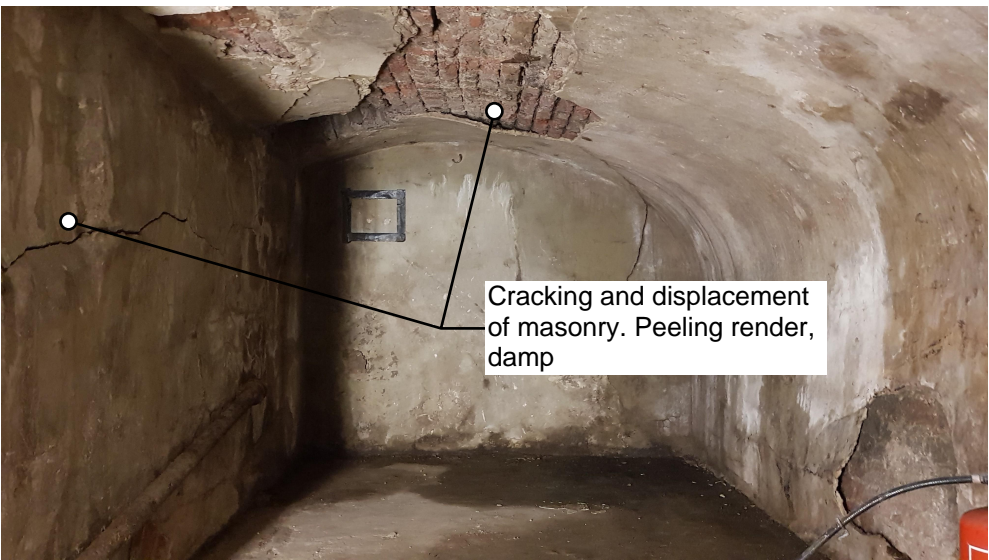
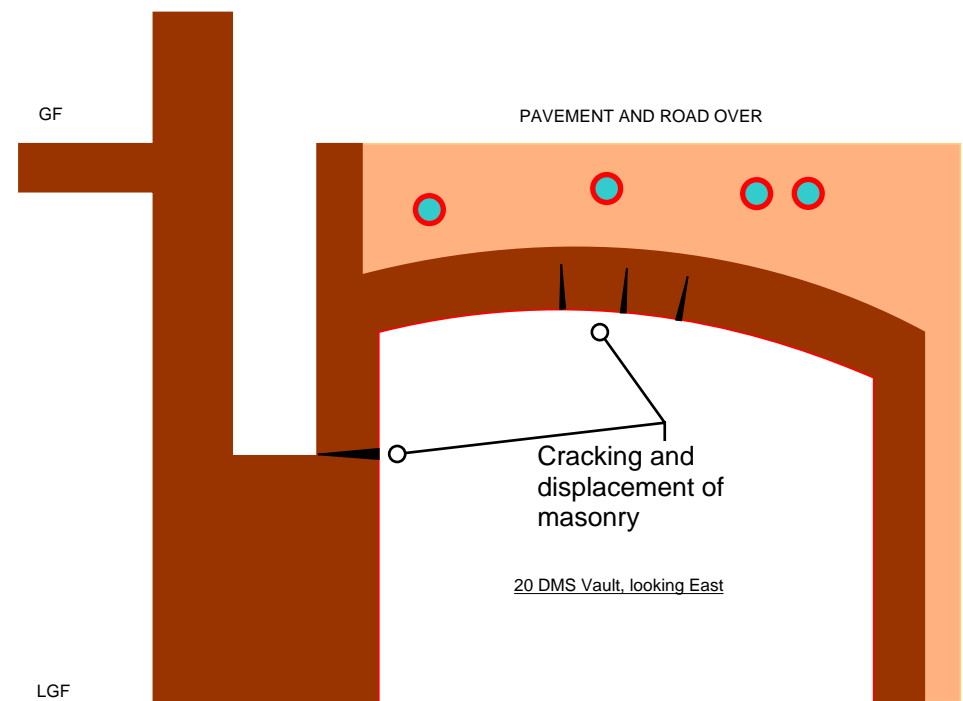


OVERVIEW



20 Denmark Street has a vault at lower ground floor that extends under the pavement
The vault is formed from a masonry arch spanning between the frontage of the property and a retaining wall beneath street level.

Multiple structural defects have been identified at 20 Denmark Street and 16 Denmark Place. Most can be resolved through careful repair and replacement methods that are sympathetic to the existing historic structure. For example, an overview of areas found of concern in lower ground floor shown overleaf. At lower ground floor there is an existing vault which is showing indications of masonry failure. The structural arrangement of the vault is not appropriate for supporting the loads over, and cannot be rectified without intrusive structural works being undertaken. Ultimately, there is a risk of structural failure and eventual collapse of the vault if left unchecked.

At the springing point of the arch, immediately under the shop front, there is a cavity. The cavity prevents the thrust line of the arch from being resolved within the masonry, and with no dead weight of facade (open shop front) and the cavity, there is little in the way of dead weight to restrain the masonry.

The vault is showing signs of failing with cracks opening up at the apex of the arch and at the springing point. The vault is in need of urgent attention to restore a robust load path, noting that the vault supports the pavement and road edge over.

20 Denmark Street at 16 Denmark Place are Grade II listed. Listing text as follows

"Includes: No.16 DENMARK PLACE. Terraced house with later shop, and former warehouse (known as No.16 Denmark Place) attached at ground floor level to rear. Now in use as shop and offices. c1686-89 as part of an estate development by Samuel Fortrey and Jacques Wiseman, early C19 warehouse. House: multi-coloured stock brick; 4th storey yellow stock brick. Stucco keystones and string course at 1st floor. 4 storeys (4th storey later addition) 2 windows. Gauged red brick flat arches & dressings to recessed sashes with flush frames & exposed boxing. C20 shop at ground floor extends through into ground floor of No.16 Denmark Place. Warehouse: yellow stock brick, painted on ground and 1st floor; brown brick to rear. 3 storeys and basement. Ground floor has C20 shopfront; 1st floor, C20 windows; 2nd floor, original central loading doors, flanked by sashes. Parapet. To rear, a range of 6 unhorned, gated sashes to each of 1st and 2nd floors and chimney-stack full height of building to right. INTERIOR: with pine beams, late C20 main stair and original subsidiary stair. 3rd floor has glazed roof lantern. "

NOTES

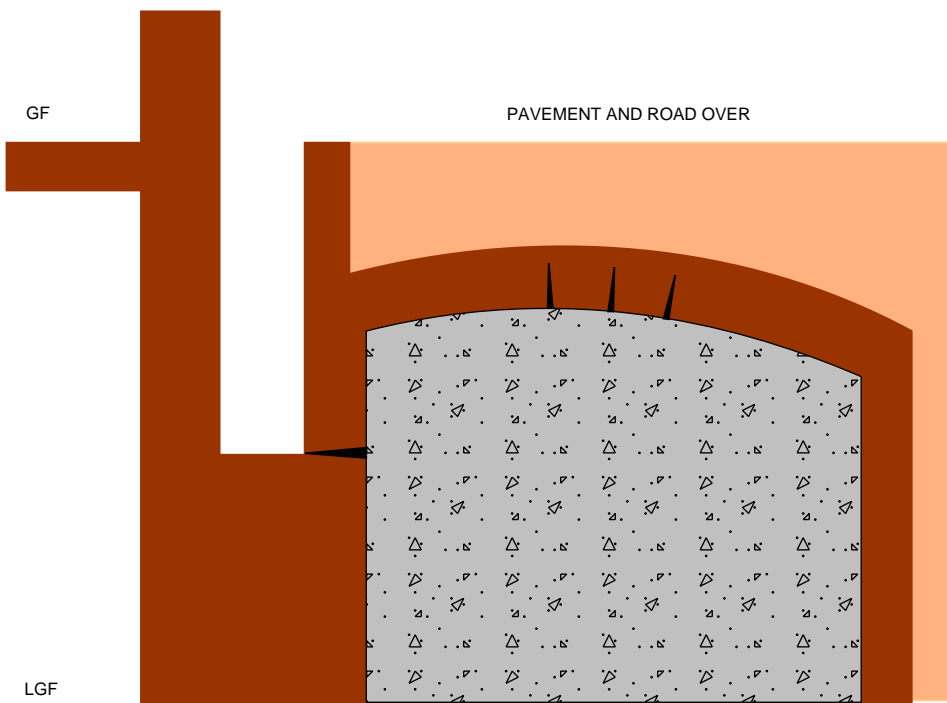
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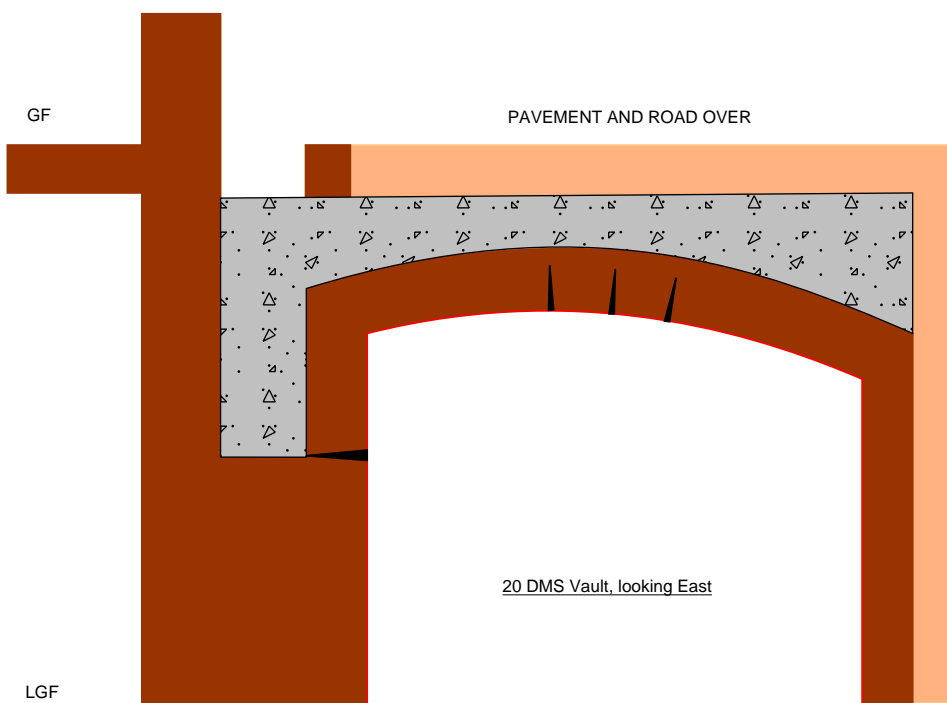
project name St Giles Circus Zone 2			
sketch title 20 DMS Vault Options			date 12.02.2019
project no 029	sketch no 029-Z2-SK156	rev P01	by ISH

THREE APPROACHES



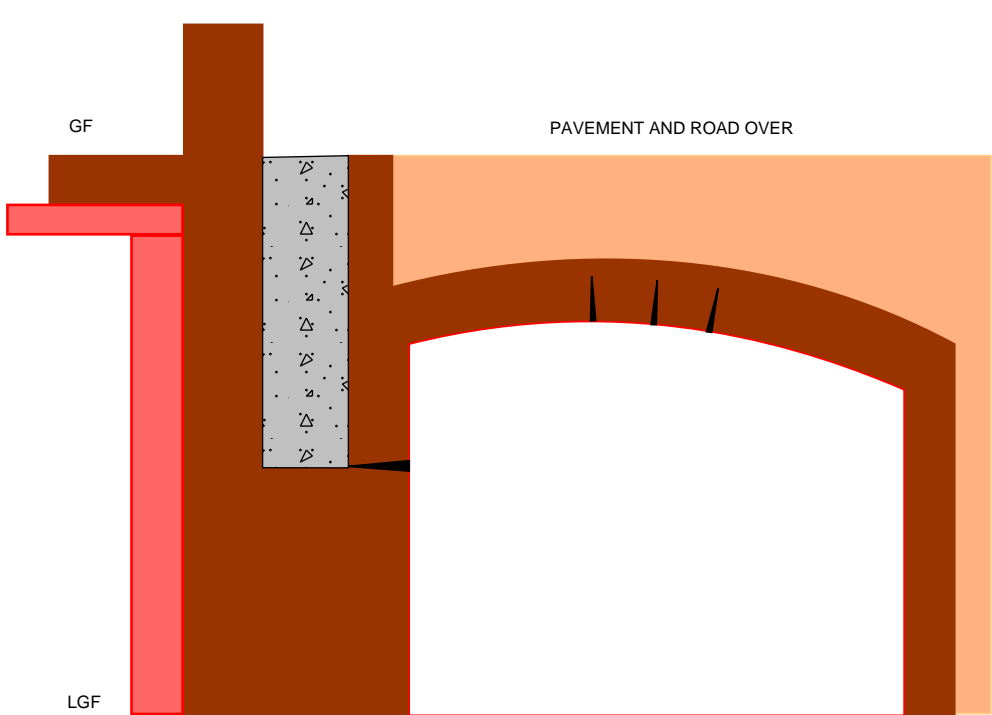
APPROACH A

- Fill vaults with foam concrete
- Pro:
- No impact on pavement
 - Makes safe
 - No alterations inside main space
 - Cost effective
- Con:
- Loss of historic vault and client floor space
 - Re-locate manhole



APPROACH B

- Build secondary lid structure over and encapsulate vault. Brick up lower ground floor windows and fill cavity.
- Pro:
- No loss of vault space
 - No alterations to main lower ground floor space
 - Robust solution, doesn't rely on interaction with historic structure to resolve.
 - Opportunity to improve waterproofing
- Con:
- Complex excavation of pavement
 - Potentially having to re-route services in pavement
 - Potentially have to open up road over, associated risks and cost.



APPROACH C

- Build secondary structure within lower ground floor space. Brick up lower ground floor windows and fill cavity.
- Pro:
- No loss of vault space
 - Minimal alterations to main lower ground floor space
 - Doesn't require road/pavement closures
 - Minimal impact on services
 - Installation and maintenance all from inside
- Con:
- Alterations to ground floor structure required
 - Minimised, but visible alterations in lower ground floor space

APPROACH C selected as preferred solution, balancing risk, cost and historical impact.

NOTES

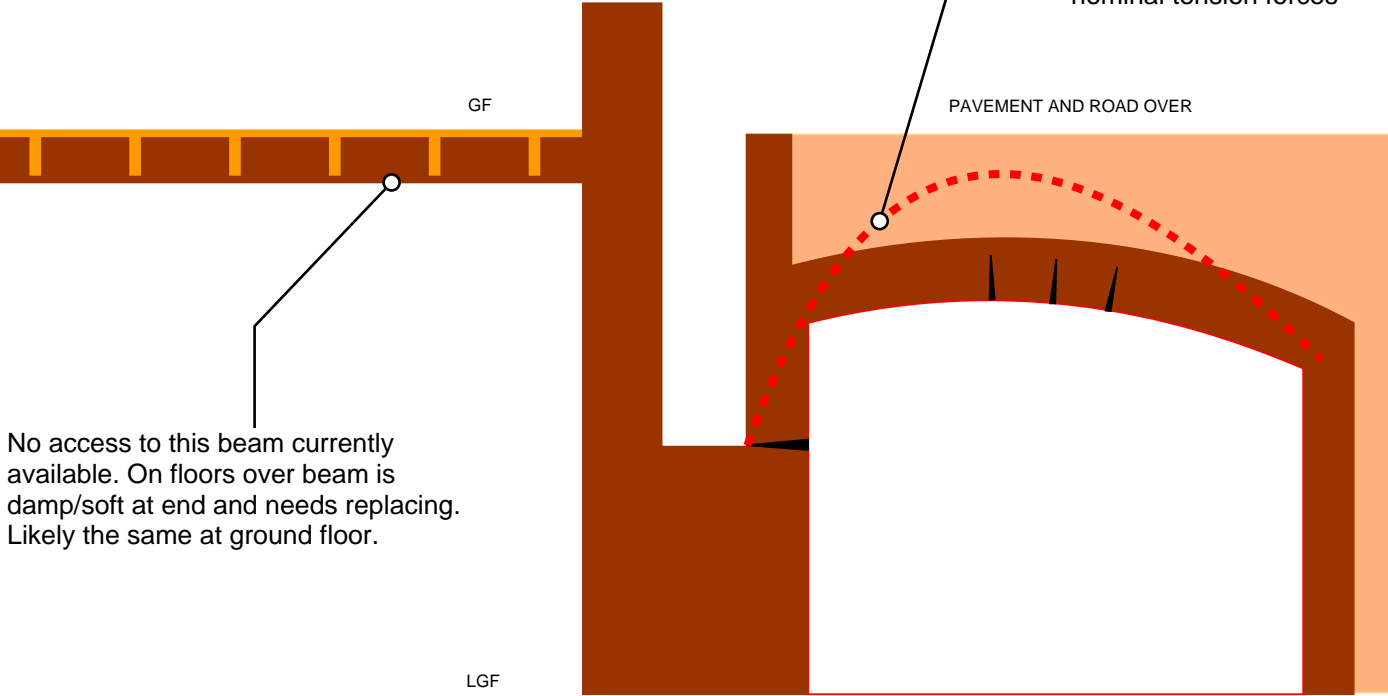
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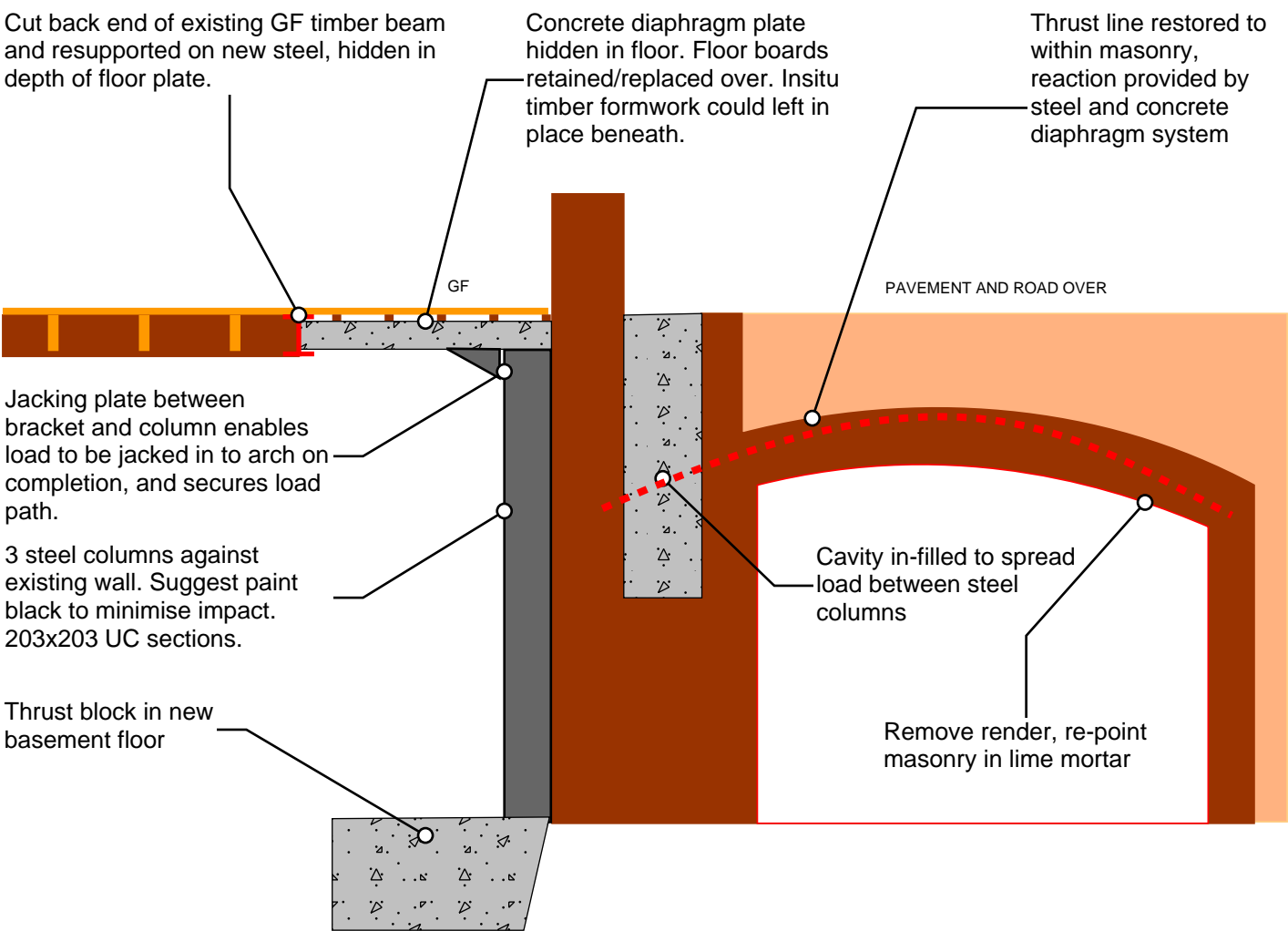
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APPROACH C



CURRENT SITUATION



PROPOSED REMEDIAL WORKS

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Where concrete plate meets wall will require a vertical lintel to spread reaction back into part walls to each side. Will consist of concrete post, approx 200mm wide extending 600mm above and below the floor-plate.

Concrete in fill to cavity. Prop to vault side, part infill brickwork to LGF side, infill with concrete, complete masonry. Reinforcement short lengths of H16 coupled bars.

Spans between UC posts, as full depth of cavity is not sensitive to exact springing point of the arch.

Bricks could be set back slightly so that original outline of "windows" is retained. UKPN cable sleeved through concrete pour.

3 No. 203 UC Posts Spanning between truss at GF and thrust blocks cast in to floor. Suggest paint black.

New steel beam. Note that there are a number of these in 20 DMS already, including at LGF level. Likely 254 UC section.

Likely degraded beam cut back and re-supported.

Jacking block to 203 UC column.

Concrete diaphragm plate spans over top of existing UKPN panel, such that panel can remain in place during works. Wall may require temporary propping.

Where concrete plate meets wall will require a vertical lintel to spread reaction back into part walls to each side. Will consist of concrete post, approx 200mm wide extending 600mm above and below the floor-plate.

Helifix masonry over door, 3mm bar at every course. Spans between return wall and UC post.

Where concrete plate meets wall will require a vertical lintel to spread reaction back into part walls to each side. Will consist of concrete post, approx 200mm wide extending 600mm above and below the floor-plate.

Circa 150mm THK, 1500mm wide concrete diaphragm hidden in floor-plate zone. A steelwork solution may be utilised here instead, depending on design development. Principle of hiding as much as possible within floor depth remains.

APPROACH C- DETAIL

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