

External Realm Specification

25th April 2024

Version 3

To be read in conjunction with;

- Hard Landscape Product Schedule
- Hard Landscape General Arrangement Drawing
- Soft Landscape General Arrangement Drawing
- Associated Construction Details

Record of issue

Ref	Date	Nature of Change	By	Checked
1	6/10/23	N/A First Issue	SR	SLR
2	9/10/23	Bollard Q50 References corrected	SR	SLR
3	25/4/24	Bird box details added to Q50	SR	SLR

Wrexham Museum Renovation

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C Demolition/ Alteration/ Renovation

C10 Site survey

To be read with Preliminaries/ General conditions.

SURVEYS

135 ASSESSMENT SURVEY – Forecourt sub-base

- Qualifications of survey author: Civil Engineer.
- Area to be surveyed: Forecourt, Education Garden and side of museum adjacent to car parking
- Objectives: Identify and match artefacts/ buildings/ structures within site boundary. Criteria: To provide definitive information on the build-up of these areas to confirm suitability of paving proposals.
- Permissible survey techniques to acquire additional data: Trail pits and window sampling.
- Source data for reference/ verification: The following information is provided: Services drawing and drainage plan – By others
- Assessment survey report: Submit.
 - Timing: 4 weeks of contract award.

155 ARBORICULTURAL SURVEY

- Qualifications of survey author: Arboricultural Association member
- Area to be surveyed: 4 No, Pear trees in forecourt and sycamore to west side of museum
 - Existing conservation status/ designation: Conservation Area protection
- Objectives:
 - Survey scope TO assess the safe useful life expectancy of the trees that are proposed for retention by the proposals.
- Methodology: Visual inspection from ground level
 - Permissible survey techniques: All none intrusive forms of investigation permissible.
 - Timing: On appointment.
- Source data provided for reference/ verification: None..
- Arboricultural survey report: Submit.
 - Timing: 4 weeks of contract award

165 INVASIVE SPECIES SURVEY _____

- Qualifications of survey author: _____.
- Area to be surveyed: _____.
 - Existing conservation status/ designation: _____.
- Objectives:
 - Designated areas: Identify and record boundaries of designated areas within or adjacent to site.
 - Survey scope: _____.
 - Species: _____.
 - Methodology: In accordance with _____.
 - Permissible survey techniques: _____.
 - Timing: _____.
- Source data provided for reference/ verification: _____.
- Invasive species survey report: Submit.
 - Timing: _____.

SURVEY TECHNIQUES

420 UNFORESEEN HAZARDS

- Unrecorded hazards and hazardous materials: Give notice when found. Do not disturb.

430 SURVEY INSTRUMENTS

- Equipment calibration: In accordance with manufacturer's recommendations.
- Site use calibration: To relevant parts of BS 7334-1, -2, -3, -4, -5, -6, -7 and -8.
- Calibration: Use only persons accredited by the United Kingdom Accreditation Service (UKAS).
- Calibration compliance: Submit evidence prior to use.

440 PROTECTION

- Protect the following: Trees and listed artefacts including museum buildings and forecourt walls.

CII Site investigation

C11 Site investigation

To be read with Preliminaries/ General conditions.

GENERAL REQUIREMENTS

110 EXTENT OF INVESTIGATION

- Location: All external realm areas
- Objectives: TO identify soft spots or areas of suspected contamination.

112 MONITORING OF GROUND CONDITIONS DURING CONSTRUCTION

- Purpose: To identify differences between actual ground conditions and those assumed in design.
- Assumed ground conditions: Made ground but stable.
- Inspect and record: Sequence and soil types revealed in sides of excavations and nature of soil in formations.
- Other requirements: Areas of potential contamination or saturation.
- Actions: Report ground conditions revealed. If these differ from conditions assumed, await instructions before constructing ground supported/ supporting structures.

140 ACCESS TO THE SITE

- Details: See main preamble and preliminaries.
- Contact: Contract Administrator

150 PUBLIC SAFETY

- Protection of the public and occupiers of adjoining property: Erect temporary fences, hoardings, footpaths, warning lights, etc. before starting work.
- Means of escape from adjoining property in the event of fire: Maintain for the duration of the Works.
- Specific hazards which may be encountered: Traffic on adjacent walls, stability of stone boundary wall to St Mary's Cathedral to west of the forecourt area with pronounced tree pressure leading to a bulge in the wall.

160 SITE SAFETY

- Excavations and boreholes: Support sides and keep free from ground and surface water.
- Protection: As required to protect site operatives and any passing members of the public..

170 SURVEY INSTRUMENTS

- Equipment calibration: In accordance with manufacturer's recommendations.
- Site use calibration: To BS 7334.
- Calibration: Use only persons accredited by the United Kingdom Accreditation Service (UKAS).
- Calibration compliance: Submit evidence prior to use.
- Documentation: Supplied if requested.

180 COMPETENCE

- Skill and experience: Appropriate for the type of work.
 - Evidence: Submit prior to commencement.

190 PROTECTION

- Protect the following: _____.

INVESTIGATION

205 PRESENTATION OF DATA AND INFORMATION

- Requirements: Interpretative report.
- Photographs: Included in above report..

230 DETAILED EXAMINATION/ SPECIAL STUDY

Examine available information, carry out a study and submit a report to include the following:

- Scope of study: Stability of boundary stone wall to St Mary's Cathedral
- Features to be included: Bulge in wall near sycamore tree and where soil is to be placed up against wall in Education Garden.
- Specific requirements as to method: None

240 GROUND INVESTIGATION

- Requirement: Determine the soil profile, physical and chemical nature of the soils and the necessary design parameters.
- Standard: Relevant British Standards
- Method:
 - Exploratory holes: 4 No in forecourt, 2 No in Education Garden, 2 No at car parking.
 - Field testing: CBR Testing
 - Sampling: Suitable sample sizes for lab testing if required.

242 CONTRACTOR DESIGNED GROUND INVESTIGATION _____

- Requirements: Design and carry out a ground investigation to determine the soil profile, physical and chemical nature of the soils and the necessary design parameters.
- Standard: As proposed.
- Proposals: Submit proposals for As proposed
 - Timing:- 2 weeks after appointment

250 TRIAL PITS AND TRENCHES

- Purpose: To understand build up in forecourt and Education Garden
- Locations: To be agreed
- Full depth: 600mm
- Hand dig: If near services including drain lines.
- Minimum trench width: 450mm
- Minimum base area of pits: 0.45m²
- Protection: to sides of pit
- Backfill material: Arisings.
- Reinstatement: Cold lay bitumen macadam

265 SUBSTRUCTURE INSPECTION PITS

- Purpose: To determine the dimensions and formation level of existing substructures and the nature of the soil on which they are bearing.
- Pit dimensions: The minimum necessary for the described purpose.
- Method of excavation: By hand.
 - Precautions: Observation on adjacent walls and props as required.
- Samples: To be advised on opening up
- Backfill material: Arisings.
- Reinstatement: Cold lay bitumen macadam
- Record: Dimensions of visible face of substructure; level of substructure formation; sequence of strata visible in sides of pit; level at which soil samples were taken.

FIELD TESTS

275 INFORMATION

- General: For each test record, supply the following:

- Project name and reference.
- Date and time of test.
- Weather conditions.
- Soil type and description
- Location and details of sample, including exploratory hole number and position, depth, ground level, water level.
- In-situ photographs: Digital for ease of transfer
- Feature encountered: Provide description and state depth of any services, foundations or unexpected item of historic interest or contamination.

300 GEOPHYSICAL TESTS

- Standard: Carry out and report in accordance with BS 5930 and BS 7022.
- Purpose: To determine suitability of sub-base for paving proposals
- Test/ method: To be confirmed
 - Locations: To be agreed
- Test report: Include interpretation of test results, clearly identifying any areas of uncertainty.
 - Format: Digital interpretative report
 - Timing: Within 2 weeks of testing.

310 SPECIAL TESTS

- Type: _____.
- Location: _____.
 - Method: _____.
 - Frequency: _____.
 - Equipment and procedure: Provide full description before commencement.
 - Data to be submitted: _____.

314 TELEVISION SURVEY OF BOREHOLES

- Location: _____.
- Camera: With lighting and all round viewing, and safe for use in atmosphere containing explosive gas.
- Record:
 - Format: DVD, with depth, orientation and inclination displayed.
- Written interpretation: To include features observed and depth at which located.
- Submission of record: _____.

SAMPLING

327 SAMPLING FOR CONTAMINATION TESTING

- Cleanliness: Wash samplers and tools in clean water before obtaining samples, and prevent cross contamination of samples and sampling points.
- Supervision: Sampling and handling to be supervised by an environmental scientist.
- Details: Size and type of sample, methods of sampling, and storage and time limitations until testing to suit specified or agreed testing.
- Solid samples:
 - Location: Take samples from proposed trial pits.
 - Generally: Take samples of each material encountered and at changes in colour, odour or consistence of the material.
 - Sampling commencement: Below existing surfacing sub-base.
 - Sampling within layers: In separate layers if present
- Groundwater samples: Not required.

350 LABORATORY TESTS FOR MECHANICAL PROPERTIES OF SOILS

- Tests: To be confirmed
 - Standard for testing and reporting: As agreed with Contractor.
 - Samples: As supplied to lab by the GI Contractor

360 LABORATORY TESTS FOR CHEMICAL PROPERTIES OF SOILS AND WATER

- Tests: To be confirmed
 - Standard for testing and reporting: As agreed with Contractor.
 - Samples: As supplied to lab by the GI Contractor

370 INTERPRETATIVE REPORT

- Scope: Structural quality of sub-base to receive proposed surfacing and any ground contamination encountered
 - Features to be included: As agreed
 - Evaluation criteria: Site and materials safe for public use, but not habitation.
 - Specific requirements as to method: None
 - Specific limitations on presentation: English only is acceptable.
 - Preliminary Report: Not required.

C20 Demolition

C20 Demolition

To be read with Preliminaries/ General conditions

GENERAL REQUIREMENTS

110 DESK STUDY/ SURVEY

- Scope: Before starting deconstruction/ demolition work, examine available information, and carry out a survey of:
 - the structure or structures to be deconstructed/ demolished,
 - the site on which the structure or structures stand, and
 - the surrounding area.
- Report and method statements: Submit, describing:
 - Form, condition and details of the structure or structures, the site, and the surrounding area.
Extent: External realm around the museum
 - Type, location and condition of features of historical, archaeological, geological or ecological importance.
 - Type, location and condition of adjoining or surrounding premises that might be adversely affected by removal of the structure or structures, or by noise, vibration and/ or dust generated during deconstruction/ demolition.
 - Identity and location of services above and below ground, including those required for the Contractor's use, and arrangements for their disconnection and removal.
 - Form and location of flammable, toxic or hazardous materials, including lead-based paint, and proposed methods for their removal and disposal.
 - Form and location of materials identified for reuse or recycling, and proposed methods for removal and temporary storage.
 - Proposed programme of work, including sequence and methods of deconstruction/ demolition.
 - Details of specific pre-weakening required.
 - Arrangements for protection of personnel and the general public, including exclusion of unauthorized persons.
 - Arrangements for control of site transport and traffic.
 - Special requirements: Retention of seats, Brymbo Man head sculpture and Acton Dog sculpture.
- Format of report: Digital Risk Assessment Method Statements (RAMS)

120 EXTENT OF DECONSTRUCTION/ DEMOLITION

- General: Subject to retention requirements specified elsewhere, deconstruct/ demolish structures down to 300mm below ground level.

130 GROUNDWORKS

- Old foundations, slabs and the like: Break out in locations and to the extents required to lay / build proposals.
- Contaminated material: Remove and carry out remediation required to allow construction.

140 BENCH MARKS

- Unrecorded bench marks and other survey information: Give notice when found. Do not remove marks or destroy the fabric on which they are found.

150 FEATURES TO BE RETAINED INSITU

- General: Keep in place and protect the following:
 - Forecourt - 4 pear trees, door stone to Court 1, boundary wall
 - Education Garden – central drainage channel
 - Car Parking Area – surfacing to deliver area.

152 FEATURES TO BE RETAINED AND LIFTED FOR RENOVATION AND RETURNED

- General: Keep in place and protect the following:
 - Forecourt – Brymbo man head sculpture, Acton Dog, bespoke metal seats (2No.), Yorkstone setts, bespoke gates adjacent to Court 1.

SERVICES AFFECTED BY DECONSTRUCTION/ DEMOLITION

210 SERVICES REGULATIONS

- Work carried out to or affecting new and/ or existing services: Carry out in accordance with the byelaws and/ or regulations of the relevant Statutory Authority.

220 LOCATION OF SERVICES

- Services affected by deconstruction/ demolition work: Locate and mark positions.
- Mains services marking: Arrange with the appropriate authorities for services to be located and marked.
 - Marking standard: In accordance with National Joint Utilities Group 'Guidelines on the positioning and colour coding of underground utilities' apparatus'.

230 SERVICES DISCONNECTION ARRANGED BY CONTRACTOR

- General: Arrange with the appropriate authorities for disconnection of services and removal of fittings and equipment owned by those authorities prior to starting deconstruction/ demolition.

231 SERVICES DISCONNECTION ARRANGED BY EMPLOYER

- General: The Employer will arrange with the appropriate authorities for disconnection of services and removal of fittings and equipment owned by those authorities prior to deconstruction/ demolition, as follows: WCBC internal ICT equipment.
- Timing: Do not start deconstruction/ demolition until disconnections are completed.

232 SERVICES DISCONNECTION ARRANGED BY EMPLOYER AND CONTRACTOR

- Responsibility: The Employer will arrange with the appropriate authorities for disconnection of services and removal of fittings and equipment owned by those authorities prior to deconstruction/ demolition, as follows: None
- Disconnection of remaining services: Arrange with the appropriate authorities. Remove fittings and equipment not owned by those authorities.
- Timing: Do not start deconstruction/ demolition until disconnections are completed.

240 DISCONNECTION OF DRAINS

- General: Locate, disconnect and seal disused foul and surface water drains.
- Sealing: Permanent, and within the site.

250 LIVE FOUL AND SURFACE WATER DRAINS

- Drains and associated manholes, inspection chambers, gullies, vent pipes and fittings:
 - Protect; maintain normal flow during deconstruction/ demolition.
 - Make good any damage arising from deconstruction/ demolition work.
 - Leave clean and in working order at completion of deconstruction/ demolition work.
- Other requirements: Mark runs for new connections of linear drains in Forecourt.

260 SERVICE BYPASS CONNECTIONS

- General: Provide as necessary to maintain continuity of services to occupied areas of the site on which the deconstruction/ demolition is taking place and to adjoining sites/ properties.
- Minimum notice to adjoining owners and all affected occupiers: 72 hours, if shutdown is necessary during changeover.

270 SERVICES TO BE RETAINED

- Damage to services: Give notice, and notify relevant service authorities and/ or owner/ occupier regarding damage arising from deconstruction/ demolition.
- Repairs to services: Complete as directed, and to the satisfaction of the service authority or owner.

DECONSTRUCTION/ DEMOLITION WORK

310 WORKMANSHIP

- Standard: Demolish structures in accordance with BS 6187.
- Operatives:
 - Appropriately skilled and experienced for the type of work.
 - Holding, or in training (under supervision on site) to obtain, relevant CITB Certificates of Competence.
- Site staff responsible for supervision and control of work: Experienced in the assessment of risks involved and methods of deconstruction/ demolition to be used.

320 GAS OR VAPOUR RISKS

- Precautions: Prevent fire and/ or explosion caused by gas and/ or vapour from tanks, pipes, etc.

330 DUST CONTROL

- General: Reduce airborne dust by periodically spraying deconstruction/ demolition works with an appropriate wetting agent. Keep public roadways and footpaths clear of mud and debris.
- Lead dust: Submit method statement for control, containment and clean-up regimes.

340 HEALTH HAZARDS

- Precautions: Protect site operatives and general public from hazards associated with vibration, dangerous fumes and dust arising during the course of the Works.

350 ADJOINING PROPERTY

- Temporary support and protection: Provide. Maintain and alter, as necessary, as work proceeds. Do not leave unnecessary or unstable projections.
- Defects: Report immediately on discovery.
- Damage: Minimize. Repair promptly to ensure safety, stability, weather protection and security.
- Support to foundations: Do not disturb.

360 STRUCTURES TO BE RETAINED

- Extent: Boundary walls to all space
- Parts which are to be kept in place: Protect.
- Interface between retained structures and deconstruction/ demolition: Cut away and strip out with care to minimize making good.

370 PARTLY DEMOLISHED STRUCTURES

- General: Leave in a stable condition, with adequate temporary support at each stage to prevent risk of uncontrolled collapse. Make secure outside working hours.
- Temporary works: Prevent overloading due to debris.
- Access: Prevent access by unauthorized persons.

380 DANGEROUS OPENINGS

- General: Provide guarding at all times, including outside of working hours. Illuminate during hours of darkness.
- Access: Prevent access by unauthorized persons.

390 ASBESTOS-CONTAINING MATERIALS – KNOWN OCCURRENCES

- General: Materials containing asbestos are known to be present in: None anticipated in the external realm.
- Removal: By competent contractor to planned and agreed Method Statement.

391 ASBESTOS-CONTAINING MATERIALS – UNKNOWN OCCURRENCES

- Discovery: Give notice immediately of suspected asbestos-containing materials when discovered during deconstruction/ demolition work. Avoid disturbing such materials.
- Removal: Submit statutory risk assessments and details of proposed methods for safe removal.

410 UNFORESEEN HAZARDS

- Discovery: Give notice immediately when hazards such as unrecorded voids, tanks, chemicals, are discovered during deconstruction/ demolition.
- Removal: Submit details of proposed methods for filling, removal and making good afterwards.

420 OPEN BASEMENTS AND VOIDS

- Temporary support: Leave adequate buttress walls or provide temporary support to basement retaining walls up to ground level.
- Safety: Make remaining sections of retaining and buttress walls safe and secure.
- Water movement: Make holes in basement floors to allow water drainage or penetration (depending on water table). Provide a hole for every 10 m², not less than 600 mm in diameter.

430 FILLING OF BASEMENTS AND VOIDS

- Temporary support: Leave adequate buttress walls or provide temporary support to basement retaining walls up to ground level.
- Water movement: Make holes in basement floors to allow water drainage or penetration (depending on water table). Provide a hole for every 10 m², not less than 600 mm in diameter.
- Filling: Remove organic material and soil from basements and other voids. Fill and consolidate with clean compacted stone aggregate in 300mm layers.

442 SITE SURFACE AT COMPLETION

- Levels: Grade the site to follow the levels of adjacent areas.
- Temporary surface: Not applicable.

450 SITE CONDITION AT COMPLETION

- Debris: Clear away and leave the site in a tidy condition.
- Other requirements: Pass details of unknown structures and voids to Contract Administrator.

MATERIALS ARISING

510 CONTRACTOR'S PROPERTY

- Components and materials arising from the deconstruction/ demolition work: Property of the Contractor except where otherwise provided.
- Action: Remove from site as work proceeds where not to be reused or recycled for site use.

511 EMPLOYER'S PROPERTY

- Components and materials to remain the property of the Employer: All sculptures and gates, yorkstone setts
- Protection: Maintain until these items are removed by the Employer or reused in the Works, or until the end of the Contract.
- Special requirements: Lift, clean and store (off site if necessary) the reclaimed yorkstone setts that line the ditched drainage channel as a reclaimed material.

520 RECYCLED MATERIALS

- Materials arising from deconstruction/ demolition work: Can be recycled or reused elsewhere in the project, subject to compliance with the appropriate specification and in accordance with any site waste management plan.
- Evidence of compliance: Submit full details and supporting documentation.
 - Verification: Allow adequate time in programme for verification of compliance.

D Groundwork

D20 Excavating and filling

D20 Excavating and filling

To be read with Preliminaries/General conditions

GENERALLY/THE SITE

110 SITE INVESTIGATION

- Report: To be prepared after site investigation activity.

112 SITE INVESTIGATION REPORT

- Interpretative by Contractor appointed specialist.

145 VARIATIONS IN GROUND WATER LEVEL

- Give notice: If levels encountered are significantly different from levels in the site investigation report or previously measured.

150 EXISTING SERVICES, FEATURES AND STRUCTURES

- Services: See Works Information by ?? for locations.
- Site features to be retained: See section C20:150 and C20:152 for details.

CLEARANCE/EXCAVATING

164 TREE ROOTS

- Protected area: Do not cut roots within tree root protection area.
 - Size of area: 6m radius around every tree stem.
- Excavation in protected area:
 - Method: By hand or vacuum excavation under the supervision of a competent SArboriculturalist.
 - Backfill as soon as possible or temporarily line with polyethylene sheet to reduce evaporation.
- Outside protected area: Give notice of roots exceeding 25 mm and do not cut without approval.
- Cutting:
 - Make clean smooth cuts with no ragged edges.
 - Pare cut surfaces smooth with a sharp knife.
 - Treatment of cut roots: None.
- Backfill: Organic topsoil, moist in water content

168 SITE CLEARANCE

- Timing: Before topsoil stripping, if any.
- General: Clear site of rubbish, debris and vegetation. Do not compact topsoil.
- Treatment: None
- Treatment: Apply a suitable translocated nonresidual herbicide.
- Timing: Not less than two weeks before excavating topsoil.

240 ADJACENT EXCAVATIONS

- Requirement: Where an excavation encroaches below a line drawn at an angle from the nearest formation level of another higher excavation, the lower excavation, all work within it and backfilling thereto, must be completed before the higher excavation is made.
- Angle of line below horizontal: 45 degrees.
- Backfill material: Clean, angular stone

242 EXCAVATIONS ADJACENT TO EXISTING BACKFILLED TRENCHES

- Proximity: When width of undisturbed ground between the two excavations will be less than
- Action: Assume that the ground between the trenches is unstable and provide side support

accordingly.

244 EXCAVATIONS ADJACENT TO EXISTING FOUNDATIONS

- Prior to commencing excavation:
 - Excavate trial pits adjacent to existing foundations to determine extent and formation levels.
 - Allow for inspection of trial pits.
 - Allow time for amendment of details if required.
Time period: 2 weeks .
- Backfill material to new excavation: Clean angular stone

245 EXCAVATIONS ADJACENT TO EXISTING FOUNDATIONS - CONTRACTOR'S DESIGN

- Prior to commencing excavation: Excavate trial pits adjacent to existing foundations to determine extent and formation levels.
- Submit proposals: For ensuring the safety of the existing foundations if the formation level for the new excavation will be below
- Backfill material to new excavation: Clean angular stone.

250 PERMISSIBLE DEVIATIONS FROM FORMATION LEVELS

- Beneath mass concrete foundations: ± 25 mm.
- Beneath ground bearing slabs and r.c. foundations: ± 15 mm.
- Embankments and cuttings: ± 50 mm.
- Ground abutting external walls: ± 50 mm, but such as to ensure that finished level is not less than 150 mm below dpc.

255 ACCURACY - LINEAR DIMENSIONS

- Permissible deviations from linear dimensions generally: ± 10 mm.

260 INSPECTING FORMATIONS

- Give notice: Make advance arrangements for inspection of formations for forecourt surfacing
 - Notice (minimum): 72 hours.
- Preparation: Just before inspection remove the last 150 mm of excavation.
- Trim to required profiles and levels.
Seal: Within 4 hours of inspection.

270 FOUNDATIONS GENERALLY

- Give notice if:
 - A natural bearing formation of undisturbed subsoil is not obtained at the depth shown through site investigation
 - The formation contains soft or hard spots or highly variable material.

280 TRENCH FILL FOUNDATIONS

- Excavation: Form trench down to formation in one operation.
- Safety: Prepare formation from ground level.
- Inspection of formations: Give notice before commencing excavation.
 - Period of notice: 72 hours.
- Shoring: Where inspection of formation is required, provide localised shoring to suit ground conditions.
- Concrete fill: Place concrete immediately after inspection and no more than four hours after exposing the formation.

290 FOUNDATIONS IN MADE UP GROUND

- Depth: Excavate down to a natural formation of undisturbed subsoil.
- Discrepancy: Give notice if this is greater or less than depth given.

310 UNSTABLE GROUND

- Generally: Ensure that the excavation remains stable at all times.
- Give notice: Without delay if any newly excavated faces are too unstable to allow earthwork support to be inserted.
- Take action: If instability is likely to affect adjacent structures or roadways, take appropriate emergency action.

320 RECORDED FEATURES

- Recorded foundations, beds, drains, manholes, etc: from trial pits.
- Contaminated earth: Remove and dispose of as required by local authority at Licenced Facility.

330 UNRECORDED FEATURES

- Give notice: If unrecorded foundations, beds, voids, basements, filling, tanks, pipes, cables, drains, manholes, watercourses, ditches, etc. not shown on the drawings are encountered.

335 NEW FOUNDATIONS CROSSING OLD FOUNDATIONS OR WALLS

- Break out: The old foundation/ wall where it crosses the new foundation/ wall:
 - Length of breaking out: Width of the new foundation/ wall plus 300mm.
 - Depth of breaking out: 300mm.
- Disturbed/ softened soil: When the formation for the old foundation/ wall is deeper than the formation of the new foundation.
 - Excavate: Soil that has been disturbed and/ or softened on either side of the old wall/ foundation, and for 500mm
- Step up: The formation for the new foundation as necessary on either side of the old foundation/ wall until the formation is at its design level.
 - Size of steps: 300mm.
- Backfilling beneath design formation level: Clean, angular stone compacted to remove voids.

360 EXCESS EXCAVATION

- Excavation taken wider than required:
 - Backfill: Clean angular stone compacted in 300mm layers.
- Excavation taken deeper than required:
 - Backfill: Clean angular stone compacted in 300mm layers

370 UNDERGROUND STRUCTURES IN LANDSCAPE AREAS

- Generally: Remove walls, roads, foundations, disused services, drains, manholes and the like to minimum depth.
- Minimum depth below finished levels:
 - Grass, ground cover and perennial planting: 500 mm.
 - Shrub planting: 750 mm.
 - Within 2 m of tree planting: 1000 mm.
- Walls and slabs remaining: In every 10 m² of wall or slab, make a drainage hole at least 600 mm diameter.

DISPOSAL OF MATERIALS

410 EXCAVATED TOPSOIL STORAGE

- Storage: Stockpile in temporary storage heaps – none anticipated.

415 EXCAVATED TOPSOIL REMOVAL

- General: Remove from site.

441 SURPLUS SUBSOIL

- Excavated material: Stockpile in temporary storage heaps until removed from Site.
- Retained material: Do not spread or retain surplus subsoil on site.

- Remaining material: Remove from site.

450 WATER

- Generally: Keep all excavations free from water until:
 - Formations are covered.
 - Below ground constructions are completed.
 - Basement structures and retaining walls are able to resist leakage, water pressure and flotation.
- Drainage: Form surfaces of excavations and fill to provide adequate falls.
- Removal of water: Provide temporary drains, sumps and pumping as necessary. Do not pollute watercourses with silt laden water.

454 GROUND WATER LEVEL, SPRING OR RUNNING WATER

- Give notice: If it is considered that the excavations are below the water table.
- Springs/ Running water: Give notice immediately if encountered.

457 PUMPING

- General: Do not disturb excavated faces or stability of adjacent ground or structures.
- Pumped water: Discharge without flooding the site or adjoining property.
- Sumps: Construct clear of excavations. Fill on completion.
 - Locations: To be agreed given site conditions and phase of works.

460 PERMANENT DRAINAGE SYSTEM

- Disposal of water from the excavations through system to Welsh Water standards.

FILLING

500 PROPOSED FILL MATERIALS

- Details: Submit full details of proposed fill materials to demonstrate compliance with specification, including:
 - Type and source of imported fill.
 - Proposals for processing and reuse of material excavated on site.
 - Test reports as required elsewhere.
- Timing: 2 weeks before proposed filling exercise

510 HAZARDOUS, AGGRESSIVE OR UNSTABLE MATERIALS

- General: Do not use fill materials which would, either in themselves or in combination with other materials or ground water, give rise to a health hazard, damage to building structures or instability in the filling, including material that is:
 - Frozen or containing ice.
 - Organic.
 - Contaminated or noxious.
 - Susceptible to spontaneous combustion.
 - Likely to erode or decay and cause voids.
 - With excessive moisture content, slurry, mud or from marshes or bogs.
 - Clay of liquid limit exceeding 80 and/or plasticity index exceeding 55.
 - Unacceptable, class U2 as defined in the Highways Agency 'Specification for highway works', clause 601.

512 LIMITATION OF SULFATE CONTENT IN FILL MATERIALS

Certificates of test result: Submit.

520 FROST SUSCEPTIBILITY

- General: Except as allowed below, fill must be non frost-susceptible as defined in Highways Agency 'Specification for Highway Works'.
- Test reports: If the following fill materials are proposed, submit a laboratory report confirming they

are non-frost-susceptible:

- Fine grained soil with a plasticity index less than 20%.
- Coarse grained soil or crushed granite with more than 10% retained on a 0.063 mm sieve.
- Crushed chalk.
- Crushed limestone fill with average saturation moisture content in excess of 3%.
- Burnt colliery shale.
- Frost-susceptible fill: May only be used:
 - At depths below the finished ground surface greater than: 600mm.
 - Where frost heave will not affect structural elements.

525 TESTING OF SUITABILITY OF FILL MATERIALS BEFORE START OF FILLING

- Laboratory: To be agreed.
- Submit report to: Contract Administrator.
 - Timing: 2 weeks before start of filling
- Samples: Deliver to laboratory as required.
- Tests: To confirm structural strength of compacted material and free from contamination.
- Frequency: Once.

530 PLACING FILL

- Surfaces of excavations and areas to be filled: Free from loose soil, topsoil, organic material, rubbish and standing water.
- Freezing conditions: Do not place fill on frozen surfaces. Remove material affected by frost. Replace and recompact if not damaged after thawing.
- Adjacent structures, membranes and buried services:
 - Do not overload, destabilise or damage.
 - Submit proposals for temporary support necessary to ensure stability during filling.
 - Allow 14 days (minimum) before backfilling against in situ concrete structures.
- Layers: Place so that only one type of material occurs in each layer.
- Earthmoving equipment: Vary route to avoid rutting.

535 COMPACTION GENERALLY

- General: Compact fill not specified to be left loose as soon as possible after placing.
- After compaction: Surface of each layer must be well closed, showing no movement under compaction plant, and without cracks, holes, ridges, loose material and the like.
- Defective areas: Remove and recompact to full thickness of layer using new material.

540 BENCHING IN FILL

- Adjacent areas: If, during filling the difference in level between adjacent areas of filling exceeds 600 mm, cut into edge of higher filling to form benches 600 mm minimum width and height equivalent to depth of a layer of compacted filling.
- New filling: Spread and compact to ensure maximum continuity with previous filling.

550 GEOTEXTILE SHEET

- Manufacturer: Terram
- Product reference: to be agreed
- Type: to be agreed
- Polymer type: to be agreed
- Recycled content: to be agreed.
- Jointing: 300mm overlap
- Preparation of subgrade: Rolled and clean
- Protect from:
 - Exposure to light.
 - Contaminants.
 - Materials listed as potentially deleterious by geotextile manufacturer.
 - Wind uplift.

555 GEOGRIDS

- Manufacturer: To be agreed
 - Product reference: to be agreed
- Polymer type: to be agreed.
- Recycled content: at least 50%
- Directional strength: to be agreed.
- Tensile strength: to be agreed.
- Grid geometry: Stretcher bond
 - Direction of grids: 90 degrees to direction of car travel.
- Preparation of subgrade: compacted and rolled
- Fixing: As per manufacturer's recommendations

610 COMPACTED FILLING FOR LANDSCAPE AREAS

- Fill: Material capable of compaction by light earthmoving plant.
- Filling: Layers not more than 200 mm thick. Lightly compact each layer to produce a stable soil structure.

615 LOOSE TIP FILLING FOR LANDSCAPE AREAS

- Filling: Do not firm, consolidate or compact when laying. Tip and grade to approximate levels in one operation with minimum of trafficking by plant.

617 HIGHWAYS AGENCY TYPE 1 UNBOUND MIXTURE

- Fill: To Highways Agency 'Specification for highway works',:
 - Crushed rock (other than argillaceous rock).
 - Crushed concrete.
 - Recycled aggregates.
 - Crushed non-expansive slag.
 - Well-burned non-plastic colliery shale.
- Filling: To Highways Agency 'Specification for highway works'

618 HIGHWAYS AGENCY TYPE 2 UNBOUND MIXTURE

- Fill: To Highways Agency 'Specification for highway works', clauses 801 and 804:
 - Crushed rock (other than argillaceous rock).
 - Crushed concrete.
 - Crushed non-expansive slag.
 - Well-burned non-plastic colliery shale.
 - Natural gravel.
 - Natural sand.
- Amendments to requirements in Highways Agency 'Specification for highway works': _____.
- Filling: To Highways Agency 'Specification for highway works', clause 802.

620 SUBGRADE IMPROVEMENT LAYER (CAPPING)

- Fill: To Highways Agency 'Specification for highway works', Table 6/1, Class 6F1 or 6F2.
- Filling: Place and compact to Highways Agency Specification for highway works, Table 6/1, clause 612 and clause 613.3, 613.9 and 613.10.

626 COMPACTED GENERAL FILL

- Suitable material: clean angular stone.
- Excavated material: Select suitable material and keep separate.
- Filling: Spread and level material in layers. As soon as possible thoroughly compact each layer.
- Required compaction: Heavy, mechanical vibrating roller – 50k/N
- Proposals: Well in advance of starting work submit details of proposed:
 - Materials to be used, including quantities of each type.
 - Type of plant.
 - Maximum depth of each compacted layer.

- Minimum number of passes per layer.
- 640 STARTER LAYER OF COMPACTED FILLING
- Fill: Suitable hard granular material. Compact thoroughly.
 - Thickness: 150mm.
- 650 PROTECTION OF COMPACTED FILLING
- Temporary protective filling: Before allowing construction traffic, raise level of compacted cohesive soil filling at least 150 mm above formation level using properly compacted temporary filling.
 - Removal: Remove temporary protective filling from site before permanent construction.
- 700 BACKFILLING AROUND FOUNDATIONS
- Under oversite concrete and pavings: Hardcore as clause 710.
 - Under grassed or soil areas: Material excavated from the trench, laid and compacted in 300 mm maximum layers.
- 710 HARDCORE FILLING
- Fill: Granular material, free from excessive dust, well graded, all pieces less than 75 mm in any direction, minimum 10% fines value of 50 kN when tested in a soaked condition to BS 812-111, and in any one layer only one of the following:
 - Crushed rock (other than argillaceous rock) or quarry waste with not more binding material than is required to help hold the stone together.
 - Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
 - Crushed non-expansive slag.
 - Gravel or hoggin with not more clay content than is required to bind the material together, and with no large lumps of clay.
 - Well-burned non-plastic colliery shale.
 - Natural gravel.
 - Natural sand.
 - Filling: Spread and level in 150 mm maximum layers. Thoroughly compact each layer.
- 715 VENTING HARDCORE LAYER
- Fill: Clean granular material, well graded, passing a 75 mm BS sieve but retained on a 20 mm BS sieve. In each layer only one of the following:
 - Crushed hard rock.
 - Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
 - Gravel.
 - Filling: Spread and level in 150 mm maximum layers. Thoroughly compact each layer whilst maintaining enough voids to allow efficient venting.
- 730 BLINDING
- Surfaces to receive sheet overlays or concrete:
Blind with:
 - Concrete where shown on drawings; or
 - Sand, fine gravel, or other approved fine material applied to fill interstices. Moisten as necessary before final rolling to provide a flat, closed, smooth surface.
 - Sand for blinding: To BS EN 12620, grade 0/4 or 0/2 (MP).
 - Permissible deviations on surface level: +0 -25 mm.

E In situ concrete/Large precast concrete

E10 Mixing/casting/curing in situ concrete

E10 Mixing/casting/curing in situ concrete

To be read with Preliminaries/General conditions.

CONCRETE MIXES

101 SPECIFICATION

- Concrete generally: To BS 8500-2.
- Exchange of information: Provide concrete producer with information required by BS 8500-1, clauses 4 and 5.

125 SUBSTITUTION OF STANDARDIZED PRESCRIBED CONCRETE FOR DESIGNATED CONCRETE

- General: Conform to BS 8500-2, clause 9.
- Substitution: In accordance with BS 8500-1, table A.13.
 - Proposals: Submit for each substitution, stating reasons.
- Site mixing: No permitted.

132 DESIGNED CONCRETE- By Structural Engineer

- Embedded metal: _____.
- Compressive strength class (cylinder/ cube minimum): _____.
- Target density (oven-dry): _____.
- Fibres: _____.
- Aggregates:
 - Size (maximum): _____.
 - Type/ Density: _____.
 - Coarse recycled aggregates: _____.
 - Additional aggregate requirements: _____.
- Design chemical class: _____.
- Limiting values for composition:
 - Water:cement ratio (maximum): _____.
 - Cement/ combination content (minimum): _____.
 - Cement/ combination content (maximum): _____.
 - Air content in situ (minimum): _____.
- Consistence class: _____.
- Permitted cement/ combinations: _____.
- Chloride class: _____.
- Admixtures: _____.
- Colour: _____.
- Additional mix requirements: _____.

160 STANDARDIZED PRESCRIBED CONCRETE By Structural Engineer _

- Grade: _____.
- Aggregates:
 - Size (maximum): _____.
 - Additional aggregate requirements: _____.
- Special requirements for cement/ combinations: _____.
- Consistence class: _____.
- Site mixing: _____.

185 PRE-BLENDED CONCRETE – as specified by Structural Engineer

- Manufacturer: _____.

- Product reference: _____.
- Storage: In unopened bags clear of the ground in cool dry conditions. Use consignments in order of delivery.
 - Shelf life: _____.
- Mixing: _____.
 - Quantity of water (maximum): _____.
- Other requirements: _____.

MATERIALS, BATCHING AND MIXING

215 READY-MIXED CONCRETE

- Production plant: Currently certified by a body accredited by UKAS to BS EN 45011 for product conformity certification of ready-mixed concrete.
- Source of ready-mixed concrete: Obtain from one source if possible. Otherwise, submit proposals.
 - Name and address of depot: Submit before any concrete is delivered.
 - Delivery notes: Retain for inspection.
- Declarations of nonconformity from concrete producer: Notify immediately.

218 SITE MIXED CONCRETE

- Batching by mass:
 - Restrictions: As specified by Structural Engineer
 - Accuracy of measuring devices: To BS EN 206-1, clause 9.6.2.2
Tolerances for quantity of constituent material: To BS EN 206-1, table 21.
- Batching by volume:
 - Restrictions: As specified by Structural Engineer
- Mixing: To BS 8000-2.1, subsections 2, 3 and 4.

225 CHANGES TO SPECIFICATION

- Changes to specification of fresh concrete (outside concrete producer's responsibility): 14 days notice .

312 PROPRIETARY AGGREGATE

- Manufacturer: As specified by Structural Engineer
 - Product reference: As specified by Structural Engineer.
- Standard: To BS 8500-2: As specified by Structural Engineer
 - Permitted deviations from standard: As specified by Structural Engineer
- Other requirements: As specified by Structural Engineer.

315 AGGREGATES FOR EXPOSED VISUAL CONCRETE

- Limitations on contaminants: Free from absorbent particles which may cause 'popouts', and other particles such as coal and iron sulfide which may be unsightly or cause unacceptable staining.
- Colour: Consistent.
- Supply: From a single source and maintained throughout the contract.
- Samples: Submit on request.

415 ADMIXTURES

- Calcium chloride and admixtures containing calcium chloride: Do not use.

PROJECT TESTING/ CERTIFICATION

505 PROJECT TESTING OF CONCRETE - GENERAL

- Testing: As specified by Structural Engineer
 - Nonconformity: Obtain instructions immediately.
- Recording: Maintain complete correlated records including:
 - Concrete designation.
 - Sampling, site tests, and identification numbers of specimens tested in the laboratory.
 - Location of the parts of the structure represented by each sample.

- Location in the structure of the batch from which each sample is taken.

508 **REGULAR PROJECT TESTING OF CONCRETE**

- Tests: As specified by Structural Engineer
- Sampling:
 - Point: As specified by Structural Engineer
 - Rate: As specified by Structural Engineer.
- Other requirements As specified by Structural Engineer

530 **TESTS RESULTS**

- Submission of reports: Within one day of completion of each test.
 - Number of copies: 1.
- Reports on site: A complete set, available for inspection.

PLACING/ COMPACTION/ CURING AND PROTECTION

630 **PREMATURE WATER LOSS**

- Requirement: Prevent water loss from concrete laid on absorbent substrates.
 - Underlay: Select from:
 - Polyethylene sheet: 250 micrometres thick.
 - Building paper: To BS 1521, grade B1F.
 - Installation: Lap edges 150 mm.

635 **CONSTRUCTION JOINTS**

- Location: As specified by Structural Engineer

640 **CONSTRUCTION JOINTS**

- Location of joints: As specified by Structural Engineer
- Preparation of joint surfaces: As specified by Structural Engineer

650 **SURFACES TO RECEIVE CONCRETE**

- Cleanliness of surfaces immediately before placing concrete: Clean with no debris, tying wire clippings, fastenings or free water.

680 **PLACING**

- Records: Maintain for time, date and location of all pours.
- Timing: Place as soon as practicable after mixing and while sufficiently plastic for full compaction.
- Temperature limitations for concrete: 30°C (maximum) and 5°C (minimum), unless otherwise specified. Do not place against frozen or frost covered surfaces.
- Continuity of pours: Place in final position in one continuous operation up to construction joints. Avoid formation of cold joints.
- Discharging concrete: Prevent uneven dispersal, segregation or loss of ingredients or any adverse effect on the formwork or formed finishes.
- Thickness of layers: To suit methods of compaction and achieve efficient amalgamation during compaction.
- Poker vibrators: Do not use to make concrete flow horizontally into position, except where necessary to achieve full compaction under void formers and cast-in accessories and at vertical joints.

690 **COMPACTING**

- General: Fully compact concrete to full depth to remove entrapped air. Continue until air bubbles cease to appear on the top surface.
 - Areas for particular attention: Around reinforcement, under void formers, cast-in accessories, into corners of formwork and at joints.
- Consecutive batches of concrete: Amalgamate without damaging adjacent partly hardened concrete.
- Methods of compaction: To suit consistence class and use of concrete.

810 CURING GENERALLY

- Evaporation from surfaces of concrete: Prevent, including from perimeters and abutments, throughout curing period.
- Surfaces covered by formwork: Retain formwork in position and, where necessary to satisfy curing period, cover surfaces immediately after striking.
- Top surfaces: Cover immediately after placing and compacting. If covering is removed for finishing operations, replace it immediately afterwards.
- Surface temperature: Maintain above 5°C throughout the specified curing period or four days, whichever is longer.
- Records: Maintain details of location and timing of casting of individual batches, removal of formwork and removal of coverings. Keep records on site, available for inspection.

811 COVERINGS FOR CURING

- Sheet coverings: Suitable impervious material.
- Curing compounds: Selection criteria:
 - Curing efficiency: Not less than 75% or for surfaces exposed to abrasion 90%.
 - Colouring: Fugitive dye.
 - Application to concrete exposed in the finished work: Readily removable without disfiguring the surface.
 - Application to concrete to receive bonded construction/ finish: No impediment to subsequent bonding.
- Interim covering to top surfaces of concrete: Until surfaces are in a suitable state to receive coverings in direct contact, cover with impervious sheeting held clear of the surface and sealed against draughts at perimeters and junctions.

818 CURING PERIODS GENERALLY

- Minimum periods: When not otherwise indicated to 14 days.

820 CURING PERIODS - As specified by Structural Engineer

- General: Curing periods are in days (minimum).
 - Definition of 't': The average surface temperature of concrete in degrees Celsius during the curing period.
- Curing periods for concrete made using CEM1 strength class 42.5 or 52.5, or SRPC class 42.5:
 - Drying winds or dry, sunny weather (relative humidity < 50%): As specified by Structural Engineer
 - Intermediate conditions (relative humidity between 50 and 80%): As specified by Structural Engineer
 - Damp weather, protected from sun and wind (relative humidity >80%): _ As specified by Structural Engineer
- Curing periods: For concrete made using cements listed in BS 8500-1, table A.6 except for those listed above and for supersulfated cement:
 - Drying winds or dry, sunny weather (relative humidity < 50%): As specified by Structural Engineer
 - Intermediate conditions (relative humidity between 50 and 80%): As specified by Structural Engineer
 - Damp weather, protected from sun and wind (relative humidity > 80%): As specified by Structural Engineer
- Curing periods: For concretes using admixtures or other types of cements/ combinations: Submit proposals.
- Other requirements: _ As specified by Structural Engineer

840 PROTECTION

- Prevent damage to concrete, including:
 - Surfaces generally: From rain, indentation and other physical damage.
 - Surfaces to exposed visual concrete: From dirt, staining, rust marks and other disfiguration.
 - Immature concrete: From thermal shock, physical shock, overloading, movement and vibration
 - In cold weather: From entrapment and freezing expansion of water in pockets.

E20 Formwork for in situ concrete

E20 Formwork for in situ concrete

To be read with Preliminaries/ General conditions.

GENERALLY/ PREPARATION

110 LOADINGS

- Requirement: Design and construct formwork to withstand the worst combination of the following:
 - Total weight of formwork, reinforcement and concrete.
 - Construction loads including dynamic effects of placing, compacting and construction traffic.
 - Wind and snow loads.

115 DESIGN

- Standard: Contractor designed.
- Other requirements: None

170 WORK BELOW GROUND - As specified by Structural Engineer

- Casting vertical faces against faces of excavation: As specified by Structural Engineer.
 - Requirements: _____.

CONSTRUCTION

310 ACCURACY

- General requirement for formwork: Accurately and robustly constructed to produce finished concrete in the required positions and to the required dimensions.
- Formed surfaces: Free from twist and bow (other than any required cambers).
- Intersections, lines and angles: Square, plumb and true.

320 JOINTS IN FORMS

- Requirements including joints in form linings and between forms and completed work:
 - Prevent loss of grout, using seals where necessary.
 - Prevent formation of steps. Secure formwork tight against adjacent concrete.

330 INSERTS, HOLES AND CHASES

- Positions and details:
 - Dimensioned on drawings provided on behalf of the Employer: Do not change without consent.
 - Undimensioned or from other sources: Submit proposals.
- Positioning relative to reinforcement: Give notice of any conflicts well in advance of placing concrete.
- Method of forming: Fix inserts or box out as required. Do not cut hardened concrete without approval.

STRIKING

510 STRIKING FORMWORK

- Timing: Prevent any disturbance, damage or overloading of the permanent structure.

521 MINIMUM PERIOD FOR RETAINING FORMWORK/ TEMPORARY SUPPORTS IN POSITION

- Concrete strength at time of formwork removal (minimum):
 - As specified by Structural Engineer.
- Assumptions: Concrete will hold form with clean even sides and base
 - Before removing formwork: Submit proposals if assumptions will not be realised.
- Method to be used in assessing early age strength of concrete: _ As specified by Structural Engineer

FORMED FINISHES

605 CONTROL SAMPLES

- Sample areas that are part of the finished work: As specified by Structural Engineer.
- Approval of appearance: Obtain before proceeding with remainder of the work.

610 BASIC FINISH

- Requirements: Face fully compacted and to tolerance, otherwise no particular requirements.
- Use: Below ground finishes to bases of sculpture

620 PLAIN SMOOTH FINISH

- Finish: Even with panels arranged in a regular pattern as a feature of the surface.
- Permissible deviation of surfaces:
 - Sudden irregularities (maximum): 5 mm.
 - Gradual irregularities when measured from the underside of a 1 m straightedge, placed anywhere on surface (maximum): 5 mm.
- Variations in colour:
 - Permitted: Those caused by impermeable form linings.
 - Not permitted: Discoloration caused by contamination or grout leakage.
- Surface blemishes:
 - Permitted: Blowholes less than 10 mm in diameter and at an agreed frequency.
 - Not permitted: Voids, honeycombing, segregation and other large defects.
- Formwork tie holes: In a regular pattern and filled with matching mortar.

630 FINE SMOOTH FINISH

- Finish: Smooth and even. Panels to be as large as is practicable and arranged in a regular pattern as a feature of the surface.
- Permissible deviation of surfaces:
 - Sudden irregularities (maximum): 3 mm.
 - Gradual irregularities when measured from the underside of a 1 m straightedge, placed anywhere on surface (maximum): 3 mm.
- Variations in colour:
 - Permitted: Those caused by impermeable form linings.
 - Not permitted: Discoloration caused by:
 - Contamination or grout leakage.
 - Replacement of formwork panels.
- Cover spacers: As specified by Structural Engineer
- Surface blemishes:
 - Permitted: Blowholes less than 5 mm in diameter and at an agreed frequency.
 - Not permitted: Voids, honeycombing, segregation and other defects.
- Formwork tie holes: As specified by Structural Engineer.

635 STANDARD FINISH

- Standard: BS 8110-1, clause 6.2.7.3.
- Quality: As specified by Structural Engineer
- Face as formed: As specified by Structural Engineer.

E30 Reinforcement for in situ concrete

E30 Reinforcement for in situ concrete

To be read with Preliminaries/ General conditions.

110 QUALITY ASSURANCE OF REINFORCEMENT

- Standards:
 - Reinforcement: To BS 4449, BS 4482, BS 4483 or BS 6744.
 - Cutting and bending: To BS 8666.
- Source of reinforcement: Companies holding valid certificates of approval for product conformity issued by the UK Certification Authority for Reinforcing Steels (CARES).

140 PLAIN BAR REINFORCEMENT

- Standard: To BS 4482.
 - Strength grade: 250.

150 RIBBED BAR REINFORCEMENT

- Standard: To BS 4449.
 - Strength grade: As specified by Structural Engineer

210 STANDARD FABRIC REINFORCEMENT

- Standard: To BS 4483.
- Strength grade: _ As specified by Structural Engineer.

255 PREFABRICATED CONTINUITY REINFORCEMENT STRIPS

- Source: Obtain from a manufacturer holding a valid Technical Product Approval certificate issued by the UK Certification Authority for Reinforcing Steels (CARES) or equivalent.

310 CUTTING AND BENDING REINFORCEMENT

- General: To schedules and to BS 8666.
- Bending on site, including minor adjustments: As specified by Structural Engineer _.

320 PROTECTION OF REINFORCEMENT

- Dropping from height, mechanical damage and shock loading: Prevent.
- Cleanliness of reinforcement at time of pouring concrete: Free from corrosive pitting, loose millscale, loose rust and contaminants which may adversely affect the reinforcement, concrete, or bond between the two.

425 LAPS NOT DETAILED ON DRAWINGS

- Laps in bar reinforcement (minimum): _ As specified by Structural Engineer
- Laps in fabric reinforcement (minimum): As specified by Structural Engineer
- Laps at corners: Avoid four layer build-up.

451 FIXING REINFORCEMENT

- Standard: To BS 7973-1 and -2.
- Installation: In addition to any spacers and chairs shown on drawings or schedules, provide adequate support, tie securely and maintain the specified cover.
- Tying:
 - Wire type: 16 gauge black annealed. Use stainless steel wire for stainless steel reinforcement.
 - Ends of tying wire: Prevent intrusion into the concrete cover. Remove loose ends.
- Compatibility of metals: Prevent contact between ordinary carbon steel and stainless or galvanized reinforcement.

E40 Designed joints in in situ concrete

E40 Designed joints in in situ concrete

To be read with Preliminaries/General conditions.

- 120 CONSTRUCTION/MOVEMENT JOINTS GENERALLY
- Accuracy: Position and form joints accurately, straight, well-aligned and truly vertical or horizontal or parallel with setting out lines of the building.
 - Modifications to joint design or location: Submit proposals.
 - Placing concrete to form movement joints:
 - Maintain effectiveness of joints. Prevent concrete entering joints or penetrating or impregnating compressible joint fillers.
 - Do not place concrete simultaneously on both sides of movement joints.
- 132 ADDITIONAL CONSTRUCTION JOINTS
- Joints additional to those required by designer: As specified by Structural Engineer
 - Approval of additional joints: Submit proposals.
- 210 FORMED JOINTS
- Forms/ stop ends generally: Rigid and grout tight.
 - Forms/ stop ends for projecting continuity reinforcement: To accommodate bars or fabric without temporary bending or displacement.
- 211 FORMED JOINTS IN CONCRETE WEARING SURFACES
- Temporary forms: Square edged with a steel top surface.
 - Placing concrete: Compact thoroughly at edges to give level, closely abutted joints with no lipping.
- 230 PREPARATION OF CONSTRUCTION JOINTS
- Roughening of joint surfaces: Select from:
 - Brushing and spraying: Remove surface laitance and expose aggregate finish while concrete is still green.
 - Other methods: Submit proposals.
 - Condition of joint surfaces immediately before placing fresh concrete: Clean and damp.
- 250 INSERTED STRIP CRACK INDUCERS
- Type: As specified by Structural Engineer.
 - Depth: As specified by Structural Engineer.
 - Installation: To accurate line and level with concrete thoroughly compacted at edges and with no lipping.
- 260 SAWN CRACK INDUCING GROOVES
- Groove dimensions:
 - Depth: As specified by Structural Engineer.
 - Width: As narrow as practicable.
 - Sawing: Sufficiently early to prevent random cracking (within 24 hours of casting slab) and to produce strong, well defined arrises.
 - Groove filling: As specified by Structural Engineer
- 410 CARBON STEEL TIE BARS
- Standard: To As specified by Structural Engineer
 - Product form: As specified by Structural Engineer
 - Strength grade: As specified by Structural Engineer.

- Cleanliness: Free from corrosive pitting, loose millscale, loose rust and contaminants which may adversely affect the tie bars, reinforcement, concrete, or bond between the two.
- Position: Centred on joint.
- Other requirements: As specified by Structural Engineer

420 FABRIC TIE STRIPS

- Standard: To BS 4483.
- Cleanliness: Free from corrosive pitting, loose millscale, loose rust and contaminants which may adversely affect the fabric, concrete, or bond between the two.
- Position: Width of the mesh strip centred on the joint.

430 CARBON STEEL DOWEL BARS

- Standard: To As specified by Structural Engineer.
 - Product form: Plain.
 - Strength grade: 250.
 - Properties: Perfectly straight, with sawn (not sheared) ends.
- Debonding: Achieve effective debonding of each bar
 - Material: As specified by Structural Engineer.
 - Extent: As specified by Structural Engineer
- Position: At right angles to and centred on joint.
- Other requirements: As specified by Structural Engineer.

520 SHEET JOINT FILLER As specified by Structural Engineer

- Manufacturer: As specified by Structural Engineer
 - Product reference: As specified by Structural Engineer
- Joints finished with sealant: Leave sufficient space for sealant by using temporary formers.

530 SEALANT_____

- Manufacturer: As specified by Structural Engineer.
 - Product reference: As specified by Structural Engineer
 - Colour of surfaces exposed to view: To match adjacent cladding.
- Preparation and application: As section Z22.

545 COMPRESSIBLE SEALING STRIP SYSTEM As specified by Structural Engineer

- Manufacturer: _ As specified by Structural Engineer .
 - Product reference: As specified by Structural Engineer
 - Colour: As specified by Structural Engineer .

E4I Worked finishes to in situ concrete

E41 Worked finishes to in situ concrete

To be read with Preliminaries/ General conditions.

150 FINISHING

- Timing: Carry out at optimum times in relation to setting and hardening of concrete.
- Prohibited treatments to concrete surfaces:
 - Wetting to assist surface working.
 - Sprinkling cement.

230 BRUSHED FINISH

- Surface on completion: Light, even texture.

240 WOOD FLOATED FINISH

- Surface on completion: Slightly coarse, even texture with no ridges or steps.

310 SMOOTH FLOATED FINISH

- Surface on completion: Even, with no ridges or steps.

320 TROWELLED FINISH

- Surface on completion: Uniform, smooth but not polished, free from trowel marks and blemishes, and suitable to receive specified flooring material.

330 TROWELLED FINISH FOR WEARING SURFACES

- Surface on completion: Uniform and smooth, free from trowel marks and blemishes.

F Masonry

F10 Brick/ block walling

F10 Brick/ block walling

To be read with Preliminaries/ General conditions.

TYPES OF WALLING

255 CONCRETE FACING BLOCKWORK – For base to Brymbo man sculpture and to receive yorkstone cladding.

- Blocks: To BS EN 771-3.
 - Manufacturer: Contractors choice.
 - Product reference: Contractors choice
 - Configuration: Stretcher bond
 - Compressive strength: As specified by Structural Engineer
 - Mean value: _____.
 - Characteristic value: _____.
 - Category: _____.
 - Freeze/ Thaw resistance: Required.
 - Work sizes (length x width x height): _____.
 - Finish/ Colour: Natural.
 - Special shapes: None.
 - Additional requirements: As specified by Structural Engineer
- Mortar: As section Z21.
 - Standard: 3:1 sand to cement.
 - Mix: Standard.
 - Additional requirements: Ensure mortar does not react to cladding fixing chemicals
- Bond: Stretcher.
- Joints: 10-15mm – bucket handle finish.
- Features: None

385 ENGINEERING BRICKWORK – for new inspection chambers and Anderson Shelter

- Bricks: To BS EN 771-1.
 - Manufacturer: Ibstock
 - Product reference: _____.
 - Type: HD.
 - Mean compressive strength: _____.
 - Category: _____.
 - Water absorption: <5%
 - Freeze/ Thaw category: F2.
 - Active soluble salts content category: S2.
 - Additional requirements: _____.
- Mortar: As section Z21.
 - Standard: 3:1 sand to cement with water repellent
 - Mix: Standard.
 - Additional requirements: None
- Bond: Stretcher
- Joints: Flush.

395 DAMP PROOF COURSE BRICKWORK

- Bricks to BS EN 771-1.
 - Manufacturer: _____.
 - Product reference: _____.
 - Type: HD.
 - Water absorption: _____.
 - Net dry density: _____.
 - Freeze/ Thaw category: F2.
 - Active soluble salts content category: S2.
 - Additional requirements: _____.
- Mortar: As section Z21.
 - Standard: _____.
 - Mix: _____.
 - Additional requirements: _____.
- Bond: _____.
- Joints: _____.

WORKMANSHIP GENERALLY

440 CONDITIONING OF CONCRETE BRICKS/ BLOCKS

- Autoclaved concrete bricks/ blocks delivered warm from manufacturing process: Do not use.
- Age of nonautoclaved concrete bricks/ blocks: Do not use until at least four weeks old.
- Avoidance of suction in concrete bricks/ blocks: Do not wet.
 - Use of water retaining mortar admixture: Submit details.

500 LAYING GENERALLY

- Mortar joints: Fill vertical joints. Lay bricks, solid and cellular blocks on a full bed.
- Thin mortar adhesive and gypsum block adhesive joints: Fill vertical joints. Lay blocks on a full bed.
- Bond where not specified: Half lap stretcher.
- Vertical joints in brick and concrete block facework: Even widths. Plumb at every fifth cross joint.

560 COURSING BRICKWORK

- Gauge: Four brick courses including bed joints to 300 mm.

620 BLOCK BONDING NEW WALLS TO EXISTING

- Pocket requirements: Formed as follows:
 - Width: Full thickness of new wall.
 - Depth (minimum): 100 mm.
 - Vertical spacing:
 - Brick to brick: 4 courses high at 8 course centres.
 - Block to block: Every other course.
- Pocket joints: Fully filled with mortar.

635 JOINTING

- Profile: Consistent in appearance.

645 ACCESSIBLE JOINTS NOT EXPOSED TO VIEW

- Jointing: Struck flush as work proceeds.

665 POINTING – To architect's specification

- Joint preparation: Remove debris. Dampen surface.
- Mortar: As section Z21.
 - Standard: _____.

- Mix: _____.
- Additional requirements: To match adjacent walls
- Profile: To match existing

690 ADVERSE WEATHER

- General: Do not use frozen materials or lay on frozen surfaces.
- Air temperature requirements: Do not lay bricks/ blocks:
 - In cement gauged mortars when at or below 3°C and falling or unless it is at least 1°C and rising.
 - In hydraulic lime:sand mortars when at or below 5°C and falling or below 3°C and rising.
 - In thin joint mortar glue when outside the limits set by the mortar manufacturer.
- Temperature of walling during curing: Above freezing until hardened.
- Newly erected walling: Protect at all times from:
 - Rain and snow.
 - Drying out too rapidly in hot conditions and in drying winds.

ADDITIONAL REQUIREMENTS FOR FACEWORK

710 THE TERM FACEWORK

- Definition: Applicable in this specification to all brick/ block walling finished fair.
 - Painted facework: The only requirement to be waived is that relating to colour.

740 FINISHED MASONRY WORK REFERENCE PANELS

- General: Before proceeding to construct the following walling types, construct panels as specified.
Give notice when panels are dry.

750 COLOUR CONSISTENCY OF MASONRY UNITS

- Colour range: Submit proposals of methods taken to ensure that units are of consistent and even appearance within deliveries.
- Conformity: Check each delivery for consistency of appearance with previous deliveries and with approved reference panels; do not use if variation is excessive.
- Finished work: Free from patches, horizontal stripes and racking back marks.

760 APPEARANCE

- Brick/ block selection: Do not use units with damaged faces or arrises.
- Cut masonry units: Where cut faces or edges are exposed cut with table masonry saw.
- Quality control: Lay masonry units to match relevant reference panels.
 - Setting out: To produce satisfactory junctions and joints with built-in elements and components.
 - Coursing: Evenly spaced using gauge rods.
- Lifts: Complete in one operation.
- Methods of protecting facework: Submit proposals.

780 GROUND LEVEL

- Commencement of facework: Not less than 150 mm below finished level of adjoining ground or external works level.

800 TOOTHED BOND

- New and existing facework in same plane: Bond together at every course to achieve continuity.

830 CLEANLINESS

- Facework: Keep clean.
- Mortar on facework: Allow to dry before removing with stiff bristled brush.
- Removal of marks and stains: Rubbing not permitted.

F2I Natural stone walling /dressings

F21 Natural stone walling/dressings

To be read with Preliminaries/ General conditions.

TYPES OF WALLING/ DRESSINGS

110 NATURAL STONE Boundary walls to St Mary's Church and forecourt area, no works planned but should it become necessary.

- Stone: To BS EN 771-6.
 - Name (traditional): To match existing stone.
 - 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.
- Mortar: As section Z21.
 - Standard: To match existing walling.
- Bond: To match existing walling.
- Joints: Flush.
 - Width: To match existing walling.
 - Pointing: To match existing walling
- Other requirements: Sample works to be assessed by Conservation Officer if works to Listed Walls become necessary.

GENERAL/ PRODUCTION

250 CUTTING AND DRESSING OF STONE

- Timing: After seasoning but before delivery to site.
- Accuracy:
 - Exposed and joint surfaces: Square, true planes free from hollow or rough areas.
 - Dimensions: Maintain specified joint widths.
- Orientation for natural bed of stones: Appropriate to properties of stones and positions in walling/dressings.

260 IDENTIFICATION OF STONE UNITS

- Marking: Clearly and indelibly on concealed faces to indicate the natural bed and position in the finished work.

LAYING AND JOINTING

300 REFERENCE PANELS

- General: Complete areas of specified walling types and obtain approval of appearance before proceeding.
- Walling type:
 - Location: St Mary's Cathedral Wall and Forecourt Wall
 - Size: To match existing walling .
 - Features: To match existing walling

315 ADVERSE WEATHER

- General: Do not use frozen materials or lay on frozen surfaces.
- Air temperature: Do not lay stones:
 - In cement gauged mortars: At or below 3°C and falling or below 1°C and rising.
 - In hydraulic lime:sand mortars: At or below 5°C and falling or below 3°C and rising.
- Temperature of walling during curing: Above freezing until mortar hardened.

- Newly erected walling: Protect at all times from:
 - Rain and snow.
 - Drying out too rapidly in hot conditions and in drying winds.

325 LAYING GENERALLY

- Stone selection: Do not use units with damaged faces or arrises.
- Accuracy:
 - Courses: Level and true to line.
 - Faces, angles and features: Plumb.
 - Setting out: Achieve satisfactory junctions and joints with adjoining or built-in elements and components.
- Absorbent stones: Dampen in warm weather to reduce suction. Do not soak.
- Mortar joints:
 - Laying: Full bed of mortar with all joints and voids filled.
 - Temporary distance pieces: Lead or stainless steel. Remove when mortar is sufficiently strong.
 - Appearance: Neat and consistent.
- Cleanliness: Keep facework clean. Rubbing and other abrasive or chemical cleaning methods to remove marks and stains not permitted.

330 WALLING BELOW GROUND LEVEL

- Extent of facework below finished level of adjoining ground or external works (minimum): 150 mm.

340 PUTLOG SCAFFOLDING

- Use: Not permitted.

360 OPENINGS

- Method of forming: Rigid templates, accurately fabricated to the required size.

370 JOGGLE JOINTS

- General: Fill with bedding mortar. Tamp to expel air.

390 POINTING

- Joint preparation: Rake out to depth of 7-10 mm as work proceeds. Remove debris. Dampen surface.
- Mortar application: Neat and consistent.

F30 Accessories/sundry items for brick/block/stone walling

F30 Accessories/sundry items for brick/block/stone walling

- 5 CAVITIES
- Concrete fill to base of cavity:
 - Concrete generally: To BS EN 206-1 and BS 8500-2.
 - Designated concrete: GEN1 or Standard mix ST2 with high workability.
 - Extent: Maintain 75 mm between top of fill and external ground level and a minimum of 225 mm between top of fill and ground level dpc.
 - Cleanliness: Keep cavity faces, ties and dpcs free from mortar and debris.
- 7 PERPEND JOINT WEEP HOLES
- Form: Open clear perpend joint.
 - Locations: Through outer leaf, immediately above base of cavity, at cavity trays, stepped dpcs and over openings. 75 mm above top of cavity fill at base of cavity.
 - Provision: At not greater than 1000 mm centres and not less than two over openings.
- 8 PERPEND JOINT PLASTICS WEEP HOLES
- Manufacturer: Contractors Choice
 - Product reference: Contractors Choice.
 - Locations: Through outer leaf, immediately above base of cavity at cavity trays, stepped dpcs and external openings. 75 mm above top of cavity fill at base of cavity.
 - Provision: At not greater than 1000 mm centres and not less than two over openings.
- 46 DAMP PROOF COURSE - POLYETHYLENE
- Standard: To BS 6515.
 - Manufacturer: Contractors Choice .
 - Product reference: Contractors Choice .
- 66 INSTALLATION OF HORIZONTAL DPCS
- Placement: In continuous lengths on full even bed of fresh mortar, with 100 mm laps at joints and full laps at angles.
 - Width: At least full width of masonry leaf. Edges of dpc not covered with mortar or projecting into cavity.
 - Overlying construction: Immediately cover with full even bed of mortar to receive next masonry course.
 - Overall finished joint thickness: As close to normal as practicable.
 - Ground level dpcs joint with damp proof membrane: Continuous and effectively sealed.
 - Low level dpcs in external walls: Install not less than 150 mm above adjoining finished ground level.
 - Sill dpcs form and placement: In one piece and turned up at the back when the sill is in contact with inner leaf.
 - Dpcs crossing cavity: Provide support to prevent sagging.
- 68 SEALING DPCS
- Overlaps and junctions: Seal with approved tape.
- 76 MOVEMENT JOINTS WITH SEALANT
- Joint preparation and sealant application: As section Z22.
 - Filler: Contractors Choice.
 - Placement: Build in as work proceeds ensuring no projections into cavities and to correct depth to receive sealant system.
 - Sealant: Contractors Choice .
 - Colour: To match mortar in walling

G20 Carpentry/ timber framing/ first fixing

G20 Carpentry/ timber framing/ first fixing

To be read with Preliminaries/ General conditions.

GENERAL

105 TIMBER PROCUREMENT

- Timber (including timber for wood based products): Obtained from well managed forests/ plantations in accordance with:
 - FSC
 - The laws governing forest management in the producer country or countries.
 - International agreements such as the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).
- Documentation: Provide either:
 - Documentary evidence (which has been or can be independently verified) regarding the provenance of all timber supplied, or
 - Evidence that suppliers have adopted and are implementing a formal environmental purchasing policy for timber and wood based products.

150 STRENGTH GRADING OF TIMBER

- Grader: A company currently registered under a third party quality assurance scheme operated by a certification body approved by the UK Timber Grading Committee.

160 GRADING AND MARKING OF SOFTWOOD

- Timber of a target/ finished thickness less than 100 mm and not specified for wet exposure: Graded at an average moisture content not exceeding 20% with no reading being in excess of 24% and clearly marked as 'DRY' or 'KD' (kiln dried).
- Timber graded undried (green) and specified for installation at higher moisture contents: Clearly marked as 'WET' or 'GRN'.
- Structural timber members cut from large graded sections: Regraded to approval and marked accordingly.

PRODUCTS

210 STRUCTURAL SOFTWOOD (GRADED DIRECT TO STRENGTH CLASS)

- Grading standard: To BS 4978, BS EN 14081-1, or other national equivalent and so marked.
- Strength class to BS EN 338:
- Treatment: Pressure treated preservative – Tanobrun or Jakcure or similar approved

230 STRUCTURAL SOFTWOOD (STRENGTH CLASS NOT SPECIFIED)_____

- Species and origin: Redwood
- Grading standard: To the appropriate standard or rules for the specified grade and so marked.
- Treatment: Pressure treated preservative – Tanobrun.

WORKMANSHIP GENERALLY

401 CROSS SECTION DIMENSIONS OF STRUCTURAL SOFTWOOD AND HARDWOOD

- Dimensions: Dimensions in this specification and shown on drawings are target sizes as defined in BS EN 336.
- Tolerances: The tolerance indicators (T1) and (T2) specify the maximum permitted deviations from target sizes as stated in BS EN 336, clause 4.3:
 - Tolerance class 1 (T1) for sawn surfaces.

- Tolerance class 2 (T2) for further processed surfaces.
- 402 CROSS SECTION DIMENSIONS OF NONSTRUCTURAL SOFTWOOD
- Dimensions: Dimensions in this specification and shown on drawings are finished sizes.
 - Maximum permitted deviations from finished sizes: As stated in BS EN 1313-1:
 - Clause 6 for sawn sections.
 - Clause NA.2 for further processed sections.
- 403 CROSS SECTION DIMENSIONS OF NONSTRUCTURAL HARDWOOD
- Dimensions: Dimensions in this specification and shown on drawings are finished sizes.
 - Maximum permitted deviations from finished sizes: As stated in BS EN 1313-2:
 - Clause 6 for sawn sections.
 - Clause NA.3 for further processed sections.
- 420 WARPING OF TIMBER
- Bow, spring, twist and cup: Not greater than the limits set down in BS 4978 or BS EN 14081-1 for softwood, or BS 5756 for hardwood.
- 430 SELECTION AND USE OF TIMBER
- Timber members damaged, crushed or split beyond the limits permitted by their grading: Do not use.
 - Notches and holes: Position in relation to knots or other defects such that the strength of members will not be reduced.
 - Scarf joints, finger joints and splice plates: Do not use without approval.
- 440 PROCESSING TREATED TIMBER
- Cutting and machining: Carry out as much as possible before treatment.
 - Extensively processed timber: Retreat timber sawn lengthways, thickness, planed, ploughed, etc.
 - Surfaces exposed by minor cutting/ drilling: Treat with two flood coats of a solution recommended by main treatment solution manufacturer.
- 450 MOISTURE CONTENT
- Moisture content of wood and wood based products at time of installation: Not more than:
 - Covered in generally unheated spaces: 24%.
 - Covered in generally heated spaces: 20%.
 - Internal in continuously heated spaces: 20%.
- 510 PROTECTION
- Generally: Keep timber dry and do not overstress, distort or disfigure sections or components during transit, storage, lifting, erection or fixing.
 - Timber and components: Store under cover, clear of the ground and with good ventilation. Support on regularly spaced, level bearers on a dry, firm base. Open pile to ensure free movement of air through the stack.
 - Trussed rafters: Keep vertical during handling and storage.
- 520 EXPOSED END GRAIN
- Components: Seal exposed end grain before delivery to site:
- 530 PAINTED FINISHES
- Structural timber to be painted: Primed as specified before delivery to site.
- 540 CLEAR FINISHES
- Structural timber to be clear finished: Keep clean and apply first coat of specified finish before delivery to site.

550 EXPOSED TIMBER

- Planed structural timber exposed to view in completed work: Prevent damage to and marking of surfaces and arises.

JOINTING TIMBER

570 JOINTING/FIXING GENERALLY

- Generally: Where not specified precisely, select methods of jointing and fixing and types, sizes and spacings of fasteners in compliance with section Z20.

•

600 BLACK BOLTS AND NUTS

- Standard: To BS EN ISO 898-1 and BS EN 20898-2.
- Finish (applied by manufacturer): _____.

615 BOLT/ SCREW ASSEMBLIES

- Coating applied by manufacturer: _____.
- Nuts and washers: Material grade and finish to suit bolts.
- Washer dimensions: Diameter/ side length of washers in contact with timber faces to be minimum 3 times bolt diameter, with a thickness not less than 0.25 times bolt diameter.

630 BOLTED JOINTS

- Bolt spacings (minimum): To BS 5268-2, table 81.
- Holes for bolts: Located accurately and drilled to diameters as close as practical to the nominal bolt diameter and not more than 2 mm larger.
- Washers: Placed under bolt heads and nuts that would otherwise bear directly on timber. Use spring washers in locations which will be hidden or inaccessible in the completed building.
- Bolt tightening: So that washers just bite the surface of the timber. Ensure that at least one complete thread protrudes from the nut.
 - Checking: At agreed regular intervals up to Completion. Tighten as necessary.

670 ANTICORROSION FINISHES FOR FASTENERS

- Galvanizing: To BS 7371-6, with internal threads tapped and lightly oiled following treatment.
- Sherardizing: To BS 7371-8, Class 1.
- Zinc plating: To BS EN ISO 4042 and passivated.

ERECTION AND INSTALLATION

760 TEMPORARY BRACING

- Provision: As necessary to maintain structural timber components in position and to ensure complete stability during construction.

770 ADDITIONAL SUPPORTS

- Provision: Position and fix additional studs, noggings and/ or battens to support edges of sheet materials, and planter.
- Material properties: Additional studs, noggings and battens to be of adequate size and have the same treatment, if any, as adjacent timber supports.

M60 Painting/clear finishing

M60 Painting/clear finishing

- 12 GLOSS PAINT: - For restored gates Gate restorers recommendation
- Manufacturer: Gate restorers recommendation.
 - Product reference: Gate restorers recommendation _.
 - Surfaces: Clean, flake free and without grease.
 - Preparation: Full gate and hangers.
 - Initial coats:
 - Number of coats: 1
 - Undercoats: For metal
 - Number of coats: 2.
 - Finishing coats: High gloss – Black RAL 9006
 - Number of coats: 2.
- 16 DECORATIVE WOODSTAIN/ VARNISH/ PRESERVATIVE – Stage decking boards in Education Garden
- Manufacturer: Contractor's Choice.
 - Product reference: Clear preservative
 - Surfaces: External Facing
 - Preparation: Clean and dry
 - Initial coats: 1.
 - Number of coats: 1
 - Finishing coats: 1
 - Number of coats: 1
- 25 SURFACES NOT TO BE COATED
- Jackson fencing.
- 26 SURFACES TO BE CLEANED BUT NOT COATED
- . Timber Planters
 - Suspected hazardous materials: submit method statement.
- 30 PREPARATION GENERALLY
- Standard: In accordance with BS 6150.
 - Risk assessment and method statement for hazardous materials: Prepare for operations, disposal of waste, containment and reoccupation, and obtain approval before commencing work.
 - Preparation materials: Types recommended by their manufacturers and the coating manufacturer for the situation and surfaces being prepared.
 - Substrates: Sufficiently dry in depth to suit coating.
 - Efflorescence salts, dirt, grease and oil: Remove.
 - Surface irregularities: Provide smooth finish.
 - Organic growths and infected coatings:
 - Remove with assistance of biocidal solution.
 - Apply residual effect biocidal solution to inhibit regrowth.
 - Joints, cracks, holes and other depressions: Fill with stoppers/ fillers. Provide smooth finish.
 - Dust, particles and residues from preparation: Remove and dispose of safely.
 - Doors, opening windows and other moving parts:
 - Ease, if necessary, before coating.
 - Prime resulting bare areas.
- 32 PREVIOUSLY COATED SURFACES GENERALLY
- Preparation: In accordance with BS 6150, clause 11.5.
 - Contaminated or hazardous surfaces: Give notice of:
 - Coatings suspected of containing lead.

- Substrates suspected of containing asbestos or other hazardous materials.
- Significant rot, corrosion or other degradation of substrates.
- Risk assessment and method statement for hazardous materials: Prepare for operations, disposal of waste, containment and reoccupation, and obtain approval before commencing work.
- Removing coatings: Do not damage substrate and adjacent surfaces or adversely affect subsequent coatings.
- Loose, flaking or otherwise defective areas: Carefully remove to a firm edge.
- Alkali affected coatings: Completely remove.
- Retained coatings:
 - Thoroughly clean.
 - Gloss coated surfaces: Provide key.
- Partly removed coatings: Apply additional preparatory coats.
- Completely stripped surfaces: Prepare as for uncoated surfaces.

35 FIXTURES AND FITTINGS

- Risk assessment and method statement for hazardous materials: Prepare for operations, disposal of waste, containment and reoccupation, and obtain approval before commencing work.
- Removal: Before commencing work: _____.
- Replacement: Refurbish as necessary, refit when coating is dry.

37 WOOD PREPARATION

- General: Provide smooth, even finish with lightly rounded arrises.
- Degraded or weathered surface wood: Take back surface to provide suitable substrate.
- Degraded substrate wood: Repair with sound material of same species.
- Heads of fasteners: Countersink sufficient to hold stoppers/ fillers.
- Resinous areas and knots: Apply two coats of knotting.
- Defective primer: Take back to bare wood and reprime.

55 EXISTING GUTTERS

- Dirt and debris: Remove from inside of gutters.
- Defective joints: Clean and seal with suitable jointing material.
- Suspected hazardous materials: submit method statement.

61 COATING GENERALLY

- Application standard: In accordance with BS 6150, clause 9.
- Conditions: Maintain suitable temperature, humidity and air quality.
- Surfaces: Clean and dry at time of application.
- Thinning and intermixing: Not permitted unless recommended by manufacturer.
- Priming coats: Apply as soon as possible on same day as preparation is completed.
- Finish:
 - Even, smooth and of uniform colour.
 - Free from brush marks, sags, runs and other defects.
 - Cut in neatly.
- Doors, opening windows and other moving parts: Ease before coating and between coats.

65 CONCEALED JOINERY SURFACES

- General: After priming, apply additional coatings to surfaces that will be concealed when component is fixed in place.

66 CONCEALED METAL SURFACES

- General: Apply additional coatings to surfaces that will be concealed when component is fixed in place.

68 STAINING WOOD

- Primer: Apply if recommended by stain manufacturer.
- Application: Apply in flowing coats and brush out excess stain to produce uniform appearance.

- 70 EXTERNAL DOORS – Anderson shelter
- Bottom edges: Prime and coat before hanging.

N Furniture/Equipment

N9I External signage and interpretation

N91 External signage and interpretation

SIGNAGE OUTLINE

- 110 PROPRIETARY SIGNAGE SYSTEM – A0 Roller Signs
- Function: To promote exhibitions and events at Museum
 - Sign type: Roller sign.
 - Electrical supplies: Not necessary.
- 120 BESPOKE SIGNAGE SYSTEM – Museum Orientation Signage
- Function: To explain what is in museum
 - Sign type: To be confirmed by Exhibition Designer.
 - Products/ Integral features: To match remainder of museum.
 - Materials: To match remainder of museum but weather and uv resistant
 - Electrical supplies: Not necessary.

SYSTEM PERFORMANCE

- 205 DESIGN OF SIGNAGE SYSTEMS – By Exhibition Designer
- Design: Complete detailed design and submit before commencing work.
 - Proposals: Submit drawings, schedules, technical information, calculations and manufacturer's literature before commencing work.
- 210 EXTERNAL SIGNAGE GENERALLY
- Signage systems generally: Complete to BS 559, including components, inserts, accessories and fixings necessary to complete the system.
 - External signage: To BS 559 clause 6.3.
 - Content: Signs including facing information, components, inserts, accessories and fixings necessary to complete the system.
 - Geometric shapes, colours and layout: To BS 8501 and ISO 7001.
 - Wind loads: To BS 6399-2.
- 215 DESIGN LIFE
- Duration: 10 years.
 - Subject to reasonable wear and tear.
 - Environment: Urban set to edge of planting near main entrance.
 - Condition of use: Subject to regular maintenance.
- 220 SAFETY SIGNAGE REQUIREMENTS – To Architect's Brief and adjacent to external gates and doors to the museum that act as part of the fire escape routes system.
- General: To relevant parts of BS 5499.
 - Safety meaning: To BS 5499-5.
 - Geometric shapes, colours and layout: To BS 5499-1 and BS 5378-2.
 - Font: Helvetica medium.
 - Water safety: To BS 5499-11.
 - Escape route: To BS ISO 16069.
- 225 ROAD TRAFFIC SIGNAGE REQUIREMENTS
- Signage system design: Complete to BS 12899-1 and the Department for Transport 'Traffic Signs Manual' Chapter 7.
 - Wind loads: To BS 12899-2.

230 ACCESSIBILITY

- Design standard for disabled users: In accordance with BS 8300.
- Geometric shapes, colours and layout: To BS 5499-1 and BS 8501.
 - Font: Helvetica medium.

235 ELECTRICAL REQUIREMENTS FOR ILLUMINATED SIGNS

- Electrical requirements for illumination: To BS 559 clause 6.4 and section 7.

PRODUCTS

305 SIGNAGE PRODUCTS GENERALLY

- Materials: To BS 559.
- Colorimetric and photometric properties: To BS 5378-2.
- Fabricated letters: To BS 559 clause 6.6.
- Fixings: To BS 559 clause 6.11 and section Z12.

315 POSTS FOR ROAD TRAFFIC SIGNS – To comply with Highway Authority requirements

- Standard: To BS 873-7

515 ROAD TRAFFIC SIGN – To comply with Highway Authority Standards

- Standard: To BS EN 12899-1.
 - Piercing of signs: _____.
 - Sign edges: _____.
 - Surface protection: _____.
- Manufacturer: _____.
 - Product reference: _____.
- Material: _____.
 - Manufacturing process: _____.
- Layout and dimensions: _____.
- Lettering: _____.
 - Language: _____.
 - Font: _____.
 - Colour: _____.
 - Size: _____.
- Symbols and graphics: _____.
 - Colour: _____.
 - Size: _____.
- Background colour: _____.
- Fixing accessories: _____.
- Additional requirements: _____.

520 MONOLITH/ ENTRANCE/ WELCOME SIGN – To Exhibition Designer standards

- Manufacturer: _____.
 - Product reference: _____.
- Material: _____.
 - Finish: _____.
 - Background colour: _____.
- Layout and dimensions: _____.
 - Content: _____.
 - Lettering:
 - Manufacturing process: _____.
 - Font: _____.
 - Size: _____.
 - Colours: _____.
 - Language: _____.
 - Symbols and graphics: _____.

- Manufacturing process: _____.
- Size: _____.
- Colours: _____.
- Bespoke artwork: _____.
- Manufacturing process: _____.
- Fixing accessories: _____.
- Additional requirements: _____.

EXECUTION/ ERECTION/ INSTALLATION

- 605 METHOD OF FIXING SIGNS – Entrance signs
- Method of fixing Chemical fixed hold down bolts to concrete foundation
- 610 FIXING SIGNS GENERALLY
- Generally: Where not specified precisely, select methods of jointing and fixing and types, sizes and spacings of fasteners in compliance with section Z20.
 - Installation: To BS 559.
 - Secure, plumb and level.
 - Strength of fasteners: Sufficient to support all live and dead loads.
 - Fasteners and/ or adhesives: As section Z20.
 - Fasteners for external signs: Corrosion resistant material or with a corrosion resistant finish. Isolate dissimilar metals to avoid electrolytic corrosion.
 - Fixings showing on surface of sign: Must not detract from the message being displayed.
 - Temporary support: Do not subject members to non-design loadings.
 - Protection of users:
 - Fasteners for signs must not have sharp edges or protrusions that would cause injury to users.
 - Fasteners for tactile/ Braille signs must not have protrusions that would cause confusion to users.
- 620 FIXING ROAD SIGNS
- Protrusion of post top above sign: Not permitted unless supporting a luminaire.
 - Drilling of components:
 - Ferrous components: Drilled before the application of any finish.
 - Plastics sheeting: Apply clear lacquer recommended by plastics sheet manufacturer to edges of holes to prevent ingress of moisture damaging the lamination.
 - Erection: In accordance with the DFT 'Traffic Signs Manual,' Chapter 1.
 - Fixing: Austenitic stainless steel fasteners recommended for the purpose by the sign manufacturer.
- 625 FIXING SIGN POSTS INTO CONCRETE_____
- Concrete: To BS 8500-2.
 - Mix: Designated concrete not less than GEN 1 or standard prescribed concrete not less than ST2.
 - Admixtures: Submit proposals.
 - Prohibited: Calcium chloride and admixtures containing calcium chloride.
 - Depth of foundations, bedding, haunching: Appropriate to provide adequate support and to receive overlying soft landscape or paving finishes.
 - Type: _____.
 - Size: _____.
 - Other requirements: _____.
 - Foundation holes: Neat vertical sides.
 - Components: Accurately positioned and securely supported.
 - Concrete fill: Compact as filling proceeds.
 - Concrete foundations exposed to view: Compact until air bubbles cease to appear on the upper surface, then weather to shed water and trowel smooth.
 - Temporary support: Maintain undisturbed for minimum 48 hours.
- 635 POSTS SET IN EARTH_____

- Holes: As small as practicable.
- Components: Accurately positioned and securely supported.
- Buried depth (minimum): _____.
- Earth fill: Well rammed as filling proceeds.

COMPLETION

920 DOCUMENTATION

- Submit:
 - Copies of structural design calculations/ test reports.
 - General product information.
 - Installation information.
 - Inspection and maintenance reports.
 - Manufacturer's maintenance instructions.
 - Guarantees, warranties, test certificates, record schedules and log books.
- Number of copies: 1 digital copy
- Submission: For inclusion in Health and Safety File.

925 SPARE PARTS

- Supply as follows
 - Type: As proposed by Exhibition Designer.
 - Quantity: As proposed by Exhibition Designer

930 SPECIALIST TOOLS

- Supply as follows: Any keys or specialist screw heads for main entrance sign elements.

Q Paving/Planting/Fencing/Site furniture

Q10 Kerbs/ edgings/ channels/ paving accessories

Q10 Kerbs/ edgings/ channels/ paving accessories

To be read with Preliminaries/General conditions.

TYPES OF KERBS/EDGINGS AND CHANNELS

- 125 RECLAIMED STONE – Site reclaimed Yorkstone Setts
- Location and access: Reclaimed from clearance of forecourt
 - Lifting, storage and protection: On or off site
 - Preparation: Cleaned.
 - Bedding: Mortar.
 - Joints generally: Butt.
 - Sealant movement joints: None
 - Accessories: None
- 130 RECLAIMED CLAY BRICK – Dished Channels in Blue Engineering Brick Clay
- Location and access: Reclaimed from clearance of forecourt for repair / patching to those reclaimed in Education Garden,
 - Lifting, storage and protection: On or off site
 - Preparation: Cleaned.
 - Bedding: Mortar.
 - Joints generally: Butt.
 - Sealant movement joints: None
 - Accessories: None
- 170 LINEAR SLOT DRAINAGE CHANNEL SYSTEMS
- Manufacturer: ACO.
 - Product reference: _ Multidrain PPD D400 Load Class with single brick slot MT
 - Bore: _200mm.
 - Finish: Brick slot in galvanised steel – unit in concrete
 - Colour: Galvanised brick slot.
 - Accessories: Traps, jetting chambers and connections to main surface water drain.
 - Bedding: As per manufacturer's recommendations
 - Joints generally: Male / Female system as supplied as part of product by manufacturer
- 172 LINEAR SLOT DRAINAGE CHANNEL SYSTEMS
- Manufacturer: ACO.
 - Product reference: _ Multidrain PPD D400 Load Class with double brick slot MT
 - Bore: _200mm.
 - Finish: Brick slots in galvanised steel – unit in concrete
 - Colour: Galvanised brick slots.
 - Accessories: Traps, jetting chambers and connections to main surface water drain.
 - Bedding: As per manufacturer's recommendations
 - Joints generally: Male / Female system as supplied as part of product by manufacturer
- 180 DRAINAGE CHANNEL SYSTEMS WITH GRATINGS
- Manufacturer: ACO.
 - Product reference: _ Multidrain PPD D400 Load Class with mosaic cover
 - Bore: _200mm.
 - Finish: Ductile Iron Mosaic cover
 - Colour: Black cover.

- Accessories: Traps, jetting chambers and connections to main surface water drain.
- Bedding: As per manufacturer's recommendations
- Joints generally: Male / Female system as supplied as part of product by manufacturer
 - Cover gratings: Ductile Iron
 - Fixings: Lockable but removeable to aid jetting out
 - Loading grade to BS EN 124: _____.
 - Finish/ Colour: Black

ROADS/PAVING ACCESSORIES/MARKING

305 TREE GRILLES / RINGS

- Manufacturer: Everedge.
 - Product reference: Tree Ring.
- Size: 600mm diameter – 125mm deep
- Material: Galvanised steel.
- Finish: Galvanised_.
- Colour: Slate.
- Accessories: Fixing rods for driving down back of ring with associated fixings

307 METAL EDGING

- Manufacturer: Everedge.
 - Product reference: Titan Edging.
- Size: 4mm thick – 150mm deep – 2500mm long
- Material: Galvanised steel.
- Finish: Galvanised_.
- Colour: Galvanised.
- Accessories: Fixing rods for driving down back of edging with associated fixings

LAYING

510 LAYING KERBS, EDGINGS AND CHANNELS

- Cutting: Neat, accurate and without spalling. Form neat junctions.
 - Long units (450 mm and over) minimum length after cutting: 300 mm.
 - Short units minimum length after cutting: The lower of one third of their original length or 50 mm.
- Bedding of units: Positioned true to line and levelled along top and front faces, in a mortar bed on accurately cast foundations or on a race of fresh concrete.
- Securing of units: After bedding has set, secured with a continuous haunching of concrete or on a race of fresh concrete with backing concrete cast monolithically.

520 ADVERSE WEATHER

- Conditions: Do not construct if the temperature is below 3°C on a falling thermometer or 1°C on a rising thermometer. Adequately protect foundations, bedding and haunching against frost and rapid drying by sun and wind.

530 CONCRETE FOR FOUNDATIONS, RACES AND HAUNCHING

- Standard: To BS 8500-2.
- Designated mix: Not less than GEN0 or Standard mix ST1.
- Workability: Very low.

540 CEMENT MORTAR BEDDING

- General: To section Z21.
- Mix (Portland cement:sand): 1:3.
 - Portland cement: Class CEM I 42.5 to BS EN 197-1.
 - Sand: to BS EN 12620, grade 0/4 or 0/2 (MP).

- Bed thickness: 12-40 mm.

547 BEDDING/BACKING OF UNITS ON FRESH CONCRETE RACES

- Standard: To BS 7533-6.

550 KERB DOWELS

- Dowels: Steel bar to BS 4482.
 - Size: 12 mm diameter, 150 mm long.
- Installation of dowels: Vertically into foundation while concrete is plastic.
 - Centres: To suit holes in kerbs.
 - Projection: 75 mm.
- Grouting of holes in kerbs: Filled with 1:3 cement:sand mortar finished flush.

560 HAUNCHING DOWELS

- Dowels: Steel bar to BS 4482.
 - Size: 12 mm diameter, 150 mm long.
- Installation of dowels: Vertically into foundation while concrete is plastic.
 - Centres: 450 mm.
 - Distance from back face of kerb: 50 mm.
 - Projection: 75 mm.
- Haunching: Rectangular cross section, cast against formwork, fully enclosing and protecting dowels.

570 CHANNELS

- Installation: To an even gradient, without ponding or backfall.
- Lowest points of channels: 6 mm above drainage outlets.

580 DRAINAGE CHANNEL SYSTEMS

- Installation: To an even gradient, without ponding or backfall. Commence laying from outlets.
- Silt and debris: Removed from entire system immediately before handover.
- Washing and detritus: Safely disposed without discharging into sewers or watercourses.

590 DRAINAGE CHANNEL SYSTEMS WITH BUILT IN FALL

- Installation: Top of channels level, installed in correct sequence to form an even gradient without ponding or backfall. Commence laying from outlets.
- Silt and debris: Removed from entire system immediately before handover.
- Washings and detritus: Safely disposed without discharging into sewers or watercourses.

600 RADIUS KERBS/CHANNELS

- Usage: Radii of 15 m or less.

610 ANGLE KERBS

- Usage: Internal and external 90° changes of direction.
- Cutting of mitres: Not permitted.

620 ACCURACY

- Deviations (maximum):
 - Level: ± 6 mm.
 - Horizontal and vertical alignment: 3 mm in 3 m.

625 REGULARITY OF PAVED SURFACES

- Maximum undulation of (non-tactile) paving surface: 3 mm.
 - Method of measurement: Under a 1 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the surface).
- Difference in level between adjacent units (maximum):
 - Joints flush with the surface: Twice the joint width (with 5 mm max difference in level).

- Recessed, filled joints: 2 mm.
Recess depth (maximum): 5 mm.
- Unfilled joints: 2 mm.
- Sudden irregularities: Not permitted.

630 NARROW MORTAR JOINTS

- Jointing: Ends of units buttered with bedding mortar as laying proceeds. Joints completely filled, tightly butted and surplus mortar removed immediately.
 - Joint width: 3 mm.

640 TOOLED MORTAR JOINTS

- Jointing: Ends of units buttered with bedding mortar as laying proceeds. Joints completely filled and tooled to a neat flush profile.
 - Joint width: 6 mm.

641 TOOLED COLOURED MORTAR JOINTS

- Jointing: Ends of units buttered with bedding mortar as laying proceeds. Joints completely filled and raked out to a depth of 10 mm for pointing.
 - Joint width: 6 mm.
- Pointing: Joints refilled and tooled to a neat flush profile.
 - Pointing mortar: 1:3 cement:sand.
 - Pigment colour: To match adjacent blocks.

650 SEALANT MOVEMENT JOINTS

- Joint filler: Compressible cellular rubber or plastics compatible with specified sealant.
- Filler installation: Built in as work proceeds, extending through haunching and foundation. Filler positioned accurately to fully support sealant at the recommended depth below exposed faces of units.
- Joint width: 10mm
- Sealant: Mastic.
 - Colour: To match adjacent blocks.
- Sealant application: As section Z22.

Q20 Granular sub-bases to roads/pavings

Q20 Granular sub-bases to roads/pavings

To be read with Preliminaries/ General conditions.

- 110 THICKNESSES OF SUB-BASE/ SUBGRADE IMPROVEMENT LAYERS
- Thicknesses: See sections:
Subject to ground investigation around museum
- 120 CHECKING OF SUBGRADES
- Anticipated subgrade conditions:
 - Soil type: Unknown.
 - Plasticity index: Unknown.
 - CBR (minimum): Unknown.
 - Depth below formation level to groundwater table: Unknown
 - Subgrade variation: If material appears to vary from anticipated conditions, or if there are extensive soft spots, Contact Contract Administrator and.
 - Submit: Results and obtain instructions before proceeding.
- 130 HERBICIDES
- Type: Glyphosate based contact herbicide – applied in dry, wind free conditions at least 7 days before laying final surfacing.
 - Application: To top of subgrade (bituminous concrete) under all resin bound gravel areas
- 140 EXCAVATION OF SUBGRADES
- Final excavation to formation or sub-formation level: Carry out immediately before compaction of subgrade.
 - Soft spots and voids: Give notice.
 - Old drainage and service trenches: Seek Contract Administrator's instruction.
 - Wet conditions: Do not excavate or compact when the subgrade may be damaged or destabilized.
- 145 PREPARATION AND COMPACTION OF SUBGRADES
- Timing: Immediately before placing sub-base.
 - Soft or damaged areas: _ Seek Contract Administrator's instruction.
 - Compaction: Thoroughly, by roller or other suitable means, adequate to resist subsidence or deformation of the subgrade during construction and of the completed roads/ pavings when in use. Take particular care to compact fully at intrusions, perimeters and where local excavation and backfilling has taken place.
- 150 SUBGRADES FOR VEHICULAR AREAS
- Preparation and treatment: To Highways Agency 'Specification for highway works', clauses 616 and 617.
- 170 GEOTEXTILE FILTER/ SEPARATOR MEMBRANE
- Manufacturer: Terram or equal and similar approved .
 - Product reference: Contractor to propose.
 - Jointing: 300mm overlap with sealed edges .
 - Protect from:
 - Exposure to light, except during laying (maximum five hours).
 - Contaminants.
 - Materials listed as potentially deleterious by geotextile manufacturer.
 - Damage, until fully covered by fill.

- Wind uplift, by laying not more than 15 m before covering with fill.
 - Preparation: Remove humps and sharp projections and fill hollows before laying.
- 175 IMPERMEABLE MEMBRANE – Should they be instructed after opening up
- Manufacturer: Contractor proposal.
 - Product reference: Contractor proposal.
 - Jointing: 300mm overlap and sealed.
 - Protect from: _____.
 - Exposure to light, except during laying (maximum five hours).
 - Contaminants.
 - Materials listed as potentially deleterious by geotextile manufacturer.
 - Damage, until fully covered by fill.
 - Wind uplift, by laying not more than 15 m before covering with fill.
 - Preparation: Remove humps and sharp projections and fill hollows before laying.
 - Other requirements: _____.
- 180 NOTICE
- Give notice: for works adjacent to museum building.
 - Period of notice: 72 hours.
- 200 SUBGRADE IMPROVEMENT LAYER (CAPPING)
- Material: To Highways Agency 'Specification for highway works', table 6/1, Class D400
 - Standard: Placed and compacted to Highways Agency 'Specification for highway works', table 6/1, clauses 612 and 613.3, 613.8, 613.9, 613.10 and 613.13.
- 205 HIGHWAYS AGENCY TYPE 2 UNBOUND MIXTURE FOR SUB-BASE
- Material: Type 2 unbound mixture to Highways Agency 'Specification for highway works', clauses 801 and 804.
 - Recycled aggregate: 20%
 - CBR (minimum): To be confirmed after site investigation
- 210 HIGHWAYS AGENCY TYPE 1 UNBOUND MIXTURE FOR SUB-BASE
- Material: Type 1 unbound mixture to Highways Agency 'Specification for highway works', clauses 801 and 803.
 - Recycled aggregate: 20%
 - CBR (minimum): To be confirmed after site investigation
- 211 GRANULAR MATERIAL
- Quality: Of a known suitability for use in sub-bases, free from excessive dust, well graded, all pieces less than 75 mm in any direction, minimum 10% fines value of 50 kN when tested in a soaked condition to BS 812-111 or a resistance to fragmentation of LA50 for the Los Angeles test to BS EN 1097-2, and in any one layer only one of the following:
 - Crushed rock (other than argillaceous rock) or quarry waste with not more binding material than is required to help hold the stone together.
 - Crushed concrete, crushed brick or tile, free from plaster, timber and metal.
 - Gravel or hoggins with not more clay content than is required to bind the material together, and with no large lumps of clay.
 - Natural gravel.
 - Natural sand.
 - Filling: Spread and levelled in 150 mm maximum layers, each layer thoroughly compacted.
- 215 COARSE GRADED AGGREGATE FOR PERMEABLE PAVING – to bases of retained trees.
- Material: Porous bitumen concrete as base to porous resin bound aggregate
 - Standard: To BS EN 13242 Type 3
 - Aggregate size: 15-30mm
 - Laying: To maintain open structure

- Protection: Prevent damage by traffic and contamination by mud and soil.
- 220 FROST SUSCEPTIBLE GRANULAR MATERIAL
- Definition (non frost susceptible material): To Highways Agency 'Specification for highway works' clause 801.8.
 - Depth of frost susceptible material below final surface of paving (minimum): _____.
 - Testing: Test materials used if required and supply certificates.
- 230 PLACING GRANULAR MATERIAL GENERALLY
- Preparation: Loose soil, rubbish and standing water removed.
 - Structures, membranes and buried services: Ensure stability and avoid damage.
- 240 LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS
- General: Spread and levelled in layers. As soon as possible thereafter compact each layer.
 - Standard: To Highways Agency 'Specification for highway works' clause 802.
 - At drainage fittings, inspection covers, perimeters and where local excavation and backfilling has taken place: Take particular care to compact fully.
- 241 LAYING GRANULAR SUB-BASES FOR VEHICULAR AREAS
- Proposals: Well in advance of starting work submit details of:
 - Maximum depth of each compacted layer.
 - Type of plant.
 - Minimum number of passes per layer.
 - General: Spread and levelled in layers. As soon as possible thereafter compact each layer.
 - At drainage fittings, inspection covers, perimeters and where local excavation and backfilling has taken place: Take particular care to compact fully.
 - Defective areas: Remove loose, segregated or otherwise defective areas to the full thickness of the layer and lay and compact new material.
 - Sub-base surface after compaction and immediately before overlaying: Uniformly well closed and free from loose material, cracks, ruts or hollows.
- 250 LAYING GRANULAR SUB-BASES – If required in external realm to museum.
- General: Spread and levelled.
 - Compaction:
 - Timing: As soon as possible after laying.
 - Method: By roller or other suitable means, adequate to resist subsidence or deformation of the sub-base during construction and of the completed paving when in use. Take particular care to compact fully at intrusions, perimeters and where local excavation and backfilling has taken place.
- 310 ACCURACY
- Permissible deviation from required levels, falls and cambers (maximum):
 - Subgrades:
 - Roads and parking areas: +20 -30 mm.
 - Footways and recreation areas: ± 20 mm.
 - Sub-bases:
 - Roads and parking areas: ± 10 -20 mm
 - Footways and recreation areas: ± 10 mm.
- 330 COLD WEATHER WORKING
- Frozen materials: Do not use.
 - Freezing conditions: Do not place fill on frozen surfaces. Remove material affected by frost. Replace and recompact if not damaged after thawing.
- 340 PROTECTION
- Sub-bases: As soon as practicable, cover with subsequent layers, specified elsewhere.
 - Subgrades and sub-bases: Prevent degradation by construction traffic, construction operations and

inclement weather.

Q22 Asphalt roads/ pavings

Q22 Asphalt roads/ pavings

To be read with Preliminaries/ General conditions.

TYPES OF PAVING

110 ASPHALT CONCRETE PAVING – To parking areas

All following details to be defined if asphalt concrete is needed to parking areas after site investigation.

- Standard: _____.
- Subgrade improvement layer: _____.
 - Compacted thickness: _____.
- Granular sub-base: _____.
 - Compacted thickness: _____.
- Base: _____.
 - Paving grade: _____.
 - Compacted thickness: _____.
- Binder course: _____.
 - Paving grade: _____.
 - Compacted thickness: _____.
- Surface course: _____.
 - Paving grade: _____.
 - Compacted thickness: _____.
- Reclaimed content:
 - Standard: To BS EN 13108-8.
 - Value (maximum): _____.
- Surface treatment: _____.
- Other requirements: _____.

115 ASPHALT CONCRETE PAVING – To forecourt area

All following details to be defined if asphalt concrete is needed to forecourt after site investigation.

- Standard: _____.
- Subgrade improvement layer: _____.
 - Compacted thickness: _____.
- Granular sub-base: _____.
 - Compacted thickness: _____.
- Binder course: _____.
 - Paving grade: _____.
 - Compacted thickness: _____.
- Surface course: _____.
 - Paving grade: _____.
 - Compacted thickness: _____.
- Reclaimed content:
 - Standard: To BS EN 13108-8.
 - Value (maximum): _____.
- Surface treatment: _____.
- Other requirements: _____.

115 ASPHALT CONCRETE PAVING – To education garden

All following details to be defined if asphalt concrete is needed to education garden after site investigation.

- Standard: _____.
- Subgrade improvement layer: _____.

- Compacted thickness: _____.
- Granular sub-base: _____.
- Compacted thickness: _____.
- Binder course: _____.
- Paving grade: _____.
- Compacted thickness: _____.
- Surface course: _____.
- Paving grade: _____.
- Compacted thickness: _____.
- Reclaimed content:
 - Standard: To BS EN 13108-8.
 - Value (maximum): _____.
- Surface treatment: _____.
- Other requirements: _____.

127 PERMEABLE ASPHALT CONCRETE PAVING – to base of retained trees in forecourt area

- Standard: To BS EN 13108-1.
- Granular sub-base: - Type 3 porous.
 - Compacted thickness: 50mm
- Base: 20-30mm
 - Compacted thickness: 75mm.
- Binder course: Not required
 - Paving grade: _____.
 - Compacted thickness: _____.
- Surface course: Not required – resin bound aggregate finish
 - Manufacturer: _____.
 - Product reference: _____.
 - Type: _____.
 - Compacted thickness: _____.
- Reclaimed content:
 - Standard: To BS EN 13108-8.
 - Value (maximum): 20%.
 - Compacted thickness: _____.

175 PROPRIETARY PEDESTRIAN PAVING – Resin bound aggregate

- Subgrade improvement layer: If required after site investigation.
 - Compacted thickness: Defined after site investigation
- Granular sub-base: Defined after site investigation.
 - Compacted thickness: Defined after site investigation.
- Binder course: To BS EN 13108-1, Defined after site investigation
 - Paving grade: Defined after site investigation.
 - Compacted thickness: Defined after site investigation
 - Laying/ Compaction: To BS 594987.
- Surface course:
 - Manufacturer: Coatech.
 - Product reference: 6mm Butterscotch resin bound impermeable aggregate.
 - Compacted thickness: 25mm.
 - Laying/ Compaction: For pedestrian and occasional vehicle overrun.

PREPARATORY WORK/ REQUIREMENTS

210 TIMBER EDGING – To back of planting beds in Education Garden.

- Softwood board:
 - Size: 38 x 150 x 2400 mm.
 - Fixing: Galvanized nails into softwood pegs.
- Softwood pegs:

- Size: 50 x 50 x 600mm.
- Fixing: Drive into ground.
- Centres: 1.2m
- Preservative treatment: Tanobrun Pressure Treated

220 BITUMINOUS MATERIALS GENERALLY

- Suppliers names: Submit.
 - Timing (minimum): 2 weeks before starting work.
- Test certificates: At the time of delivery for each manufacturing batch submit certificate:
 - Confirming compliance with this specification and the relevant standard.
 - Stating full details of composition of mix.

230 SAMPLES

- Submit: As requested by Contract Administrator.

240 ACCEPTANCE OF SURFACES

- Surface: Sound, clean and suitably close textured.
- Level tolerances: To BS 5949:87.
- Kerbs and edgings: Complete, adequately bedded and haunched and to the required levels.

250 ABUTMENTS

- Vertical edges of manholes, gullies, kerbs and other abutments: Clean and paint with a thin uniform coating of bitumen based tanking paint
- Finishing: Tamp surface around projections.
 - Level: Flush or not more than 3 mm above projections.

LAYING

310 LAYING GENERALLY

- Preparation: Remove all loose material, rubbish and standing water.
- Adjacent work: Form neat junctions. Do not damage.
- Channels, kerbs, inspection covers etc: Keep clean.
- New paving:
 - Keep traffic free until it has cooled to prevailing atmospheric temperature.
 - Do not allow rollers to stand at any time.
 - Prevent damage.
 - Lines and levels: With regular falls to prevent ponding.
 - Overall texture: Smooth, even and free from dragging, tearing or segregation.
 - State on completion: Clean.

320 ADVERSE WEATHER

- Frozen materials: Do not use.
- Suspend laying:
 - During freezing conditions
 - If the air temperature reaches 0°C, or in calm dry conditions -3°C, on a falling thermometer.
 - Hot rolled asphalt: During periods of continuous or heavy rain or if there is standing water on the base.

330 LEVELS

- Permissible deviation from the required levels, falls and cambers (maximum): In accordance with BS 5949:87, Table 7.

340 FLATNESS/ SURFACE REGULARITY

- Deviation of surface: Where appropriate in relation to the geometry of the surface, the variation in gap under a 3 m straightedge placed anywhere on the surface to be not more than:
 - Base: _+ or -15mm

- Binder course: $\pm$ or -10mm
- Surface course: $\pm$ or -5mm
- Where a straightedge cannot be used the surface must be of a comparable standard of accuracy when judged by eye.

350 CONTRACTOR'S USE OF PAVEMENTS

- Before use:
 - Timing: allow newly laid sections to cool before trafficking.
 - Open-grained surface: Fill with 0/4 mm size coated grit. Remove surplus.
 - Finish: Uncoated chipping and binder surface treatment.
- Preparation for final surfacing:
 - Timing: Defer laying until as late as practicable.
 - Immediately before laying final surfacing: Clean and make good the base/ binder course. Allow to dry.
Accuracy: Uniform, without puddles.
 - Finishing: Allow emulsion to break completely before applying surface.

351 CONTRACTOR'S USE OF PAVEMENTS

- Preparation for final surfacing:
 - Timing: Defer laying until as late as practicable.
 - Immediately before laying final surfacing: Clean and make good the base/ binder course. Allow to dry.
Accuracy: Uniform, without puddles.
 - Finishing: Allow emulsion to break completely before applying surface.

COMPLETION

390 DOCUMENTATION

- Standard: All resin bound gravel surfaces
 - Declaration of conformity: Submit.
- Number of copies: 1 digital copy
- Submission: 4 weeks after completion and period of heavy rain to confirm puddling situation.

Q23 Gravel/ Hoggins/ Woodchip/ Resin bound roads/ paving/ overlays

Q23 Gravel/ Hoggin/ Woodchip/ Resin bound roads/ paving/ overlayss

To be read with Preliminaries/ General conditions.

TYPES OF SURFACING

- 160 LOOSE GRAVEL to Back pf planting beds in Education Garden and possibly to car park side of building
- Subgrade improvement layer: N/A.
 - Compacted thickness: N/A.
 - Granular sub-base: Type 3 porous build-up
 - Compacted thickness: 225mm
 - Blinding to sub-base: Terram 1000 separation layer
 - Gravel: Loose laid and raked to uniform thickness.
 - Type: Golden pea shingle 7mm nominal size.
 - Source: Contractor sourced
 - Colour: Golden.
 - Size: 7mm nominal size
 - Thickness: 75mm.

LAYING

- 310 TIMBER EDGING
- Softwood board:
 - Size: 150 x 38 x 2400mm.
 - Fixing: Galvanized nails into softwood pegs.
 - Softwood pegs:
 - Size: 50 x 50 x 600mm
 - Fixing: Drive into ground.
 - Centres: 1200mm.
 - Preservative treatment: Tanobrun Pressure Treated.
- 315 MATERIALS
- Compatibility: Chippings suitable for use with respective binders/ emulsions/ resin/ epoxy.
- 320 SAMPLES
- Submit: Representative samples of resin bound gravel and loose gravel
- 330 HERBICIDE TO PAVING Q23
- Type: Suitable for the application, location and conditions of use.
 - Weeds and moss: Grub up.
 - Application: As section A34, before surfacing.
- 340 LAYING GENERALLY
- Channels, gullies, etc: Keep clear.
 - Finished surfaces:
 - Lines and levels: To prevent ponding.
 - Overall texture: Even.
 - State at completion: Clean.
- 350 COLD WEATHER WORKING
- Frozen materials: Do not use.
 - Freezing conditions: Do not lay pavings.
 - Cold bituminous surface dressings: Do not apply when ambient temperature is below 10°C.
 - Other dressings or overlays: As manufacturers' recommendations.

360 DRAINAGE FALLS

- Sealed surfaces:
 - Falls and cross falls (minimum): 1:40.
 - Camber (minimum): 1:50.
- Unsealed surfaces (minimum): 1:30.

370 LAYING GRANULAR SURFACES IN VEHICULAR AREAS

- Permissible deviation from required levels, falls and cambers (maximum): ± 10 mm.
- General: Spread and level in 150 mm maximum layers. As soon as possible compact each layer.
- Dry weather: Lightly water layers during compaction.

380 LAYING GRANULAR SURFACES IN PEDESTRIAN AREAS

- Permissible deviation from required levels, falls and cambers (maximum): ± 10 mm.
- General: Spread and level in 100 mm maximum layers. As soon as possible, compact each layer.
- Dry weather: Lightly water layers during compaction.

390 PROTECTION FROM TRAFFIC AND PLANT

- Paved areas: Restrict access to prevent damage.

Q24 Interlocking brick/block roads/pavings

Q24 Interlocking brick/block roads/pavings

To be read with Preliminaries/ General conditions

TYPES OF PAVING

120 CONVENTIONAL CLAY PAVER PAVING – Repair to existing surfacing at car park / delivery area

- Subgrade improvement layer: To be confirmed after site inspection.
 - Compacted thickness: To be confirmed after site inspection.
- Granular sub-base: To be confirmed after site inspection
 - Compacted thickness: To be confirmed after site inspection.
- Geotextile: Terram 1000
 - Manufacturer: Terram.
 - Product reference: 1000
- Laying course:
 - Material: In accordance with BS 7533-3.
 - Category: To match existing
 - Method of screeding, in accordance with BS 7533-3: Compaction.
 - Nominal thickness after compaction: To be confirmed after site inspection
- Pavers: To BS EN 1344.
 - Requirements: Reclaimed or matched to existing.
 - Manufacturer: To be confirmed.
 - Product reference: _ To be confirmed.
 - Sizes: 100x200x65
 - Special pavers: None
 - Colour/ Finish: To match existing
- Jointing:
 - Material: In accordance with BS 7533-3.
 - Joint width: 2-4 mm.
- Sealer/ Stabilizer: No
- Setting out:
 - Bond: To match existing
 - Features: Yorkstone sett bands to demark car parking areas
- Accessories None

122 CONVENTIONAL CLAY PAVER PAVING WITH BOUND BASE_ As per 120 above based on site inspection results

- Subgrade improvement layer: _____.
 - Compacted thickness: _____.
- Granular sub-base: _____.
 - Compacted thickness: _____.
- Base: _____.
 - Thickness: _____.
- Laying course:
 - Material: In accordance with BS 7533-3.
 - Category: _____.
 - Method of screeding, in accordance with BS 7533-3: _____.
 - Nominal thickness after compaction: _____.
- Pavers: To BS EN 1344.
 - Requirements: _____
 - Manufacturer: _____.
 - Product reference: _____.

- Sizes: _____.
- Special pavers: _____.
- Colour/ Finish: _____.
- Jointing:
 - Material: In accordance with BS 7533-3.
 - Joint width: 2–4 mm.
- Sealer/ Stabilizer: _____.
- Setting out:
 - Bond: _____.
 - Features: _____.
- Accessories: _____.

130 NATURAL STONE SETT PAVING – As trims to entrance areas to Forecourt,

- Subgrade improvement layer: To be confirmed after site investigation.
 - Compacted thickness: To be confirmed after site investigation
- Granular sub-base: To be confirmed after site investigation.
 - Compacted thickness: 150mm.
- Geotextile To be confirmed after site investigation
 - Manufacturer: To be confirmed after site investigation.
 - Product reference: To be confirmed after site investigation _.
- Laying course:
 - Material: In accordance with BS 7533-7, clause 6.1.1.1.
 - Compaction: In accordance with BS 7533-7, clauses 9.4.1 and 12.1 and Annex E.
 - Nominal thickness after compaction: 30mm
- Setts:
 - Requirements: Yorkstone setts.
 - Supplier: Reclaimed_.
 - Product reference: N/A.
 - Sizes: 200x100mm – depth to be confirmed after site investigation.
 - Method of cutting sett sides: Diamond sawn.
 - Dimensional tolerance: In accordance with BS 7533-7, clause 6.3.
 - Freeze/ thaw resistance to BS EN 1342: Class 1 (F1).
 - Colour/ Finish: As reclaimed.
 - Special setts: None.
- Jointing:
 - Material: In accordance with BS 7533-7, clause 6.2.1.1.
 - Joint width: 2–4 mm.
- Sealer/ Stabilizer: None.
- Setting out: To be confirmed by Contract Administrator
 - Bond: Stack or stretcher
 - Features: None.
- Accessories: None

132 NATURAL STONE SETT PAVING WITH BOUND BASE As per 130 above based on site inspection results

- Subgrade improvement layer: _____.
 - Compacted thickness: _____.
- Granular sub-base: _____.
 - Compacted thickness: _____.
- Base: _____.
 - Thickness: _____.
- Laying course:
 - Material: In accordance with BS 7533-7, clause 6.1.1.1.
 - Compaction: In accordance with BS 7533-7, clauses 9.4.1 and 12.1 and Annex E.
 - Nominal thickness after compaction: _____.
- Setts:
 - Requirements: _____

- Supplier: _____.
- Product reference: _____.
- Sizes: _____.
- Method of cutting sett sides: Diamond sawn.
- Dimensional tolerance: In accordance with BS 7533-7, clause 6.3.
- Freeze/ thaw resistance to BS EN 1342: Class 1 (F1).
- Colour/ Finish: _____.
- Special setts: _____.
- Jointing:
 - Material: In accordance with BS 7533-7, clause 6.2.1.1.
 - Joint width: 2-4 mm.
- Sealer/ Stabilizer: _____.
- Setting out: _____.
- Bond: _____.
- Features: _____.
- Accessories: _____.

EXECUTION

200 EXECUTION GENERALLY - CONCRETE BLOCK AND CLAY PAVER PAVING

- Standard: In accordance with BS 7533-3.

205 EXECUTION GENERALLY - NATURAL STONE PAVING

- Standard: Generally in accordance with BS 7533-7, as relevant to flexible laying and construction:
 - Moisture content of laying course material (clause 7).
 - Laying setts (clause 9).
- Subgrade, sub-base and roadbase presentation: In accordance with BS 7533-3.
- Regularity of finished paving surface: In accordance with BS 7533-3.
- Construction in adverse weather conditions: In accordance with BS 7533-3.
- Cutting and trimming: In accordance with BS 7533-3. Cut setts with a disc cutter or masonry saw.

211 COLOUR BANDING

- General: Unless premixed by manufacturer, select blocks/ pavers/ setts vertically from at least _____ 3 separate packs in rotation to avoid colour banding.

220 SAMPLES

- General: Before ordering, submit samples of clay pavers/ additional yorkstone setts that are representative of colour and appearance.

230 CONTROL SAMPLES

- General: Carry out sample area of finished work:
 - Location: Adjacent to Church Wall.
 - Size (minimum): 1 lm.
 - Features to be included: None.
- Give notice: When ready for inspection.
- Timing: Obtain approval of appearance before proceeding.

240 ADVERSE WEATHER

- General: Do not use frozen materials or lay bedding on frozen or frost covered sub-bases.

335 PLANING AND REPAIRS TO EXISTING BASES

- Existing macadam/ asphalt surfaces: Plane to required levels.
- Repairs: excavated, stone and brought back to level with matching macadam grade.
- Building up to required levels: Maximum 150mm layers.

- 350 GRANULAR LAYER OVER EXISTING BASES
- Material: Crush and run aggregate
 - Thickness: As required to make up levels
 - Compaction: With appropriate sized roller avoiding tree root protection areas
 - Blinding: If instructed by Contract Administrator.
- 385 MORTAR BEDDED – Yorkstone flags and setts
- Foundation: As defined after site inspection
 - Size: As defined after site inspection.
 - Concrete: As section E10 As defined after site inspection.
 - Bedding:
 - Thickness: 10 mm minimum to 40 mm maximum.
 - Mortar: As section Z21 Instarmac bedding material .
 - Laying: Bed units on foundation, and secure with continuous mortar haunching.
 - Keep exposed faces clean and free from mortar.
 - Jointing: Butt or stretcher joint.
- 420 TOOLED JOINTS IN MORTAR BEDDED UNITS
- Jointing: Butter ends of units with bedding mortar as work proceeds, to completely fill joints.
 - Joint width: 5-10mm.
 - Finish: Tool to a neat flush profile.
- 425 TOOLED COLOURED JOINTS IN MORTAR BEDDED UNITS
- Jointing: Butter ends of units with bedding mortar as work proceeds, to completely fill joints.
 - Joint width: 8-12mm
 - Pointing: Rake out to 10 mm depth and point with 1:3 cement:sand mortar with pigment.
 - Colour: Buff to match Yorkstone.
- 430 SEALANT MOVEMENT JOINTS IN MORTAR BEDDED UNITS
- Spacing: 7m centres.
 - Extent of joints: Across bands
 - Joint filler: Compressible cellular rubber or plastics compatible with specified sealant. Build in as work proceeds.
 - Joint width: 15mm through full sett, bedding and haunch.
 - Barrier (joint breaker): As recommended by sealant manufacturer. Position filler and barrier accurately to fully support sealant at recommended distance from exposed faces of units.
 - Sealant: Mastic for external use
 - Colour: Buff
 - Application: As section Z22.
- 440 LAYING GEOTEXTILE EDGING STRIP FOR CONVENTIONAL PAVING
- Location: Immediately below laying course, abutting features that interrupt the laying course, including:
 - Perimeters, edge restraints and kerbs.
 - Other types of paving.
 - Drainage fittings, e.g. channels and manholes.
 - Width: 150mm.
 - Jointing: 50mm overlap
 - Edge detail: Turn sheet up to form an upstand fitted neatly against features.
 - Height (minimum): Thickness of bedding course.
- 452 PREPARED EXISTING AND NEW BOUND BASES (ROADBASES)
- Condition before placing laying course: Sound, clean, free from rutting or major cracking and cleared of sharp stones, projections or debris.
- 485 LAYING BLOCKS/ PAVERS/ SETTS

- Setting out: Start from an edge restraint.
- Cutting: Cleanly, accurately and vertically, without spalling. Do not mark or damage visible surfaces.
- Cut edges: Turn inwards where possible; do not position against edge restraints or other features.
- In situ mortar or concrete infill: Full mortar bed.
- Compaction: Vibrate to produce thoroughly interlocked paving of even overall appearance with regular joints and accurate to line, level and profile. Do not mark or damage paving units, kerbs and adjacent work.
 - Concrete blocks and clay pavers: In accordance with BS 7533-3, Annex F, to site category required for laying course material.

490 LAYING PERMEABLE PAVING

- General: To manufacturer's recommendations.

500 REGULARITY OF PAVED SURFACES

- Maximum variation in gap under a 3 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the surface):
 - Precast concrete paving blocks and clay pavers for flexible pavements: 10 mm.
- Difference in level between adjacent paving units (maximum): 2 mm.
- Sudden irregularities: Not permitted.

505 REGULARITY OF PAVED SURFACES

- Maximum undulations in the surface of pavings (except tactile paving surfaces) under a 1 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the surface): 3 mm.
- Joints between paving units or utility access covers:
 - Joints flush with the surface: difference in level between adjacent units to be no more than twice the joint width (with a 5 mm max difference in level).
 - Recessed, filled joints: difference in level between adjacent units to be no greater than 2 mm; the recess to be no deeper than 5 mm.
 - Unfilled joints: difference in level between adjacent units to be no greater than 2 mm.
- Sudden irregularities: Not permitted.

COMPLETION

615 COMPLETION OF PAVING

- Final compaction of the surface course: In accordance with BS 7533-3.
- Vacuum cleaning machines: Not allowed.

Q25 Slab/brick/sett/cobble pavings

Q25 Slab/brick/sett/cobble pavings

To be read with Preliminaries/ General conditions.

GENERAL

- 110 NATURAL STONE SLAB PAVING SYSTEM – Yorkstone flags in Forecourt area
- Subgrade improvement layer: Dependent on trial pit results.
 - Compacted thickness: Dependent on trial pit results
 - Granular sub-base: Dependent on trial pit results
 - Compacted thickness: _ Dependent on trial pit results.
 - Base: Dependent on trial pit results
 - Thickness: Dependent on trial pit results.
 - Laying course: Instarmac – Ultrascape Bedding .
 - Accessories: Instarmac Primer applied to full base of flags
 - Paving units: Yorskstone – 6-sided diamond sawn, 450mm course width in random lengths of between 300=900mm
 - Jointing: 10mm – Ultrascape brush in or slurry based jointing compound.
 - Bond: Stretcher bond with no long joints.
 - Accessories: None.
 - Movement joints: At 10m centres
 - Locations: Adjacent to slot drains
- 140 NATURAL STONE SETT PAVING SYSTEM – for entrance thresholds where laid in more than single strips.
- Subgrade improvement layer: Dependent on trial pit results.
 - Compacted thickness: Dependent on trial pit results
 - Granular sub-base: Dependent on trial pit results
 - Compacted thickness: _ Dependent on trial pit results.
 - Base: Dependent on trial pit results
 - Thickness: Dependent on trial pit results.
 - Laying course: Instarmac – Ultrascape Bedding .
 - Accessories: Instarmac Primer applied to full base of setts
 - Paving units: Reclaimed Yorkstone Sett
 - Jointing: 10mm Ultrascape brush in or slurry based jointing compound
 - Bond: Stretcher bond
 - Accessories: None
 - Filling: _____.
- 185 GRAVEL FILLED PLASTICS PAVING SYSTEM – Potentially to side of building adjacent to car park dependent on results of ground investigation
- Subgrade improvement layer: Dependent on survey results.
 - Compacted thickness: Dependent on survey results
 - Granular sub-base: Dependent on survey results.
 - Compacted thickness: Dependent on survey results
 - Laying course: Dependent on survey results – potentially on drainage trough to take water away
 - Accessories: Rodding eye for drainage trough
 - Paving units: Geogrid rigid recycled plastic .
 - Bond: Stacked to fit space.
 - Filling: 7mm grey pea shinge.
 - Accessories: None.

SYSTEM PERFORMANCE

210 DESIGN - NATURAL STONE SLAB PAVING SYSTEM

- Design: Complete the design of the natural stone slab paving system in accordance with BS 7533-4.
 - Site category: D400 pedestrian and occasional slow moving maintenance vehicle .
- Ground conditions: To be confirmed.
- Performance criteria: non-slip and use of slot drains is mandatory.
- Proposals: Submit drawings, technical information, calculations and manufacturers' literature.

240 DESIGN - NATURAL STONE SETT PAVING SYSTEM

- Design: Complete the design of the natural stone sett paving system in accordance with BS 7533-7.
- Ground conditions: To be confirmed.
- Performance criteria: Non-slip.
- Proposals: Submit drawings, technical information, calculations and manufacturers' literature.

285 DESIGN - GRAVEL FILLED PLASTICS PAVING SYSTEM

- Design: Complete the design of the gravel filled plastics paving system in accordance with manufacturer's instructions.
- Ground conditions: To be confirmed
- Performance criteria: Fit necessary drainage troughs and non bio-degradable.
- Proposals: Submit drawings, technical information, calculations and manufacturers' literature.

PRODUCTS

305 GRANULAR MATERIAL FOR LAYER OVER EXISTING BASES

- Material: Contractor's choice

310 NATURAL STONE SLABS – To main entrance of museum

- Standard: To BS EN 12044.
- Supplier: Drings Stone or Johnsons Wellfield Ltd
 - Product reference: 6-sided diamond sawn flag.
 - Quarry: Seek Contract Administrators approval.
- Stone type: Yorkstone Flag..
- Finish: Smooth, diamond sawn.
- Sizes: 450mm coursed, random length between 300-900mm and 70mm thick
 - Plan dimension deviation class: + or – 2mm.
 - Thickness deviation class: + or – 2mm _.
- Arrises: None.
- Freeze/ thaw resistance class: High Resistance
- Flexural strength (MPa): 13 MPa.
- Abrasion resistance class: <23.
- Slip/ Skid resistance (USRV):45
- Water absorption (% by mass): 3% by mass.
- Surface treatment: Diamond sawn.

330 NATURAL STONE SETTS – As 'top-up' to reclaimed yorkstone setts

- Standard: To BS EN 1342.
- Supplier: Drings Stone or Johnsons Wellfield Ltd
 - Product reference: sawn then tumbled
 - Quarry: To be agreed with Contract Administrator
- Stone type: Yorkstone
- Finish: Tumbled
- Sizes: 200 x 100 x 100 mm after checking reclaimed stock.
 - Thickness deviation class: + or – 2mm
- Special setts: None
- Freeze/ thaw resistance class: High Resistance

- Flexural strength (MPa): 13 MPa.
- Abrasion resistance class: <23.
- Slip/ Skid resistance (USRV):45
- Water absorption (% by mass): 3% by mass.
- Surface treatment: Diamond sawn.

- 370 CEMENT FOR SITE MIXED MORTAR – Instarmac product or equal and similar approved
- Standard: As section Z21.

- 375 SAND/ FINE AGGREGATE FOR SITE MIXED MORTAR As proposed by Contractor •
- Standard: To BS EN 12620, designations:

- 435 PRIMER FOR UNDERSIDE OF FLAGS AND SLABS Instarmac product or equal and similar approved
- Manufacturer: Instarmac
 - Product reference: Slurry primer.

- 440 READY MIXED MORTAR Instarmac product or equal and similar approved
- Type: Suitable for natural stone flag and setts.
 - Standard/ Performance requirements: BS7533
 - Manufacturer: Instarmac or equal and similar approved
 - Product reference: Ultrascap Range.
 - Compressive strength >35N/mm²
 - Adhesive Strength >2N/mm²
 - Flexural Strength >4.5N/mm²
 - Modulus of Elasticity >18,000N/mm²
 - Shrinkage <0.1%

- 455 JOINT FILLER FOR MOVEMENT JOINTS Flexi-board or rubber polymer
- Type: Contractor proposed
 - Manufacturer: Contractor proposed.
 - Product reference: Contractor proposed

- 460 JOINT BREAKER BARRIERS FOR MOVEMENT JOINTS _____
- Manufacturer: Contractor proposed.
 - Product reference: Contractor proposed

- 465 SEALANT FOR MOVEMENT JOINTS – expansion joints fully cleaned and primed prior to cleaning
- Sealant: Contractor proposed.
 - Manufacturer: Contractor proposed.
 - Product reference: Contractor proposed.
 - Colour: To match Yorkstone.

- 470 SEALER/ STABILIZER SOLUTION FOR BLOCKS AND SETTS
- Manufacturer: Contractor proposed.
 - Product reference: Contractor proposed.

- 475 CLEANING SOLUTION FOR EXISTING BLOCKS AND SETTS – If required to clean construction spills to retained paving near delivery area / car parking
- Manufacturer: Contractor proposed.
 - Product reference: Contractor proposed.

EXECUTION

- 610 MATERIAL SAMPLES
- Samples representative of colour and appearance of designated materials: Submit before placing

orders.

- Designated materials: Yorkstone flags and additional Yorkstone setts to match existing

615 CONTROL SAMPLES

- Sample areas: Complete as part of the finished work.
 - Types of paving: Yorkstone flag.
 - Location: To be agreed.
 - Size (minimum): 1.8m x 1.8m
 - Included features: 300mm and 900mm length stone.
- Approval of appearance and surface: Obtain before proceeding.

620 ADVERSE WEATHER

- General:
 - Temperature: Do not lay or joint paving if the temperature is below 3°C on a falling thermometer or below 1°C on a rising thermometer.
 - Frozen materials: Do not use. Do not lay bedding on frozen or frost covered bases.
- Paving with mortar joints and/ or bedding:
 - Protect from frost damage, rapid drying out and saturation until mortar has hardened.
- Paving laid and jointed in sand:
 - Stockpiled bedding sand: Protect from saturation.
 - Exposed areas of sand bedding and uncompacted areas of sand bedded paving: Protect from heavy rainfall.
 - Saturated sand bedding: Remove and replace, or allow to dry before proceeding.
 - Laying dry-sand jointed paving in damp conditions: Brush in as much jointing sand as possible. Minimize site traffic over paving. As soon as paving is dry, top up joints and complete compaction.

625 LAYING PAVINGS - GENERAL

- Appearance: Smooth and even with regular joints and accurate to line, level and profile.
- Falls: To prevent ponding.
- Bedding of paving units: Firm so that rocking or subsidence does not occur or develop.
 - Bedding/ Laying course: Consistently and accurately graded, spread and compacted to produce uniform thickness and support for paving units.
- Slopes: Lay paving units upwards from the bottom of slopes.
- Paving units: Free of mortar and sand stains.
- Cutting: Cut units cleanly and accurately, without spalling, to give neat junctions with edgings and adjoining finishes.

630 LEVELS OF PAVING

- Permissible deviation from specified levels:
 - Generally: ± 4 mm.
- Height of finished paving above features:
 - At gullies: +3 to +5 mm.
 - At drainage channels and kerbs: +3 to +5 mm.

635 REGULARITY OF PAVED SURFACES

- Maximum variation in gap under a 3 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the surface):
 - Precast concrete paving blocks and clay pavers for flexible pavements: 10 mm.
 - Precast concrete flags or natural stone slabs: 3 mm.
- Difference in level between adjacent paving units (maximum): 2 mm.
- Sudden irregularities: Not permitted.

637 REGULARITY OF PAVED SURFACES

- Maximum undulations in the surface of pavings (except tactile paving surfaces) under a 1 m straight edge placed anywhere on the surface (where appropriate in relation to the geometry of the

- surface): 3 mm.
 - Joints between paving units or utility access covers:
 - Joints flush with the surface: difference in level between adjacent units to be no more than twice the joint width (with a 5 mm max difference in level).
 - Recessed, filled joints: difference in level between adjacent units to be no greater than 2 mm; the recess to be no deeper than 5 mm.
 - Unfilled joints: difference in level between adjacent units to be no greater than 2 mm.
 - Sudden irregularities: Not permitted.
- 640 COLOUR BANDING
- General: Unless premixed by manufacturer, select from at least 3 separate packs in rotation to avoid colour banding.
- 645 PROTECTION
- Cleanliness: Keep paving clean and free from mortar droppings, oil and other materials likely to cause staining.
 - Materials storage: Do not overload pavings with stacks of materials.
 - Handling: Do not damage paving unit corners, arrises, or previously laid paving.
 - Mortar bedded pavings: Keep free from traffic after laying:
 - Pedestrian traffic (minimum): 72 hours.
 - Vehicular traffic (minimum): As per mortar manufacturer's recommendation.
 - Access: Restrict access to paved areas to prevent damage from site traffic and plant.
- 650 CEMENTITIOUS BASES AND SUB-BASES
- General: Protect from moisture loss, if not covered by another pavement course within 2 hours of completion.
- 655 CONDITION OF SUB-BASES/ BASES BEFORE SPREADING LAYING COURSE
- Trenches and excavation of soft or loose spots in subgrade: Fill and thoroughly compact.
 - Granular surfaces: Lay and compact so as to be sound, clean, smooth and close-textured enough to prevent migration of bedding/ laying course materials into the sub-base during compaction and use, free from movement under compaction plant and free from compaction ridges, cracks and loose material.
 - Prepared existing and new bound bases (roadbases): Sound, clean, free from rutting or major cracking. Remove sharp stones, projections and debris.
 - Sub-base/ Roadbase level tolerances: To BS 7533-7, Annex A.
 - Levels and falls: Accurate and within the specified tolerances.
 - Drainage outlets: Within 0-10 mm of the required finished level.
 - Features in sand bedded paving (including mortar bedded restraints and drainage ironwork): Complete to required levels; adequately bed and haunch in mortar.
 - Sub-bases containing cement/ hydraulic binder: Cure for minimum times specified in BS 7533-4.
- 665 PLANING AND REPAIRS TO EXISTING BASES
- Existing macadam/ asphalt surfaces: Plane to required levels.
 - Repairs: Contractor proposal for approval.
 - Building up existing surfaces to required levels.
- 670 LAYING GRANULAR LAYER OVER EXISTING BASES
- Thickness In 150mm layers.
 - Compaction: To achieve Civil engineer requirements
 - Blinding: As required
- 690 RECLAIMED NATURAL STONE – Reclaimed Yorkstone Setts
- Location/ Access: Forecourt as banding to dishd drainage channels
 - Lifting/ Storage/ Protection: Lift, store and protect on or off site – if off site mark as property of WCBC
 - Preparation: Clean in readiness for relaying

- 715 LAYING FLAG AND SLAB PAVING - MORTAR LAYING COURSE AND JOINTING
- Standard generally: In accordance with BS 7533-4.
 - Flag installation and cutting: - so 300mm is the minimal flag length
 - Laying course:
 - Nominal thickness: To manufacturer's instruction but no less than 30mm.
 - Laying and jointing: Stretcher bond with no long joints and minimum 100mm between vertical joints in adjoining courses.
 - Joint width (nominal): 10mm
- 730 LAYING NATURAL STONE SETT PAVING
- Standard generally: In accordance with BS 7533-7.
 - Laying type: Rigid.
 - Laying and jointing method: Mortar bed and joints
 - Laying course:
 - Target thickness after compaction: As per mortar manufacturer's recommendation
 - Joint width (nominal): 10mm.
- 770 LAYING GRAVEL FILLED PLASTICS PAVERS
- Laying: Tamp down into lightly compacted laying course
 - Nominal thickness of laying course after compaction: 100mm
 - Securing on slopes: Not applicable.
 - Filling: Allow to settle and refill level with surface.
- 790 TOOLED COLOURED JOINTS IN MORTAR BEDDED UNITS
- Joints: Completely filled with bedding mortar as work proceeds.
 - Joint width: 10mm
 - Pointing: 1:3 cement:sand mortar with pigment, colour To match Yorkstone
 - Depth: Full depth of flag or sett.
- 795 SEALANT MOVEMENT JOINTS IN MORTAR BEDDED UNITS
- Spacing: 10m centres or as agreed.
 - Extent of joints: Through paving build up and along line of linear drain.
 - Joint filler: Compressible cellular rubber or plastics compatible with specified sealant. Build in as work proceeds.
 - Joint width: 25mm
 - Barrier (joint breaker): As recommended by sealant manufacturer. Position filler and barrier accurately to fully support sealant at recommended distance from exposed faces of units.
 - Sealant:
 - Application: As section Z22.
- 800 APPLYING SEALER/ STABILIZER TO BLOCKS AND SETTS
- Surface preparation: _____.
 - Application: To dry paving.
 - Method: _____.
 - Number of coats: _____.
 - Coverage: _____.
- 805 CLEANING EXISTING BLOCKS AND SETTS
- Area: _____.
 - Application:
 - Method: _____.
 - Dosage: _____.
 - Sand jointed paving: Do not displace jointing sand during cleaning process.

Q26 Special surfacings/ pavings for sport/ general amenity

Q26 Special surfacings/ pavings for sport/ general amenity

To be read with Preliminaries/ General conditions.

IMPACT ABSORBING SURFACINGS FOR PLAY AREAS

- 300 EXTENT OF IMPACT ABSORBING SURFACING – At play end of Education Garden if deemed necessary.
- General: Lay to the impact areas shown in the relevant parts of BS EN 1176.
- 301 EXTENT OF IMPACT ABSORBING SURFACING
- General: Lay impact absorbing surfacing as indicated on drawings.
- 360 IN SITU SYNTHETIC SURFACING
- Sub-base : Compacted Type 1 stone
 - Thickness: 150mm
 - Base: Base course bitumen concrete.
 - Thickness: 60mm
 - Surface course: Wet pour, in situ laid polyurethane bound EPDM rubber crumb surface.
 - Standard: To BS 7188.
 - Manufacturer: To be confirmed.
Product reference: to be confirmed.
 - Colour: Blue.
 - Critical fall height when tested to BS EN 1177: 1.2m.
 - Health and safety:
Substance known to be toxic or carcinogenic on skin contact or released as vapour or dust during normal use: Not permitted.
 - Submit:
 - Resistance to abrasive wear, slip resistance, resistance to indentation and ease of ignition:
Evidence of testing to BS 7188.
 - Critical fall height: Evidence of testing to BS EN 1177.

ASSOCIATED ACCESSORIES

- 920 PLAY SURFACE TESTING
- Standard: To BS EN 1177 and BS 7188, where applicable.
 - Testing body: A United Kingdom Accreditation Service (UKAS) independent laboratory.
 - Timing: Within ten days of completing the surfacing works.
 - Test results: Submit.
- 930 DOCUMENTATION
- General: For all types of surfacing, provide the following:
 - Name and contact details of installer.
 - Date of installation.
 - Name and contact details of manufacturer.
 - Type/ description/ reference of products used.
 - Manufacturer's recommended inspection and maintenance procedures to maintain safety and impact absorbing performance.
 - Manufacturer's recommended cleaning and maintenance methods, where relevant.

Q28 Topsoil, growing media and ameliorants

Q28 Topsoil, growing media and ameliorants

To be read with Preliminaries/ General conditions.

SYSTEM OUTLINE

110 TOPSOIL SYSTEM – For planting areas to outer part of Forecourt, new ground level beds within the Education Garden, raised planter in Education Garden and Anderson Shelter beds in Education Garden.

- Topsoil: TO BS3882.
- Ameliorants: Peat Free Compost.
- Accessories: None

PRODUCTS

300 PREPARATION MATERIALS GENERALLY

- Purity: Free of pests, disease, and fungus.
- Foreign matter: On visual inspection, free of fragments and roots of aggressive weeds, sticks, straw, subsoil, pieces of brick, concrete, glass, wire, large lumps of clay or vegetation, and the like.
- Contamination: Do not use topsoil contaminated with subsoil, rubbish or other materials that are:
 - Corrosive, explosive or flammable.
 - Hazardous to human or animal life.
 - Detrimental to healthy plant growth.
- Subsoil: In areas to receive topsoil or planting media, do not use subsoil contaminated with the above materials.
- Objectionable odour: None.
- Give notice: If any evidence or symptoms of soil contamination are discovered on the site or in topsoil or planting media to be imported.

305 PERMITTED MATERIALS

- Materials: Topsoil.
- Give notice: before ordering or using.
- Declaration of compliance: Supplied with sample load.

310 MATERIALS NOT PERMITTED

- Materials: Deleterious contamination within topsoil.

315 IMPORTED TOPSOIL TO BS 3882

- Quantity: Provide as necessary to make up any deficiency of topsoil existing on site and to complete the work.
- Standard: To BS 3882.
- Classification: _____.
 - Grade: General grade for Forecourt - Suitable for growing produce in Education Garden.
- Source: Contractor proposal
 - Product reference: Contractor proposal

325 IMPORTED TOPSOIL, CUSTOM MIX

- Quantity: Provide as necessary to make up any deficiency of topsoil existing on site and to complete the work.
- Source: Contractor proposal
- Texture to BS 3882, figure 1: _Fine, friable crumb
- Reaction, to BS 1377-3: pH 6-8.
- Organic matter: _High - <20% by dry weight.
- Nutrient content: Minimum index values for nitrogen, phosphorus, potassium and magnesium to be as for BS 3882 multipurpose topsoil.
- Crumb structure: Made up of discernible crumbs.

- Stones:
 - Size in any dimension (maximum): 20mm.
 - Stone content by dry weight (maximum): 5%.
- 330 IMPORTED MANUFACTURED GROWING MEDIUM – As alternative to Topsoil
- Type: Contractor proposal.
 - Grade: Contractor proposal
 - Source: Contractor proposal.
 - Product reference: Contractor proposal
- 335 IMPORTED GROWING MEDIUM, CUSTOM MIX_ As alternative to Topsoil
- Quantity: Provide as necessary to make up any deficiency of topsoil existing on site and to complete the work.
 - Source: Contractor proposal
 - Product reference: Contractor proposal
 - Texture: Fine, friable crumb
 - Reaction, to BS 1377-3: pH 6-8
 - Organic matter to BSI PD CR 13456: High >30%.
 - Nutrient content: Minimum index values for nitrogen, phosphorus, potassium and magnesium to be as for BS 3882 multipurpose topsoil.
 - Crumb structure: Made up of discernible crumbs.
 - Stone size in any dimension (maximum): 20mm.
- 360 SANITIZED AND STABILIZED COMPOST – Peat Free
- Standard: In accordance with PAS 100.
 - Source: Contractor proposal
 - Product reference: Contractor proposal.
 - Horticultural parameters:
 - pH (1:5 water extract): 7.0-8.7.
 - Electrical conductivity (maximum, 1:5 water extract): 200 mS/m.
 - Moisture content (m/m of fresh weight): 35-55%.
 - Organic matter content (minimum): 25%.
 - Grading (air dried samples): 99% passing 25 mm screen, and 90% passing 10 mm screen mesh aperture.
 - Carbon:Nitrogen ratio (maximum): 20:1.
 - Texture: Friable.
 - Objectionable odour: None.
- 365 COMPOSTED MATERIALS - Contractor proposal
- Type: Contractor proposal.
 - Source: Contractor proposal.
 - Product reference: Contractor proposal
 - Horticultural parameters:
 - pH (1:5 water extract): 7.0-8.7.
 - Electrical conductivity (maximum, 1:5 water extract): 200 mS/m.
 - Moisture content (m/m of fresh weight): 35-55%.
 - Organic matter content (minimum): 25%.
 - Grading (air dried samples): 99% passing 25 mm screen, and 90% passing 10 mm screen mesh aperture.
 - Carbon:Nitrogen ratio (maximum): 20:1.
 - Texture: Friable.
 - Objectionable odour: None.
- 375 INDUSTRIAL BY-PRODUCTS e.g. Sugar Beet washings, Mushroom Farm Composts
- Not allowed

- 380 MYCORRHIZAL INOCULANT – Required for any bare root stock
- Manufacturer: Contractor choice.
 - Product reference: MYCORRHIZAL INOCULANT
- 385 GEL IRRIGATION SYSTEMS – For incorporation in Raised Planter Soil and Anderson Shelter veg patch
- Type: Water Saving Gel crystals
 - Manufacturer: Westland or equal and similar approved
 - Product reference: Water saving Gel
 - Rate: 250g per m2 of vegetable Gardne
- 390 FERTILIZERS TO BE INCORPORATED INTO SOIL/ GROWING MEDIA – Slow release granular fertiliser
- Type: Miracle-Gro or equal and approved.
 - Source: Contractor's Choice.
 - Product reference: : Contractor's Choice
- 395 FERTILIZERS FOR CONTAINER PLANTING – Slow release granular fertiliser
- Type: Miracle-Gro or equal and approved.
 - Source: Contractor's Choice.
 - Product reference: : Contractor's Choice
- 400 MAINTENANCE FERTILIZERS Slow release granular fertiliser
- Type: Miracle-Gro or equal and approved.
 - Source: Contractor's Choice.
 - Product reference: : Contractor's Choice

EXECUTION

- 605 SITE INVESTIGATION
- Report: See section – No soil report, all new media required other than around existing pear trees.
- 620 IMPORTING TOPSOIL
- Give notice: Before stripping topsoil for transfer to site.
 - Notice period: 1 week.
- 625 SAMPLE LOADS – Topsoil growing or manufactured growing media
- Deliver to site a sample load: 1 tonne.
 - Give notice: Allow inspection before making further deliveries to site. Retain for comparison with subsequent loads.
 - Notice period: 1 week.
- 630 DOCUMENTATION FOR IMPORTED TOPSOIL
- Timing: Submit at handover.
 - Contents:
 - Full description of all soil components.
 - Record of source for all soil components.
 - Record drawings showing the location and depth of all soils by type and grade.
 - Declaration of analysis: in accordance with BS 3882, Annex E.
 - Number of copies: 1 digital
- 635 DOCUMENTATION FOR COMPOST AND COMPOSTED MATERIALS
- Timing: Submit at handover.
 - Contents:
 - Full description of all compost components.
 - Record of source for all compost components.
 - Analyst's report for each test carried out.
 - Declaration of compliance: in accordance with PAS 100 and BSI PD CR 13456.

- Quality Compost Protocol certification
- Number of copies: 1 digital

640 DOCUMENTATION FOR PREPARATION MATERIALS

- Timing: Submit at handover.
- Contents:
 - Full description of all components.
 - Record of source for all components.
 - Analyst's report for each test carried out.
 - Supplier's declaration of compliance with BSI PD CR 13456.
- Number of copies: 1 digital

650 NOTICE

- Give notice before:
 - Setting out.
 - Spreading topsoil.
 - Applying herbicide.
 - Applying fertilizer.
 - Visiting site during maintenance period.
- Period of notice: 72 hours.

655 MECHANICAL TOOLS

- Restrictions: Do not use within 100 mm of tree and plant stems.

660 GRADING SUBSOIL

- General: Grade to smooth flowing contours to achieve specified finished levels of topsoil.
- Areas of thicker topsoil: Excavate locally.

665 SUBSOIL SURFACE PREPARATION

- General: Excavate and/ or place fill to required profiles and levels, as section D20.
- Loosening:
 - Light and non-cohesive subsoils: When ground conditions are reasonably dry, loosen thoroughly to a depth of 300 mm.
 - Stiff clay and cohesive subsoils: When ground conditions are reasonably dry, loosen thoroughly to a depth of 450 mm.
 - Rock and chalk subgrades: Lightly scarify to promote free drainage.
- Stones: Immediately before spreading topsoil, remove stones larger than 50mm in any direction.
- Remove from site: To approved tip

670 INSPECTING FORMATIONS

- Give notice: Before spreading topsoil for all areas to allow inspection of panning and glazing
- Notice period: 72 hours

675 PREPARATION OF UNDISTURBED TOPSOIL

- Standard: In accordance with BS 4428.
 - Grading and cultivation: Light to protect existing tree roots
- Hard ground: Break up thoroughly with hand tools or compressed air avoiding damage to tree roots.
- Clearing: Remove visible tones with a diameter greater than 50mm
- Areas covered with turf or thick sward: Plough or dig over to full depth of topsoil.
- Fallow period (minimum): N/A.
 - Weed control: At appropriate times keep weed free by hand / chemical weeding

680 SURPLUS TOPSOIL TO BE RETAINED

- Generally: Remove from site:
 - Locations: To Contractors yard.
 - Protected areas: Do not raise soil level within root spread of trees that are to be retained.

685 SURPLUS MATERIALS TO BE REMOVED

- Topsoil: Remove from site To Contractors yard.
- Subsoil, stones, debris, wrapping material, canes, ties, temporary labelling, rubbish, prunings and other arisings: Remove to licenced recycling centre

290

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690 TOPSOIL STORAGE HEAPS

- Location: To be agreed.
- Height (maximum): 1.5m
- Width (maximum): 10m.
- Protection:
 - Do not place any other material on top of storage heaps.
 - Do not allow construction plant to pass over storage heaps.
 - Prevent compaction and contamination, by fencing and covering as appropriate.

695 CULTIVATION

- Compacted topsoil: Break up to full depth.
- Tilth: Loosen, aerate and break up topsoil to a tilth suitable for hand grading.
 - Depth: 300mm.
 - Particle size (maximum): 5mm.
 - Timing: Within a few days before planting.
 - Weather and ground conditions: Suitably dry.
- Surface: Leave regular and even.
- Levels: 25mm above adjacent hard surfacing to allow for settlement.
- Undesirable material brought to the surface: Remove visible weeds, roots and large stones with any dimension exceeding 25mm
- Soil within root spread of trees and shrubs to be retained: Do not dig or cultivate.

700 GRADING OF TOPSOIL

- Topsoil condition: Reasonably dry and workable.
- Contours: Smooth and flowing, with falls for adequate drainage.
 - Hollows and ridges: Not permitted.
- Finished levels after settlement: 25 mm above adjoining paving, kerbs, manholes etc.
- Blade grading: Not permitted
- Give notice: If required levels cannot be achieved by movement of existing soil.

705 HANDLING TOPSOIL

- Aggressive weeds: Give notice and obtain instructions before moving topsoil.
- Plant: Select and use plant to minimize disturbance, trafficking and compaction.
- Contamination: Do not mix topsoil with:
 - Subsoil, stone, hardcore, rubbish or material from demolition work.
 - Other grades of topsoil.
- Multiple handling: Keep to a minimum. Use or stockpile topsoil immediately after stripping.
- Wet conditions: Handle topsoil in the driest condition possible. Do not handle during or after heavy rainfall or when it is wetter than the plastic limit.

710 SPREADING TOPSOIL

- Temporary roads/ surfacing: Remove before spreading topsoil.
- Layers:
 - Depth (maximum): 150 mm.
 - Gently firm each layer before spreading the next.
- Depths after firming and settlement (minimum): Varies – 450mm for forecourt beds, 450mm for Education Garden ground level beds and 600mm for raised planter
- Crumb structure: Do not compact topsoil. Preserve a friable texture of separate visible crumbs wherever possible.

715 LOOSE TIPPING OF TOPSOIL

- General: Do not firm, consolidate or compact topsoil when laying. Tip and grade to approximate levels in one operation with minimum of trafficking by plant.
- Depths after settlement (minimum): As 710 above.

720 FINISHED LEVELS OF TOPSOIL AFTER SETTLEMENT

- Below adjoining paving or kerbs: 25mm
- Below dpc of adjoining buildings: Not less than 150mm.
- Shrub areas: Higher than adjoining grass areas by N/A
- Within root spread of existing trees: Unchanged.
- Adjoining soil areas: Marry in.
- Thickness of turf or mulch: Included.

805 APPLYING SOIL AMELIORANT – To all planting beds

- Type: Peat Free compost
- Locations: All planting beds.
- Fully incorporate into topsoil to a depth of 300mm.
- Application: Spread evenly.
 - Timing: Apply prior to cultivation.
 - Rate: 40L per m2.
- Timing: Prior to cultivation.
- Other requirements: Incorporate with Water Saving Gel and slow release fertiliser accessory

820 APPLYING GENERAL FERTILIZER

- Locations: All beds.
- Application: Spread evenly, carefully incorporating below mulch materials.
 - Timing: Immediately before cultivation.
 - Application rate: 50 grammes per m2.
 - Other requirements: At time of soil amelioration

835 APPLYING BURIED GEL IRRIGATION SYSTEM

- Depth: 300mm

840 APPLYING MYCORRHIZAL INOCULANT yo vegetable plot only

- Depth: 150mm

COMPLETION

905 APPLYING MAINTENANCE FERTILIZER

- Time of year: March or April.
- Application: Evenly spread, carefully incorporating below mulch materials.
- Rate: 25 grammes p

Q3I External planting

Q31 External planting

To be read with Preliminaries/General conditions.

GENERAL INFORMATION/ REQUIREMENTS

112 SITE CLEARANCE GENERALLY

- General: Remove rubbish, concrete, metal, glass, decayed vegetation and contaminated topsoil.
- Stones: Remove those with any dimension exceeding 25mm.
- Contamination: Remove material containing toxins, pathogens or other extraneous substances harmful to plant, animal or human life.
- Vegetation: Remove existing weeds.
- Large roots: Grub up and dispose of without undue disturbance of soil and adjacent areas.
- Additional requirements: Ensure no damage to adjacent walling

118 SOIL CONDITIONS

- Soil for cultivating and planting: Moist, friable and (excepting aquatic/ marginal planting) not waterlogged.
- Frozen or snow covered soil: Give notice before planting. Provide additional root protection. Prevent planting pit sides and bases and backfill materials from freezing.

120 CLIMATIC CONDITIONS

- General: Carry out the work while soil and weather conditions are suitable.
 - Strong winds: Do not plant.

125 TIMES OF YEAR FOR PLANTING

- Deciduous trees and shrubs: Late October to late March.
- Conifers and evergreens: September/ October or April/ May.
- Herbaceous plants (including marginal): September/ October or March/ April.
- Container grown plants: At any time if ground and weather conditions are favourable.
 - Watering and weed control: Provide as necessary.
- Dried bulbs, corms and tubers: September/ October.
- Colchicum (crocus): July/ August.
- Green bulbs: After flowering in spring.
- Wildflower plugs: Late August to mid November or March/ April.
- Aquatic plants: May/ June or September/ October.

130 MECHANICAL TOOLS

- Restrictions: Do not use within 100 mm of tree and plant stems.

145 WATERING

- Quantity: Wet full depth of topsoil.
- Application: Even and without damaging or displacing plants or soil.
- Frequency: As necessary to ensure establishment and continued thriving of planting.

150 WATER RESTRICTIONS

- General: If water supply is or is likely to be restricted by emergency legislation, do not carry out planting until instructed. If planting has been carried out, obtain instructions on watering.

160 NOTICE

- Give notice before:
 - Setting out.

- Applying herbicide.
 - Applying fertilizer.
 - Delivery of plants/ trees.
 - Planting shrubs.
 - Planting trees into previously dug pits.
 - Watering.
 - Visiting site during maintenance period.
 - Period of notice: 72 hours.
- 165 PREPARATION, PLANTING AND MULCHING MATERIALS
- General: Free from toxins, pathogens or other extraneous substances harmful to plant, animal or human life.
 - Certification of source, analysis, suitability for purpose and absence of harmful substances: Submit.
 - Certified materials: Mulch to Mulch and Soil Council classification (MSC).
 - Give notice before ordering or using.
- 200 PLANTS/ TREES - GENERAL
- Condition: Materially undamaged, sturdy, healthy and vigorous.
 - Appearance: Of good shape and without elongated shoots.
 - Hardiness: Grown in a suitable environment and hardened off.
 - Health: Free from pests, diseases, discoloration, weeds and physiological disorders.
 - Budded or grafted plants: Bottom worked.
 - Root system and condition: Balanced with branch system.
 - Species: True to name.
 - Origin/ Provenance: UK.
- Definition: Origin and Provenance have the meaning given in the National Plant Specification.
- 215 PLANTS/ TREES - SPECIFICATION CRITERIA
- Name, forms, dimensions, provenance and other criteria: As scheduled and defined in the National Plant Specification.
- 216 PLANTS/ TREES - SPECIFICATION CRITERIA
- Name, forms, dimensions and other criteria: To the relevant part of BS 3936.
- 225 BULBS/ CORMS/ TUBERS
- Condition: Firm, entire, not dried out or shrivelled.
 - Health: Free from pests, diseases and fungus.
 - Handling: Remove from packaging immediately.
 - Storage: Permitted only when necessary.
 - Location: Well ventilated, dark, covered, rodent proof container, away from exhausts and fruit.
 - Duration: Minimum period.
 - Temperature: 18-21°C.
- 235 CONTAINER GROWN PLANTS/ TREES
- Growing medium: With adequate nutrients for plants to thrive until permanently planted.
 - Plants: Centred in containers, firmed and well watered.
 - Root growth: Substantially filling containers, but not root bound, and in a condition conducive to successful transplanting.
 - Hardiness: Grown in the open for at least two months before being supplied.
 - Containers: With holes adequate for drainage when placed on any substrate commonly used under irrigation systems.
- 245 LABELLING AND INFORMATION
- General: Provide each plant/ tree or group of plants/ trees of a single species or cultivar with supplier's labelling for delivery to site, showing:
 - Full botanical name.

- Total number.
- Number of bundles.
- Part bundles.
- Supplier's name.
- Employer's name and project reference.
- Plant specification, in accordance with scheduled National Plant Specification categories.
- Additional information: Submit on request: _None

246 LABELLING AND INFORMATION

- Standard: To BS 3936.

255 PLANTS/ TREES RESERVED AT SUPPLIER'S PREMISES

- Types/ Species: None.
- Predelivery inspection: Give notice.
- Labelling: Identify inspected plants/ trees as reserved for use on this project.

260 PLANT/ TREE SUBSTITUTION

- Plants/ trees unobtainable or known to be likely to be unobtainable at time of ordering: Submit alternatives, stating:
 - Price.
 - Difference from specified plants/ trees.
- Approval: Obtain before making any substitution.

265 PLANT HANDLING, STORAGE TRANSPORT AND PLANTING

- Standard: To HTA 'Handling and establishing landscape plants'.
- Frost: Protect plants from frost.
- Handling: Handle plants with care. Protect from mechanical damage and do not subject to shock, e.g. by dropping from a vehicle.
- Plant packaging: Biodegradable and removed from Site after planting.
- Packaging of bulk quantities: Biodegradable and removed from Site after planting
- Planting: Upright or well balanced with best side to front.

275 PERMANENT IDENTIFICATION OF PLANTS – Not required

280 TREATMENT OF TREE WOUNDS

- Cutting: Keep wounds as small as possible.
 - Cut cleanly back to sound wood using sharp, clean tools.
 - Leave branch collars. Do not cut flush with stem or trunk.
 - Set cuts so that water will not collect on cut area.
- Fungicide/ Sealant: Do not apply unless instructed.

290 SURPLUS MATERIAL

- Subsoil, stones, debris, wrapping material, canes, ties, temporary labelling, rubbish, prunings and other arisings: Remove.

PLANT CONTAINERS

292 PREFABRICATED PLANT CONTAINERS – Large Terracotta Pots – 930mm diameter, 730mm height

- Manufacturer: Mud Mountain or equal and similar approved
 - Product reference: Vaso tradizionale
- Material: Terracotta
- Dimensions/ Shape: Traditional
- Lining: Permeable geotextile to base
- Accessories: Feet for placement.
- Accessories: _____.

- Installation: Empty and filling post placement.

PREPARATION OF PLANTING BEDS/ PLANTING MATERIALS

- 300 HERBICIDE_Contact and translocation based herbicide
- Locations: All planting beds if weed growth has developed between soiling and planting
 - Type: Suitable for suppressing perennial weeds.
 - Timing: Allow fallow period before cultivation.
 - Duration (minimum): 2 weeks
- 305 WEED CONTROL_____
- Locations: All planting beds
 - General: Prevent weeds from seeding and perennial weeds from becoming established, Between soiling works and planting
- 375 CULTIVATION
- Compacted topsoil: Break up to full depth.
 - Cultivation: Loosen, aerate and break up soil into particles of 2-8 mm.
 - Depth: 300mm.
 - Timing: Within a few days before planting.
 - Weather and ground conditions: Suitably dry.
 - Surface: Leave regular and even.
 - Levels: 25mm above surrounding hard paving to allow for settlement.
 - Undesirable material brought to the surface: Remove visible weeds, roots and large stones with any dimension exceeding 25mm.
 - Soil within root spread of trees and shrubs to be retained: Do not dig or cultivate.

PLANTING SHRUBS/ HERBACEOUS PLANTS/ BULBS

- 405 SHRUB PLANTING PITS
- Timing: Excavate 1 day (maximum) before planting.
 - Sizes: 300 x 300 x 300.
 - Pit bottom improvement - broken.
 - Backfilling material: Bed arisings.
- 445 PLANTING BULBS/ CORMS/ TUBERS
- Depth: Top of bulb/ corm/ tuber at a depth of approximately twice its height, base in contact with bottom of hole.
 - Backfilling: Finely broken soil. Lightly firm to existing ground level.
 - Naturalized planting in existing grassed areas:
 - Scattering: Random. Plant bulbs/ corms/ tubers where they fall.
 - Planting: Neatly remove a plug of turf and replace after planting.
- 476 SHRUB, HERBACEOUS AND BULB BACKFILLING MATERIAL
- Composition: Previously prepared mixture of topsoil excavated from pit and additional topsoil as required:
 - Ameliorant/ Conditioner: Compost in topsoil mix.
 - Application rate: Already included.
 - Fertilizer: Slow release fertiliser
 - Application rate: 10 grammes per plant
- 480 AFTER PLANTING
- Watering: Immediately after planting, thoroughly and without damaging or displacing plants or soil.
 - Firming: Lightly firm soil around plants and fork and/ or rake soil, without damaging roots, to a fine

tilth with gentle cambers and no hollows.

- Top dressing: Not required.
- DepthN/A

485 MULCHING PLANTING BEDS

- Material: Decorative bark product
 - Purity: Free of pests, disease, fungus and weeds.
 - Recycled content: 0%
- Preparation: Clear all weeds. Water soil thoroughly.
- Coverage: 50mm depth.
- Finished level of mulch: 25mm above surrounding hard surfacing.

PLANTING TREES

505 TREE PITS

- Sizes: As per Soft Landscape drawing.
- Sloping ground: Maintain horizontal bases and vertical sides with no less than minimum depth throughout.
- Pit bottoms: With slightly raised centre. Break up to a depth of 200mm at base of pit.
 - Treatment: _None
- Pit sides: Scarify.
- Backfilling material: Topsoil and compost mix from bed topped up as required.
- Accessories: Watering / aeration tube with cap.

510 TREE PIT ROOT BARRIERS

- Locations: As required by Structural or Services Engineer
- Manufacturer: Contractor proposal
 - Product reference: Contractor proposal
- Depth of top of root barrier below finished soil level: 100mm.
- Installation: With sides vertical.

512 TREE PIT ACCESSORIES

- Locations: Around rootball.
- Manufacturer: Contractor proposal
 - Product reference: Contractor proposal
 - Type: Perforated plastic tube for watering and aeartion.

525 SPECIMEN TREES

- Standard: Prepare roots and transplant to BS 4043.
- Backfilling material: As clause 586.
- Support: Platypus underground guying system or similar approved.
- Protection: hessian sacking to trunk during planting operations.

535 STAKING GENERALLY – Not proposed with underground guying specified

586 TREE BACKFILLING MATERIAL

- Composition: Previously prepared mixture of topsoil excavated from pit and additional topsoil as required.
- Ameliorant/ Conditioner: Compost
 - Application rate: 100L/Cu.m
- Fertilizer: Seribliein Tree Fertiliser Slow Release tablets
 - Application rate: 10 NO per tree

590 MULCHING TREES

- Material: As part of wider planting beds
 - Purity: Free of pests, disease, fungus and weeds.
 - Recycled content: 0%
- Preparation: Clear all weeds. Water soil thoroughly.
- Coverage: Full.
- Finished level of mulch: 50mm

PROTECTING/ MAINTAINING/ MAKING GOOD DEFECTS

710 MAINTENANCE

- Duration: Carry out the operations in the following clauses from completion of planting until 24 months after certified completion of planting. Visits at least on a monthly basis of maintenance visits:

720 FAILURES OF PLANTING

- Defects due to materials or workmanship not in accordance with the Contract: Plants/ trees/ shrubs that have failed to thrive.
 - Exclusions: Theft or malicious damage after completion.
 - Rectification: Replace with equivalent plants/ trees/ shrubs.
- Replacements: To match size of adjacent or nearby plants of same species or match original specification, whichever is the greater.
- Timing of making good: 1 month of notification within appropriate planting seasons.

740 CLEANLINESS

- Soil and arisings: Remove from hard surfaces and grassed areas.
- General: Leave the works in a clean tidy condition at completion and after any maintenance operations.

750 PLANTING MAINTENANCE GENERALLY

- Weed control: Maintain weed free area around each tree and shrub.
 - Diameter (minimum): The larger of 1 m or the surface of original planting pit.
 - Keep planting beds clear of weeds: In totality
- Planted areas: Fork over beds as necessary to keep soil loose, with gentle cambers and no hollows. Take care not to reduce depth or effect of mulch.
- Precautions: Ensure that trees and shrubs are not damaged by use of mowers, nylon filament rotary cutters and similar powered tools.
- Underground guying: Check condition of guys.
 - Broken or missing items: Replace.
 - Rubbing: Prevent.
 - Ties: Adjust to accommodate growth.
 - Damage to bark: Cut back neatly with sharp knife. Prevent further damage.
 - Frequency of checks: _____.
- Firming up: Gently firm loosened soil around trees/ shrubs. Straighten leaning trees/ shrubs.
- Watering: As required through 24 month period.

755 PLANTING MAINTENANCE - FERTILIZER

- Time of year: March or April.
- Fertilizer: Slow release fertiliser
 - Manufacturer: Miracle-Gro or equal and similar approved
 - Product reference: Slow release granular fertiliser.
- Application: Evenly spread, carefully incorporating below mulch materials.
- Application rate: 20 grammes per m2.

760 PLANTING MAINTENANCE - PRUNING

- General: Prune to promote healthy growth and natural shape.
 - Dead, dying, diseased wood and suckers: Remove.
 - Timing: _____.

- Trees: Favour a single central leading shoot.
- Arisings: Remove.

780 MAINTENANCE INSTRUCTIONS

- General: Before end of the maintenance period, submit printed instructions recommending procedures to be established by the Employer for maintenance of the planting work for three full years: 1 digital copy

790 FINAL MULCHING – Forecourt beds and ground level beds in Education Garden but not raised planter or Anderson Shelter.

- Timing: At end of the maintenance period.
- Watering: Ensure that soil is thoroughly moistened prior to re-mulching, applying water where necessary.
- Planting beds: Re-mulch.
Depth (minimum): 50mm.
- Trees: Re-mulch.
Depth (minimum): 50mm.

Q35 Landscape maintenance

Q35 Landscape maintenance

To be read with Preliminaries/ General conditions.

GENERALLY

105 MAINTENANCE OBJECTIVES

- Location: Overall public realm.
 - Duration: 24 months.
- Aims: Successful establishment of planting material and safe operation of hard landscape.
- Restrictions: None yet identified but liaison with Museum Operational Manager required.

110 NOTICE

- Give notice before:
 - Application of herbicide.
 - Application of fertilizer.
 - Watering.
 - Each site maintenance visit.
- Period of notice: 1 week

130 REINSTATEMENT

- Damage or disturbance to soil structure, planting, grass, fencing, hard landscaping, structures or buildings: Reinstate to original condition.

140 CONTROL OF MAMMALIAN PESTS

- Specialist firms: Contractor proposal.
 - Method: As proposed by Specialist Firm.

145 CONTROL OF INVASIVE ANIMAL SPECIES

- Specialist firms: Contractor proposal
- Species: Wasps, bees, ants and other non-mammalian species.
- Location: External Realm.
- Method: To be confirmed by Specialist Firm.

150 PERFORMANCE CRITERIA FOR CONTROL OF INVASIVE ANIMAL SPECIES

- Specialist firms: Contractor proposal
- Species: Wasps, bees, ants and other non-mammalian species.
- Location: External Realm _.
- Requirement: Removal
 - Timing: 48 hour response period.

152 PERFORMANCE CRITERIA FOR CONTROL OF INVASIVE PLANT SPECIES

- Specialist firms: _ Contractor proposal.
- Species: Notifiable weed species such as Japanese Knotweed or Giant Hogweed.
- Location: External Realm _.
- Requirement: Removal
 - Timing: 7 day response period.

155 WATERING

- Supply: External mains tap
- Quantity: 100l per tree and 5 litres per shrub plant.
- Application: Do not damage or loosen plants.
- Compacted soil: Loosen or scoop out, to direct water to rootzone.
- Frequency: As necessary for the continued thriving of all planting.

160 WATER RESTRICTIONS

- General: If water supply is, or is likely to be, restricted by emergency legislation, submit proposals for an alternative suitable source of water. Obtain instructions before proceeding.

170 DISPOSAL OF ARISING

- General: Unless specified otherwise, dispose of arisings as follows:
 - Biodegradable arisings: To Contractor's tip
 - Grass cuttings: N/A
 - Tree roots and stumps: N/A.
 - Shrub and tree prunings: To Contractor's tip.
 - Litter and nonbiodegradable arisings: To Contractor's tip

180 CHIPPING OR SHREDDING

- General: Not permitted on site.

181 MECHANICAL EQUIPMENT

- General: Minimize.
- Prohibited equipment: Leaf blowers, jet wash.
- Timing: Throughout maintenance period.

190 LITTER

- Extraneous rubbish not arising from the contract work: Collect and remove from site.

197 CLEANLINESS

- Soil and arisings: Remove from hard surfaces.
- General: Leave the works in a clean, tidy condition at completion and after any maintenance operations.

SHRUBS/TREES/HEDGES

500 ESTABLISHMENT OF NEW PLANTING

- Duration: 24 months
- Weed control:
 - Method: Keep planting beds clear of weeds by hand.
 - Area: Maintain a weed free planting bed.
- Soil condition: Fork over beds to keep soil loose, with gentle cambers and no hollows. Do not reduce depth or effect of mulch.
- Watering: As required.

502 ESTABLISHMENT OF NEW PLANTING - FERTILIZER

- Time of year: March or April.
- Type: Slow release granular herbicide.
- Spreading: Spread evenly. Carefully lift and replace any mulch materials.
 - Application rate: 20 grammes /m2

515 TREE GUY WIRES

- Inspection/ Maintenance times: At every maintenance visit check stability of guying wires.
- Operations:
 - Replace or resecure loose or missing guy wires.
 - Adjust to suit stem growth and to provide correct and uniform tension.
- Removal: Not required.

520 REFIRMING OF TREES AND SHRUBS

- Timing: After strong winds, frost heave and other disturbances.
- Refirming: Tread around the base until firmly bedded.

- Collars in soil at base of tree stems, created by tree movement: Break up by fork, avoiding damage to roots. Backfill with topsoil and refirm.
- - Material for making up levels and refilling: topsoil / compost mix

540 PRUNING GENERALLY

- Pruning: In accordance with good horticultural and arboricultural practice.
 - Removing branches: Do not damage or tear the stem or bark.
 - Wounds: Keep as small as possible and cut cleanly back to sound wood.
 - Cutting: Make cuts above and sloping away from an outward facing healthy bud, angled so that water will not collect on cut area.
 - Larger branches: Prune neither flush nor leaving a stub, but using the branch bark ridge or branch collar as a pruning guide.
- Appearance: Thin, trim and shape each specimen appropriately to species, location, season, and stage of growth, leaving a well balanced natural appearance.
- Tools: Use clean sharp secateurs, hand saws or other approved tools. Trim off ragged edges of bark or wood with a sharp knife.
- Disease or infection: Give notice if detected.
- Growth retardants, fungicide or pruning sealant: Do not use unless instructed.

545 PRUNING OF EXCESSIVE OVERHANG

- Timing: Between 1st September and 28th February
- Operations: Remove growth encroaching onto grassed areas, paths, roads, signs, sightlines and road lighting luminaires.
- Special requirements: Ensure pedestrian safety.

550 PRUNING OF EXCESSIVE HEIGHT

- Timing: Between 1st September and 28th February
- Operations: Remove excessive height as agreed with Museum Operational Manager

555 PRUNING TREES AND SHRUBS

- Standard: To BS 7370-4.
- Special requirements: None

570 FORMATIVE PRUNING OF YOUNG TREES

- Standard: Type and timing of pruning operations to suit the plant species.
- Time of year: Do not prune during the late winter/ early spring sap flow period.
- Young trees up to 4 m high:
 - Crown prune by removing dead branches and reducing selected side branches by one third to preserve a well balanced head and ensure the development of a single strong leader.
 - Remove duplicated branches and potentially weak or tight forks. In each case cut back to live wood.
- Whips or feathered trees: Do not prune.
- Operatives: Horticulturally trained and competent.

575 PRUNING ORNAMENTAL SHRUBS

- General: Prune to encourage healthy and bushy growth and desirable ornamental features, e.g. flowers, fruit, autumn colour, stem colour.
- Suckers: Remove by cutting back level with the source stem or root.

580 PRUNING FLOWERING SPECIES OF SHRUBS AND ROSES

- Time of year:
 - Winter flowering shrubs: Spring.
 - Shrubs flowering between March and July: Immediately after the flowering period.
 - Shrubs flowering between July and October: Back to old wood in winter.
 - Rose bushes: Early spring to encourage basal growths and a balanced, compact habit.

- 590 PRUNING PARTICULAR SPECIES
- Species to be pruned to separate specific instructions: Those in large terracotta pots.
- 620 REMOVAL OF DEAD PLANT MATERIAL
- Operations: At the end of the growing season, check all shrubs and remove all dead foliage, dead wood, and broken or damaged branches and stems.
- 630 DEAD AND DISEASED PLANTS
- Removal: after cause of death, or disease recorded and included in gapping up information
 - Replacement: As per Q31: 720.
- 635 REINSTATEMENT OF SHRUB/ HERBACEOUS AREAS
- Dead and damaged plants: Remove.
 - Mulch/ matting materials:
 - Carefully move to one side and dig over the soil, leaving it fit for replanting.
 - - Do not disturb roots of adjacent plants.
 - Replacement plants:
 - Use pits and plants: To original specification or to match the size of adjacent or nearby plants of the same species, whichever is the greater.
 - Additional requirements: None.
 - Dressing: Slow release fertilizer:
 - Type Miracle Gro Slow Release Granular Fertiliser
 - Application rate: 10 grammes per plant
- 640 THINNING BY REMOVAL OF SURPLUS PLANTS
- Plants to be thinned: Only as instructed by Museum Operational Manager.
 - Standard: BS 7370-4.
 - Timing: As required
 - Roots:
 - Disturbance to adjacent plants: Minimise.
 - Soil: Refill holes with topsoil to leave an even graded surface.
 - Mulch: Maintain mulch as original specification.
 - Adjacent plants: Make good any minor damage immediately.
 - Plants for retention: Select plants with a strong healthy habit.
- 645 WEED CONTROL GENERALLY
- Weed tolerance: Keep planting beds weed free
 - Adjacent plants, trees and grass: Do not damage.
- 650 HAND WEEDING
- General: Remove weeds entirely, including roots.
 - Disturbance: Remove the minimum quantity of soil, and disturb plants, bulbs and mulched surfaces as little as possible.
 - Completion: Rake area to a neat, clean condition.
 - Mulch: Reinstate to original depth.
- 655 WEED CUTTING BY HAND OR MACHINE
- Undesirable grass, brambles and herbaceous growth: Cut down cleanly to a maximum height of 100mm and lower leaves prior to application of stump killing, translocated herbicide
 - Herbicides: Stump killing variety.
- 657 HERBICIDE TO KILL REGROWTH
- Type: Suitable foliar acting herbicide to kill regrowth.
 - Timing: Allow recommended period for herbicide to take effect before clearing dead weeds.

680 SOIL AERATION

- Compacted soil surfaces:
 - Prick up: To aerate the soil of root areas and break surface crust.
 - Size of lumps: Reduce to crumb and level off.
 - Damage: Do not damage plants and their roots.

685 SOIL LEVEL ADJUSTMENT

- Level of soil/mulch at edges of beds: Reduce to 50 mm below adjacent grass or hard surface.
 - Arisings (if any): Spread evenly over the bed.

690 MAINTENANCE OF LOOSE MULCH

- Thickness (minimum): 50mm
 - Top up: when down to 25mm or bare patches are evident
- Mulch spill on adjacent areas: Remove weeds and rubbish and return to planted area.
- Weeding: Remove weeds growing on or in mulch by hand

700 SNOW REMOVAL FROM SHRUBS/ TREES

- Standard: To BS 7370-4.
- Plants subject to snow removal: None
- Timing: Not required

TREE WORK

810 TREE WORK GENERALLY

- Identification: Before starting work agree which trees, shrubs and hedges are to be removed or pruned.
- Protection: All other stock in vicinity that is not receiving works
- Standards: To BS 3998 and Health & Safety Executive (HSE) 'Forestry and arboriculture safety leaflets'.
- Removing branches: Cut as Arboricultural Association Leaflet 'Mature tree management'. Cut vertical branches similarly, with no more slope on the cut surface than is necessary to shed rainwater.
- Appearance: Leave trees with a well balanced natural appearance.
- Chain saw work: Operatives must hold a Certificate of Competence.
- Tree work: To be carried out by an approved member of the Arboricultural Association.

815 ADDITIONAL WORK

- Defective, diseased, unsafe or weak parts of trees additional to those scheduled for attention: Give notice if detected.

820 PREVENTION OF WOUND BLEEDING

- Standard: To BS 3998, clause 8.

825 PREVENTION OF DISEASE TRANSMISSION

- Standard: To BS 3998, clause 9 and Appendix B.

830 CLEANING OUT AND DEADWOODING

- Remove:
 - Dead, dying, or diseased wood, broken branches and stubs.
 - Fungal growths and fruiting bodies.
 - Rubbish, wind blown or accumulated in branch forks.
 - Wires, clamps, boards and metal objects, if removable without causing further damage and not part of a support structure that is to be retained.
 - Other unwanted objects, e.g. tree houses, swings.
 - Climbing plants Remove unless otherwise agreed

835 CUTTING AND PRUNING GENERALLY

- Tools: Appropriate, well maintained and sharp.
- Final pruning cuts:
 - Chainsaws: Do not use on branches of less than 50 mm diameter.
 - Hand saws: Form a smooth cut surface.
 - Anvil type secateurs: Do not use.
- Removing branches: Do not damage or tear the stem.
- Wounds: Keep as small as possible, cut cleanly back to sound wood leaving a smooth surface, and angled so that water will not collect on the cut area.
- Cutting: Cut at a fork or at the main stem to avoid stumps wherever possible.
Large branches: 50mm in diameter or over.
 - Remove in small sections and lower to ground with ropes and slings.
- Dead branches and stubs: When removing, do not cut into live wood.
- Unsafe branches: Remove epicormic shoots and potentially weak forks that could fail in adverse weather conditions.
- Disease or fungus: Give notice if detected. Do not apply fungicide or sealant unless instructed.

840 CROWN REDUCTION/ SHAPING

- General: Cut back selectively to lateral or sublateral buds or branches to retain flowing branch lines without leaving stumps.
- Operations: By trained arborist

845 CROWN LIFTING

- Clearances: Remove branch systems to give clearance.
 - Height: 2.0m
- Removing branches: Remove whole branches back to the stem, or cut lower portions of branches back to lateral or sublateral buds or branches. Do not leave stumps.

850 CROWN THINNING

- Removing branches: Remove inward growing, crossing, rubbing, dead and damaged branches.
- Thinning: Selectively remove secondary and small live branch growth evenly throughout the crown.
 - Quantity: _____.
- Cutting: Make no cuts of more than _____.
 - Branches: Cut back to lateral or sublateral buds or branches without leaving stumps.
- Appearance: Leave a uniform and well balanced structure of branches and foliage.

855 CUTTING TREE ROOTS

- Excavating: Use hand tools only.
- Protected area: Do not cut roots within the root protection area.
- Outside protected area: Give notice of roots exceeding 50 mm in diameter. Do not cut without Approval of WCBC Tree Officer
- Cutting:
 - Cutting: Make clean smooth cuts with a hand saw.
 - Wounds: Minimize. Avoid ragged edges.
 - Finishing: Pare cut surfaces smooth with a sharp knife.
- Backfilling:
 - Protection: Cover cut roots with clean sharp sand.
 - Material: Backfill with original topsoil.

865 BARK DAMAGE

- Wounds:
 - Do not attempt to stop sap bleeding.
 - Bark: Remove ragged edges using a sharp knife.
 - Wood: Remove splintered wood from deep wounds.
 - Size: Keep wounds as small as possible.
- Liquid or flux oozing from apparently healthy bark: Give notice.

870 CAVITIES IN TREES

- Investigation: Remove rubbish and rotten wood. Probe the cavity to find the extent of any decay, and give notice.
- Water filled cavities: Do not drain.
- Sound wood inside cavities: Do not remove.
- Cavity openings: Seek arboricultural advice

HARD LANDSCAPE AREAS/FENCING

900 SNOW CLEARANCE

- Clearance: Responsibility of Wrexham County Borough Council staff
- Deicing: Responsibility of Wrexham County Borough Council staff

910 HARD SURFACES AND GRAVEL AREAS

- Herbicide: Apply a suitable foliar acting or residual herbicide. Allow recommended period for herbicide to take effect before clearing arisings.
- Hard surfaces: Remove litter, leaves and other debris.
- Surface gutters and channels: Remove mud, silt and debris.
- Drainage gullies: Empty traps and flush clean.
- Gravel areas: Rake over. Remove weeds, litter, leaves and debris, and level off.
- Repairs to flexible bituminous and resin bound gravel pavings: In accordance with the original paving specification or BS 7370-2, clause 4.12.
- Stain removal: In accordance with BS 7370-2, table 4.

Q40 Fencing

Q40 Fencing

To be read with Preliminaries/ General conditions.

FENCING SYSTEMS

170 ACOUSTIC FENCING

- Manufacturer: Jacksons Fencing Ltd.
 - Product reference: Jakcoustic Fence
- Height: 2.5m
- Materials: Planed Softwood.
 - Treatment: Jakcure.
- Centres of posts (maximum): Suppliers recommendation.
- Method of setting posts: Concrete footings
- Accessories: Emergency gated access.

250 PREFABRICATED WOOD PANEL FENCING

- Manufacturer: Jacksons Fencing Ltd.
 - Product reference: Tongue and Groove vertical panel
- Standard: To BS 1722-11.
- Type of infill: Bespoke panel sizes.
 - Treatment: Jakcure
 - Finish: Planed.
- Height: 1.83m.
- Posts: _Timber and for gate hanging
 - Treatment: Jakcure
 - Finish: Planed.
- Method of setting posts:
 - Hole depth: 600mm.
 - Concrete depth: Filled to not less than 2/3rds the hole depth.
- Accessories: Hythe twin leaf gate
- Conformity: Submit manufacturer's and installer's certificates, to BS 1722-11.

GATES, POSTS AND STILES

550 WOOD – Gates G2 & G3

- Manufacturer: Jacksons Fencing Ltd
- Standard: To BS 5709.
- Wood: Planed softwood
- Treatment: As section Z12 and Wood Protection Association Commodity Specification C3.
 - Type: Jakcure.
 - Finish: Smooth, planed and splinter free
- Adhesive: Synthetic resin to BS EN 301, type 1.
- Workmanship: As section Z10.
- Fittings: Stainless Steel or blackened galvanised products but consistent across gates
 - Finish: Smooth and fixed flush with gate surface.
- Method of fixing: Hanging posts
- Accessories: All ironmongery

580 WROUGHT IRON – restoration of Gate G1

- Standard: Traditional blacksmith's methods.
 - Documentation: Submit certification of training and experience.
 - Membership: British Artist Blacksmith Association (BABA).
- Samples: Submit on request an executed piece of work carried out by the proposed blacksmith.
- Materials: Best quality true wrought iron.
 - Steel or other substitutes: As agreed with catalytic corrosion impact.

- Consistency: Tough, ductile and fibrous in character and of even texture.
- Submit: Invoices or certificate of authenticity to confirm provenance, on request.
- Workmanship:
 - Ornamental work: Carefully forged, hand wrought and incised where required to produce the design and effect desired.
 - Free ornament: Forged from substantial iron and forge welded where connected to other ironwork.
 - Accuracy: Substantially framed together and closely fitted.
 - Cast parts: Not permitted other than as indicated on the approved design drawings.
- Electric welding: Not permitted.
- Joints: Neatly tenoned and riveted or forge welded.
 - Heads of tenons and rivets: Match existing.
- Method of fixing: As proposed by Blacksmith.
- Treatment: Black gloss paint finish
- Accessories: Gate ironmongery and vandal resistant hanging pegs set by appropriate conservation method e.g. caulked lead in museum and church boundary walls.

ACCESSORIES

- 635 GATE OPENERS & FASTENERS – to all gates
- Manufacturer: Jacksons supplied or Blacksmith Artist.
 - Product reference: Contractor proposal
 - Type: Hand operation
 - Mechanism: Contractor proposal.
 - Number of transmitters N/A
 - Accessories: Drop down bolts for all gates.

EXECUTION

- 710 INSTALLATION GENERALLY
- Set out and erect:
 - Alignment: Straight lines or smoothly flowing curves.
 - Tops of posts: Following profile of the ground.
 - Setting posts: Rigid, plumb and to specified depth, or greater where necessary to ensure adequate support.
 - Fixings: All components securely fixed.

- 715 COMPETENCE
- Operatives: Contractors must employ competent operatives.
 - Qualifications: Submit certification of training.

- 720 SETTING POSTS IN CONCRETE
- Standard: To BS 8500-2.
 - Mix: Designated concrete not less than GEN1 or Standard prescribed concrete not less than ST2.
 - Alternative mix for small quantities: 50 kg Portland cement to 150 kg fine aggregate to 250 kg 20 mm nominal maximum size coarse aggregate, medium workability.
 - Admixtures: Do not use.
 - Holes: Excavate neatly and with vertical sides.
 - Filling: Position post/ strut and fill hole with concrete to not less than the specified depth, well rammed as filling proceeds and consolidated.
 - Backfilling of holes not completely filled with concrete: Excavated material, well rammed and consolidated.

- 730 EXPOSED CONCRETE FOUNDATIONS
- Filling: Compact until air bubbles cease to appear on the upper surface.

- Finishing: Weathered to shed water and trowelled smooth.

770 SITE CUTTING OF WOOD

- General: Kept to a minimum.
- Below or near ground level: Cutting prohibited.
- Treatment of surfaces exposed by minor cutting and drilling: Two flood coats of solution recommended for the purpose by main treatment solution manufacturer.

780 MAKING GOOD GALVANIZED SURFACES

- Treatment of minor damage (including on fasteners and fittings): Low melting point zinc alloy repair rods or powders made for this purpose, or at least two coats of zinc-rich paint to BS 4652.
- Thickness: Apply sufficient material to provide a zinc coating at least equal in thickness to the original layer.

790 SITE PAINTING

- Timing: Prepare surfaces and apply finishes as soon as possible after fixing.

COMPLETION

910 CLEANING

- General: Leave the works in a clean, tidy condition.
- Surfaces: Clean immediately before handover.

920 FIXINGS

- All components: Tighten.
 - Timing: Before handover.

930 GATES

- Hinges, latches and closers: Adjust to provide smooth operation. Lubricate where necessary.
 - Timing: Before handover.

Q50 Site/street furniture/equipment

Q50 Site/street furniture/equipment

To be read with Preliminaries/ General conditions.

GATES, BARRIERS AND PARKING CONTROLS

- 190 BOLLARDS – Type B1 - To side of parking area to define delivery area to Museum
- Manufacturer: Broxap.
 - Product reference: Manchester Bollard
 - Material: Cast Iron.
 - Finish as delivered: High gloss paint.
 - Colour: Black.
 - Height above ground: 950mm
 - Special features: 2 No reflective white bands and With Eyebolts, drilled, tapped and bonded to receive welded chain.
- .
 - Method of fixing: Root fixed in concrete footing
- 192 BOLLARDS – Type B3 - To side entrance to Forecourt.
- Manufacturer: Broxap.
 - Product reference: Sheffield sloped top bollard
 - Material: Class 304 Stainless Steel.
 - Finish as delivered: Matt satin finish.
 - Colour: Stainless Steel.
 - Height above ground: 750mm – 104mm Diameter
 - Special features: 1 No reflective white band set below top slope.
- .
 - Method of fixing: Root fixed in concrete footing
- 196 REMOVABLE BOLLARDS – Type B2 – To define museum delivery area.
- Manufacturer: Broxap.
 - Product reference: Manchester Bollard
 - Material: Cast Iron.
 - Finish as delivered: High gloss paint.
 - Colour: Black.
 - Height above ground: 950mm
 - Special features: 2 No reflective white bands and With Eyebolts, drilled, tapped and bonded to receive welded chain.
- .
 - Method of fixing: Removeable ground socket with integral padlock hasp, suited padlocks supplied by WCBC.
- 198 REMOVEABLE BOLLARDS – Type B4 - To main entrance to Forecourt and in front of glazed atrium.
- Manufacturer: Broxap.
 - Product reference: Sheffield sloped top bollard
 - Material: Class 304 Stainless Steel.
 - Finish as delivered: Matt satin finish.
 - Colour: Stainless Steel.
 - Height above ground: 750mm – 104mm Diameter
 - Special features: 1 No reflective white band set below top slope.
- .
 - Method of fixing: Removeable ground socket with integral padlock hasp, suited padlocks supplied by WCBC.

SITE AND STREET FURNITURE

210 CYCLE STANDS

- Manufacturer: Artform Urban Furniture Ltd
 - Product reference: Emerson Cycle Stand.
- Material: Cast aluminium.
- Number of stands: 3.
- Accessories: None.
- Method of fixing: Concealed chemical fixed hold down bolt through base of stand

220 BENCHES – Curved and straight benches

- Manufacturer: Streetlife UK Ltd.
 - Product reference: Rough and Ready Benches
- Material: FS Approved Hardwood
 - Finish: Natural.
 - Colour: Natural.
- Size: Various – see separate seating schedule.
- Accessories/ Special requirements: Backs and armrests fitted as per schedule.
- Method of fixing: Chemical fixed hold down bolts through galvanised steel frame legs.

240 LITTER BINS – Forecourt area

- Manufacturer: Artform Urban Furniture Ltd .
 - Product reference: Poe Litter Bin
- Material: Cast aluminium and timber
- Accessories/ Special requirements: None.
- Method of fixing: Concealed chemical fixed hold down bolt through base of bin.

340 BESPOKE SCULPTURE/ LANDSCAPE ART – RELOCATION No.1

- Material: Stone.
- Approximate weight: Unknown.
- Approximate size: 1.5m x 1.5m x 1.2m
- Delivery/ Handling/ Storage requirements: Move from current location, store securely without damage and return to new plinth at entrance area.
- Method of fixing: None, reliant on weight

342 BESPOKE SCULPTURE/ LANDSCAPE ART – RELOCATION No.2

- Material: Steel.
- Approximate weight: Unknown.
- Approximate size: 5m x 3m x 1m
- Delivery/ Handling/ Storage requirements: Move from current location, store securely without damage and return to new paving in Education Garden.
- Method of fixing: Hold down bolts

343 BIRD BOXES

- Material: Woodcrete (Mix of cementous and woodfibre).
- Manufacturer: Vivaro or equal approved
- Products: House Sparrow Terrace – Dual Chamber – grey colour
- Products: Open fronted pro-Barcelona bird box – brown colour
- Products: Starling Nest Box – Brown colour
- Approximate weight: Unknown.
- Method of fixing: Masonry screws and wood screws

INSTALLATION

510 CONCRETE FOUNDATIONS GENERALLY

- Standard: To BS 8500-2.
- Mix: Designated concrete not less than GEN 1 or standard prescribed concrete not less than ST2.

- Admixtures: Do not use.
- Foundation holes: Neat vertical sides.
- Depth of foundations, bedding, haunching: Appropriate to provide adequate support and to receive overlying soft landscape or paving finishes.

515 SETTING COMPONENTS IN CONCRETE

- Holes: To manufacturer's / suppliers recommendations for ground conditions.
- Components: Accurately positioned and securely supported.
- Concrete fill: Fully compacted as filling proceeds.
- Concrete foundations exposed to view: Not allowed.
- Temporary component support: Maintain undisturbed for minimum 48 hours.

520 SETTING IN EARTH

- Not allowed.

530 PRESERVATIVE TREATED TIMBER

- Surfaces exposed by minor cutting and drilling: Treated by immersion or with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.
- Heavily worked sections: Re-treat.

540 BUILDING IN TO MASONRY WALLS – G1 Gates

- Components being built in: Accurately positioned and securely supported. Set in mortar and pointed neatly to match adjacent walling.
- Temporary support: Maintain for 48 hours (minimum) and prevent disturbance.

545 ERECTION OF TIMBER AND PREFABRICATED STRUCTURES

- Checking: 5 days (minimum) before proposed erection date, check foundations, holding down bolts, etc.
- Inaccuracies or defects in prepared bases or supplied structures: Report immediately. Obtain instructions before proceeding.

550 DAMAGE TO GALVANIZED SURFACES

- Minor damage in areas up to 40 mm² (including on fixings and fittings): Make good.
 - Material: Low melting point zinc alloy repair rods or powders made for this purpose or at least two coats of zinc-rich paint to BS 4652.
 - Thickness: Sufficient to provide a zinc coating at least equal to the original layer.

560 SITE PAINTING

- Timing: Prepare surfaces and apply finishes as soon as possible after fixing.

563 BIRD BOX FIXING

- Method - Sparrow Terrace to be fixed with masonry screws and suitable plugs under eaves of annex building ensuring the boxes do not compromise any vents or services on the outside or interior of the building structure in accordance with manufacturer's instructions.
- Method - Pro-Barcelona and Starling Nest Boxes fixed to pear tree stem or major branch a minimum of 3.0m above ground level using woodscrews directly into stems or branch in accordance with manufacturer's instructions..
 - Location – north or east facing sides of trees or building
 - Alignment – vertical with fronts accessible by birds species and to allow cleaning out by humans
 - Movement – solid so the boxes do not move in higher winds

Q52 Play and sports equipment

Q52 Play and sports equipment

To be read with Preliminaries/ General conditions.

GENERAL

- 115 PLAYGROUND – adjacent to bin store
- Equipment: Early Years busy benches – Ref DR016
 - System manufacturer: Costcuttersuk.com
 - Surfacing: Timber.
 - Containment: None.
 - Accessories: Galvanized tie back strap with wing nuts fixings
- 117 STORAGE CABINETS – near to Anderson shelter
- Equipment: W900 x D600 x H1200mm to take gardening hand tools
 - System manufacturer: Contractor proposal
 - Surfacing: Timber stained sedge green.
 - Containment: None.
 - Accessories: Galvanized tie back strap with wing nuts fixings

EXECUTION

- 710 PLAY EQUIPMENT INSTALLATION GENERALLY
- Standard: To manufacturer's written instructions provided in accordance with BS EN 1176-1.
Surface placed, tie back to boundary walls with suitable galvanised strap, with wing nut bolts for ease of future movement
- 740 PRESERVATIVE TREATED TIMBER
- Surfaces exposed by minor cutting and drilling: Treated by immersion or with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.
- 750 DAMAGE TO GALVANIZED SURFACES
- Minor damage in areas up to 40 mm² (including on fixings and fittings): Make good.
 - Materials: Low melting point zinc alloy repair rods or powders made for this purpose or at least two coats of zinc-rich paint to BS 4652.
 - Thickness: Sufficient to provide a zinc coating at least equal to the original layer.
- 760 SITE PAINTING
- Timing: Prepare surfaces and apply finishes as soon as possible after installing components.

COMPLETION

- 920 CLEANING
- General: Leave the works in a clean, tidy condition.
 - Surfaces: Clean immediately before handover.
- 930 TESTING
- Standard: To BS EN 1176-1.
- 950 DOCUMENTATION
- Standard: Supply information for Health & Safety File.
 - Contents:
 - Copies of test reports.
 - General product information.

- Installation information.
- Inspection and maintenance information.
- Number of copies: 1 digital.
- Submission: On completion.

970 OPERATING TOOLS

- Tools: Supply tools required for operation, maintenance and cleaning purposes.

Q55 External decks, boardwalks and bridges

Q55 External decks, boardwalks and bridges

To be read with Preliminaries/ General conditions.

GENERAL

- 110 DECK – Stage Area near Anderson Shelter
- Base preparation: Broken Ground for drainage covered with geotextile weed suppressant membrane.
 - Structure, other than surfacing: Timber sub-frame and leg posts.
 - Fasteners: Galvanised or stainless steel
 - Post setting: Concrete footings
 - Surfacing: Decking boards with integral non-slip surfacing set within grooves
 - Method of attachment: Decking screws
 - Guarding: None – set 250mm above ground level.
 - Edge protection: None
 - Accessories: None.

SYSTEM PERFORMANCE

- 210 DESIGN
- Structure and associated features: Decking boards and subframe
 - Proposals: Submit drawings, technical information, calculations and manufacturers' literature.
 - Performance criteria: To allow stage performance

- 220 MAXIMUM PERMITTED LOADS
- Dead loads: 12 adults.
 - Imposed loads:
 - Activity/ Occupancy loading: Plays.
 - Point loads: Not specified
 - Horizontal uniformly distributed line loads on railings (maximum): Not applicable

PRODUCTS

- 305 TIMBER PROCUREMENT
- Timber (including timber for wood-based products): Obtained from well managed forests and/ or plantations in accordance with:
 - The laws governing forest management in the producer country or countries.
 - FSC Certified supplier
 - International agreements such as the Convention on International Trade in Endangered Species of wild fauna and flora (CITES).
 - Documentation: Provide either:
 - Documentary evidence (which has been or can be independently verified) regarding the provenance of all timber supplied.
 - Evidence that suppliers have adopted and are implementing a formal environmental purchasing policy for timber and wood based products.
 - Certification scheme: FSC.
 - Other evidence: Preservative certification and anti-slip insert certification.
- 310 STRUCTURAL SOFTWOOD (GRADED DIRECT TO STRENGTH CLASS)
- Grading standard: To BS 4978, BS EN 14081, or other national equivalent and so marked.
 - Strength class to BS EN 338: Suitable for external decks
 - Treatment: Pressure preservative with 15 year lifetime..

FABRICATION

510 FABRICATION GENERALLY

- Design: Complete the detailed design and obtain approval prior to commencing fabrication.
- Shop drawings: Submit.
- Structural calculations: Submit.
- Frameworks: Assemble and brace, including temporary members required for installation.
- Contact between dissimilar metals: Avoid.
- Fixings: Fully bolt together. Tighten bolts.
- Temporary support: Do not subject members to non-design loadings.

EXECUTION

610 LOADING

- Site activities: Restrict, to ensure that design loads are not exceeded, or submit proposals for temporary supports.

620 CONCRETE FOUNDATIONS GENERALLY

- Standard: To BS 8500-2.
- Mix: Designated concrete not less than GEN 1 or standard prescribed concrete not less than ST2.
- Admixtures: Do not use.
- Foundation holes: Neat vertical sides.
- Depth of foundations, bedding, haunching: Appropriate to provide adequate support and to receive overlying soft landscape or paving finishes.

630 SETTING COMPONENTS IN CONCRETE

- Holes: 450 x 450 x 600mm.
- Components: Accurately positioned and securely supported.
- Concrete fill: Compact as filling proceeds.
- Concrete foundations exposed to view: Finished to weathering profile to shed water and trowel smooth.
- Temporary component support: Maintain undisturbed for minimum 48 hours.

655 ERECTION OF PREFABRICATED TIMBER STRUCTURES ON PREPARED BASES

- Survey: Five days (minimum) before proposed erection date. Check foundations, holding down bolts, etc.
- Inaccuracies or defects in prepared bases or supplied structures: Report immediately. Obtain instructions before proceeding.

660 PRESERVATIVE TREATED TIMBER

- Surfaces exposed by minor cutting and drilling: Treated by immersion or with two flood coats of a solution recommended for the purpose by main treatment solution manufacturer.
- Heavily worked sections: Re-treat.

665 INSTALLATION GENERALLY

- Fasteners and methods of fixing: As section Z20.
- Structural members: Do not modify, cut, notch or make holes in structural members, except as indicated on drawings.
- Temporary support: Do not use stairs, walkways or balustrades as temporary support or strutting for other work.

670 INSTALLATION OF SURFACING

- Heading joints: Kept to a minimum, and formed only as butt joints situated over joists.
- Length: Each board must span not less than two bays between joists with joints in adjacent boards staggered.
- Gaps between boards: 10mm

672 INSTALLATION OF SLIP RESISTANT PRODUCTS

- Surfacing: Sound and level. Prepared/ rebated for products
- Fixing: Incorporated in decking boards by suppliers

680 SITE PAINTING AND STAINING

- Timing: Prepare surfaces and apply finishes as soon as possible after installing components.

COMPLETION

910 INSPECTION OF TIMBER STRUCTURES

- Standard: In accordance with BS 5268-2.
- Period of notice (minimum): 3 working days.
- Maintenance inspection: Check and tighten fixings 6-8 weeks after completion of structure.

930 TESTING OF TIMBER STRUCTURES

- Standard: In accordance with BS 5268-2, section 8.

950 DOCUMENTATION

- Contents:
 - Copies of structural design calculations/ test reports.
 - General product information.
 - Installation information.
 - Inspection and maintenance reports.
- Number of copies: 1 digital copy
- Submission: On completion of deck element

R Disposal systems

R12 Below ground drainage systems

R12 Below ground drainage systems

To be read with Preliminaries/ General conditions.

GENERAL

- 110 BELOW GROUND DRAINAGE SYSTEMS – Surface Water (Pluvial) System
- Surface water and rainwater drainage sources: Roof surfaces of museum and external realm hard landscape surfaces.
 - Foul drainage sources: Museum – see Services Engineer Works Information package
 - Land drainage sources: None known or anticipated.
 - Pressure relief drainage sources: None known or anticipated.
 - Pipes, bends and junctions: To suit conditions.
 - Accessories: As required for regular cleaning and maintenance.
 - Manholes, inspection chambers, traps, and separators: As required for regular cleaning and maintenance
 - Accessories: Inspection chamber covers to be recessed in nature to accept paving to match adjacent paving areas.
 - Disposal: To Welsh Water main drain.
 - Accessories - general: To suit flow rates and maintenance requirements

SYSTEM PERFORMANCE

- 211 DESIGN - BELOW GROUND DRAINAGE SYSTEMS
- Design: Complete the design of the below ground drainage system in accordance with BS EN 752, BS EN 1295-1 and BS EN 1610.
 - Ground conditions: Made ground with predominant hard surfacing
 - Performance criteria: To retain current run-off rates so there is no increase in surface water run-off rate to the Welsh Water Main with a design lifespan of at least 30 years
 - Proposals: Submit drawings, technical information, calculations and manufacturers' literature details.

PRODUCTS

- 311 CONNECTORS
- Material and standard: Plastics to BS 4660 and Kitemark certified.
 - Type: Contractor Designer's Proposal.
 - Manufacturer: Contractor Designer's Proposal.
 - Product reference: Contractor Designer's Proposal.
- 313 ONE PIECE GULLIES
- Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
 - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
 - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
 - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
 - Polypropylene: To BS EN 1852-1.
 - Material: Contractor Designer's Proposal.
 - Manufacturer: Contractor Designer's Proposal.
 - Product reference: Contractor Designer's Proposal
 - Sizes: To suit.
 - Outlet sizes: To suit.
 - Silt buckets: _ To suit _.
 - Product reference - Contractor Designer's Proposal

315 ONE PIECE GULLIES AND COVERS

- Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
 - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
 - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
 - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
 - Polypropylene: To BS EN 1852-1.
- Material: Contractor Designer's Proposal.
- Manufacturer: Contractor Designer's Proposal.
 - Product reference: Contractor Designer's Proposal
- Sizes: To suit.
- Outlet sizes: To suit.
- Silt buckets: _ To suit _
 - Product reference - Contractor Designer's Proposal

317 COMPOSITE GULLIES

- Standards: To BS EN 1253-1, -2, -3, -4 and -5; or
 - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
 - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
 - Polypropylene: To BS EN 1852-1.
- Material: Contractor Designer's Proposal.
- Manufacturer: Contractor Designer's Proposal.
- Traps:
 - Product reference: Contractor Designer's Proposal
- Raising pieces:
 - Product reference: Contractor Designer's Proposal.
 - Heights: Contractor Designer's Proposal
- Hoppers:
 - Product reference: To suit
- Covers:
 - Product reference: _ Contractor Designer's Proposal.
 - Type: Contractor Designer's Proposal
 - Material: Contractor Designer's Proposal.
 - Sizes: As required.
 - Loading grades to BS EN 124: _____.
- Silt buckets: As required.
 - Product reference: Contractor Designer's Proposal.

329 PIPES, BENDS AND JUNCTIONS - SUPPLY

- Pipes and fittings: From same manufacturer for each pipeline.

334 PIPES, BENDS AND JUNCTIONS - CAST IRON - GREY

- Standard: Contractor Designer's Proposal.
- Manufacturer: _ Contractor Designer's Proposal.
 - Product reference: Contractor Designer's Proposal
 - Sizes: Contractor Designer's Proposal.
- Additional corrosion protection: _Catalytic protection.
- Jointing type: Contractor Designer's Proposal.

336 PIPES, BENDS AND JUNCTIONS - CLAY - FLEXIBLE JOINTS

- Material and standard: Vitrified clay to BS EN 295-1, Kitemark certified.
- Manufacturer: Contractor Designer's Proposal.
 - Product reference: Contractor Designer's Proposal.
- Sizes: Contractor Designer's Proposal.

- Crushing strength (minimum): Contractor Designer's Proposal _.
 - Jointing type: Contractor Designer's Proposal
- 344 PIPES, BENDS AND JUNCTIONS - PLASTICS -STRUCTURED WALL
- Standard: Contractor Designer's Proposal
 - Supplementary requirements: Puncture resistance, jetting resistance and longitudinal bending to requirements of WIS 4-35-01, issue 2.
 - Material Contractor Designer's Proposal
 - Manufacturer: Contractor Designer's Proposal.
 - Product reference: _ Contractor Designer's Proposal
 - Recycled content: 20%
 - Sizes: Contractor Designer's Proposal.
 - Jointing type: Contractor Designer's Proposal
- 346 PIPES, BENDS AND JUNCTIONS - PVC-U - SOLID WALL
- Standard: BS EN 1401-1 with flexible joints.
 - Class: _ Contractor Designer's Proposal
 - Manufacturer: _ Contractor Designer's Proposal.
 - Product reference: Contractor Designer's Proposal
 - Recycled content: 20%.
 - Sizes: Contractor Designer's Proposal.
 - Application area code: UD.
- 352 ACCESS POINTS - PLASTICS
- Standard: To BS 4660 and Kitemark certified, to BS EN 13589-1, or Agrément certified.
 - Manufacturer: Contractor Designer's Proposal
 - Nominal diameter: Contractor Designer's Proposal _.
 - Bases:
 - Product reference: Contractor Designer's Proposal
 - Raising pieces:
 - Product reference: Contractor Designer's Proposal.
 - Heights: Contractor Designer's Proposal
 - Access covers and frames:
 - Product reference: Contractor Designer's Proposal but recessed covers suitable to take paving
 - Loading grades to BS EN 124: D400
- 357 CONNECTORS - SADDLE
- Standards:
 - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
 - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
 - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
 - Material: Contractor Designer's Proposal
 - Manufacturer: Contractor Designer's Proposal
 - Product reference: Contractor Designer's Proposal.
 - Sizes: Contractor Designer's Proposal.
- 359 FLEXIBLE COUPLINGS
- Standard: To BS EN 295-4 or WIS 04-41-01 and Kitemark certified, or Agrément certified.
 - Manufacturer: Contractor Designer's Proposal
 - Product reference: Contractor Designer's Proposal.
- 361 FRESH AIR INLETS (if required)
- Manufacturer: Contractor Designer's Proposal.
 - Product reference: Contractor Designer's Proposal.

- 371 RODDING POINTS (In addition to ACO drainage units)
- Standards:
 - Cast iron: To BS 437 and Kitemark certified, or Agrément certified.
 - Clay: To BS EN 295-1 and Kitemark certified, or Agrément certified.
 - Concrete: To BS 5911-6 and Kitemark certified, or Agrément certified.
 - Plastics: To BS 4660 and Kitemark certified, or Agrément certified.
 - Material: Contractor Designer's Proposal.
 - Manufacturer: Contractor Designer's Proposal.
 - Product reference: _ Contractor Designer's Proposal
 - Sizes: As small as reasonably possible
- 379 WARNING MARKER TAPES Above all new services and those located during the opening up of works
- Type: Heavy gauge polyethylene.
 - Manufacturer: Contractors choice
 - Product reference: Contractors choice
 - Colour: Yellow and black, or Red and white
 - Widths: 50mm.
 - Message: Warning – Buried Services
 - Wire detection aid: Yes to all
- 401 INSPECTION CHAMBERS - PLASTICS
- Standard: To BS 7158 or BS EN 13598-1, or Agrément certified.
 - Diameter: As per Contractor's Designer Proposals.
 - Manufacturer: _ As per Contractor's Designer Proposals
 - Bases:
 - Product reference: As per Contractor's Designer Proposals
 - Shaft units: As per Contractor's Designer Proposals
 - Product reference: As per Contractor's Designer Proposals.
 - Access covers and frames:
 - Product reference: As per Contractor's Designer Proposals
 - Loading grades to BS EN 124: D400
- 407 MANHOLES AND INSPECTION CHAMBERS - CONCRETE
- Standards:
 - To BS 5911-3 and BS EN 1917 and Kitemark certified; or
 - To BS 5911-4 and BS EN 1917.
 - Manufacturer As per Contractor's Designer Proposals
 - Shape: As per Contractor's Designer Proposals
 - Sizes: As per Contractor's Designer Proposals.
 - Cement type and content: As per Contractor's Designer Proposals
 - Chamber sections:
 - Product reference: As per Contractor's Designer Proposals.
 - Jointing type: As per Contractor's Designer Proposals
 - Cover slabs:
 - Product reference: As per Contractor's Designer Proposals.
 - Thickness: As per Contractor's Designer Proposals _.
 - Loading grades to BS EN 124 D400
 - Openings: To suit access covers.
 - Steps: As required.
- 412 MANHOLES AND INSPECTION CHAMBERS – PLASTICS
- Standard: To BS 7158 or BS EN 13598-1, or Agrément certified.
 - Manufacturer: As per Contractor's Designer Proposals.
 - Product reference: _ As per Contractor's Designer Proposals
 - Material As per Contractor's Designer Proposals
 - Shape: As per Contractor's Designer Proposals.

- Size: As per Contractor's Designer Proposals.
- Moulded base:
 - Channels and connections: As per Contractor's Designer Proposals.
 - Benching: As per Contractor's Designer Proposals
- Formwork for concrete surround: As per Contractor's Designer Proposals.
- Steps: As required

471 ACCESS COVERS AND FRAMES

- Standard: To BS EN 124.
- Types: _ Recessed Inspection Cover.
- Manufacturer: As per Contractor's Designer Proposals.
 - Product reference: As per Contractor's Designer Proposals
- Materials: As per Contractor's Designer Proposals.
- Finishes: _ As per Contractor's Designer Proposals
- Sizes: As required to suit service or replacement cover.
- Loading grades to BS EN 124: D400
- Edging trims: None
- Accessories: _None

483 CONCRETE (GENERAL)

- Standard: To BS 8500-2.
- Concrete: As per Contractor's Designer Proposals.

EXECUTION

610 STRIPPING OUT

- Extent of stripping out: As per Contractor's Designer Proposals.
- Exposed ends of existing drainage to be abandoned: Seal with concrete (general).

611 EXISTING DRAINS

- Setting out: Before starting work, check invert levels and positions of existing drains, sewers, inspection chambers and manholes against drawings. Report discrepancies.
- Protection: Protect existing drains to be retained and maintain normal operation if in use.

613 EXCAVATED MATERIAL

- Turf, topsoil, hardcore, etc: Set aside for use in reinstatement.

616 SELECTED FILL FOR BACKFILLING

- Selected fill: As-dug material, free from vegetable matter, rubbish, frozen soil and material retained on a 40 mm sieve.
 - Compaction: By hand in 100 mm layers.

623 LOWER PART OF TRENCH - GENERAL

- Trench up to 300 mm above crown of pipe: Vertical sides, width as small as practicable.
 - Width (minimum): External diameter of pipe plus 300 mm.

631 TYPE OF SUBSOIL

- General: Where type of subsoil at level of crown of pipe differs from that stated for the type of bedding, surround or support, give notice.

635 FORMATION FOR BEDDINGS

- Timing: Excavate to formation immediately before laying beddings or pipes.
- Mud, rock projections, boulders and hard spots: Remove. Replace with consolidated bedding material.
- Local soft spots: Harden by tamping in bedding material.

- Inspection of excavated formations: Give notice.

655 CLASS D BED

- Type of subsoil: Consolidated.
- Trench: Excavate slightly shallower than final levels.
 - Trimming: By hand to accurate gradients. Replace overdig with compacted soil.
- Pipes: Rest uniformly on barrels, adjust to line and gradient. Do not use hard packings under pipes.
- Initial testing before backfilling: Yes to ensure level.
- Backfilling:
 - Material: Protective cushion of selected fill.
 - Depth: 150 mm (250 mm for adoptable sewers) above crown of pipe.
 - Compaction: By hand in 100 mm layers.

657 CLASS F BEDDING

- Type of subsoil: Consolidated
- Granular material:
 - Pipe sizes DN 100 and DN 150: Size 4/10.
 - Pipe sizes DN 225 and DN 300: Size 4/10 or 10/20.
 - Pipe sizes DN 375-500: Size 10/20.
 - Pipe sizes DN 600 and above: Size 10/20 or 20/40.
- Bedding:
 - Material: Granular, compacted over full width of trench.
 - Thickness (minimum): 50 mm for sleeve jointed pipes, 100 mm for socket jointed pipes. Where trench bottom is uneven, increase thickness by 100 mm.
- Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.
- Initial testing before backfilling: Yes
- Backfilling:
 - Material: Protective cushion of selected fill.
 - Depth: 150 mm (250 mm for adoptable sewers) above crown of pipe.
 - Compaction: By hand in 100 mm layers.

659 CLASS N BEDDING

- Type of subsoil: Consolidated.
- Granular material: As per Contractor's Designer Proposals
 - Size: 0/4 or 0/10.
- Bedding:
 - Material: As per Contractor's Designer Proposals
 - Compaction: Over full width of trench.
 - Thickness (minimum): 50 mm for sleeve jointed pipes, 100 mm for socket jointed pipes. Where trench bottom is uneven, increase thickness by 100 mm.
- Pipes: Dig slightly into bedding, rest uniformly on barrels and adjust to line and gradient.
- Initial testing before backfilling: Yes.
- Backfilling:
 - Material: Protective cushion of selected fill.
 - Depth: 150 mm (250 mm for adoptable sewers) above crown of pipe.
 - Compaction: By hand in 100 mm layers.

680 CONCRETE SURROUND FOR PIPE RUNS NEAR FOUNDATIONS

- Class Z surround: Provide in locations where bottom of trench is lower than bottom of foundation and as follows (horizontal clear distance between nearest edges of foundations and pipe trenches):
 - Trenches less than 1 m from foundations: Top of concrete surround not lower than bottom of foundation.
 - Trenches more than 1 m from foundations: Top of concrete surround not lower than D mm below bottom of foundation, where D mm is horizontal distance of trench from foundation, less 150 mm.

- Laying pipes: To true line and regular gradient on even bed for full length of barrel with sockets (if any) facing up the gradient.
- Ingress of debris: Seal exposed ends during construction.
- Timing: Minimize time between laying and testing.

685 JOINTING PIPELINES

- Connections: Durable, effective and free from leakage.
- Junctions, including to differing pipework systems: With adaptors intended for the purpose.
- Cut ends of pipes: Clean and square. Remove burrs and swarf. Chamfer pipe ends before inserting into ring seal sockets.
- Jointing or mating surfaces: Clean and, where necessary, lubricate immediately before assembly.
- Allowance for movement: Provide and maintain appropriate clearance at ends of spigots as fixing and jointing proceeds.
- Jointing material: Do not allow to project into bore of pipes and fittings.

689 PIPELINES PASSING THROUGH STRUCTURES

- Pipelines that must be cast in or fixed to structures (including manholes, catchpits and inspection chambers): Provide 600 mm long rocker pipes adjacent to the external face of the structure (or both faces where appropriate, e.g. walls to footings), with flexible joints at both ends.
 - Distance to rocker pipe from structure (maximum):150 mm.
- Provision for movement for pipelines that need not be cast in or fixed to structures (e.g. walls to footings):
 - Rocker pipes as specified above; or
 - Openings in the structures to give 50 mm minimum clearance around the pipeline. Closely fit a rigid sheet to each side of opening to prevent ingress of fill or vermin.

697 INSTALLING FLEXIBLE COUPLINGS

- Ends of pipes to be joined: Cut cleanly and square.
- Outer surfaces of pipes to be joined: Clean and smooth. Where necessary, e.g. on concrete or iron pipes, smooth out mould lines and/ or apply a cement grout over the sealing area.
- Clamping bands: Tighten carefully to make gastight and watertight seals.

705 INITIAL TESTING OF PIPELINES

- Before testing:
 - Cement mortar jointing: Leave 24 h.
 - Solvent welded pipelines: Leave 1 h.
- Method: Block open ends of pipelines to be tested and pressurise. Air test short lengths to BS EN 1610.

715 BACKFILLING TO PIPELINES

- Backfilling above top of surround or protective cushion: Material excavated from trench, compacted in layers 300 mm (maximum) thick.
- Heavy compactors: Do not use before there is 600 mm (total) of material over pipes.

720 BACKFILLING UNDER ROADS AND PAVINGS

- Backfilling from top of surround or protective cushion up to formation level: Granular sub-base material, laid and compacted in 150 mm layers.

722 PUBLIC ROADS AND PAVINGS - E & W, SCOT

- Excavating and backfilling of trenches: To Department for Transport 'Specification for the reinstatement of openings in highways'.

724 PUBLIC ROADS AND PAVINGS - NI

- Excavating and backfilling of trenches: To Northern Ireland Road Authority and Utilities Committee 'Specification for the reinstatement of openings in highways'.

728 LAYING WARNING MARKER TAPES

- Installation: During backfilling, lay continuously over pipelines.
- Depth: 300-400 mm.
 - Pipelines deeper than 2 m: Lay an additional tape 600 mm above the top of the pipeline.

734 INSTALLING ACCESS POINTS AND GULLIES

- Bedding:
 - Material: As per Contractor's Designer Proposals.
 - Thickness (minimum): As per Contractor's Designer Proposals.
- Surround:
 - Material: As per Contractor's Designer Proposals.
 - Thickness (minimum): As per Contractor's Designer Proposals.
 - Height: _ As per Contractor's Designer Proposals
- Backfilling As per Contractor's Designer Proposals.
 - Material: As per Contractor's Designer Proposals.
 - Compaction: By hand in 100 mm layers.
- Setting out relative to adjacent construction features: Square and tightly jointed.
- Permissible deviation in level of external covers and gratings: +0 to -6 mm.
- Raising pieces (clay and concrete units): Joint with 1:3 cement:sand mortar.
- Exposed openings: Fit purpose made temporary caps. Protect from site traffic.

736 INSTALLING RODDING POINTS

- Bedding and surround:
 - Material: Concrete (general).
 - Thickness (minimum): Full depth of rodding yet unit
- Permissible deviation in level of external covers and gratings: +0 to -6 mm.

741 INSTALLING INSPECTION CHAMBERS - PLASTICS

- Bedding:
 - Material: As per Contractor's Designer Proposals.
 - Thickness (minimum): As per Contractor's Designer Proposals
- Surround:
 - Material: As per Contractor's Designer Proposals
 - Thickness (minimum): As per Contractor's Designer Proposals
- Backfilling As per Contractor's Designer Proposals
 - Compaction: By hand in 100 mm layers.
- Concrete collar:
 - Material: As per Contractor's Designer Proposals.
 - Thickness (minimum): As per Contractor's Designer Proposals
 - Width (minimum): As per Contractor's Designer Proposals
- Seating: _ As per Contractor's Designer Proposals

773 INSTALLING ACCESS COVERS AND FRAMES

- Seating: As per Contractor's Designer Proposals
- Bedding and haunching of frames: Continuously.
 - Material: As per Contractor's Designer Proposals.
 - Top of haunching: 30 mm below surrounding surfaces.
- Horizontal positioning of frames:
 - Centred over openings.
 - Square with joints in surrounding paving.
- Vertical positioning of frames:
 - Level; or
 - Marry in with levels of surrounding paving.
- Permissible deviation in level of external covers and frames: +0 to -6 mm.

776 EXPOSED OPENINGS IN INSPECTION CHAMBERS, ACCESS POINTS, FITTINGS AND

EQUIPMENT

- General: Fit purpose made temporary caps. Protect from site traffic.

COMPLETION

901 REMOVAL OF DEBRIS AND CLEANING

- Preparation: Lift covers to manholes, inspection chambers and access points. Remove mortar droppings, debris and loose wrappings.
 - Timing: Before cleaning, final testing, CCTV inspection if specified, and immediately before handover.
- Cleaning: Thoroughly flush pipelines with water to remove silt and check for blockages. Rod pipelines between access points if there is any indication that they may be obstructed.
- Washings and detritus: Do not discharge into sewers or watercourses.
- Covers: Securely replace after cleaning and testing.

911 TESTING AND INSPECTION

- Dates for testing and inspection: Give notice.
 - Period of notice: 72 hours

921 FINAL TESTING OF PRIVATE GRAVITY DRAINS AND SEWERS UP TO DN 300

- Before testing:
 - Cement mortar jointing: Leave 24 h.
 - Solvent welded pipelines: Leave 1 h.
- Standard: To Building Regulations.
- Method: As per Contractor's Designer Proposals

941 WATER TESTING OF MANHOLES AND INSPECTION CHAMBERS

- Timing: Before backfilling.
- Standard:
 - Exfiltration: To BS EN 1610.
 - Method: Testing with water (method W).
 - Infiltration: No identifiable flow of water penetrating the chamber.

951 TESTING OF ANCILLARY COMPONENTS

- Components: Rodding eyes, hoppers and drain shoes.
- Standard: To BS EN 1610.

S Piped supply systems

S15 Fountains and water features

S15 Fountains and water features

To be read with Preliminaries/ General conditions.

GENERAL

- 105 EXTERNAL SINKS _____
- Two Belfast sinks reclaimed from Museum utilised in education garden
- 120 WATER SUPPLY to be determined from west side of museum
- Source: Nearest internal WC or water supply to west (Church) side of museum building
 - Flow rate (minimum): To be confirmed.
 - Pressure: Low
 - Pump: Not desired .
 - Pipelines: Domestic scale_ .
 - Display: None .
 - Controllers: Stop cock on outside of building in suitable Toby Box .
 - Treatment: Not required .
 - Accessories: One way flow valve (backflow prevention) and frost protection to internal supply. .

PERFORMANCE

- 200 GENERAL DESIGN
- Design: Complete the design of the Belfast sinks.
 - Proposals: Submit drawings (showing equipment positions and pipeline routes), technical information, calculations and manufacturers' literature.
 - Performance criteria: Childrens sink to be set on timber backboard to hide pipes and at a level of 500mm above ground level, adult sink near green house to be set at 750mm.
To include waste pipes for disposal of water back to foul drain system with suitable traps and S-bend.
- 415 POLYETHYLENE PIPELINE FOR UNDERGROUND USE
- Standard: To BS EN 12201-2, Kitemark certified.
 - Jointing: Compression fittings to BS EN 12201-3.
 - Colour: Blue.
- 420 SPIRAL PLASTICS HOSE allowable but hidden
- Manufacturer: To Contractor's design.
 - Product reference: To Contractor's design. •
 - Size: To Contractor's design..
 - Colour: To Contractor's design..
- 425 STAINLESS STEEL PIPELINE To Contractor's design.
- Standard: To BS EN 10312.
 - Jointing: To Contractor's design. .
 - Fluxes: Do not use fluxes containing chlorides or borides.
 - Type: To Contractor's design. _ .
 - Supports: To Contractor's design. _ .
- 430 THERMOPLASTICS
- Standard: To BS 7291.
 - Material: To Contractor's design..
 - Jointing: To Contractor's design..

- Supports: To Contractor's design..

435 PIPELINE INSULATION

- Material: Preformed flexible closed cell or mineral fibre split tube.
- Thermal conductivity (maximum): 0.04 W/ m"K.
- Thickness:
 - Internal pipelines: 25 mm.
 - External pipelines: 38 mm.
- Fire performance: Class 1 spread of flame when tested to BS 476-7.

525 VALVES GENERALLY

- Standard: To suit location and pipeline material.
- Types: Approved for the purpose by local water supply undertaker and of appropriate pressure ratings.
- Control of valves: Fit with handwheels for isolation and regulation of circuits or equipment.

585 DRAIN

- Manufacturer: To Contractor's design.
 - Product reference: To Contractor's design.
 - Type: To Contractor's design for connection to foul drain system.

645 EQUIPMENT ENCLOSURE – For mounting of Belfast Sinks

- Manufacturer: Bespoke joiner made
 - Product reference: N/A.
- Type: _____ Backboard / Fixing Board with steel legs to support front of sink
- Material: Timber
- Colour: Sage green stain
- Features: Cold Water Tap only, dismantling of timber boards to allow access to plumbing

EXECUTION

700 INSTALLATION GENERALLY

- Performance: Free from leaks and the audible effects of expansion, vibration and water hammer.
- Concealment: Supply and waste pipes behind timber mounting board.
- Fixing of equipment, components and accessories: Fix securely to the structure of the feature using appropriate purpose made fixings.
- Preparation: Prior to installation, clear all surfaces of debris and projections.
- Access: Allow adequate space for inspection, servicing and maintenance.
- Corrosion resistance: In locations where moisture is present or may occur, provide corrosion resistant fittings/ fixings and avoid contact between dissimilar metals by including suitable washers, gaskets, etc.

720 PIPELINE INSTALLATION

- Appearance: Install pipes straight, and parallel or perpendicular to walls, floors, ceilings, and other built elements.
- Joints, bends and offsets: Minimize.
- Access: Locate runs to facilitate installation of equipment, accessories and insulation and allow access for maintenance.
- Electrical equipment: Install pipelines 150 mm (minimum) clear of electrical equipment.
 - Separation: Do not run pipelines through electrical enclosures or above distribution boards, controllers or outlets.
- Insulation: Allow space around pipelines to fit insulation without compression.

721 PIPELINE FIXING

- Fixing: Secure and neat.
- Pipeline support: Prevent strain, e.g. from the operation of taps or valves.

- Drains and vents: Fix pipelines to falls. Fit draining taps at low points and vents at high points.
- Thermal expansion and contraction: Allow for thermal movement of pipelines. Isolate from structure.
 - Noise or abrasion of pipelines caused by movement: Prevent.
 - Pipelines passing through walls, floors or other built elements: Sleeve.

722 SUPPORTS FOR COPPER AND STAINLESS STEEL PIPELINES

- Spacing: Fix securely and true to line at the following maximum centres:
 - 15 and 22 mm pipe OD: 1.2 m horizontal, 1.8 m vertical.
 - 28 and 35 mm pipe OD: 1.8 m horizontal, 2.4 m vertical.
 - 42 and 54 mm pipe OD: 2.4 m horizontal, 3.0 m vertical.
- Additional supports: Locate within 150 mm of connections, junctions and changes of direction.

723 SUPPORTS FOR THERMOPLASTICS PIPELINES

- Spacing: Fix securely and true to line at the following maximum centres:
 - Up to 16 mm pipe OD: 300 mm horizontal, 500 mm vertical.
 - 17–25 mm pipe OD: 500 mm horizontal, 800 mm vertical.
 - 26–32 mm pipe OD: 800 mm horizontal, 1000 mm vertical.
- Additional supports: Locate within 150 mm of connections, junctions and changes of direction.

725 INSTALLATION OF INSULATION TO PIPELINES

- All above ground pipelines: Insulate in unheated spaces.
- External supply pipelines: If less than 750 mm below finished ground level, Insulate.
- Appearance: Fix securely and neatly. Make continuous over fittings and at supports.
 - Gaps: Not permitted.
 - Location of seam: On 'blind' side of pipeline.
- Timing: Fit insulation after testing.

730 JOINTS IN COPPER AND STAINLESS STEEL PIPELINES:

- Preparation: Cut pipes square. Remove burrs.
- Joints: Neat, clean and fully sealed. Install pipe ends into joint fittings to full depth.
- Bends: Do not use formed bends on exposed pipework, except for small offsets. Form changes of direction with radius fittings.
- Adaptors for connecting dissimilar materials: Purpose designed.
- Substrate and plastics pipes and fittings: Do not damage, e.g. by heat when forming soldered joints.
- Flux residue: Clean off.

731 JOINTS IN THERMOPLASTICS PIPELINES

- Fittings and accessories for joints: Purpose designed.
- Preparation: Cut pipes square. Remove burrs.
- Joints: Neat, clean and fully sealed. Install pipe ends into joint fittings to full depth.
- Compression fittings: Do not over tighten.

735 INSTALLATION OF VALVES

- Isolation and regulation valves: Provide on equipment and subcircuits.
- Access: Locate where valves can be readily operated and maintained and next to equipment which is to be isolated.
- Connection to pipework: Fit with joints to suit the pipe material.

COMPLETION

910 FLUSHING

- Standard: To BS 6700 clause 6.1.10.1.

920 SYSTEM DISINFECTION

- Standard: To BS 6700 clauses 6.1.10.2–6.1.10.4.

930 TESTING AND COMMISSIONING OF PIPEWORK

- Standard: To BS 6700 clause 6.1.12.
 - Notice (minimum): 3 days.
- Preparation: Secure and clean pipework and equipment. Fit tank covers.
- Leak testing: Run the system until all parts are at normal operating pressures for a period of 3 hours.
- Pressure testing: Joints, fittings and components must be free from leaks and signs of physical distress when tested for at least 1 hour as follows:
 - Systems fed directly from the mains: Apply a test pressure equal to 1.5 times the maximum pressure to which the installation or relevant part is designed to be subjected in operation.
 - Systems fed from storage: Apply a test pressure equal to the pressure produced when the storage cistern is filled to its normal maximum operating level.
- Inaccessible or buried pipelines: Carry out hydraulic pressure test to twice the working pressure.
- Equipment: Check and adjust operation of equipment, controls and safety devices.
- Nozzles: Check operation of nozzles for satisfactory rate of flow and operation of display.

936 CLEANING

- Equipment: Clean immediately before handover.

940 DOCUMENTATION

- Contents:
 - Full technical description of each system installed.
 - Manufacturers' operating and maintenance instructions for equipment and controls.
 - Manufacturers' guarantees and warranties.
 - System operating and maintenance instructions for the system as a whole giving optimum settings for controls and maintenance intervals for all equipment.
 - Record drawings showing the location of circuits, fittings, pipes, apparatus and operating controls.
 - List of normal consumable items.
 - Electrical inspection and completion certificates.
- Number of copies: 1 digital copy.
- Submission: _On completion

950 OPERATING TOOLS

- Tools: Supply tools for operation, maintenance and cleaning purposes.
- Keys: Supply keys for valves, vents and cabinets.

960 LABELS

- Valve labels: Provide on isolating and regulating valves on primary circuits, stating function.

V Electrical supply/power/lighting systems

V9I Electrical systems - landscape

V91 Electrical systems - landscape

To be read with Preliminaries/ General conditions and Electrical Proposals supplied by Services Engineer

GENERAL

110 LOW VOLTAGE SUPPLY

- Nature of current: Alternating.
- Phase: Single Phase.
- Voltage: 250V.
- Source: Electricity Distributor.
- Metering: In external supply cabinet for lighting and recessed power supplies
- Accessories: Power supply and control kiosk for external equipment.

115 EXTERNAL LIGHTING SYSTEM

- Origin of supply: External supply kiosk.
 - Type: To be confirmed by electrical engineer designer.
- Final circuit cabling: To be confirmed by electrical engineer designer
 - Containment: Suitable ducting within landscape areas
- Rewireable installation: Yes
- Concealed installation: Yes.
- Cable identification and protection: Yes
- Luminaires: Silka Max by DW Windsor.
- Lighting columns: Silka Columns.
- Lamps: Required.
 - Lamp ballasts: Required.
- Individual control of luminaires: No.
- Group control of luminaires: Yes.
- Final connections: Required.
- Accessories: RGBW luminaire capacity for control via Bluetooth App supplied by DW Windsor.

120 SMALL POWER SYSTEM – Pop up Power Supply

- Origin of supply: External supply kiosk
 - Type: AC – 3 phase supply.
 - Final circuit cabling: To be confirmed by electrical engineer designer
 - Containment: Suitable ducting within landscape areas
- Rewireable installation: Yes
- Concealed installation: Yes.
- Cable identification and protection: Yes
- Outlets: Ground recessed power boxes
- Final connections: Required.
- Accessories: Recessed inspection cover for filling with matching surfacing.

SYSTEM PERFORMANCE

205 DESIGN

- Design: Complete the design of the electrical systems - landscape.
 - Standards: To BS 7671 and the requirements of the electricity distributor.
- Proposals: Submit drawings, technical information, calculations and manufacturers' literature.

210 DESIGN OF LOW VOLTAGE SUPPLY

- Capacity: Determine the anticipated maximum demand of the installation and complete the design of the low voltage supply.
- Proposals: Submit drawings showing equipment positions and routes, technical information and

calculations.

- Evidence of agreement with Electricity Distributor: Submit.
- General: Liaise with the Electricity Distributor and determine the following:
 - Maximum demand of the installation.
 - Nature of the supply, its suitability for the installation and type of earthing arrangement.
 - Location of the incoming supply.
 - Space requirements and location of the switches, fuses and meters.
- Electricity supplier: SP Energy Networks.
 - Coordination: Liaise with the electricity supplier, complete an application for supply of electricity and manage installation of metering equipment.

220 DESIGN OF LOW VOLTAGE DISTRIBUTION AND SMALL POWER SYSTEMS

- Spare capacity: To be confirmed by Electrical Engineer Designer.
- Equipment: Provide electrical supplies to equipment requiring power.

230 DESIGN OF EXTERNAL LIGHTING SYSTEM

- Purpose: To illuminate Forecourt area for safe use and improve amenity during hours of darkness.
- Design: To CIBSE Code for Lighting and Lighting Guide 6.
- Illuminance level (maintained average): 20 lux.
- Illuminance level at any point (minimum): 15 lux.

245 DESIGN AND LIGHTING CALCULATIONS

- Lighting calculations:
 - Type: Computer generated point calculations.
- Submit the following:
 - Luminaire layout drawings.
 - Luminaire photometric data including flux fraction ratios and polar intensity curves.
 - Lamp technical information.
 - Maintenance factor calculations, including proposals for luminaire maintenance and lamp replacement.
 - Isolux contour plots for the working plane.
 - Schedule of design and calculated maintained average illuminance values.
 - Schedule of design and calculated uniformity values.

250 CONDUIT AND TRUNKING

- Standard: To BS 50086-1 or BS EN 61386-1.
- Type: Suitable for location and use.
- Sizes not shown: Submit proposals.

260 CABLES GENERALLY

- Cable sizes not stated: Submit proposals and calculations.

PRODUCTS

303 PRODUCT STANDARDS AND APPROVALS GENERALLY

- Standards: To BS 7671.
 - Cables:
 - Approval: BASEC certified.

305 PARTICULAR PRODUCT STANDARDS

- Mineral insulated copper sheathed cables: To BS EN 60702-1.
 - Mineral insulated copper sheathed cable terminations: To BS EN 60702-2.
- Cable distribution cabinets: To BS EN 60439-5.
- Trunking and ducting: To BS EN 50085-1.
- Luminaires: To BS EN 60598-1 and BS EN 55015.
- Separated extra low voltage (SELV) transformers: To BS EN 61558-2-1.

- Lighting columns:
 - Aluminium: To BS EN 40-6.
 - Steel: To BS EN 40-5.
- Discharge lamp ballasts: To BS EN 61347-2-9 and BS EN 60923.
- Lamps:
 - Compact fluorescent lamps: To BS EN 60901 and BS EN 61199.
 - High pressure mercury lamps: To BS EN 60188 and BS EN 62035.
 - High pressure sodium lamps: To BS EN 62035.
 - Metal halide lamps: To BS EN 62035.
 - Tubular fluorescent lamps: Single-capped: To BS EN 60901 and BS EN 61199.
 - Tubular fluorescent lamps: Double-capped: To BS EN 60081 and BS EN 61195.
 - Tungsten halogen lamps: To BS EN 60432-2 and BS EN 60357.
- Photoelectric control units: To BS 5972.
- Time switches: BS EN 60730-1 and BS EN 60730-2-7.
 - Approval: BEAB.
- Underground cable marker tape: To BS EN 12613.
- Underground concrete cable protection covers: To BS 2484.

315 CABLE DISTRIBUTION CABINETS – Located in landscape bed near entrance to Courtroom 2

- Standard: To BS EN 60439-5.
- Manufacturer: To be confirmed by Electrical Engineer Designer.
 - Product reference: To be confirmed by Electrical Engineer Designer.
- Base: Concrete fixing base with necessary through conduits.
- Enclosure:
 - Material: GRP
 - Finish: GRP
 - Colour: Green
 - Doors: Internally hinged with padlock loop.
 - Ingress protection to BS EN 60529: IP55.
- Busbars and connections: Fully shrouded.
- Neutral and earth bars: Individual terminal for each outgoing circuits.
 - Identification:
 - Neutral and earth bar terminals: Label with the outgoing circuit reference.
 - Cable terminations: Label with circuit reference, with push on plastic markers.
- Spare fuses: Mount within cabinet.
 - Quantity (minimum): Two of each size and rating used.
- Anti-condensation heater and thermostat: Required.
- Controls: To be confirmed by Electrical Engineer Designer.
- Internal lighting: Required.

320 DISTRIBUTION BOARDS AND CONSUMER UNITS

- Approval: ASTA certified.
- Manufacturer: To be confirmed by Electrical Engineer Designer
 - Product reference: To be confirmed by Electrical Engineer Designer
- Main control: To be confirmed by Electrical Engineer Designer.
 - Rating: To suit maximum demand.
- Number of ways: Determine.
 - Spare capacity: To be confirmed by Electrical Engineer Designer
- Circuit protection: Miniature circuit-breakers.
 - Standard: To BS EN 60898-1.
- Additional circuit protection: To be confirmed by Electrical Engineer Designer.
 - Standard: To BS EN 61008 or BS EN 61009.
- Enclosure: Within Cable distribution cabinet
 - Material: GRP
 - Ingress protection to BS EN 60529: IP55
 - Location: Proposed in within landscape bed near Courtroom 2 entrance.

- Lock: Yes

330 RIGID CONDUIT AND FITTINGS _____

- Standards:
 - Steel: To BS EN 50086-1, or BS EN 61386-1 and BS EN 61386-21.
 - PVC-U: To BS EN 50086-1, or BS EN 61386-1 and BS EN 61386-21.
- Manufacturer: To be confirmed by Electrical Engineer Designer
 - Product reference: _ To be confirmed by Electrical Engineer Designer
- Material: To be confirmed by Electrical Engineer Designer
- Shape and colour: To be confirmed by Electrical Engineer Designer
- Fittings: To be confirmed by Electrical Engineer Designer
- Gauge: To be confirmed by Electrical Engineer Designer
- Joints: To be confirmed by Electrical Engineer Designer

332 TRUNKING AND DUCTING

- Standard: To BS EN 50085-1.
- Manufacturer: To be confirmed by Electrical Engineer Designer
 - Product reference: To be confirmed by Electrical Engineer Designer
- Material: To be confirmed by Electrical Engineer Designer
- Shape and colour: To be confirmed by Electrical Engineer Designer
- Fittings: To be confirmed by Electrical Engineer Designer
- Resistance to impact: Spade impact in soft landscape area.

335 LUMINAIRES GENERALLY

- Standards: To BS EN 60598-1 and BS EN 55015.

365 LIGHTING COLUMNS GENERALLY Silka by DW Windsor

- Nominal column height: 4.4m
- Base arrangement: Root fixed
- Electrical cut outs: To BS 7654.
- Accessories: Shoes for cable fitting and draw cables.

385 LAMPS GENERALLY

- Standards:
 - Compact fluorescent lamps: To BS EN 60901 and BS EN 61199.
 - High pressure mercury lamps: To BS EN 60188 and BS EN 62035.
 - High pressure sodium lamps: To BS EN 62035.
 - Metal halide lamps: To BS EN 62035.
 - Tubular fluorescent lamps: Single-capped: To BS EN 60901 and BS EN 61199.
 - Tubular fluorescent lamps: Double-capped: To BS EN 60081 and BS EN 61195.
 - Tungsten halogen lamps: To BS EN 60432-2 and BS EN 60357.
- Manufacturer: _____.
- Lamps of the same type and rating: Same manufacturer.

400 PHOTOELECTRIC CONTROL UNITS

- Standard: To BS 5972.
- Manufacturer: To be confirmed by Electrical Engineer Designer
- Product reference: To be confirmed by Electrical Engineer Designer
- Features: _To coincide with adjacent highway lighting photoelectric control levels
- Mounting: As per manufacturer's recommendations

410 CABLE GUARDS

- Manufacturer: To be confirmed by Electrical Engineer Designer
 - Product reference: To be confirmed by Electrical Engineer Designer
- Material: To be confirmed by Electrical Engineer Designer

425 UNDERGROUND CABLE MARKER TAPE

- Standard: To BS EN 12613.
- Material: Polyethylene.
- Size:
 - Width: 150 mm.
 - Thickness: 0.1 mm.
- Format:
 - Background colour: Yellow.
 - Text colour: Black.
- Labelling: "CAUTION ELECTRIC CABLE BELOW" continuous along the tape length.

430 UNDERGROUND PLASTICS CABLE PROTECTION COVERS

- Manufacturer: To be confirmed by Electrical Engineer Designer
 - Product reference To be confirmed by Electrical Engineer Designer
- Material: Polyethylene.
- Size:
 - Width: 150 mm.
 - Thickness: _ To be confirmed by Electrical Engineer Designer.
- Jointing method: Peg.
- Identification: Laminate underground cable marker tape to top face.

EXECUTION

605 ELECTRICAL INSTALLATION GENERALLY

- Standard: To BS 7671.

610 ARRANGEMENT OF PARTICULAR CIRCUITS

- Separation: Divide installation into separately controlled circuits.
 - Separately controlled circuits: To be confirmed by Electrical Engineer Designer
- Further subdivision: As required.

615 INSTALLING STEEL CONDUIT AND FITTINGS

- Fixing: Fix securely. Fix boxes independently of conduit.
- Conduit drainage: Provide drainage outlets at lowest points.
- Location: Position vertically and horizontally in line with equipment served, and parallel with building lines. Locate where accessible.
- Jointing:
 - Number of joints: Minimize.
 - Lengths of conduit: Maximize.
 - Cut ends: Remove burrs, and plug.
 - Movement joints in structure: Manufactured expansion coupling.
 - Threaded steel conduits: Tightly screw to ensure electrical continuity, with no thread showing.
- Movement: Fix securely.
 - Conduit connections to boxes and items of equipment, other than those with threaded entries: Earthing coupling and male brass bush and protective conductor.
- Changes of direction: To be confirmed by Electrical Engineer Designer
- Connections to boxes, trunking, equipment and accessories: Screwed couplings, adaptors, connectors and glands: Attach rubber bushes at open ends.
- Mounting and support: To be confirmed by Electrical Engineer Designer

616 INSTALLING PVC-U CONDUIT AND FITTINGS

- Fixing:
 - Spacing of conduit saddles (maximum): 900 mm on horizontal, 1250 mm on vertical. Reduce spacing in areas of high ambient temperature in accordance with manufacturer's instructions.
 - Fix boxes independently of conduit.
 - At fittings and changes of direction: Fit conduit saddles 150 mm either side.

- Thermal expansion: Allow for expansion couplings in accordance with manufacturer's recommendations.
 - Conduit drainage: Provide drainage outlets at lowest points.
 - Location: Position vertically and horizontally in line with equipment served, and parallel with building lines. Locate where accessible.
 - Jointing:
 - Number of joints: Minimize.
 - Lengths of conduit: Maximize.
 - Cut ends: Remove burrs.
 - Movement joints in structure: Manufactured expansion coupling.
 - Adhesive: Use water resistant solvent cement to form watertight joints. Use water resistant lubricant sealant at expansion couplers.
 - Changes of direction: To be confirmed by Electrical Engineer Designer
 - Connections to boxes, trunking, equipment and accessories: Threaded adaptors.
 - Mounting and support: To be confirmed by Electrical Engineer Designer
- 620 CABLES ENTERING BUILDINGS/COLUMNS/KIOSK FROM BELOW GROUND
- Install within pipeducts: To be confirmed by Electrical Engineer Designer.
 - Proposals: Submit drawings.
- 630 INSTALLING CABLES
- Joints: At luminaires and electrical accessories only.
 - Fixings: Corrosion-resistant and compatible with the environment where they are installed.
- 635 CABLES IN TRENCHES
- Cables: Lay on newly prepared bedding.
 - Multiple cables in same trench: Set 150 mm apart.
 - Cable pulling: Prevent kinks and twisting of the cable.
 - Installation method: Submit proposals.
 - Cable formation within trench: To be confirmed by Electrical Engineer Designer
 - Trefoil cable groups and protective conductors: Bind at 1 m intervals.
 - Cables below roads and hardstandings: Duct and derate if longer than 10 m. Extend ducts 1 m each side of hard standing.
 - Above ground identification: Concrete cable markers at changes in direction.
- 647 INSTALLING CABLE GUARDS
- Cable guards: Provide where exposed cables are vulnerable to mechanical damage.
 - Height: 600MM below finished ground level
- 648 CONCRETE MIX
- Standards: To BS 8500-2 and BS EN 206-1.
 - Mix: _Gen 1.
 - Admixtures: Do not use.
- 650 SETTING COMPONENTS IN CONCRETE FOUNDATIONS AND BASES
- Foundation holes: Form neat holes with vertical sides. Cover bottom with a 50 mm layer of concrete.
 - Locating components: Accurately position, plumb and provide secure temporary support.
 - Cable ducts: Connect to column cable entry slot and protect against collapse during backfilling.
 - Concrete surround: Fill holes to at least the specified depth. Fully compact as filling proceeds. Maintain temporary support and prevent disturbance for at least 48 h.
 - Concrete foundations:
 - Concealed: Finish by bedding and haunching at a depth suitable to receive the overlying finish.
 - Exposed: Compact until air bubbles cease to appear on the surface. Weather to shed water, and trowel smooth.

655 SETTING COMPONENTS IN EARTH

- Foundation holes: Form as small as practicable to allow refilling.
- Locating components: Accurately position, plumb and provide secure temporary support.
- Cable ducts: Connect to column cable entry slot and protect against collapse during backfilling.
- Earth for backfilling: Selected material free from stones or lumps of clay exceeding 40 mm in any direction.
- Backfilling: Refill with earth. Fully compact in 50 mm layers as filling proceeds.

660 HANDLING AND ERECTING LIGHTING COLUMNS

- Standard: To Highways Agency 'Specification for highway works Volume 1'.

665 SITE PAINTING

- Timing: Prepare surfaces and apply finishes immediately after fixing.

670 LIGHTING COLUMN IDENTIFICATION

- Manufacturer's marking: To Highways Agency 'Specification for highway works Volume 1' clause 1304.
- Location marking for inspection and maintenance purposes: Facing museum for ease of reading.

675 INSTALLING LUMINAIRES AND LAMPS GENERALLY

- Location: Forecourt landscape beds and hard landscape
- Orientation: Vertical column and luminaire..
- Supports: Adequate for weight of luminaire.

680 INSTALLING CONTROLGEAR

- Location: Control Gear Cabinet
- Labelling of control gear enclosures: Describe control gear purpose.

COMPLETION

910 INSPECTION AND TESTING

- Standards: Part M
- Notice before commencing tests (minimum): 24 h.
- Certificates: Submit.
 - Number of copies: 1 paper copy and 1 digital copy

915 CLEANING

- Electrical equipment: Clean immediately before handover.

920 COMMISSIONING

- Setting for control devices: Submit proposals and commission.
- Operation of control devices: Verify.
- Orientation of adjustable luminaires: Adjust to give optimum performance.
- Additional requirements: Teach, or arrange to teach Museum Operational Staff how to use light control

App.

930 DOCUMENTATION

- Timing: Submit at completion.
- Contents:
 - Full technical description of each system installed.
 - Manufacturers' operating and maintenance instructions for fittings and apparatus including relamping instructions for luminaire types. Identify hazardous lamps that require specialist disposal.
 - Recommended frequency of testing and inspection, both for electrical safety, and for matters such as the corrosion and security of lighting columns and luminaire fixings.

- Manufacturers' guarantees and warranties.
- Record drawings showing circuits and their ratings and locations of fittings and apparatus.
- List of normal consumable items and their sources.

935 SPARE LAMPS

- Quantity to be supplied: Zero.
- Labelling: Label the lamps with the corresponding luminaire reference.

940 PADLOCKS AND KEYS

- Keys for control kiosk – 4 sets

950 MAINTENANCE

- Servicing and maintenance: Undertake.
 - Duration: 12 months

Z Building fabric reference specification

Z10 Purpose made joinery

Z10 Purpose made joinery

To be read with Preliminaries/ General conditions.

110 FABRICATION

- Standard: To BS 1186-2.
- Sections: Accurate in profile and length, and free from twist and bowing. Formed out of solid unless shown otherwise.
 - Machined surfaces: Smooth and free from tearing, wooliness, chip bruising and other machining defects.
- Joints: Tight and close fitting.
- Assembled components: Rigid. Free from distortion.
- Screws: Provide pilot holes.
 - Screws of 8 gauge (4 mm diameter) or more and screws into hardwood: Provide clearance holes.
 - Countersink screws: Heads sunk at least 2 mm below surfaces visible in completed work.
 - Adhesives: Compatible with wood preservatives applied and end uses of timber.

120 CROSS SECTION DIMENSIONS OF TIMBER

- General: Dimensions on drawings are finished sizes.
- Maximum permitted deviations from finished sizes:
 - Softwood sections: To BS EN 1313-1:-
 - Clause 6 for sawn sections.
 - Clause NA.2 for further processed sections.
 - Hardwood sections: To BS EN 1313-2:-
 - Clause 6 for sawn sections.
 - Clause NA.3 for further processed sections.

130 PRESERVATIVE TREATED WOOD

- Cutting and machining: Completed as far as possible before treatment.
- Extensively processed timber: Retreat timber sawn lengthways, thickened, planed, ploughed, etc.
- Surfaces exposed by minor cutting and/ or drilling: Treat as recommended by main treatment solution manufacturer.

140 MOISTURE CONTENT

- Wood and wood based products: Maintained within range specified for the component during manufacture and storage.

250 FINISHING

- Surfaces: Smooth, even and suitable to receive finishes.
 - Arises: Eased unless shown otherwise on drawings.
- End grain in external components: Sealed with primer or sealer as section M60 and allowed to dry before assembly.

Z11 Purpose made metalwork

Z11 Purpose made metalwork

To be read with Preliminaries/ General conditions.

PRODUCTS

310 MATERIALS GENERALLY

- Grades of metals, section dimensions and properties: To appropriate British Standards. When not specified, select grades and sections appropriate for the purpose.
- Prefinished metal: May be used if methods of fabrication do not damage or alter appearance of finish, and finish is adequately protected.
- Fasteners: To appropriate British Standards and, unless specified otherwise, of same metal as component being fastened, with matching coating or finish.

FABRICATION

515 FABRICATION GENERALLY

- Contact between dissimilar metals in components: Avoid.
- Finished components: Rigid and free from distortion, cracks, burrs and sharp arrises.
 - Moving parts: Free moving without binding.
- Corner junctions of identical sections: Mitre.

520 COLD FORMED WORK

- Profiles: Accurate, with straight arrises.

527 WELDING – Only with Hot Ticket

- Welding procedures:
 - Method and standard: Contractor to propose.
 - Welding Procedure Specification (WPS): To follow best practice
- Preparation:
 - Joint preparation: Clean thoroughly.
 - Surfaces of materials that will be self-finished and visible in the completed work: protect from weld splatter.
- Jointing:
 - Joints: Fully bond parent and filler metal throughout with no inclusions, holes, porosity or cracks.
 - Dissimilar metals: Avoid.
 - Strength requirements: Welds to achieve design loads.
 - Heat straightening: Avoid.
 - Complex assemblies: Agree priority for welding members to minimize distortion caused by subsequent welds.
 - Tack welds: Use only for temporary attachment.
 - Jigs: Provide to support and restrain members during welding.
 - Filler plates: As necessary.
 - Lap joints: Minimum 5 x metal thickness or 25 mm, whichever is greater.
 - Weld terminations: Clean and sound.

FINISHING

710 FINISHING WELDED AND BRAZED JOINTS VISIBLE IN COMPLETE WORK

- Standard: To BS EN ISO 8501-3.
 - Preparation grade: _____.
- Butt joints: Smooth, and flush with adjacent surfaces.
- Fillet joints: Neat.
- Grinding: Grind smooth where indicated on drawings.

745 PREPARATION FOR APPLICATION OF COATINGS

- General: Complete fabrication, and drill fixing holes before applying coatings.
- Paint, grease, flux, rust, burrs and sharp arrises: Remove.

780 GALVANIZING

- Standard: To BS EN ISO 1461.
 - Preparation:
 - Vent and drain holes: Provide in accordance with BS EN 14713. Seal after sections have been drained and cooled.
 - Components subjected to cold working stresses: Heat treat to relieve stresses before galvanizing.
 - Welding slag: Remove.
 - Component cleaning: To BS EN ISO 8501-1.
- Grade: As required for purpose and location

Z12 Preservative/ fire retardant treatment

Z12 Preservative/ fire retardant treatment

To be read with Preliminaries/ General conditions.

110 TREATMENT APPLICATION

- Timing: After cutting and machining timber, and before assembling components.
- Processor: Licensed by manufacturer of specified treatment solution.
- Operatives: Competent and trained..
- Certification: For each batch of timber provide a certificate of assurance that treatment has been carried out as specified.

120 COMMODITY SPECIFICATIONS

- Standard: Current edition of the Wood Protection Association (WPA) publication 'Industrial wood preservation specification and practice'.

130 PRESERVATIVE TREATMENT SOLUTION STRENGTHS/ TREATMENT CYCLES

- General: Select to achieve specified service life and to suit treatability of specified wood species.

140 COPPER-ORGANIC PRESERVATIVE TREATMENT

- Solution:
 - Manufacturer: Tanolith producers
Product reference: Tanabrun.
 - Colour: Brown / Clear.
 - Application: High pressure impregnation.
- Moisture content of wood:
 - At time of treatment: Not more than 28%.
 - After treatment: Timber to be surface dry before using.

160 ORGANIC SOLVENT PRESERVATIVE TREATMENT

- Solution:
 - Manufacturer: Contractor proposal
Product reference: Contractor proposal.
 - Application: Double vacuum + low pressure impregnation, or immersion.
- Moisture content of wood:
 - At time of treatment: As specified for the timber/ component at time of fixing.
 - After treatment: Timber to be surface dry before use.

165 WATER BASED MICROEMULSION PRESERVATIVE TREATMENT

- Solution:
 - Manufacturer: Contractor proposal
Product reference: Contractor proposal.
 - Application: Double vacuum + low pressure impregnation.
- Moisture content of wood:
 - At time of treatment: As specified for the timber/ component at time of fixing.
 - After treatment: Timber to be surface dry before use.

167 BORON COMPOUND PRESERVATIVE TREATMENT

- Solution:
 - Manufacturer: Contractor proposal
Product reference: Contractor proposal.
 - Application: High pressure impregnation.
- Moisture content of wood:
 - At time of treatment: Not more than 28%.
 - After treatment: Timber to be surface dry before using.

180 RECYCLED TIMBER CONTAINING CREOSOTE OR CHROMIUM/ ARSENIC BASED PRESERVATIVE

- Usage: _Not allowed.

610 MAKING GOOD TO PRESERVATIVE TREATMENT ON SITE

- Preservative solution: Compatible with off-site treatment.
- Application: In accordance with preservative manufacturer's recommendations.

Z20 Fixings and adhesives

Z20 Fixings and adhesives

To be read with Preliminaries/ General conditions.

PRODUCTS

310 FASTENERS GENERALLY

- Materials: To have:
 - Bimetallic corrosion resistance appropriate to items being fixed.
 - Atmospheric corrosion resistance appropriate to fixing location.
- Appearance: Submit samples on request.

320 PACKINGS

- Materials: Noncompressible, corrosion proof.
- Area of packings: Sufficient to transfer loads.

340 MASONRY FIXINGS

- Light duty: Plugs and screws.
- Heavy duty: Expansion anchors or chemical anchors.

350 PLUGS

- Type: Proprietary types to suit substrate, loads to be supported and conditions expected in use.

390 ADHESIVES GENERALLY

- Standards:
 - Hot-setting phenolic and aminoplastic: To BS 1203.
 - Thermosetting wood adhesives: To BS EN 12765.
 - Polyvinyl acetate thermoplastic adhesive: To BS 4071.

410 POWDER ACTUATED FIXING SYSTEMS

- Types of fastener, accessories and consumables: As recommended by tool manufacturer.

EXECUTION

610 FIXING GENERALLY

- Integrity of supported components: Select types, sizes, quantities and spacings of fixings, fasteners and packings to retain supported components without distortion or loss of support.
- Components, substrates, fixings and fasteners of dissimilar metals: Isolate with washers/ sleeves to avoid bimetallic corrosion.
- Appearance: Fixings to be in straight lines at regular centres.

620 FIXING THROUGH FINISHES

- Penetration of fasteners and plugs into substrate: To achieve a secure fixing.

630 FIXING PACKINGS

- Function: To take up tolerances and prevent distortion of materials and components.
- Limits: Do not use packings beyond thicknesses recommended by fixings and fasteners manufacturer.
- Locations: Not within zones to be filled with sealant.

640 FIXING CRAMPS

- Cramp positions: Maximum 150 mm from each end of frame sections and at 600 mm maximum centres.
- Fasteners: Fix cramps to frames with screws of same material as cramps.

- Fixings in masonry work: Fully bed in mortar.

670 PELLETED COUNTERSUNK SCREW FIXING

- Finished level of countersunk screw heads: Minimum 6 mm below timber surface.
- Pellets: Cut from matching timber, match grain and glue in to full depth of hole.
- Finished level of pellets: Flush with surface.

680 PLUGGED COUNTERSUNK SCREW FIXING

- Finished level of countersunk screw heads: Minimum 6 mm below timber surface.
- Plugs: Glue in to full depth of hole.
- Finished level of plugs: Projecting above surface.

690 USING POWDER ACTUATED FIXING SYSTEMS

- Powder actuated fixing tools: To BS 4078-2 and Kitemark certified.
- Operatives: Trained and certified as competent by tool manufacturer.

700 APPLYING ADHESIVES

- Surfaces: Clean. Adjust regularity and texture to suit bonding and gap filling characteristics of adhesive.
- Support and clamping during setting: Provide as necessary. Do not mark surfaces of or distort components being fixed.
- Finished adhesive joints: Fully bonded. Free of surplus adhesive.

Z2I Mortars

Z21 Mortars

To be read with Preliminaries/ General conditions.

CEMENT GAUGED MORTARS

- 110 CEMENT GAUGED MORTAR MIXES
 - Specification: Proportions and additional requirements for mortar materials are specified elsewhere.
- 120 SAND FOR SITE MADE CEMENT GAUGED MASONRY MORTARS
 - Standard: To BS EN 13139.
 - Grading: 0/2 (FP or MP).
 - Fines content where the proportion of sand in a mortar mix is specified as a range (e.g. 1:1: 5-6):
Lower proportion of sand: Use category 3 fines.
Higher proportion of sand: Use category 2 fines.
 - Sand for facework mortar: Maintain consistent colour and texture. Obtain from one source.
- 131 READY-MIXED LIME:SAND FOR CEMENT GAUGED MASONRY MORTARS
 - Standard: To BS EN 998-2.
 - Lime: Nonhydraulic to BS EN 459-1.
 - Type: CL 90S.
 - Pigments for coloured mortars: To BS EN 12878.
- 135 SITE MADE LIME:SAND FOR CEMENT GAUGED MASONRY MORTARS
 - Permitted use: Where a special colour is not required and in lieu of factory made ready-mixed material.
 - Lime: Nonhydraulic to BS EN 459-1.
 - Type: CL 90S.
 - Mixing: Thoroughly mix lime with sand, in the dry state. Add water and mix again. Allow to stand, without drying out, for at least 16 hours before using.
- 160 CEMENTS FOR MORTARS
 - Cement: To BS EN 197-1 and CE marked.
 - Types: Portland cement, CEM I.
Portland limestone cement, CEM II/A-L or CEM II/A-LL.
Portland slag cement, CEM II/B-S.
Portland fly ash cement, CEM II/B-V.
 - Strength class: 32.5, 42.5 or 52.5.
 - White cement: To BS EN 197-1 and CE marked.
 - Type: Portland cement, CEM I.
 - Strength class: 52.5.
 - Sulfate resisting Portland cement:
 - Types: To BS 4027 and Kitemarked.
To BS EN 197-1 fly ash cement, CEM II/B-V and CE marked.
 - Strength class: 32.5, 42.5 or 52.5.
 - Masonry cement: To BS EN 413-1 and CE marked.
 - Class: MC 12.5.
- 180 ADMIXTURES FOR SITE MADE CEMENT GAUGED MORTARS
 - Air entraining (plasticizing) admixtures: To BS EN 934-3 and compatible with other mortar constituents.
 - Other admixtures: Submit proposals.

- Prohibited admixtures: Calcium chloride, ethylene glycol and any admixture containing calcium chloride.

190 RETARDED READY TO USE CEMENT GAUGED MASONRY MORTARS

- Standard: BS EN 998-2.
- Lime for cement:lime:sand mortars: Nonhydraulic to BS EN 459-1.
 - Type: CL 90S.
- Pigments for coloured mortars: To BS EN 12878.
- Time and temperature limitations: Use within limits prescribed by mortar manufacturer.
 - Retempering: Restore workability with water only within prescribed time limits.

210 MAKING CEMENT GAUGED MORTARS

- Batching: By volume. Use clean and accurate gauge boxes or buckets.
 - Mix proportions: Based on dry sand. Allow for bulking of damp sand.
- Mixing: Mix materials thoroughly to uniform consistency, free from lumps.
 - Mortars containing air entraining admixtures: Mix mechanically. Do not overmix.
- Working time (maximum): Two hours at normal temperatures.
- Contamination: Prevent intermixing with other materials.

LIME:SAND MORTARS

310 LIME:SAND MORTAR MIXES

- Specification: Proportions and additional requirements for mortar materials are specified elsewhere.

320 SAND FOR LIME:SAND MASONRY MORTARS

- Type: Sharp, well graded.
 - Quality, sampling and testing: To BS EN 13139.
 - Grading/ Source: As specified elsewhere in relevant mortar mix items.

330 READY PREPARED LIME PUTTY

- Type: Slaked directly from CL 90 quicklime to BS EN 459-1, using an excess of water.
 - Maturation: In pits/ containers that allow excess water to drain away.
 - Density of matured lime putty: 1.3-1.4 kg/litre.
- Maturation period before use (minimum): Suppliers recommendation.

335 READY PREPARED LIME PUTTY

- Manufacturer: Contractor proposal
 - Product reference: Contractor proposal
- Maturation period before use (minimum): Contractor proposal.

Z22 Sealants

Z22 Sealants

To be read with Preliminaries/General conditions.

PRODUCTS

- 310 JOINTS – Expansion joints in horizontal plain
- Primer, backing strip, bond breaker: Types recommended by sealant manufacturer.

EXECUTION

- 610 SUITABILITY OF JOINTS
- Presealing checks:
 - Joint dimensions: Within limits specified for the sealant.
 - Substrate quality: Surfaces regular, undamaged and stable.
 - Joints not fit to receive sealant: Make good
- 620 PREPARING JOINTS
- Surfaces to which sealant must adhere:
 - Remove temporary coatings, tapes, loosely adhering material, dust, oil, grease, surface water and contaminants that may affect bond.
 - Clean using materials and methods recommended by sealant manufacturer.
 - Vulnerable surfaces adjacent to joints: Mask to prevent staining or smearing with primer or sealant.
 - Backing strip and/ or bond breaker installation: Insert into joint to correct depth, without stretching or twisting, leaving no gaps.
 - Protection: Keep joints clean and protect from damage until sealant is applied.
- 630 APPLYING SEALANTS
- Substrate: Dry (unless recommended otherwise) and unaffected by frost, ice or snow.
 - Environmental conditions: Do not dry or raise temperature of joints by heating.
 - Sealant application: Fill joints completely and neatly, ensuring firm adhesion to substrates.
 - Sealant profiles:
 - Butt and lap joints: Slightly concave.
 - Fillet joints: Flat or slightly convex.
 - Protection: Protect finished joints from contamination or damage until sealant has cured.