



Alteration, Renovation and Remediation

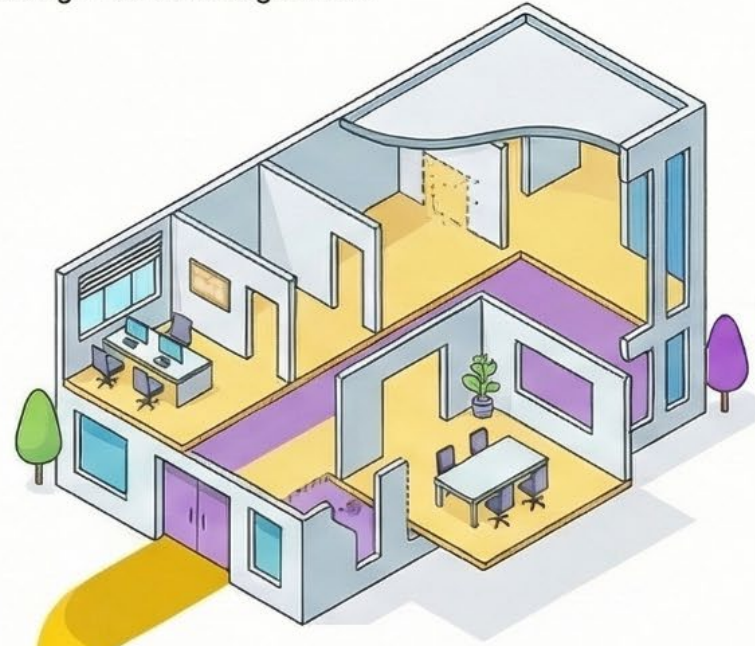
Remediation: Fixing Hazards

Restores buildings to a safe condition by removing contaminants or structural damage.



Alteration: Changing Layout

Modifies the physical structure or function to change how a building is used.



Renovation: Upgrading Experience

Improves appearance and comfort without fundamentally changing the building's underlying structure.

Focus on Modernization

Aims to boost functionality and style while maintaining the existing footprint.



Method

Primary Objective:

Primary Objective:

Primary Objective:

Primary Objective



Safety & Restoration



Reconfiguration



Modernization

Scope of Change



Repairs damage/hazards



Structural/functional shifts

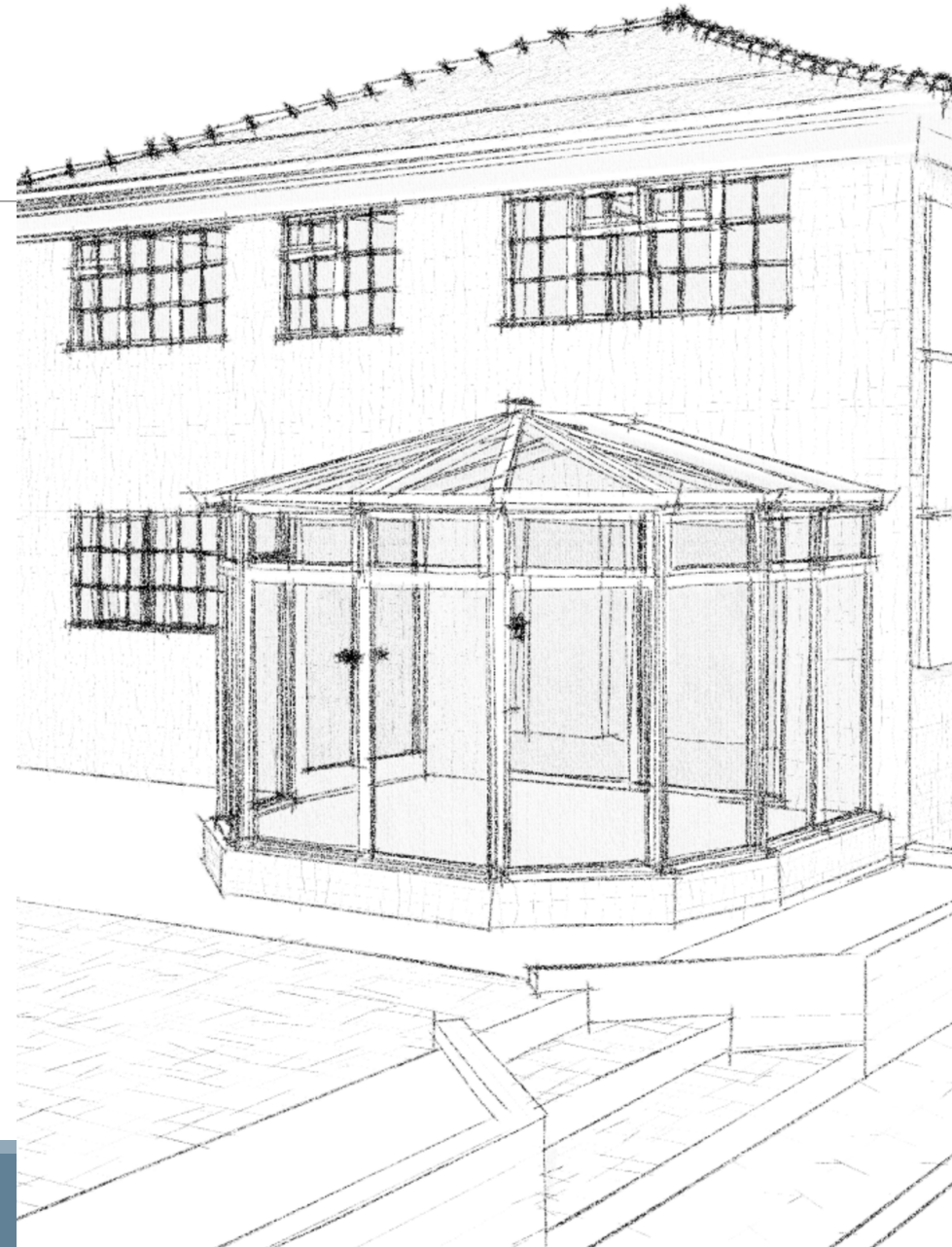


Aesthetic/comfort upgrades

Alteration

Alteration is work intended to change the function or appearance of a building.

Existing buildings often undergo alterations during their life to change, modify or improve their performance or the nature of their use.



Alteration

It can be done to achieve some or a combination of the following objectives:

- Compliance with New Regulations



Compliance with New Regulations

Accessibility



Fire Safety



Sound



Structure



Sustainability



Alteration

It can be done to achieve some or a combination of the following objectives:

- Compliance with New Regulations
- Environmental Enhancement





Environmental Enhancements

- Installation of new or upgraded services to improve internal comfort conditions and energy efficiency.
- Contribute to better sustainability
- Higher performance standards for the indoor climate.



Environmental Enhancements

- Painting or repainting external facades of buildings to improve their appearance.
- External environmental improvements, such as new hard and soft landscaping, as part of an urban regeneration scheme.

Alteration

It can be done to achieve some or a combination of the following objectives:

- Compliance with New Regulations
- Environmental Enhancement
- Spatial Modifications

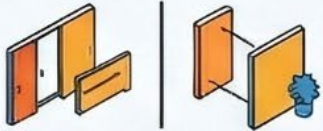
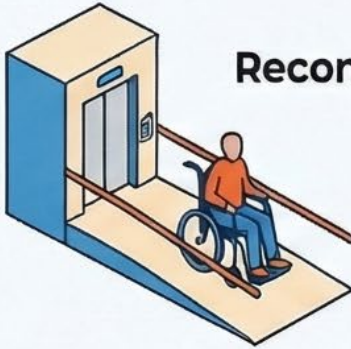


Spatial Modifications



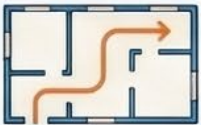
Accessibility & Accommodation

Implementing alterations specifically designed to support elderly and disabled users.



Functional Adaptation

Reconfiguring internal layouts and changing space functions to enhance user convenience.

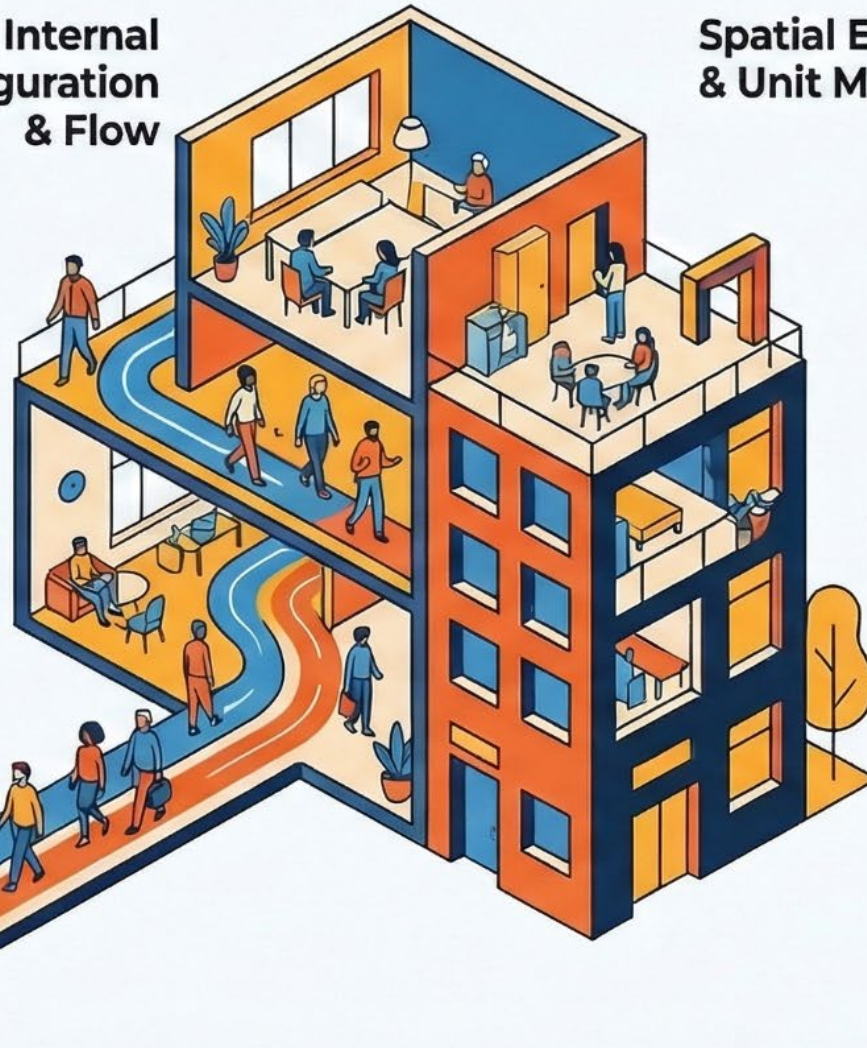


Enhanced Circulation

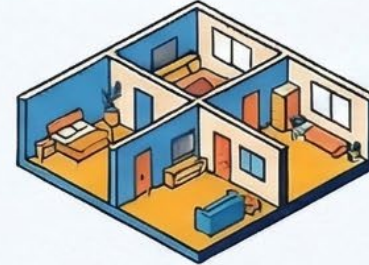
Providing dedicated common areas and improved paths for movement within the building.



Internal Reconfiguration & Flow

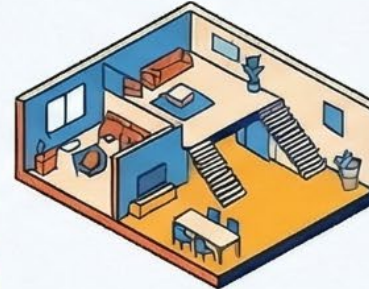


Spatial Expansion & Unit Modification



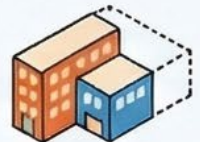
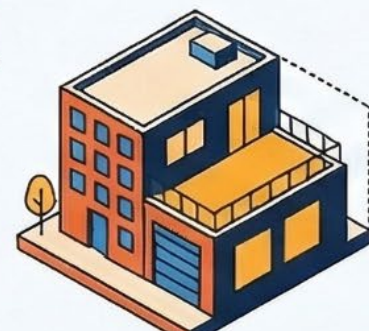
Unit Subdivision

Dividing large buildings vertically or horizontally into smaller, self-contained units.



Spatial Consolidation

Combining distinct spaces to create larger, integrated living or working environments.



Dimensional Expansion

Adding new floor area or extending existing footprints for special activities.

Alteration

It can be done to achieve some or a combination of the following objectives:

- Compliance with New Regulations
- Environmental Enhancement
- Spatial Modifications
- Structure and Fabric Upgrading



Structure and Fabric Upgrading

Overcladding or recladding to improve weather resistance, as well as aesthetic, acoustic and thermal performance of the building.

General repairs and improvements to damp proofing and timber preservation.

Major remedial works to rectify damage.

Inserting new columns and/or beams for strengthening or improved load-bearing capacity.

Repairing defective or substandard structural elements (e.g. underpinning foundations).



Scale of Alteration

Small (Minor)



Minor improvements to surfaces, upgrading fittings, or minor extensions.

Scale of Alteration

Scale	Degree of Change	Type	Example
Small	Minor	Minor improvements to surfaces. Upgrading of fittings. Minor extension.	New floor coverings, re-roofing, painting / re-painting or rendering / re-rendering external walls. Replacement of doors , windows, bathroom and kitchen fittings. Porch, conservatory or small rear/side extension, and loft conversion. These may involve some minor structural work, such as forming new openings.



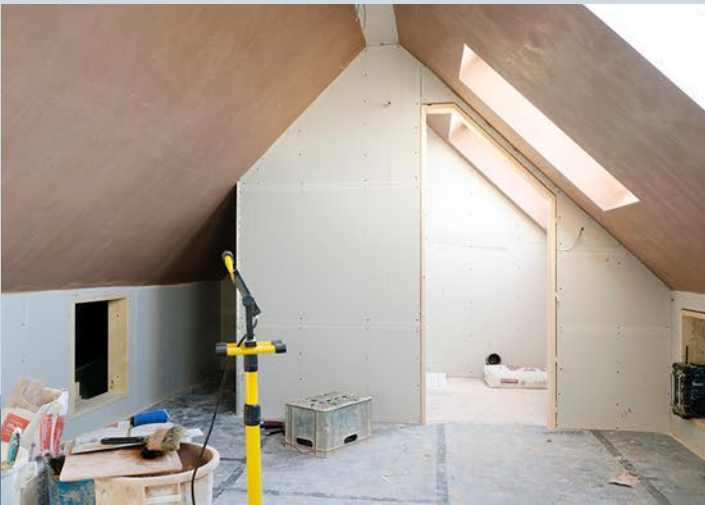
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Scale of Alteration

Small (Minor)



Minor improvements to surfaces, upgrading fittings, or minor extensions.

Medium (Substantial)



Conversion schemes, major retrofitting of services, or structural alterations.

Scale of Alteration

Scale	Degree of Change	Type	Example
Medium	Substantial	Conversion Scheme. Major upgrading of surfaces or elements. Major retrofitting of services. Enlargement of capacity. Structural alterations. Major change of use of an old building.	Change of use from office to flats or vice versa. Overcladding of walls and recovering of roofs with improved thermal qualities, over-roofing flat roof, recladding of walls. Re-wiring, new air-conditioning system, addition of lift/s and service cores. Major lateral or vertical extension. Removal/insertion of walls and floors. Conversion/renovation works to a derelict or wrecked property.



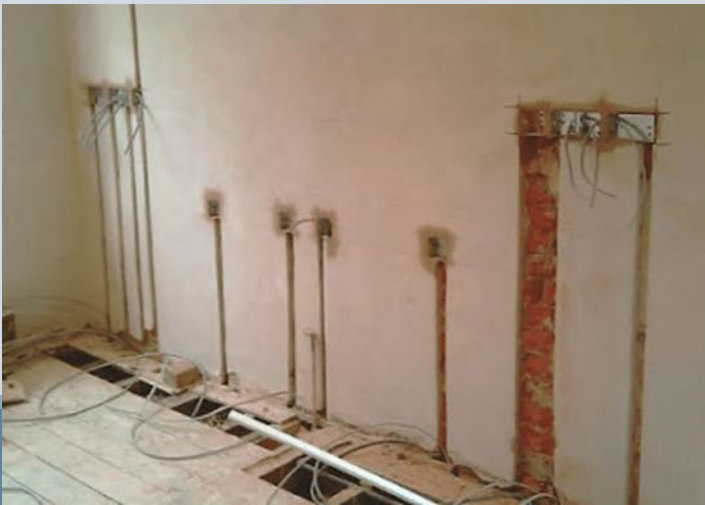
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Scale of Alteration

Small (Minor)



Minor improvements to surfaces, upgrading fittings, or minor extensions.

Medium (Substantial)



Conversion schemes, major retrofitting of services, or structural alterations.

Large (Drastic)



Extensive re-modelling works and reconstruction of a new building behind existing main walls.

Scale of Alteration

Scale	Degree of Change	Type	Example
Large	Drastic	Extensive re-modelling works. Reconstruction of new building behind existing main external walls. Extensive spatial and structural alterations to enlarge/reduce the building's capacity or change its use.	Restoration of a ruinous multi-storey building. Façade retention scheme. Major extension to as well as internal and external modification of existing building.



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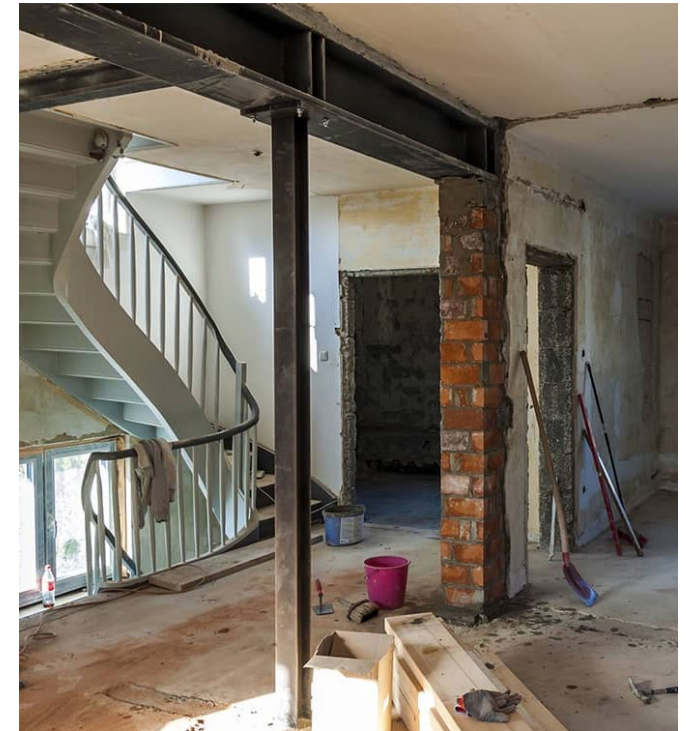


Renovation

Renovation is the process of upgrading, restoring, or repurposing an existing building to improve its condition, functionality, and efficiency.

It differs from new construction in that it retains the original structure while enhancing key aspects such as sustainability, aesthetics, and usability.

Renovation is often preferred over demolition and reconstruction due to its environmental benefits, cost-effectiveness, and potential for preserving historical or architectural significance.



Feasibility Stage



Project Goals

Identifying if the primary focus is on modernisation, sustainability, compliance, or aesthetic improvements.

Usage Requirements

Identifying exactly how the building will be used post-refurbishment.

Future Flexibility

Ensuring that the current refurbishment supports potential future adaptations or expansions.



Building Assessment

A thorough assessment of the existing building helps in understanding its current state and identifying necessary interventions. This includes:

Structural Integrity – Checking for cracks, foundation issues, load-bearing capacity, and deterioration of materials



Building Assessment

A thorough assessment of the existing building helps in understanding its current state and identifying necessary interventions. This includes:

Building Services – Evaluating electrical systems, plumbing, HVAC, and fire safety measures to determine if they need upgrading.





Building Assessment

A thorough assessment of the existing building helps in understanding its current state and identifying necessary interventions. This includes:

Asbestos and Hazardous Materials – Identifying any hazardous substances that require safe removal or containment.



Building Assessment

A thorough assessment of the existing building helps in understanding its current state and identifying necessary interventions. This includes:

Accessibility and Compliance – Ensuring the building meets modern accessibility standards and legal requirements.



Building Assessment

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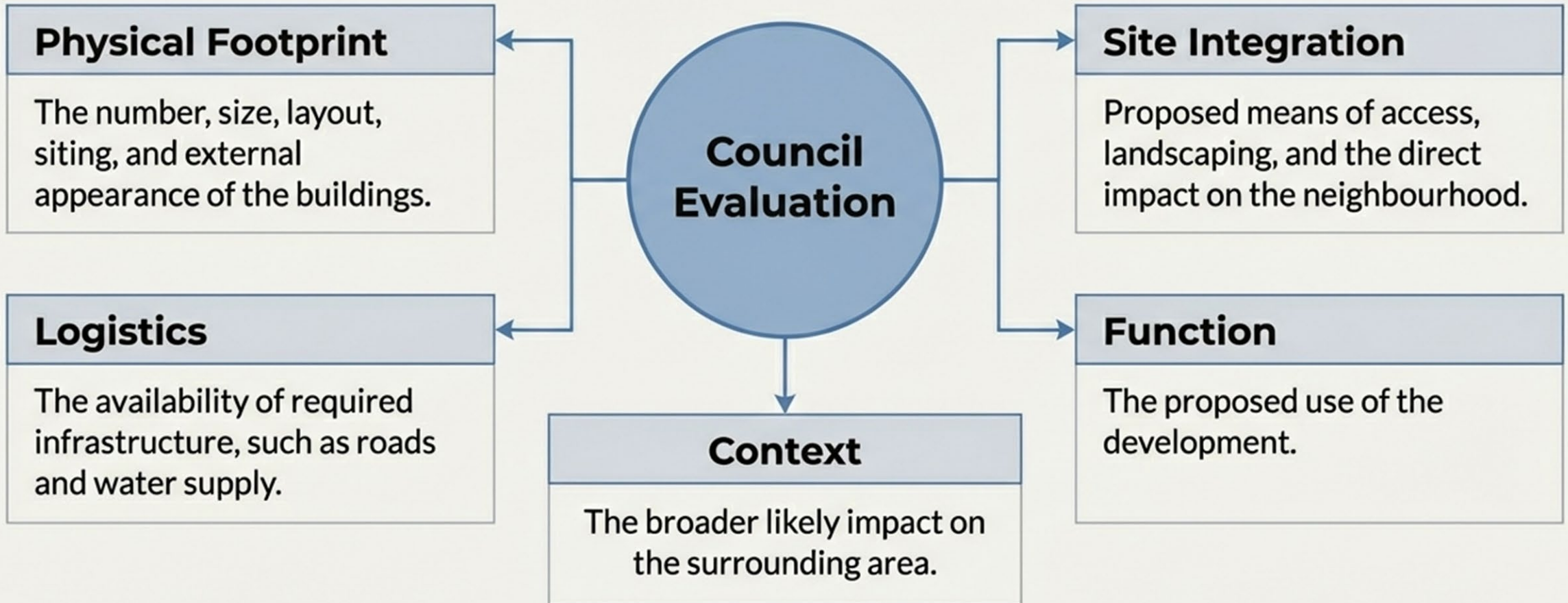
Energy Performance – Assessing insulation, glazing, and overall thermal efficiency to explore opportunities for energy improvements.

Regulatory Compliance

Renovation projects must adhere to national and local regulations, which may influence design and construction decisions.

1. Planning Permissions Permissions	2. Building Codes & Fire Safety	3. Heritage & Conservation Restrictions
Determining whether council approvals are required for structural changes or a change of use.	Setting standards for design/construction to ensure human health and safety, conservation of fuel/power, and providing facilities for people with disabilities.	Special approvals and restoration guidelines triggered if a building is legally listed or located in a conservation area.

Planning Permissions



Planning Permissions

The Town and Country Planning (Use Classes) Order 1987 (as amended) puts uses of land and buildings into various categories known as 'Use Classes.'

Planning Permissions



A1 Shops - Shops, retail warehouses, hairdressers, undertakers, travel and ticket agencies, post offices (but not sorting offices), pet shops, sandwich bars, showrooms, domestic hire shops, dry cleaners and funeral directors

A2 Financial and professional services - Financial services such as banks and building societies, professional services (other than health and medical services) including estate and employment agencies and betting offices.

A3 Food and drink - For the sale of food and drink for consumption on the premises - restaurants, snack bars and cafes, drinking establishments and take-aways

Planning Permissions



B1 Business - Offices (other than those that fall within A2), research and development of products and processes, light industry appropriate in a residential area.

B2 General industrial - Use for industrial process other than one falling within class B1 (excluding incineration purposes, chemical treatment or landfill)

B8 Storage or distribution - Use for storage or as a distribution centre. This class includes open air storage.

Planning Permissions



C1 Hotels - Hotels, boarding and guest houses where no significant element of care is provided (excludes hostels).

C2 Residential institutions - Residential care homes, hospitals, nursing homes, boarding schools, residential colleges and training centres.

C2(a) Secure Residential Institution - Use for a provision of secure residential accommodation, including use as a prison, young offenders institution, detention centre, secure training centre, custody centre, short term holding centre, secure hospital, secure local authority accommodation or use as a military barracks.

Planning Permissions



C3 Dwellinghouses - this class is formed of 3 parts:

C3(a) covers use by a single person or a family, an employer and certain domestic employees, a carer and the person receiving the care and a foster parent and foster child.

C3(b) up to six people living together as a single household and receiving care

C3(c) allows for groups of people (up to six) living together as a single household to allow for those groupings that do not fall within the C4 HMO definition to be provided for.

Planning Permissions



C4 Houses in multiple occupation - small shared houses or flats occupied by between three and six unrelated individuals, as their only or main residence, who share basic amenities such as a kitchen or bathroom.

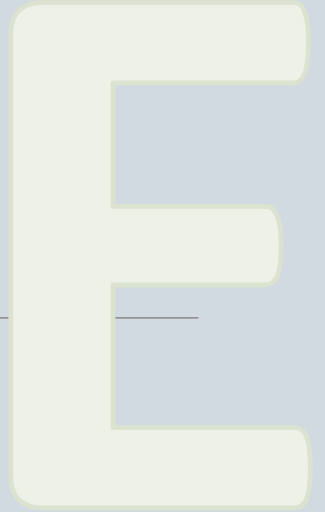
Planning Permissions



D1 Non-residential institutions - Clinics, health centres, crèches, day nurseries, day centres, schools, art galleries, museums, libraries, halls, places of worship, church halls, law court, non residential education and training centres.

D2 Assembly and leisure - Cinemas, music and concert halls, casinos, bingo and dance halls, swimming baths, skating rinks, gymnasiums or area for indoor or outdoor sports and recreation.

Planning Permissions



E(a) Display or retail sale of goods, other than hot food

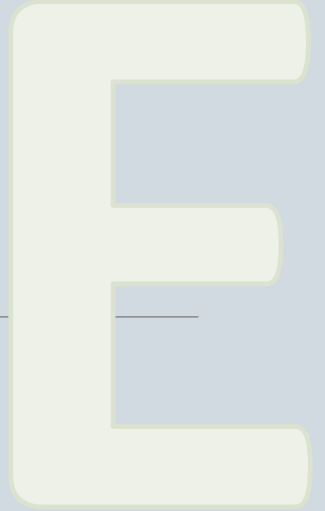
E(b) Sale of food and drink for consumption (mostly) on the premises

E(c) Provision of:

- **E(c)(i)** Financial services,
- **E(c)(ii)** Professional services (other than health or medical services), or
- **E(c)(iii)** Other appropriate services in a commercial, business or service locality

E(d) Indoor sport, recreation or fitness (not involving motorised vehicles or firearms or use as a swimming pool or skating rink,)

Planning Permissions

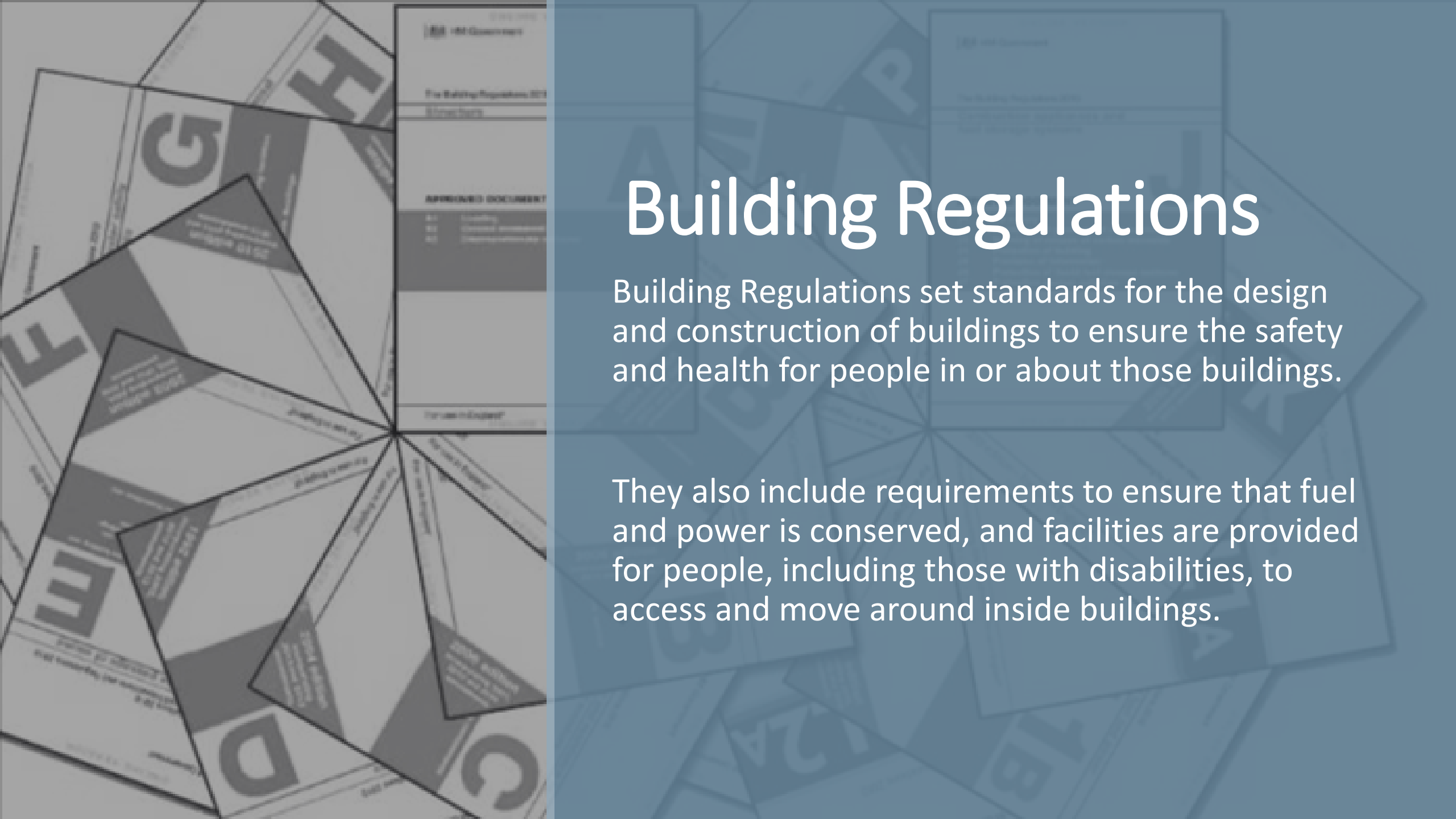


E(e) Provision of medical or health services (except the use of premises attached to the residence of the consultant or practitioner)

E(f) Creche, day nursery or day centre (not including a residential use)

E(g) Uses which can be carried out in a residential area without detriment to its amenity:

- **E(g)(i)** Offices to carry out any operational or administrative functions,
- **E(g)(ii)** Research and development of products or processes
- **E(g)(iii)** Industrial processes



Building Regulations

Building Regulations set standards for the design and construction of buildings to ensure the safety and health for people in or about those buildings.

They also include requirements to ensure that fuel and power is conserved, and facilities are provided for people, including those with disabilities, to access and move around inside buildings.

Heritage Buildings

- Listing is the way that a building or structure of special architectural or historic interest is recognised by law through the Planning (Listed Buildings and Conservation Areas) Act 1990.
- The term 'listed building' is wide ranging and includes not only buildings such as houses, churches or barns but also walls, milestones, bridges, telephone boxes and many other types of structure.

Heritage Buildings

- Changes to listed buildings are managed through listed building consent, which is part of the planning system.
- Listing is not a preservation order but it is intended to help manage change and protect the building, its setting and its features from unsympathetic works that could damage its special interest.

Heritage Buildings

- Buildings are graded to show their relative architectural or historic interest. In England and Wales the classification is as follows (the designation differs in Scotland and Northern Ireland):



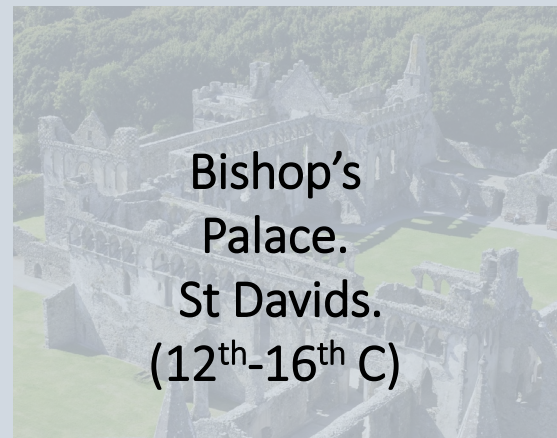
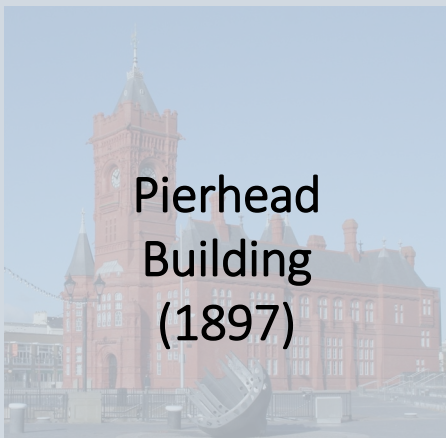
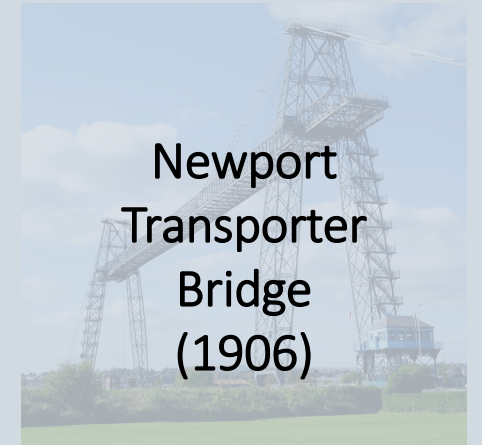
Grade I: Exceptional Interest

(Exceptional interest)

Grade I Buildings



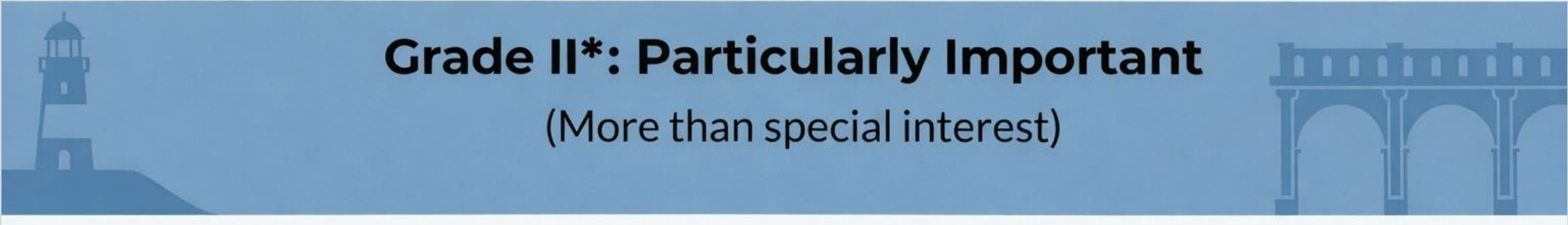
Grade I Buildings





Grade I: Exceptional Interest

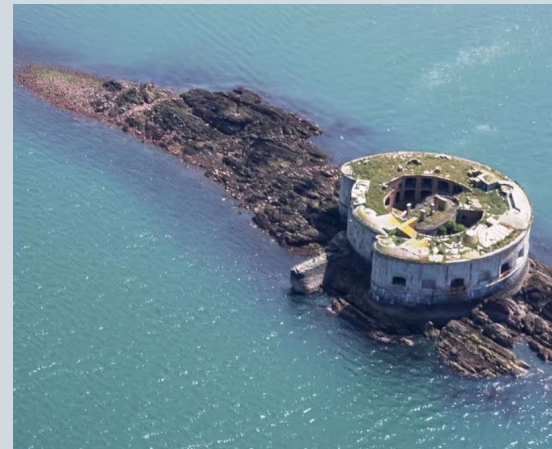
(Exceptional interest)



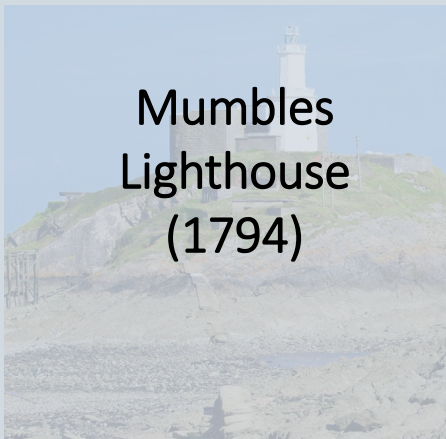
Grade II*: Particularly Important

(More than special interest)

Grade II* Buildings



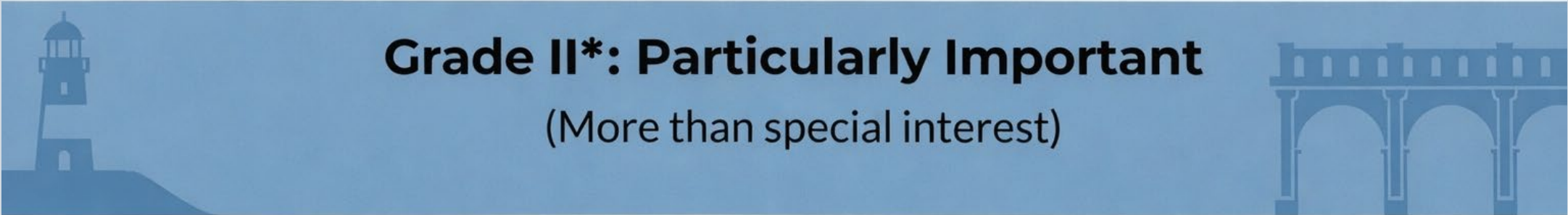
Grade II* Buildings





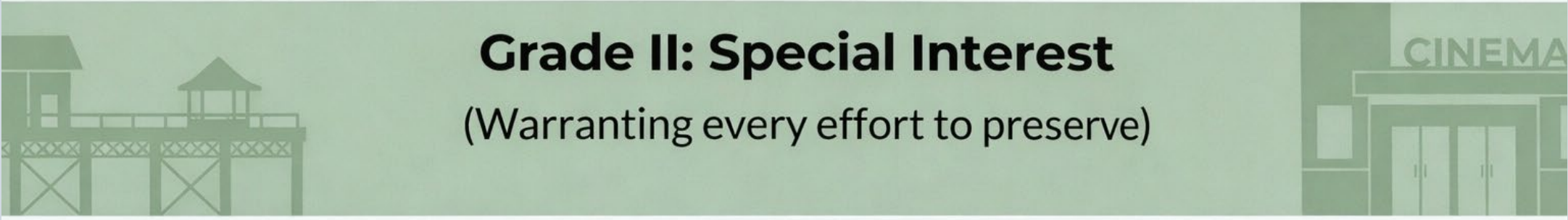
Grade I: Exceptional Interest

(Exceptional interest)



Grade II*: Particularly Important

(More than special interest)



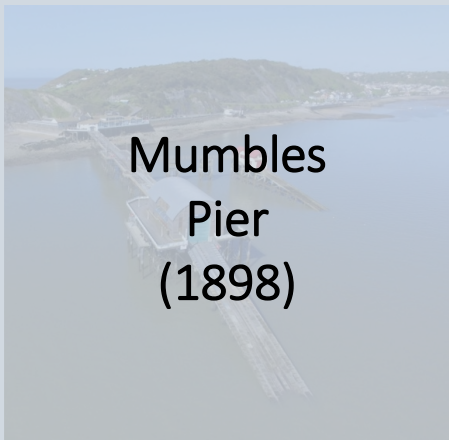
Grade II: Special Interest

(Warranting every effort to preserve)

Grade II Buildings



Grade II Buildings



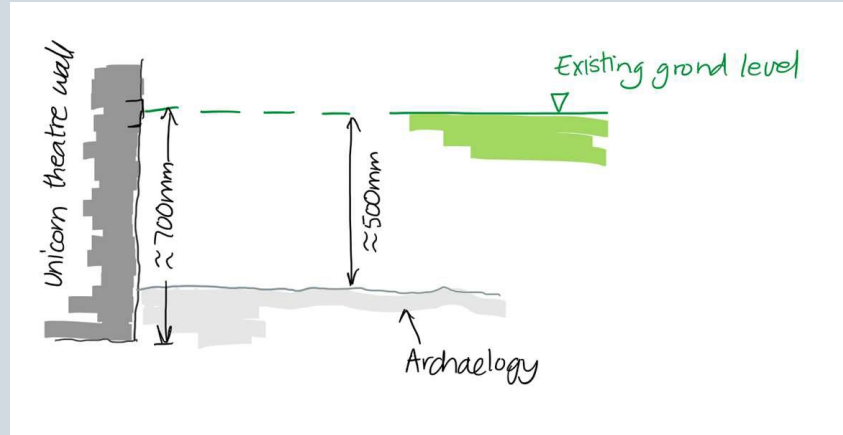
Scheduled Monuments

- Protection as a “scheduled monument” means a historic site is legally protected because of its national archaeological or historic importance.
- In the UK, this protection comes from the Ancient Monuments and Archaeological Areas Act 1979.

Scheduled Monuments



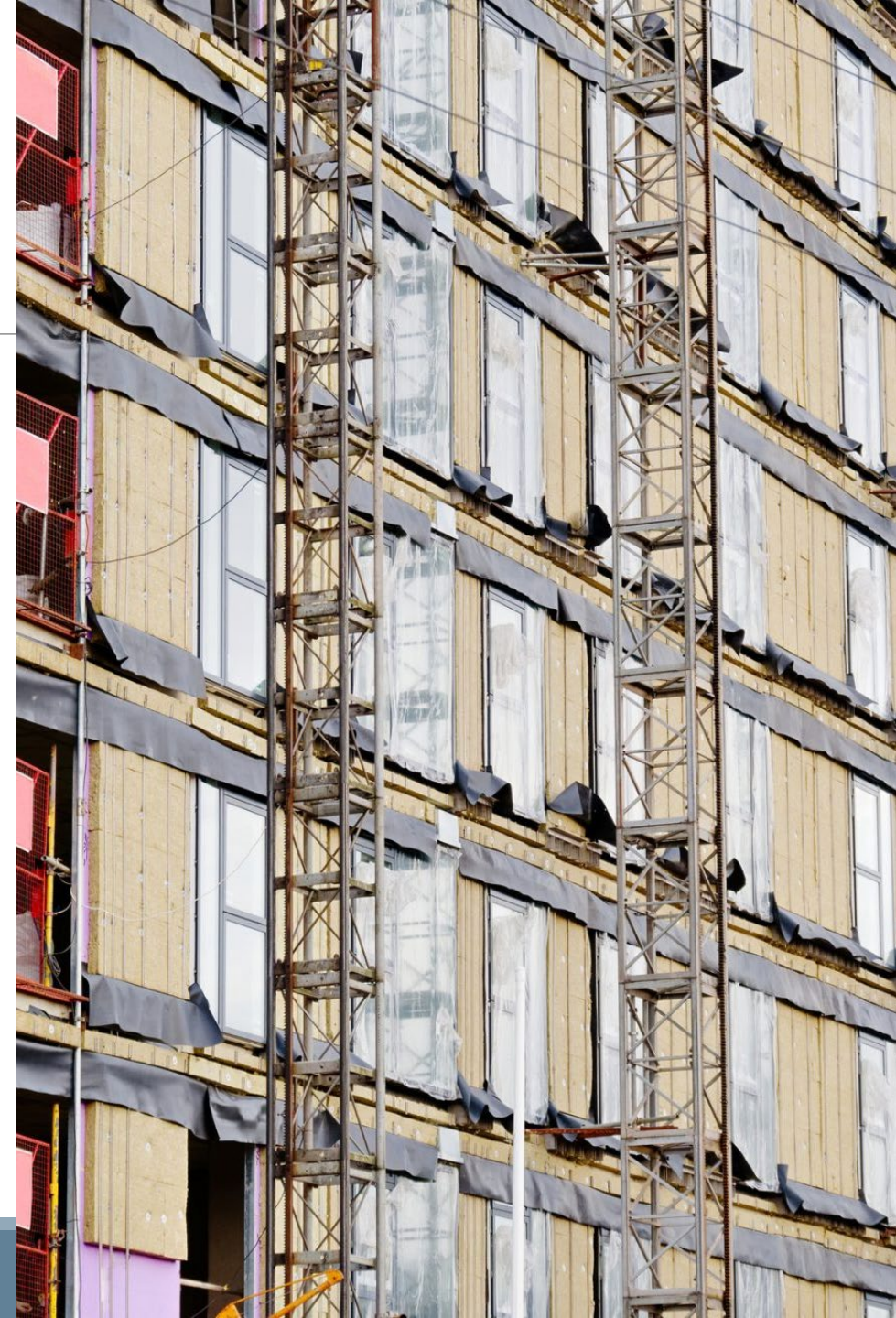
Scheduled Monuments



Remediation

Remediation focuses on fixing or removing a problem or hazard in a building to restore it to a safe condition.

Remediation is problem-driven — it deals with health, safety, or environmental issues rather than aesthetics.



What are defects?

Defects generally occur when buildings are left to decay or deteriorate.

Construction materials can be very durable but there are many cases of building materials failing prematurely.

All building materials can suffer from deterioration if they are not protected and maintained correctly, although some provide more strength and durability than others.

Buildings and structures deteriorate because of various factors.

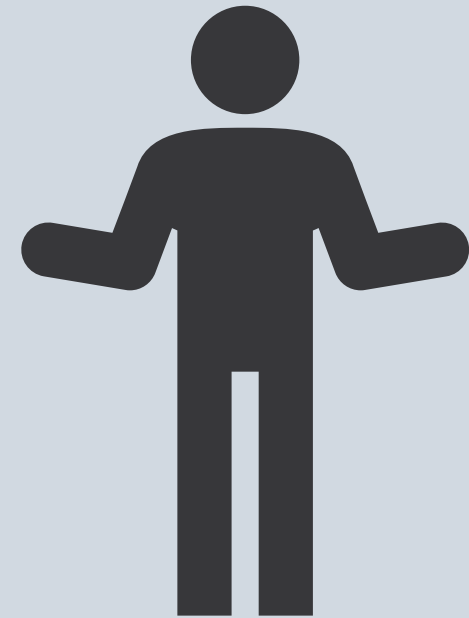
Causes of deterioration

- Human factors
- Chemical factors
- Atmospheric factors
- Structural factors
- Moisture
- Fire

Human factors

Most deterioration in structures is caused by human factors:

- Due to lapses in the construction phase.
- Poor specification of materials or poor understanding of materials leading to inappropriate use
- Due to misuse of the building by its occupants.
- Due to improper and inadequate maintenance of the building.



Human factors

Use of bad quality building materials.



Human factors

Bad quality building materials.

Improper execution during construction.



Human factors

Bad quality building materials.

Improper execution during construction.

Failure to perform ongoing maintenance.



Human factors

Bad quality building materials.

Improper execution during construction.

Failure to perform ongoing maintenance.

Intentional damage to buildings.



Human factors

Bad quality building materials.

Improper execution during construction.

Failure to perform ongoing maintenance.

Intentional damage to buildings.

Accidental damage to buildings.



Human factors

Bad quality building materials.

Improper execution during construction.

Failure to perform ongoing maintenance.

Intentional damage to buildings.

Accidental damage to buildings.

Theft.



Human factors

Bad quality building materials.

Improper execution during construction.

Failure to perform ongoing maintenance.

Intentional damage to buildings.

Accidental damage to buildings.

Theft.

Bad Design.



Chemical factors

Chemical reactions are caused by the interaction of certain materials with the surrounding environment.



Chemical factors

Dissolution / softening of material or components.



Chemical factors

Dissolution / softening of material or components.

Leaching of soluble substances.



Chemical factors

Dissolution / softening of material or components.

Leaching of soluble substances.

Sulphates.



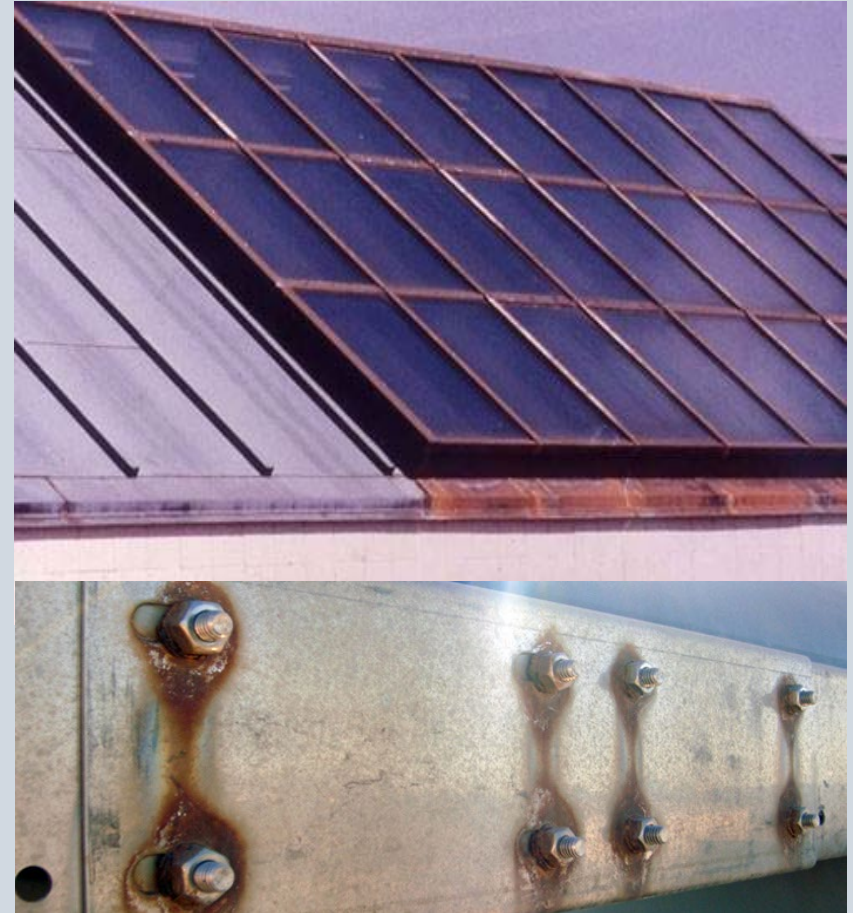
Chemical factors

Dissolution / softening of material or components.

Leaching of soluble substances.

Sulphates.

Interaction between different materials.



Chemical factors

Dissolution / softening of material or components.

Leaching of soluble substances.

Sulphates.

Interaction between different materials.

Concrete corrosion.



Chemical factors

Dissolution / softening of material or components.

Leaching of soluble substances.

Sulphates.

Interaction between different materials.

Concrete corrosion.

Alkali-silica reaction (ASR / Concrete Cancer)



Atmospheric factors

Reaction of the structure, external fabric, finishes and cladding to the atmospheric elements



Atmospheric factors

Rain.



Atmospheric factors

Rain.

Temperature.



Atmospheric factors

Rain.

Temperature.

Air pollution.



Atmospheric factors

Rain.

Temperature.

Air pollution.

Solid contaminants.



Atmospheric factors

Rain.

Temperature.

Air pollution.

Solid contaminants.

UV.



Atmospheric factors

Rain.

Temperature.

Air pollution.

Solid contaminants.

UV.

Wind.



Atmospheric factors

Rain.

Temperature.

Air pollution.

Solid contaminants.

UV.

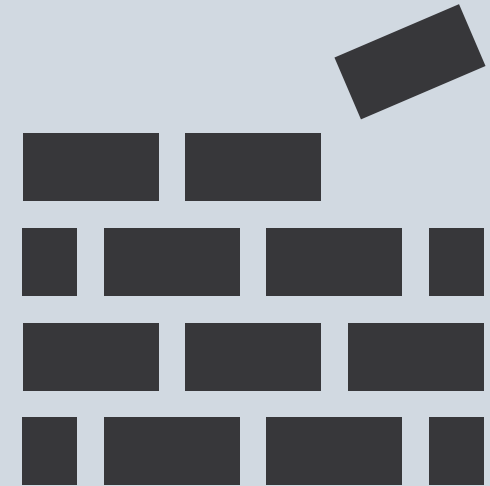
Wind.

Vegetation.



Structural factors

Structural deterioration is defined as any change to the material or the geometric properties affecting the structural performance.



Structural factors

Settlement.



Structural factors

Settlement.

Overloading.



Structural factors

Settlement.

Overloading.

Alterations.



Structural factors

Settlement.

Overloading.

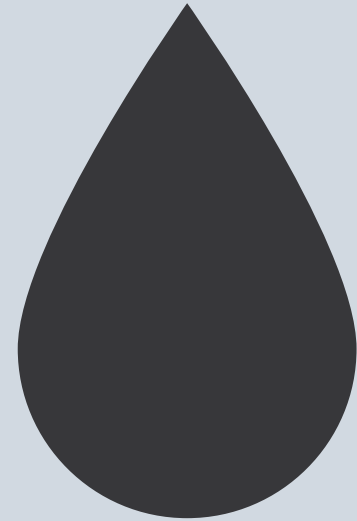
Alterations.

Aging.



Moisture

The penetration of moisture through the external fabric, or through ground floor constructions giving to dampness which may create a suitable condition for fungi growth and attack.



Moisture

Damp penetration.



Moisture

Damp penetration.

Condensation.



Moisture

Damp penetration.

Condensation.

Leaks.



Fire

The aftermath of a fire can lead to many possible defects that will affect the integrity of the structure.



Fire

Fire.



Fire

Fire

3rd Party damage.



Fire

Fire

3rd Party damage

Water damage.



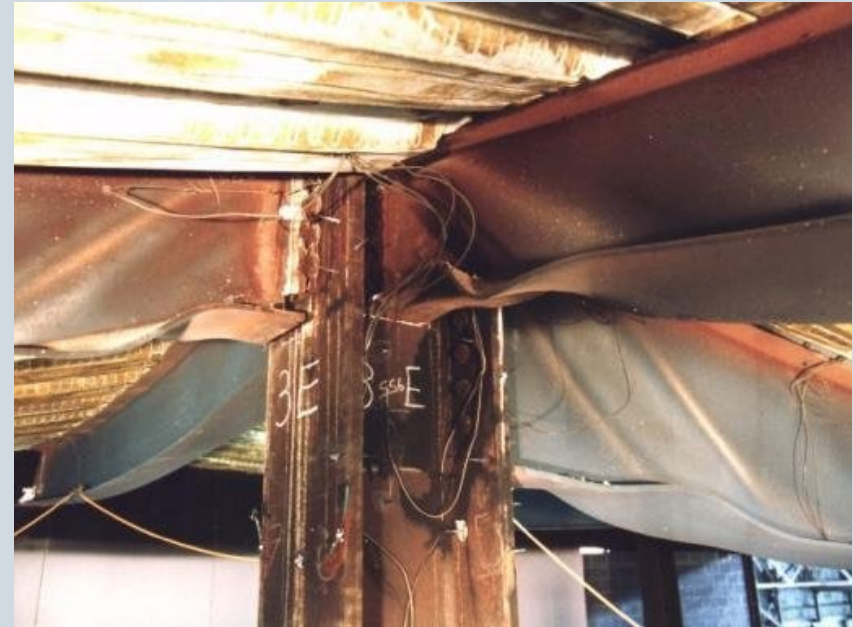
Fire

Fire

3rd Party damage

Water damage

Melting, swelling, distortion, spilling and cracking.



Fire

Fire

3rd Party damage

Water damage

Melting, swelling, distortion, spilling and cracking

Loss of cross-sectional area.



Repair vs. Replacement

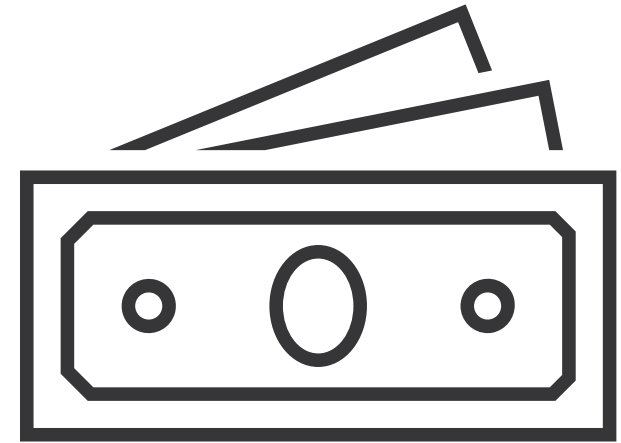
When dealing with building defects, construction managers and quantity surveyors must decide whether to repair the issue or replace the affected component or system.

Cost

Short-term costs: Repairing might be cheaper initially, but frequent repairs can add up.

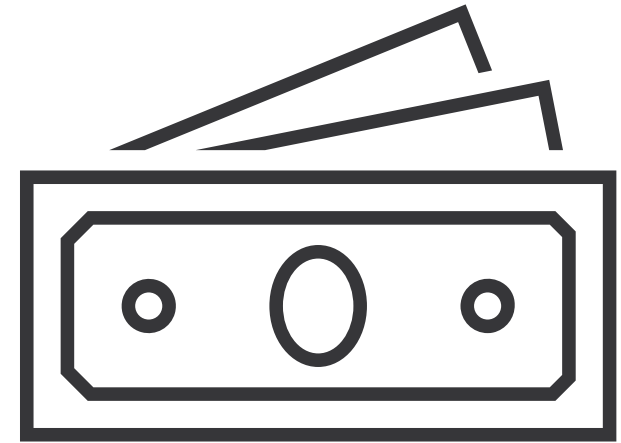
Long-term costs: If repairs are temporary, replacement may be a more cost-effective solution in the long run.

Funding availability: Budget constraints may push for phased repairs rather than immediate replacement



Cost Analysis

When deciding between repair and replacement, a detailed cost analysis is required, considering direct costs, indirect costs, and long-term savings.





Deconstruction

Altering / Renovating buildings is generally a desirable objective.

However, not all schemes are either necessary or worthwhile.

In some cases, they can prove unsuccessful because the changes to the building are either inappropriate or of poor quality.