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Seeing What You are Looking At Unit 6 Learning Handbook

COTAC Insight 1



COTAC Insight 1: The Need to Appreciate the Built Heritage

Unit 6 Learning Handbook: Seeing What You Are Looking At

Council on Training in Architectural Conservation (COTAC)

COTAC originated in 1959 in response to the need for training resources for practitioners in the repair and conservation of historic churches. Since its inception the Charity has consistently worked to lift standards across the UK's conservation, repair and maintenance (CRM) sector. This has involved working in partnership with national agencies, professional and standard setting bodies, educational establishments and vocational training interests. Whilst every care has been taken in the preparation of this Learning Handbook, COTAC and its researchers specifically exclude any liability for errors, omissions or otherwise arising from its content. The Unit images are primarily sourced from both authors personal collections. A few historic and archival resources incorporated as fair-use educational material are acknowledged where their source has been readily identified.

Insight 1 Unit 6 Learning Handbook: Seeing What You Are Looking At

Much can be gained from a close scrutiny of what the building, site or structure can reveal about how it was constructed, its materials and how they have performed in use. Interpreting the available information requires an ability to 'read' what is being looked at and leads to greater understanding and appreciation. This Unit explores how supplementary information can be gleaned from the Image Set illustrations by offering pointers in the form of additional consideration notes set alongside an outlined indication of what the various illustrations might reveal.

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Insight 1 Unit 6 Learning Handbook was researched and written as a joint exercise by Ingval Maxwell and Barry Bridgwood in support of COTAC's stated Educational Aims and Objectives.

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Insight 1: The Need to Appreciate the Built Heritage: Unit 6

Learning the Need to Appreciate and Become Aware of the Built Heritage

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Insight 1 Unit 6 Learning Handbook: Seeing What You Are Looking At

Introduction and Intentions of Unit 6

Insight 1 Unit 6 aims to offer an enhanced perception of *How to Appreciate and become Aware of the Built Heritage* through Images and supporting caption comments alongside *Additional Considerations* that build upon Insight 1 Units 1 to 5. Related Image sets of 24 illustrations show various issues that link with the theme of each Unit. Using the same Image Sets, the intention of Unit 6 is to view them as full screen illustrations along with the undernoted captions and considerations to offer a greater insight in how to appreciate what they reveal. Unit 6 is best reviewed after working through the previous five Units that may, individually, take up to 30 minutes to assimilate.

Each Insight 1 Image Set of 24 illustrations also shows some of the complex issues faced by project teams when they first start to plan for works involving the Heritage. Within the text of Units 1 to 5, a consistent emphasis is placed on the need for pre-work deliberations and planning in order to ensure that the basic questions of practical building conservation works are asked. These five basic issues cover the need to establish:

- Why the building is special - in terms of its **Worth** and how to explain that **Worth** to others
- What it is constructed from, how it was built and by whom it was built
- How it is deteriorating and how this might be affecting its **Worth**
- What needs to be done to protect its **Worth**
- How will what we want to do to it affect its **Worth**

Initial deliberations such as these should always be faced when working on and carrying out conservation projects. The content of the underlying material has been written (in this Unit 6) to reveal how an acquired and broader knowledge/understanding of conservation work might better protect the Heritage. This is achieved by raising a number of additional considerations that could be thought about when viewing each illustration and so place them in a broader context. This Unit 6 and its *Associated Considerations* should only be embarked on after reading the previous Units 1 - 5. In completing that process a basic understanding of matters conservation will have been acquired and will hopefully have encouraged an additional curiosity to enhance that basic understanding: Thereby improving readers' knowledge and skill and thus helping to prolong the existence of cultural heritage by appreciating and clarifying the artistic and historical messages it contains.

Each Image-related caption below has been developed from the specific content of the previous five Insight 1 Units. These images offer an holistic approach and have been chosen to help encourage an up-take of additional visual information: This information is either contained in or related to each individual image. The intention of these images is to extend an ability to read, use and interpret knowledge gained: In some situations additional independent on-line research might be required to identify a variety of external sources in order to clarify why a particular consideration has been highlighted.

In this Unit 6, supporting deliberations are offered to build upon where:

- Unit 1 seeks an identification, appreciation and consideration of the location of a small variety of international monuments and buildings: This is to create a visual link across the diversity of important and officially classified heritage where the application of recognised value criteria apply as an indication of Worth
- Unit 2 also seeks to achieve identification, appreciation and consideration of the location of various national monuments and buildings so that they are better understood: This to emphasis the different forms and shapes of regional buildings alongside their original and locally sourced building materials, constructed details, colours and textures and where absorption of such information can lead to a greater appreciation of Worth
- Units 3, 4 and 5 present practical considerations building upon what is revealed by the Image Set illustrations. This requires a closer inspection of each image to try to gather and interpret what is behind the suggested *Additional Considerations*. The approach is an exercise in “*Trying to see beyond what is being looked at*”. In other words, what might be cause and effect where these factors might be interpreted from simple viewing of the image so that a broader appreciation of the issues might be achieved: In some cases this may indicate that further study and advice is required so that an improved opinion can emerge, guided by additional and supporting information.

In the practical world, many different craft and professional disciplines are likely to be involved in caring for the Heritage. These additional disciplines need to adopt a flexible yet realistic approach with an ability to soundly interpret all the necessary issues involved in order to guide good decision making. The image-associated ‘*Additional Considerations*’ aims to encourage the viewer to think about related factors. A few asterisks have been used to identify where that approach might require some additional on-line research.

Combined all Insight 1’s Units 1 to 6 are offered as ‘bridging’ documents, linking COTAC’s on-line material and readers who are initially seeking an ‘Appreciation’ and, subsequently, an ‘Awareness’ of heritage related matters and skills. The aim is that this approach might lead to a move to a ‘Skilled-In’ level where ‘Understanding’ is at an advanced or professional level: Thus facilitating an additional ability to pass on this knowledge to others.

Insight 1 Unit 6: Incorporating Units 1-5 Image Sets

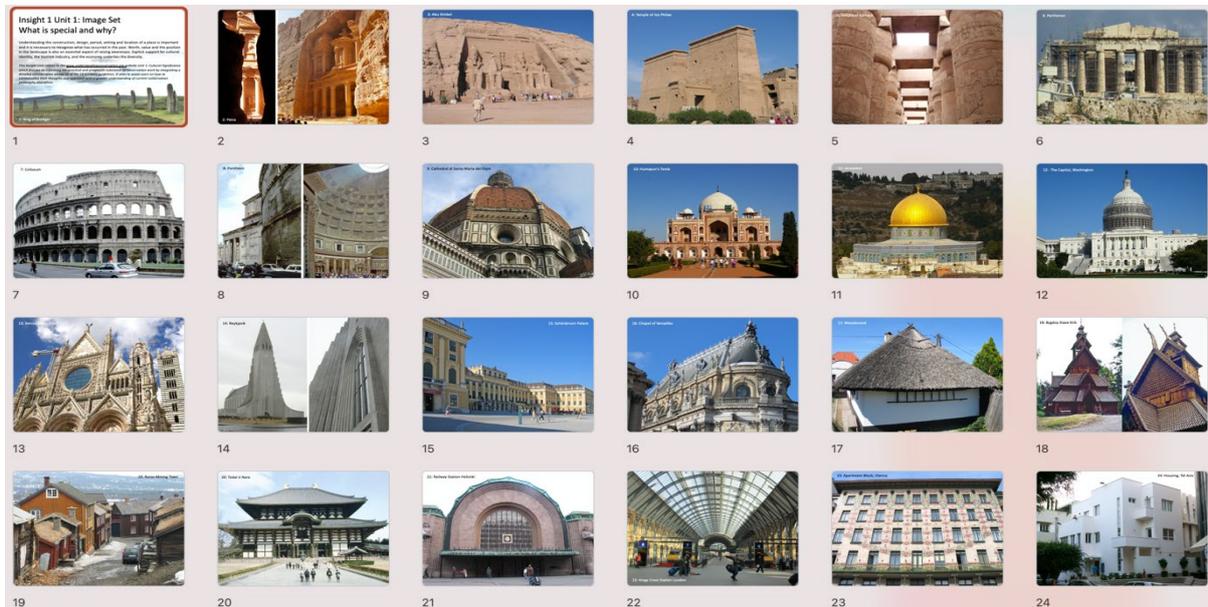
Relating specifically to the previous five Units, their associated Image Sets should be viewed and used in conjunction with the contents of this Unit 6 Learning Handbook which offers further context to the captions with additional considerations to be thought about.

The numerous illustrations have been incorporated to offer interest and appreciation of a large range of examples. They scope over local, national and international buildings and locations, supporting Units 1-5 text at a human interaction and scale, aiming to reveal related community and/or social values. These illustrations should be considered as integral components of Unit 6. Contemporary examples are included to offer a broader relevance.

Insight 1 Unit 6.1: *What is Special and Why?*

Refer to and View Full Page Image Set for Unit 1

Refer to and View Unit 1 Full page PDF Image Set when studying the captions and additional considerations set out below. Virtually all locations have web page information that can also be searched and accessed.



No.	Unit 1 Image Set: Caption Context	Additional Considerations
1	Ring of Brodgar, Orkney: Part of a World Heritage Site (WHS)	Only part of the site's ground cover has been controlled for visitor access to help protect underlying archaeology
2	Petra, Jordan: Initial surprise on arrival is followed by wonder - how did they do it? (WHS)	The entire monument is carved into the solid rock face of the canyon with great skill involved in setting out the shape and sculpting the form
3	Abu Simbel, Egypt: So special it had to be cut apart, relocated and reconstructed 60 m above the original location (WHS)	Its original location was to be flooded when Lake Nasser was created behind a new dam at Aswan on the River Nile. Located in the middle of the desert considerable planning and logistics was required for this costly project
4	Temple of Isis Philae, Egypt: An amazing size of a structure which has also to be saved from the Aswan Dam construction (WHS)	The sloping or 'battered' shape of the pylons, or gateway towers, adds strength and stability. A modern version of pylons exists at Brunel's Clifton Suspension Bridge, Bristol
5	Temple of Karnak, Egypt: large stone lintels on columns create internal spaces - this form of construction is known as trabeated (WHS)	Modern infilled mortar patches represent missing pieces that are recessed from the original surface to avoid deception

6	Parthenon, Greece: Classical chic and elegance (WHS) split between Athens and London's British Museum	Removed by 7th Earl Elgin in the early 19 th C, why the Elgin Marbles should remain in the UK is a difficult philosophical question to answer
7	Coliseum, Rome: Look what is possible by simply using arches (WHS)	The modern angled buttressing on the right hand side help stabilise the upper structure
8	Pantheon, Rome: A concrete dome on a circular plan (WHS)	The dome thickness and size of aggregate used reduces towards the top which, with the recessed panels (coffers), help to reduce overall weight and load of the dome on the walls
9	Cathedral di Santa Maria del Fiore, Florence, Italy: a double dome on an amazing interior (WHS)	A walkway located between the outer and inner dome leads up to the cupola. The walls need to be the right thickness to support both domes
10	Humayan's Tomb, India: Built before the Taj Mahal (WHS)	Restoration required much research to establish original design finishes and details
11	Dome of the Rock, Israel: Set over a spiritual place (WHS)	In 1993, the golden dome covering was refurbished following a donation of 8.2 million US dollars by King Hussein of Jordan to fund the required 80 kilograms of gold
12	The Capitol, Washington, USA: A dome that has academic and design links with Edinburgh University's Old College	Constructed from 1793 this symbolically important and architecturally impressive American building was set on fire by the British in 1814
13	Sienna Cathedral, Italy: A 'wedding cake' of beautiful architectural and sculpted details (WHS)	Designed and constructed from 1215 with later additions. The rich facade was built in two stages combining elements of French Gothic, Tuscan Romanesque and Classical architecture.
14	Hallgrimskirkja, Reykjavik, Iceland. This is what can be achieved with concrete	This Parish Church took 41 years to build and was finished in 1986, designed to emulate features in the landscape. In 2008 the tower required restoration work
15	Schönbrunn Palace, Vienna: What can be achieved using a simple set of building materials (WHS)	With over 3 million visitors each year, the palace and gardens show the tastes and interests of the Habsburg monarchs with 1,441 rooms.
16	Chapel of Versailles Palace, France: Adding ornamental details everywhere on the building (WHS)	Completed in 1710 it was the fifth chapel to be built on the site. The design was inspired by Gothic and earlier architectural styles
17	Mezokovesd, Northern Hungary: An insulating roof thatched with reeds that were grown on the ground, with a considerable overhang to protect the wall against snow	An agricultural museum displays how the local community worked and farmed in the past with 19 th C machinery

18	Bygdoy Gol Stave Kirk, Norway: A reconstructed church now an exhibit in the open-air Norwegian Museum of Cultural History in Oslo, the first such type of museum in the world	Dating from 1157-1216: In 1880 It was saved from destruction by the Society for the Preservation of Ancient Norwegian Monuments, they bought and documented the materials in order to re-erect the church
19 *	Roros Mining Town, Norway: Using locally available building materials (WHS) Research consideration: What is special about the Circumference	The Town and the Circumference is linked to copper mines, established in the 17 th C and exploited for 333 years until 1977 in an industrial-rural cultural landscape
20	Todai Ji Nara Temple, Japan: The wonder of a large timber building with flexible jointing (WHS)	The site can be dated to 728 CE and was subjected to two fires. The current building completed in 1709 houses the world's largest bronze statue of the Buddha Vairocana. Until 1998 it was the world's largest wooden building.
21	Helsinki Railway Station, Finland: A modern use of the arch in its design	An Art Nouveau replacement front building constructed by 1919, mostly clad in Finnish granite with a copper canopy and protection over the stonework
22	Kings Cross Station, London: What structural engineers can produce	Opened in 1852, the station platform roof, being the largest of its time, was supposedly modelled on the Riding School of the Czars of Moscow. A new concourse was opened in 2012 with the brick Victorian entrance restored by 2013
23	Majolica Apartment House, Vienna, Austria: Applied tile decoration built in 1898-99 (WHS) Influenced by the German Art Nouveau movement known as the 'Jugendstil' and part of the late 19 th C 'Austrian Secessionist Movement'	Designed as a 'rebellion' against its Baroque Revival neighbour, Linke Wienzeile 42 it features a gradation of detail and colour in complexity of floral patterns, extending up from its green iron base to the roof, using a pottery tile technique originating in Italy during the Renaissance.
24	Tel Aviv, Israel: What modern architects started to produce during the 1930's (WHS)	The White City has a major collection of over 4,000 Modernist Movement buildings, built by Jewish architects from Germany and other Central and East European countries creating a unique International Style with a strong Bauhaus component.

Insight 1 Unit 6.2: *Is Appearance and Appeal Important?*

Refer to and View Full Page Image Set for Unit 2

Refer to and View Unit 2 Full page PDF Image Set when studying the captions and considerations set out below Consider where in the UK the illustrated examples are located and their regional variations in form and construction. Virtually all locations have web page information that can also be searched and accessed.



No	Unit 2 Image Set: Caption Context	Additional Considerations
1	Norwich Cathedral, Norfolk: Work started in 1094 when the Bishopric moved from Thetford, it was dedicated in 1101 and completed 1145	A most complete example of Norman architecture with later additions. Many different arch forms create this covered extent but, when an area is in regular use, it is easy to forget what Worth it has.
2	Skara Brae, Orkney: Walls and furniture built from stone without mortar	Some 5,000 years old, the houses were linked by roofed passageways. Each had a door secured by a wooden or whalebone bar. The settlement of houses were built into a tough clay-like material full of domestic rubbish
3	Brough of Birsay, Orkney: Archaeological remains offer a window into the past	Features the remains of Pictish and Norse settlements this tidal island was intensively occupied with religious and political power from the 7 th to the 13 th C

4	King's Knot , Stirling Castle: Archaeological remains of a formal garden	This three-tiered octagonal earthwork rises to three metres in height and was once part of the formal gardens of Stirling Castle. It was surrounded by the King's Park dating to the 12 th C
5	Crail, Fife : Picturesque setting of a previous busy harbour	A photogenic fishing village with cobbled streets leading to the harbour. The most easterly of coastal settlements along the south of the East Neuk. Its Tollbooth tower dates from ca. 1600
6	New Lanark, Lanarkshire : Founded by David Dale and Richard Arkwright in 1786 near the Falls of Clyde it is now a World Heritage Site	An exceptional purpose-built 18 th C mill village : In the early 19 th C, Utopian idealist Robert Owen (1771-1858), son-in-law of Dale, expanded Dale's ideals as a model industrial community, based on textile production
7	Preston Mill, East Lothian : There has been a mill on the site since the 16 th C.	Distinctive in colour and local materials used, the present mill dates from the 18 th C and was used commercially until 1959: It was the region's last working watermill
8	Wanlockhead, Dumfriesshire : Founded in 1680 when the Duke of Buccleuch built a lead smelting plant and workers' cottages	Local lead ore (Galena) was first exploited by the Romans as it and other mineral deposits were found in the surrounding hills, including the world's purest gold at 22.8 carats. Panning for gold continues.
9	Ulster Folk Museum, Cultra : An important collection of rural buildings saved to inform about history	Created by an Act of Parliament in 1958, the Folk Museum opened to the public in 1964. It offers a variety of buildings and dwellings that have been collected from various parts of Ireland and rebuilt in the grounds
10	Tretower, Abergavenny, Powys : This is a monumental four-storey tower with stone walls 2.7m thick	Manifestly built as 'social climbing' it imitates the castles at Pembroke and Skenfrith. Nearby, across the castle green, is a magnificent and entire medieval court
11	Weald and Downland Living Museum, West Sussex : Timber frame and other saved buildings relocated and rebuilt to inform about history	With over 50 historic buildings and period gardens the Museum displays the regions vernacular building techniques and industries through structures dating from 950 AD to the 19 th C
12	Penpont, Dumfriesshire : A Turnpike crossroads settlement from the 19 th C	First mentioned in 1280 with regard to financing the Crusades, a presbytery seat, parish and village through which sections of turnpike roads were constructed, along with building an inn, stabling and a toll house
13	Ashburton, Devon : A formerly important stannary town it remains the largest town on the edge of Dartmoor National Park.	A stannary was an organisation established to manage the collection of tin coinage - the duty payable on the metal tin, smelted from cassiterite

	Buildings along a hillside road (A38) adds to the appearance	ore mined in the region. Tin coinage was abolished in 1838
14	Aberdeen Footdee: Settled in Medieval times, first recorded in 1398. Now, a unified community settlement remaining valid for modern use	Footdee at the east end of the harbour is known locally as Fittie. It is a good example of a planned housing development purpose-built to re-house Aberdeen's local fishing community: Laid out in 1809 by John Smith the then Superintendent of the Town's Public Works
15	Kendal, Cumberland: Buildings of different dates add to the attraction	A chartered market town with a 12 th C castle. The town centre was formed along the high street with fortified alleyways, known locally as yards, off to either side. The main industry was the manufacture of woollen goods
16	Elm Hill, Norwich, Norfolk: A historic cobbled street with many buildings dating back to the Tudor period	During the 15 th and 16 th C, Elm Hill and the River Wensum were important commercial thoroughfares. The street was almost lost due to wholesale deterioration: In 1927 the Norwich Society carried out a detailed survey and report that led to its retention and revival
17	Totnes, South Devon: Different parts of the country have used their own local building materials	Totnes' history dates to 907 when its first castle was built. By the 12 th C it was an important market town with its former wealth and importance seen by the number of merchants' houses built in the 16 th and 17 th C
18	Londonderry, Northern Ireland: Built in 1613–1619 by The Honourable The Irish Society as defences for early 17 th C settlers from England and Scotland	It is the only remaining completely intact walled city in Ireland and one of the finest examples of a walled city in Europe. Its fortifications were never breached, withstanding several sieges, including the famous Siege of Derry in 1689
19	Durham, County Durham: A cathedral city and the county town, building up a sense of place before reaching the Cathedral	The final resting place of St Cuthbert its Norman Cathedral became a centre of pilgrimage in medieval England. The Cathedral and adjacent 11 th C castle were designated a World Heritage Site in 1986. The castle has been the home of Durham University since 1832
20	Barnard Castle, County Durham: A central meeting place	A market town named after the 12 th C Grade I Listed Castle around which it was built; a Chapel in the outer ward is Grade II Listed; both are cared for by English Heritage
21	Oxford: The city is home to the University of Oxford, founded 1096	It is the oldest university in the English-speaking world. It has buildings in every style of English architecture from late Anglo-Saxon period onwards
22	Tynemouth, Tyne and Wear: Open spaces add to a sense of wellbeing	The headland at the mouth of the River Tyne has been settled since the Iron Age. On it, Tynemouth

		Castle was a major coastal fortress and control centre of the Tyne defences, which stretched from Sunderland to Blyth playing an important role during World War II
23	Bootham Bar, York: Originally designed to limit who gets in by controlling entry	Although much of Bootham Bar was built in the 14 th C and 19 th C, it also incorporates some of the oldest surviving stonework dating to the 11 th C. Its barbican, a double fortified tower/gateway, was removed in 1835
24	Barbican, London: Modern-day living in elevated streets	Building upon a site almost completely razed by the Blitz and opening in 1982, the controversial result is an icon of Brutalist architecture. Voted 'London's ugliest building' in 2003, it is home to 4,000 residents in 2,000 flats, with schools, church, library, artificial lake, conservatory and arts centre/theatre. It was listed Grade II in 2001, the result is considered to be one of capital's most ambitious and unique architectural achievements



The construction of the built heritage has much relied upon the use of traditional craft skills. © Ingal Maxwell

Insight 1 Unit 6.3: How Does a Building Work?

Refer to and View Full Page Image Set for Unit 3

Refer to and View Unit 3 Supporting PDF Image Set when studying the captions and considerations set out below. Virtually all locations or topics have web page information that can also be searched and accessed.



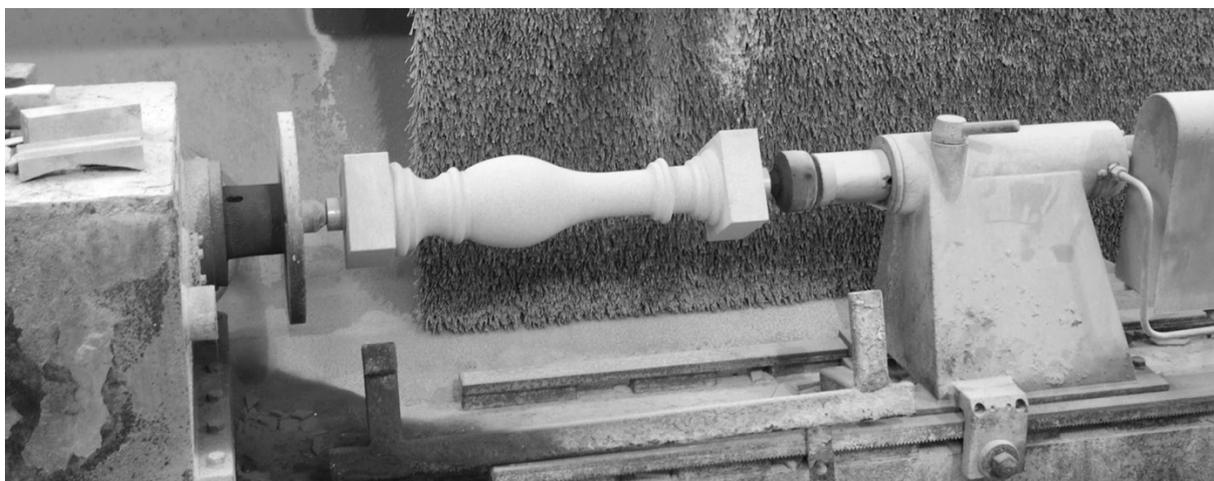
No.	Unit 3 Image Set: Caption Context	Additional Considerations
1	Stanley Mills: A variety of building shapes and sizes generally exist in association with each other	The variations of shapes relate to what the original purposes of each part was; this understanding is necessary to successfully plan for any work that might be required
2	Exeter: Even durable material surfaces can be worn away though repetitive use over time	The process of wear and tear can be increased and speeded-up by weathering and needs to be understood. If allowed to develop too far safety problems can arise
3	St Nicholas Church, Aberdeen: Whilst archaeological excavations seriously disrupt the ground by investigative digging, such excavations can be required for a number of reasons	To investigate and confirm what existed in the past in order to inform work in advance of building activities: Or where a location is under serious threat of being totally lost through natural and man-made causes: Or alongside a requirement for research and recording, Or by official direction.

4	Edinburgh: A number of issues need to be thought about before starting major road works in an urban setting	Safeguarding the general public, traffic disruption/re-direction, location of existing buried services, consideration of possible archaeology, disruption of building foundations
5	Lincoln: The 'blackening' of stone masonry wall surfaces can vary in intensity and with the type of stone used	Atmospheric pollution, rainwater run-off, and the behaviour of different stone types and their geology can all contribute to visual disturbance through discolouration. Limestone in particular reacts more with weather and pollution whilst sandstones can react to water penetration and interaction with the stone's mineral composition
6 *	Oxford: Due to a number of reasons significant erosion of stonework often occurs on the lower levels of wall Research consideration: Find out more about the effects of the wetting and drying cycle and what expertise might be required to explain the consequences	The stones might be wrongly cut and positioned. They may be subjected to excess wetting caused by 'splash-up'. The effects of frost action can be damaging and salts used to de-ice adjacent pavement surfaces can penetrate the stone and break it down. Harder more-durable stone built on top of less - durable block can increase water runoff and worsen the wetting and drying cycle
7 *	Exeter: With some types of sedimentary rocks (here a conglomerate), the stone blocks used for buildings can erode and lose their ashlar finished face as tooled by the original stone mason Research consideration: How many different forms of erosion might affect stonework on a building	Soft and poorly consolidated original stone can be susceptible to the effects of rain and sun through alternating of the drying and wetting process. The decay can result in a variety of effects and patterns which, depending upon their severity may require some stonework to be replaced. But often this is carried out unnecessarily when the remaining stone blocks can still carry their structural load – provided the visually eroded appearance is acceptable
8	Tynemouth: Brickwork that has failed can create a 'patchwork' effect of erosion	Some poor quality bricks result from under-fired clay losing their fired surface due to weathering. Ledges created by such erosion can increase further loss and decay by holding rainwater against the remnant bricks, where moss/lichen build-up and frost action can add to the difficulties
9	Barnard Castle: Structural distortion can be caused by a variety of issues resulting in walls leaning out of the vertical	Ground shrinkage and movement or land slip directly under or near heavy structural elements can affect the foundations causing them to rotate. Distortions can remain stable provided the 'middle-third rule' of stability remains intact, otherwise collapse is inevitable without temporary propping requiring advice from structural engineers

10	Bath: Later addition or alteration to an original building and its detail can be visually disruptive creating additional maintenance problems and may require to be researched to fully appreciate the issues involved	A wall is first constructed in length and thickness and in height building from the ground up. Later additions are often only applied to the flat wall face against which they are to be added. This approach requires the need to weatherproof the external junctions, frequently relying on the surface application of a mastic sealant to stop rainwater penetration
11	Glasgow: The application of a non-breathing 'plastic-based' paint coverings to wall surfaces with the mistaken belief that it can protect the structure against weather can become a significant error	Whilst it might be realistic to accept assurances that such a covering can prevent water from getting into the structure, it can also equally and significantly prevent water in the structure from getting out! Consequently when the bond between the paint and the wall surface fails due to moisture penetration from faulty maintenance elsewhere, the paint blisters and peels off creating a greater problem to solve
12	South Queensferry: If an excess of moisture is allowed to continue to saturate the structure of a wall, its lime mortar can be the first element to decay. Analysis of the original mortar may be required	Such persistent sources of water can come from faulty parapets, broken or leaking gutters and downpipes or overflows. Erosion of mortar joints and beds and the loss of loose mortar provided ledges for moss to grow and the deposition of seeds and penetrating roots, followed by more established plant growth
13	Exeter: Wall climbing plants growing on buildings to such an extent as this might look attractive to some but, if it were Ivy, greater and potentially costly concerns can be raised	Ivy uses tendrils to attach to a surface and will seek vulnerable areas such as soft mortar joints to which they can attach. In doing so damage to the joints will occur. Ivy can also hold moisture against/in the wall altering its ability to perform and leading to decay. Once established Ivy tendrils are difficult to remove, dislodging masonry and penetrating deeply into the heart of the wall
14 *	Glasgow: An extremely bad, but revealing, example of the consequences of using an inappropriate stone cleaning technique, coupled with cement mortar patch repairs on an ashlar sandstone building Research consideration: Why is stone cleaning a sandstone building more of a problem than cleaning a limestone one?	Aggressive physical and chemical stone cleaning techniques can completely remove the outer surface patina of sandstone to expose the interior of the stone block increasing weathering and decay. Patching areas of walling with a thin, hard, cement-based plaster, lined on the surface to copy the underlying shape of the stones, only adds to the problems. This approach traps rainwater behind the cement work, increasing the rate and degree of erosion of the underlying stone. The thin and, usually, sharp-edged cement

		patches quickly fail and detach to fall off the wall face creating a safety issue for passers-by
15	Glasgow: A poor and excessively abrasive stone cleaning method has damaged the original detailing of these Ionic fluted columns. Consideration may be required to establish the original appearance	The original projecting fluted detailing of the columns has been cut off, reducing their profiles to only shadows or 'ghost' lines of the original fluting. The edges of the large lintol have also been damaged. The short lintol on the left has been replaced with new moulded stone
16	Newry: Uncontrolled, cheaply installed and poorly secured electric, telephone, cable TV supplies and junction boxes on the building exterior. Redundant cables are often left furthering poor visual appearance	Poorly introduced cable runs and associated mechanical fixings, security grilles to windows, advertising banners and signs combine to create a seriously detracting visual impact. Mechanical damage to the stonework from fixing methods are permanently disfiguring and will remain long after cabling has become redundant.
17	Sheffield: Poorly applied hard cement-based mortar pointing shows a lack of skills training and understanding	The walling, constructed of soft red-clay bricks, is susceptible to a high degree of erosion. The effect of using a non-breathable and hard cement mortar to re-point the wall, instead of a more traditional lime mortar mix, will increase the rate of erosion by trapping rainwater behind the cement work
18	Kendal: A form of applied cement-based 'strap' pointing had been adopted in the re-pointing of this masonry	The technique is likely to cause long-term erosion as the hard mortar is subject to a high degree of shrinkage cracking. This can lead to rain water being caught on the upper surface of each joint then running into the body of the wall, through shrinkage cracks. The use of 'strap' re-pointing is also visually detracting although, in some areas of the country, it is the traditional way of working
19	Lincoln: The original moulded stone detailing is missing on the right where it has been roughly chiselled off leaving ugly scars	A groove has been cut at an angle across stonework into which a membrane had been inserted to create a weathertight junction for an addition that has since been removed. The glued on spikes are to prevent birds from roosting
20	Belfast: The main section of the entrance steps have been re-surfaced with access path defined and limited by the handrailing	The treads have been reduced in thickness and thin slabs have been inserted. The sections of steps beyond the handrails are untouched and un-used because of the blocking infill work between the columns

21	Plymouth: Unsympathetic changes detract from the original detailing and harmony of these terraced houses	Modern tiles have been used in one re-roofing exercise; the original terracotta ridge has been lost in one. Different designs of plastic windows and doors have replaced the original timber windows and door details. False stone 'cladding' has been added to one house. Plastic rainwater goods have replaced the original (probably) cast iron. The shape of the window openings have been changed. Pavement side railings and gates have been changed/lost.
22	Newport: Health and Safety concerns emerge due to the method of working	No personal protection used – high visibility clothing, hard hat etc and especially no safety harness whilst working from height. Lead is a hazardous material and there appears to be no safety precautions adopted about handling it.
23	Aberdeen: Evidence of increased accommodation needs, coupled with a lack of basic and poor maintenance?	The wider dormer mullion was required to accommodate the thickness of an internal room partition in the attic. Grass growing in the guttering has not been cleared risking rainwater discharging into the building. Timberwork of lower window frames has not been subject to regular re-painting. Some stonework joints are eroded and need re-pointing
24	Duddingston: Reading the patterns on a wall face can be revealing about the past	The three blocked-up areas have once been a door and two windows of an external wall of a house, since demolished. A series of flat coping stone have been added to protect the remaining wall structure from the weather. The pavement level has been regraded

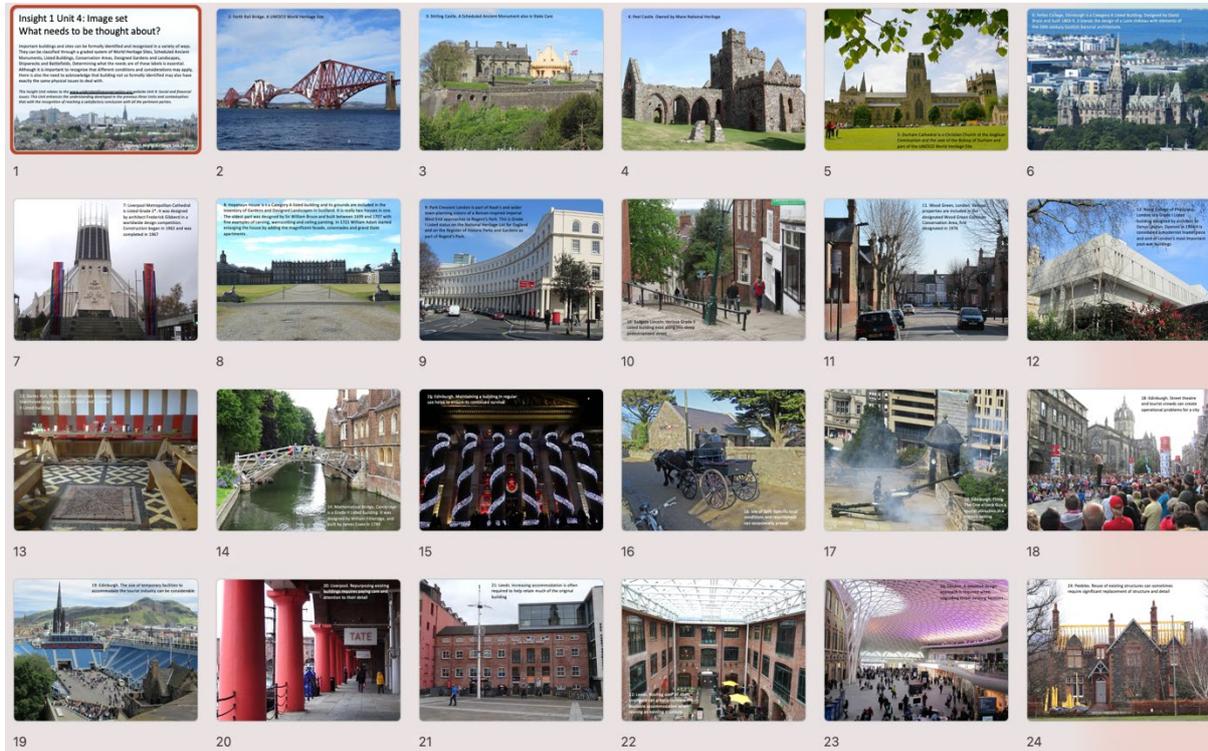


Skilled operations when working in stone and timber have many parallels. © Ingval Maxwell

Insight 1 Unit 6.4: What Needs to be Thought About?

Refer to and View Full Page Image Set for Unit 4

Refer to and View Unit 4 Full page PDF Image Set when studying the captions and additional considerations set out below. Virtually all locations or topics have web page information that can also be searched and accessed.



No.	Unit 4 Image Set: Caption Context	Additional Considerations
1	Edinburgh: (WHS) Retaining the historic skyline	The advent of high-rise building blocks, especially those from the 1960's, created major visual intrusions into the skyline of many historic urban centres. Prior to that, it was the tapering spires of churches and the profiles of some public buildings that had created visual incidence and a sense of place
2	Forth Bridge: (WHS) International status is awarded to important world-wide locations through UNESCO and its World Heritage Convention but, carrying out maintenance can be challenging in some circumstances	Specifically established criteria have been set against which all formal applications are rigorously judged when a country submits an application for WHS status. Considerable documentation is required to be submitted with each case.
3	Stirling Castle: (Scheduled Ancient Monument) One of the premier castles	Covering the costs of maintaining a Monument in State Care is a Government responsibility,

	in Scotland consisting of a broad range of architectural periods from the 15 th C	but also relies upon income generated by the sale of admission tickets, merchandise and public events, requiring the creation and addition of facilities within the historic fabric
4	Peel Castle, Isle of Mann: In the care of Manx National Heritage: such monuments serve as a major tourist facility	A roofless structure is more vulnerable to decay and deterioration as virtually all the external and internal surfaces, are exposed to weathering. Any complete ground floor vaults require additional consideration on how to protect the structure from water penetration. Keeping the structure secure to avoid safety problems from falling masonry requires regular inspections
5 *	Durham Cathedral: (WHS) Size, scale and operational use of cathedrals pose a significant issue for those responsible for their care. Research consideration: Which bodies might provide advice for those who look after Cathedrals?	A wide variety of skilled specialists may have to be called upon to help care for many of the internal artistic and liturgical features and details that are an integral part of the building
6	Edinburgh: (Category A listed building) Such architecturally ornate buildings pose numerous maintenance requirements relying on many individuals who are skilled in different crafts Note: Variations exist in how Heritage buildings are categorised in different countries	Maintaining and running a large historic building involves day-to-day and long-term management arrangements. Funding both short and long-term. Budget allocation. Safety management especially access to high structures and fragile roof surfaces. Use of lead products including roofing surfaces and old lead based paints. Possible use of other hazardous materials including asbestos
7	Liverpool Metropolitan Cathedral: (Grade II* listed building) a 1960's concrete framed building with ceramic mosaic cladding, walls clad in Portland stone, an aluminium sheet covered roof and modern stained glass cemented with epoxy resin and bonded into thin concrete tracery ribs	Numerous issues might have to be addressed when carrying out maintenance as a result of the use of modern materials and their constructional techniques. The complex building shape with large areas of sloping roof, adds to the issue of safety when carrying out inspections and remedial work. The adoption of modern building techniques may require researched studies to determine how to approach some work activities.
8	Hopetoun House: (Category A Listed building) Large important buildings often remain located in their original extent of park lands which adds to overall value. The Gardens have a	The symmetrical design of such buildings were often extended into the surrounding policy grounds. Care was paid to how such buildings sat in their parklands and how the natural landscape might be seamlessly, safely and visually be incorporated when viewed from the

	separate entry in the Inventory of Gardens and Designed Landscapes	building. This was achieved by a landscape device known as a 'Ha-Ha' and used to keep out animals
9 *	<p>Park Crescent, London: (Grade A listed building) The crescent built by the architect John Nash between 1812-21 consists of stuccoed terraced houses, which form a semicircle and was part of wider town-planning vision originally conceived as a Circus (circle)</p> <p>Research consideration: Find out more about how to mix and apply stucco</p>	The Germanic term Stucco refers to a renders made from a mix of various aggregates with lime to bind them and water. It is applied wet and hardens to a dense solid decorative cover for walls, ceilings and sculpted external architectural details. In England it can be defined as common, rough, bastard or trowelled, with each being specifically mixed for their intended application
10	Bailgate, Lincoln: (Grade II Listed) The form, materials and architectural styles of the buildings in the area vary greatly, reflecting the complex history of developments in the area	The irregular medieval street pattern is largely formed by deep building plots running back from the streets with narrow frontages reflecting surviving medieval burgage plots with varied patterns of doors and windows. Distortion and settlement of the structures can be revealed by fractures, misaligned openings and bulging wall faces
11	Wood Green, London: (Conservation Area) Conservation Areas can be created where a local planning authority identifies an area of special architectural or historic interest that deserves careful management to protect its character.	Initiated in 1967, types of Areas can including: <ul style="list-style-type: none"> • Historic village, town and city centres • Fishing and mining villages • 18th, 19th and 20thC suburbs • Model housing estates, including late 20thC housing projects • Country houses and their historic parks • Historic transport links environs including canals, railways and airfields • Industrial heritage
12 *	<p>Royal College of Physicians, London: (a Grade I listed building). This modern design is a blend of art and engineering in a white-tiled structure of concrete and glass. It was listed in 1998.</p> <p>Research consideration: Grading systems and labels vary across the four home countries that make up the British Isles</p>	In England and Wales, Listed Buildings are graded to reflect their relative special architectural and historic interest. <ul style="list-style-type: none"> • Grade I buildings are of exceptional special interest • Grade II* buildings are particularly important buildings of more than special interest • Grade II buildings are of special interest, warranting every effort to preserve them
13	Barley Hall, York: Until 1984 the building was hidden behind a relatively modern façade. It was only when it was going to be destroyed that the medieval	Once the full Worth of a building is uncovered and rediscovered, a full building archaeological survey is called for to fully understand all its features and details. Support archival research

	structure, dating from ca.1360, was discovered and uncovered. It was subsequently restored and reopened in 1993.	might include studying a range of historic documents, maps and early and later plans to help determine its history and evolution
14	Mathematical Bridge, Cambridge: The original wooden bridge on stone abutments was built in 1749 and was rebuilt in 1866 and again in 1905, keeping to the same overall design. Although it appears to look like an arch, it is built entirely of straight timbers to a sophisticated engineering design	The timbers are set out as a series of tangents that form an arc shape to the bridge. The triangulated structure makes it rigid and self-supporting. This type of structure is technically described as a tangent and radial truss and provides an efficient structural use of timber. The technique is also adopted to create temporary timber supporting arches (centring) that is used for building stone arched bridges and similar large arched structures
15	Previous Commercial Bank of Scotland, Edinburgh: (Category A listed building) Construction began in 1844 with the design of the frontage based on nearby Surgeons Hall. Following several changes in bank ownership it opened as a bar and restaurant and renamed the Dome in recognition of its magnificent domed interior, in 1996.	The neoclassical Greco-Roman style architectural frontage has other international models including the remodelling of the former British Residency in Hyderabad, India in 1857. The shift to neoclassical architecture is considered to date to the 1750's, gaining influence in England and France; inspired by excavations at Pompeii amongst other sites, the influence of the Grand Tour and the work of William Chambers and Robert Adam
16	Isle of Sark: Not part of the United Kingdom nor the European Union, Sark is reputed to be the smallest independent feudal state in Europe and to have the last feudal constitution in the western world	As the new faith of Christianity spread across Europe, the missionary St. Magloire arrived in Sark around 560AD. St. Magloire is credited with founding a monastery on the north-west of the island (still known as 'La Moinerie') and from there he dispatched his friars to bring the Christian faith to the other Channel Islands. Strict control is exercised over developments on the island and combustion engine vehicles, other than farm tractors, are banned.
17	One O'clock Gun, Edinburgh: The ritual of firing a military gun from the Castle ramparts at lunchtime signifies the time to the local population	Ships in the Firth of Forth once set their maritime clocks by the One o'clock Gun. The firing of the gun dates back to 1861, when a businessman brought the idea to Edinburgh from Paris. Intangible and tangible rituals motivate individuals and through them build communities and sense of place, whilst making transitions and marking important events. Where they occur at historic sites they act as a draw, pulling people towards them and generate a need to plan for accommodating attending public

18	Street Theatre and Performances, Edinburgh: Either spontaneous or planned such events can hold a similar attraction as might rituals	Increased open-air assemblies also create a burden for the Heritage through the need for crowd control and safety, access for emergency vehicle and health care personnel. Wear and tear of ancient surfaces, the provision of services, toilets, drinking and foodstuffs and associated litter. Working with a range of others is required to ensure success
19	Temporary Stadium, Edinburgh: The necessity to create temporary tourist facilities can impose constraints on the day-to-day operations of an historic environment	A variety of practical concerns may need to be incorporated including noise reduction, works access, loading impositions, temporary services installations, crowd control, crowd facilities (toilets, first aid provision etc), emergency evacuation procedure and access for emergency vehicles that will require cooperation with others to resolve
20	Albert Dock, Liverpool: (Grade I listed buildings + Part of the UNESCO World Heritage Maritime Mercantile City). Opened in 1846 it was built from cast iron, brick and stone, with no structural timbers. Revolutionary in design, ships were loaded and unloaded directly from or to the warehouses	Prior to building, with almost 14,000 timber piles, 23 million brick, 47,000 tons of mortar, cast-iron support columns were needed and a supplying granite stone quarry had to be opened in southwest Scotland. The site had to be cleared evicting 59 tenants and demolishing numerous premises. The result was the creation of 120,000 sq.m of warehouse space with large/clear open floor plans that subsequently made the changes of use and associated compartmentation easy: It reopened in 1988
21	Electric Press, Leeds: (Grade II listed building) The project was delivered as a joint commercial venture to create a mixed-use leisure scheme built around a former Carriage works	The scheme combines the Victorian building refurbishment with new-build construction to create a significant complex including a 350 seat theatre and conference facility. Located in a key position it overlooks the Millennium Square, opposite the City Centre Civic Hall and was completed in 2005
22	Electric Press, Leeds: The building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.	Such refurbishment and redevelopment schemes require close collaborative working with all involved to ensure a successful outcome respecting the integrity and Worth of the historic structure. Detailed survey work in advance of construction can aid achieving an appropriate project plan prior to construction starting
23	Kings Cross Station, London: Opened in 1852: Meeting modern operational demands from 2005-2012 created	Different times can reveal different attitudes and values associate with the care of heritage structures. Modern methods and options can

	challenging design issues that paid respect to the original historic structure and fabric whilst removing less than sympathetic redevelopment work of the 1970's	be better adopted to maintain integrity of the original. Free-standing additions without taking support from or connection to the original building can ensure minimal impact on it
24	Domestic Property, Peebles: it is becoming increasingly challenging to source replacement building materials that exactly match the diversity of original supplies. As a result, decision makers are forced into reaching for alternatives that may compromise the appearance of what was originally created	A variety of issues emerged during the 20 th C that compounded the ideal requirement of sourcing the right material for the right job. Numerous stone quarries and traditional brickworks have closed; cement has superseded the use of lime; timber is no longer so readily available in matching dimensions and quality; economic conditions and traditional skill training have changed dramatically and an overall lack of knowledge often prevails

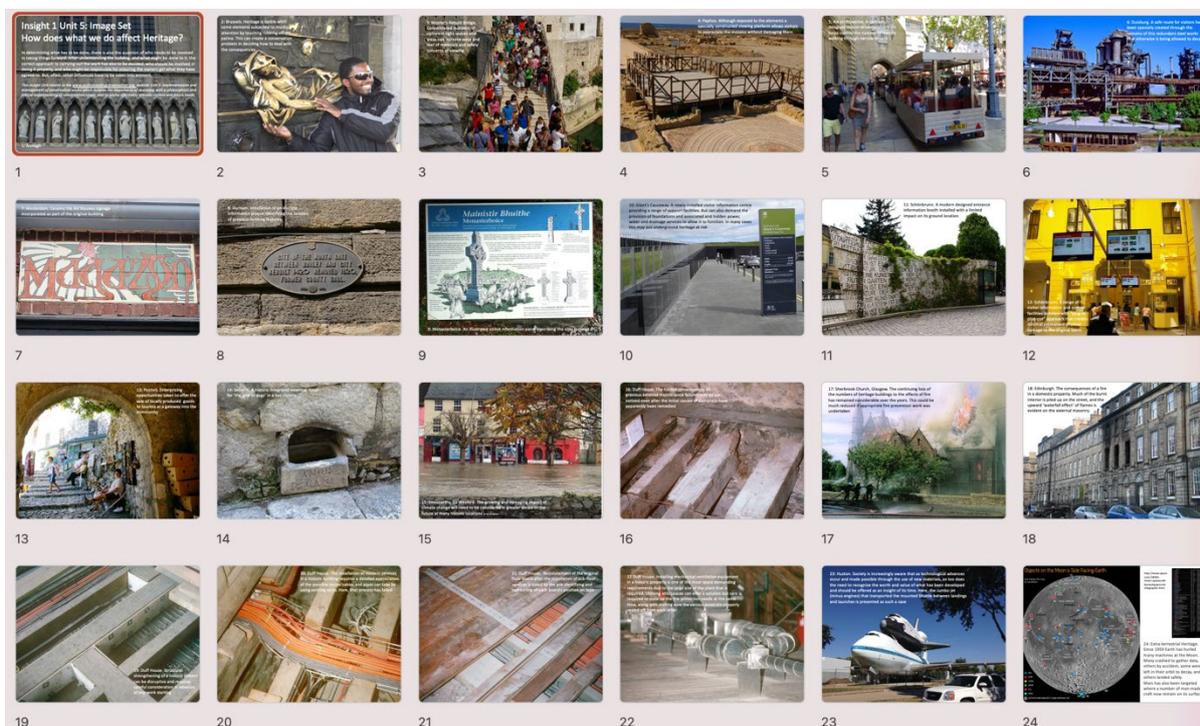


Everything which has ever been built throughout the centuries has either been constructed from materials that have been excavated from below ground or has grown on its surface, all of which has previously required considerable energy and effort to extract, cut and/or manufacture. To discard, demolish, or not properly care for our heritage amounts to a considerable disregard of natural resources. © Ingval Maxwell

Insight 1 Unit 5: *How Does What We Do Affect the Heritage?*

Refer to and View Full Page Image Set for Unit 5

Refer to and View Unit 5 Full page PDF Image Set when studying the captions and additional considerations set out below. Virtually all locations or topics have web page information that can also be searched and accessed.



No	Unit 6.5 Image Set: Caption Context	Additional Considerations
1	<p>St Patrick (RC) Cathedral Armagh: Construction started in 1840, it was dedicated for worship in 1873. Its interior was completed in the early 20th century but later internal changes were not always universally accepted</p>	<p>The external masonry had become so eroded as to create a safety threat from stonework falling onto passing public and worshippers entering the building. Difficult and challenging decisions followed, leading to a soundly-considered and costly general re-tooling and cutting back of much of the external masonry to recreate sound and secure wall faces. But at the expense of creating slightly widened openings, slimmer mouldings and structural architectural elements, a question might be asked as to whether different options could have been adopted that better addressed conservation principles when set against serious safety concerns</p>
2	<p>Brussels: Sculpted heritage, especially of bronze, is tactile with some readily</p>	<p>Patina in this case is the external dark colour of bronze resulting from a chemical reaction with</p>

	accessible features subjected to much physical attention, leading to a loss of patina. This can create a conservation problem in how to deal with the consequences	the copper in the bronze. It changes the surface appearance and can either be natural, man-made or both. When a bronze surface is highly disfigured, repatination involves the recolouring of the surface by hand employing similar methods to how the foundry would have finished it when first made. Other non-metallic surfaces can also achieve a 'patina' through use and ageing
3	Mostar Bridge: (WHS) The original 1556 single arched structure was destroyed by war-time shelling in 1990 but was rebuilt in 2004.	The reconstructed Old Bridge and Old City of Mostar is internationally considered a symbol of reconciliation, international co-operation and of the coexistence of diverse cultural, ethnic and religious communities. The work was based on a thorough and detailed analysis of high quality documentation and records. Its reconstruction was created through the use of authentic materials and techniques. Remaining original material is presented in a museum. Structures accessible to the general public will require careful consideration of safe measures during use – especially where falls from height are a risk factor
4	Paphos, Archaeological Park: (WHS) The villas are richly adorned with mosaic floors that are among the most beautiful in the world. The floors offer an visual album of ancient Greek mythology with representations of Greek gods, goddesses, heroes and everyday activities of life	The integrity of the location is the results of actions taken by the State to preserve the original condition of the ruins. Conservation work was undertaken ensuring their structural safety, whilst respecting the original material and its aesthetic value all without interfering with integrity. To avoid damaging footfall wear-and-tear on the mosaic floor the platform also allows a clearer view from an elevated position
5	Aix en Provence, Visitor Train: The small 57-seater electrically powered tourist train is used to travel at low speeds through the city's narrow streets. Those on board have headsets providing audio commentary in eight languages	The form of the City imposes limitations on the size and design of the visitor train. Minimally polluting using an electric power source it is quiet in operation, but with a visible pedestrian alert system installed (flashing light). Its construction allows clear passage through the narrow arches and soft tyres minimise damage to historic street surfaces. Close cooperation between the vehicle manufacturers and city authorities would have been essential to ensure all operational aspects were taken into account
6	Landschaftspark, Duisburg: This innovative public park was designed in 1991 with the intention that it works to	This challenging approach accepts the previous use of the site as a polluting coal and steel production plant (abandoned in 1985) and the

	<p>heal and understand the industrial past, rather than rejecting it. In attempting to preserve as much of the existing site as possible the approach also incorporates the intangible aspect of 'memory'</p>	<p>agricultural land that existed there up to the mid 19thC. The site was designed with the idea that a grandfather, who worked at the plant, could walk through it with his grandchildren explaining what he used to do and what the machinery had been used for. Visitor safety was of primary importance with regular safety checks as to general stability and condition of the walkways: Visitors are excluded from unsafe areas</p>
7	<p>Art Nouveau Tiles Amsterdam: This insert panel of 12 tiles shows a mismatch between the applied design and the size of tiles, noted by the supplementary slips added at the end of the word 'Magazyn' which incorporates the remnant part of the design. (See also Unit 1 image 23)</p>	<p>Ceramic tiles were not new to the Art Nouveau era: The use of glazed bricks and tiles goes back as far as the 13thC BC in Iran and have been used ever since. Significant and illustrated collections of European Art Nouveau tiles have been amassed by various collectors and are accessible for reference on the internet.</p>
8	<p>Durham North Gate: The Gate was one of the Castle's more important defensive structures. It has been added to over the centuries and was used as the county jail until 1820 when a new prison was built: This occasioned its demolition. By then it had become dysfunctional and an obstruction to traffic.</p>	<p>The historic significance of lost structures is frequently commemorated with durable and maintenance free wall mounted plaques (here in 1973 by the Rotary Club). Official endorsements are also afforded through the UK Blue Plaque scheme and, internationally, by affixing of Blue Shield plaques. Where applied to sensitive historic wall faces, care needs to be exercised in positioning as permanent mechanical damage can be caused through drilling and the installation of fixing screw or bolts. A similar concern also applies to shop front facias and corporate identity name plates, many of which are frequently replaced as occupation changes; each of which usually involves new fixing points</p>
9	<p>Monasterboice, Information Board: Increased visitor numbers to historic locations increase the need for easily accessible information about a site</p>	<p>A number of detailed issues need to be considered when installing such information panels. They can affect the visual integrity of the site if poorly located, whilst creating ground wear patterns in their immediate vicinity due to concentrated footfall. Height positioning is determined by allowing easy reading. Durability, installation methods and ease of cleaning, without loss of definition or information adds to the concerns whilst multi-language version can add to panel size</p>
10	<p>Giant's Causeway, Visitor Centre: Determining the scale and location of</p>	<p>Many aspects need to be considered, including design, visual impact, accessibility, car parking,</p>

	<p>visitor centres attached to historic sites and the value they contribute to the local economy is a constant challenge. Their success involves working with others</p>	<p>ground conditions and possible impact on buried archaeological remains as well as footfall wear and tear. Current guidance emphasises the need for creating 'Visitor Servicing' with the need for:</p> <ul style="list-style-type: none"> • locations to engage with the local community and suppliers • a good experience of telling the story effectively • provision of support facilities • embracing digital services • questioning what might be done better beyond using basic metrics • being financially sustainable and have strong leadership and management
11	<p>Schönbrunn, Information Booth: Supplementary facilities, in the form of advance information provision can add to the satisfaction of visitors to historic locations</p>	<p>Such facilities could well be temporarily sited and be liable to regular updates and relocations: So, siting is important to ensure minimal damage to the ground on which they sat when they are eventually removed</p>
12	<p>Schönbrunn, Internal Information Systems: Such facilities could well be liable to regular updates and relocations as operational circumstances change</p>	<p>A 'plug-in' and plug-out' approach may be preferred so information and promotional details can be easily removed, replaced or changed with minimal impact to historic structures. A preferred option might be to consider support gantries, ticket or information booths and sales stands as being of a temporary nature allowing greater flexibility in future changes</p>
13	<p>Pocitelj: The historic village and an open-air museum in Bosnia and Herzegovina was built in a natural karst amphitheatre beside the Neretva River during the Middle Ages. Currently the village supports a population of almost 800</p>	<p>Many less well-known locations have achieved greater preservation of their significant historic integrity whilst still reminding an active community . Enterprising local traders benefit from siting their stall/displays in prominent locations such as entrance and exit gates thus concentrating visitors' attention on arrival and departure.</p>
14	<p>Šibenik: A water dish (one of two) for dogs built into a Renaissance wall – (translation) "For the love of dogs"</p>	<p>Historically, animals suffering from rabies often had a fear of water. By providing water containers locals could identify afflicted animals seen avoiding the stone dish. Currently the dish serves as a healthy stop for cats and dogs seeking water during the summer. It is recessed to avoid it being a trip hazard to visitors: The fact that it is recessed also reduces evaporation of water during hot weather</p>

15	Enniscorthy, Co. Wexford: Located on the banks of the River Slaney the town has a long history of flooding with extreme events having occurred in 1924, 1947, 1965, 2000 and 2015 requiring serious consideration of the installation of a flood defence scheme	The impact of climate change is imposing new hazards which the built environment has to accommodate. Flooding represents a risk to health and safety, significant property damage and traffic disruption which adversely affects commercial activity. Floating debris and the force of water flow can cause impact damage and wash-out of foundations risking the collapse of vulnerable buildings. This is an area of concern where there is a need for additional training and improvement of knowledge about how to respond; especially where flooding directly affects the Heritage
16	Timber Beam Decay: Water penetration and saturation is a main cause of timber decay: As decay develops it can seriously affect the structural integrity of load bearing timbers	Dry rot is a serious form of fungal attack spreading unnoticed in voids and enclosed internal spaces where there is insufficient ventilation. Dry rot frequently requires cutting out and removal of affected timber. Wet rot occurs more frequently, is less serious and can be dealt with more readily. The removal of historic timbers creates a loss of authenticity so preventative maintenance following regular inspections is a recommended response – thus avoiding the high cost of low maintenance!
17	Sherbrook Church, Glasgow: Minor roofing repair work was being carried out in 1994 when a uncontrollable fire took hold reducing the building to a burnt-out shell. Costly restoration work was required and was completed in 1998	Each year the number of historic buildings lost to the effects of fire is a well-recognised and considerable international problem. Any loss of fabric or detail is an historic loss too and whilst it can be replicated it is not original and, in consequence, overall Worth is diminished. To fight against such loss, enhanced techniques of management, compartmentation, detection and, importantly, suppression needs to be given more thought
18	Domestic Property Fire, Edinburgh: At a personal level the consequences of a domestic fire can be devastating. Within 3 minutes of a fire starting, the interior temperature of a room can reach 1,000°C.	During a fire the ‘upward’ pattern of staining and heat damage above building openings is a consequence of heat rising thus damaging appearance beyond the seat of the original fire. Fire safety legislation is inevitably focused on preservation of life: But life safety, as with original fabric and contents integrity, would coincidentally be improved if greater consideration was also given to enhanced use of suppression and alarm systems.
19	Structural Floor Strengthening: To withstand imposed modern-day floor loadings supplementary historic timber	Professional Structural Engineering expertise might be called upon to assist in assessing the strength of an existing structure in addition to

	beam construction may require the insertion of supportive steel work	designing what may be required to improve an area of weakness. To ensure adequate fire protection, inserted steelwork will probably require the application of fire resisting intumescent coatings
20	Service Cable Installation: The installation of modern services in an historic building requires a detailed survey and assessment of possible routes for cables and pipes by using existing voids.	Here, the floor joist have been extensively 'notched' to accommodate cables and supporting mesh trays, in so doing the strength of the floor joists has been seriously compromised. The use of neutral axis drilling and notching within structurally acceptable locations might be a better option but, in heritage situations more thought and ingenuity should be applied
21	Floor Reinstatement: Locating, identifying and numbering prior to uplifting can aid re-laying and re-fixing of floor boards after sub-floor service installations	Damage to covered or unobvious service runs should be avoided and anticipated when re-nailing or screwing boards back in position, with special care being taken in the vicinity of historic and damaging notching. A survey record plan of service runs before they are covered will aid future maintenance needs and access. Intumescent packing should be installed where new service runs pass through any internal fire separation compartmentation
22	Mechanical and Electrical Installations: Modern day internal environmental demands can place considerable pressures and generate problems within historic interiors when deciding where associate plant and equipment is to be located	Dealing with increased operational risks might necessitate the provision of fire barriers and monitoring equipment within concealed roof voids: Especially where there is limited or no regular access. Where compartmentation is required care needs to be exercised to ensure this extends vertically through the building without interruptions alongside checking and maintaining its integrity after later work has been carried out to ensure any subsequent breaching is rectified
23	Shuttle Replica 'Independence' and Actual NASA 905, Huston: The replica was built using schematics, blueprints and archival documents provided by NASA and by shuttle contractors. It was mated with an actual Shuttle-carrying Jumbo jet in 2014 with an accessibility gantry-style tower with ramps and an elevator for visitor to both vehicles: It opened in 2016	Society is becoming increasingly aware that recognising technological advances has also become part of the Heritage warranting acknowledgment and display. In relation to newer, less familiar or modern materials, advice concerning their conservation may have to be sought from a new cohort of professionals including material scientists, subject-related engineers (e.g. rail, marine, and aeronautical), health and safety advisers, the original designers, builders and archivists et al

24	<p>Extra-terrestrial Heritage: How might extra-terrestrial locations be valued and offered protection is emerging as an issue that needs to be addressed</p>	<p>Sputnik I was launched in 1957 and the 1958 US Vanguard 1 satellite is the oldest man-made object still in space. To date five nations and ESA have placed objects on the Moon and Mars. International consultation and agreement would appear necessary to help ensure that non-terrestrial sites might be physically protected, perhaps by developing the 1967 <i>United Nations Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space</i></p>
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New and emerging technologies offer considerable advantages for the future awareness, appreciation and care of the built heritage ©CDDV