CONSIDERATIONS FOR PROJECTING BRICKWORK IN BUILDING DESIGN

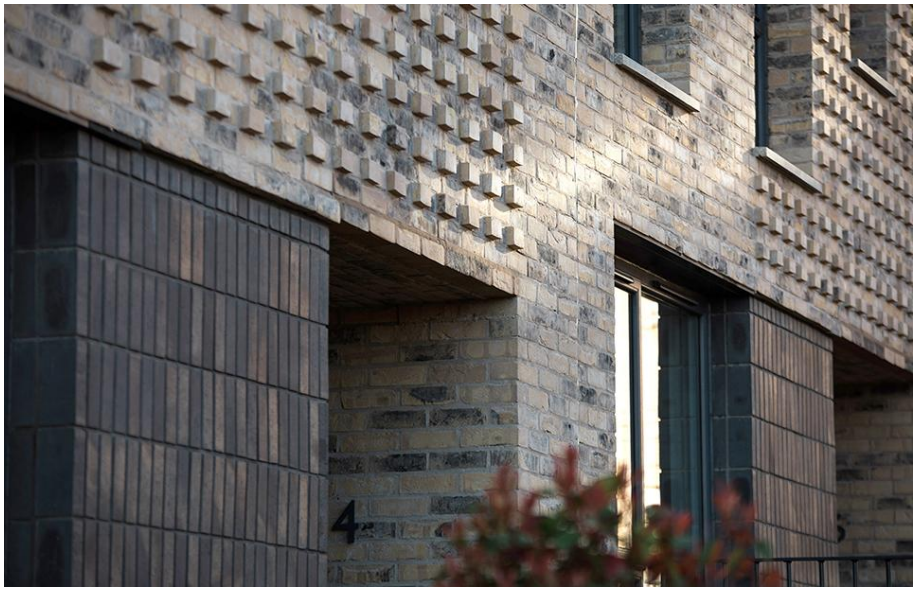
Projecting brickwork is a common architectural feature that adds visual interest, depth, and character to building facades. However, the design and construction of projecting masonry elements require careful consideration of structural stability, weathering performance, and compliance with relevant standards. This document outlines the key considerations for designers and specifiers when incorporating projecting brickwork into building designs, with particular reference to PD 6697 Recommendations for the Design of Masonry Structures, and BS 8000-3 Workmanship on Construction Sites: Masonry – code of practice.

What is Projecting Brickwork?

Projecting brickwork refers to any masonry element that extends beyond the main face of the wall. Common examples include:

- String courses and band courses
- Corbelling and corbel tables
- Projecting sills and lintels
- Decorative brick features
- Projecting plinths
- Balconies and canopies

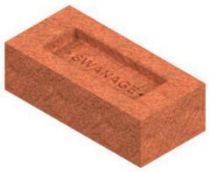
Ibstock Brick



Project: Gardenmore Green, Belfast
Brick type: Ibstock Ivanhoe Cream
Architect: Hall Black Douglas Architects
Brick Award winner: 2022 Small Housing Development Award

Key Design Considerations

1. Brick Specification



Frogged

Extruded

Waterstruck

Selecting the right type of brick is critical if it is to be used as a projecting feature:

- Standard bricks – the upper and lower bed faces of a standard frogged or wire cut extruded bricks are not finished for exposure and long-term durability. The frog or perforations of Ibstock bricks are generally within 20mm of the finished face of the brick and in some cases closer, please always check with Ibstock Technical Dept. for details of the specific brick type being considered. In addition to building tolerance on site, consideration should be given to not exposing these voids.
- Water Struck bricks – these are solid by default and therefore offer greater flexibility for projecting details. The upper and lower bed faces are not an aesthetically finished face and may vary in colour and texture compared to the finished stretcher or header face.

2. Structural Stability

The primary concern with projecting brickwork is ensuring adequate structural support and stability. Always consult with a structural engineer if brickwork deviates from standard applications. Reference should be made to relevant national building regulations and PD 6697 and Eurocode 6. Key considerations include:

Cantilever Limits: The extent to which brickwork can safely project depends on the bond pattern, brick strength, mortar quality, and loading conditions. Generally, projections should be limited to avoid excessive cantilever moments that could cause rotation or failure. Projections should not exceed 1/3 of the thickness of the external leaf

Support Mechanisms: Larger projections may require additional support such as:

- Steel angles or brackets

- Concealed bed joint reinforcement
- Corbelling from below

Load Distribution: Consider the self-weight of the projection plus any imposed loads (such as snow on projecting features). The bearing capacity of the supporting masonry must be adequate.

Connection Details: Guidance on connecting projecting elements to the main structure, including the use of wall ties, reinforcement, and mechanical fixings.

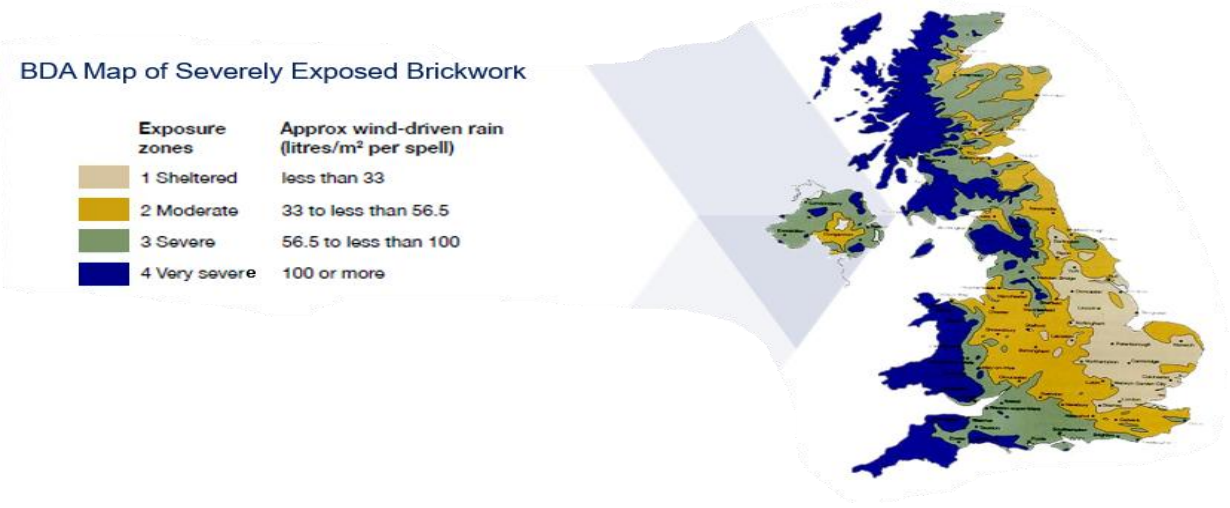
Thickness of external walls: Consideration should be given to minimum thickness of masonry walls for certain small buildings as per the relevant national building regulations.

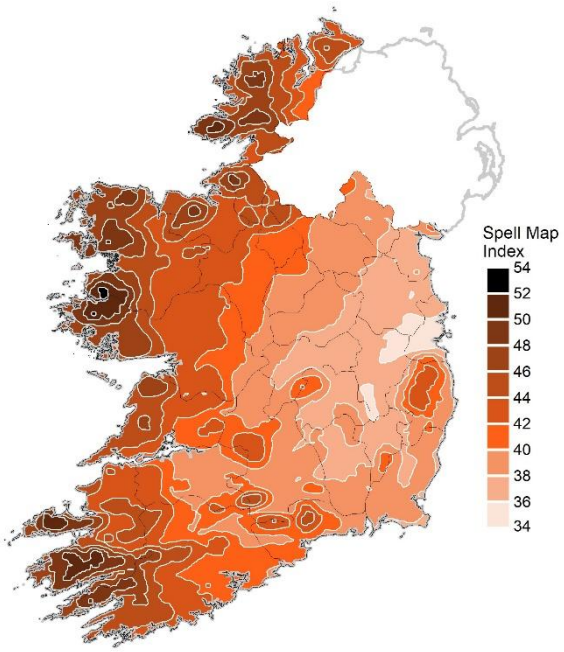
3. Weather Resistance and Durability

Projecting elements are particularly vulnerable to weather exposure:

Water Penetration: Horizontal or near-horizontal surfaces on projections are prone to moisture accumulation. This will allow more moisture to soak into the body of the brick and potentially reduce longer term durability. Key considerations include:

- Surface moisture run-off from impervious materials such as windows or other cladding materials. This could result in oversaturation of the brickwork below, consideration should be given to purpose made sill bricks, precast concrete sills or preformed metal sills
- Drips or throating on undersides of sills to prevent moisture tracking back
- Correct mortar specification relative to site exposure and design
- Correct mortar joint profile – recessed joints impede the runoff of moisture and increase the risk of rainwater penetration at the mortar/ masonry interface. The addition of mortar fillets or chamfers are not considered a suitable solution and are not recommended by Ibstock. A tooled joint profile such as bucket handle or weather struck is best.





Republic of Ireland map showing exposure zones for wind driven rain.

4. Design Approach

When designing projecting brickwork also consider the following:

1. Do the projections encourage climbing? Is there a security or H&S risk?
2. Do they encourage birds to roost?
3. Do the projections create ledges on the cavity face that might collect interstitial or saturation moisture? Do the projections create ledges to catch mortar snots on the cavity side?
4. Will the projections also encourage the collection or organic or urban dirt? Will this result in runoff staining? Will this create a future management issue?

5. Workmanship

BS 8000-3 Workmanship on Construction Sites, code of practice for masonry. Recommendations for the execution and quality control of masonry work including projecting details.

Relevant Requirements

Workmanship Quality: BS 8000-3 emphasizes the importance of skilled workmanship for projecting elements, which are more technically demanding than standard walling:

- Proper setting out and alignment
- Consistent joint widths and profiles
- Full bedding of units
- Adequate curing of mortar

Weather Protection: BS 8000-3 specifies measures to protect incomplete work:

- Covering exposed horizontal surfaces
- Protection during cold weather
- Prevention of mortar washout
- Curing requirements for fresh mortar

Quality Control: The standard emphasizes inspection and testing:

- Regular dimensional checks
- Visual inspection of mortar joints
- Verification of materials compliance
- Documentation of non-conformances

Practical Considerations from BS 8000-3

Jointing and Pointing: Projecting work requires particular attention to jointing:

- Tooled joints to compact mortar and shed water (bucket handle or weather struck)
- Recessed joints may be inappropriate for exposed positions

Dimensional Tolerances: Tighter tolerances may be necessary for projecting features to ensure visual quality and proper function.

6. Additional Design Considerations

Aesthetic Integration

- Ensure projecting elements are proportionate to the building scale
- Consider shadow lines and visual depth
- Maintain consistency with overall architectural language
- Coordinate with other facade elements

Specification

Comprehensive specifications should address:

- Brick type, quality, and durability rating
- Mortar designation
- DPC and flashing materials
- Support systems and fixings
- Quality control requirements
- Workmanship standards (reference BS 8000-3)

7. Alternative Design Approach

Aesthetics

- Consider using a contrasting brick colour or texture to create the illusion of perforated or hit & miss brickwork. A subtle change in brick colour can create relief and articulation such as banding or string coursing.

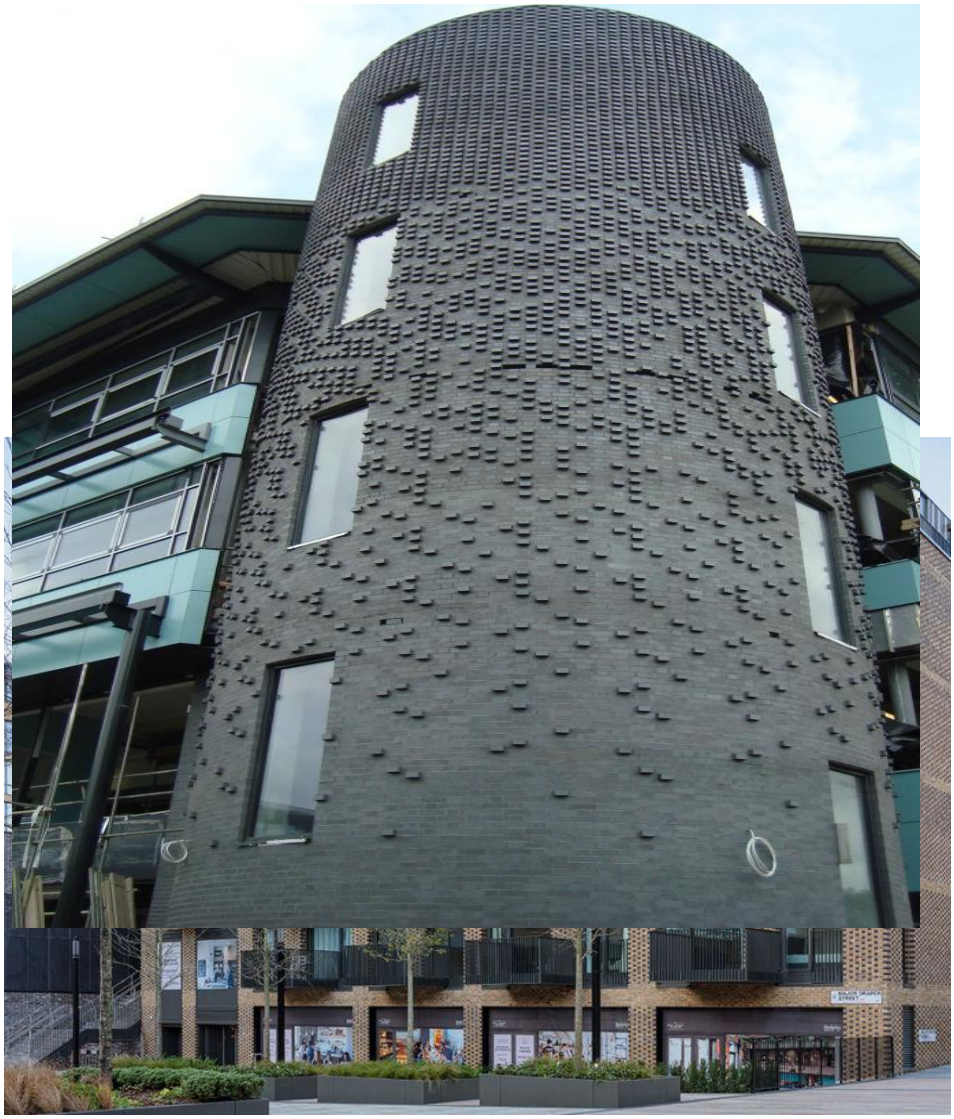
- Consider using ‘traditional’ bond pattern such as English or Flemish bond.

- Restrict projections to a maximum of 10mm, this still offers a noticeable shadow effect. Test this out by dry laying a few bricks facing good light.

- Construct a site reference panel incorporating the proposed detail to demonstrate aesthetics and establish expected standards of workmanship.

TECHNICAL INFORMATION **C9**

Ibstock Brick



8. Common Issues and How to Avoid Them

Water Staining

Problem: Water running down from projections causes staining.

Solution:

- Reduce projection depth to 10 mm
- Consideration of projections that face prevailing conditions
- Maintain a well-drained 50mm clear cavity with the required cavity trays, weep holes and stop ends

Cracking

Problem: Projections crack due to inadequate support or movement.

Solution:

- Appropriate structural design per PD 6697
- Movement joints at correct spacing
- Adequate support and restraint – increase tie centres and included bed joint reinforcement

Frost Damage

Problem: Saturation and freeze-thaw action cause spalling.

Solution:

- Frost-resistant brick specification
- Effective and efficient surface water runoff
- Quality mortar with a mix appropriate to site specific design and exposure

- Avoid large areas of flat horizontal brickwork to vulnerable areas eg wide cappings to parapets and/or retaining walls etc and instead use alternative materials such as recon stone or profiled metal with falling slope.

Poor Bonding

Problem: Inadequate tying between projection and structure.

Solution:

- Proper bonding details per BS 8000-3
- Wall ties and bed joint reinforcement at appropriate spacing
- Construction sequence allowing proper integration

9. Inspection and Maintenance

Regular inspection should verify:

- Structural integrity of projections
- Condition of pointing and jointing
- Function of drainage features
- Integrity of DPCs and flashings
- Early signs of deterioration

Maintenance should address:

- Repointing as necessary
- Clearing of weep holes
- Repair of spalled or damaged units
- Vegetation removal

Conclusion

Projecting brickwork enhances building facades but requires careful design and execution. Compliance with PD 6697 ensures structural adequacy through proper engineering calculations. BS 8000-3 provides the framework for quality workmanship and appropriate construction practices. Together, these standards support the creation of durable, attractive projecting masonry features that perform well throughout the building's service life.

Successful projecting brickwork results from:

- Thorough structural design
- Appropriate brick specification

- Careful weathering detailing
- Skilled workmanship
- Adequate quality control
- Regular maintenance

By addressing these considerations systematically, designers can confidently incorporate projecting brickwork elements that are both visually compelling and structurally sound.

Recommendations

- **Projections greater than 15mm**
  - Use a BD 1.3 solid special or filled & re-faced brick – please note these are approximately ten times the cost of a standard brick. Our standard 60 year durability warranty will be maintained
  - Use an Ibstock Birtley water struck brick. This is solid by default but not finished on the top (bed face) or underside face, can be finished if required at extra cost. The 60 year durability guarantee will be maintained in either circumstance.

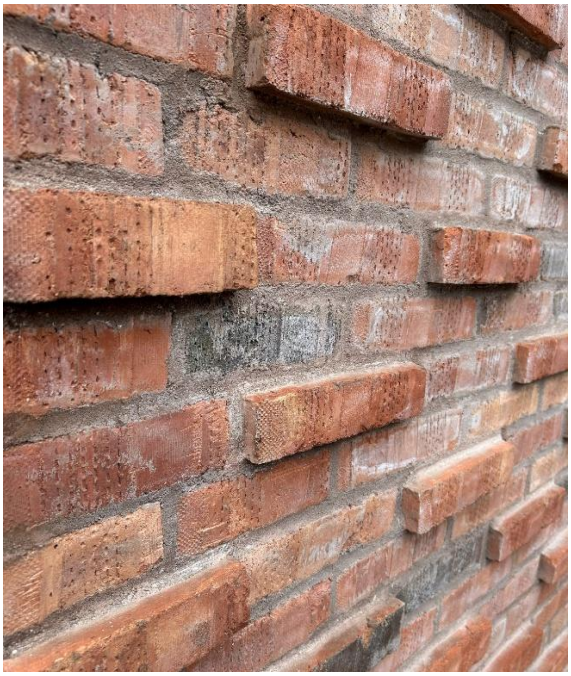
- **Projections between 10mm and 15mm**
  - Use a standard brick, Ibstock complete a Product risk assessment relative to the building design and exposure rating and offer a reduced durability warranty.
  - Select any of the options from item 1). Above.

- **Projections up to 10mm**
  - Use a standard brick to achieve a standard 60-year product warrantee, used in conjunction with either a bucket handle or flush mortar joint with a tooled finish.

Ibstock Brick

Examples of projecting Brickwork

The following images show examples of successful projecting brickwork in recently completed contemporary architecture. Note all have used a solid water struck brick type with a neatly tooled mortar joint. All these measure no greater than 20mm.



Ibstock Brick

The following images show an example of a building that uses a contrasting brick to create aesthetic relief in both projecting and flush brickwork.