

National Trust

Castlefield Viaduct Urban Park – Phase 2

Concept Fire Strategy

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1. Introduction

Arup have been appointed by National Trust to fire safety engineering advice in the implementation of the Phase 2 of the Castlefield Viaduct Urban Park scheme, which consists of extending the current Castlefield Viaduct offer to include the entire length of the viaduct (~330m).

This report outlines the concept fire safety strategy for the extended Phase 2 viaduct scheme.

Arup is cognisant of the array of challenges the scheme offers from a fire engineering perspective specifically in relation to fire service vehicle access and means of escape, having developed the Phase 1 fire strategy with the Phase 2 implementation in mind.

The extent of works during Phase 1 and Phase 2 are shown in Figure 1.



Figure 1 - Extent of Phase 1 and Phase 2 works

1.1 Building overview

Castlefield Viaduct is a Grade II listed structure located in the Castlefield area of Manchester, UK. It was built in 1892, with 56 arches supporting a wrought iron lattice viaduct spanning 330m.

The structure lies South-West of the city centre between the Bridgewater Streetcar Park and Egerton Street. The viaduct extends further to the west where it meets the Metrolink corridor.

Following the successful implementation of Phase 1, where part of the viaduct (~165m) was opened to the public, National Trust are now implementing Phase 2, i.e., extending the current Castlefield Viaduct offer to include the entire length of the viaduct (~330m). This report identifies the concept fire strategy for the viaduct development including the both the Phase 1 & 2 areas.

It is understood that there shall be minimal changes to the Phase 1 section of the viaduct.

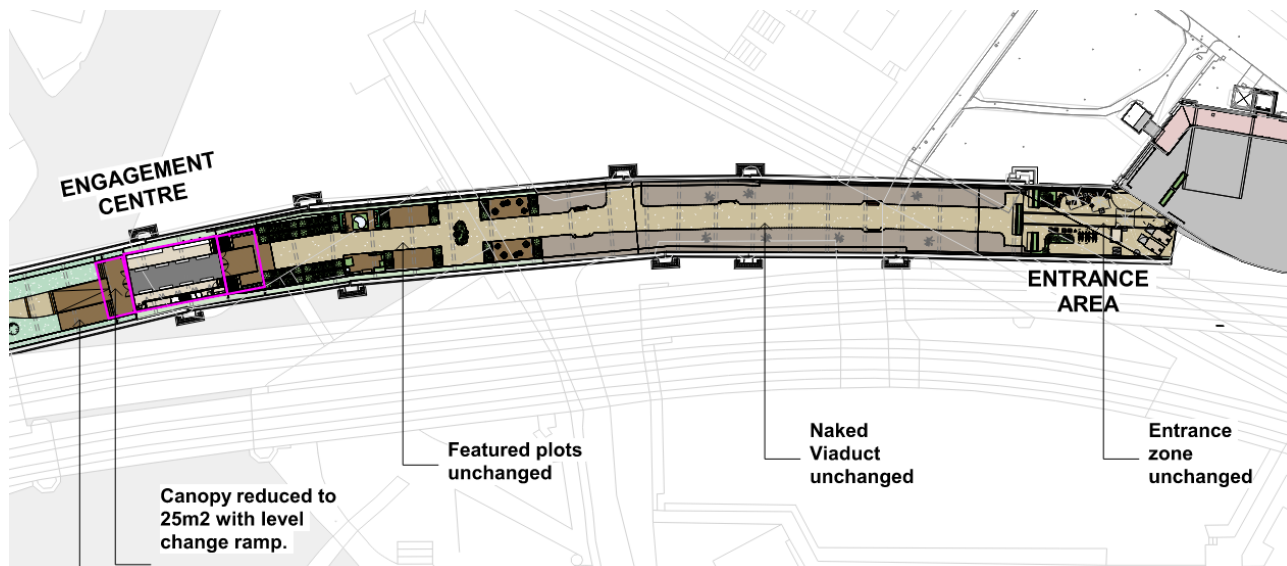


Figure 2 - Phase 1 area layout

This report provides the fire strategy implications for the potential Phase 1 & 2 development works following the introduction of the Phase 2 area, focussing on National Trust's key goals for the project.

The layout of the new Phase 2 area is shown in Figure 3, as part of Phase 2 works a new secondary means of escape will be introduced including a new lift.

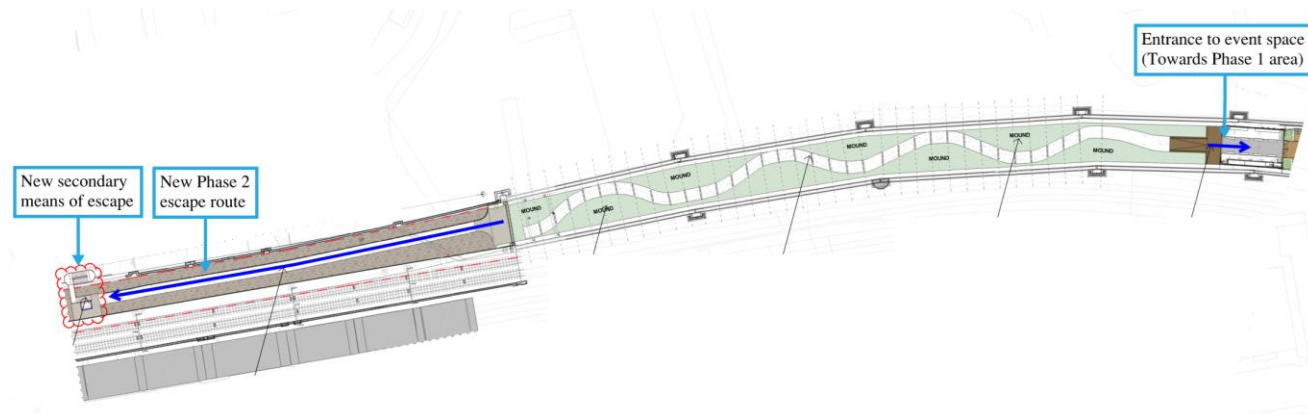


Figure 3 - Phase 2 area layout

1.1.1 Phase 2 scope of works

The following key design aspects will be introduced as part of the Phase 2 works:

- Introduction of a new secondary means of escape from the west end of the viaduct.
- Development of the Phase 2 area including the introduction of the Phase 2 garden.
- Introduction of the new 'WaterAid' garden to the Phase 2 area of the viaduct.

The event space which was introduced during Phase 1 of works will be retained and the Phase 1 area of the viaduct will remain unchanged.

1.2 Stakeholders

The relevant stakeholders are identified in Table 1.

Table 1 - Stakeholders

Role Organisation	Role Organisation
Client	National Trust

Fire Service	Greater Manchester Fire and Rescue Service, GMFRS
Adjacent landowners/operators	Network Rail Transport for Greater Manchester
Architect	Twelve Architects
Landscape architect	BDP
Planning consultant	RJP Town Planners
Engineering (Structural, Building Services, Fire, Civil, Contamination, Lighting Design, Transport planning, BIM)	Arup

The viaduct itself is to be owned, operated, and managed by the National Trust. It is currently accessed via a car park, which is believed to be owned by Transport for Greater Manchester.

Additionally, a live train line operated by Network Rail passes underneath the viaduct and the Metrolink, operated by Transport for Greater Manchester, passes alongside the viaduct.

Other land in the vicinity of the viaduct, such as the area directly underneath, may have additional stakeholder involvement that impacts upon this fire strategy.

Continued consultation and co-ordination with the above parties are required throughout the period of occupation in order to communicate any changes in risk level which may impact this fire strategy and subsequent Fire Risk Assessment (FRA) and Fire Safety Management Plan (FSMP) to be undertaken by the National Trust.

2. Fire safety goals

The Phase 2 development has been provided against the regulatory framework set out below and starts with the approach employed in the development of the Phase 1 fire strategy (**Ref:** CVI-ARUP-ZZ-ZZ-RP-YF-0002) and a Phase 2 feasibility study (Ref: CVI-ARUP-ZZ-ZZ-RPT-YF-0003).

The Phase 2 arrangement is anticipated to differ from Phase 1 proposals primarily in relation to a larger extent of the viaduct being accessible to the public and two potential escape routes being provided, one at either end of the viaduct. The structure and use of the viaduct will remain similar to Phase 1 and, therefore, the applicable legislation will be similar. This section also discusses the appropriate guidance that has been considered to aid the feasibility study and advice provided within.

2.1 Regulatory compliance

As a minimum, the fire strategy must comply with legal requirements. The relevant fire safety legislation in respect of the design, construction, maintenance, and operation of Castlefield Viaduct is summarised below. Fulfilling the legislative requirements is therefore the main goal of this fire strategy.

The Phase 2 arrangement is anticipated to differ from Phase 1 proposals primarily in relation to a larger extent of the viaduct being accessible to the public and two potential escape routes being provided, one at either end of the viaduct. The structure and use of the viaduct will remain similar to Phase 1 and, therefore, the applicable legislation will be similar. This section also discusses the appropriate guidance that has been considered to aid the feasibility study and advice provided within.

2.1.1 Regulatory Reform (Fire Safety) Order (RR(FS)O) 2005

The Regulatory Reform (Fire Safety) Order (RR(FS)O) 2005 places a general duty of fire safety care on employers, occupiers, and owners of almost all premises and requires them to take such fire precautions as may be reasonably required to ensure that premises are safe for the occupants and those in the immediate vicinity.

In accordance with Article 6 of the RR(FS)O, the viaduct constitutes a premises to which the RR(FS)O applies to. Greater Manchester Fire and Rescue Service have noted, in Phase 1, that they would consider the premises to be a workplace under Article 5 of the RR(FS)O.

In addition, fire strategy information developed during the design typically forms part of the Fire Safety Information, as required by the RR(FS)O, and to be handed to the Responsible Person in accordance with the Building Regulations 2010 (amended 2018). In addition, that fire strategy document can form the first stage of the RR(FS)O process (fire risk assessment) and details the key fire safety design objectives and provisions within the premises in accordance with Regulation 38 of the Building Regulations 2010.

As part of the ongoing fire safety management of the viaduct, the responsible person for National Trust must make sure that a suitable and sufficient assessment of the risks to which persons are exposed is carried out, for the purpose of identifying the general fire precautions they need to take to comply with the requirements and prohibitions imposed by the RR(FS)O. These assessments shall be undertaken periodically or be adapted as appropriate to take account of any new or changed risks.

2.1.2 Building Regulations 2010 (amended 2018)

The Building Regulations 2010 apply to all buildings in England, wherein a building is defined as any permanent or temporary building but not any other kind of structure or erection.

In Phase 1, the viaduct comprised of temporary buildings, (i.e., event space and kiosk) which also rely upon the availability of the viaduct to reach a place of ultimate safety. This is expected to be continued during Phase 2; on this basis, the viaduct is therefore required to comply with the Building Regulations.

It should be noted that the Building Regulations and the RR(FS)O have been drafted to ensure coordination between design and operation phases of buildings. Ideally, the design is to reflect the operational intent. While the Building Regulations would not apply should all buildings on the viaduct be removed, applying the Building Regulations is typically still used to enable the operational intent and compliance with the RR(FS)O requirements.

We would therefore recommend that compliance with the functional requirements set out under the Building Regulations are sought, in order to support National Trust in demonstrating that the requirements under the RR(FS)O are met.

In addition, compliance with the Building Regulations offers the following added benefits of:

- adopting this solution also allows for future flexibility of use of the space, and;
- defining a clear basis for health and safety and fire risk assessment.

In accordance with Clause 5(e) of the 2010 Building Regulations the following functional requirements should be met:

- B1: Means of Warning and Escape
- B2: Internal Fire Spread – Linings
- B3: Internal Fire Spread – Structure
- B4: External Fire Spread
- B5: Access and Facilities for the Fire Service

2.1.3 Construction (Design and Management) Regulations (CDM)

Projects undertaken within Great Britain and Northern Ireland are subject to the requirements of the Construction (Design and Management) Regulations 2015 (CDM).

The objective of CDM Regulations is to reduce risk to health and safety during construction and maintenance of construction sites and occupied buildings.

As described above, this report defines the Fire Strategy for compliance with the RR(FS)O. In order to fulfil their duties under CDM Regulation 14, the Contractor should ensure, so far as reasonably practicable, the early installation and operation of fire protection measures contained within this report and any others required as part of the Contractor's construction phase fire safety plan.

A proactive fire risk assessment process throughout the construction phases is required to ensure the appropriate general and process fire precautions are being dealt with by the Principal Contractor.

In addition, where any conclusions or recommendations have been arrived at in this report, which specify particular materials, products or forms of construction that result in significant or unusual risks during the construction, operation, maintenance, or refurbishment of the building, these will have been assessed in accordance with CDM Regulations 9 (duties for designers).

2.2 Additional non-life safety goals

A number of client fire safety goals beyond life safety requirements of the Building Regulations have been communicated to Arup. These include the following:

- **Property protection**

National Trust have noted that 'reasonable care' should be taken in the design of the Phase 2 scheme (following from the pilot Phase 1 scheme) in order to reduce the potential impact of a fire event on the existing heritage structure of the viaduct.

- **Architectural aspiration**

Promotion of the existing heritage viaduct structure by not enclosing in new materials. No further specific architectural aspirations have been defined in relation to the fire strategy, however the fire strategy accounts for the developed architectural design.

- **Increase occupancy**

National Trust wish to increase potential occupancy and use of the viaduct, beyond the 60 person limit applicable within the Phase 1 scheme.

- **Minimized staffing requirements**

National Trust have noted that there is an aspiration to minimise the number of staff required to assist and manage public occupants from a fire safety perspective.

- **Provision of secondary means of escape at west end of viaduct**

A new secondary means of escape will be provided to the west end of viaduct.

2.3 Insurer requirements

The National Trust has not specified any additional Insurer requirements over and above the life safety requirements outlined in typical fire safety guidance to meet Building Regulations and the RR(FS)O.

2.4 Basis of fire safety design

During Phase 1 of the development, BS 9999:2017 was selected as the most appropriate guidance; although the viaduct is an external structure and not 'a building' in the practical sense of the word, the structure itself is to serve as an assembly space for members of the public who will be located several floor levels above ground with one entry and exit points. It is therefore akin to a roof top terrace space with a single exit. Certain principles from Phase 1 of the development are carried over during Phase 2.

In recognition of the provision of an escape route at each end of the viaduct and therefore availability of alternative escape routes, considering this additional Phase 2 provision, the guidance of BS 9999 may place onerous requirements on the use of the viaduct compared to the risks posed to occupants and staff. Therefore, the means of escape performance of the viaduct will be benchmarked against *The HM Government fire safety risk assessment guidance for open air events and venues* (Crown copyright, 2007) (hereafter noted as FSRAG). This has been selected as the more appropriate guidance due to the unique nature of the viaduct as an external structure which is largely open-air, and which will now have exits at either end.

The viaduct is considered to be 'Normal' risk level, in line with *Fire safety risk assessment guide: open-air events and venues*. It is noted that if any significant sources of ignition, e.g. hot food concessions, petrol generators or extensive electrical equipment or highly flammable or explosive materials, are introduced the risk profile may change to 'higher'.

3. Means of warning and escape

3.1 Evacuation philosophy

Castlefield viaduct is designed to adopt a simultaneous evacuation strategy, whereby the viaduct will evacuate on the activation of the fire alarm.

3.2 Occupancy characteristics

The events building and general external area of the viaduct shall be occupied by visitors who may not be familiar with the space. The anticipated furnishings both within the building and externally are expected to be similar to those in an office or similar events space.

There will also be staff present who are involved in operating or maintaining the spaces on the viaduct.

Previously during Phase 1 of the development, a B2 risk profile was adopted in line with BS 9999. Although the viaduct no longer needs to comply with the guidance of BS 9999 it is noted that a B2 risk profile is also representative of the Phase 2 condition, i.e. occupants are awake and may be unfamiliar.

The anticipated number of occupants on the viaduct is not explicitly defined, but it is understood that National Trust aspire to minimise the number of staff required, including to monitor and manage occupancy levels. For the purposes of evaluating available fire safety provisions, a maximum occupancy is defined based on the available escape routes.

As an indication of possible occupancy, floor space factors can be considered. A floor space factor of 5m² per person could be considered for the accessible areas for public (similar to typical public leisure space such as an art gallery, museum or library spaces in buildings), applied to a total area of approximately 1500m² (including pathways and the events/engagement building but omitting planted areas). This would estimate a reasonable maximum occupancy of 300 people. For context, in discussion with National Trust, it is understood that a typical operational maximum occupancy of 200 – 300 is expected for the Phase 2 viaduct.

3.3 Alarm and detection

Currently in the Phase 1 viaduct configuration, internal spaces such as the events building and entrance kiosk are provided with a Category L1 fire detection and alarm system designed and installed in accordance with BS 5839-1:2017, so that occupants are alerted to a fire in these areas as soon as possible. Currently no new internal spaces of this nature are expected to be provided during Phase 2.

In addition, the new lift shaft and motor room which will be used to assist in the evacuation of Mobility Impaired Persons (MIPs) to evacuate from the Western end of the platform should be provided fire detection at the top of the lift shaft to ensure that the lift is not used in the event of a fire in the lift shaft or motor room. Further detail is provided in relation to the lift provision in Section 3.6.1.

Manual call points are positioned in the external areas of Phase 1, installed in line with BS 5839-1:2017, which requires the call points to be spaced no greater than every 45m along the viaduct's length. It is recommended that additional manual call points are positioned in the external areas along the Phase 2

viaduct so that staff/visitors can alert occupants to a fire anywhere on the viaduct or under of the viaduct (internally or externally) which has the potential to compromise the escape routes.

Based on the availability of alternative external escape routes where a new exit is positioned at the western end of the viaduct, it is not considered essential to provide a voice alarm system along the remainder of the Phase 2 viaduct for fire safety. Instead, it is recommended that an automatic alarm system be placed externally along the Phase 2 section of the viaduct, which may consist of alarm tone or voice sounders, and this be linked into the existing alarm system. This measure would provide occupants with warning of a fire event in the building or notified by manual call point activation elsewhere on the viaduct, and alert them to make their way to the exits. The Phase 1 voice alarm sounder system could also be extended to provide an automated alarm message to evacuate to the Phase 2 area also, subject to further consideration during design. These measures would minimise the requirement for staff to be present to operate the voice alarm system.

3.4 Horizontal egress provisions

During Phase 2 of the development, the viaduct and event space has been benchmarked against guidance of *'Fire safety risk assessment guide: open-air events and venues'* (FSRAG). FSRAG does not apply travel distances to open air events but instead considers the maximum amount of time it takes to escape and compares this to the risk category assigned. For a 'normal' risk space such as the viaduct, it permits escape times of between 5 to 10 minutes.

The largest exit from the viaduct is the exiting Phase 1 exit currently provided at the eastern end of the Phase 1 development, which has a clear width of 2.1m as observed on a site visit on 24/01/2024. The stair which will be provided as part of Phase 2 works is expected to be 1.2m wide. Therefore, the largest exit from the viaduct currently provided at the eastern end of the Phase 1 development, is discounted as the worst-case fire scenario.

Assuming a flow rate of 73 people/metre/minute for stairs and an evacuation time of 5 minutes (as per the FSRAG guidance for minimum allowed evacuation time in normal risk events) and assuming the Phase 1 exit is discounted due to a possible fire located in close proximity, the maximum number of people who could be evacuated using the stair exit is 438 people.

All other areas that are not stairs, gangways for seating or ramps in the viaduct would be required to be a minimum of 850mm wide for accessibility purposes – this does not further restrict the occupancy indicated based on FSRAG.

The maximum occupancy number based on the current widths provided is therefore 438 people. Therefore, the expected maximum occupancy of 300 occupants can be safely accommodated by the proposed means of escape measures.

3.4.1 Metrolink land

A secondary means of escape is required at the Eastern end of the Phase 2 development. Due to spatial limitations this exit will be provided via the adjacent Metrolink land, as shown in Figure 4.



Figure 4 - Metrolink land

The Metrolink land is currently considered as part of the operational railway. A suitable barrier is required, in accordance with BS 6180:2011 to separate the operational railway from the public access area, with an accessible walkway suitable for safe escape to the west exit.

3.5 Vertical means of escape

For occupants exiting the viaduct at the eastern end, upon exiting the viaduct structure, occupants shall enter the existing external car park at which point they are considered in a place of safety. From here, occupants shall have the option to continue towards Deansgate-Castlefield Metrolink station or Albion Street, or travel down the public stairs onto Beaufort Street.

For occupants exiting the viaduct at the western end, a new stair is provided. A new lift is provided adjacent to the stair to provide a means of vertical egress for MIPs, as described in Section 3.6

3.6 Mobility Impaired Persons (MIPs)

In order to ensure that mobility impaired persons (MIPs) can easily evacuate in the event of a fire, 850mm wide escape routes are required throughout the building and the viaduct.

Step free egress routes should also be available across the full length of the viaduct. It is noted that currently, step free egress routes are available throughout the Phase 1 development, and this should be extended to the Phase 2 area of the development prior to occupation of these areas. This includes addressing level changes between the events building and Phase 2 external viaduct area with suitable accessible ramps (currently approx. 600 mm, as observed on site visit undertaken on 24/01/2024).

For occupants exiting the viaduct at the eastern end, upon exiting the viaduct structure, occupants shall enter the existing external car park at which point they are considered in a place of safety. From here, occupants shall continue towards Deansgate-Castlefield Metrolink station and beyond, including to lift provisions to surrounding public streets.

3.6.1 Lift provision

A lift will be provided at the Western end of the viaduct adjacent to provide a secondary means of escape to MIPs.

The specification of the lift is to be further developed in Stage 3 design. The provided lift not expected to meet all requirements outlined in BS 9999, Annex G to be a compliant evacuation lift, however, a resilient power supply should be considered to enable retained use during an evacuation. A lift which isn't designed as a code compliant evacuation lift could be used to assist in the evacuation of MIPs on the basis that MIP occupants are provided with a secondary means of escape and therefore, if a fire occurs which directly impacts operation of the lift, MIPs could utilise the alternative Eastern exit.

Table 2 sets out the BS 9999, Annex G requirements for evacuation lifts alongside commentary on the proposed lift provisions at the west of the viaduct.

Table 2 - BS 9999, Annex G evacuation lift requirements

BS 9999 Annex G requirement	Proposed to be provided at Castlefield Viaduct
It should be designed and installed in accordance with the relevant provisions in BS EN 81-20 and BS EN 81-70.	The lifts at Castlefield Viaduct are not proposed to be provided as full evacuation lifts and therefore will not generally be designed and installed in accordance with these standards.
An evacuation lift should be situated within a protected enclosure consisting of the lift well itself and a protected lobby at each storey served by the lift and should be provided with a protected route from the evacuation lift lobby at the final exit level to a final exit.	The lift shafts at Castlefield Viaduct shall be enclosed in fire resisting construction and constructed of materials of limited combustibility or better. Refer to Section 6 for further information. Due to the open nature of the viaduct, no protected lobbies will be provided.

It should be associated with a refuge (see G.1) and should be clearly identified.	An associated refuge area will not be provided at Castlefield Viaduct. This is because if occupants are unable to use the lift to evacuate (e.g. if the lift is out of action due to maintenance, or if a fire scenario impacts the lift directly), they would use the alternative escape route.
An evacuation lift should be provided with a switch clearly marked “Evacuation Lift” and situated adjacent to the lift landing door at the final exit level. Operation of this switch should cause the evacuation lift to operate as described in G.2.3. Where evacuation lifts are provided, their use to evacuate people requiring assistance should be a matter of priority. Once under staff control, the lift should normally only be used to evacuate those persons in need of assistance. Secondary or alternative power supplies, etc. might only be specified to accommodate the evacuation of people requiring assistance and might not have sufficient capacity or endurance to allow their use by others. Other building occupants should be directed to escape via the alternative escape route.	A switch test is not required at Castlefield Viaduct, passengers will use the lift as normal to evacuate from the viaduct. The lifts will not require staff to be present for passengers to utilise the lifts for evacuation, however, the National Trust will need to develop management procedures to determine if it is safe to use lifts for evacuation.
To ensure that operation of the evacuation lift is maintained for as long as required for the evacuation of disabled people, an alternative power supply should be provided	It is recommended that an alternative power supply is provided; this should be discussed with National Trust. If a secondary power supply is not provided a local automatic rescue device would be required to ensure the lift moved safely to ground level and allowed evacuation at ground level.

In addition, the new lift shaft and motor room which will be used to assist in the evacuation of Mobility Impaired Persons (MIPs) to evacuate from the Western end of the viaduct should be provided fire detection at the top of the lift shaft to ensure that the lift is not used in the event of a fire in the lift shaft or motor room.

3.7 Emergency signage

Suitable wayfinding and signage for the developed arrangement across Phase 1 & 2 should be provided. Escape signage conforming to the Health and Safety (safety signs and signals) Regulations 1996 should be provided within the building and along the viaduct in accordance with BS 5499-4:2013. Signs containing symbols or pictograms need to comply with BS ISO 13864-1:2011.

3.8 Emergency lighting

Emergency lighting shall be installed and comply with BS 5266-1:2016 to all internal and external areas of the building and the viaduct, including for external lighting in the new Phase 2 external areas and escape routes.

3.9 Assembly points

To avoid any conflict between escaping occupants and emergency/other vehicles that may be on the main road leading out of the car park, it is proposed that the car park at the east entrance may be used as an assembly point in the event of a fire elsewhere on the viaduct, as per the Phase 1 strategy.

At the west end the stair and lift are expected to discharge to a public pavement. From this point, the assembly by the main entrance is a significant distance to walk (approx. 10 mins walk) so either an alternative assembly point could be identified or a strategy for staff/signage to advise occupants to disperse and direct people to nearby transport and walking routes may be adopted. This should be further discussed with National Trust and a suitable approach adopted as part of the fire safety management plan.

4. Fuel load

The restrictions on fuel loading from Phase 1 were in place to prevent rapid fire spread and minimise impact on the single direction means of escape. With two exits and diverse escape routes now available in Phase 2, these restrictions do not directly apply.

Whilst the previous Phase 1 fuel load limits no longer apply, it should be noted that in line with '*Fire safety risk assessment guide: open-air events and venues*' the viaduct is considered as having a 'normal' risk level, this is because it does not contain any of the following:

- Significant ignition sources, e.g., hot food concessions, petrol, generators or extensive electrical equipment.
- Highly flammable or explosive materials.
- Significant additional facilities which might radiate heat (in normal operation).

If any of these risks are introduced the risk level will need to be reassessed as 'higher' risk which may lead to further restrictions on occupancy.

5. Internal fire spread – Linings

The open-plan events building installed during Phase 1 should have linings that achieve a Class C-s3,d2 performance when classified in accordance with BS EN 13501-1, or better. Any new smaller rooms off the open-plan space should achieve a Class D-s3,d2 performance, or better.

The external areas of the viaduct (structural elements above and to the side) shall not be lined with any materials and shall remain as existing.

Consideration of suitable floor structure is required, such that fire could not rapidly spread across and throughout a floor structure or cavities such that large sections of escape routes could be compromised. This should be considered in the following design stages, based on the proposed materials and walkway structures.

6. Internal fire spread – Structure

Currently, no additional building structures are proposed to be installed on the viaduct during Phase 2.

The new stair structure is external and is expected to be self-supporting, and it does not support any other structure on the viaduct. Provided that the stairs are located away from any building accommodation or other direct fire hazards on or around the viaduct and given the alternative escape routes available in the event of any open fire that may occur close to the stair outside the area under National Trust's boundaries, it is proposed that the new external stair is not subject to structural fire resistance requirements.

This existing structure has no defined fire resisting performance. Notwithstanding this, the concrete filled columns and large steel structural beams including 10mm thick steel plate are expected to provide a degree of resistance to fire and would therefore provide sufficient structural integrity for occupants to egress the viaduct in a fire scenario.

7. External fire spread

The viaduct should adequately resist the spread of fire over it in order to limit the risk to its occupants and to any neighbouring areas. As outlined previously, the existing viaduct is constructed from steel structure, which includes a steel panel deck with a layer of ballast above, both of which are non-combustible materials.

The events building is located with a Metrolink line to the South and the Bridgewater Canal (and tow path) to the North. These have therefore been taken as the relevant site boundaries. The viaduct itself continues along the East and West and therefore no site boundaries exist in these directions.

Initial external fire spread calculations were undertaken for the events building at Phase 1, and the events building remains unchanged. The external fire spread assessment was undertaken in accordance with the guidance within BR 187 show that the events building can have 100% unprotected area if is located at least 4.2m away from this boundary line to the North and South, which is achieved with the current proposals to the South measured to the centre line of the Metrolink.

There is however a small area of tow path to the North within 4.2m of the events building directly adjacent to and below the level of the viaduct. This is shown in Figure 5. It is noted that there is no risk of external fire spread currently as no building is present and it is unlikely that this area directly below would be developed. It is understood that the National Trust has consulted with the landowner and there are no plans to build upon this land within the next year, however there could be plans within the next 5 years. For any longer-term plan for the viaduct, measures may need to be reconsidered if a suitable longer-term agreement with the adjacent landowner is not reached.

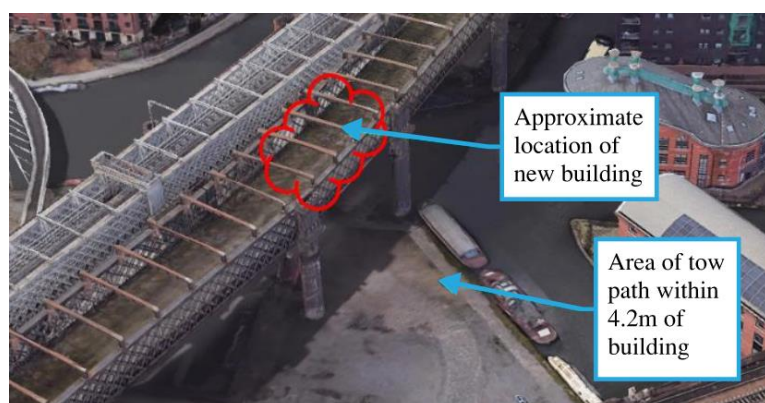


Figure 5 - Area of tow path in relation new building

8. Fire service access

During Phase 1, fire service access was provided via the single entrance at the raised car park level via the ramp from Albion Street. A dry riser is currently provided at the Phase 1 development with an inlet point at the viaduct entrance and at 45m intervals for the length of the viaduct.

The Phase 2 section of the viaduct passes over numerous canals and other areas (such as gated private car parking) that are not readily accessible for fire service tender vehicles. Access may be possible from the west on the Mancunian way and limited access may be possible on roads around the side of the Potato Wharf buildings. It is expected that direct fire service vehicle access to the west viaduct section will be limited to specific locations only and that direct water supplies close to that section of viaduct may also be limited. Detailed survey and review of relevant services information will be required in design to understand the potential access and water supplies for firefighting access.

To ensure sufficient fire service coverage, the existing Phase 1 dry riser outlet is proposed to be extended to cover the Phase 2 development.

9. Management

The intent of the management of the premises is to meet the overarching fire safety objectives listed below:

- Enforcement of fuel load controls and materials;
- Early identification and warning of a fire event (including measures to ensure automated systems are correctly maintained and functioning);
- Undertaking of first-aid fire-fighting, where appropriate;
- Facilitating successful evacuation of occupants from the viaduct.

National Trust are required to produce a Fire Risk Assessment (FRA) and Fire Safety Management Plan (FSMP) based on the design information and fire strategy that should be developed during the design, under the RR(FS)O.

9.1 Staffing requirements

Depending on the specification of the lift, it may be possible that the lift is retained in normal operation for disabled occupants to use for self-evacuation. If a facility is needed to operate a lift and assist occupants to evacuate, it would be expected that only one person would be required to communicate with MIP occupants waiting for the lift, which could potentially be done remotely via an Emergency Voice Communication point and assist with the lift evacuation. This is subject to further design development during RIBA Stage 3 design.

10. Conclusions and Recommendations

This document outlines the fire safety strategy for the Phase 2 viaduct development. The strategy has been developed in line with the life safety goals of the Regulatory Reform (Fire Safety) Order.

It is intended for this report to act as a record of the design development that has been undertaken in relation to fire engineering thus far and will form part of ongoing consultations with the relevant authorities, including Greater Manchester Fire and Rescue Service.

Overall, it is considered that the life safety standards required for compliance with the RR(FS)O are achieved.

The strategy presented is subject to further design development including production of a detailed fire safety strategy and formal agreement with the relevant approving authorities.

The following recommendations should be considered during the next phase of works:

- The specification of the lift serving MIPs at the Western exit should be confirmed following discussions with National Trust, as described in Section 3.6.1.
- This fire strategy is based on a 'normal' risk level in line with '*Fire safety risk assessment guide: open-air events and venues*'. If any new risks are introduced the risk level will need to be reassessed as 'higher' risk which may lead to further restrictions on occupancy.
- The fire service access and facilities should be coordinated in detail with the fire service, including the extension of the existing dry riser and the vehicle access facilities.