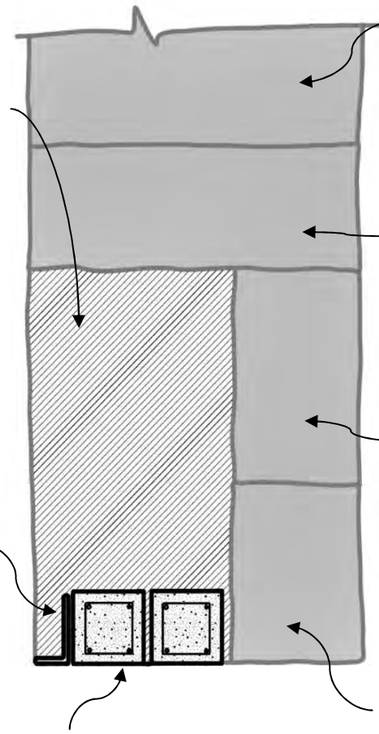
Existing stone work over the window is loose. Allow for fully recording all the stone in this area and carefully dismantle the stone work and store it on site. Consolidate and repair the underside of the upper arch when the stone is removed. Note deep repointing maybe required. Once the repair work to the lintel is complete, rebuild the section of wall exactly as is was, dry pack between the rebuilt section and the underside of the arch. Repoint the wall, refer to specification.

100mm x 200mm (high) x 12mm (thick) stainless steel angle to support the stone work over. Stainless steel angle to be fixed to the precast lintels with 2 No. M12 stainless steel chemical anchors at 400mm centres, 65mm edge distance. Minimum embedment depth of 150mm. Fischer FIS V chemical resin.



Stone wall over.

Existing stone relieving arch over the window. Relieving arch extends through the wall (Upper arch).

Existing stone work between the two arches.

Existing stone relieving arch on the internal face. Window head to be inspected from the scaffolding to determine the width of the relieving arch (lower arch).

215mm x 215mm precast concrete lintels over the window opening. Allow for two number precast lintels with the rough side facing up. Number of lintels to be confirmed on site. Note lintel weighs approx. 300kg each.

## SECTION THROUGH THE TOP WINDOW

Existing lintel remains to be dowelled into the new stone window reveals with 2 No. M8 stainless steel dowels with chemical resin suitable for stonework.

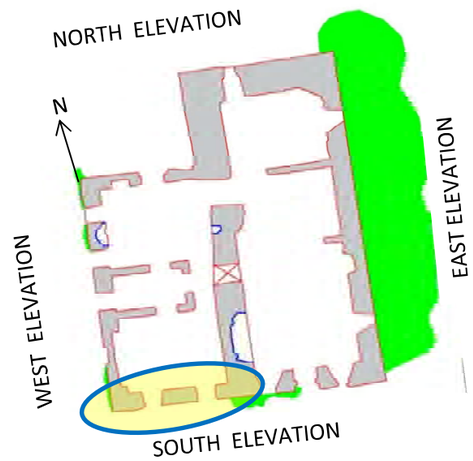
New carved stone window reveals and lintel over the windows to match the existing. New stone window reveals to be dowelled into the existing where they remain with 2 number M8 stainless steel dowel and chemical resin suitable for stonework. Stainless steel dowel per new section of stone window reveal.

New carved stone lintel to match the existing approximately 100mm x 100mm.

## SOUTH ELEVATION EXTERNAL

Refer to CORA drawing SK4002 and SK4004 for the number of lintels.

Windows to be inspected once the scaffolding is erected along the south elevation.

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| Drawing Stage: **Information** | | | | | | Drawn By: RK | Checked By: LE | Approved By: LE | Date: 25/01/2024 | CORA CONSULTING ENGINEERS | | | | | | | | Behan House, 10 Lower Mount Street, Dublin 2. D02 HT71 Tel: +353 (0)1 661 1100 e-mail: info@cora.ie web: www.cora.ie |
| Project Details: Menlough Castle | | | | | | Project Name: **Menlough Castle Galway Phase 4** | | | Scale: NTS | Project Number: 20612 | | | | | | | | |
| Site Address: | Menlough Castle, Galway | | | | | | | | | | | | | | | | | |
| Client: | Galway City Council | I1 | Issued for Information | 25/01/2024 | RK | Drawing Title: **Summary of Proposed Works To The External South Elevation - Sheet 1** | | | Project: | Originator: CORA | Zone: | Level: | Type: | Discipline: | Drawing No.: SK4001 | Stage: | Revision: I1 |
| Architect: | 7L Architects | REV. No. | REVISION DESCRIPTION | DATE | ISSUED BY | | | | | | | | | | | | |

Existing holes to be consolidated and flaunched to allow any rainwater to self drain. Lintel over holes to be inspected. Allow for a new 100mm x 100mm stone lintel. Denoted by ◯ on the elevation.

Spray all of the vegetation growing from the wall, refer to specification.

Vegetation to be carefully removed from the window cill and the stone work to be consolidated. The base of the windows to be flaunched to allow water to self drain. Note small stone may be required to reduce the width of the mortar joint. Note some of the existing cill stone may be cracked. Allow to 3 number crack repairs with M6 stainless steel dowels stitching across the cracks.

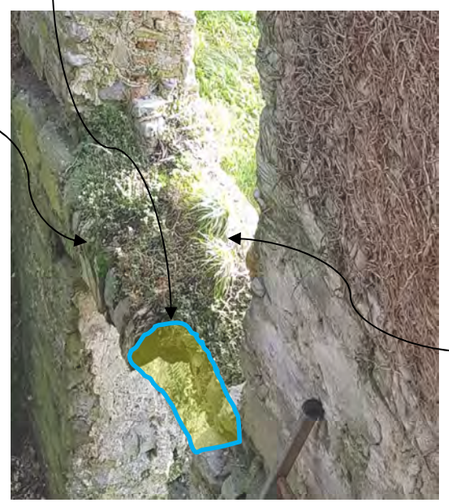
Allow for consolidation of the underside of the stone arch. Note deep repointing may be required with pieces of slate.

Note all precast cast concrete lintels to be installed with the rough side facing upwards.

Missing voussoirs to be replaced with new stone to match the existing.
Assumed sequence of works.
Temporary props to be installed to support the wall over. Temporary works to contractors design.
Timber formwork to be installed to support the arch.
Existing voussoirs to be number and record.
Damage voussoirs to be carefully removed.
New stone to match the existing, bedding on sand and packed with hot mix placed hot.
Protect the works from rain to allow the lime to cure.
Carefully dismantle the form work and mark good may pockets for the scaffolding.
Window cill to be consolidated.

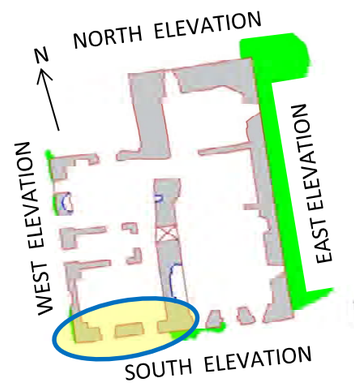
Existing lintel to be inspected on site. Allow for four number 215mm x 65mm precast lintels with one number 100mm x 100mm limestone lintel on either side, number of lintels per opening. Dry pack between the new lintels and the existing stone. Wall over to be temporary propped during the works. Repair the wall over once the temporary works have been removed.

Allow for consolidation of the underside of the stone arch. Note deep repointing may be required and slate between the voussoirs maybe required.



Infill the section over the new stone lintel with new stone to match the existing and lime mortar. Denoted by ▭ on the elevation.

Allow for new carved stone cill bedded in lime mortar.




## SOUTH ELEVATION INTERNAL

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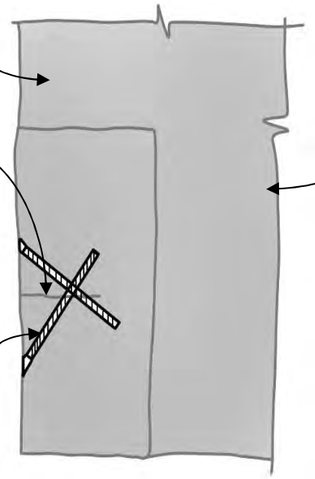
| Drawing Stage: **Information** | | | | | | Drawn By: RK | Checked By: LE | Approved By: LE | Date: 25/01/2024 | CORA CONSULTING ENGINEERS | | | | | | | | Behan House, 10 Lower Mount Street, Dublin 2. D02 HT71 Tel: +353 (0)1 661 1100 e-mail: info@cora.ie web: www.cora.ie |
| Project Details: Menlough Castle | | | | | | Project Name: **Menlough Castle Galway Phase 4** | | | Scale: NTS | Project Number: 20612 | | | | | | | | |
| Site Address: | Menlough Castle, Galway | | | | | | | | | | | | | | | | | |
| Client: | Galway City Council | I1 | Issued for Information | 25/01/2024 | RK | Drawing Title: **Summary of Proposed Works To The Internal South Elevation - Sheet 3** | | | Project: | Originator: CORA | Zone: | Level: | Type: | Discipline: | Drawing No.: SK4002 | Stage: | Revision: I1 |
| Architect: | 7L Architects | REV. No. | REVISION DESCRIPTION | DATE | ISSUED BY | | | | | | | | | | | | |

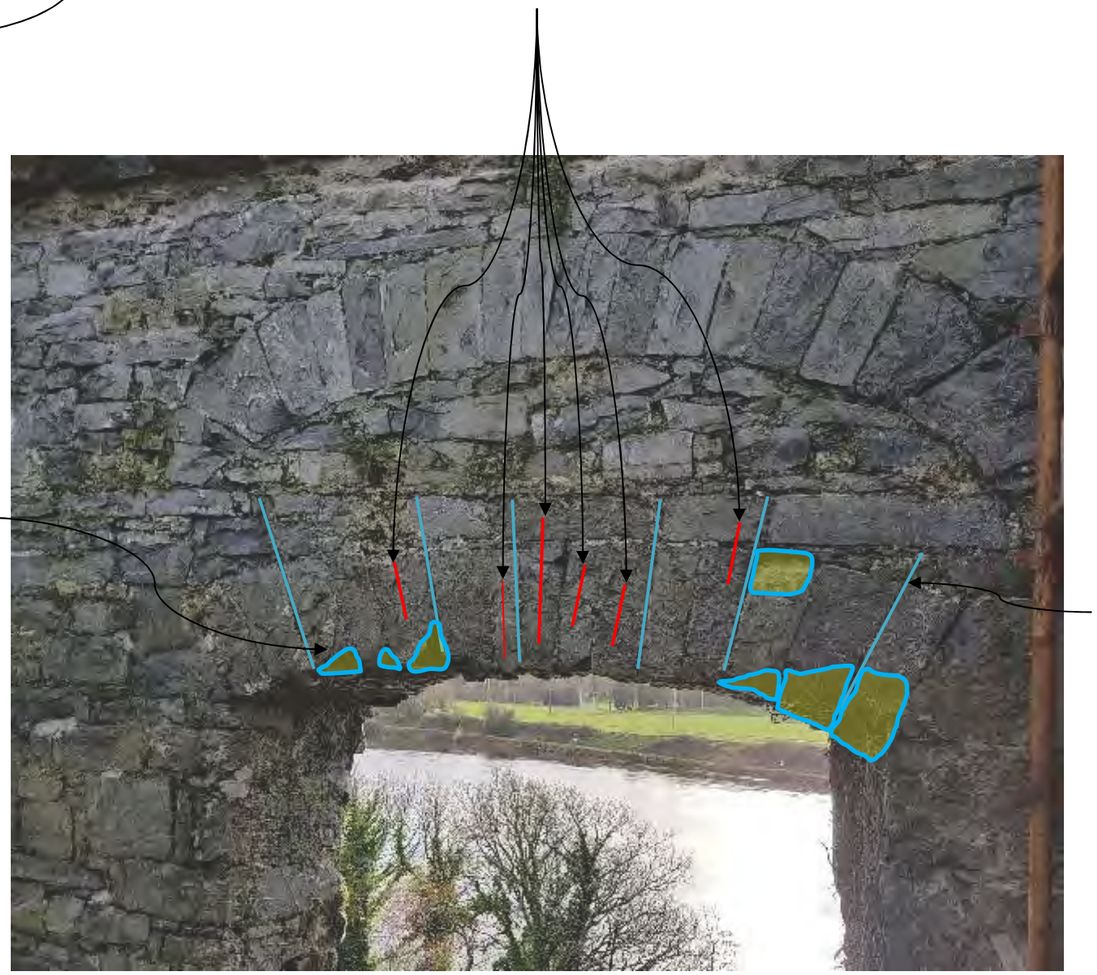
Existing stone.

Crack in the voussoir stone.



Stitch across the cracks in the voussoir stones with 2 No. M8 stainless steel dowel installed diagonally across the crack. Stainless steel dowels to be chemically resined in place with a resin compatible with stone. Conceal the repair.

Stitch across the cracks in the voussoir stones with 2 No. M8 stainless steel dowel installed diagonally across the crack. Stainless steel dowels to be chemically resined in place with a resin compatible with stone. Conceal the repair. Allow for 6 number repairs.



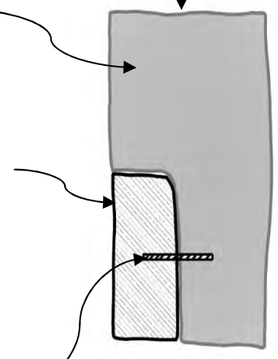
Allow for consolidation of the underside of the stone arch. Note deep repointing may be required with pieces of slate.

Missing sections of the voussoirs to be replaced with new stone to match the existing. New section of the voussoirs to be dowelled into the existing stone with M8 stainless steel dowels.

Allow for 6 number M8 stainless steel Helibar to between the voussoirs. Helibar to be installed as per manufactures specification.

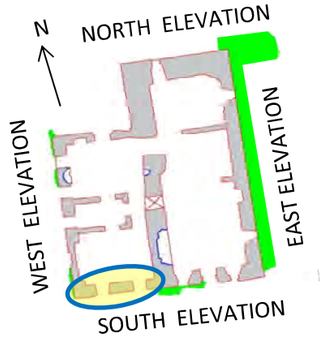
Existing stone.

Missing sections of the voussoirs to be replaced with new stone to match the existing.



New section of the voussoirs to be dowelled into the existing stone with M8 stainless steel dowels. Dowels 150mm long with 75mm embedment depth. Stainless steel dowels to be chemical resined with resin compatible with stone.

## SOUTH ELEVATION INTERNAL

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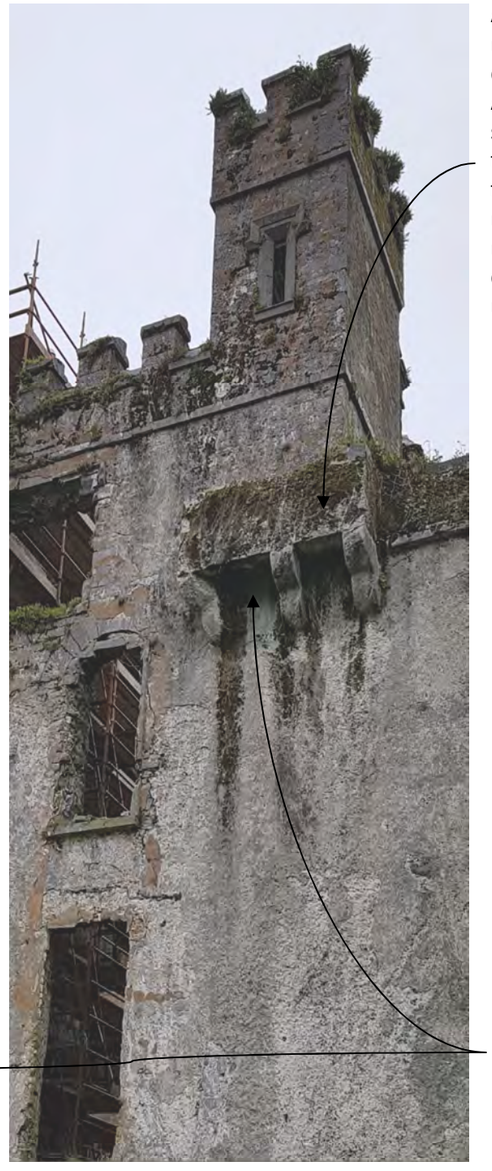
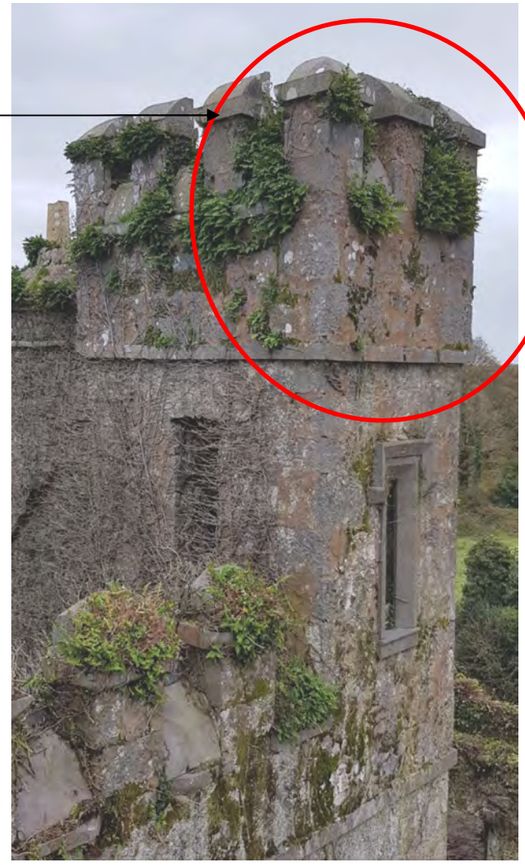
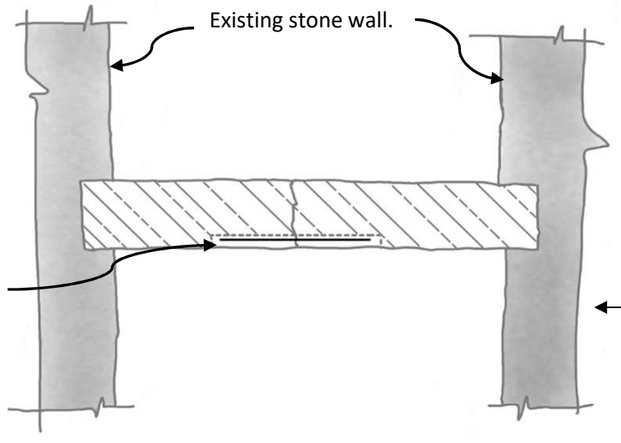
| Site Address: | Menlough Castle, Galway | | | | | | | | | | | | | | | | | |
| Client: | Galway City Council | I1 | Issued for Information | 25/01/2024 | RK | Drawing Title: **Summary of Proposed Works To The Internal South Elevation - Sheet 2** | | | Project: | Originator: CORA | Zone: | Level: | Type: | Discipline: | Drawing No.: SK4003 | Stage: | Revision: I1 |
| Architect: | 7L Architects | REV. No. | REVISION DESCRIPTION | DATE | ISSUED BY | | | | | | | | | | | | | |

Spray all of the vegetation growing from the wall tops.
Fully record all stones in the top 200-300mm  of the wall.
Carefully rake out loose mortar.
Arrange for inspection.
Allow for careful dismantling and rebuilding of the top 200-300mm of the wall top exactly as is now but with adjustments to give a top surface that is self draining. Repoint the wall, refer to specifications.
Allow for the stone capping's of the merlons to be carefully lifted and reseated in lime mortar.



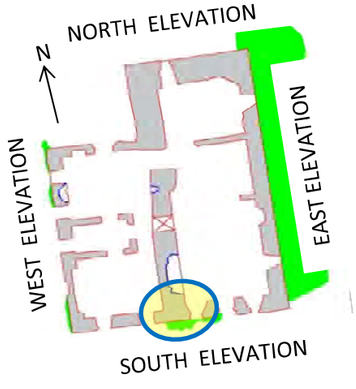
Allow for the vegetation to be removed and the existing drainage stones to be repointed. Allow for 1 number new curved saddle stones across the joint in the wall walk. Drainage stone is to be bedded in lime mortar, refer to Architect for detail of new curved stones. Assumed detail. Note photo from the north east corner.






Crack in existing stone to be repaired using Helibar system.

Existing stone lintels to be inspection from the scaffolding. Allow for a crack repair to one of the stone lintels. Carefully cutting slots 25mm deep x 12mm wide at 200mm centres (typically 2 per stone) across the crack. Prime the surface with 'HeliPrimer WB'. Partially fill the joint with a bead of 'HeliBond' grout by firmly pressing the grout into the joint - use a pointing iron or similar tool. Install a 10mm diameter stainless steel grade 316 Helibar across the crack. Leave to set for minimum curing time as recommended by the material manufacturer. Conceal the repair.




## SOUTH ELEVATION EXTERNAL

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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| Project Details: Menlough Castle | | | | | | Project Name: **Menlough Castle Galway Phase 4** | | | Scale: NTS | Project Number: 20612 | | | | | | | |
| Site Address: | Menlough Castle, Galway | | | | | | | | | | | | | | | | |
| Client: | Galway City Council | I1 | Issued for Information | 25/01/2024 | RK | Drawing Title: **Summary of Proposed Works To The External South Elevation - Sheet 2** | | | Project: | Originator: CORA | Zone: | Level: | Type: | Discipline: | Drawing No.: SK4005 | Stage: | Revision: I1 |
| Architect: | 7L Architects | REV. No. | REVISION DESCRIPTION | DATE | ISSUED BY | | | | | | | | | | | | |

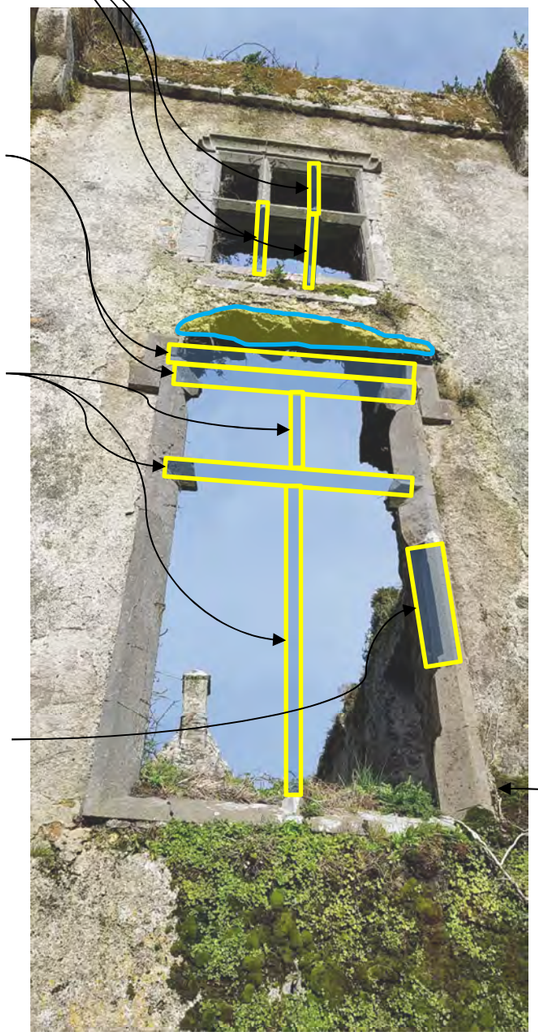
Spray all of the vegetation growing from the wall tops.
Fully record all stones in the top 200-300mm of the wall.
Carefully rake out loose mortar.
Arrange for inspection.
Allow for careful dismantling and rebuilding of the top 200-300mm of the wall top exactly as is now but with adjustments to give a top surface that is self draining. Repoint the wall, refer to specifications.

Allow for raking out any loose mortar and repoint with lime mortar. Condition of the brickwork to be inspected on site. Allow for the top three course of brickwork to be record and reseated in lime mortar.

New carved stone mullions to match the existing. New stone mullions to be dowelled into the cill, transom and lintel with M8 stainless steel dowels and chemical resin suitable for stonework. Stainless steel dowels per new section of stone mullion.

New carved stone lintel to match the outline line of the existing stone window surround. New stone lintels to be dowelled into the existing stone on either side with 2 number M10 stainless steel dowel and chemical resin suitable for stonework on either side. Section over to be infilled with new / salvaged stone to match the existing and dry packed between the new and existing stone work.

New carved stone mullions and transom to match the existing. New stone mullions to be dowelled into the cill, transom and lintel with M8 stainless steel dowels and chemical resin suitable for stonework. Stainless steel dowels per new section of stone mullion.

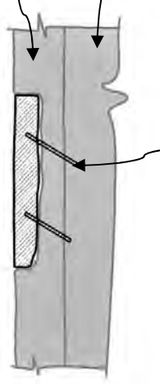


Allow for the vegetation to be moved and the existing drainage stones to be repointed. Allow for 1 number new curved stones across the joints in the wall walk. Drainage stone is to be bedded in lime mortar, refer to Architect for detail of new curved stones. Note photo from the north east corner.

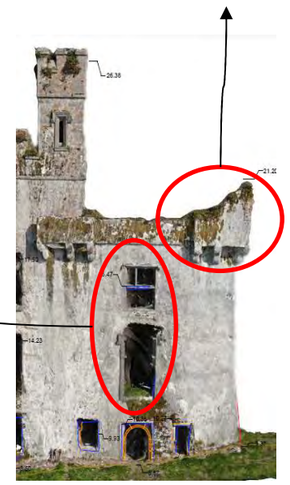
Existing stone lintels to be inspection from the scaffolding. Allow for a crack repair to one of the stone lintels. Carefully cutting slots 25mm deep x 12mm wide at 200mm centres (typically 2 per stone) across the crack. Prime the surface with 'HeliPrimer WB'. Partially fill the joint with a bead of 'HeliBond' grout by firmly pressing the grout into the joint - use a pointing iron or similar tool. Install a 10mm diameter stainless steel grade 316 Helibar across the crack. Leave to set for minimum curing time as recommended by the material manufacturer.

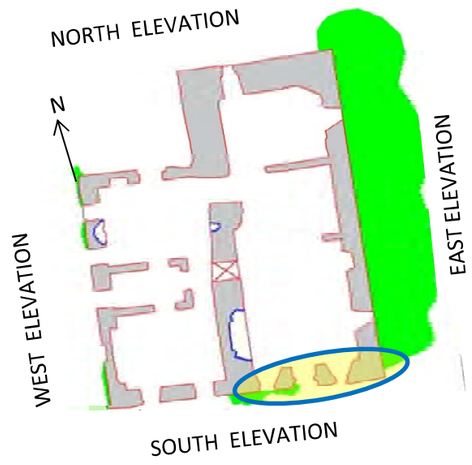
Existing stone reveal.

Existing stone wall.



New carved stone section of the window reveal to be dowelled into the existing stone section with M8 stainless steel dowels and chemical resin suitable for stonework. Stainless steel dowels per section of stone to be replaced. Stainless steel dowels to be approximately 150mm long with a minimum of 100mm embedment into the existing stone work.



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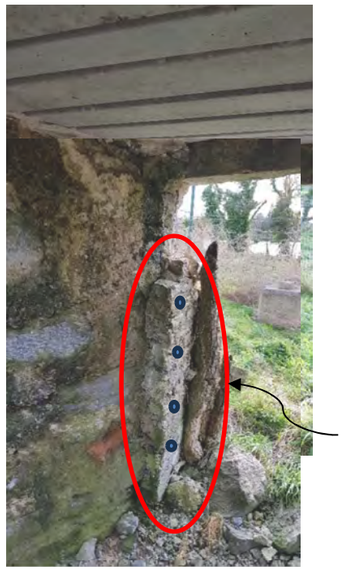
| Project Details: Menlough Castle | | | | | | Project Name: **Menlough Castle Galway Phase 4** | | | Scale: NTS | Project Number: 20612 | | | | | | | | |
| Site Address: | Menlough Castle, Galway | | | | | | | | | | | | | | | | | |
| Client: | Galway City Council | I1 | Issued for Information | 25/01/2024 | RK | Drawing Title: **Summary of Proposed Works To The External South Elevation Sheet 3** | | | Project: | Originator: CORA | Zone: | Level: | Type: | Discipline: | Drawing No.: SK4006 | Stage: | Revision: | |
| Architect: | 7L Architects | REV. No. | REVISION DESCRIPTION | DATE | ISSUED BY | | | | | | | | | | | | | |

Spray all of the vegetation growing from the wall tops.
Fully record all stones in the top 200-300mm of the wall.
Carefully rake out loose mortar.
Arrange for inspection.
Allow for careful dismantling and rebuilding of the top 200-300mm of the wall top exactly as is now but with adjustments to give a top surface that is self draining. Repoint the wall, refer to specifications.

Existing holes to be consolidated and flaunched to allow any rainwater to self drain. Lintel over the holes to be inspected. Allow for a new 100mm x 100mm stone lintel.

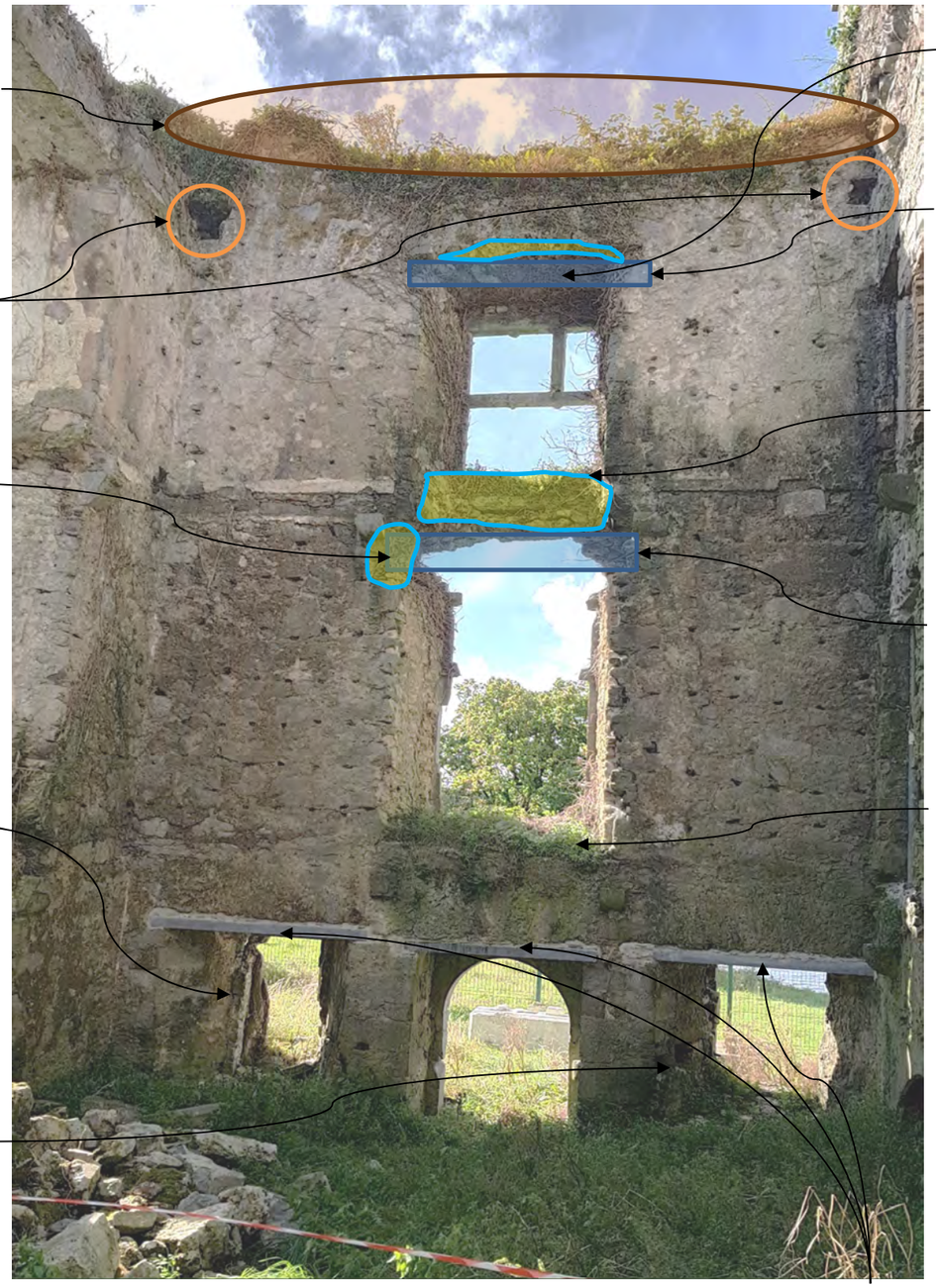


Localised rebuilding at the end of the new lintel with new / salvaged stone in lime mortar.

Existing vegetation to be carefully removed. Existing stone reveal to be inspected. Allow for 6mm diameter x 400mm long stainless steel sock anchors to restrain the stone pier reveal back to the main wall, allow for 4 number stainless steel sock anchors.

Window reveals to be consolidated and repointed were required. New salvaged stone to match the existing to be keyed in were required.

Holes to be flaunched to allow any rain water to be self draining.



**SOUTH ELEVATION EXTERNAL**

Allow for consolidation of the underside of the stone arch. Note deep repointing may be required.

Existing lintel missing. Allow for five number 215mm x 215mm precast lintels or 215mm x 215mm cast insitu lintels (4H16 with H10 links at 100mm centres per lintel) with one number 200mm x 100mm limestone lintel on one side. Dry pack between the new lintels and the existing stone. Wall over to be temporary propped during the works. Repair the wall over once the temporary works have been removed.

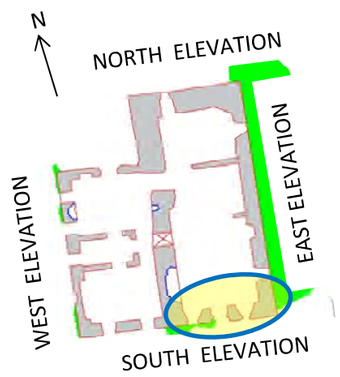
Vegetation to be removed from the base of the window and the stone work consolidated. The wall below the cill is to be inspected once the scaffolding is erected. Allow for new stone work to match the existing to be keyed into the existing wall. The base of the window is to be flaunched to allow water to self drain. Note small stone may be required to reduce the width of the mortar joint.

Existing lintel missing. Allow for five number 215mm x 215mm precast lintels or 215mm x 215mm cast insitu lintels (4H16 with H10 links at 100mm centres per lintel) with one number 200mm x 100mm limestone lintel on one side. Dry pack between the new lintels and the existing stone. Wall over to be temporary propped during the works. Repair the wall over once the temporary works have been removed.

Vegetation to be removed from the base of the window and the stone work to be consolidated. The base of the window to be flaunched to allow rain water to self drain. Note small stone may be required to reduce the width of the mortar joint.

Note all precast cast concrete lintels to be installed with the rough side facing

Precast lintels installed as part of a previous phase.

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| Drawing Stage: **Information** | | | | | | Drawn By: RK | Checked By: LE | Approved By: LE | Date: 25/01/2024 | CORA CONSULTING ENGINEERS | | | | | | | | Behan House, 10 Lower Mount Street, Dublin 2. D02 HT71 Tel: +353 (0)1 661 1100 e-mail: info@cora.ie web: www.cora.ie |
| Project Details: Menlough Castle | | | | | | Project Name: **Menlough Castle Galway Phase 4** | | | Scale: NTS | Project Number: 20612 | | | | | | | | |
| Site Address: | Menlough Castle, Galway | | | | | | | | | | | | | | | | | |
| Client: | Galway City Council | I1 | Issued for Information | 25/01/2024 | RK | Drawing Title: **Summary of Proposed Works To The Internal South Elevation - Sheet 4** | | | Project: | Originator: CORA | Zone: | Level: | Type: | Discipline: | Drawing No.: SK4007 | Stage: | Revision: I1 |
| Architect: | 7L Architects | REV. No. | REVISION DESCRIPTION | DATE | ISSUED BY | | | | | | | | | | | | |

## Specification for containment of plant growth - Where NO masonry works are envisaged

*For maintenance / control of growth and / or survey and assessment purposes where no immediate repair works are planned. This will allow more effective survey and also reduce windage on walls.*

**General – before starting**

Vegetation treatment / cutting / removal should ideally occur within the period 1st September to 28th February (dates inclusive) to comply with the Wildlife Act 1976 (Amendment) 2000. www.npws.ie/legislation

Although the removal of structure endangering plant growth outside of this period is not illegal, consultation with the National Parks and Wildlife Service is advised where substantial removal of vegetation is envisaged.

It is possible that bats are roosting in dense plant growth and cutting of the plant foliage should only occur after inspection by a qualified bat ecologist, who will recommend appropriate mitigation measures. All bat species are protected under the Wildlife Act and it is prohibited to interfere with their roosts.

Only very specific use of herbicides or biocides as mentioned below is to be deployed at any stage as the general policy is to reduce the plant growth immediately at the wall but not to the surrounding areas.

**Access for works**

Extreme care must be taken when removing plant growth from walls and at high levels to reduce the risk of injury from falls and from falling masonry.

The operatives removing the plant growth should work in pairs.

All work above 1.8 metres must be carried out from a safe access platform such as a mobile tower, scaffold or MEWP such as a small articulating boom lift hoist.

Machinery must be operated by personnel qualified to do such.

**NB: IF IN DOUBT STOP WORK**

**Disposal of waste**

All vegetation waste should be chipped on site and a place for disposal preferably in the nearby vicinity agreed with the client. Note waste must be disposed of correctly and in accordance with the Waste Management Acts 1996 to 2011.under which parties disposing of the waste must be licensed.

http://www.citizensinformation.ie/en/environment/waste_management_and_recycling/waste_management.html

**Cutting of plant growth on/in walls and at base of walls**

All the plant growth growing from the sides or top of the walls and within 2m of any wall should be clipped back to reduce the canopy without interfering with the root system of the plants. This will reduce the demand of the root system and also reduce the risk of wind damage to the structure. Reduction of the vegetation also allows for better inspection of the wall for surveying and assessment of the structures.

The vegetation may be mechanically trimmed initially but then carefully cut close to the building by hand.

Hedge trimmers and croppers are likely to be the appropriate tools for this job.

It is extremely important not to pull any plants or roots away from the masonry walls as this will dislodge stones and mortar.

Removal of roots and vines attached to the walls should only happen alongside masonry repair works to the building at a later date. Under no circumstances should ivy that is growing up the walls be cut at the base as this only encourages development of the aerial roots and potential for much greater damage to the building in future years

There is to be no general herbicide treatment at this stage excepting that as below to woody stems**.**

**Woody stems growing out of sides; tops and bases of walls and within 1m of wall bases**

Where woody stemmed plants / trees are found growing out of walls or within 1m of base of walls cut back root close to face of wall / ground and paint suitable root killer on cut stem within one hour of cutting.

All roots / stems over 30mm diameter to be treated with EcoPlug by Monsanto or similar approved, treatment to be carried out in accordance with manufacturers instructions.

Typically:- Treat within 2 days for optimum performance.

Using the prescribed drill bit make the appropriate number of holes in the living part of the stump just inside the bark. Each hole should be 25-30mm deep, 13mm wide.

Place an EcoPlug Max in each hole with the narrow end first.

The top of the plug will protrude by about 10mm.

Tap each EcoPlug Max until the head is flush with the stump.

This will force out the sides of the plug and release the glyphosate


**Useful References:-**

"Ruins – The conservation and repair of masonry ruins" ISBN 978 1 4064 2445 4

Department of Culture Heritage and the Gaeltacht Architectural Advice series /

" Bats, Birds, Buildings and You! The heritage Council

"Bats in Buildings" Guidance notes for planners, engineers, architects and developers

https://www.batconservationireland.org/

http://invasivespeciesireland.com/

"The Herbicide Handbook: Guidance on the use of herbicides on nature conservation sites"

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| Drawing Stage: **Information** | | | | | | Drawn By: LE | Checked By: RK | Approved By: LE | Date: 25/01/2024 | CORA CONSULTING ENGINEERS | | | | | | | | Behan House, 10 Lower Mount Street, Dublin 2. D02 HT71 Tel: +353 (0)1 661 1100 e-mail: info@cora.ie web: www.cora.ie |
| Project Details: Menlough Castle | | | | | | Project Name: **Menlough Castle Galway Phase 4** | | | Scale: NTS | Project Number: 20612 | | | | | | | | |
| Site Address: | Menlough Castle, Galway | | | | | Drawing Title: **Vegetation Control To Walls where NO masonry works to take place** | | | Project: | Originator: CORA | Zone: | Level: | Type: | Discipline: | Drawing No.: SK4050 | Stage: | Revision: I1 | |
| Client: | Galway City Council | I1 | Issued for Information | 25/01/2024 | RK | | | | | | | | | | | | | |
| Architect: | 7L Architects | REV. No. | REVISION DESCRIPTION | DATE | ISSUED BY | | | | | | | | | | | | | |

## Specification for containment of plant growth where Masonry works are being carried out

**Treatment of vegetation growing on and in the walls**

**General – before starting**

Vegetation treatment / cutting / removal should ideally occur within the period 1st September to 28th February (dates inclusive) to comply with the Wildlife Act 1976 (Amendment) 2000. www.npws.ie/legislation

Although the removal of structure endangering plant growth outside of this period is not illegal, consultation with the National Parks and Wildlife Service is advised where substantial removal of vegetation is envisaged.

It is possible that bats are roosting in dense plant growth and cutting of the plant foliage should only occur after inspection by a qualified bat ecologist, who will recommend appropriate mitigation measures. All bat species are protected under the Wildlife Act and it is prohibited to interfere with their roosts.

Only very specific use of herbicides or biocides as mentioned below is to be deployed at any stage as the general policy is to reduce the plant growth immediately at the wall but not to the surrounding areas.

**Access for works**

Extreme care must be taken when removing plant growth from walls and at high levels to reduce the risk of injury from falls and from falling masonry.

The operatives removing the plant growth should work in pairs.

All work above 1.8 metres must be carried out from a safe access platform such as a mobile tower, scaffold or MEWP such as a small articulating boom lift hoist.

Machinery must be operated by personnel qualified to do such.

**NB: IF IN DOUBT STOP WORK**

**Disposal of waste**

All vegetation waste should be chipped on site and a place for disposal preferably in the nearby vicinity agreed with the client. Note waste must be disposed of correctly and in accordance with the Waste Management Acts 1996 to 2011.under which parties disposing of the waste must be licensed.

http://www.citizensinformation.ie/en/environment/waste_management_and_recycling/waste_management.html


**Prior and during repair works to masonry**

Leave all growth in place and carefully weed wipe or very topically spray only those plants growing from foundations or walls with Glyphosate such as Round-up Pro Bioactive or similar approved. Apply according to manufacturer's instructions. https://www.monsanto-ag.co.uk/documents/. Extreme care must be taken to avoid any spraying in such close proximity to a water course

The herbicide should be applied as long as possible, at least 2 weeks, before any removal of growth.

This will serve to kill embedded root systems deep in the fabric of the masonry.

**Removal of vegetation**

After a minimum of two weeks all the plant growth growing from the foundations; sides and tops of walls should be clipped back hard. The vegetation may be mechanically trimmed initially but then carefully cut close to the building by hand.

Hedge trimmers and croppers are likely to be the appropriate tools for this job.

It is extremely important not to pull any plants away from the masonry walls as this will dislodge stones and mortar.

Any large or deep-seated roots are to be left in place during trimming operation so that they can be further treated – see below.

Under no circumstances should ivy that is growing up the walls be cut at the base as this only encourages development of any aerial roots and potential for much greater damage to the building in future years. Once the aerial roots have been removed during masonry works the stem will then be removed by the masons as they re-point down the wall.

Apply according to manufacturer's instructions Roundup Pro Bioactive or similar approved, to the cut faces of large stumps within 48 hours of felling. A soluble die will help in identifying which stumps have been treated.

**Proceed with masonry repairs**

Dig out as much of root as is practicable as masonry works proceed, without dismantling large sections of currently stable masonry. If in doubt consult Engineer. Where roots remain drill all roots over 30mm diameter root with 13mm diameter drill and insert EcoPlug by Monsanto. Treatment to be carried out in accordance with manufacturers instructions.

Typically:- Treat within 2 days of cutting for optimum performance.

Using the prescribed drill bit make the appropriate number of holes in the living part of the stump just inside the bark.

Each hole should be 25-30mm deep, 13mm wide.

Place an EcoPlug Max in each hole with the narrow end first. The top of the plug will protrude by about 10mm.

Tap each EcoPlug Max until the head is flush with the stump. This will force out the sides of the plug and release the glyphosate.

**Useful References:-**

"Ruins – The conservation and repair of masonry ruins" ISBN 978 1 4064 2445 4
Department of Culture Heritage and the Gaeltacht Architectural Advice series /
" Bats, Birds, Buildings and You! The heritage Council
"Bats in Buildings" Guidance notes for planners, engineers, architects and developers
https://www.batconservationireland.org/
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"The Herbicide Handbook: Guidance on the use of herbicides on nature conservation sites"

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| Drawing Stage: **Information** | | | | | | Drawn By: LE | Checked By: RK | Approved By: LE | Date: 25/01/2024 | CORA CONSULTING ENGINEERS | | | | | | | Behan House, 10 Lower Mount Street, Dublin 2. D02 HT71 Tel: +353 (0)1 661 1100 e-mail: info@cora.ie web: www.cora.ie |
| Project Details: Menlough Castle | | | | | | Project Name: **Menlough Castle Galway Phase 4** | | | Scale: NTS | Project Number: 20612 | | | | | | | |
| Site Address: | Menlough Castle, Galway | | | | | | | | | | | | | | | | |
| Client: | Galway City Council | I1 | Issued for Information | 25/01/2024 | RK | Drawing Title: **Vegetation Removal Where Masonry works are to take place** | | | Project: | Originator: CORA | Zone: | Level: | Type: | Discipline: | Drawing No.: SK4051 | Stage: | Revision: I1 |
| Architect: | 7L Architects | REV. No. | REVISION DESCRIPTION | DATE | ISSUED BY | | | | | | | | | | | | |

## Specification for repair mortars

*Note final mix designs to be a result of consultation with Lime suppliers; Cora Engineers; Architect and appointed Contractor and will be based on exemplars and a more thorough understanding of the previous construction obtained during masonry works preparation.*

Lime mortar works can be affected by excessive wind, rain, sun or low temperatures.
If these conditions prevail the working areas must be kept moist by spraying and protection using polythene or hessian sheets sprayed with water at regular intervals. Spray hoses can be used for large areas or for damping down hessian sheets but should be used with caution to avoid jet action of water washing out mortar or over saturating a wall. Thus a bottle spray, sprayer back pack or similar is an essential part of the equipment.
No works to be carried out if below 5 degree Celsius temperatures forecast within 48 hours unless temperature control methods such as tented enclosures deployed.
Full discussions regarding mortar mixes and methodologies to be undertaken with Engineer prior to commencing works. Exemplars will be required for each pointing / rebuilding type and are to be agreed with the design team before undertaking any work.

Mortar Binder
The use of Portland Cement shall not be permitted for this work. All mortars for repairs to the historic masonry including rebuilding of new sections of traditionally constructed walls will be lime and sand mixes as specified in this section.
Lime for structural repairs should be Naturally Hydraulic Lime NHL or indigenous quicklime.
There may be instances such as work in areas where a quick set is desirable because of the inherent wet conditions and the need to work in times outside of the ideal temperatures for lime because of the programme. Prompt Natural Cement may be sourced for these situations with the approval of the Engineer.
Metastar 501 pozzolan will be permitted for situations such as exposed wall tops.
Hot Mixed Lime mortars using indigenous quicklime as manufactured by Clogrennane, Co. Carlow should be considered for rebuilding. For masonry wall re-building it is proving a much quicker, more robust way of rebuilding rubble stone masonry and the expansion during slaking will be inherently useful in tightening up the arch voussoirs. The document "Hot Lime Mortars - HLM Project - TECHNOLOGY TRANSFER & APPLIED RESEARCH" should be consulted (see references).
Naturally Hydraulic Lime; Metastar; Prompt and quick lime for hot mixing are all supplied by the following (not exclusive list)
Stoneware Studios, Youghal www.stonewarestudios.com
Traditional Lime Co., Carlow www.traditionallime.com

All lime mortars should be prepared and mixed as recommended in manufacturer's printed guidelines. Bags of lime hydrate, natural cement, etc. must be stored off the ground in a clean, dry place and not used outside of the dates recommended on the bags.
Quicklime should be stored in weatherproof air tight bags/containers.

Sand
Shall be clean, coarse, well-graded sharp sand.
Particle sizes should range from 3mm to fine dust for any ashlar repointing and 5mm to fine dust for repointing larger joints in stonework.
The sand colour is important in achieving a good visual match to the existing mortar.

Mixing
Lime and sand should be carefully measured by volume, using batching boxes (shovels are not sufficiently accurate to be used). A conventional cement mixer may be used.
Add lime and sand dry and mix thoroughly. Lime hydrate and sand must be mixed dry in a mixer for a minimum of 20 minutes prior to the addition of water, to encourage air entrainment and improved workability.
Add water carefully until mixture starts to run. It should be a little dryer than a cement-sand mix. After water is added allow a full twenty minutes further mixing. The long mixing period helps improve workability.
The mortar should be damp but not too wet. Mortar for re-pointing needs to be dryer than that used for original bedding because it is being placed in small quantities in a vertical situation.
Use mixed mortar within a few hours and do not moisten to extend the working life. Mortar when mixed must be used within the time scale recommended by the manufacturer.


Mix proportions

**Hydraulic mortar: For structural repairs, and wall tops**
Mix proportions may need to vary depending on the lime + sand but are to be in the range:
Structural repairs: 1 part NHL 3.5 lime to 2.5 – 3.0 parts graded sharp sand.
Sand should be minimum 5mm down with additional larger aggregate 3-6mm and 6-10mm supplied to site for gauging
Wall tops and slopes As above but gauge the NHL3.5 with Metastar according to manufacturers' instructions.

**A typical Hot-mixed mortar: for repointing to vertical faces of wall**
1 part quicklime (Clogrennane kibbled or powder):
3 parts coarse sharp sand 5mm down (If a silica sand as opposed to a calcareous sand is to be used then substitute 0.5 part for limestone dust).
Gauging by (level) bucket. Additional 3-6mm and 6-8mm aggregate may be required to create a good match where the joints are wide

**Gauged Hot Mix Mortar - wall face work such as rebuilding sections of facing stones**
1 part Hydraulic lime (NHL5 St Astier or NHL3.5 Roundtower grey):
1 part quicklime (Clogrennane kibbled or powder):
5 parts coarse sand (If a silica sand as opposed to a calcareous sand is to be used then substitute 0.5 part for limestone dust).
Gauging by (level) bucket. Courser aggregate may be required as above.

**Moisture resistant Mortar - works below ground level to wall bases**
1 part Naturally Hydraulic Lime NHL3.5 (upper band width NHL3.5 spec)
1 part Prompt Natural Cement
2 parts 5mm down washed sharp sand + addition of up to 10% 10mm aggregate
*Note. The Prompt Natural Cement in these ratios will give an initial set in approximately one hour of placing without dramatically increasing brittleness or reducing longevity.*
*For details of Prompt refer to supply and also* www.vicat.fr/en/Activities/Cement/Prompt-natural-cement

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| Project Details: Menlough Castle | | | | | | Project Name: **Menlough Castle Galway Phase 4** | | | Scale: NTS | Project Number: 20612 | | | | | | | |
| Site Address: | Menlough Castle, Galway | | | | | | | | | | | | | | | | |
| Client: | Galway City Council | I1 | Issued for Information | 25/01/2024 | RK | Drawing Title: **Mortar Specification 1 of 2** | | | Project: | Originator: CORA | Zone: | Level: | Type: | Discipline: | Drawing No.: SK4052 | Stage: | Revision: I1 |
| Architect: | 7L Architects | REV. No. | REVISION DESCRIPTION | DATE | ISSUED BY | | | | | | | | | | | | |

## Specification for repair mortars ..... continued

Re-laying Masonry

All loose stones / bricks are to be laid on a full bed of mortar, spread on a carefully cleaned and wetted upper surface of the underlying masonry. Slate or small stone pinning's may be used to level the stone and all horizontal and vertical joints are to be completely filled with mortar well packed in so that the loadings of the structure are distributed evenly.

Think of mortars as soft beds to provide cushions between stones. Lime does not glue things together or create a hard, impervious skin like cement-based mortars and coatings.

Where new stones or bricks are to be inserted, allow for “dry packing” joint over with barely wet mortar.

The new mortar joints of the rebuilt stone and brickwork are to match exactly the existing joint depth and are to be struck flush, brushed off diagonally across joint in both directions and sponged off carefully to match exactly the re-pointing works to the remainder of the masonry. Care must be taken to ensure that mortar or grout splashes do not stain the existing masonry faces. See also note below re: beating back of mortar once stiff.

Preparation for Re-pointing and initial build-out

Prepare areas for re-pointing using small hand-held tools and by removing all the very friable mortar saving any small stones (“gallets” or “pinning's”) that come loose for re-use.

Good preparation is essential for all lime works and a brush is an essential piece of equipment for cleaning out joints, wall surfaces and for brushing pointed joints.

Do not use large blobs of mortar to fill in voids or loose areas; build up with pieces of stone. If the voids are large, bed in the small filler stones in the normal way. If smaller then fill void with mortar and then drive in a stone wedging it in tightly to tighten up loose masonry.

Re-Pointing

Carefully rake out joints to depth of twice the joint width. Face of raked out mortar to be cut back square and not sloped or V-shaped. Brush out joints to clear of all debris.

Wet down joints and adjoining masonry to be pointed thoroughly, on dry or windy days spraying may be needed several times and also occasionally during the pointing process and after the work is completed. The wetting is to stop the bed joints from drawing water out of the pointing mortar that would make it dehydrate and fail to set. Lay the pointing mortar on a hawk to a depth equal to the depth of the joint and square off the front edge. Using a pointing iron of similar depth to the joint, cut off thin strips of mortar and offering the hawk up to the joint press well in with the pointing iron.

Make sure the joint is well filled and the front face brushed off lightly once the mortar has become stiffer. Beating back the mortar with a churn brush (as supplied by lime supply companies above) once stiff also assists with compaction of the mortar into the joint and reduction in shrinkage cracks.

Protection & Follow up Work

All finished work must be protected by plastic sheeting or damp hessian sheeting to prevent the joints or coatings from drying out too quickly or conversely becoming saturated

Some slight cracking may occur to the joints and this should be pressed back by hand/churn brush. Brushing up of finished pointing is essential to roughen the finish and clean up drips and splashes from adjoining areas.

All masonry works should be carefully planned such that proper protection can be included or scheduled for the warmer months of the year.

Precautions of suspending operations until the temperature reaches $6^0$ C on a rising thermometer or $8^0$C on a falling thermometer shall be strictly observed. Also frost protection and protection from saturation by rain is essential.

The horizontal surfaces of masonry are particularly vulnerable to saturation and thus frost damage in the weeks immediately following rebuilding/ pointing and should therefore be protected from excesses of water. The vertical elevations can be protected by draping with hessian

Consideration should be given to insulating and /or applying heat to wall faces if cold weather is forecast in the two months during or after masonry works are completed.

Care must also be taken to protect applied work from rapid drying conditions i.e. exposure to direct sunlight or drying winds. In these conditions it should be kept evenly damp for up to 30 days, depending on ambient conditions and the rate of set, by lightly spraying periodically with clean water. In areas exposed to direct sunlight, the possibility of a "greenhouse" effect must be avoided, either by shading the polythene or by substituting woven cloth materials.

Polythene, hessian or other approved sheeting that is used during curing should be arranged to hang clear of the face of the wall in such a way that it does not form a tunnel through which the wind could increase the evaporation of water. The polythene or hessian sheeting must not have intermittent contact with the pointing / render as this may cause a patchy appearance.

*Example of flush pointing in stonework beaten back to expose aggregate*

*Example of appropriate protection to allow wall to dry out yet not become saturated by rain on upper*

### Stone Identification process - numbering and recording

Any part of a wall that is to be dismantled or stones that need to be removed must follow strict protocol.

All stones to be numbered using removable chalk / paint; photographed and layout mapped using clear mona flex or similar before dismantling.

After dismantling apply same number in indelible ink / paint to hidden face and store stones in reverse order on scaffold or pallets etc ready for reassembly.

### Exemplars of all proposed works will be required at start of contract.

This should include the following at minimum:

i) Pointing of original facing stonework

ii) Insertion of new facing stonework where structural repairs required

iii) Sample wall top detail both regularised + rough racked to low east walls

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| Project Details: Menlough Castle | | | | | | Project Name: **Menlough Castle Galway Phase 3** | | | Scale: NTS | Project Number: 20612 | | | | | | | | |
| Site Address: | Menlough Castle, Galway | | | | | | | | | | | | | | | | | |
| Client: | Galway City Council | I1 | Issued for Information | 25/01/2024 | RK | Drawing Title: **Mortar Specification 2 of 2** | | | Project: | Originator: CORA | Zone: | Level: | Type: | Discipline: | Drawing No.: SK4053 | Stage: | Revision: I1 | |
| Architect: | 7L Architects | REV. No. | REVISION DESCRIPTION | DATE | ISSUED BY | | | | | | | | | | | | | |