

Design and Access Statement

To accompany the following application: -

Planning Application No. P/2009/0737 **Reconstruction of Retaining/Boundary Wall** **at St Mary's Church, Minera.**

Design Brief:

The Bridge Manager has requested that a section of the existing masonry retaining wall be stabilised or reconstructed to safeguard the public using the highway. This should be achieved whilst maintaining the current width of the highway if possible.

1.0 Accessibility:

Accessibility to the area will be unaffected by the proposed works. The adjoining carriageway is narrow and does not incorporate a segregated footway. Due to the limited width available it is not proposed to make provision for a footway within the proposals.

Access and parking provisions at the church will be unaffected by the works. Access to public transport will be unaffected.

2.0 Appearance:

Description of Existing Structure:

St Mary's Church is a Grade II listed masonry church located on Church Road within the village of Minera, Wrexham, LL11 3DA. (NGR SJ 268 519).

The south western boundary of the church grounds and graveyard is formed and supported by a masonry retaining wall adjoining the highway (C224 Church Road).

The retaining wall comprises a mortared rubble masonry gravity structure varying in height from 2.0m to approximately 1.2m. The overall thickness of the wall is estimated as 500mm. A dressed masonry steeple coping is provided along the full length of the wall.

For the purposes of identification the wall has been split into three sections:

- Section 1* - this section extends for approximately 25m and is located at the western end of the boundary. The section shows evidence of significant cracking at each end and a significant outwards lean throughout. The presence of five large mature trees immediately behind the wall would appear to be the principal cause of the distress noted. Although the wall does not appear to be in imminent danger of collapse, several areas of loose masonry were apparent which could become dislodged and fall onto the highway.
- Section 2* - this section extends for approximately 27m. This section shows evidence of loose coping stones and masonry to the upper part of the wall. This would appear to be as a result of vegetation growth in the bed joints causing disturbance and opening of joints. The majority of the vegetation has been cut back, however several areas are showing evidence of re-growth. This may result in masonry being dislodged onto the highway. Additionally, the pointing to this section of wall is missing over the majority of the face.
- Section 3* - this section forms the eastern end of the wall. This section does not show evidence of significant distress. The pointing was noted as hard and flush with the masonry.

The retaining wall is considered to carry a similar Grade II listing as part of the curtilage to the church itself.

Design Progression:

Section 1

The section shows evidence of significant distress and movement. Several temporary stabilisation and permanent reconstruction options were considered as outlined below:

- Do nothing* - allowing the wall to fail with the possibility of trees collapsing onto the highway. The failure of the wall would be progressive and proceeded by isolated areas of masonry being dislodged. This could also have a significant effect on the overhead services on the southern side of the highway. Option discounted as having unacceptable risks to the public.
- Gabion Baskets* - considered as a temporary solution only requiring the installation of a single line of baskets in front of the wall. This option would have reduced the width of the highway considerably and required the installation of traffic signal control. Option discounted since it does not provide a permanent solution and also due to maintenance issues with temporary traffic signals.
- Soil nails/anchors* - considered as a temporary and permanent solution. This option would have required the installation of several lines of anchors through the existing wall into the church grounds behind. To prevent localised failure of the wall remote from the anchors, walings would need to be installed. This would have reduced the width of the highway and would require the installation of temporary traffic signals. The appearance of the wall will be affected significantly by the presence of anchor heads and walings. Option discounted since it would have changed the appearance of the wall and also due to maintenance issues with temporary traffic signals.
- Reconstruction* - demolition of the affected length of the existing wall and subsequent reconstruction incorporating masonry facing salvaged from demolition. This option would provide a permanent solution and would not reduce the width of the highway except during construction. The existing masonry wall has stood for some considerable time, however any new retaining structures would have to comply with current standards. A rebuilding of the wall to the original profiles using salvaged materials would not comply with current standards without additional support. The most appropriate approach would be to provide a salvaged masonry facing to a designed retaining wall. In order to reduce land take and any possible effects on the graveyard, a mass concrete gravity wall is considered to be the most effective solution in this instance.

It is therefore recommended that the affected section of wall be demolished and replaced with a mass concrete gravity retaining wall faced with salvaged masonry.

Section 2

The section does not show evidence of significant distress. Therefore repointing, minor rebuilding and relaying coping stones is considered to be the most appropriate remediation solution.

Section 3

No works are proposed to this section.

Materials:

Facing masonry and copings salvaged from the demolition of the existing retaining wall will be retained for use as cladding to the new retaining wall to maintain a consistency of appearance. Demolition will be undertaken carefully by hand methods to prevent damage to existing units.

The masonry will be laid and pointed in a traditional lime mortar in accordance with "The Repair and Preservation of Historic Masonry" published by CADW.

Mortar shall comprise a mix of natural hydraulic lime, sand and aggregate. Natural hydraulic lime (NHL) shall be obtained from a suitable supplier and shall be of grade NHL3.5. Sand and aggregate shall be graded in the range 0 - 3mm and be obtained from local sources to ensure consistency with retained parts of the wall. The mortar mix shall comprise 1 part NHL3.5 to 3 parts aggregate. The mortar shall be mixed with clean water in the dosages recommended by the manufacturer.

Repointing to Section 2 shall be undertaken by raking out existing lime and cement based pointing to joints by hand methods to a minimum depth of twice the thickness of the joint or 40mm whichever is the greater. The joint will then be flushed with clean water to remove any remaining loose particles and to provide a damp surface for new pointing. The joints will be solidly filled with new lime mortar as far back as possible between the stones and finished very slightly behind the face of the masonry. The joint shall be consolidated by pressing in with appropriate tools (made from 6mm round steel bar, approximately 250mm long, flattened and curved at the ends to form blades of different widths). No voids should remain. The joint will then be brushed with a soft bristle brush to expose the aggregate and the edges of the masonry after initial set of the pointing.

All new pointing and masonry works are to be subject to the provision of trial panels and agreement with the Conservation Officer.

Concrete for the proposed retaining wall will be covered over with recycled masonry and will not be visible.

3.0 Environmental Sustainability:

In order to remove the most likely cause of the apparent movement, it is anticipated that 5No. large mature trees will need to be felled. The trees comprise 3No. yew, 1No. rowan and 1No. sycamore. Compensation planting will be provided within the church grounds in locations to be agreed. The planting will comprise the provision of 5No. extra heavy standard trees of species to be agreed.

Facing masonry and copings salvaged from the demolition of the existing retaining wall will be retained for use as cladding to the new retaining wall to maintain a consistency of appearance. Excess materials will be taken to a recycling centre.

The masonry will be laid, pointed and repointed using a traditional lime mortar. Lime mortars require less energy in their manufacture and also absorb CO₂ during the curing period. Lime mortars are breathable which will reduce the possibility of frost affecting the masonry. Lime mortars can also be recycled and can be readily cleaned off masonry easing reuse of materials.

Concrete used for the proposed retaining wall will incorporate a significant proportion of cement replacement and a proportion of recycled aggregates. Cement replacement will be undertaken to limit the quantity of ordinary portland cement (opc) - a high embodied energy material - utilised. The replacement materials will comprise pulverised fuel ash

(pfa) and ground granulated blastfurnace slag (ggbfs) which are by-products of industrial processes and have a relatively low embodied energy. A proportion of recycled aggregate will limit the extraction of virgin aggregates from quarries.

The following reports have been commissioned and accompany the planning application:

- Phase I Species and Habitat Survey Report;
- Tree Survey and Impact Assessment.

4.0 Layout:

The proposals will be a replacement of the existing retaining wall and will follow the alignment as close as possible. Therefore the layout of the wall will be unaffected by the works.

Several mature trees will be felled to allow safe access to undertake the works. Compensation planting will be provided within the church grounds to account for their removal.

5.0 Scale:

The proposals will be a replacement of the existing retaining wall. Therefore the overall scale of the wall will be unaffected by the works.

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