

Technical Note

Bradford Road Wing Roof Assessment

Project: Brunswick Mill

Client: Arrowsmith Group

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1.0 Introduction and Brief

On the instruction of Arrowsmith Investments, a structural assessment was carried out of the existing concrete roof over the North-West Side (Bradford Road elevation), area of Brunswick Mill, Bradford Rd, Manchester M40 7EZ.

The purpose of the inspection was to determine the condition of the roof structures and assess their suitability for reuse within the proposed refurbishment scheme. A non-intrusive, inspection was carried on the 29th June 2024.

2.0 Roof Formation

The roof structure forms part of an extension to the original Mill building and differs significantly from the original masonry arch construction, comprising a flat reinforced concrete slab supported by structural steel beams, which are themselves carried by the existing masonry wall lines.

3.0 Observations

The area of roof inspected was noted to be in a critically poor structural state. Signs of prolonged water ingress were evident, accompanied by extensive spalling at the soffit and widespread exposure of reinforcement. In many locations, the concrete exhibited pronounced brittleness, crumbling or spalling upon light contact, an indication of advanced material degradation. The reinforcement, where visible, showed sign of surface corrosion, suggesting that deterioration has been active and progressive over an extended period. Refer to Appendix A for representative photographs illustrating the roof condition.

4.0 Review

Based on the extent of visible deterioration, it is highly probable that significant hidden structural damage also exists. Surface-level defects, such as corrosion, cracking, and spalling often serve as indicators of deeper, more pervasive internal degradation. Once corrosion initiates, particularly in damp or humid conditions, it can accelerate rapidly, compromising the integrity of the embedded reinforcement. In such cases, conventional patch repair methods are unlikely to provide a lasting solution. While they may restore surface appearance, they do not adequately restore the embedded steel, which may continue to deteriorate unchecked, thereby undermining the effectiveness and longevity of any remedial efforts.

At present the deteriorated condition of the concrete and reinforcement poses a serious safety concern. Loose fragments and corroded steel elements create a high risk of falling debris or full collapse, which could cause severe injury or damage to any individuals working direct below.

The working environment beneath the structure is considered to be unstable and poses serious safety risks. There is a risk that even attempting repairs from below could inadvertently trigger a sudden collapse, given the unpredictable nature of the damaged elements. The severely compromised structural integrity also undermines the effectiveness of standard protective measures. While boarding, propping, or installing debris netting may offer limited mitigation, such methods cannot fully safeguard against unexpected partial structural failure.

Review Continued

In practical terms, undertaking repairs in this condition not only endangers personnel but also introduces logistical challenges. Access becomes restricted, work must be carefully staged, and additional safety protocols must be implemented all of which contribute to longer timelines, increased costs, and greater uncertainty in project outcomes.

Furthermore, the roof structure appears to be incompatible with current standards. Its original design and materials would not meet today's Building Regulations.

In addition to its inadequate structural attributes, there is clear evidence of prolonged water ingress, indicating that the structure is no longer watertight. This further compromises its performance and durability. Retrofitting effective waterproofing solutions in such conditions is notoriously complex and often unreliable, making long-term protection particularly challenging.

Conclusions

The roof structure is at considerable risk of failure due to a combination of advanced concrete spalling, reinforcement corrosion, and sustained water ingress. These factors have significantly undermined its structural integrity, increasing the likelihood of sudden collapse and posing serious safety hazards to both occupants and site personnel.

Given the extent and severity of the observed deterioration, including brittle, spalled concrete, widespread exposure of reinforcement, and clear signs of long-term moisture penetration, a substantial loss of load-carrying capacity is anticipated. If left unaddressed, the roof slab is considered to be at high risk of partial or complete structural failure.

However, the original supporting steelwork appears to remain in a salvageable condition. It is therefore recommended that all surrounding concrete be carefully removed to fully expose the steel elements. Once exposed, all corroded areas should be thoroughly cleaned preferably using mechanical methods such as grit blasting—and treated with a high-performance anti-corrosion protective coating. This approach will help preserve the remaining structural steel and extend its service life, provided the surrounding concrete is reinstated using appropriate materials and detailing to prevent future moisture ingress.

APPENDIX A

Photographs

Photographs: Structural Defects



Photo 1 - North-West Roof

Examples of roof deterioration - exposed reinforcement, corroded steels concrete spalling



Photo 2 - North-West Roof

Examples of roof deterioration - exposed reinforcement and concrete spalling



Photo 3 - North-West Roof

Water staining and moss growth evident throughout



Photo 4 - North-West Roof

Heavily corroded support steels throughout



Photo 5 - North-West Roof

Examples of roof deterioration - exposed reinforcement corroded steels concrete spalling.



Photo 6 - North-West Roof

Examples of roof deterioration - exposed reinforcement corroded steels concrete spalling.



Photo 7 - North-West Roof

Examples of roof deterioration - exposed reinforcement corroded steels concrete spalling.



Photo 8 - North-West Roof

Examples of roof deterioration - exposed reinforcement corroded steels concrete spalling.

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