From: Ritchie, Jason
Sent: Tuesday, April 9, 2024 9:54 AM
To: Victoria Flintoff <
Subject: RE: Low Staindale Cottage, Dalby 2024/0145

Morning Vicky,

Thank you for your response sorry I have been out the office for a couple of days.

- I have attached the Lime mortar specification as requested.

- Unfortunately, I don't have any pictures of the roof timbers. The timber battens will be replaced as part of the roofing works as for the rafters, purlins, and trusses these will be maintained, and no repairs or replacements carried out. If anything, unforeseen is found during the works I will contact you to discuss and provide the relevant information, but this is not anticipated.

- Emergence surveys at low Staindale will be carried out and the subsequent bat licence for roof works applied for.
  - A 4-person emergence survey with IR camera will be carried out on 2 occasions for the license and they will be 3 weeks apart.
  - Tool box talks to the contractor will be undertaken.
  - IF droppings are found the Ecologist may need to send off for DNA analysis.

If you need further information, please do not hesitate to contact me.

Regards

Jason Ritchie MCIOB
Senior Let Estate Building Surveyor
Chartered Construction Manager

National Trust
North Region, Holy Jesus Hospital, City Road,
Newcastle-upon-Tyne, NE1 2AS

HOT-LIME MIXING V4 Feb 2023:

A range of limes exist from pure high-calcium or 'air-limes' through to Natural Hydraulic Limes (NHL's 2, 3.5 or 5) to Natural Cements. **All limes may have a potential use** dependent upon the building, skills of the practitioner, extent of exposure to extreme weather and whether water present permanently, aesthetics, etc. Hot-lime is not a different type of lime it is a method of mixing used extensively in the building of historic structures.

Recipe (as a starting point not to be slavishly followed in all circumstances!)**:**

1) **Quicklime: Shap -5mm (may consider Calbux 60 or 90[i]).**
2) **Aggregates: assume a blended mix of at least two types.**
3) **Addition of chalk as aggregate for porous particulate and aesthetic purposes[ii] (tbc but presume no more than a handful in a standard size bucket)**
4) **Mix aggregates with quicklime in the by-volume proportions of 1 quicklime: 3 aggregates[iii] to create your coarse stuff for mortar.**
5) **Addition of Pozzolanic Additive: Argical M1000.**
   Mixed into the coarse stuff, immediately prior to use (and keep for no more than 24 hours after adding), in the by-volume mixing ratio of approximately 5% (no more than 10%) of the coarse stuff (may consider other materials such as underfired brick-dust, trass or wood-ash[iv] but not HTI or PFA).[v]

Follow all H&S/COSHH data advice as included in the manufacturer/supplier's literature and note the caustic nature of quicklime.

Mixing Advice (from a practitioner, Nigel Copsey[vi]):

Whether hand-mixing in small batches or on a larger scale in a pan mixer, mix the quicklime with the sand and/or other aggregates (typically limestone) these being usually moist, and leave it for some minutes, after which slaking will be well underway and the 'dry-mix' will be hot. At this stage, the quicklime will have been transformed into a super-fine powder (the primary reason that conventional mixers are inappropriate for hot-lime mixing), and will shimmer and flow within the mix, behaving much like a liquid. Then add water and the mortar will be audibly 'quenched', and knock up to a workable consistency, depending upon intended use. It should then be left for at least five minutes for the slaking to complete, at which time a little more water and more knocking up may be required. Water content will depend upon intended use.

If the mortar is for plastering, we will tend to mix it the day before, rarely using it whilst still 'hot' for other than first base coats, sweetening it with a little more water just prior to application. For all other uses, immediate use is practicable although not essential. The mortar will fatten even more if left overnight. Pointing mortars may exhibit some slight shrinkage, which will be closed up the following day, during the aftercare process.

Note: it is common in North Yorkshire for hot-mixed mortars to contain animal hair, which may be to reduce the shrinkage of such lime-rich mortars. Hair is added at the dry-slaking stage.

It is characteristic of hot-mixed mortars that damping with sprays or hoses is possible without run-out of lime almost immediately after application, indicative of the strength of the bond between lime and aggregate.

[i] Any alternative that is being considered, for any material, should be firstly discussed and subsequently confirmed in writing with your Building Surveyor. A suggestion for Shap hot-lime mix supplies: https://edenhotlimemortar.co.uk

[ii] Because of the relative purity and consistent burn of the limestone there can be, unlike many historic mortars, little or none 'underburnt' lime which means we lack these inclusions in many new hot-lime mixes;

[iii] Note that this will give an eventual by-volume binder to aggregate ratio, upon slaking of the quicklime in the mix, of approximately 2:3 (noting that richer hot-lime mixes were common and quicklime increases in volume by up to 2.2 times upon slaking).

[iv] Wood-ash from charcoal burner, etc. not from biomass boilers (some people view wood-ash as an aggregate because of variability in pozzolanic performance).

[v] Many pure hot-lime mixes seem to be very durable but where additional strength and increased speed of set is considered desirable a pozzolanic additive may be necessary. Argical M1000 is consistent and has limited colour implications and, in this country, similar metakaolins have been specified for over 20 years. There is conflicting advice on the need and implications of pozzolanic additives. Note that Scottish practice has gauging of hot-limes with NHL's but, with concerns being expressed around the use of NHL's, we should perhaps, at present, avoid in hot-lime mixes.

[vi] Also see Copsey, N (2019) *Hot Mixed Lime and Traditional Mortars: a practical guide to their use in Conservation and Repair.* Crowood Press, UK.

Low Staindale Cottage

Repairing/ Re-pointing/ Conserving masonry works

C41 Repairing/ Renovating/ Conserving masonry

WORKMANSHIP GENERALLY

150 POWER TOOLS

- Usage for removal of mortar: Not permitted unless agreed with client representative.

155 PUTLOG SCAFFOLDING

- Usage: Not permitted.

165 STRUCTURAL STABILITY

- General: Maintain stability of masonry. Report defects, including signs of movement that are exposed or become apparent during the removal of masonry units.

170 DISTURBANCE TO RETAINED MASONRY

- Retained masonry in the vicinity of repair works: Disturb as little as possible.
- Existing retained masonry: Do not cut or adjust to accommodate new or reused units.
- Retained loose masonry units and those vulnerable to movement during repair works: Prop or wedge so as to be firmly and correctly positioned.

180 WORKMANSHIP

- Skill and experience of site operatives: Appropriate for types of work on which they are employed.
  - Documentary evidence: Submit on request.

185 ADVERSE WEATHER

- General: Do not use frozen materials or lay masonry units on frozen surfaces.
- Air temperature: Do not bed masonry units or repoint:
  - In cement gauged mortars when ambient air temperature is at or below 3°C and falling or unless it is at least 1°C and rising, unless mortar has a minimum temperature of 4°C when laid and the masonry is adequately protected.
  - In hydraulic lime: sand mortars when ambient air temperature is at or below 5°C and falling or unless it is at least 3°C and rising.
  - In nonhydraulic lime: sand mortars in cold weather, unless approval is given.
- Temperature of the work: Maintain above freezing until mortar has fully set.
- Rain, snow and dew: Protect masonry by covering during precipitation, and at all times when work is not proceeding.
- Hot conditions and drying winds: Prevent masonry from drying out rapidly.
- New mortar damaged by frost: Rake out and replace.

190 CONTROL SAMPLES

- General: Complete an area of each of the following types of work, and arrange for inspection before proceeding with the remainder: pointing.

MATERIAL/ PRODUCTION/ ACCESSORIES

215 MATERIAL SAMPLES

- Representative samples of designated materials: Submit before placing orders.
  - Designated materials: Mortar biscuits for pointing.
- Retention of samples: Unless instructed otherwise, retain samples on site for reference. Protect from damage and contamination.

245 REPLACEMENT STONE UNITS

- Sizes and profiles: To match existing masonry. Maintain existing joint widths.
- Sinkings for fixings, joggles and lifting devices: Accurately aligned and positioned in relation to existing masonry.
- Marking: Mark each block/ dressing clearly and indelibly on a concealed face to indicate the natural bed and position in the finished work.

REPLACEMENTS AND INSERTIONS

330 PREPARATION FOR REPLACEMENT MASONRY

- Defective material: Carefully remove to the extent agreed. Do not disturb, damage or mark adjacent retained masonry.
- Existing metal fixings, frame members, etc: Report when exposed.
- Redundant metal fixings: Remove.
- Recesses: Remove projections and loose material; leave joint surfaces in a suitable condition to receive replacement units. Protect from adverse weather if units are not to be placed immediately.
-

MORTAR REPAIRS

510 PREPARATION FOR MORTAR REPAIRS

- Repair area: Scribe area of masonry to be removed using straight horizontal and vertical lines parallel to joints. Where repair area abuts joints, maintain existing joint widths and do not bridge joints.
- Decayed masonry: Cut back carefully to a minimum depth of 25 mm to a sound background. Where the depth of removal exceeds 50 mm, seek instructions.
- Precautions: Do not weaken masonry by removing excessive material. Do not damage adjacent masonry.
- Top and vertical reveals of repair area: Undercut.

520 MORTAR REPAIRS where required and as agreed with CA

- Please see specification for hot lime mortar.

POINTING/ REPOINTING

810 PREPARATION FOR REPOINTING

- Existing mortar: Working from top of wall downwards, remove mortar carefully, without damaging adjacent masonry or widening joints, to a minimum depth of approx. twice joint thickness or 25mm.

  - Loose or friable mortar: Seek instructions when mortar beyond specified recess depth is loose or friable and/ or if cavities are found.
- Raked joints: Remove dust and debris.

820 POINTING STONEWORK GENERALLY

- Preparation of joints: Carefully brush away loose mortar and Dampen joints, as necessary, to control suction.
- Mortar: As specification – hot lime mortar
  - Mix: 1: 2: 1
- Joints profile/ finish: Recessed back from weathered arrises to retain original joint widths. Brushed finish.
- Other requirements: Deep voids may require packing and repointing. Please notify CA when such voids are identified, if not agreed in initial inspection.

860 BRUSHED FINISH TO JOINTS

- Timing: After initial mortar set has taken place remove laitance and excess fines by brushing, to give a coarse texture. Do not compact mortar.