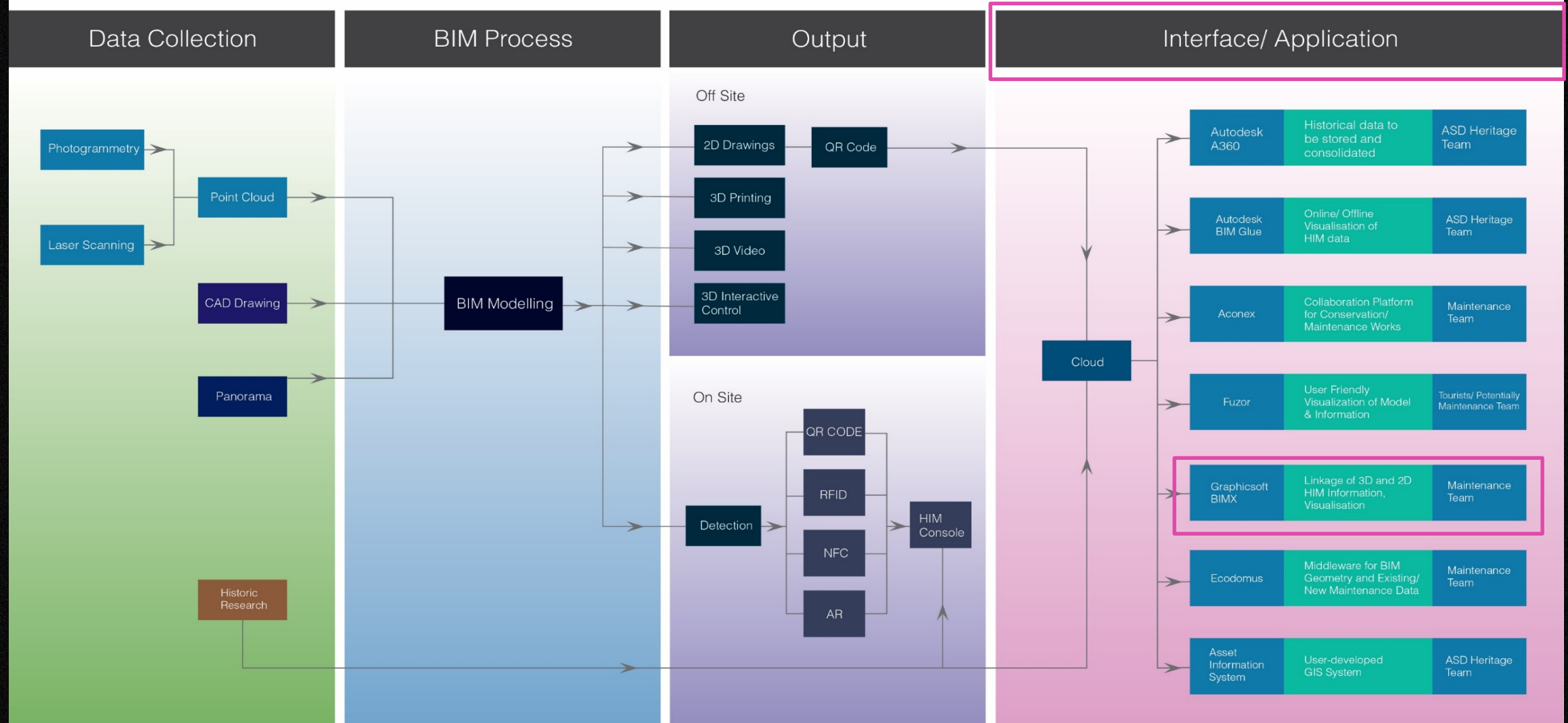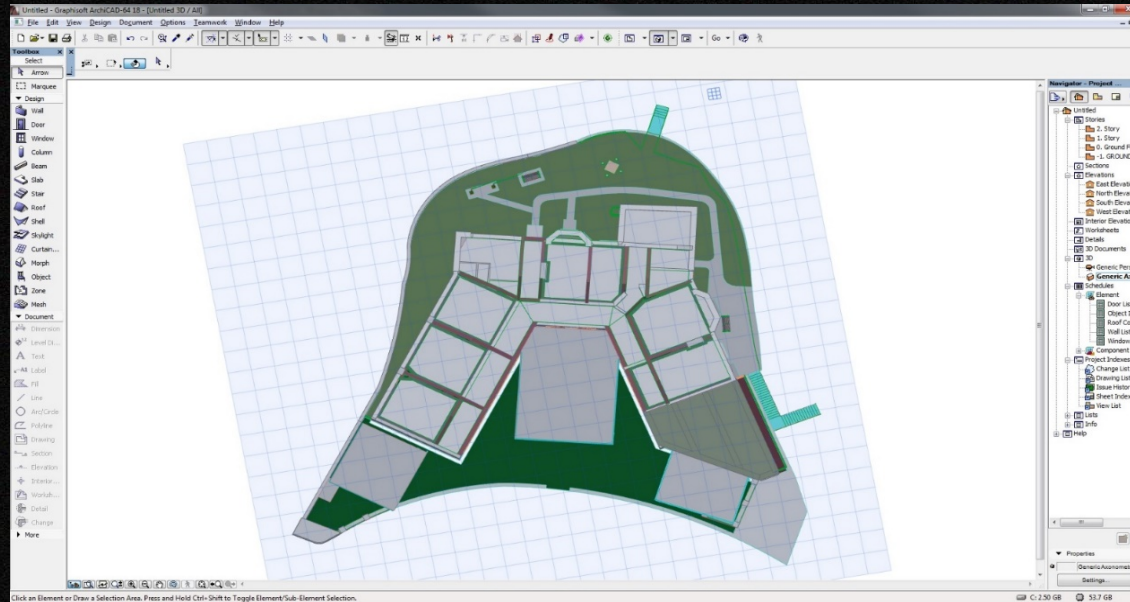
HIM Framework
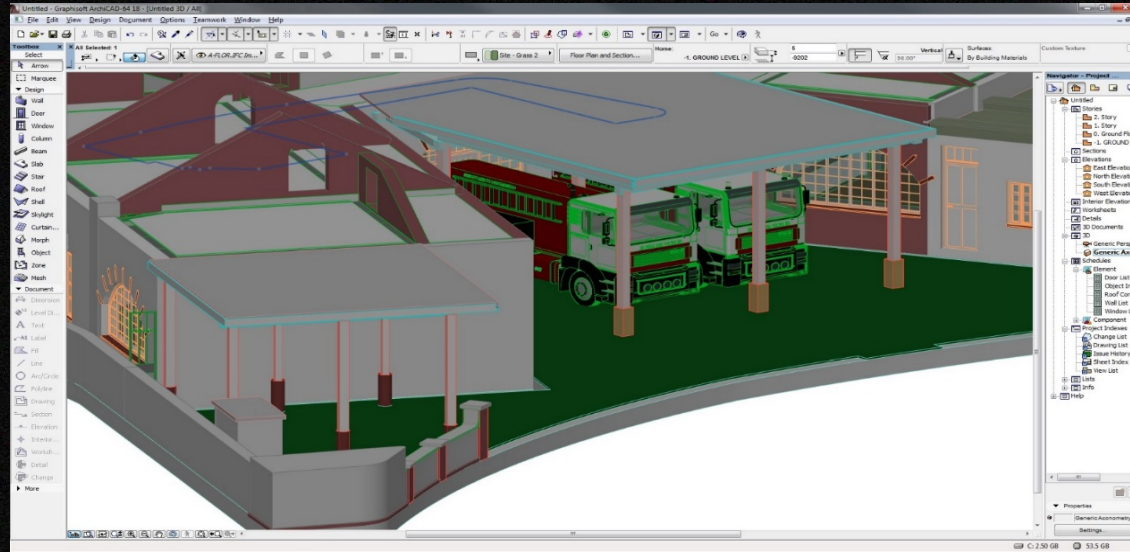
Heritage Information Modelling Framework

Cloud – Autodesk Glue

HIM Framework

Heritage Information Modelling Framework

Cloud – Aconex

HIM Framework

Heritage Information Modelling Framework

Cloud – Fuzor
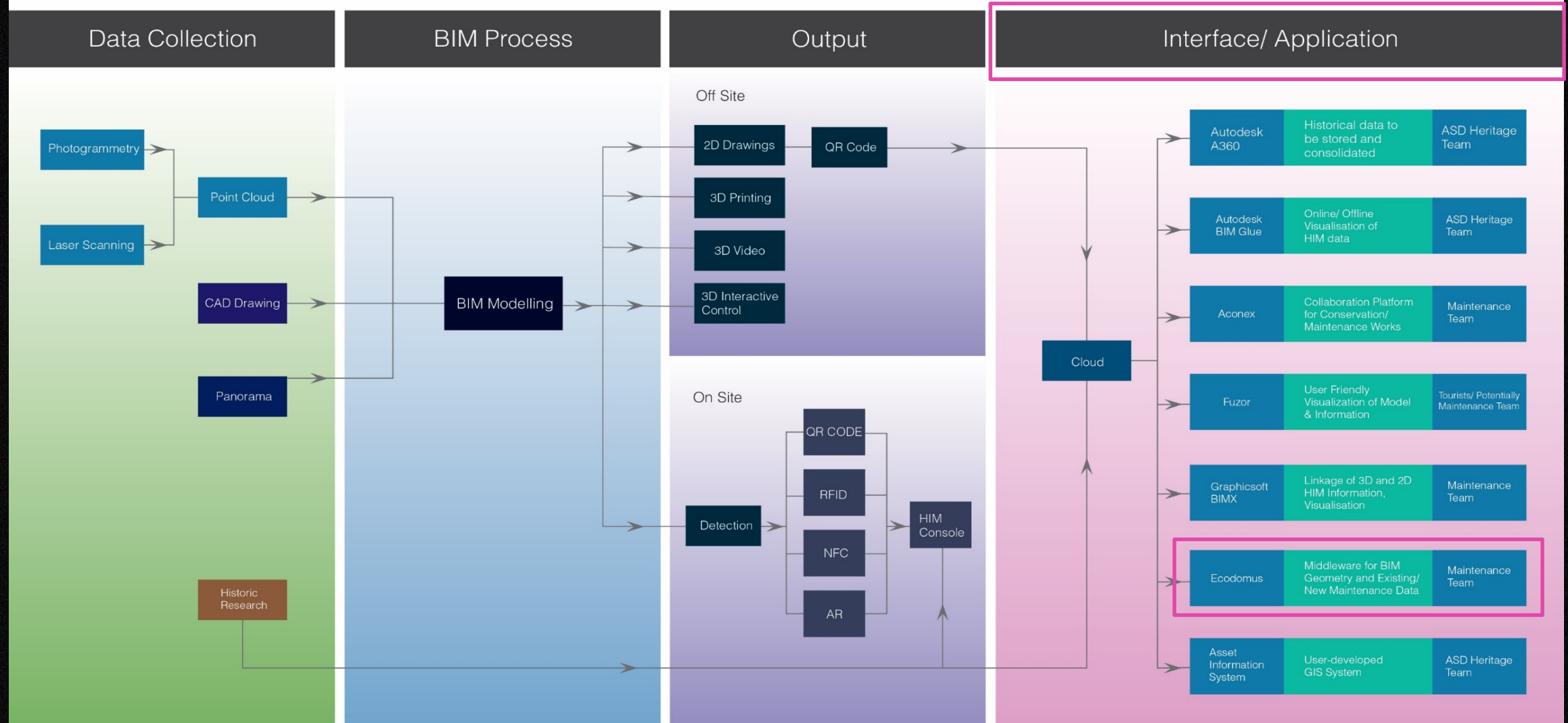
HIM Framework

Heritage Information Modelling Framework

| Data Collection | BIM Process | Output | Interface/ Application |

Cloud – Graphisoft BIMX

HIM Framework

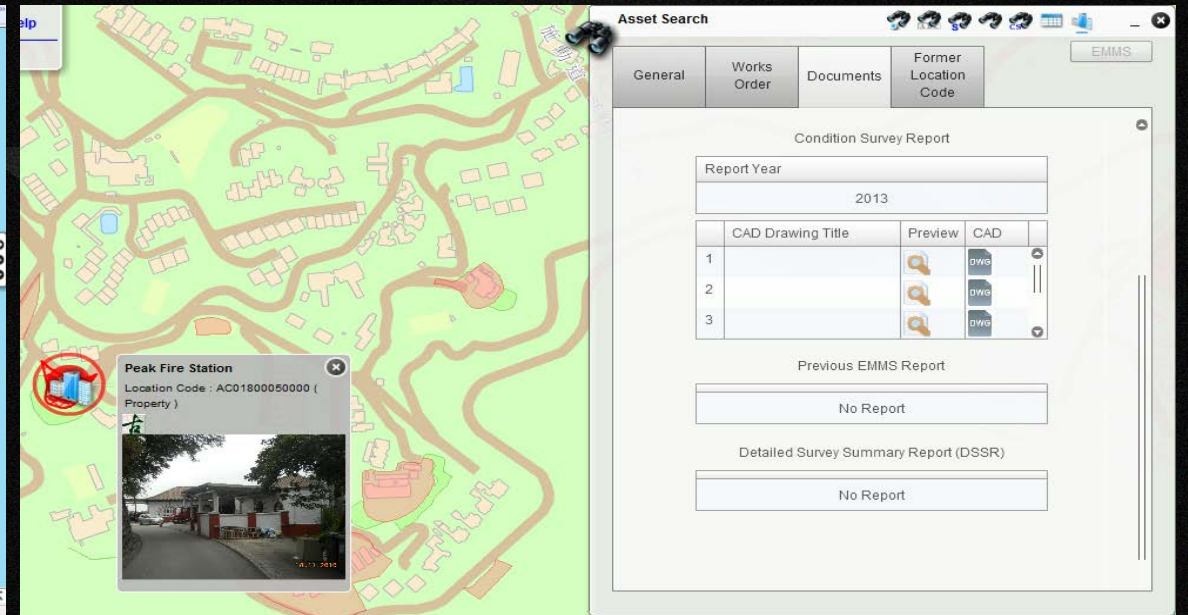Heritage Information Modelling Framework
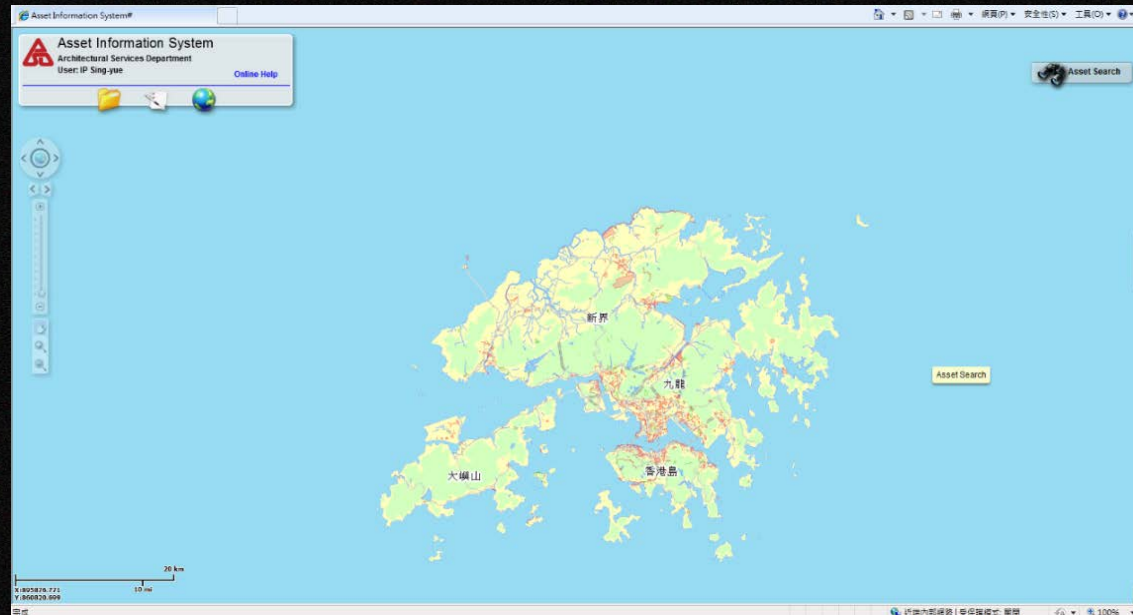
Cloud - Ecodomus

HIM Framework

Heritage Information Modelling Framework

Cloud – AIS Integration

Thank you