

PROPOSED VAULT EXTERNAL DOOR MATERIALITY

The existing painted timber doors are proposed to be replaced on a like-for-like basis to retain the external appearance of the vault openings.



PROPOSED VAULT INTERNAL DOOR MATERIALITY

As previously mentioned, metal-framed glazed doors are proposed for the internal face of the entrance thresholds so that the vaults can be naturally lit when in use and weatherproof to prevent any further damage to the listed vaults. As these doors will be fitted to the internal face of the thresholds, the timber painted doors will maintain the external appearance of the vaults. Shown to the right are examples of this approach.



REDUCING WATER INGRESS IN THE VAULTS

MASONRY INJECTION SYSTEM

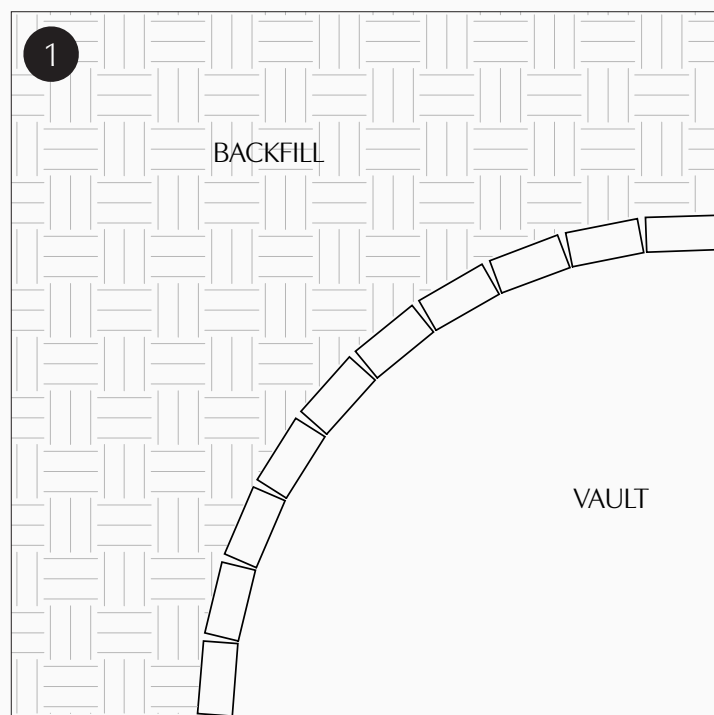
As mentioned previously, a masonry injection system is proposed to reduce water ingress in the three Grade II listed vaults. Careful consideration has been made in selecting the most appropriate system that retains as much of the existing character of the vault as possible.

To summarise the injection system:

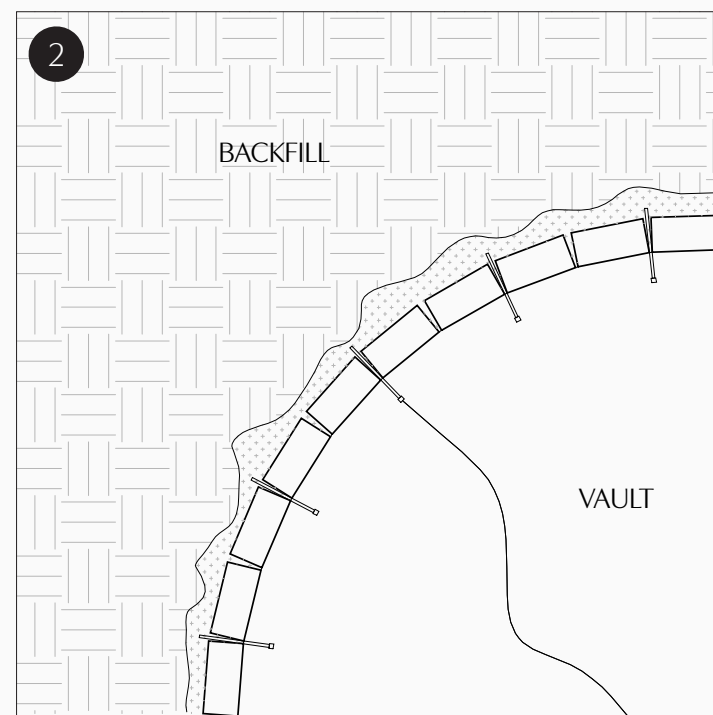
- Typically holes are drilled into the mortar joints at regular intervals
- Lime grout is injected into the brickwork to strengthen the vaults
- A flexible gel membrane is then slowly pumped at low pressure into the backfill behind the brickwork & injected grout.

- The injected gel eventually joins up to form a homogeneous membrane in the backfill behind the brickwork
- Once this process is complete, all packers are removed, excess gel is cleaned off and the brickwork is repointed, leaving no trace of the process.

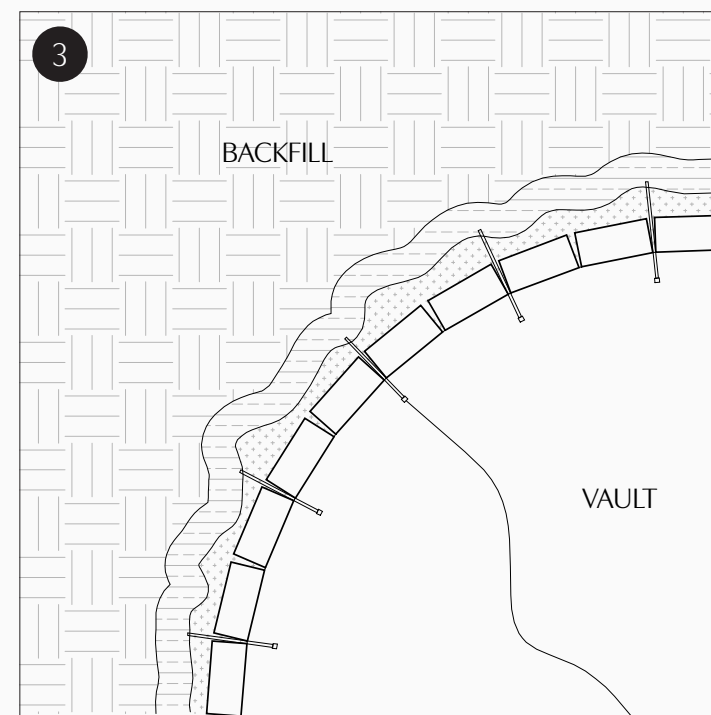
An injection system would be the least intrusive and is a proven method of reducing water ingress in historic structures, please see the following case studies overleaf for further information.



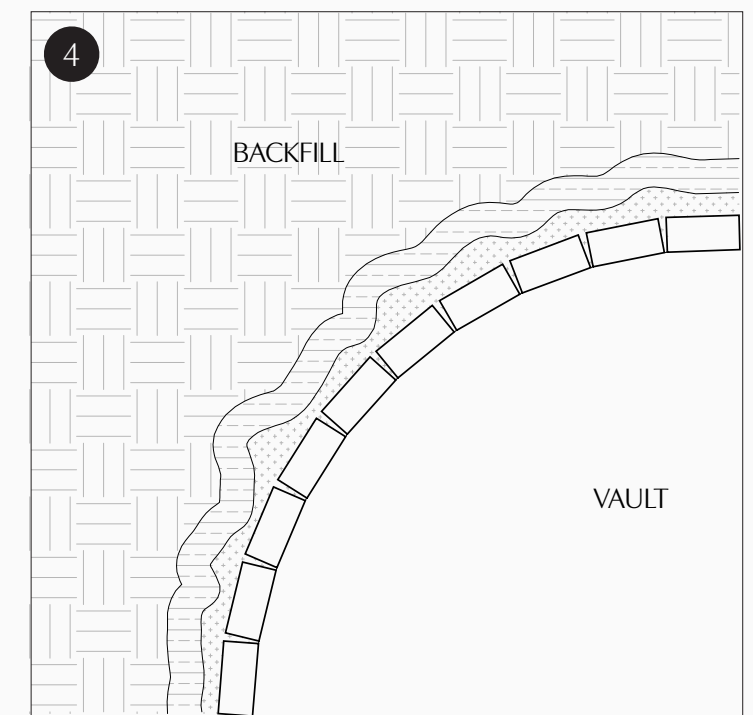
1. Holes are drilled at regular intervals into the brick mortar joints



2. Lime grout is injected into the brickwork to strengthen the vaults



3. A flexible gel membrane is then slowly pumped at low pressure into the backfill behind the brickwork & injected grout forming a homogeneous membrane behind the brickwork



4. The brickwork is then repointed leaving no visual trace of the treatment within the vault

MASONRY INJECTION CASE STUDIES

21 ARLINGTON ST, LONDON GRADE II* LISTED

SC
DA

A masonry injection system was used to reduce water ingress in the vaults at 21 Arlington St, a Grade II* property in central London.

Extract from Delta Membranes:
[<https://www.deltamembranes.com/case-studies/polyurethane/>]

“Delta Membrane Systems played a key role with this work, by supplying the Köster PUR Gel for all vaulted ceilings and earth retaining walls – to ensure the original brickwork facades were maintained. Work was carried out by Harrison Waterproofing, a company that has made use of Delta products over many years.

Walls and arches in the cellars of the building are built in brickwork with mortar joints varying in width from 5mm to 20mm. The arch brickwork

at the entrance to the cellars has mortar joints varying from 5mm to 8mm. To allow the use of a modified 13mm injection packer suitable for gel injection, holes were bored at 350mm staggered centres, with a frequency of 10 bore holes per m². Work included a combination of ‘area’ and ‘curtain’ injection for the vaulted ceilings. This method was preferred because it created a waterproof gel membrane at the back of the brickwork, filling any voids within the surrounding clay. It also fills the voids

within the mortar joints, ensuring a robust, durable waterproofing solution. Highly skilled bricklayers were called in to create new openings in the vaults, that would complement the original brickwork.”



MASONRY INJECTION CASE STUDIES

SOUTHSEA CASTLE, SCHEDULED ANCIENT MONUMENT

A masonry injection system was also used to reduce water ingress in the walls of Southsea Castle, a scheduled ancient monument.

Extract from Tempo PCE:
[<https://www.tempo-pce.com/southsea-castle>]

“Constructed by Henry VIII in 1544 and an active military base for over 400 years, Southsea Castle was withdrawn from active service and purchased by Portsmouth City Council in 1960. Now a Scheduled Ancient Monument and popular visitor attraction, the castle’s brick parapets, which were built as an extension of the fortification in the 1850s and 1860s, required refurbishing to improve longevity by removing voids within the masonry created by washout and reduce to water ingress. Tempo-PCE were awarded the injection works on the strengths of our experience with heritage structures and lime injection.

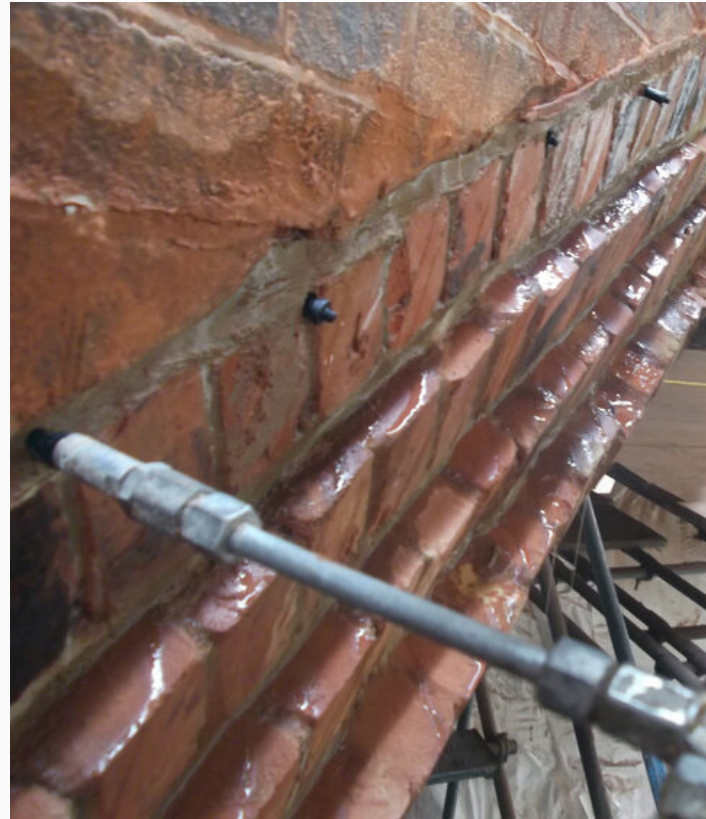
Tempo-PCE injected the inner face and the top of the sea-facing ramparts: 30mm cores were drilled through the face brick to initially allow trapped water to drain from the masonry, they were then used for grouting. Then a 300 x 300mm staggered injection grid was drilled on top of the parapet and a specialist lime grout injected to refusal, using an air-driven diaphragm pump. All drill results and injected quantities were recorded and mapped. Over 3,000 holes were injected, considerably reducing future water ingress to the parapets.”



MASONRY INJECTION CASE STUDIES

ADDITIONAL LIST OF EXAMPLES BY TEMPO PCE

- Milner Hall, hydraulic lime injection to rebond flint and rubble wall (please see info sheet attached)
- Kingsway Tramtunnel, masonry injection PU and acrylic resins
- Point of Ayr Lighthouse, rebonding injection with lime grout
- Royal Albert Hall, masonry injection in brick arches
- Monmouthshire, lime injection to rebond two listed masonry bridges



00 EXECUTIVE SUMMARY

01 INTRODUCTION

PROPOSALS

02 SUMMER HOUSE & POOL

03 LOWER GARDEN LANDSCAPE

04 HISTORIC VAULTS

05 SERVICE ROUTES

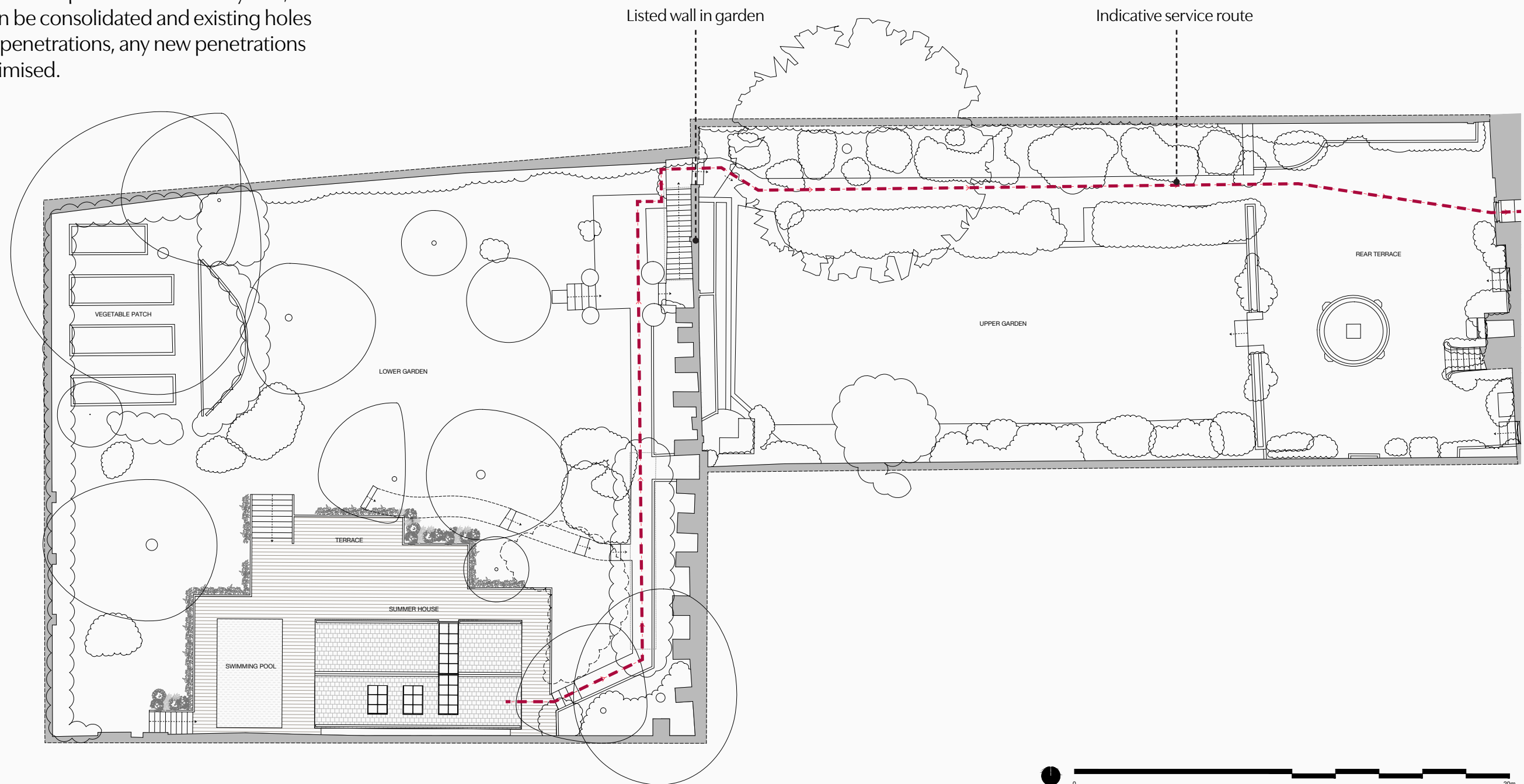
EXISTING SERVICE ROUTES

Existing power and water is supplied to the lower garden and vaults, however the routes and connections are not sympathetic to the historic character of the vaults.



PROPOSED SERVICE ROUTES

The proposal seeks to use and adapt existing service routes and improve their impact on the historic wall and vaults. Due to the existing topography of the site, the service route will need to pass through the existing listed wall that separates the upper garden from the lower. To minimise the impact on the masonry wall, services can be consolidated and existing holes utilised for penetrations, any new penetrations will be minimised.



PROPOSED FOUL DRAINAGE ROUTES

As part of the services strategy all foul drainage from the proposed Summer House and Vault 01 will be pumped back up to the main house to the nearest sewer point. The pump will be located beneath the terrace and will not be visible. Services and foul drainage pipes will be concealed within the ground and will not have a visual impact on the gardens.

