Allan Corfield
STRUCTURES

Structural Considerations

David Gallagher

Allan Corfield STRUCTURES

Allan Corfield Architects
Custom & Self Build Experts

BACKGROUND TO ACS

- ACS were established in 2021 as a Sister Company to AC Architects to provide a full design service for custom build clients
- ACS specialise in Modern Methods of Construction (MMC) and provide specialist design services to SIPs and ICF manufactures and Suppliers
- ACS uitilse BIM software to achieve full co-ordination and integration with ACA drawings
- ACS are able to offer a full project design service from site evaluation through to construction inspections to suit Client requirements
- ACS also offer specialist design services for steel connections, steel stairs, balustrades and feature glazing.
- ACS are SER Certifiers (Scotland)

Allan Corfield
STRUCTURES

PROJECT STAGES

1. Initial Design
2. Planning Application
3. Building Regulations or Warr
4. Production Drawings
5. On Site
6. CDM

ROLE OF STRUCTURAL ENGINEER

1. Preliminary Desk Top Evaluation of Site, Specification and Review of Site Investigation Scope and Findings.
2. Early Review with Architect and Client to Determine Preferred Method of Construction and Structural Design Principals
3. Structural Design and Drawings for Building Warrant/Regs. Specification of Specialist Contractor Design Elements.
4. ~~Design and/or Review of Third-Party Elements~~
5. Structural Support and Additional Visits Can be Provided on Request.

TRADITIONAL STRUCTURAL ENGEERING SCOPE

ACS INCREASED STRUCTURAL ENGEERING SCOPE

Allan Corfield
STRUCTURES

IMPORTANT CONSIDERATIONS WHEN SELECTING YOUR STRUCTURAL ENGINEER

- **Is the scope of service comparable between your tender returns?**

- **Traditionally the Structural Engineer joins the design team after architectural warrant issue.**
  - **This is not always appropriate for custom build homes as early engagement (at planning) helps identify value engineering opportunities early while they are easier to incorporate. On site support is also highly recommended. Does the level of input offered by the Structural Engineer your and the site requirements.**

- **Is your preferred Structural Engineer experienced in your preferred method of construction?**
  - **If appointed early, an engineer experienced in timber, ICF and SIPs is preferrable as they will be able to advise on the most suitable construction for your project and assist in reviewing tender returns.**

- **Does your preferred Structural Engineer have a proven experience working with your Architect?**
  - **The Structural Engineer/Architect working relationship is often crucial to a successful project and effective communication is critical**

- **Value for money. Beware of false economy. Cheapest is not always best.**
  - **An engineer that has costed to provide your project with the time it deserves is more likely to provide a more cost effective solution and reduce delays on site due to queries and lack of response.**

Allan Corfield STRUCTURES

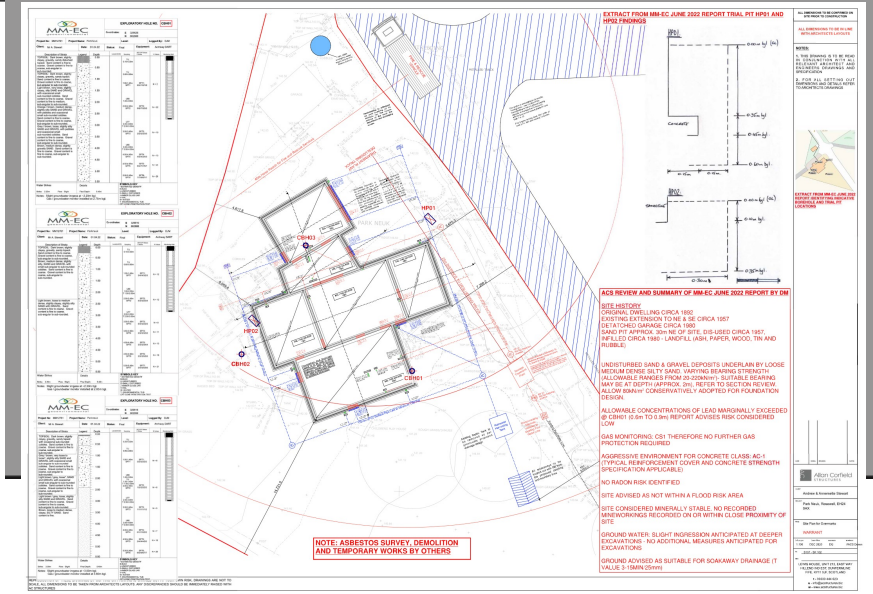
Stage 1: Initial Design

Preliminary Desk Top Evaluation of Site → **Specification for Site Investigation Tender** → **Review of Site Investigation Tender Returns** → **Review of Site Investigation Findings** → **Outline Foundation Design**

The Coal Authority

British Geological Survey

SEPA Scottish Environment Protection Agency



Allan Corfield
STRUCTURES

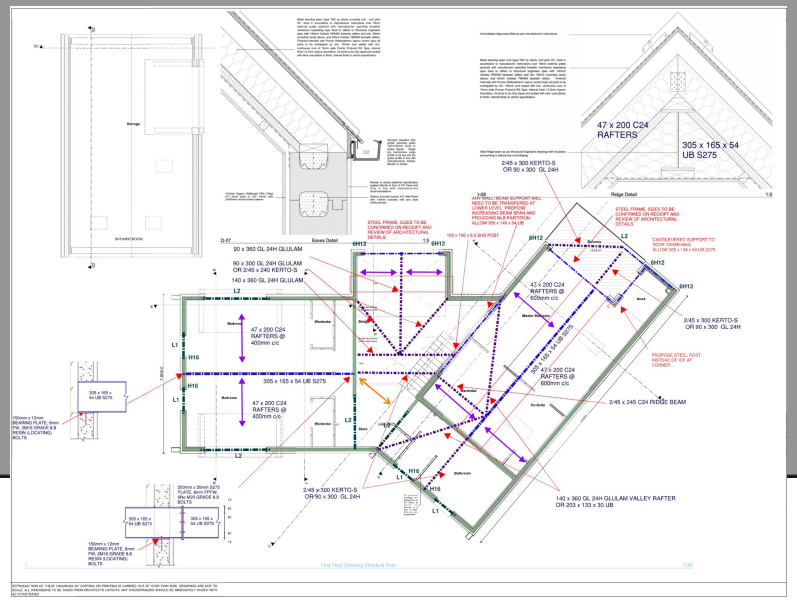
THE IMPORTANCE OF A SITE INVESTIGATION

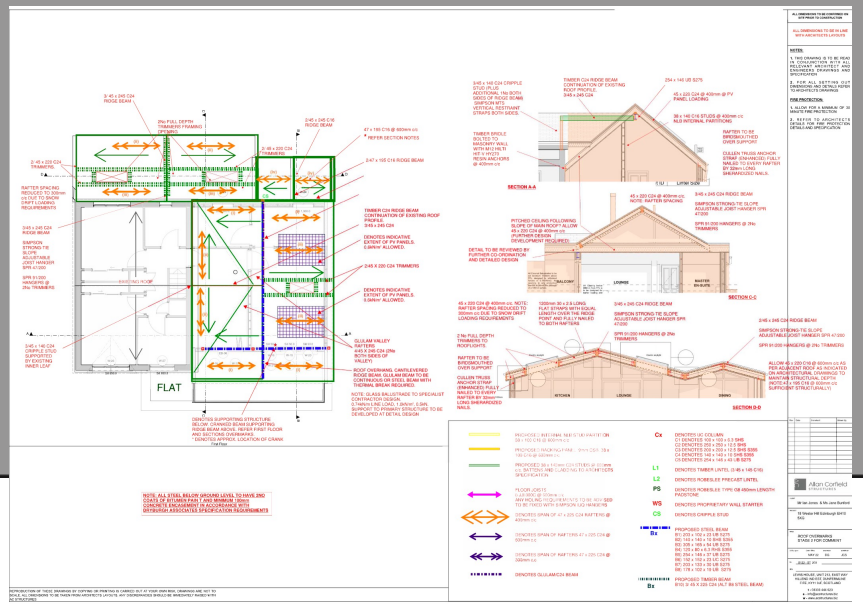
- The biggest unknown for any project is the ground conditions
- The scope of the site investigation needs to be appropriate for the scale of the project and the anticipated ground conditions and foundation requirements
- The site investigation is split into 2 phases. Phase I is a desktop evaluation of the site. This phase investigates the history of the site, potential risks and establishes the recommended scope of the Phase II intrusive investigation.
- The scope of stage 2 can vary but typically includes: Boreholes, trial pits, lab testing, percolation test, gas and water monitoring.
- If piling is anticipated the depth and number of boreholes required is likely to more to ensure sufficient information is obtained for the specialist piling design

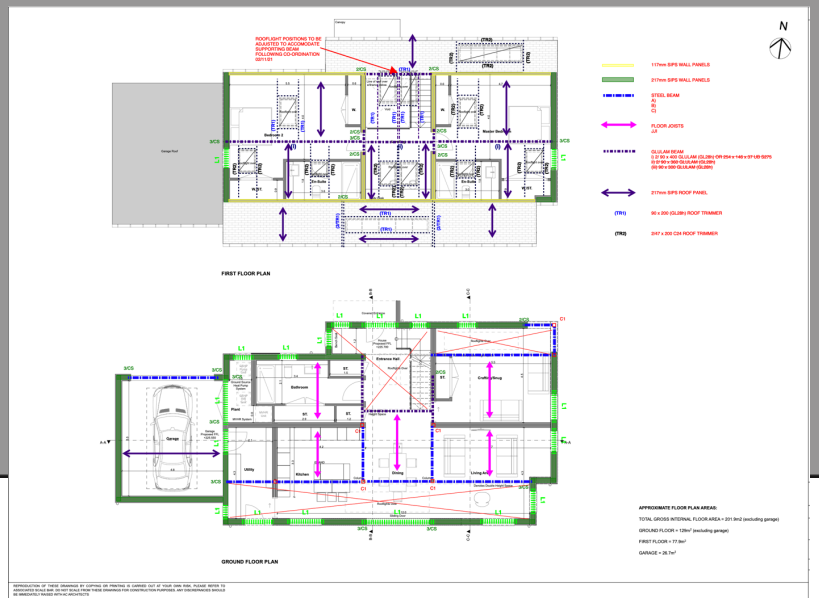
Allan Corfield
STRUCTURES

Stage 2: Early Design Review

Design Review with Client and Architect → **Review of Value Engineering Opportunities** → **Review Method of Construction Options** → **Preliminary Structural Sketch Overmarks** → **Early Design Co-ordination Review**







Allan Corfield
STRUCTURES

THE ADVANTAGE OF EARLY STRUCTURAL ENGINEER DESIGN REVIEW

❖ Different perspective

- ❖ **Your Structural Engineer will look at your project from a different perspective which will allow potential issues and opportunities to be identified early at a point in the project where they can still be easily accommodated without changes to completed work and/or amendments to Planning and Warrant**

❖ Structural Zones

- ❖ **The Structural Engineer will be able to advise on appropriate allowances for structural depths (Roof rafters/panels, floor joists, load bearing walls, beam and column sizing). This may influence your internal layout and floor to ceiling height which may in turn impact on your elevations. If not caught early, these changes may require changes to your planning and warrant submission and delay approval.**

❖ Transfer Structure and Column Locations

- ❖ **Early structural Review allows the discussion around potential downstand beams and column locations to happen at a time when architectural design decisions are still being made. This allows the Client the opportunity to make informed decisions between design aspirations and budget priorities.**

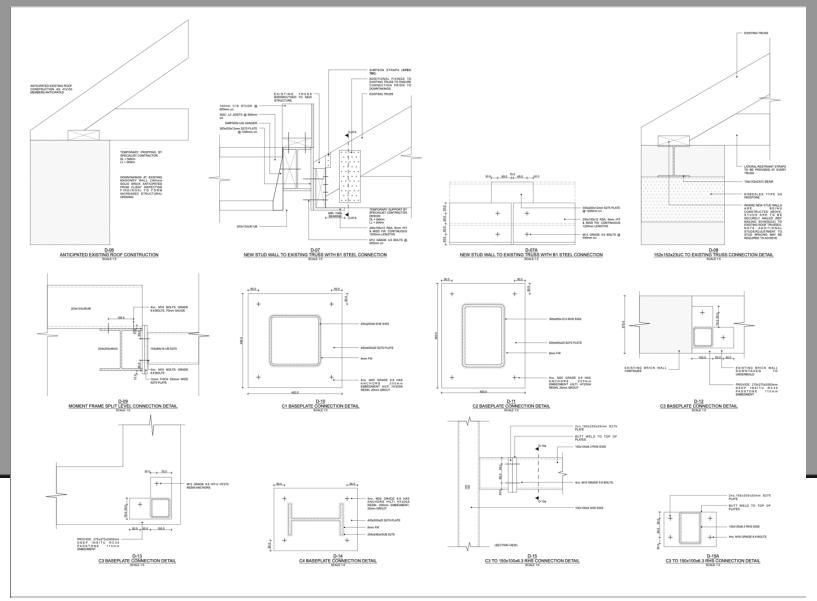
❖ Review of Tender Returns

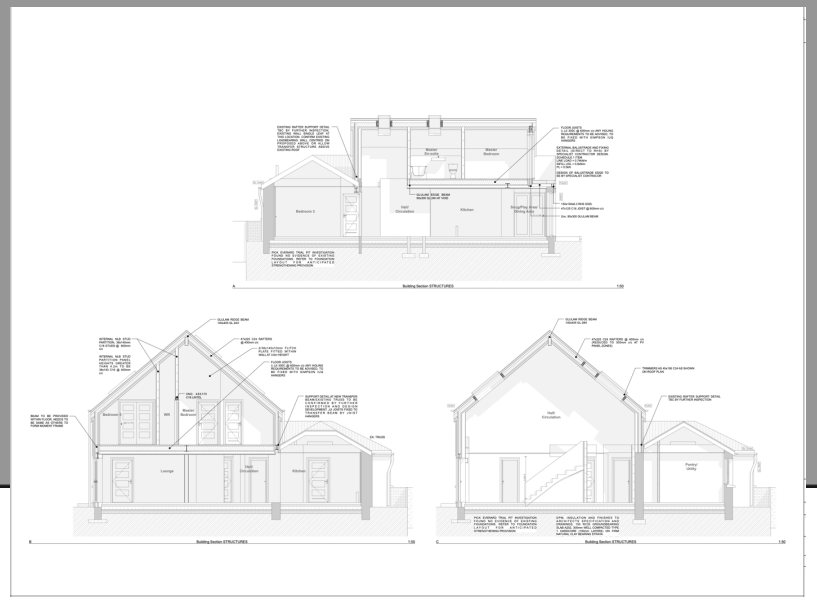
- ❖ **Tender returns from SIPs and ICF manufactures are often provided with the caveat of “subject to detailed engineering design”. While this is still the case for early involvement of the Structural Engineer, the design proposals are more likely to reflect the final design and any omissions from the tender return can be highlighted prior to appointment.**

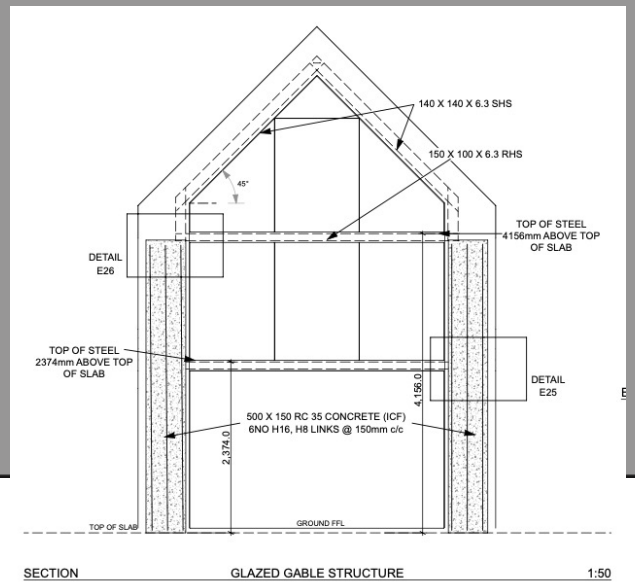
Allan Corfield
STRUCTURES

Stage 3: Structural Design and Drawings for Warrant Building Regulations

Development of Stage 2 Proposals for Frozen Layout → **Includes: Loading, Stability, Super Structure & Foundations** → **Design (or Review if not ACS) of SIP's/ICF Calculations** → **Specification and Review of Specialist Contractor Design** → **Submission for Building Warrant (& in Scotland SER Certification)**







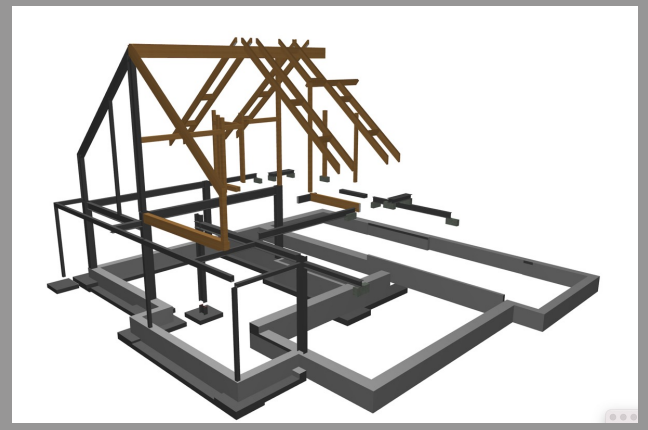
Allan Corfield
STRUCTURES

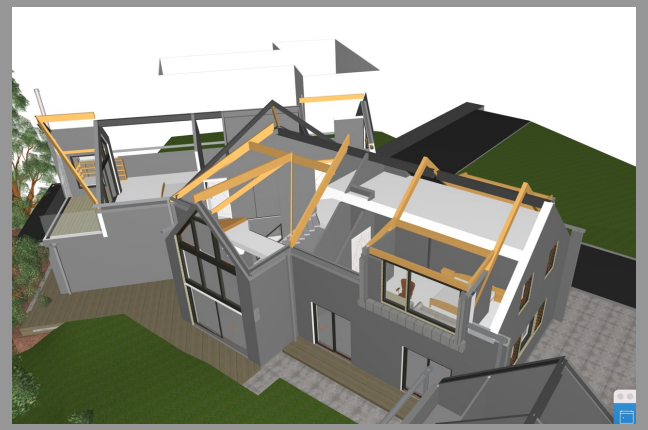
BENEFITS OF INTEGRATED DESIGN

- **Combined BIM Model**
  - At ACS/ACA The structural and architectural drawings and inputted into the same model. This helps identify potential clashes and simplifies co-ordination

- **Review of Design Options**
  - Column and beam options can be quickly added/removed from the model to assist with internal review and Client discussions.

- **Twinmotion**
  - The superstructure layer can be isolated to allow interrogation of details using VR





Allan Corfield
STRUCTURES

Stage 4: Design and/or Review of 3rd Party Elements
Note: In Scotland Under SER, Some Elements will be required for Stage 3

Specialist Contractor Design Elements as Identified and Agreed in Stage 2

→

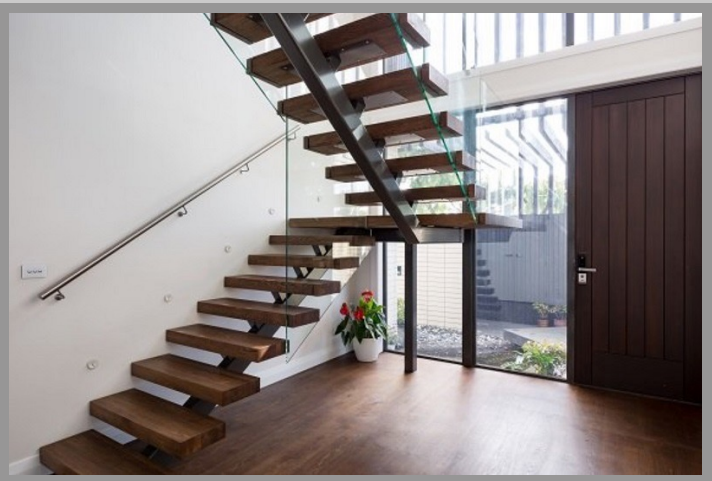
Examples: Steel Stair, Balustrades, Feature Glazing, Pre-cast Concrete, Piling

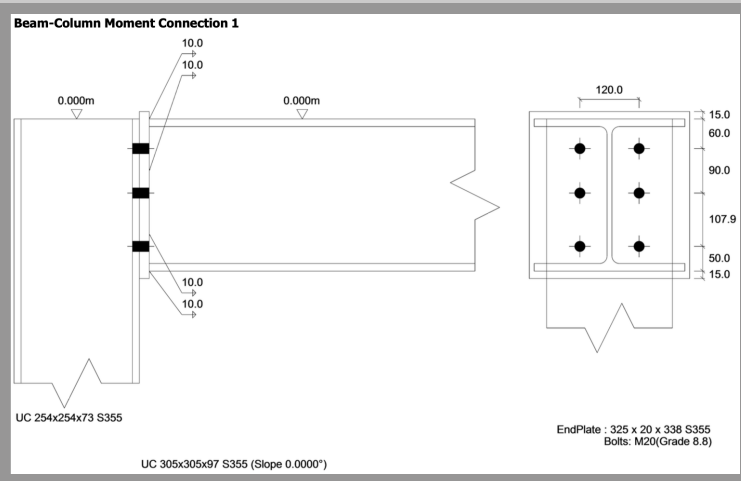
→

Specifications and Supporting Calculations Reviewed Against Design Spec

Note: Connection Design is sometimes omitted by other Engineers

Note: ACS Can Include Specialist Contractor Design Elements such as Steel Stair and Balustrades in Scope of Works as Required





Allan Corfield
STRUCTURES

Other Services Provided by ACS

Site Appraisals of Potential Plots

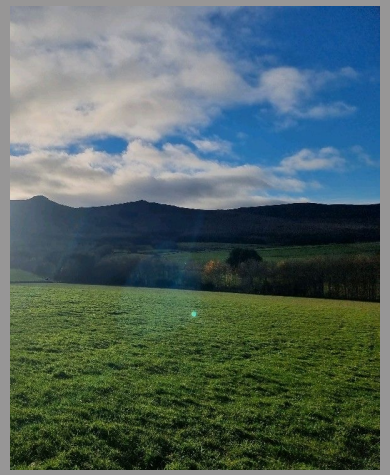
Visual Inspections of Existing Structures

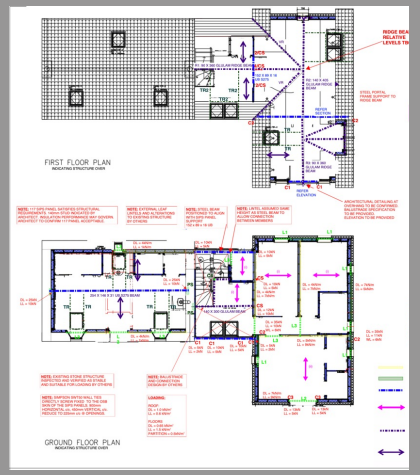
Specialist Designer for SIP's Manufacturer

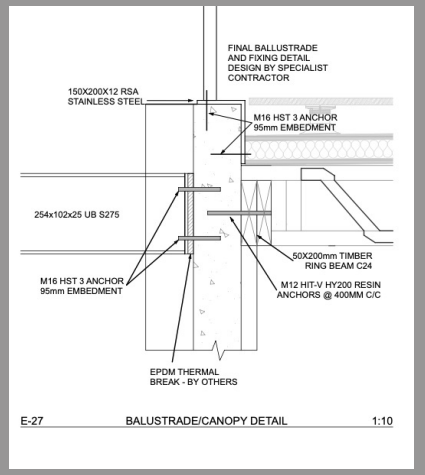
Specialist Designer for ICF Supplier

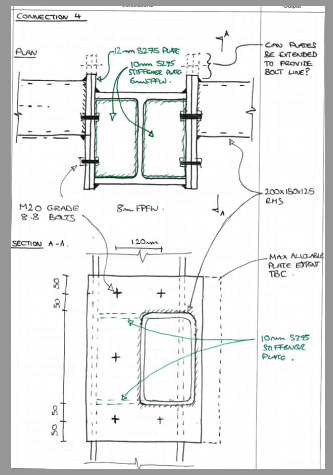
Steel Connection Design

SER Certifiers of Design (Scotland)









Structural Engineers Registration Ltd

Chartered Engineer