



INSTITUTE OF DEMOLITION ENGINEERS

THE DEMOLITION PROCESS EXPLAINED



PRODUCED BY PERSES GROUP

ABOUT PERSES

PERSES was formed in 2013 to provide consultancy services and training courses to the specialist demolition and asbestos removal sectors. It has since moved into providing health and safety advice and training courses to all sectors, including temporary works, safety awareness for construction, occupational health and safety, as well as demolition works.

PERSES is primarily a demolition consultancy with experienced demolishers working within the business capability and as a company and staff, has significant experience in dealing with the demolition process and giving advice to clients on the best approach to take on managing contracts.

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ABOUT THE IDE

The Institute of Demolition Engineers (IDE) exists to promote and foster the science of demolition engineering.

The main objectives include the:

- promotion of use of more efficient techniques in the industry
- encouragement of safer methods of working
- provision of a qualifying body for the industry

ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

ASB5:	Notification of Asbestos Work
BREEAM:	Building Research Establishment Environmental Assessment Method
CDM:	Construction (Design & Management)
F10:	Notification of Construction Project
HSE:	Health and Safety Executive
NNLW:	Notifiable Non-Licensed Work
NPC:	Notification of Practical Completion
PCI:	Pre-Construction Information
PPE:	Personal Protective Equipment
RAMS:	Risk Assessment Method Statement



1. INTRODUCTION

1.1 PURPOSE OF THE DOCUMENT

The purpose of this study is to map and explain the demolition process for demolition projects in the UK.

1.2 METHODOLOGY

The information in this document is based on a PhD study¹, where 40 interviews were conducted with various demolition engineers in the UK. Participants included directors, demolition consultants, senior project managers, and estimators.

1.3 TARGETED AUDIENCE

This work is aimed at clients, policy makers, construction stakeholders, local authorities, councils, procurement managers, principal designers, demolition practitioners, academic researchers and all those involved directly or indirectly in the demolition process.

1.4 BENEFITS OF THE STUDY

This study is considered a first attempt to systematically map and present the demolition process from the demolition engineers' perspective. This research will advance demolition project management in the UK for several reasons. First, it creates awareness and broadens the understanding of the demolition process. Second, it informs clients of their roles and responsibilities throughout the process. And third, it provides generic guidance for clients and demolition contractors to better manage demolition projects.

1.5 LIMITATION

While all demolition projects in the UK should follow a similar process in the one presented in this study, the process for small demolition projects, at times, differ; some client duties might be transferred to the demolition contractor². Such differences are not presented in this document.

¹ Guidance for Advancing Demolition Project Management in the UK by Yazan Osaily. 2021.

² Note that while the duties can be transferred, the responsibilities will remain with the client under CDM 2015.

2. THE DEMOLITION PROCESS

Findings shows that the demolition process is divided into five main stages: scope definition, procurement, pre-demolition, project delivery, and completion. Each stage will be discussed in the following sections.

2.1 STAGE 1: SCOPE DEFINITION

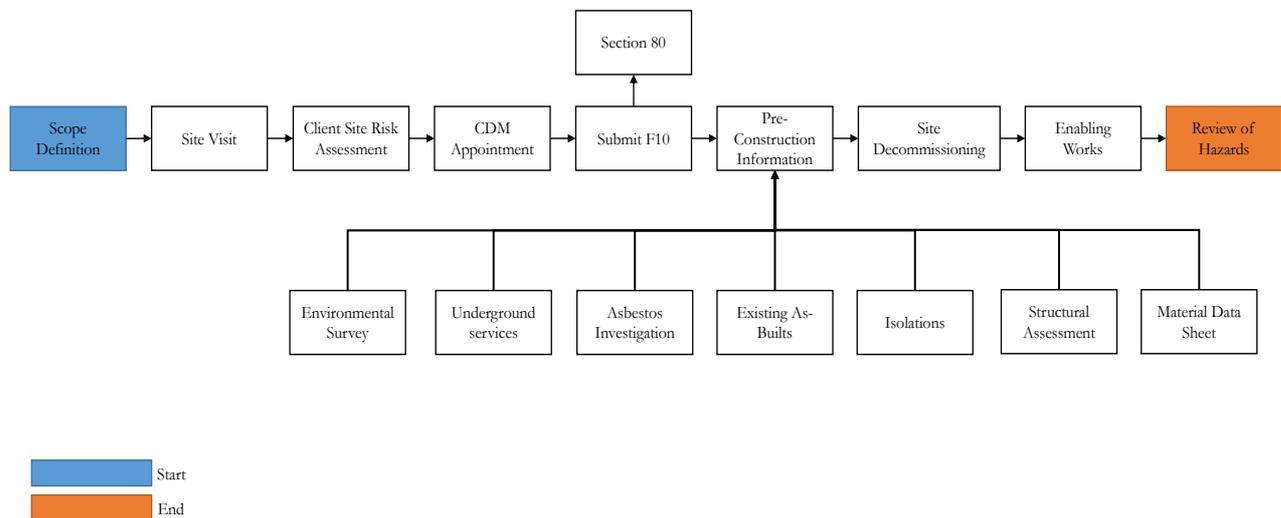


Figure 1: Scope Definition Stage

This is the first stage in the demolition process. The key stakeholder at this stage is the client, who seeks to define and understand what the site entails to prepare for demolition. At this stage, there is one key role for the client: to produce the scope of work document.

The process begins by defining what the scope of work is. This is achieved through a site visit to conduct a preliminary investigation. The client at this phase seeks to gather rough data about the site; it is important to appreciate the size of the project, the level of complexity, and have a rough estimation of the arisings³ that the building is expected to produce and a rough understanding of the associated risks. Once the client defines the scope, the preparation for demolition begins. Under Construction (Design & Management) (CDM) Regulations 2015, the client is obliged to appoint a Principal Designer to manage the process. The client is also obliged under CDM regulations to submit a notification of construction project (F10)⁴ document to the Health and Safety Executive (HSE) to notify them that works are about to commence. Alongside the F10 notice, a Section 80 Demolition Notice, which is featured in the Building Act 1984, needs to be submitted to the local authority to notify them that works are about to commence. Normally, the response for the Section 80 Demolition Notice is called Section 81, wherein the local authority provides the green light for the demolition contractor or the client to commence the work, but it may also highlight any necessary restrictions. Normally, it takes up to six weeks to receive Section 81, but if it is not

³ For this document, arisings represent any retrievable material that comes out of the structure that will not be sent to landfill. Waste, on the other hand, represents hazardous materials that cannot be processed, and any other materials which end destination is landfill.

⁴ F10 is the responsibility of the client under CDM 2015 regulations, but it is often done by the demolition contractor at the pre-demolition stage.

received after six weeks, the client or the demolition contractor under the Building Act 1984 can begin the demolition work.

Once Section 81 is received, the client must begin the process of preparing the Pre-Construction Information (PCI), which is a document that lists what the client has done on-site prior to handing it to the demolition contractor. Ideally, the site should be fully decommissioned, fully isolated, cleaned, and all necessary checks are made so that the demolition contractor knows exactly what the site contains.

Based on the preliminary investigation made through the site visit, the client then conducts or organises a detailed inspection of the building to examine the type of contaminations within the building. Contaminants differ from one project to another; for example, in an industrial building, contaminants could be related to the site's previous uses. However, in dwellings or offices, contaminants can be found in joints, adhesives, and mastics, and the most dominant one in the UK is asbestos, which can be anywhere in the building and requires immense skill and expertise to detect. This process can be complicated for large and complicated projects, and as a result, some owners prefer to move this responsibility to the demolition contractor.

2.2 STAGE 2: PROCUREMENT – CLIENT

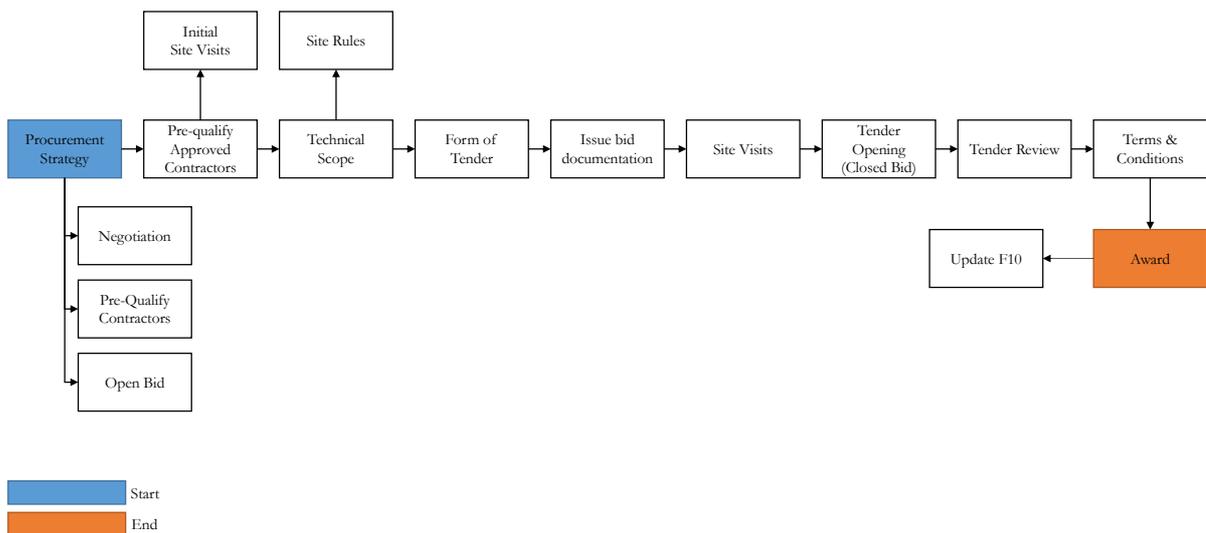


Figure 2: Procurement - Client

Once the PCI is issued, the client can move towards defining the procurement strategy. It could be through negotiating the price with a specific company, pre-qualifying a certain number of approved demolition contractors, or making it fully accessible to any demolition company through uploading it to an accessible portal. In larger organisations, the favoured choice is to pre-qualify a certain number of approved demolition contractors to bid for the project. Through this route, the client ensures that all chosen contractors are capable of delivering the job and also ensures a better price. For demolition contractors to become enlisted on the pre-qualification list, there are pre-qualification documents that the client asks to be completed.

Once the client has pre-qualified a specific number of demolition contractors and has produced all the pertinent documents, including the PCI and the technical scope of works, which is a document that highlights the site rules, restrictions, and requirements, the client produces a form of tender and prepares for a site visit by the chosen demolition contractors. Once all tenders are received, the client and principal designer review all tenders and award the contract to one of the demolition contractors.

Note: there are no specific criteria to award the contract and clients tend to have different criteria for such purposes.

2.3 STAGE 2: PROCUREMENT – DEMOLITION CONTRACTOR

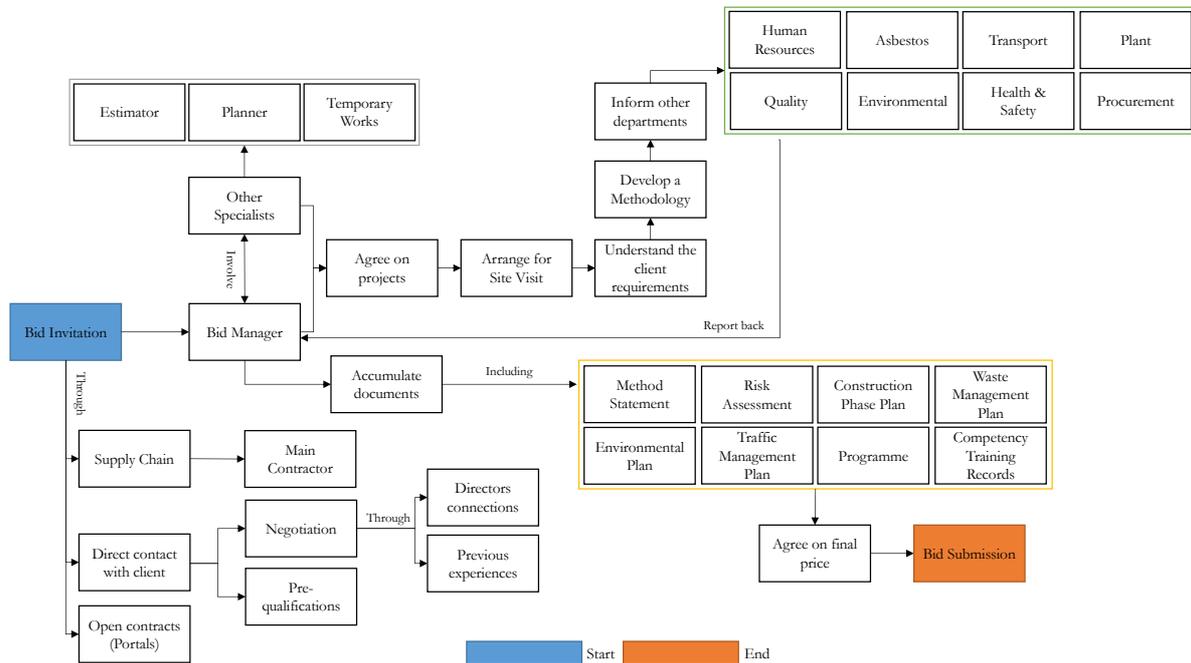


Figure 3: Procurement - Demolition Contractor

The procurement stage begins for the contractor once a bid invitation is received. This could be through direct contact with the client, the supply chain, sub-contracting for the main contractor group or local authority, or through open portals, which are available online or advertised in magazines and newspapers.

The responsible individual at this stage is known as the Bid Manager⁵. Once projects are gleaned, the Bid Manager will discuss the collected projects with the team and identify the ones the company will tender for. Depending on the complexity of the project and the requirements, other specialists might be involved in the process including a structural engineer, planner, and temporary works designer.

Once the team agrees on the projects, the Bid Manager will contact the client to arrange for site visits and seek more information regarding the site. If the company has sufficient information to bid for the project, the Bid Manager will disseminate the information to other departments, including human resources, asbestos team, transport, plant, quality, environmental, health & safety, and procurement. These departments then prepare the pertinent documents to begin the bidding process. Such documents include method statement, risk assessment, waste management plan, environmental management plan, traffic management plan, programme, and competency training records.

Once all the documents are prepared, they are returned to the Bid Manager, who will then agree on the final price with the team and prepare the final documents for submission.

⁵ This is sometimes done by the managing director, contracts manager, or any other qualified individual depending on the company size.

2.4 STAGE 3: PRE-DEMOLITION

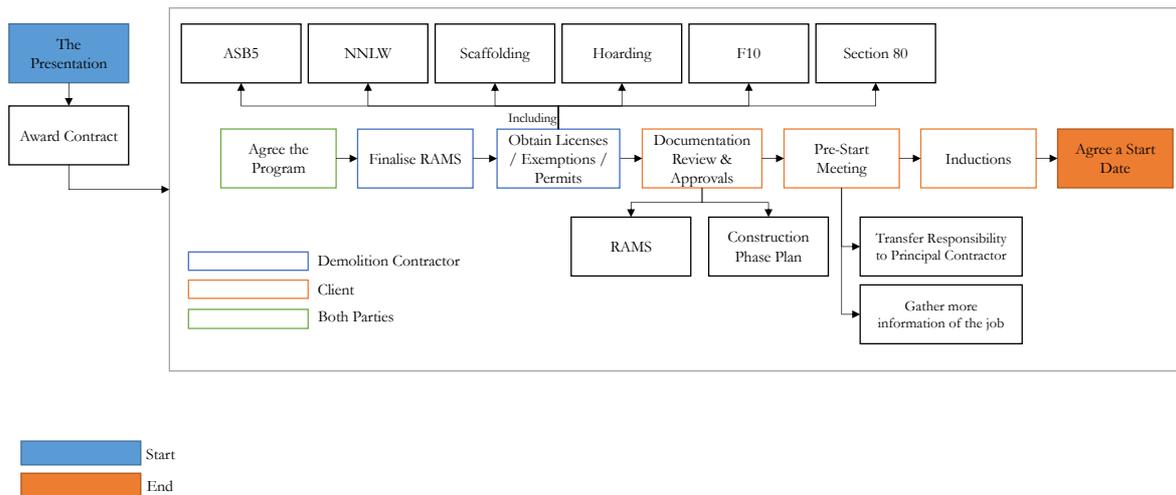


Figure 4: Pre-demolition Stage

If the bid is successful and the demolition contractor reaches the post-qualification stage, the client will invite all contractors who made it to the second round and discuss each company's strategy to approach the building as well as their health and safety plan and contribution to sustainability. This meeting is known by many names including: the presentation, high risk review meeting, or the interview. Once this is over, the client decides to whom the contract should be awarded, and the pre-demolition stage begins.

The pre-demolition stage is where the demolition contractor finalises all the paperwork, obtains the necessary licenses, and takes over the responsibility for the site from the client. This stage can be time-consuming as many of the licences take considerable time to be granted. They may not all be required on every demolition project, and they depend on a few factors, including the location of the project, its size, and the amount of asbestos detected.

The client's role at this stage is to approve the documents submitted by the demolition contractor, transfer the responsibility to the principal contractor, and deliver site induction to the demolition contractor's team.

2.5 STAGE 4: PROJECT DELIVERY

Once the responsibility of the project is transferred to the demolition contractor, the demolition works can commence. Removing any waste and residue from the site is often the responsibility of the demolition contractor. It is essential to establish a safe, healthy environment for the operatives prior to mobilisation. The worksite is then fenced and established. Facilities should include a fully equipped site office, welfare facilities including toilets, showers, drying room, and a suitable working space around the building. Before any demolition work, the management team must ensure continuous and transparent communication with the neighbours and take the necessary means to protect them.

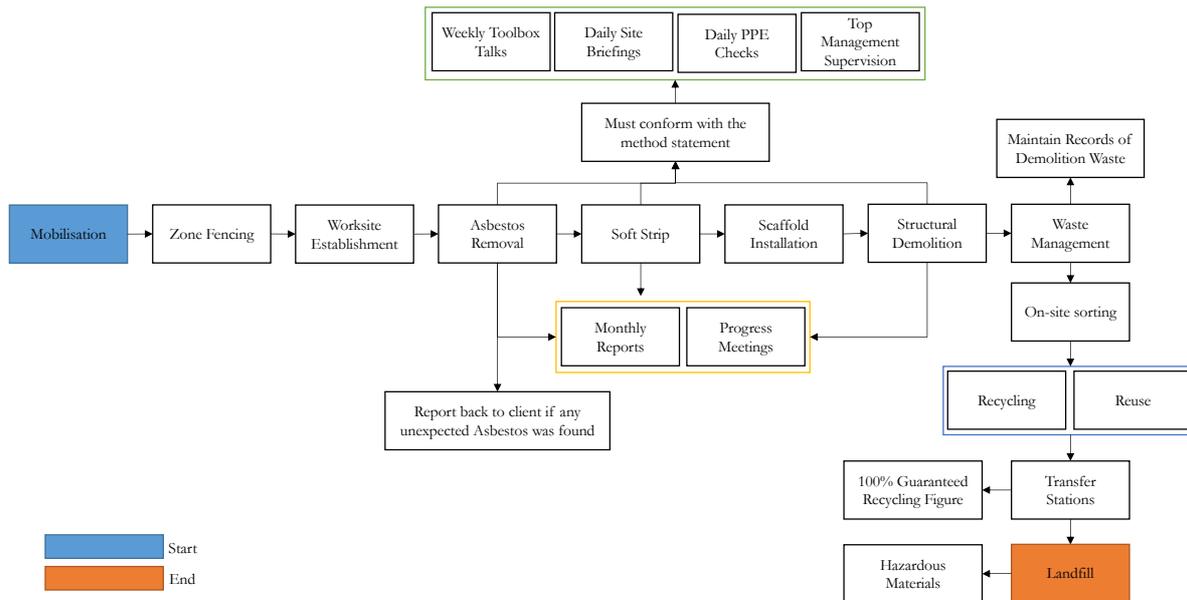


Figure 5: Project Delivery Stage

2.5.1 ASBESTOS AND HAZARDOUS MATERIALS REMOVAL

The process should always begin by detecting asbestos on-site. This is achieved by a thorough examination of the site combined with the findings of the asbestos survey and list of other potential hazardous materials⁶ provided by the client as part of the PCI document. Asbestos is elusive, and HSE (2001) urges that no work is to be carried out if no asbestos survey was conducted. Alternatively, if works must be carried out, it is safer to presume that all materials on-site contain the most hazardous types of asbestos and appropriate measures must be taken whether these materials do contain asbestos or not.

Once all information is gleaned, the area where asbestos and other hazardous materials were detected must be fully isolated, especially if other activities are ongoing at the same time. Access must be restricted to everyone on site, except authorised persons who have undertaken the necessary training, are fully aware of the risk assessment, and are fully equipped with the appropriate personal protective equipment (PPE).

2.5.2 SOFT STRIP

When the worksite is cleared of all existing asbestos and the building is safe to access, the site operatives begin the soft strip phase. This process aims to strip the building of all remaining furniture and equipment and remove any permanent installations within the building, including doors, windows, electrical installations, tiles, etc. This process will revert the building to its structural shell and prepare it for structural demolition.

2.5.3 STRUCTURAL DEMOLITION

The demolition method is usually decided upon at the tendering stage. The selection of the most suitable demolition method is influenced by many factors such as client specification, structural stability, location and surroundings, time available, presence of hazardous materials, waste management, and most importantly, health and safety, which dictates all other factors.

⁶ It is good practice to carry out a HazDem (Hazardous Material Demolition Survey) prior to works starting on-site.

The demolition process must concur with the method statement to avoid any potential conflict with the client. The project delivery stage from asbestos removal to structural demolition is fraught with risks and hazards and keeping the workforce aware and prepared is crucial to delivering the project successfully. As a result, demolition contractors, give special attention to daily briefings⁷ and toolbox talks⁸.

2.5.4 ARISINGS MANAGEMENT

Once the structural demolition is complete, the arisings produced as a result needs to be cleared. Demolition arisings are generally composed of heterogeneous mixtures of building materials, including aggregate, concrete, wood, paper, metal, insulation, and glass, and are usually contaminated with paints, fasteners, adhesives, wall coverings, insulation, and dirt (El-Haggar, 2007). Different structures will contain different mixtures depending on the age of the building, the purpose of the structure, and the materials which were used to construct the structure (El-Haggar, 2007)

Some demolition contractors prefer to segregate demolition arisings on-site and prepare it for reuse and recycling, to avoid paying extra charges for transportation, and to ensure obtaining maximum BREEAM points because transporting the materials would emit CO2 emissions. However, on-site sorting depends on the time provided for demolition, space on-site, and available resources (i.e., large manpower capacity). If the demolition contractor is unable to sort the materials on-site, the arisings will be transferred to a transfer station, which guarantees high recycling percentages⁹.

Finally, hazardous materials and substances that cannot be processed are sent to landfill. It is always favoured to maintain records of waste disposal for future reference, and particularly if the project is following the BREEAM credit system.

2.6 STAGE 5: COMPLETION

At the end of the project, once the necessary checks have been made, the demolition contractor submits a notification of practical completion (NPC). Once the NPC is submitted, the contractor will no longer be liable for liquidated damages, and this marks the beginning of the defects' liability period. The client then grants permission for the demolition contractor to begin evacuating the site and to prepare for site handover. The most important document at this stage is the health & safety file, which contains the residual risks (risks that remain associated with the site), such as underground asbestos pipework, or information regarding live services. Anything that is left on that site that could cause a hindrance to future work needs to be documented and compiled into a file so it can be assessed by any future contractor. The client and the demolition contractor both provide feedback, and the demolition contractor establishes a case study of the project for future reference and lessons learnt.

⁷ Daily briefings are short talks that are delivered daily to the workforce to ensure their constant engagement and to raise their awareness concerning the risks associated with the activities on that specific day.

⁸ Toolbox talks are short talks that are delivered on weekly basis to the project workforce to raise their awareness level on the importance of the control measures to tackle potential risks on-site.

⁹ This choice seems to be favoured by many demolition organisations despite the additional cost the contractor incurs. This is because demolition arisings require considerable storage space, which only a few demolition organisations have. Furthermore, in addition to the transportation cost, time is needed to manage and sell the collected arisings from the demolition site. Therefore, many believe it is cheaper to deal with transfer stations rather than taking the responsibility for arisings disposal.

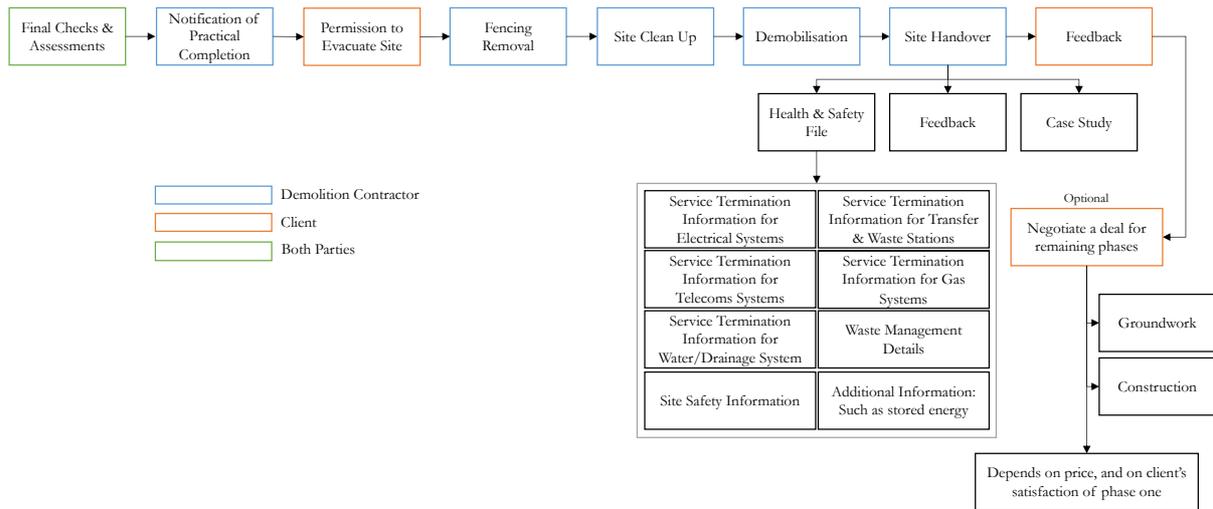


Figure 6: Completion

In large demolition projects, if demolition forms phase one of the work, whereby phases two and three are the groundwork and construction, consecutively, the client may negotiate a price with the demolition contractor to carry out the remaining phases, provided the client was satisfied with the demolition works and the price of the negotiations.

LIST OF REFERENCES

- El-Haggar, S.M., 2007. Sustainability of Construction and Demolition Waste Management. Sustainable Industrial Design and Waste Management, pp.261–292.
- HSE, 2001. Introduction to Asbestos essentials [Online]. Available from: <https://www.hse.gov.uk/asbestos/essentials/>.