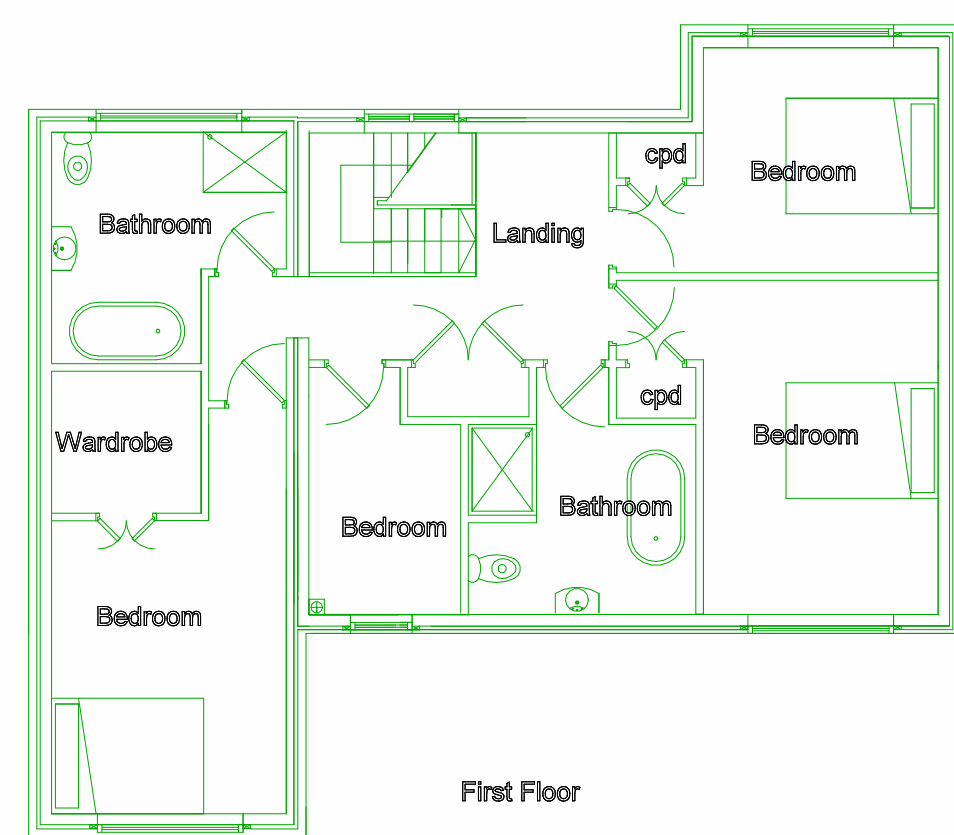
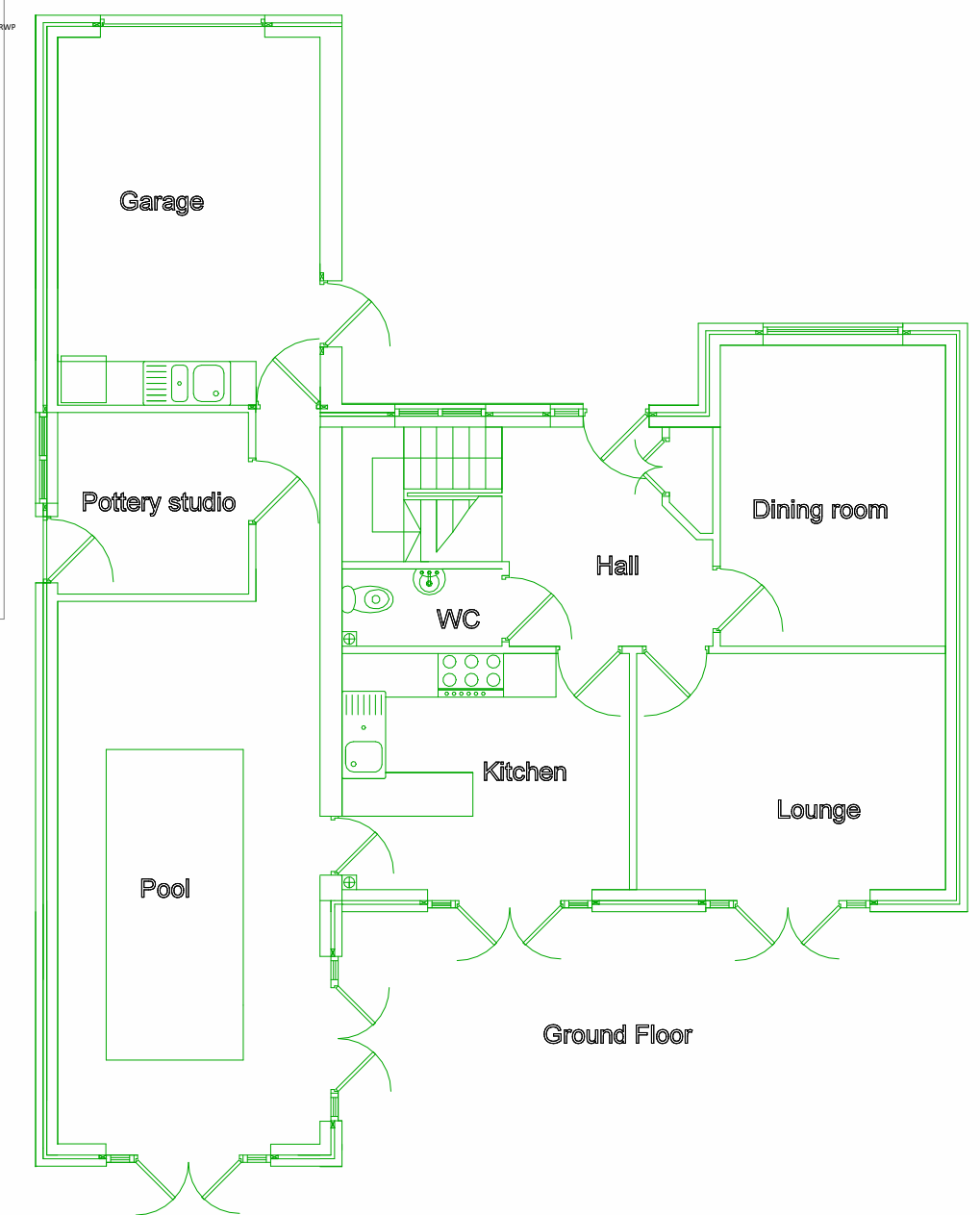
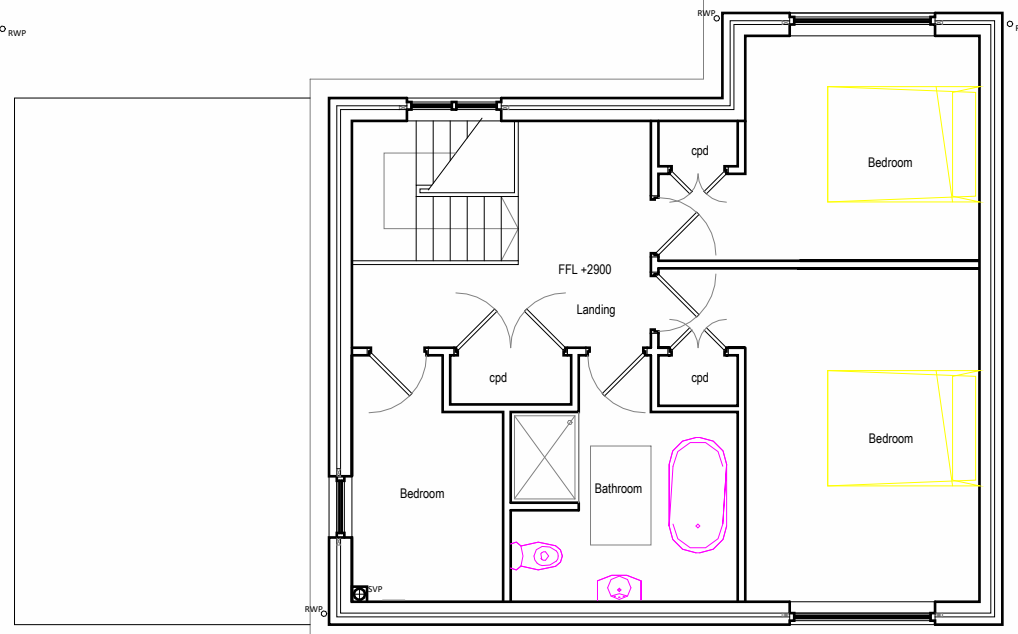
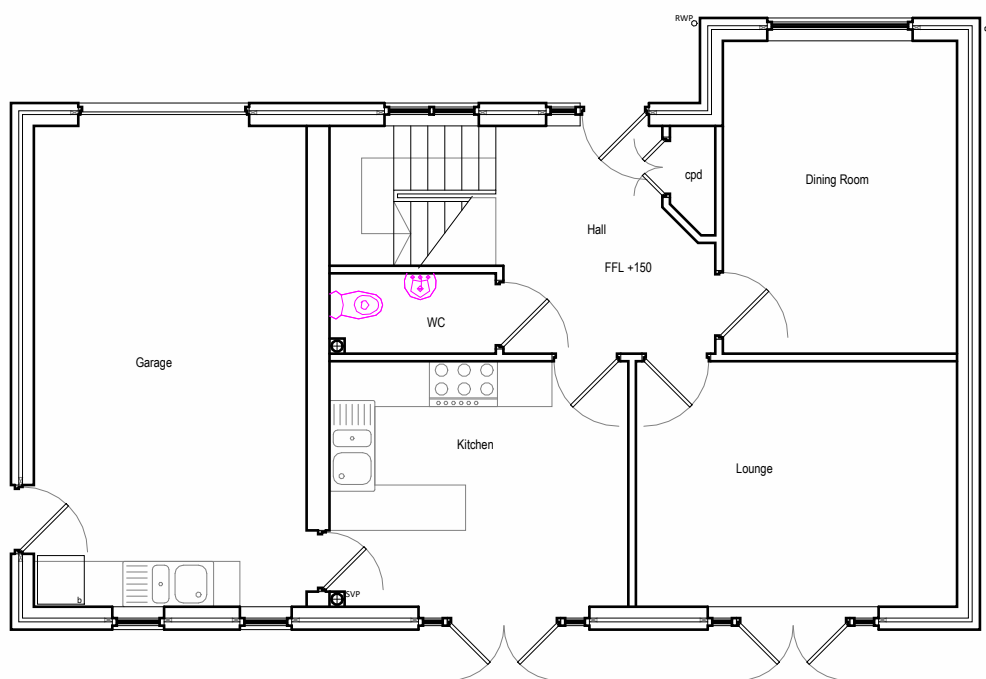
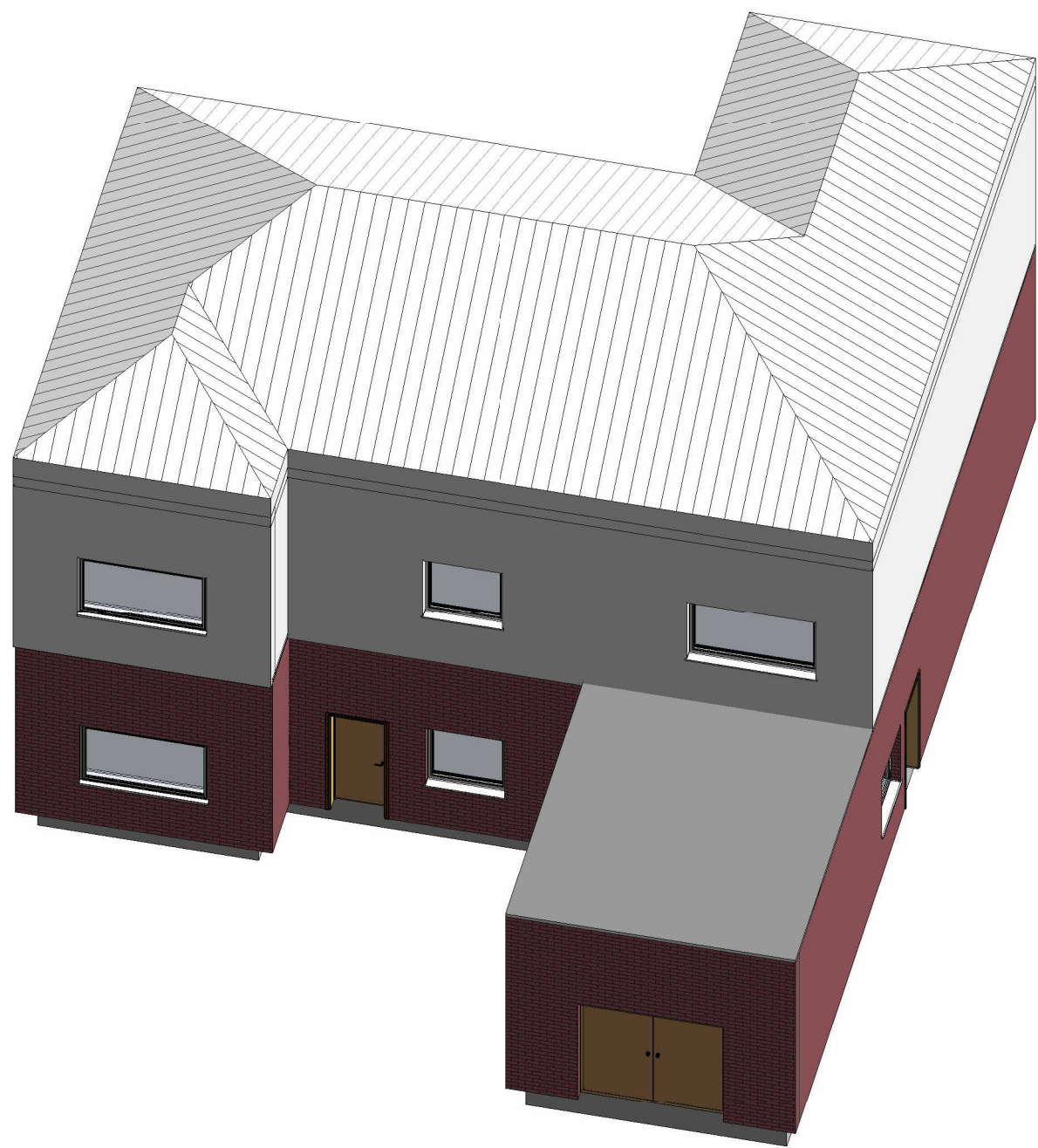
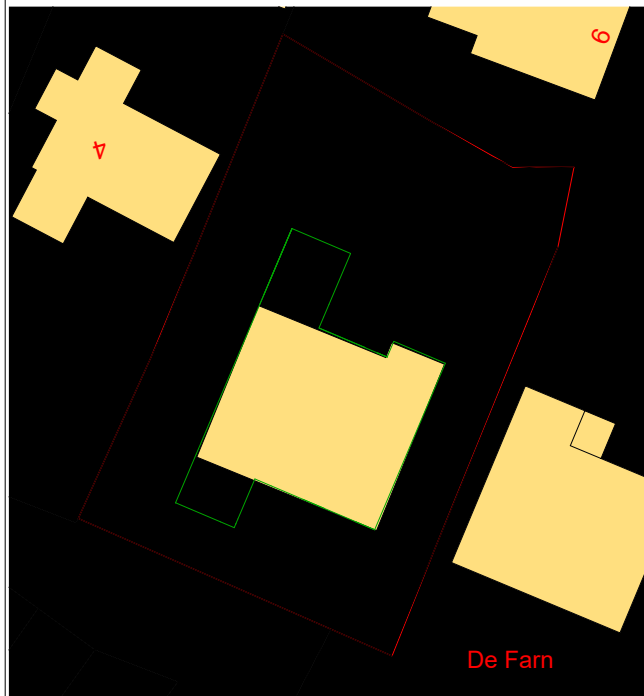




Introduction
A Client wishes to carry out a two-storey extension to a house. They have given instructions about their requirements, which include a new master bedroom with ensuite bathroom and wardrobe, a pottery studio with outside access, and an indoor pool with access to the garden. I been provided with drawings of existing floor plans, a site plan, and a site location plan. With this information, I have prepared a new design for the house.

Satisfying the Brief
I decided that it was best for the Client 's requirements that the single-storey garage is moved forward to use the huge amount of space that is in front of the house and use the new space freed up for the two-storey extension. Having done so, I decided that moving the garage side door to the opposite wall would make access to and from the front door easier. Placing the pottery studio between the relocated garage and the pool room seemed sensible. For the pottery studio I have added a window and outside access for it on the left side. The pool room satisfies the Client requirement for garden access. The new master bedroom was placed above the studio and the pool with the result that the existing first floor rooms were not interfered with except a new opening to enter the extension.

What a CDE is and How This Works in a BIM Process

A CDE is defined generally as a 'collaborative platform' for sharing files and managing tasks in technical and engineering projects. With the introduction of computers and the internet replacing traditional manual and paper-based methods, a common method of exchanging project files was by email. While faster than older methods, this method risked mistakes in keeping track of latest design versions or understanding the status of project deliverables, causing delays, errors and budget overruns. A set of stairs may end at a wall, or a light switch may be inconveniently placed behind a door, because one designer was working to out-of-date designs by others.

A CDE, by providing a single source and definition of project files and the status of project elements, overcomes many of these challenges (Dreifurst 2023). Through a CDE, project participants can know what other participants are doing so that the team works in a consistent and mutually supportive integrating way. Long after the project is complete, the CDE, when fed into a Building Information Model (BIM), provides a suppreliable shared record of what was achieved and by whom, assisting the management of the completed project asset (Oracle, 2024).

These changes to best project management practice were in response to a growing demand for CDE and BIM from clients, and an industry desire to find alternative processes or practices which may assist productivity and competitiveness. Net savings on construction costs of at least 5% were anticipated, in addition to future savings during post-occupancy in space utilisation, running costs and energy/carbon reduction (BIM Working Party Strategy Paper 2011). From as early as 2010, in the application of CDE and BIM principles to the construction industry, the UK government has been a strong promoter as part of a wider industrial strategy for Britain, inspired by earlier initiatives in the USA.

The general idea of a CDE and its application to building and construction projects is clear enough, but the actual system requires management and organisation. Stakeholders should have a common data environment to store and exchange information; but for that to be workable, standardised naming conventions are needed, along with a way of organising folders of documents to distinguish between work in progress, shared files, published files and archived files. There also must be a scheme of permissions, controlling who can access files and make changes. The International Standards Organisation (ISO) issued ISO 19650-1: 2018 setting out these requirements, which modern BIM systems seek to meet (ISO 2018).

In responding to the Client requirements, I used modelling software called Autodesk Revit or shortly named Revit. It is a building information modelling software used by architects, structural engineers, mechanical, electrical, and plumbing engineers, design for contractors (Autodesk Inc., 2024; Eastman 2011, pp.77-80). The idea behind Revit (the BIM platform market leader) and other such products is that the structure is built 'virtually' using exact data-rich objects from which plans and drawings can be generated. Revit or its competitors

The ideas of 'parametric objects' and 'object-based parametric modeling' are central to a BIM process. (Eastman 2011, pp.17, 31-33, 40). Information is linked via algorithms in a digital structured mode so that when a change is made, components are updated automatically in line with specified parameters (Eastman 2011, p.60). In this sense a BIM process is a fundamental advance on the objective of CAD tools in the 1980s which aimed just to be a digital replacement of the mechanical drawing board (Parametric BIM Modelling 2020). A door will fit automatically into a wall, a light switch will automatically locate next to the proper side of the door. Under BIM, there is not merely a 3D representation of the geometry and appearance but also an embedding of 'object attributes', to make changes intelligent and consistent, so that changes to dimensions in one view are automatically reflected in other views, and meet design, engineering and manufacturing rules contained in the parametric model of an object. Seen from a BIM perspective, a drawing is merely one sort of 'reporting output'. A user may be more interested in reports based on cost, performance or maintenance data objects (Eastman 2011, pp.18-19, 58, 60). While Revit and other parametric modeling products have enabled considerable improvements in the design, construction and management of buildings, there is much room for improvement in managing the demands on computer memory and in achieving greater inter-operability between different software systems.

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