

Flood Risk Assessment (FRA)

Cheddleton Flint Mill – Grade II Listed Flint Calcining Kilns Incorporating PPS25 Requirements

1. Introduction

This Flood Risk Assessment (FRA) has been prepared to evaluate flood-related hazards affecting the **Grade II listed flint calcining kilns** located at **Cheddleton Flint Mill**, Staffordshire. The site lies immediately adjacent to the **Caldon Canal** and elevated above, but near, the **River Churnet**. According to published flood risk mapping, the location falls within **Flood Zone 2/3**, representing medium to high probability of fluvial flooding.

As a heritage industrial site, the kilns form part of a nationally significant historic complex and require special consideration under PPS25 with respect to flood compatibility, resilience, and preservation.

2. PPS25 Policy Context

PPS25 establishes the approach for appraising, managing, and reducing flood risk. Key applicable principles:

2.1 Sequential Test

- Directs development to the areas of lowest flood risk.
- At this site, the kilns are *existing historic structures* and therefore the Sequential Test is not applied in the same way as for new development.
- Proposed works (e.g., conservation, interpretation, public access improvements) must demonstrate that they do not increase flood vulnerability or impede flood pathways.

2.2 Exception Test

Because the structures lie within Flood Zone 2/3:

- Development related to heritage conservation is considered “**water-compatible**” under PPS25 and is generally acceptable.
- However, any change of use, increased public access, or new services would require demonstration that:
 1. **Wider sustainability benefits** outweigh flood risk.
 2. The site will be **safe for users** over its lifetime.
 3. Flood risk is **reduced or not increased** elsewhere.

2.3 Development Vulnerability Classification

- Heritage assets without residential or high-occupancy use fall into **low/least vulnerable** or **water-compatible** categories.
 - This classification is appropriate for the kilns, provided no sensitive uses are introduced.
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3. Site Description

3.1 Location & Setting

- The flint calcining kilns are positioned on the historic wharf between the **Caldon Canal** and the **River Churnet**.
- Ground levels fall toward the river, with the canal sitting at a slightly higher engineered level.
- The kilns are largely of stone construction with historic voids, fire holes, and sub-floor features.

3.2 Hydrological Context

- **Caldon Canal**: Artificial waterway; overtopping is unlikely but possible during severe rainfall or lock failure.
- **River Churnet**: Primary fluvial flood source; flashy catchment responding quickly to rainfall.
- The site's proximity places it at risk from:
 - Overtopping of the riverbank
 - Canal leakage/overtopping during storm events
 - Surface water accumulation on the mill site

3.3 Flood Zone Classification

- The Environment Agency maps classify the site as **Flood Zone 2/3**:
 - **Zone 2**: Medium probability (0.1–1% annual probability)
 - **Zone 3a**: High probability ($\geq 1\%$ annual probability)
 - Some historic records indicate occasional flooding of the mill yard and ancillary structures.
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4. Sources of Flooding and Risk Pathways

4.1 Fluvial Flooding

- **Primary risk** from the River Churnet.
- Floodwaters may propagate across the lower yard, entering kiln bases and eroding historic fabric.

4.2 Canal-Related Flooding

- Though engineered, canals can pose risk through:
 - Bank overtopping in extreme weather

- Localised breaches
- Backflow from connected watercourses

4.3 Surface Water Flooding

- Impermeable historic surfaces (stone setts) can accelerate flow.

4.4 Groundwater Flooding

- Not considered a major risk but possible during prolonged saturation due to proximity to watercourses.

4.5 Structural Vulnerabilities

- The kilns contain historic brickwork sensitive to moisture.
 - Openings, vents, and voids may allow floodwater intrusion.
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5. Flood Risk Impact on the Heritage Asset

5.1 Physical Damage

- Saturation and drying cycles can weaken lime mortars and spalling of historic brick faces.
- Potential undermining of foundations by scouring.

5.2 Loss of Historic Integrity

- Prolonged standing water in kiln interiors can accelerate decay.
- Water movement through flues may destabilise internal structures.

5.3 Access and Health & Safety

- During flood events, access routes for staff or visitors may become hazardous.
 - Debris accumulation can obstruct historic pathways.
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6. Mitigation Measures (Consistent with PPS25)

6.1 Passive/Property-Level Protection

- Low-level openings can be fitted with **reversible, breathable barriers** (approved by conservation officers).
- Ensure drainage routes around the kilns remain clear to prevent ponding.

6.2 Flood-Compatible Conservation

- Use **lime-based mortars** and breathable materials for repairs to accommodate moisture cycles.
- Avoid impermeable modern coatings which trap moisture.

6.3 Maintenance of Water Pathways

- Keep the canal bank vegetation managed to maintain visibility and stability.
- Inspect and maintain any retaining structures between the site and the river.

6.4 Emergency & Access Planning

- Develop a **Flood Response Plan** for staff or volunteers:

- Trigger levels (Environment Agency alerts)
- Safe access/egress routes
- Protection of heritage features and documentation

6.5 Enhancing Site Resilience

- Consider modest regrading or drainage channels if they do not harm archaeological deposits.
 - Install raised interpretation panels and electrical points above known flood levels.
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7. Residual Risks

Even with mitigation, the following risks remain:

- Rapid-onset flooding from the River Churnet during intense rainfall.
- Potential canal overtopping during extreme events.
- Unpredictable scour or erosion affecting buried kiln structures.
- Climate change impacts (increased rainfall intensity).

Residual risks are acceptable given the site's heritage significance and the water-compatible use, provided management measures remain active.

8. Conclusion

In accordance with **PPS25**, the flint calcining kilns at Cheddleton Flint Mill:

- Are classified appropriately as **water-compatible development** in Flood Zone 2/3.
- Can be conserved and managed safely provided mitigation measures are implemented.
- Present no increased flood risk to off-site locations.
- Require continued monitoring and maintenance to preserve the asset's structural integrity and ensure safe access during flood events.

This FRA demonstrates that the historic kilns can be preserved without exacerbating flood risk and with an acceptable level of safety and resilience.

If you'd like, I can also prepare:

- ✓ A version formatted for submission to a planning authority
- ✓ A heritage-impact focused version
- ✓ Maps, risk diagrams, or an executive summary

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