

REVIT GUIDE 2025



3D MODELLING LEVEL OF DETAIL OVERVIEW

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INTRODUCTION

This document is to be read in conjunction with the Adaptive Surveys Measured Building Survey – BIM Guide and the Adaptive Surveys LOD Checklist.

The purpose of this document is to outline the 3D modelling standards as adopted by Adaptive Surveys for the use of measured building survey 3D models.

Our team have been working with 3D modelling, point clouds and BIM since 2015 and over that time have developed an indepth understanding and appreciation for the wide range of interpretations for level of detail in 3D models.





OVERVIEW

The aim of this document is to provide our interpretation of level of detail and act as a specification checklist for our clients to ensure that the final model delivered is complete, consistent, and fit for purpose.

The following pages show examples of modelled 3d geometry in varying levels of detail regarding the most common elements found in buildings and structures. Each project is unique and therefore the below examples will not be applicable to all projects.

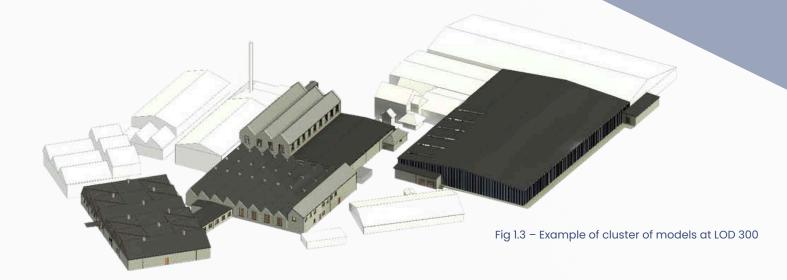
If you have any questions regarding choosing the correct LOD for your project, the friendly team at Adaptive Surveys are happy to help.

EXAMPLE MODELS



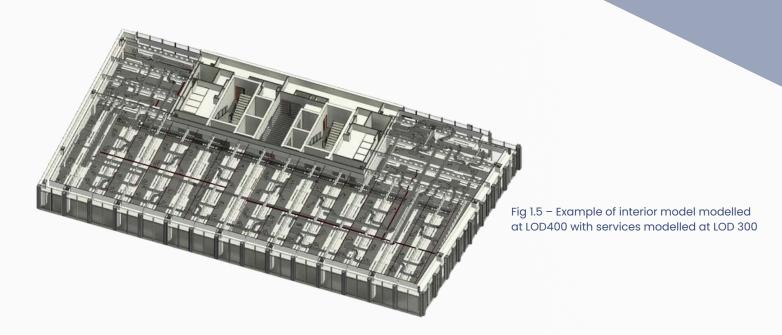


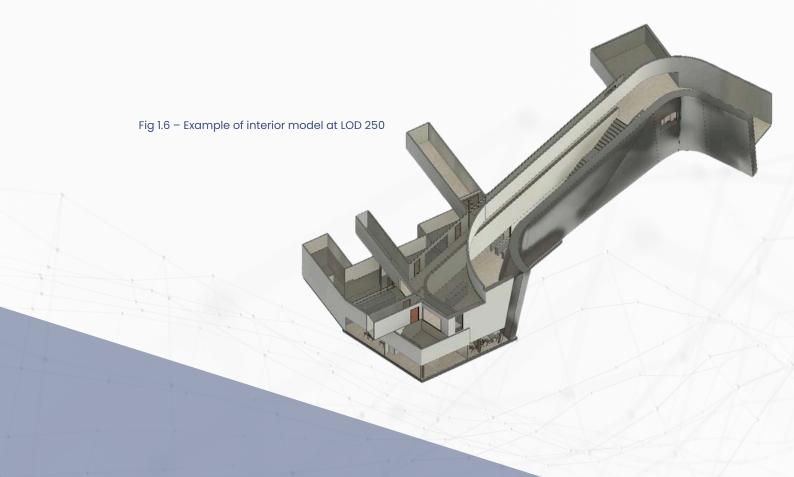






EXAMPLE MODELS





WALLS

LOD100	External wall faces modelled as mass faces	
LOD200	All full height walls modelled indicating surveyed thickness	
LOD250*	All walls modelled indicating surveyed thickness	
LOD300	All walls modelled indicating surveyed thickness including recesses	
LOD400	All walls modelled indicating surveyed thickness including recesses and ornate details such as cornicing, panelling and skirting.	

WALLS

The base of walls will be attached to a level, or an offset of a level where necessary. Walls will indicate overall thickness, and if required, an identification of a material. Ascertaining information about a wall's thickness can prove to be difficult in some cases due to access restrictions, obstructions etc. If one of the faces of a wall is not visible, walls will be named "unknown thickness" and given a nominal thickness.

The internal composition of walls will not be visible during surveying, and as so modelled walls are not an accurate representation regarding how the wall has been built. Wall studs, or the internal composition of a wall is not shown, unless the structure is completely visible at the time of surveying (for example if a project is mid-construction/mid strip-out). Toilet cubicle walls are modelled at LOD250 and above.

Architectural

All walls are modelled as architectural walls by default unless information has been provided by client regarding identification of structural walls. Walls are attached to either a ceiling, floor, or roof by default. In newer structures, if walls appear to follow an identified grid line, the centre line of the wall family will be matched to the grid line.

Ornate Wall Details

At LOD400, skirting boards, cornicing, etc can be modelled. Each will be modelled to a custom profile and are applied as wall sweeps, reveals or wall based generic families/modelled in place families. Corrugated sheet metal may also be similarly modelled as a custom profile reveal/sweep/curtain wall based on the average size of panel and application. If required, please note this in the "Client Comments" in the Adaptive Surveys LOD Checklist.

Special Conditions

Some walls noticeably change thickness at different levels. When applicable, it may be necessary to stack walls of different thickness above each other to accurately display the change. Alternatively, such walls can be drawn as in place models as extrusions or swept blends, however placing window families can prove difficult on such walls. In the case of minor changes in a wall's profile, walls are generally modelled as flat and vertical but if requested, walls can be modelled to capture their true form in the case of irregularly shaped, leaning, or warping walls.

WALLS

Visual Observations

If requested from the outset, visual observations about a wall can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and wall finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab

Curtain Walls & Glazed partitions

Curtain walls will be modelled using Revit's curtain wall tool where possible. Internal glazed partitions are also drawn as curtain wall families unless otherwise specified. Curtain grids will be placed appropriately to reflect their actual positions. Mullions can be modelled using custom profiles at LOD300 and above. If the client has information regarding the precise mullion profile, these can be incorporated into the model. Curtain panels can be modelled to match their visible thickness/type. Curtain wall windows and panels are modelled at LOD300 and above. Indicative example below.



FLOORS

LOD100	Mass floor modelled	
LOD200	All floors modelled from FFL to U/S of finish below (including ceiling void)	
LOD250*	All floors modelled to show overall thickness	
LOD300	All floors modelled to show overall thickness and openings	
LOD400	As LOD300 with additional details such as joists and visible supports	

FLOORS

All slabs and floors will be modelled as architectural floor families. The top of a floor will align with a level or an offset of a level where necessary. Floors are given an accurate thickness based on available point cloud information. If the floor thickness is not visible during the survey because of obstructions such as ceiling panels, it will be modelled as "unknown thickness". The visible floor finish can be noted in the name of the floor if requested.

Architectural

All floors are modelled as architectural floors by default unless information has been provided by the client regarding identification of structural floors.

Floor Boundaries

Floors are modelled using a footprint based on the internal faces of walls. If floor heights/thicknesses differ, separate floors can be modelled for individual rooms/areas. Walls are attached/aligned to floors where possible.

Special Conditions

Some floors have noticeable deviations from wear and damage. Such floors are modelled as straight, standard floors with comments in the families' properties section if the deviation exceeds the modelling tolerance. In the case of a floor sagging or varying in elevation, this will be noted and modelled in the most effective manner. Alternatively, such floors can be drawn as in place models as extrusions or swept blends.

Sloping Floors

In the instance of a sloping floor that does not appear to be standard ramp, a generic floor family will be used with an angle defining line to achieve the desired angle. In the case of floors sloping in more than one direction, the floor's sub-elements can be modified or modelled-in-place families can be used.

Visual Observations

If requested from the outset, visual observations about a floor can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and floor finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab

ROOFS

LOD100	External roof faces modelled as mass faces	
LOD200	Roof modelled to show visible overall thickness of construction	
LOD250*	Roof modelled to thickness with trusses/purlins (if visible)	
LOD300	Roof to include chimneys and openings	
LOD400	Roof to include fascias, coping and soffits	

ROOFS

In many cases, the thickness of a roof cannot be measured due to access to the roof itself and into roof voids. In such instances, roof families will be defined as "unknown thickness". The composition of roofs is usually not visible during surveying, so roof families are shown as one thickness. Roof constructions vary greatly in complexity. Roofs are modelled using a variety of methods to achieve an accurate representation, using angle defining footprints, profile defined extrusions, and modelled in place components.

Purlins

Purlins are modelled as beam families using an appropriate family to reflect the profile of the purlin.

Access

If a whole roof is not visible from eye level, drones are used to capture data where possible. If access to roof voids is required, roof voids are to be safe to access/accessible during the surveying. If no access is available to roof voids, the roof thickness will be shown as "unknown thickness".

Dormers

Dormers can be modelled using the dormer cut tool, walls and windows or other tools in Revit.

Chimneys

Chimneys and pipes can be modelled as in place components or loadable families to the correct dimensions depending on the LOD.

Roof Lights

Roof lights are modelled as simple generic roof based/face based opening families. Roof lights follow the same LOD guides as windows.

Additional details

Fascias, coping, soffits, box ends, and additional roof details can be included in the model at LOD400 if visible.

Visual Observations

If requested from the outset, visual observations about a roof can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and roof finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab.

WINDOWS

LOD100	N/A	
LOD200	Structural openings shown as families	
LOD250*	Basic frame and glazed panel modelled	
LOD300	Frame modelled in more detail	
LOD400	Modelled using families showing more detail such as sills, stonework and ironmongery	

WINDOWS

Windows can be modelled as families with varying detail depending on the client's requirements. Windows are generally modelled to display the overall geometries as extrusions, and do not show the internal structure/mechanisms of a window. Where anything is estimated, this will be noted. Window families are hosted upon walls families. Where possible, windows are modelled to be at the correct offset from the wall.

Special Conditions

Some windows have noticeable deviations from the wall sagging or sloping to one side. Such windows are modelled as straight windows with comments in the families' properties section if the deviation exceeds the modelling tolerance. Alternatively, such windows can be drawn as in place models as extrusions. Curtain wall glazed elements are shown as basic, generic curtain walls with mullions and transoms where appropriate.

Visual Observations

If requested from the outset, visual observations about a window can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and window finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab.

DOORS

LOD100	N/A	
LOD200	Structural openings shown as families	
LOD250*	Modelled using generic families with basic detail (Leaf, frame, swing)	
LOD300	Door handles and architraves included in generic form	
LOD400	Modelled using families showing specific type of door with more detail such as vision panels, custom architraves, panelling, kickplates and ironmongery	

DOORS

Door families are modelled if an opening appears to have a door frame. If an opening has no frame, it will be modelled as a wall opening to the correct dimensions. If a door is locked during the survey, door swings are shown based on handle location with a comment in the families properties panel.

Door families are generally modelled as basic families that show the door leaf, swing and opening. Doors can be modelled at higher detail with LOD300 and LOD400 if required. Sliding/folding door swings are shown as arrows instead of plan swings. Doors can be individually modelled at high detail if requested.

Special Conditions

Some doors have noticeable deviations from the wall sagging or sloping to one side. Such doors are modelled as straight doors with comments in the families' properties section if the deviation exceeds the modelling tolerance. Irregular shaped doors are modelled to their general shape as custom families. Curtain wall door families are modelled with the same principle as regular doors.

Visual Observations

If requested from the outset, visual observations about a door can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and door finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab. When surveying, automatic doors are required to be kept open during scanning.

CEILINGS

LOD100	N/A	
LOD200	N/A	
LOD250*	Modelled as a generic ceiling family or In- place family	
LOD300	Recesses, openings and steps in ceilings modelled	
LOD400	Modelled showing ceiling tile positions and electrical equipment if requested. Ornate ceiling details such as cornicing are modelled as In-place families. Acoustic panels can be modelled	

CEILINGS AND BULKHEADS

Ceilings are typically modelled as generic plain/compound ceilings. If the thickness of a ceiling is unknown, the ceiling family will be named accordingly. If requested, different types of ceiling (for example plasterboard tile, metal tile, perforated panel) can be modelled as separate families. Ceilings are modelled per room/area to provide accurate heights. Ceilings are modelled using sketch lines to the inside faces of walls.

Ceiling tiles can be shown as a generic material to indicate that ceiling tiles are present, or drawn to show the precise location of the lines. Ceiling tiles are not lifted during a survey. Ceiling void surveys are available if requested and agreed with Adaptive Surveys. Typically, the client is responsible for organising the removal of ceiling tiles if removal of all tiles is required. Ceiling tile supports are not modelled at LOD400 unless requested. Ceiling fixtures such as lighting, diffusers, sprinklers, AC units, emergency exit signs can be modelled as basic 3d or 2d families at required detail. See MEP section for more information. Wall/partition heights are often unclear if behind a false ceiling. Wall top heights will be connected to the bottom of a ceiling unless the top of a wall is clearly visible or identified during surveying.

Rafts and hanging acoustic panels can be modelled as individual families at LOD300 and LOD400 if requested. Bulkheads are modelled as a ceiling family with the height of the bulkhead as the thickness. Bulkheads can be drawn as walls if requested. Ceilings that are severely damaged or warped will include comments in their properties panel.

Visual Observations

If requested from the outset, visual observations about a ceiling can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and ceiling finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab.

STAIRS

LOD100	N/A	
LOD200	Stairs modelled as monolithic stairs showing the correct size tread and riser	
LOD250*	Indicative handrail included	
LOD300	Stairs modelled using appropriate family type, riser profile and stringers	
LOD400	Addition of nosings and customised baluster and handrail families	

STAIRS

The stair modelling tool in Revit has limited ability to produce stairs of unusual/irregular shapes/sizes, although care will be taken to get as close a match to the surveyed staircase as possible. If necessary, stairs can be modelled as in place components or as separate families. Detail items such as nosings, stair profiles, stringers, supports, balustrades/banisters/balusters, handrail profile, rug poles can all be modelled if requested. Complex stairs/balustrades can be modelled as in-place families to accurately display geometries.

Spiral staircases may require to be modelled as in place components due to the limitations of the stair tool in Revit. The same applies to Escalators, Ramps, Ladders and Lifts.

Visual Observations

If requested from the outset, visual observations about stairs can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab.

STRUCTURE

LOD100	N/A	
LOD200	Large beams and columns modelled in simple form	
LOD250*	Beams and columns showing correct profiles and types	
LOD300	Generic connections for steel structure modelled	
LOD400	Customised connections and secondary structure modelled	

STRUCTURE

We will aim to capture all visible structural elements during a survey. There are often hidden structural elements above ceilings and inaccessible areas which cannot be captured. If structural elements are encased, the visible geometry will be modelled. If there are unique structural elements, these will be modelled as custom families or in place components where necessary. The visible material of structural elements is shown in models above LOD250. The terminology "structural elements" refers to what appears to be beams and columns during the survey, but in no way indicates that the elements are structural/non-structural or load bearing. Where appropriate, British/Europe specific structural families are used.

Beams

Beams will be modelled using families from the Revit library. At LOD 400, beam families will be adjusted to be exact representations of the beams – such as the perforations in correct positions for castellated beams.

Columns

Columns will be modelled using families from the Revit library. The base and top of a column will be associated with a level or an offset of a level where necessary. If there are repetitive column families, these will be modelled using one family to avoid having several families of roughly the same dimensions. Ornate column details can be modelled at LOD400.

Trusses

Trusses can be modelled using generic families for regular shaped structures, or by using custom truss families/modelled in place families for more irregular roof profiles.

Bracing

Bracing can be modelled in steel structures to the correct brace profile.

Connections

Steel connections are shown as a reference to display the size and shape of a connection; however, bolt and flange information are for indicative reference only as they can be difficult to pick up from a point cloud captured at eye level.

Visual Observations

If requested from the outset, visual observations about a structural element can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab.

Special Conditions

If a structural element has been visibly altered or is an irregular shape/no longer straight, such elements can be drawn as in place models as extrusions or swept blends.

RAINWATER GOODS

LOD100	N/A	
LOD200	If applicable, large built- in gutters modelled as in-place models	
LOD250*	Modelled using generic gutter profiles and generic straight pipe families to the correct diameters	
LOD300	Modelled using custom gutter profiles and appropriate pipe connections/profiles	
LOD400	Brackets, endcaps, headers and gulley locations included. Downpipes modelled as in-place families if necessary	

RAINWATER GOODS

Where visible during a survey, gutters and downpipes can be modelled to the required level of detail. All gutters are modelled using the roof gutter tool where possible, and in-place families are used where the gutter tool is not applicable. Downpipes are modelled using the pipe tool to the nearest diameter and the appropriate connections. Square/rectangular profile downpipes are modelled as in-place families. Pipes are shown in an indicative material if clear from gathered raw data/site imagery. For example, cast iron or plastic.

Visual Observations

If requested from the outset, visual observations about gutters and downpipes can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab.

FFE – FURNITURE, FIXTURES AND EQUIPMENT

LOD100	N/A	
LOD200	N/A	
LOD250*	FFE shown in 2D	
LOD300	Modelled as an in-place 3D mass to the general volume	
LOD400	Custom families created for each item	

FFE

Fixed elements such as joinery items, built in units, stages, reception desks can be included in a model in 2d or 3d format if requested.

Furniture items can be shown as generic 2d blocks or generic 3d blocks. Simple shapes can be modelled as in-place masses. At LOD400, if there is information about the exact types of furniture, Adaptive surveys can look for manufacturers 3d drawings that can be included into the model. Note that manufacturers 3d blocks may bloat the model size significantly.

Fixed items such as joinery items, units, kitchen islands can also be modelled in 2d or 3d depending on the client's needs. Fixed equipment can be modelled.

Visual Observations

If requested from the outset, visual observations about FFE can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab.

TOPOGRAPHY

LOD100	N/A	
LOD200	2d lines on external elevations to indicate topography	
LOD250*	Topographical survey drawing linked to model if requested or provided by client	
LOD300	Toposurface generated using topographical survey contours	
LOD400	Toposurface generated using topographical survey contours, using indicative materials, including street furniture families if required	

FFE

If the topography around a structure is of importance, it is recommended to request a topographical survey from Adaptive surveys. Topographical surveys can be linked to the Revit model in DWG format, or the topographical contours can be transformed into a topographical surface within Revit if required. Client supplied 2d/3d topographical survey drawings can also be linked into the model if available.

If requested, an indicative only topographical surface can be drawn based off the point cloud in Revit – Note that these are indicative only and not as accurate as topographical surveys. The topographical surfaces tools are limited in Revit.

If requested, a Revit topographical surface can include indicative materials to differentiate grass/pavement/asphalt. In some cases, pavements can be shown as floor families with notes in the families properties panel indicating that they are an indication only.

Trees

Trees and vegetation can be shown as generic 3d families showing the approximate diameter of the trunk and the approximate height of the tree/canopy if requested. For more accuracy, refer to a topographic survey.



Special Conditions

Street furniture such as traffic lights, bollards, curbs, masts and signs can be modelled in 3d if requested to compliment the topographical survey.

Visual observations

If requested from the outset, visual observations about site topography can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on condition and finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab.

CONTEXT

LOD100	2D lines showing extents of building in plan view	
LOD200	2D lines for all main elevations	
LOD250*	Simplified mass model of building modelled using an in-place family	
LOD300	Recesses added for architectural opening positions. Chimneys and visible external structure included as masses	
LOD400	Include more detail for main features	

CONTEXT

Neighbouring buildings and structures can be modelled to give the project a better sense of context. Only the exteriors of contextual buildings are modelled. Modelling contextual buildings can assist in understanding the relationship between all buildings.

Ornate Details

At LOD400, significant ornate external features will be included in the mass model.

Special Conditions

Buildings vary greatly in age and condition. Contextual models will aim to capture the overall geometry in a simplified form; however, the Level of detail and accuracy will not match that of a full measured building survey 3D model. Deviations are not modelled in context buildings.

Ruins can be modelled in a simple form or by using mesh models created outside of Revit and linked into the model.

Pylons and wind turbines can also be modelled as per client's requirements.



Visual observations

If requested, photos can be taken during surveying and attached to the family in the properties tab.

MEP – MECHANICAL, ELECTRICAL AND PLUMBING

Like all other modelled elements, MEP equipment is modelled based on the external visible geometry only and does not include intelligent features. In some instances, to avoid misleading information, equipment is modelled as in-place/generic families to the correct overall dimensions instead of incorrectly specifying equipment.

Adaptive Surveys are not mechanical, electrical or plumbing engineers. If the client has information regarding the MEP equipment, this can be incorporated into the modelled elements.

Mechanical

Includes but is not limited to: HVAC components such as Ducts, air con units, diffusers, engines, and mechanical equipment and plant equipment.

Electrical

Includes but is not limited to: Cable trays, cable tray supports and electrical cupboards/boxes as well as lighting fixtures and socket/switch locations. Circuit board/Switch board locations can be included.

Plumbing

Includes but is not limited to: Visible plumbing equipment and fixtures, such as pipes, sprinkler pipes, sprinkler heads, WC's, sinks, showers, baths, visible drainage locations.

Visual observations

If requested from the outset, visual observations about a MEP equipment can be made during surveying and noted in the properties tab under "Survey Visual observations" in Revit, including notes on markings and finishes. If requested, photos can be taken during surveying and attached to the family in the properties tab.

PLUMBING

LOD100	N/A	
LOD200	N/A	
LOD250*	Visible pipes modelled using generic pipe families to the correct pipe profiles. Pipes modelled if diameter is above 80mm. Generic pipe connections are used	
LOD300	Generic valve positions are included. Pipes modelled if diameter is above 60mm. Pipe connections are modelled using appropriate families. Supporting structure modelled	
LOD400	Specific valve families are used in the model. Pipes modelled if diameter is above 40mm	

*Recommended by us

MECHANICAL

LOD100	N/A	
LOD200	N/A	
LOD250*	Large mechanical equipment modelled using appropriate families	
LOD300	Mechanical equipment modelled, including flexi ducts, connections, supply diffusers etc. Supporting structure modelled	
LOD400	Modelled using customised families, showing flanges and fixtures	

*Recommended by us

ELECTRICAL

LOD100	N/A	
LOD200	N/A	
LOD250*	Electrical equipment modelled using generic families	
LOD300	Electrical equipment modelled using generic families including supporting structure. Cables/bunches larger than 100mm modelled. Light fixtures modelled using generic families	
LOD400	Modelled individually using specific transitions and custom families	

*Recommended by us

ORNATE ELEMENTS

Detailed ornate elements such as column capitals, cornicing, carved objects, panelling, decorative elements, stone balustrades and large fixed non-structural items (such as fixed museum exhibit items) can be included in a model if requested.

Detailed decorative stonework can be modelled if requested. These are often modelled as wall sweeps/reveals or modelled-in-place generic families.

If required, decorative elements can be incorporated and modelled into a 3d model; however, it is worth noting that modelling such elements can take a considerable amount of time depending on their complexity. If necessary, such elements can be shown as a rough mass, or a highly detailed demonstration of the element's geometry. It is important to agree which elements are to be included so that they can be captured at the time of surveying in higher detail to allow accurate modelling.

In the case of some highly detailed decorative elements/complex fixed equipment, it may be appropriate to use mesh models derived from point clouds.





Miscellaneous

If there are any categories that require modelling not mentioned in the pages above, please ask Adaptive surveys to include them in the model.





