H51 NATURAL STONE SLAB CLADDING / LINING / FEATURES

To be read with Preliminaries/ General Conditions and Sections AA/31 and AA/90.
Items in this section to Contractor's Design as shown.

GENERAL

010 INFORMATION TO BE PROVIDED WITH TENDER
- Submit the following cladding particulars:
  - Typical plan, section and elevation drawings at suitable scales.
  - Typical detailed drawings at large scales, including stone support system, horizontal and vertical joints, corner joints, opening perimeter details..
  - Technical information and certification demonstrating compliance with specification of proposed incorporated products and finishes.
  - Certification, reports and calculations demonstrating compliance with specification of proposed cladding.
  - Proposals for connections to and support from the support structure/ background.
  - Proposals for additional support structure/ background to that shown on preliminary design drawings.
  - Schedule of builder's work, special provisions and special attendance by others.
  - Examples of standard documentation from which project quality plan will be prepared.
  - Preliminary fabrication and installation method statements and programme.
  - Proposals for replacing damaged or failed products.
  - Areas of non-compliance with specification.

TYPES OF CLADDING

110 EXTERNAL CLADDING TO PIER - LIBRARY EXTENSION LINK:
Include in Contractor's Designed Portion for Stonework

REV C1 - Drawing reference: **597-14632, 597-14633, 597-14634, 597-14635, 597-14636, 597-14637**
- Support structure/ background:
  - Primary steel structural frame as Structural Engineer's drawings and specification.
  - Secondary steelwork as GG10/140.
  - Steel framing system (SFS): As GG10/170 (including sheathing, insulation and lining).
- Stone slabs: To BS EN 1469.

REV C3
  - Name (traditional): **Cadeby Magnesian Limestone.**
  - Petrological family: **Cadeby formation of the Permian Age.**
  - Colour: Cream White**. ~~with clustered shells.~~**
    - To match approved sample range.
  - Origin: **Dolomite Quarry, Warmsworth, Ancaster, UK.**
  - Finish: Fine rubbed.
  - Supplier and reference: **Dolomite Quarry, Warmsworth, Doncaster, South Yorkshire, DN4 9RG** ***Magnesian Limestone.***
  - Unit size:
    - Face size (nominal, including joints): As drawings. (TBC).
    - Thickness: 75 mm (minimum).
  - Unit dimension tolerances: Close tolerances [length ± 0.5 mm, height ± 0.5 mm, width (exposed ends at corners and reveals) ± 0.5 mm] (TBC).

REV C3
  - Compressive strength (minimum): **80 N/mm^2 (MPa). Supplier to advise.**
    Mean value (minimum): Supplier to advise.
    Characteristic value (minimum): Supplier to advise.
    Category: Supplier to advise.

REV C3
  - Open porosity: **17% Supplier to advise.**
  - Additional requirements:
    - Freeze/ Thaw resistance: Supplier to advise.

- Quality: Free from vents, cracks, fissures, discolouration, or other defects deleterious to strength, durability or appearance. Before delivery to site, season thoroughly, dress and work in accordance with shop drawings prepared by supplier.
- Fixings: As determined by H51/210 related to fixing types H51/230-H51/237.
- Joint mortar: Hydraulic lime: sand mortar as section Z21.
  - Manufacturer/supplier: Lime Technology Ltd (0845 603 1143)
    www.limetechnology.co.uk
REV C4 *Limetec Tradtional London Ashlar Mortar*
    Factory batched - 1 : 2 hydraulic lime : sand.
    Indicative strength at 91 days: 2.5 N/mm² (approx).
  - Sand: Fine well graded sharp flint/quartz to BS EN 13139 and mortar supplier's recommendations Max Aggregate: 2mm
    - Colour of sand: To Architect's approval.
REV C4 - ~~Bond: Bond pattern - half-lap stretcher~~ as drawings
- Joints: Flush.
REV C2 - Width: **4.0mm** ~~2.0 mm~~.
  - Pointing: Brushed.
- External corner joints: Mitred and epoxy-resin bonded, with 4 x 4 mm birds-mouth profile to arris.
- Cavity width: Varies as drawings (50 mm nominal).

REV C4 ~~- Coping stones:~~
~~- Fully supported on steel framing.~~
~~- DPC as F30/330 under coping stones.~~
~~- Pre-formed rebate to underside of stone to allow for thickness of DPC set back to maintain joint width at face.~~
~~- Bed solid in mortar.~~
~~- Restraint fixings as H51/236.~~

- **Coping : Refer to H71/256 for Glass Link Pier Lead Roof**
- Other requirements:
  1. Pre-formed rebates and dowel-holes in edges of stone units to suit wall support and restraint ties and joint width requirements.
  2. Additional corrosion protection treatment to steel frame as H51/290.
  3. Interface with support requirements of structural glass assemblies H13/115.
REV C2 4. **Pre-formed drip to underside of overhanging elements**
  5. **Exposed surface to be impregnated as M60/190.**

~~112 EXTERNAL CLADDING TO SIDE PANEL - LIBRARY EXTENSION LINK:~~
REV C1 ~~**Include in Contractor's Designed Portion for Stonework**~~
~~- Drawing reference: 597~~
~~- Support structure/ background:~~
~~- Primary steel structural frame as Structural Engineer's drawings and specification.~~
~~- Secondary steelwork as GG10/140.~~
~~- Steel framing system (SFS): As GG10/170 (including sheathing, insulation and lining).~~
~~- Stone slabs: To BS EN 1469.~~
~~- Name (traditional): Ancaster Stone.~~
~~- Petrological family: Inferior Oolite of the Middle Jurassic system; member of the Lincolnshire Limestone deposits.~~
~~- Colour: Cream White with clustered shells.~~
~~- To match approved sample range.~~
~~- Origin: Ancaster, Grantham, Lincolnshire, UK.~~
~~- Finish: Fine rubbed.~~
~~- Supplier and reference: Realstone Ltd (01246 270244)~~
~~http://www.realstone.co.uk~~
~~*Ancaster Hard White.*~~
~~- Unit size:~~
~~- Face size (nominal, including joints): As drawings. (TBC).~~
~~- Thickness: 100 mm at plinth level and 50 mm above plinth (minimum).~~
~~- Unit dimension tolerances: Close tolerances [length ± 0.5 mm, height ± 0.5 mm, width (exposed ends at corners and reveals) ± 0.5 mm] (TBC).~~
~~- Compressive strength (minimum): 25 N/mm² (MPa).~~

~~Mean value (minimum): Supplier to advise.~~
~~Characteristic value (minimum): Supplier to advise..~~
~~Category: Supplier to advise.~~
~~- Open porosity: 15.3%.~~
~~- Additional requirements:~~
~~- Freeze/ Thaw resistance: Supplier to advise.~~
~~- Quality: Free from vents, cracks, fissures, discolouration, or other defects deleterious to strength, durability or appearance. Before delivery to site, season thoroughly, dress and work in accordance with shop drawings prepared by supplier.~~
~~- Fixings: As determined by H51/210 related to fixing types H51/230-H51/237.~~
~~- Joint mortar: Hydraulic lime: sand mortar as section Z21.~~
~~- Manufacturer/supplier: Lime Technology Ltd (0845 603 1143)~~
~~www.limetechnology.co.uk~~
~~*Limetec Ashlar Mortar*~~
~~Factory batched - 1 : 2 hydraulic lime : sand.~~
~~Indicative strength at 91 days: 2.5 N/mm² (approx).~~
~~- Sand: Fine well graded sharp flint/quartz to BS EN 13139 and mortar supplier's recommendations~~
~~- Colour of sand: To Architect's approval.~~
~~- Bond: Bond pattern - half-lap stretcher as drawings 597-___.~~
~~- Joints: Flush.~~
~~- Width: 2.0 mm.~~
~~- Pointing: Brushed.~~
~~- Cavity width: 50 mm nominal.~~
~~- Other requirements:~~
~~1. Pre-formed rebates and dowel-holes in edges of stone units to suit wall support and restraint ties and joint width requirements.~~
~~2. Additional corrosion protection treatment to steel frame as H51/290.~~
~~3. Interface with support requirements of structural glass assemblies H13/115.~~
~~4. Interface with support for frame of entrance door L20/__.~~

115 EXTERNAL CLADDING TO WINDOW SPANDRELS - LIBRARY EXTENSION:
Include in Contractor's Designed Portion for Stonework

REV C1
- Drawing reference: **597-14632, 597-14633, 597-14634, 597-14635, 597-14636, 597-14637**
- Support structure/ background:
  - In situ reinforced concrete slab.
  - Primary steel structural frame as Structural Engineer's drawings and specification.
  - Blockwork infill as F10/350.
- Stone slabs: To BS EN 1469.

REV C3
  - Name (traditional): **Cadeby Magnesian Limestone.**
  - Petrological family: **Cadeby formation of the Permian Age.**
  - Colour: Cream White**. ~~with clustered shells.~~**
    - To match approved sample range.
  - Origin: **Dolomite Quarry, Warmsworth, Ancaster, UK.**
  - Finish: Fine rubbed.
  - Supplier and reference: **Dolomite Quarry,**
    Warmsworth, Doncaster, South Yorkshire, DN4 9RG
    Magnesian Limestone.
  - Unit size:
    - Face size (nominal, including joints): As drawings. (TBC).
    - Thickness: 50 mm (minimum).
  - Unit dimension tolerances: Close tolerances [length ± 0.5 mm, height ± 0.5 mm, width (exposed ends at corners and reveals) ± 0.5 mm] (TBC).

REV C3
  - Compressive strength (minimum): **80 N/mm² (MPa). Supplier to advise.**
    Mean value (minimum): Supplier to advise.
    Characteristic value (minimum): Supplier to advise.
    Category: Supplier to advise.

REV C3
  - Open porosity: **17% Supplier to advise.**
  - Additional requirements:
    - Freeze/ Thaw resistance: Supplier to advise.

- Quality: Free from vents, cracks, fissures, discolouration, or other defects deleterious to strength, durability or appearance. Before delivery to site, season thoroughly, dress and work in accordance with shop drawings prepared by supplier.
- Fixings: As determined by H51/210 related to fixing types H51/230-H51/237.
- Joint mortar: Hydraulic lime: sand mortar as section Z21.
  - Manufacturer/supplier: Lime Technology Ltd (0845 603 1143)
    www.limetechnology.co.uk
REV C4 *Limetec Tradtional London Ashlar Mortar*
    Factory batched - 1 : 2 hydraulic lime : sand.
    Indicative strength at 91 days: 2.5 N/mm² (approx).
  - Sand: Fine well graded sharp flint/quartz to BS EN 13139 and mortar supplier's recommendations Max Aggregate: 2mm
    - Colour of sand: To Architect's approval.
- Bond: Bond pattern as drawings
- Joints: Flush.
REV C2 - Width: **4.0mm** ~~2.0 mm~~.
  - Pointing: Brushed.
REV C4 - Cavity width: ~~**75 mm**~~ **50mm** (excluding insulation).
REV C1 - Insulation: As F30/151**B (50 mm).**
- Other requirements:
  1. Pre-formed rebates and dowel-holes in edges of stone units to suit wall support and restraint ties and joint width requirements.
  2. Additional corrosion protection treatment to steel frame as H51/290.
  3. Interface with support requirements 'bronze' framed windows as section L10.

REV C2 **4. Pre-formed drip to underside of overhanging elements**
5. Exposed surface to be impregnated as M60/190.

120 EXTERNAL CLADDING TO SKYLIGHT UPSTANDS / PARAPET WALLS - FIXED: **(EAST TERRACE AND LIBRARY)**
Include in Contractor's Designed Portion for Stonework

REV C1/ C2/ C3- Drawing reference: **597-41104, 597-41107, 597-41115-41119, 597-41121, 597-41131, 597-41134, 597-41135, 597-41136, 597-41139, 597-41150, 597-41152, 597-41157, 597-41161, 597-41162, 597-41164, 597-41166, 597-14632, 597-14633, 597-14634, 597-14635, 597-14636, 597-14637**

- Support structure/ background: Insitu reinforced concrete upstand to new concrete slabs.
- Stone slabs: To BS EN 1469.

REV C3
  - Name (traditional): **Cadeby Magnesian Limestone.**
  - Petrological family: **Cadeby formation of the Permian Age.**
  - Colour: Cream White. ~~**with clustered shells.**~~
    - To match approved sample range.
  - Origin: **Dolomite Quarry, Warmsworth, Ancaster, UK.**
  - Finish: Fine rubbed.
  - Supplier and reference: **Dolomite Quarry,**
    Warmsworth, Doncaster, South Yorkshire, DN4 9RG
    Magnesian Limestone.
  - Unit size:
    - Face size (nominal, including joints): As drawings. (TBC).

REV C1
    - Thickness: 50-**100** mm (minimum).
  - Unit dimension tolerances: Close tolerances [length ± 0.5 mm, height ± 0.5 mm, width (exposed ends at corners and reveals) ± 0.5 mm] (TBC).

REV C3
  - Compressive strength (minimum): **80 N/mm² (MPa). Supplier to advise.**
    Mean value (minimum): Supplier to advise.
    Characteristic value (minimum): Supplier to advise.
    Category: Supplier to advise.

REV C3
  - Open porosity: **17% Supplier to advise.**
  - Additional requirements:
    - Freeze/ Thaw resistance: Supplier to advise.

- Quality: Free from vents, cracks, fissures, discolouration, or other defects deleterious to strength, durability or appearance. Before delivery to site, season thoroughly, dress and work in accordance with shop drawings prepared by supplier.
- Fixings: As determined by H51/210 related to fixing types H51/230-H51/237.
- Joint mortar: Hydraulic lime: sand mortar as section Z21.
  - Manufacturer/supplier: Lime Technology Ltd (0845 603 1143) www.limetechnology.co.uk
REV C4 *Limetec Tradtional London Ashlar Mortar*
Factory batched - 1 : 2 hydraulic lime : sand.
Indicative strength at 91 days: 2.5 N/mm² (approx).
  - Sand: Fine well graded sharp flint/quartz to BS EN 13139 and mortar supplier's recommendations Max Aggregate: 2mm
    - Colour of sand: To Architect's approval.

REV C1
- Bond: Bond pattern - ~~half-lap stretcher~~ as drawings
- Joints: Flush.

REV C2
  - Width: **4.0mm** ~~2.0 mm~~.
  - Pointing: Brushed.
- External corner joints: Mitred and epoxy-resin bonded, with 4 x 4 mm birds-mouth profile to arris.

REV C1
- Cavity width: Varies as drawings (50-**120** mm nominal).
- Copings:

~~- Fully supported on stainless steel (304) angle brackets (75 x 50 x 100 mm nominal) bolted to both sides of top edge of concrete upstand to support stones; 4 No. per stone. [Stones not to bear on vertical cladding].~~

  - DPC as F30/330 under stone units.
  - Pre-formed rebate to underside of stone to allow for thickness of DPC set back to maintain joint width at face.
  - Bed solid in mortar.
  - Restraint fixings as H51/236.

REV C1
- **EAST TERRCE** Bench seat elements:
  - Unit size:
    - Section: Profile as drawings (400 x 150 mm nominal).
    - Length: Allow for 750 mm.
  - Fabricated stainless steel (304) T-section cantilever brackets (8.0 mm thick plate) recessed into stone profile at joints and resin anchored to concrete. To be concealed from view within stone thickness.
  - Pre-formed rebate and slots to underside and edges of stone to allow for thickness of bracket to maintain joint width at front and top face.
  - Bed solid in mortar.
  - Restraint fixings to back of stone as H51/236.
- Other requirements:
  1. Pre-formed rebates and dowel-holes in edges of stone units to suit wall support and restraint ties and joint width requirements.
  3. Interface with support requirements of structural glass assemblies H13/120, 122, 124, 126.

REV C2
  4. Parapet incorporated into planter north of main skylight to East Terrace as drawing **597-17012** - Waterproof lining and drainage as required.
  5. Stone cladding core-drilled as required to suit recessed luminaires.

REV C2
  6. **Pre-formed drip to underside of overhanging elements**
  7. **Exposed surface to be impregnated as M60/190.**

122 EXTERNAL CLADDING TO SKYLIGHT UPSTANDS - DEMOUNTABLE:
Include in Contractor's Designed Portion for Stonework

REV C1/ C2/ C3- Drawing reference: **597-41150, 597-41152, 597-41153, 597-41155, 597-41157, 597-41158, 597-41159, 597-41161, 597-41164, 597-14632, 597-14633, 597-14634, 597-14635, 597-14636, 597-14637**
- Support structure/ background: Insitu reinforced concrete and stainless steel secondary steelwork to glazing.
- Stone slabs: To BS EN 1469.

REV C3
  - Name (traditional): **Cadeby Magnesian Limestone.**
  - Petrological family: **Cadeby formation of the Permian Age.**

- Colour: Cream White. ~~with clustered shells.~~
  - To match approved sample range.
- Origin: **Dolomite Quarry, Warmsworth, Ancaster, UK.**
- Finish: Fine rubbed.
- Supplier and reference: **Dolomite Quarry, Warmsworth, Doncaster, South Yorkshire, DN4 9RG *Magnesian Limestone.***
- Unit size:
  - Face size (nominal, including joints): As drawings. (TBC).

REV C1
  - Thickness: 50-**100** mm (minimum).

- Unit dimension tolerances: Close tolerances [length ± 0.5 mm, height ± 0.5 mm, width (exposed ends at corners and reveals) ± 0.5 mm] (TBC).

REV C3
- Compressive strength (minimum): **80 N/mm² (MPa). Supplier to advise.**
  Mean value (minimum): Supplier to advise.
  Characteristic value (minimum): Supplier to advise.
  Category: Supplier to advise.

REV C3
- Open porosity: **17% Supplier to advise.**
- Additional requirements:
  - Freeze/ Thaw resistance: Supplier to advise.
- Quality: Free from vents, cracks, fissures, discolouration, or other defects deleterious to strength, durability or appearance. Before delivery to site, season thoroughly, dress and work in accordance with shop drawings prepared by supplier.

- Fixings: As determined by H51/210 Stainless steel nuts, bolts and anchors (concealed) with isolation washers..
- Prefabricated units: Stone panels resin bonded to 30 x 30 mm stainless steel (304) angle frame (mitred and welded corners) for concealed bolted connections to background framing elements. Additional chemical anchors through frame into back of stone as required.
- Bond pattern: As drawings 597-

REV C2
- Joints: **sealant as H51/630** ~~Open~~ (TBC).

REV C2
  - Width: **4.0mm** ~~2.0 mm~~.

- Cavity width: Varies as drawings (50 mm nominal).
- Other requirements:
  1. Demountable panels for maintenance and glass replacement.
  2. Fixing sequence to be agreed.
  3. System to be independent of continuous waterproofing and air barrier membranes to glazing system.
  4. Interface with support requirements of structural glass assemblies H13.

REV C2
  5. **Pre-formed drip to underside of overhanging elements**
  6. **Exposed surface to be impregnated as M60/190.**

REV C4 125 INTERNAL CLADDING / LINING TO ~~EAST WALL AND~~ PIER - LIBRARY EXTENSION LINK **& TURRET OPENINGS**

Include in Contractor's Designed Portion for Stonework

REV C1
- Drawing reference: **597-14632, 597-14633, 597-14634, 597-14635, 597-15204**
- Support structure/ background (to suit stone fixing requirements):
  - Primary steel structural frame as Structural Engineer's drawings and specification.
  - Secondary steelwork as GG10/140. **/ Existing Masonry**
  - Steel framing system (SFS): As GG10/170..
- Stone slabs: To BS EN 1469.

REV C3
  - Name (traditional): **Cadeby Magnesian Limestone.**
  - Petrological family: **Cadeby formation of the Permian Age.**
  - Colour: Cream White. ~~with clustered shells.~~
    - To match approved sample range.
  - Origin: **Dolomite Quarry, Warmsworth, ~~Ancaster~~ South Yorkshire, UK.**
  - Finish: Fine rubbed.
  - Supplier and reference: **Dolomite Quarry, Warmsworth, Doncaster, South Yorkshire, DN4 9RG *Magnesian Limestone.***
  - Unit size:
    - Face size (nominal, including joints): As drawings. ~~(TBC).~~

- Thickness: 50 mm (minimum).
- Unit dimension tolerances: Close tolerances [length ± 0.5 mm, height ± 0.5 mm, width (exposed ends at corners and reveals) ± 0.5 mm]

REV C3
- Compressive strength (minimum): **80 N/mm² (MPa). Supplier to advise.**
  Mean value (minimum): Supplier to advise.
  Characteristic value (minimum): Supplier to advise.
  Category: Supplier to advise.

REV C3
- Open porosity: **17% Supplier to advise.**
- Additional requirements:
  - Freeze/ Thaw resistance: N/A.
- Quality: Free from vents, cracks, fissures, discolouration, or other defects deleterious to strength, durability or appearance. Before delivery to site, season thoroughly, dress and work in accordance with shop drawings prepared by supplier.

- Fixings: As determined by H51/210 related to fixing types H51/230-H51/237.
- Joint mortar: Hydraulic lime: sand mortar as section Z21.
  - Manufacturer/supplier: Lime Technology Ltd (0845 603 1143)
    www.limetechnology.co.uk

REV C4
    Limetec Tradtional London Ashlar Mortar
    Factory batched - 1 : 2 hydraulic lime : sand.
    Indicative strength at 91 days: 2.5 N/mm² (approx).
  - Sand: Fine well graded sharp flint/quartz to BS EN 13139 and mortar supplier's recommendations Max Aggregate: 2mm
    - Colour of sand: To Architect's approval.

REV C4
- Bond: Bond pattern **- half-lap stretcher** as drawings.
- Joints: Flush.

REV C2
  - Width: **4.0mm** ~~2.0 mm~~.
  - Pointing: Brushed.
- External corner joints: Mitred and epoxy-resin bonded, with 4 x 4 mm birds-mouth profile to arris.
- Cavity width: 25 mm (minimum).
  - Airtight barrier: Reinforced polyethylene membrane as P10/315 fixed to support framing.
- Other requirements:
  1. Pre-formed rebates and dowel-holes in edges of stone units to suit wall support and restraint ties and joint width requirements.
  2. Interface with support requirements of structural glass assemblies H13/115.

REV C2
  5. Surface to be impregnated as M60/190B.

GENERAL REQUIREMENTS/ PREPARATORY WORK

210 DESIGN
- Cladding: Complete detailed design.
  - Standard: To BS 8298.
- Related works: Coordinate in detailed design.
- Structural requirements: As Structural Engineer's specification Section B50.

230 FIXINGS (LOADBEARING):
- Standard: To BS 8298-1 and -2.
- Designer/ Supplier: To be the following or similar:-
  Ancon Building Products (Tel: 0114 2755224)
  www.ancon.co.uk
- Type: *Ancon CFA/SD Corbel Angle*
- Material: Stainless steel to BS EN 10088 grade 1.4301 (304 S16).
- Dimensions: Not less than recommended by manufacturers.
- Extent of adjustment: To accommodate support structure/ background and cladding fabrication/ installation tolerances.
- Method of fixing to backing structure: High performance stainless steel bolts and expanding anchors.

231 FIXINGS (RESTRAINT - VERTICAL DOWEL):

- Standard: To BS 8298-1 and -2..
- Designer/ Supplier: To be the following or similar:-
  Ancon Building Products (Tel: 0114 2755224)
  www.ancon.co.uk
- Type: *Ancon DPV Restraint Ties (Vertical Dowel)*
- Material: Stainless steel to BS EN 10088 grade 1.4301 (304 S16).
- Dimensions: Not less than recommended by manufacturers.
- Extent of adjustment: To accommodate support structure/ background and cladding fabrication/ installation tolerances.
- Method of fixing to backing structure: High performance stainless steel bolts and expanding anchors.

232 FIXINGS (RESTRAINT - HORIZONTAL DOWEL):
- Standard: To BS 8298-1 and -2..
- Designer/ Supplier: To be the following or similar:-
  Ancon Building Products (Tel: 0114 2755224)
  www.ancon.co.uk
- Type: *Ancon DHV Restraint Ties (Horizontal Dowel)*
- Material: Stainless steel to BS EN 10088 grade 1.4301 (304 S16).
- Dimensions: Not less than recommended by manufacturers.
- Extent of adjustment: To accommodate support structure/ background and cladding fabrication/ installation tolerances.
- Method of fixing to backing structure: High performance stainless steel bolts and expanding anchors.

233 FIXINGS (CHANNEL SUPPORT SYSTEM):
- Standard: To BS 8298-1 and -2..
- Designer/ Supplier: To be the following or similar:-
  Ancon Building Products (Tel: 0114 2755224)
  www.ancon.co.uk
- Type: *Ancon 40/25 Channel*
- Ties: H51/
- Material: Stainless steel to BS EN 10088 grade 1.4301 (304 S16).
- Dimensions: Not less than recommended by manufacturers.
- Extent of adjustment: To accommodate support structure/ background and cladding fabrication/ installation tolerances.
- Method of fixing to backing structure: High performance stainless steel bolts and expanding anchors.

234 FIXINGS (RESTRAINT - CHANNEL SUPPORT VERTICAL DOWEL):
- Standard: To BS 8298-1 and -2..
- Designer/ Supplier: To be the following or similar:-
  Ancon Building Products (Tel: 0114 2755224)
  www.ancon.co.uk
- Type: *Ancon DP40 Restraint Ties (Vertical Dowel)*
- Material: Stainless steel to BS EN 10088 grade 1.4301 (304 S16).
- Dimensions: Not less than recommended by manufacturers.
- Extent of adjustment: To accommodate support structure/ background and cladding fabrication/ installation tolerances.
- Method of fixing to backing structure: High performance stainless steel bolts and expanding anchors.

235 FIXINGS (RESTRAINT - CHANNEL SUPPORT HORIZONTAL DOWEL):
- Standard: To BS 8298-1 and -2..
- Designer/ Supplier: To be the following or similar:-
  Ancon Building Products (Tel: 0114 2755224)
  www.ancon.co.uk
- Type: *Ancon DH40 Restraint Ties (Horizontal Dowel)*
- Material: Stainless steel to BS EN 10088 grade 1.4301 (304 S16).

- Dimensions: Not less than recommended by manufacturers.
- Extent of adjustment: To accommodate support structure/ background and cladding fabrication/ installation tolerances.
- Method of fixing to backing structure: High performance stainless steel bolts and expanding anchors.

236 FIXINGS (COPING STONES / BENCH SEATS):
- Standard: To BS 8298-1 and -2..
- Designer/ Supplier: To be the following or similar:-
  Ancon Building Products (Tel: 0114 2755224)
  www.ancon.co.uk
- Type: *Ancon DPV Restraint Ties.*
- Material: Stainless steel to BS EN 10088 grade 1.4301 (304 S16).
- Dimensions: Not less than recommended by manufacturers.
- Extent of adjustment: To accommodate support structure/ background and cladding fabrication/ installation tolerances.
- Method of fixing to backing structure: High performance stainless steel bolts and expanding anchors.
- Fixing through DPC: Fully lap and seal over and around fixing with mastic paste to suit DPC as F30/330.

237 FIXINGS (CORNER ANGLE):
- Standard: To BS 8298-1 and -2..
- Designer/ Supplier: Halfen Ltd (Tel: 08705 31630)
  www.halfen.co.uk
- Type: *Lutz Corner Angle NAS-W-1*
- Material: Stainless steel to BS EN 10088 grade 1.4301 (304 S16).
- Dimensions: Not less than recommended by manufacturers.
- Extent of adjustment: To accommodate support structure/ background and cladding fabrication/ installation tolerances.
- Method of fixing: High performance stainless steel bolts and expanding anchors.

245 INFORMATION TO BE PROVIDED DURING DETAILED DESIGN
- Submit the following cladding particulars:
  - A schedule of detailed drawings and dates for submission for comment.
  - A schedule of loads that will be transmitted from cladding to the support structure/ background.
  - Proposed fixing details and systems relevant to structural design and construction with methods of adjustment and tolerances.
  - A schedule of fabrication tolerances/ size tolerances.
  - A detailed testing programme in compliance with Main Contract master programme.
  - A detailed fabrication and installation programme in compliance with Main Contract master programme.
  - Proposals to support outstanding applications for Building Regulation consents or relaxations.
- Timing of submissions: As Preliminaries section A31.

247 QUALITY PLAN
- Requirement: Submit during detailed design.
- Content: In accordance with BS EN ISO 9001 and including the following:
  - Name of the quality manager.
  - Quality assessment procedures.
  - Inspection procedures to be adopted in checking the work.
  - Stages at which check lists will be used and samples of the lists.
  - List of work procedures on the correct use of materials or components, both off-site and on-site.
  - List of product information with latest revisions.
  - Subcontractors involved in the work.
  - Subcontractors' quality plans.
  - Storage, handling, transport and protection procedures.

- Procedure for registering and reporting non compliances.
- Maintenance procedures and calibration records.
- Certification that completed work complies with specification.
- Check list register to ensure all items have been inspected and non compliances discharged.

261 STONE SAMPLES
- General: Before commencing detailed design, submit labelled samples or arrange for samples that represent the range of variation in appearance to be inspected.

271 FIXING SAMPLES
- General: During detailed design, submit samples of every type. Clearly identify. Include manufacturer's recommended torque figures.
- Shims: Submit dimensions.

280 SAMPLE PANEL:
REV C2 - Construct sample panel in agreed location to establish quality of finish and construction. Obtain approval of appearance before proceeding. **Sample to be impregnated as M60/190.**
- Size: 1500 x 1500mm nominal.

281 CONTROL SAMPLES
- General: Complete areas of finished work and obtain approval of appearance before proceeding.
REV C2 - Size: 1500 x 1500mm nominal. **Sample to be impregnated as M60/190.**
- Location: (TBC).

290 ADDITIONAL CORROSION TREATMENT OF STEEL FRAMING:
- Site-cut, site-drilled and damaged elements of galvanised steel to be prepared and coated with zinc-rich paint (eg. Fosroc *Galvafroid*) as manufacturer's recommendations.

DESIGN/ PERFORMANCE REQUIREMENTS

325 PRELIMINARY TEST INFORMATION
- Stone type: As H51/110.
- Stone supplier to provide following design information to Contractor:-
  - Petrographic examination to BS EN 12407.
  - Water absorption coefficient by capillarity to BS EN 1925:.
  - Apparent density to BS EN 1936:
  - Real density to BS EN 1936:
  - Open porosity to BS EN 1936:
  - Total porosity to BS EN 1936:
  - Flexural strength to BS EN 12372:

330 ACCURACY OF ERECTION
- Elevation joint widths: Within joint lengths, including in-line continuations across tranverse joints, as follows:
  - Tolerance: Greatest width not to exceed least width by more than 18%.
  - Variations: Evenly distribute, with no sudden changes.
- Offset in elevation: Between nominally in-line edges across transverse joints not to exceed 15% width of joint.
- Offset in plan or section: Between flat faces or adjacent panels across joints not to exceed 18% width of joint.
- Sealant joints width limitations: To recommendations of sealant manufacturer.
- Finished work: Square, regular, true to line and plane with satisfactory fit at junctions.

TESTING

405 TESTING AUTHORITY

- Testing: Carried out by a United Kingdom Accreditation Service (UKAS) approved independent laboratory.

415 TESTING AUTHORITY
- Testing: Carried out by the stone supplier/ contractor and witnessed/ certified by the CA.

425 STONE PRODUCTION TESTS
- Frequency of tests: After quarrying every 15m^3 of stone.
- Procedures: Water absorption coefficient by capillarity to BS EN 1925.
- Results: Submit prior to fabrication.

435 SITE TESTING OF FIXINGS TO DETERMINE ULTIMATE LOAD
- Number and location of test fixings: 10 fixings into steel framing system GG10/170 and 10 fixings into concrete shear wall.
- Test method: To BS 5080-1 and Construction Fixings Association guidance note 'Procedure for site testing construction fixings'.

445 SITE TESTING OF FIXINGS DURING INSTALLATION
- Number and location of test fixings: 10 fixings into steel framing system GG10/170 and 10 fixings into concrete shear wall..
- Test method: To BS 5080-1 and Construction Fixings Association guidance note 'Procedure for site testing construction fixings'.

FABRICATION AND INSTALLATION

510 GENERALLY
- Location of joints: Joints must occur only at positions indicated on final detailed drawings.
- Electrolytic corrosion: Isolate dissimilar metals.
- Prefabrication: Machine cut and drill products in workshop wherever possible.
- Identification: Mark or tag products. Do not mark surfaces visible in the complete installation.
- Natural bed: Indicate on a non exposed surface of each stone.
- Cleanliness: Keep facework clean. Rubbing to remove marks and stains not permitted.

520 CUTTING OF STONE
- Standard: To BS 8298 for production generally, including permissible deviations.
- Bedding: Appropriate to position.
- Oversize stones: Leave selected stone units oversize, to accommodate deviations within building structure. Cut to precise dimensions taken on site.
  - Selected units: Clearly identify on shop drawings.

525 CUTTING OF STONE
- Standard: To BS 8298 for production generally.
- Bedding: Appropriate to position.
- Permissible deviations (finer tolerances preferred):

Dimension	Deviation
- Height	± 2mm
- Width	± 2mm
- Diagonal lesser of 0.5% or	± 5mm
- Thickness	± 3mm
- Kerf width	± 1.5mm.
- Kerf position	± 1.5mm
- Hole position on face	± 6mm.
- Undercut anchor on rear	±

- Oversize stones: Leave selected stone units oversize, to accommodate deviations within building structure. Cut to precise dimensions taken on site.
  - Selected units: Clearly identify on shop drawings.

530 INSPECTION OF STONE UNITS
- Give notice:

- At appropriate stages of production.
- Before dispatch to site.

540 SUITABILITY OF STRUCTURE

- Contractor's survey:
  - Programme: Not less than 4 weeks before commencement of cladding installation.
  - Scope: Geometric survey of supporting structure, checking line, level and fixing points.
  - Coordinate: With surveys for adjacent cladding.
  - Give notice: If the structure will not allow the required accuracy or security of erection.
- Setting out: Establish erection datum points, lines and levels for a complete elevation at a time unless otherwise agreed.

560 METALWORK

- Material standards and fabrication: As section Z11.

570 WELDING

- In situ welding: Not permitted.

580 FIXING

- Torque figures and shim dimensions: Do not exceed fixing manufacturer's recommendations.
- Grouting: Secure fixings in place in cladding and support structure/ background with cement:sand, epoxy or modified polymer mix, as recommended by the stone supplier.
- External cladding: Do not use mortar spacer dabs. Keep cavity clear of debris.
- Give notice:
  - Before covering up loadbearing fixings.
  - Before proceeding with next course on completion of: plinth course.

599 HYDRAULIC LIME: SAND MORTAR:

- Mortar: As section Z21.
- Manufacturer/supplier: Lime Technology Ltd

REV C4

Type: *Limetec Traditional London Ashlar Mortar*
Mix: Premixed as manufacturer's recommendations.
Sand: Sharp, well graded sand to an approved colour. Max Aggregate: 2mm

- Joints: Flush; brushed.
- Preparation: Wet stones thoroughly.
- Laying: Full mortar bed with joints and voids filled.
  - Cavities: Clear of mortar.
- Appearance: Neat and consistent.
- Temporary distance spacers: Remove.

630 SEALANT MOVEMENT/ OTHER JOINTS

- Sealant: One part low modulus silicone (non-staining for natural stone).
  - Manufacturer and reference: Otto-Chemie
    http://www.otto-chemie.de
    Ottoseal S70 Natural Stone Sealant
  - Colour: To match colour of mortar (TBC).
  - Application: As section Z22.
- Joint widths: Where not specified, to be as small as practicable. Allow for shrinkage, thermal and other movements in structure and cladding.