

Remediation Validation Report

Weldale Street, Reading

April 2022



FAIRHURST

CONTROL SHEET**CLIENT:** Henry's Construction Projects**PROJECT TITLE:** Weldale Street Reading**REPORT TITLE:** Remediation Validation Report**PROJECT REFERENCE:** 112990**DOCUMENT NUMBER:** R9**STATUS:** FINAL

Issue & Approval Schedule		Name	Signature	Date
	Prepared by	Andrew Allcock	Digitally Authorised	14/04/2022
	Checked by	Kerstin Wray	Digitally Authorised	19/04/2022
	Approved by	Kerstin Wray	Digitally Authorised	19/04/2022

Revision Record	Rev.	Date	Status	Description	Signature	
					By	
					Check	
					Approve	
					By	
					Check	
					Approve	

This document has been prepared in accordance with procedure OP/P02 of the Fairhurst Quality and Environmental Management System

This document has been prepared in accordance with the instructions of the client, Henry's Construction Projects, for the client's sole and specific use. Any other persons who use any information contained herein do so at their own risk.

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1.0 INTRODUCTION

1.1 General Objectives

Fairhurst have been appointed by Henry's Construction Projects (The Client) to provide a Remediation Validation Report in support of the redevelopment of Phase 1 at Weldale Street, Reading (The Site). This Remediation Validation Report was prepared to partially discharge Planning Conditions 19 and 20 as specified by Reading Borough Council Planning Permission Reference 170326.

The Remediation Validation Report summarises the remedial works undertaken at the site and presents the associated validation evidences for Phase 1, the western part of the site. The background information on the ground conditions of the site and the requirements of the remedial work can be found in 'Geo-Environmental and Geotechnical Ground Investigation Report' (112990/R5, June 2018) and the subsequent 'Remediation Options Appraisal and Strategy' (112990/R6, August 2019).

The site is centred on National Grid Reference 471020 173610 and is located at the address; Weldale Street, West Reading, RG1 7BZ, with a site location plan is presented with Appendix A.

1.2 Planning Condition Details

The development proposals for the site comprise the demolition of all the buildings and structures on site, and the subsequent construction of new buildings between 4 storeys with a lower ground floor and 11 storeys with a lower ground floor. It is understood that the new development will include 427 No. residential units (Class C) including 233 No. 1-bed, 182 No. 2-bed & 12 No. 3-bed units) and 1 No. flexible ground floor retail shop (Class A1) or restaurant and cafe (Class A3) unit, together with new public realm, landscaping, accesses, parking and associated works.

Foundation solutions for this site include continuous flight auger (CFA). Soft landscaping is proposed, concentrated in central, eastern and southern sections of the site.

The site is subject to Reading Borough Council Planning Permission Application Ref: 170326. This report aims to satisfy the following conditions:

Condition 19 - The approved remediation scheme shall be implemented in accordance with the approved timetable of works. A validation report should also be submitted to and approved by the LPA prior to construction of the development.

Condition 20 - In the event of contamination is found at any time when carrying out the approved development not previously identified, development shall be halted on that part of the site the contamination reported in writing to the LPA.

An assessment of the nature and extent of the contamination shall be undertaken and where remediation is necessary a remediation scheme, together with a timetable for its implementation, shall be submitted to the LPA for its written approval.

The measures in the approved remediation scheme shall be implemented in accordance with the approved timetable. Halted works shall not be re-commenced until the measures identified in the approved remediation scheme have been completed and a validation report approved in writing by the LPA.

1.3 Roles and Responsibilities

The Principal Contractor responsible for undertaking the remedial works and providing the verification evidences is Henry Construction Projects. In some instances, Henry Construction Projects used third party service providers to fulfil the requirements of the Remediation Statement. Where relevant, any third party is identified in the appropriate sections of this report.

Fairhurst undertook the role of the Engineer and was responsible for collating the provided evidences and comparing them to the requirements of the Remediation Statement in this Validation Report. Fairhurst also undertook occasional site visits to inspect the remedial works being undertaken by Henry Construction Projects.

1.4 Reference Reports

The following reports should be read in conjunction with this Remediation Validation Report:

- *Fairhurst, Preliminary Risk Assessment, Weldale Street, (ref. 112990/R3) January 2017;*
- *Fairhurst, Geo-Environmental Ground Investigation Report, Weldale Street (ref. 112990/R4), January 2017;*
- *Fairhurst, Ground Investigation Report, Weldale Street, (ref. 112990/R5), June 2019;*
- *Fairhurst, Remediation Statement, Weldale Street, (ref. 112990/R6), August 2019.*

2.0 REMEDIATION STATEMENT SUMMARY

2.1 General

The objective of the Remediation Statement was to set out the remedial work required in order to mitigate or reduce potential geo-environmental risks, such that the site is suitable for its intended use.

The Remediation Statement therefore set out the relevant source-pathway-receptor linkages of concern, proposed remedial works and details of how the works should be validated. A brief summary is provided within this report for context, although the Remediation Statement should be referred to for full details.

2.2 Relevant Pollutant Linkages

For the site to be considered 'suitable for use' with respect to the proposed high rise residential development, the potentially complete pollutant linkages indicated in Table 1 required remediation. The remediation and validation requirements for each pollutant linkage are presented in more detail in Section 3.

Table 1 – Potentially Complete Pollutant Linkages Requiring Remediation

Source	Pathway	Receptor	Remedial Action
Identified Potential Sources of Contamination as per the Remediation Method Statement	Direct Contact, ingestion and / or inhalation of Lead and PAH The pathways are viable where open ground is exposed following construction i.e. in soft landscaping areas. The pathways are appropriately mitigated where building floor slab or external hardstanding is constructed.	Human health (site end-users)	Construction of a clean cover layer in the west and southwest of the site, where areas of soft landscaping have been previously identified as at risk of the noted contaminants (see Section 3.2)

The Remediation Statement also specifies the requirement for an unexpected finds strategy to be implemented. This is in order to manage any potentially contaminated materials encountered which were not previously characterised by the site investigation and risk assessment works. A description of the works undertaken with respect to unexpected finds is presented in Section 3.4.

Section 3 also presents a comparison of the validation evidences to the Remediation Statement requirements, in order to assess compliance.

3.0 COMPLETED REMEDIAL AND VERIFICATION WORKS

3.1 General

This section summarises the detailed remediation / validation requirements for the potentially complete pollutant linkage and associated remedial action indicated in Table 1. The corresponding evidences provided by the Principal Contractor are also presented and Fairhurst assess whether the evidences meet the requirements of the Remediation Statement.

3.2 Clean Cover Layer

Remediation Statement Requirements -

The following requirements were made within the Remediation Statement:

- *In areas of proposed lawn, a minimum of 450mm clean cover system, comprising 150mm topsoil and 300mm subsoil (and in keeping with the Landscape Architects requirements), is considered appropriate where deep root action/intermixing and site user digging is unlikely;*
- *In areas of proposed new planting where maintenance / digging could occur, and root systems are likely to be present, the clean cover system thickness should be increased to 600mm in thickness. In this instance, it is recommended the capping system comprise either:*
 - *An orange alert barrier (such as barrier fencing) to act as a visual/anti-dig warning, overlain by 450mm subsoil and 150mm topsoil; OR*
 - *150mm clean non-calcareous coarse reject stone (to act as a physical barrier to digging) overlain by 300mm subsoil and 150mm topsoil.*
- *Laboratory testing of all imported or site won materials to be used in the clean capping encapsulation system detailed in the Remediation Statement should be undertaken at the appropriate frequencies and for the specified contaminants, and shown to meet the Site Acceptance Criteria for the site.*
- *A survey shall be carried out by the Main Contractor prior to and after placement of the clean cover to confirm that the extents and thicknesses comply with the requirements of this Method Statement. Validation pits, the positions of which are to be agreed with the Engineer, are also be required to confirm that adequate thicknesses have been placed.*

In addition to the general requirements listed above, the Landscape Architect's specification required the materials to be:

- Free of pests and disease as well as foreign matter such as sticks, straw, brick, concrete, glass wire or large lumps of clay or vegetation;
- Not contaminated;
- Subsoil: in areas to receive topsoil or planting media, contaminated subsoil was not to be used.

Different encapsulation systems were specified dependent on the historical and future land use, as follows:

- Areas of existing subsoil – The Landscape Architects requirements are the provision of 300mm topsoil cover for planting beds and tree pits. For amenity grass area a cover thickness of 150m topsoil was specified;

- Areas of new planting – The Landscape Architect requirements are the provision of 300mm topsoil;
- New planting adjacent to Chatham Street (southern boundary of the site); Planting beds and tree pits require 300mm of topsoil. For tree pits where suitable subsoil is not present, the Landscape Architect's requirements are the provision of 300mm topsoil underlain by 700mm subsoil.

The Landscape Architect's specification is included at Appendix A. Section Q28 and Q31 apply to the topsoil and subsoil thicknesses required, with particular reference to Q28 316 and 342 which set out the topsoil requirements and subsoil depths within tree pits.

Verification Evidences -

Areas of Existing Subsoil

With reference to the attached Inspection Pit Plan (see Appendix A), grid square B3 represented the only area of encountered existing subsoil. 1 No. inspection pit was advanced within this grid square which identified 300mm topsoil overlying existing subsoil. As such it is considered that the cover system across B3 was installed in line with the Landscape Architect's requirements. As the topsoil overlies existing natural subsoil it is also considered suitable from a geo-environmental perspective.

The Landscape Architect's plan shows this area is to be planted with herbaceous perennial planting and ornamental grasses and a 1m high hedge.

Areas of New Planting

With reference to the attached Inspection Pit Plan (see Appendix A), grid squares A1 and B2 represent area of new planting. 2 No. inspection pits were advanced within this area of the site (1 per grid square). A summary of the cover system encountered within the grid squares is provided within Table 2 below:

Table 2 – Areas of New Planting Cover System Details

Grid Square Reference	Cover System Build Up	Comments
A1	300mm topsoil, 150mm subsoil, orange alert barrier To be planted with: • herbaceous perennial planting and ornamental grasses • shrubs	Installed in accordance with the requirements of the Remediation Statement.
B2	240mm topsoil, 60mm subsoil, orange alert barrier To be planted with: • herbaceous perennial planting and ornamental grasses • a 1m high hedge	This does not meet the 450mm clean cover system over orange alert barrier as per Remediation Statement nor does it meet the Landscape Architect's Specification of 300mm topsoil. However the 240mm topsoil and 60mm subsoil provide the required thickness of 300mm for planting beds and tree pits.

As outlined within Table 2 above, the cover system build up for the areas in grid square reference B2 of new planting has not been installed strictly in accordance with the Landscape Architect's

specification. Despite this, the minimum 300mm build-up of the cover system formed of both topsoil and subsoil, and the presence of an orange alert barrier, the existing cover system is considered suitable with regards to mitigating the potential for future residential end users and maintenance workers from coming into contact with the contaminated soils below.

The orange alert barrier is a thick needle-punched nonwoven geotextile membrane manufactured from polypropylene fibres. The specification for the orange alert barrier utilised within the cover system build up is provided within Appendix F. Given the type of alert barrier installed, soil mixing with in-situ soils below the alert barrier is unlikely and therefore the requirements for 450mm clean topsoil / subsoil has been relaxed for grid reference B2.

New planting adjacent to Chatham Street

With reference to the attached Inspection Pit Plan (see Appendix A), grid squares B1, C1 and D1 represent areas of new planting adjacent to Chatham Street. The Matthew Wigan drawing (no 1903-MWA-00-XX-DR-L-1001, dated 1 May 2019, see Appendix A) shows the proposed landscape arrangement. The majority of the area along the southern boundary will be planted with shrubs and localised specimen shrubs. A limited number of trees will be planted (3No in the south west (B1) and 4No in the south east (D1)). Six of these trees are indicated as small trees with one tree, located in the south west, demarked as medium tree.

Three inspection pits were advanced within this area of the site (1 per grid square). A summary of the cover system encountered within the grid squares is provided within Table 3 overleaf.

Table 3 – Areas of New Planting Adjacent Chatham Street Cover System Details

Grid Square Reference	Cover System Build Up	Comments
B1	230m topsoil, 110mm subsoil, orange alert barrier	B1 and C1 did not achieve the 450mm thickness required by the Remediation strategy however it did meet the 300mm stipulated by the Landscape Architect. D1 met the Remediation Strategy and Landscape Architect's requirements for shrub planting.
C1	260mm topsoil, 40mm subsoil, orange alert barrier	
D1	400mm topsoil, 250mm subsoil, orange alert barrier	

As outlined within Table 3 above, the cover system build up for the areas of new planting adjacent Chatham Street has been installed in accordance with the Landscape Architect's specification. Whilst not meeting the 450mm cover thickness set out in the Remediation Strategy, the minimum 300mm build-up of the cover system formed of both topsoil and subsoil, and the presence of an orange alert barrier, the existing cover system is considered suitable with regards to mitigating the potential for future residential end users and maintenance workers from coming into contact with the contaminated soils below.

The specification for the orange alert barrier utilised within the cover system build up is provided within Appendix F.

It should be noted that no level survey was undertaken however, the validation pits demonstrate general compliance with the Remediation Statement and Landscape Architect's Specification.

3.3 Earthworks Procedures and Geo-environmental Classification of Imported Material

Remediation Statement Requirements -

The Earthworks Procedures and Geo-Environmental Classification of Material for site-won material are presented in detail in the Remediation Statement (Section 4.4). Included in the requirements are:

- *All imported materials for use in areas of soft landscaping should meet the Site Acceptance Criteria (Table 1 of Appendix C of the Remediation Statement). Consignment / delivery notes for all materials imported should be collated and detail the source, volume and carrier of materials, and be provided for inclusion within the Verification Report;*
- *It is recommended that all materials imported onto site are recorded, including stockpiling referencing and areas of re-use to allow a clear audit trail of materials used to facilitate the development; and,*
- *As a minimum, clean capping materials shall be tested for the parameters detailed within Appendix C at a frequency of 1 per 250m³ or a minimum of 3 samples per source (whichever results in the greatest testing frequency). The Geo-Environmental Engineer may request additional testing.*

Verification Evidences -

Geo-environmental verification testing of the imported topsoil utilised within the aforementioned soft landscaping cover systems was undertaken in accordance with Table 1 of Appendix C of the Fairhurst Remediation Statement. 6 No. topsoil samples (1 per inspection pit) was submitted for chemical analysis, none of which recorded chemical constituents exceeding the acceptability criteria (see Appendix B for the results of the chemical testing).

A review of the topsoil import tickets (see Appendix D) indicates that 120m³ of topsoil material was imported from Freeland Horticulture Limited for utilisation with the cover system. As such topsoil sampling and verification testing has been undertaken on a frequency of 1 per 20m³.

Chemical testing undertaken on both the topsoil, and subsoil imported to site by Tim O'Hare Associates on behalf of Freeland Horticulture Limited prior to importation is presented within Appendix E. The results also display no exceedances when compared to aforementioned suitability criteria.

As such, the contractor has provided the evidences required to demonstrate that the soils placed at the site are suitable for use and do not pose a risk to the end users and/or the environment, and the soils sampling and assessment undertaken by Fairhurst confirms this.

3.4 Unexpected Contamination

Remediation Statement Requirements -

In the event of encountering 'unexpected contamination' the following protocols were required:

- *Site inspections, further testing and risk assessment may be required to determine if the potential risks associated with the unexpected contamination pose an immediate, and / or long term risk, and mitigation measures should be designed accordingly.*
- *Any deviations from protection measures detailed in this Remediation Statement should be sent to the Local Planning Authority and / or appropriate regulators, including details of the unexpected contamination encountered, the associated potential risks and the proposed mitigation measures where required, for approval. Any remedial actions undertaken should be verified, and included within the Validation Report for the site.*

Verification Evidences -

No evidence that any unexpected contamination was encountered during the works has been reported to Fairhurst. No unexpected contamination was observed during Fairhurst site visits.

4.0 SUMMARY OF WORKS

Table 2 presents a summary of the potentially complete pollutant linkages at the site following the remediation and verification works undertaken as evidenced above.

Table 2 – Post-Remediation Pollutant Linkages Summary

Source	Pathway	Receptor	Remedial Action	Post-Remediation Status
Identified Potential Sources of Contamination as per the Remediation Method Statement	Direct Contact, ingestion and / or inhalation of Lead and PAH The pathways are viable where open ground is exposed following construction i.e. in soft landscaping areas. The pathways are appropriately mitigated where building floor slab or external hardstanding is constructed.	Human health (site end-users)	Construction of a clean cover layer in the west and southwest of the site, where areas of soft landscaping have been previously identified as at risk of the noted contaminants (see Section 3.2)	Pathway no longer viable. No further works required.

In summary, it is considered that remediation and verification of the identified potentially complete pollutant linkages has been achieved as per the requirements of the Remediation Strategy and that no further works are required for Phase 1.

5.0 CONCLUSIONS AND RECOMMENDATIONS

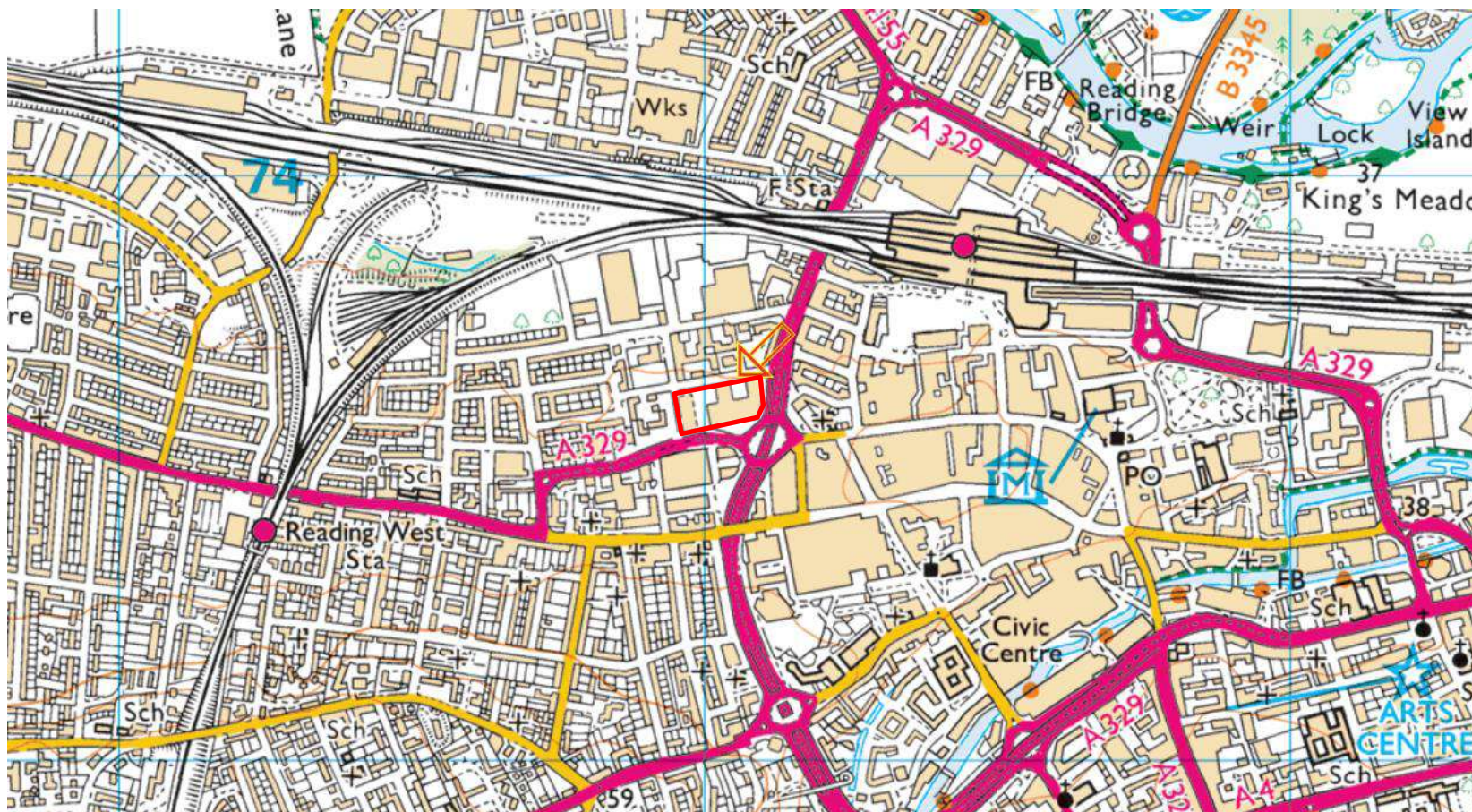
Based on the information provided by Henry Construction, and the geo-environmental soils sampling undertaken by Fairhurst, the remedial works for Phase 1 have achieved the aims set out in the Remediation Statement. As such, it is considered that the risks associated with the previously identified potentially complete pollutant linkages have been appropriately mitigated within this area of the site. The part of the site associated with Phase 1 is therefore considered 'suitable for use' in accordance with the National Planning Policy Framework.

In completing and validating the remediation works as presented in this report, it is considered that all outstanding requirements of Planning Condition 19 and Planning Condition 20 have been addressed (Planning Reference 170326) for Phase 1. This report should be issued to Reading Borough Council to support the partial discharge of the respective Planning Conditions.

Further works associated with subsequent Phases at the site will require the preparation of separate validation report(s).

This report should be included in the Health & Safety File for the operational site prior to occupation such that relevant information is available to future contractors and site management.

APPENDIX A – DRAWINGS



— Approximate Site Boundary

FAIRHURST

Weldale Street
Reading

Site Location Plan
(Not to Scale)

Remediation Method
Statement

Date:
26/04/19

Initials:
HB

Figure:
1



Do not scale from this drawing.		
SAFETY HEALTH AND ENVIRONMENTAL INFORMATION		
IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.		
RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.		
CONSTRUCTION		
DEMOLITION		
FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE		
IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.		

- Potential extent of elevated lead concentrations.
- Areas of soft landscaping requiring cover system.
- Elevated contaminant (lead / PAH) concentrations.
- Contaminant (lead / PAH) concentrations below acceptance criteria level.

Rev.	Date	Description	Drwn.	Chkd.	Appd.
FAIRHURST					
135 Park Street LONDON SE1 9EA					
Tel: 020 7828 8205 Fax: 084 4381 4412 Fairhurst.co.uk					
Client: Ropemaker Properties Ltd.					

Project Title:
**Weldale Street,
Reading**

Drawing Title:
Clean Capping Extent

Scale at A3: Not to Scale		Status: ISSUE	
Drawn: EY	Checked: DD	Approved: DD	
Date: 05/08/19	Date: 06/08/19	Date: 08/08/19	
Drawing No.: 112990 Figure 3			Revision: -

FAIRHURST

Key

25m grid lines

Inspection Pit **A1**



Do not scale from this drawing.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.

RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.

CONSTRUCTION

DEMOLITION

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

■ Potential extent of elevated lead concentrations.

■ Areas of soft landscaping requiring cover system.

● Elevated contaminant (lead / PAH) concentrations.

● Contaminant (lead / PAH) concentrations below acceptance criteria level.

Rev.	Date	Description	Drawn	Check	Appd.
1	08/02/2022	Initial Issue			

FAIRHURST

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**Ropemaker
Properties Ltd.**

Project No:
Weldale Street,
Reading

Clean Cover
Encapsulation System
Inspection Pit Plan

Date: 08/02/2022



KEY

Paving: Refer to drg. 1903-MWA-00-XX-DR-L-0010 for paving and edging layout.

PT1 Resin bound surfacing, 6mm aggregate in Scandinavian Pearl by Addagrip or similar approved.

PT3 Block paving, Marshalls Tegula 160x240x80mm in herringbone pattern, Harvest colour or similar approved.

PT4 Block paving, Marshalls Tegula 160x240x80mm in herringbone pattern, Pennant Grey colour or similar approved.

PT5 Concrete paving slabs, 450x450x50mm, Marshalls Conservation Smooth in Silver Grey or similar approved. **PT5A: Hazard Warning Slabs**

PT6 Wetpour rubber crumb safety surfacing, in EPDM Earth Blend.

PT7 Permeable block paving, Marshalls Tegula Priora 160x240x80mm in herringbone pattern, Pennant Grey colour or similar approved.

PT8 Asphalt surfacing to Engineer details

PT9 Paving bands: two rows of block paving as PT4 in stretcher bond

ST1 Granite-textured precast concrete step units, 150x350x500mm, silver grey colour with two inlaid delineation strips in black.

ET1 Precast concrete kerbs to Highway Engineer specification. To include transition kerbs and flush kerbs to crossing points.

ET2 Flexible metal edging: Kinley Systems or similar approved.

ET4 Precast 50mm flush concrete edging. Colour: natural.

Railings: Refer to 1903-MWA-00-XX-DR-L-drg. 0030 for walls layout.

R1 Defensible space railing, 1.1m ht. Jackson's Fencing 'Sentry' or similar approved galvanised steel vertical bar with flat bar top rail, RAL7015 Slate Grey painted finish. With matching 1m wide gates where shown.

R2 1.8m ht railing to match R1. With matching 1.2m width single gates / 3m width opening double gates where shown.

R3 800mm ht railing to match R1, fixed to top of wall (overall ht 1.1m)

R3B 1100mm ht railing to match R1, fixed to top of wall

R4 575mm ht railing to match R1, fixed to top of wall (overall ht 1.1m)

PS 1.8m ht glazed privacy screens

Walls: Refer to drg. 1903-MWA-00-XX-DR-L-0020 for walls layout.

W1 Concrete planter wall, fair-faced reinforced concrete in light grey smooth finish. Top of wall flush with finished level of planting area. Waterproofing and drainage panel to rear of wall to engineer specification.

W2 Brick faced retaining wall. Reinforced concrete with brick facing to match building. Smooth precast concrete coping with 45mm overhang and drip line, in light grey colour.

W3 Dwarf wall with railings, with brick facing to match building. Coping as W2.

W4 West boundary modular concrete retaining wall system to engineer specification. To be fitted with stainless steel cable climbing plant supports to provide a 'green wall' effect.

W5 Existing wall to be reduced in height, and clad with brick to match building.

Furniture: Refer to drg. 1903-MWA-00-XX-DR-L-0040 for furniture layout.

FT1 Timber slatted bench. Supplier: Benchmark or Similar Approved. Galvanised steel supports with RAL 7015 paint finish, with iroko timber slats - smooth planed finish. Size: 2330 x 600 x 450mm

FT2 Falco Kronos litter bin or similar approved. 50L. Powdercoated RAL 7015 (Slate Grey)

FT3 Bollards, Marshalls Geo or similar approved with brushed stainless steel finish. 140mm dia. x 1m ht above ground. R = removable.

FT4 Hardwood linear seating. Supplier: Benchmark or Similar Approved. Galvanised steel supports with RAL 7015 paint finish, with iroko timber slats - smooth planed finish. Size: 500mm x 450mm, length varies depending on location

FT6 Handrails. Alpha rail or similar approved, galvanised and painted RAL 7015 slate grey

FT7 Sheffield Cycle Stands, stainless steel

Soft Landscape: Refer to 1903-MWA-00-XX-DR-L-1900-1904 & 2900-2903 for details.

AG Amenity grass

WG Wildflower Lawn

H1 Hedge - 1m ht. formal hedges: Carpinus betulus, Taxus baccata

HP Herbaceous perennial planting & ornamental grasses.

SP Shrub planting.

CP Climber planting.

SS Specimen shrubs - Supplied at 1-1.5m ht.

T1 Small tree, multistem. Supplied at 2-2.5m ht.

T2 Medium tree, multistem. Supplied at 3.5-4m ht.

T3 Medium tree, clear stem. 25-30cm girth.

T4 Large tree, clear stem. 25-30cm girth.

T5 Extra-Large specimen tree, 35-40cm girth.

Rev.	Date	Revision Notes / Status	Drawn	Checked
03	08.07.19	General amendments	WB	MW
04	05.08.19	General amendments, NBS references	WB	MW
05	17.09.19	Amendments to AWW comments	WB	MW
06	10.10.19	TOW heights indicated	WB	MW
07	27.11.19	Fireman stops levels amended, temporary grass Weldale St	WB	MW
08	05.12.19	Bellmouth amended to S27S works	WB	MW
09	14.02.20	External levels south of A2 amended	WB	MW
10	14.01.22	Updated in line with current whole site drg (0001)	WB	MW
11	29.03.22	Note re south western entrance landscape area	WB	MW

Title: Weldale Street, Site Landscape General Arrangement Plan
Project: Weldale Street
Drg no: 1903-MWA-00-XX-DR-L-1001
Rev: 11 **Status:** C
Scale: 1:250@A1

Date: 01.05.2019
Client: Crossmark

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Drawing Status: SK - Sketch, I - Information, P - Planning, ER - Employers Requirements, T - Tender, CT - Contract, CO - Construction, AB-As Built

- All dimensions are in mm unless otherwise stated.
- All dimensions shall be checked on site prior to commencing the works and errors and omissions to be reported to Matthew Wigan Associates.
- Levels to be checked against Highway and Drainage Engineer levels details.
- All works shall conform to the current edition of the building regulations and other statutory requirements.
- All materials and workmanship shall conform with the relevant British Standard specifications and codes of practice.
- If this drawing forms part of an application for planning application on behalf of the client, it shall not be used for any other purpose without the express permission of Matthew Wigan Associates.
- This drawing may incorporate information from other professionals. Matthew Wigan Associates cannot accept responsibility for the integrity and accuracy of such information. Any clarification or additions that are required regarding such information should be sought from the relevant profession or their appointment representative.

1903-MWA-00-XX-SP-L-1001 Weldale Landscape Specification

Rev. 03

04 October 2019

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F30	Accessories/sundry items for brick/block/stone walling
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M	Surface finishes
M20	Plastered/rendered/roughcast coatings
M60	Painting/clear finishing
Q	Paving/Planting/Fencing/Site furniture
Q10	Kerbs/ edgings/ channels/ paving accessories
Q20	Granular sub-bases to roads/pavings
Q22	Asphalt roads/ pavings
Q23	Gravel/ Hoggins/ Woodchip/ Resin bound roads/ paving/ overlays
Q24	Interlocking brick/block roads/pavings
Q25	Slab/brick/sett/cobble pavings
Q26	Special surfacings/ pavings for sport/ general amenity
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D
Groundwork

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To be read with Preliminaries/General conditions

12 LIMITATIONS

The following clauses cover landscape works and topsoil handling only. To be read in conjunction with the relevant Engineer and Architect specifications.

GENERALLY/THE SITE

145 VARIATIONS IN GROUND WATER LEVEL

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

CLEARANCE/EXCAVATING

164 TREE ROOTS

- Protected area: Do not cut roots within precautionary protection area.
 - Size of area: Circle around each tree of radius 12 times trunk diameter, measured 1.5 m above ground level.
- Excavation in protected area:
 - Method: By hand.
 - 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: Not required.
- Backfill: As dug material, enriched with amelioration as section Q31.

168 SITE CLEARANCE

- Timing: Before topsoil stripping, if any.
- General: Clear site of rubbish, debris and vegetation. Do not compact topsoil.
- Treatment: Apply a suitable non-residual herbicide to areas to receive planting.

170 REMOVING SMALL TREES, SHRUBS, HEDGES AND ROOTS

- Identification: Clearly mark trees to be removed.
- Small trees, shrubs and hedges: Cut down
- Roots: Grub up and dispose of without undue disturbance of soil and adjacent areas
- Safety: Comply with HSE/ Arboriculture and Forestry Advisory Group safety leaflets.

175 FELLING LARGE TREES

- Definition: Girth over 600 mm.
- Identification: Clearly mark trees to be removed.
- Safety: Comply with HSE/ Arboriculture and Forestry Advisory Group safety leaflets.
- Felling: As close to the ground as possible.
- Stumps: Remove by stump grinding.
- Work near retained trees: Take down trees carefully in small sections to avoid damage to adjacent trees that are to be retained, where tree canopies overlap and in confined spaces generally.

180 CHIPPING AND SHREDDING

- General: Permitted, remove arisings from site.

220 STRIPPING TOPSOIL

- General: Before beginning general excavation or filling, strip topsoil from areas where there will be regrading, buildings, pavings/ roads and other areas shown on drawings.
- Depth:
 - Remove to an average depth of 300 mm.
 - Give notice where the depth of topsoil is difficult to determine.
- Handling: Handle topsoil for reuse or sale in accordance with clause 225.
- Around trees: Do not remove topsoil from below the spread of trees to be retained.
- Site storage: Keep separate from excavated sub-soil.

226 HANDLING TOPSOIL

- Standard: To BS 3882 and in compliance with with Construction code of practice for the sustainable use of soils on construction sites, DEFRA, 2009.
- Aggressive weeds:
 - Species: Included in the Weeds Act, section 2 or the appropriate Wildlife and Countryside Act for the relevant jurisdiction.
 - Give notice: Obtain instructions before moving topsoil.
- Contamination: Do not mix topsoil with:
 - Subsoil, stone, hardcore, rubbish or material from demolition work.
 - Other soil or material containing aggressive weeds, sharps, plastics and non soil forming materials and notifiable animal or plant diseases.
 - Oil, fuel, cement or other substances harmful to plant growth.
 - Other classifications of topsoil.
- Multiple handling: Keep to a minimum. Use topsoil immediately after stripping.

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.

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.

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 - locations to be agreed with Landscape Architect. To comply with Construction code of practice for the sustainable use of soils on construction sites, DEFRA, 2009 .

415 EXCAVATED TOPSOIL REMOVAL

- General: Remove from site.

420 TOPSOIL STORAGE HEAPS

- Location: To be agreed with Landscape Architect.
- Standard: To BS 3882.
- Height (maximum): To comply with Construction code of practice for the sustainable use of soils on construction sites, DEFRA, 2009.
- 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.

421 TOPSOIL STORAGE HEAP TREATMENT

- Treatment: Sow with perennial ryegrass and clover mix, sowing rate 20g/m² .

441 SURPLUS SUBSOIL

- Excavated material: Stockpile in temporary storage heaps.
- Retained material: Spread and level surplus subsoil on site.
 - Locations: to be agreed with landscape Architect .
 - Protected areas: Do not raise soil level within root spread of trees that are to be retained.
- Remaining material: Remove from site.

611 CONSOLIDATED FILLING FOR LANDSCAPE AREAS

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

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', clauses 801 and 803:
 - Crushed rock (other than argillaceous rock).
 - Crushed concrete.
 - Recycled aggregates.
 - Crushed non-expansive slag.
 - Well-burned non-plastic colliery shale.
- Amendments to requirements in Highways Agency 'Specification for highway works': None.
- Filling: To Highways Agency 'Specification for highway works', clause 802.

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

To be read with Preliminaries/General conditions.

- 12 DESIGNED CONCRETE SPECIALIST
Suitably experienced and qualified concrete contractor to complete work related to the visual concrete and formwork for the W1 Planter Walls.

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.
- 110 BASIC DESIGNATED CONCRETE FOR FOUNDATIONS / FOOTINGS
- Designation: FND2.
 - Coarse recycled aggregates: Not permitted.
 - Consistence class: Contractor's choice.
 - Additional requirements: Submit proposals.
- 130 VISUAL CONCRETE TO W1 CONCRETE PLANTER WALLS
Reinforcement to be confirmed by project Engineer.
Suitably qualified and experienced specialist concrete contractor to complete the work.
Trial panel as E20 606.
- 132 DESIGNED CONCRETE VISUAL CONCRETE FOR W1 CONCRETE PLANTER WALLS
- Embedded metal: Steel reinforcement to Engineer's specification.
 - Compressive strength class (cylinder/ cube minimum): .
 - Target density (oven-dry): .
 - Fibres: Not required.
 - Aggregates:
 - Size (maximum): 20 mm.
 - Type/ Density: Normal weight.
 - Coarse recycled aggregates: Not permitted.
 - Additional aggregate requirements: Not more than 20% to pass through 10mm sieve.
 - Design chemical class: Not applicable.
 - Limiting values for composition:
 - Water:cement ratio (maximum): 0.45.
 - Cement/ combination content (minimum): 350 kg/m³ .
 - Cement/ combination content (maximum): Not applicable.
 - Air content in situ (minimum): .
 - Consistence class: S3.
 - Permitted cement/ combinations: Contractor's choice.
 - Chloride class: .
 - Admixtures: Concrete producer's choice.
 - Colour: To match trial panel.
 - Additional mix requirements: To achieve consistent light grey, even matt finish with suitable strength and resistance to weathering. Refer to Clause E20 631 for visual concrete formwork.

MATERIALS, BATCHING AND MIXING

- 215 READY-MIXED CONCRETE
- Production plant: Currently certified by a body accredited by UKAS to BS EN ISO/IEC 17065 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.
- 225 CHANGES TO SPECIFICATION
- Changes to specification of fresh concrete (outside concrete producer's responsibility): Submit proposals .
- 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: To BS EN 206, Annex B.
 - 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.

530 TESTS RESULTS

- Submission of reports: Within one day of completion of each test.
 - Number of copies: 2.
- 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.

640 CONSTRUCTION JOINTS

- Location of joints: Submit proposals when not shown on drawings.
- Preparation of joint surfaces: Remove surface laitance and expose aggregate by lightly brushing and spraying. Joint surface to be clean and damp immediately before placing fresh concrete.

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.

820 CURING PERIODS FOR EXTERNAL CONCRETE

- 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%): 6 days when surface temperature is between 5°C and 10°C.
 - Intermediate conditions (relative humidity between 50 and 80%): 4 days when surface temperature is between 5°C and 10°C.
 - Damp weather, protected from sun and wind (relative humidity >80%): No special requirements.
- 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%): 10 days when surface temperature is between 5°C and 10°C.
 - Intermediate conditions (relative humidity between 50 and 80%): 6 days when surface temperature is between 5°C and 10°C.
 - Damp weather, protected from sun and wind (relative humidity > 80%): No special requirements.
- Curing periods: For concretes using admixtures or other types of cements/ combinations: Submit proposals.
- Other requirements: Increase curing period by any time during which surface temperature of concrete is less than 5°C.

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, etc.

850 ANTI GRAFFITI COATING / SURFACE SEALER

Apply to visible concrete surfaces after fully cured.
 Colour: Clear
 Finish: Matt

E20 Formwork for in situ concrete

To be read with Preliminaries/ General conditions.

- 12 DESIGNED CONCRETE SPECIALIST
Suitably experienced and qualified concrete contractor to complete work related to the visual concrete and formwork for the W1 Planter Walls.

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.

- 170 WORK BELOW GROUND
- - BASES;
 - - FOOTINGS; and
 - - FOUNDATIONS
 - Casting vertical faces against faces of excavation: Not permitted.
 - Requirements: Prevent contamination of concrete by loose soil.

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):
To BS EN 13670, clauses 5.7 and 8.5, and Annex F.
 - Assumptions: None.
 - Before removing formwork: Submit proposals if assumptions will not be realised.
 - Method to be used in assessing early age strength of concrete: To BS EN 13670, Annex F.

FORMED FINISHES

- 606 CONTROL SAMPLES (PART OF THE FINISHED WORK) W1 CONCRETE PLANTER WALLS
- Quality of finish: Special finish, see clause 630.
 - Location: Obtain instructions.
 - Area (minimum): 1m x 0.5m ht trial section of wall.
 - Features to be included: radiused section, top profile of wall with arrises.
 - Viewing distance (maximum): 2m.
 - Approval of appearance: Obtain before proceeding with remainder of the work.
- 610 BASIC FINISH
- Location: Faces below ground level.
 - Finish: Faces fully compacted and cover to reinforcement provided.

631 SPECIAL FINISH

- Location: W1 CONCRETE PLANTER WALLS.
- Finish: Smooth, even matt finish. Formwork panels as large as practicable. Arrange in a regular pattern as a feature of the surface. Flexible formwork panels to achieve required radii to curved walls.
 - Tie bolt arrangement: Evenly spaced, aligned with each other, equal number per board
 - Top of wall: Weathered towards planting bed
 - Arrises: 10mm arrises to edges and corners
- Permissible deviation of surfaces:
 - Sudden irregularities (maximum): 3 mm.
 - Gradual irregularities (maximum): 3 mm when measured from the underside of a 1 m straightedge, placed anywhere on surface.
- Variations in colour:
 - Permitted: None.
 - Not permitted: Those caused by contamination, grout leakage and replacement of formwork panels.
- Cover spacers: In same concrete to match finish, to minimise visual impact. Submit proposals.
- 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: Prohibited.

641 PROTECTION

Finished walls are to be protected during and after the curing process so that:

- Concrete has sufficient moisture held within it to cure fully
 - Concrete walls are protected from impact and damage from other construction activities
- Protection measures should ensure that they do not affect or damage the finish of the walls.

F
Masonry

F10 Brick/ block walling

To be read with Preliminaries/ General conditions.

10 STATUS OF TENDER INFORMATION

The Matthew Wigan Associates drawings indicate the design in terms of design intent and general arrangement. Foundation and structural design is to be confirmed by the project engineer, ensuring compliance with the relevant British Standards / Eurocodes.

TYPES OF WALLING

110 CLAY FACING BRICKWORK TO ALL BRICK FACING TO MIN. 150mm BELOW GROUND LEVEL

- Bricks: To BS EN 771-1.
 - Manufacturer: Contractor's choice.
 - Product reference: F2 class bricks to match bricks used in housing units.
 - Recycled content: Contractor's choice.
 - Special shapes: None.
- Mortar: As section Z21.
 - Standard: To BS EN 998-2.
 - Mix: 1:5 masonry cement:sand.
 - Additional requirements: Coloured to match mortar used in buildings.
- Bond: Half lap stretcher.
- Joints: Recessed.
- Features: Concrete foundations and steel reinforcement to engineer specification. Copings and pier caps as section F31. Retaining walls: plastic weepholes at min. 2m centres, free draining granular fill and continuous DPC to rear face.

WORKMANSHIP GENERALLY

430 CONDITIONING OF CLAY AND CALCIUM SILICATE BRICKS AND CLAY BLOCKS

- Bricks and blocks delivered warm from manufacturing process: Do not use until cold.
- Absorbent bricks in warm weather: Wet to reduce suction. Do not soak.

500 LAYING GENERALLY

- Mortar joints: Fill vertical joints. Lay bricks, solid and cellular blocks on a full bed.
- AAC block thin mortar adhesive and gypsum block adhesive joints: Fill vertical joints. Lay blocks on a full bed.
- Clay block joints:
 - Thin layer mortar: Lay blocks on a full bed.
 - Interlocking perpend: Butted.
- 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.

580 LAYING FROGGED BRICKS

- Single frogged bricks: Frog uppermost.
- Double frogged bricks: Larger frog uppermost.
- Frog cavity: Fill with mortar.

635 JOINTING

- Profile: Consistent in appearance.

645 ACCESSIBLE JOINTS NOT EXPOSED TO VIEW

- Jointing: Struck flush as work proceeds.

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

745 MASONRY SAMPLE PANELS

- Sampling frequency: A panel for each type and delivery of masonry unit.
- Selection of masonry units: Reasonably representative of the average quality of the whole order to be delivered .
- Panel types: As clause 740.

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.

- 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.

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

- 5 CAVITIES
- Concrete fill to base of cavity:
 - Concrete generally: To BS EN 206 and BS 8500-2.
 - Concrete type: Designated GEN1 or Standardized prescribed ST2 mix 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.
- 44 DAMP PROOF COURSE - BITUMEN BASED
- Standard: To BS 6398.
 - Class: A .
 - Manufacturer: Contractor's choice .
 - Product reference: DPC to Copings .
- 46 DAMP PROOF COURSE - POLYETHYLENE
- Standard: To BS 6515.
 - Manufacturer: - .
 - Product reference: Continuous DPC to rear of Retaining Walls .
- 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 GENERALLY
- Overlaps and junctions: Seal with Adhesive recommended by dpc manufacturer .
- 74 INSTALLATION OF VERTICAL DPCS
- Form: In one piece wherever possible.
 - Joints: Upper part overlapping lower not less than 100 mm.
 - Dpcs to jambs of openings: Fully lap behind cavity tray/ lintel at head and over horizontal dpc at sill. Project not less than 25 mm into cavity and maintain full contact with frames.
 - Fixing of jamb dpcs to back of built in timber frames: Secure using galvanized clout nails or staples.

F31 Precast concrete sills/lintels/copings/features

- 2

PRECAST CONCRETE COPINGS TO W2 and W3 WALLS

 - Manufacturer: Submit proposals .
 - Size: 450mm width, 75mm / 100mm ht single weathered, 600mm length .
 - Finish to visible faces: Light grey, smooth finish .
 - Special units: End units
 - Other requirements: Ensure 45mm overhang. Drip groove to underside c.25mm from edge. Securely fix with stainless steel dowels .
- 3

PRECAST CONCRETE COPINGS TO W4 WALL

 - Manufacturer: Submit proposals .
 - Size: To suit TensarTec retaining wall system .
 - Finish to visible faces: As cast .
 - Special units: End units
 - Other requirements: None .
- 4

PRECAST CONCRETE COPINGS TO W5 WALL

 - Manufacturer: Submit proposals .
 - Size: 550mm width, 75mm / 100mm ht single weathered, 600mm length .
 - Finish to visible faces: Light grey, smooth finish .
 - Other requirements: Special end units. Ensure 45mm overhang. Drip groove to underside c.25mm from edge. Securely fix with stainless steel dowels .
- 41

LAYING

 - Mortar for bedding and jointing: As section Z21.
 - Type: Site batched and mixed.
 - Mix: As used for adjacent work.
 - Bedding components: On full bed of mortar. Apply bond bridge to underside of coping.
 - Bedding one piece sills/ thresholds: Leave clear of mortar except at end bearings and beneath masonry mullions.
 - On completion: Point with mortar to match adjacent work.

M
Surface finishes

M20 Plastered/rendered/roughcast coatings

- 19 PROPRIETARY RENDER To reverse face of Wall Type W5 (side nearest the southern elevation of Block A)
- Substrate: Concrete blockwork.
 - Preparation: Bonding treatment recommended by the render manufacturer.
 - Manufacturer: Contractor's choice.
 - Undercoats:
 - Product reference: Contractor's choice.
 - Thickness (excluding dubbing out and keys): First coat 8-12 mm and second coat 6-10 mm.
 - Final coat:
 - Product reference: Submit proposals.
 - Thickness: 5-8 mm.
 - Finish: Plain.
- 67 COLD WEATHER
- Internal work: Take precautions to prevent damage to internal coatings when air temperature is below 3°C.
 - External work: Avoid when air temperature is at or below 5°C and falling or below 3°C and rising.
- 71 SUITABILITY OF SUBSTRATES
- General: Suitable to receive coatings. Sound, free from contamination and loose areas.
- 82 BEADS/ STOPS
- Location: External angles and stop ends.
 - Materials:
 - External render: Stainless steel.
 - Internal plaster/ render: Galvanized steel.
 - Fixing: Secure and true to line and level.
 - Beads/ stops to external render: Fix mechanically.
- 87 APPLICATION OF COATINGS
- General: Apply coatings firmly and achieve good adhesion.
 - Appearance of finished surfaces: Even and consistent. Free from rippling, hollows, ridges, cracks and crazing.
 - Accuracy: Finish to a true plane with walls and reveals plumb and square.
 - Drying out: Prevent excessively rapid or localized drying out.
 - Keying undercoats: Cross scratch (plaster coatings) and comb (render coatings). Do not penetrate undercoat.
- 93 CURING AND DRYING OF RENDER COATINGS
- Curing: Keep each coat damp by covering with polyethylene sheet and/ or spraying with water
 - Curing period (minimum): as recommended by manufacturer .
 - Drying: Allow each coat to dry thoroughly, with shrinkage substantially complete before applying next coat.
- 99 RENDER FINAL COAT - PLAIN FLOATED FINISH
- Finish: Even, open texture free from laitance.

M60 Painting/clear finishing

- 13 METAL PAINT TO RAILINGS AND METALWORK
- Manufacturer: Contractor's Choice.
 - Product reference: Contractor's Choice, suitable external metalwork paint; RAL 7015 'Slate Grey'.
 - Surfaces: Preprimed and sealed.
 - Preparation: Degrease and provide key.
 - Initial coats: As recommended by manufacturer.
 - Number of coats: To manufacturer recommendations.
 - Undercoats: As recommended by manufacturer.
 - Number of coats: To manufacturer recommendations.
 - Finishing coats: Full gloss.
 - Number of coats: To manufacturer recommendations.
- 17 WOOD PROTECTION TO ALL UNPAINTED EXTERNAL TIMBER
- Manufacturer: Osmo (<https://www.osmouk.com>).
 - Product reference: Osmo UV protection oil: natural, or similar approved..
 - Application: To be applied in accordance with manufacturer's recommendations, including number of coats, time between applications, appropriate weather conditions and surface preparation etc.
- 30 PREPARATION GENERALLY
- Standard: In accordance with BS 6150.
 - Refer to any pre-existing CDM Health and Safety File and CDM Construction Phase Plan where applicable.
 - 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.
- 41 MASONRY AND RENDERING PREPARATION
- Loose and flaking material: Remove.
- 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.
- 170 MASONRY COATING To Rendered Walls
- " Manufacturer: Sandtex Trade, product of Crown Paints Ltd, or similar approved
Web: www.sandtextrade.co.uk
" Product reference: 365 All Weather Smooth Masonry
" Colour: Vermont Grey

Q

Paving/Planting/Fencing/Site furniture

Q10 Kerbs/ edgings/ channels/ paving accessories

To be read with Preliminaries/General conditions.

TYPES OF KERBS/EDGINGS AND CHANNELS

- 111 PROPRIETARY METAL EDGE TYPE ET2 METAL EDGING
- Manufacturer: Kinley Systems.
 - - Product reference: AluExcel 100mm Edging: 101022 (Flexible) to curves, 101023 (Rigid) to straight sections.
 - Size (height): 100mm.
 - Special shapes: .
 - Finish: As cast.
 - Colour: Natural.
 - Bedding: Cement mortar.
 - Accessories: Spiral fixing screws.
- 113 PRECAST CONCRETE KERBS
- Refer to Highway Engineer proposals and specification
- Manufacturer: Marshalls or similar approved
- Product reference: Half Battered Kerb
- Standard: To BS EN 1340.
 - Recycled content: Contractor's choice.
 - Size (width x height x length): 255 x 125 x 915 mm.
 - Special shapes: Radius kerbs, quadrant kerbs to 90 degree corners, transition kerbs and dropper kerbs to footway crossings.
 - Finish: As cast.
 - Bedding: Fresh concrete races.
 - Joints generally: Dry, 2-3 mm gap.
 - Sealant movement joints: Not required.
 - Accessories: None.
- 116 PRECAST CONCRETE ET4 PCC FLUSH 50mm EDGING
- Manufacturer: Marshalls or similar approved
- Product reference: Flat Top Edging or similar approved
- Standard: To BS EN 1340.
 - Recycled content: Contractor's choice.
 - Size (width x height x length): 50 x 200 x 915mm.
 - Special shapes: None.
 - Finish: As cast.
 - Bedding: Fresh concrete races.
 - Joints generally: Dry, 2-3 mm gap.
 - Sealant movement joints: Not required.
 - Accessories: None.
- 181 DRAINAGE CHANNEL SYSTEMS WITH GRATINGS
- To Drainage Engineer specification and layout
 - Gratings:
 - Load class D400 (Cars, vans and HGV's, not suitable for carriageways or public roads): 'Heelguard' ductile iron grating.

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.
- 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.
- 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.

Q20 Granular sub-bases to roads/pavings

To be read with Preliminaries/ General conditions.

- 12 NB
To be read in conjunction with Fairhurst External Works Details (drawing no. 112990 - 1202) and specification.
Sub-bases on Podium Deck structure: Confirm build-up requirements and laying method with AWW and manufacturer of Podium Deck waterproofing and drainage system.
- 111 THICKNESSES OF SUB-BASE/ SUBGRADE IMPROVEMENT LAYERS
- Thicknesses:
 - To Engineer Specification.
- 120 CHECKING OF SUBGRADES
- Anticipated subgrade conditions:
 - Soil type: Refer to Engineer's Reports.
 - Plasticity index: Refer to Engineer's Reports.
 - CBR (minimum): Refer to Engineer's Reports.
 - Depth below formation level to groundwater table: Refer to Engineer's Reports.
 - Subgrade variation: If material appears to vary from anticipated conditions, or if there are extensive soft spots, report condition and submit proposals .
 - Submit: Results and obtain instructions before proceeding.
- 140 EXCAVATION OF SUBGRADES
- Final excavation to formation or subformation level: Carry out immediately before compaction of subgrade.
 - Soft spots and voids: Give notice.
 - Old drainage and service trenches: Excavate to remove soft or damaged material, then backfill with specified granular sub-base material and compact..
 - 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: Excavate and replace with sub-base material, compacted in layers 300 mm (maximum) thick.
 - 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: Contractor's choice .
 - Product reference: .
 - Jointing: 300 mm overlap .
 - 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.
- 200 SUBGRADE IMPROVEMENT LAYER (CAPPING)
- Material: To Highways Agency 'Specification for highway works', table 6/1, Class To Engineer Specification.
 - 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.
- 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: Permitted.
- 216 COARSE GRADED AGGREGATE FOR PERMEABLE PAVING PERMEABLE BLOCK PAVING.
- Material: To Engineer specification.
 - Standard: To BS EN 13242 and paving manufacturer's recommendations.
 - Laying: Lay in 100-150 mm thick layers and lightly compact to ensure maximum density and aggregate interlock without crushing individual particles or unacceptably reducing the void ratio.
 - Protection: Prevent damage by traffic and contamination by mud and soil.
 - Refer to Fairhurst External Works Details (drawing no. 112990 - 1202) and specification
- 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.

251 LAYING GRANULAR SUB-BASES FOR PEDESTRIAN / MEWP ACCESS AREAS

- 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.
- Sub-bases on Podium Deck structure: Confirm build-up requirements and laying method with AWW and manufacturer of Podium Deck waterproofing and drainage system.

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: ± 20 mm.
 - Footways and recreation areas: ± 12 mm .

320 SURFACES TO RECEIVE SAND BEDDING FOR PAVING TO SECTIONS Q24 and Q25.

- Blind surface: As necessary before compaction to ensure that surface is tight and dense enough to prevent laying course sand being lost into it during construction or use.
- Material: Fine stuff of the same nature as the sub-base material.

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

To be read with Preliminaries/ General conditions.

TYPES OF PAVING

- 100 GENERAL
Project engineer's specification and drawings to take priority over clause 110 and 115.
- 110 ASPHALT CONCRETE PAVING TO ALL ROADS
- Standard: To Highways Agency (HA) 'Specification for highway works'.
 - Subgrade improvement layer: To engineer specification.
 - Compacted thickness: To engineer specification.
 - Geotextile: Not required.
 - Manufacturer: Not applicable.
 - Product reference: Not required.
 - Granular sub-base: Highways Agency Type 1 unbound mixture, as section Q20.
 - Compacted thickness: To engineer specification.
 - Base: AC 32 dense base.
 - Paving grade: 40/60.
 - Compacted thickness: To engineer specification.
 - Binder course: AC 20 dense bin.
 - Paving grade: 40/60.
 - Compacted thickness: To engineer specification.
 - Surface course: AC 10 close surf.
 - Paving grade: 40/60.
 - Slip/ Skid resistance: PTV to BS 7976-2 of 40 (water) wet.
 - Compacted thickness: To engineer specification.
 - Reclaimed content:
 - Standard: To BS EN 13108-8.
 - Value (maximum): Contractor's choice.
 - Surface treatment: Not required.
 - Other requirements: -.
- 115 ASPHALT CONCRETE PAVING TO FOOTWAYS
- Standard: To Highways Agency (HA) 'Specification for highway works'.
 - Subgrade improvement layer: To engineer specification.
 - Compacted thickness: To engineer specification.
 - Geotextile: Not required.
 - Manufacturer: Not applicable.
 - Product reference: Not required.
 - Granular sub-base: To engineer specification.
 - Compacted thickness: To engineer specification.
 - Binder course: To engineer specification.
 - Paving grade: To engineer specification.
 - Compacted thickness: To engineer specification.
 - Surface course: AC 10 close surf.
 - Paving grade: 40/60.
 - Slip/ Skid resistance: PTV to BS 7976-2 of 40 (water) wet.
 - Compacted thickness: To engineer specification.
 - Reclaimed content:
 - Standard: To BS EN 13108-8.
 - Value (maximum): Contractor's choice.
 - Surface treatment: Not required.
 - Other requirements: .
- PREPARATORY WORK/ REQUIREMENTS**
- 220 BITUMINOUS MATERIALS GENERALLY
- Suppliers names: Submit.
 - Timing (minimum): Two 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.
- 240 ACCEPTANCE OF SURFACES
- Surface: Sound, clean and suitably close textured.
 - Level tolerances: To BS 594987.
 - 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 hot applied 40/60 paving grade bitumen.
 - 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 594987, clause 5.2.

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.
 - Adhesion: Tack coat to BS 434-1 or BS EN 13808.
 - Application rate: As manufacturer's recommendation.
 - Accuracy: Uniform, without puddles.
 - Finishing: Allow emulsion to break completely before applying surface.

COMPLETION**390 DOCUMENTATION**

- Standard: BS EN 13108-1.
 - Declaration of conformity: Submit.
- Number of copies: 2.
- Submission: Two weeks prior to date when Contractor expects work to be complete.

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

To be read with Preliminaries/ General conditions.

TYPES OF SURFACING**225 PROPRIETARY RESIN BOUND CHIPPINGS PAVING TYPE PT1**

- Subgrade improvement layer: Refer to Engineer specification.
 - Compacted thickness: .
- Geomembrane: Refer to Engineer specification.
 - Manufacturer: .
 - Product reference: .
- Granular sub-base: Highways Agency Type 1 unbound mixture to Engineer specification.
 - Compacted thickness: .
- Water collection: Not required .
- Geotextile: Edging strip, 500 mm wide.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Base course: Dense binder course to Engineer specification.
- Surface course:
 - Manufacturer: Addagrip or similar approved.
 - Product reference: Addaset Resin Bound Surfacing: Scandinavian Pearl 6mm.
 - Slip/ skid resistance: PTV to BS 7976-2 of 45 (water) wet.
 - Binder: Epoxy resin.
 - Chippings: Scandinavian Pearl.
 - Colour: Warm grey.
 - Aggregate size: 6mm.
 - Mix ratio (binder:aggregate): To manufacturer's recommendation.
- Application: Thoroughly mixed and uniformly spread.
 - Spreading rate: To manufacturer's recommendation.
 - Thickness: 20 mm.
 - Compaction to all layers: By heavy roller or other appropriate means, adequate to resist subsidence or deformation of the completed roads/ pavings when in use.

LAYING**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.

390 PROTECTION FROM TRAFFIC AND PLANT

- Paved areas: Restrict access to prevent damage.

COMPLETION**400 SLIP RESISTANCE TESTING**

- Surfaces to be tested: PT1 Resin Bound Surfacing.
 - Surface condition: Dry and wet.
- Timing: Post final clean, prior to handover.
- Period of notice (minimum): 3 working days.
- Test standard: To BS 7976.
 - Testing authority: An approved laboratory.
 - Witnessing/ Certification: Arrange for tests to be witnessed/ certified by: Project manager.
 - Report: Submit.
 - Format: As required under BS 7976.

Q24 Interlocking brick/block roads/pavings

To be read with Preliminaries/ General conditions

TYPES OF PAVING

110A CONCRETE BLOCK PAVING PAVING TYPE PT3

- Subgrade improvement layer: To engineer's specification.
 - Compacted thickness: To engineer's specification .
- Granular sub-base: Highways Agency Type 1 unbound mixture, to Engineer specification.
 - Compacted thickness: To engineer's specification.
- Laying course:
 - Material: To engineer's specification.
- Blocks: To BS EN 1338.
 - Manufacturer: Marshalls or similar approved.
Product reference: Tegula or similar approved.
 - Sizes: Plan size 240 x 160mm, 80mm depth.
 - Special blocks: None.
 - Arrises: Unchamfered.
 - Colour/ Finish: Harvest.
 - Recycled content: Contractor's choice.
 - Requirements: .
Freeze/ thaw resistance: Class 1.
Abrasion resistance: .
Slip/ Skid resistance: .
- Jointing:
 - Material: Dry sand to BS 7533-3, clause 5.4.4.1
 - Joint width: 2-3mm.
- Sealer/ Stabilizer: Not required.
- Setting out:
 - Bond: 90° herringbone.
 - Adjust bond to ensure that no unit is cut to <100mm. Cut edge blocks with circular saw to ensure clean running lines to edge of paving.
 - Features: Two course stretcher bond margins.
- Accessories: [Recessed manhole covers where required - see Q25 462].

110B CONCRETE BLOCK PAVING PAVING TYPE PT4

- Subgrade improvement layer: To engineer's specification.
 - Compacted thickness: To engineer's specification .
- Granular sub-base: Highways Agency Type 1 unbound mixture, to Engineer specification.
 - Compacted thickness: To engineer's specification.
- Laying course:
 - Material: To engineer's specification.
- Blocks: To BS EN 1338.
 - Manufacturer: Marshalls or similar approved.
Product reference: Tegula or similar approved.
 - Sizes: Plan size 240 x 160mm, 80mm depth.
 - Special blocks: None.
 - Arrises: Unchamfered.
 - Colour/ Finish: Pennant Grey.
 - Recycled content: Contractor's choice.
 - Requirements: .
Freeze/ thaw resistance: Class 1.
Abrasion resistance: .
Slip/ Skid resistance: .
- Jointing:
 - Material: Dry sand to BS 7533-3, clause 5.4.4.1
 - Joint width: 2-3mm.
- Sealer/ Stabilizer: Not required.
- Setting out:
 - Bond: 90° herringbone.
 - Adjust bond to ensure that no unit is cut to <100mm. Cut edge blocks with circular saw to ensure clean running lines to edge of paving.
 - Features: Two course stretcher bond margins.
- Accessories: [Recessed manhole covers where required - see Q25 462].

114 PERMEABLE CONCRETE BLOCK PAVING - TOTAL INFILTRATION PT7 TYPE PAVING

- Subgrade improvement layer: To engineer specification.
 - Compacted thickness: To engineer specification.
- Geotextile below granular sub-base: To engineer specification.
- Granular sub-base: To engineer specification.
 - Compacted thickness: To engineer specification.
- Laying course:
 - Material: To engineer specification.
 - Compaction: In accordance with BS 7533-3. Determine by trial the depth of loose bedding material needed to ensure specified bedding course thickness after final compaction of paving.
 - Nominal thickness after compaction: To engineer specification.
- Blocks: To BS EN 1338.
 - Manufacturer: Marshalls or similar approved.
 - Product reference: Tegula Priora.
 - Sizes: 240 x 160 x 80 mm.
 - Special blocks: White marker blocks to demarcate bays.
 - Spacer nibs: required.
 - Arrises: Unchamfered.
 - Colour/ Finish: Pennant Grey.
 - Recycled content: Contractor's choice.
 - Requirements: .
 - Freeze/ thaw resistance: Class 1.
 - Abrasion resistance: .
 - Slip/ Skid resistance: .
- Jointing:
 - Material: To engineer specification.
 - Joint width: To engineer specification.
 - Conventional sand jointing: Do not use.
- Setting out:
 - Bond: 90° herringbone.
 - Features: Two course stretcher bond margins.
 - Adjust bond to ensure that no unit is cut to <100mm. Cut edge blocks with circular saw to ensure clean running lines to edge of paving.
- Accessories: Recessed manhole covers where required - see Q25 462. Thermoplastic markings to demarcate disabled bay and car club bay.

EXECUTION**200 EXECUTION GENERALLY - CONCRETE BLOCK AND CLAY PAVER PAVING**

- Standard: In accordance with BS 7533-3.

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 all blocks/ pavers/ setts that are representative of colour and appearance.

230 CONTROL SAMPLES

- General: Carry out sample area of finished work:
 - Location: As directed by Landscape Architect.
 - Size (minimum): 3.0 x 3.0 m.
 - Features to be included:
 - Channel;
 - Edging; and
 - Kerb.
- 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.

430 SEALANT MOVEMENT JOINTS IN MORTAR BEDDED UNITS

- Spacing: To Engineer's specification.
- Extent of joints: .
- Joint filler: Compressible cellular rubber or plastics compatible with specified sealant. Build in as work proceeds.
 - Joint width: .
- 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: .
 - Colour: .
 - 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: 1000 mm.
- Jointing: Lap by 300 mm.
- Edge detail: Turn sheet up to form an upstand fitted neatly against features.
 - Height (minimum): Thickness of sand laying course.

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: Do not use.
- 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.

496 INTERFACE WITH LIGHTING, FENCING POSTS AND FURNITURE

- Locations: Refer to Lighting Supplier's layout drawing for lighting locations, and drawing no. MWA-16.03-001 for furniture.
- In-ground and Bollard Lighting: Allow for the placing of lighting power connections as advised by the Lighting Supplier prior to laying sub-base and laying course. Paving units to be core-drilled to allow placement of in ground lights and lighting bollards, to ensure a neat final appearance with no visible joints. In ground light positions to be adjusted (in alignment with the other units) by the minimum amount required to allow core drilling of the paving unit.
- Fencing and furniture posts: Paving to be neatly cut around posts with minimal (<10mm) visible mortar joints.

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

To be read with Preliminaries/ General conditions.

GENERAL

- 111 PCC STEP SYSTEM ST1 TYPE STEP UNITS
- Base: Concrete base to engineer specification.
 - Laying course: Ready mixed mortar.
 - Accessories: Primer for underside of flags or slabs.
 - Step units: Tobermore precast concrete 'Granite Step Units' step units in silver colour or similar approved, 350 x 150 x 750mm square profile. To be laid staggered to provide 300mm treads.
 - Jointing: Ready mixed mortar.
 - Bond: Staggered joints.
 - Accessories: Black delineation strip to nosings (tread and riser).
- 120 CONCRETE FLAG PAVING SYSTEM PAVING TYPE PT5: PCC SLAB PAVING TO FOOTWAYS AND TERRACES
- Subgrade improvement layer: To Engineer's specification.
 - Compacted thickness: .
 - Granular sub-base: Highways Agency Type 1 unbound mixture, to Engineer specification.
 - Compacted thickness: .
 - Base: To Engineer's specification.
 - Thickness: .
 - Laying course: To Engineer's specification.
 - Accessories: None.
 - Paving units: Concrete flags.
 - Jointing: Sand.
 - Bond: Half lap staggered.
 - Accessories: None.

PRODUCTS

- 311 PCC STEP UNITS ST1 TYPE STEP UNITS
- Supplier: Tobermore or Similar Approved.
 - Product reference: Granite PCC Step Units or Similar Approved.
 - Finish: Textured.
 - Sizes: 350 x 150 x 500mm.
 - Arrises: Square.
 - Slip resistance: PTV to BS 7976-2 of 40.
 - Accessories: Black delineation strip to nosings (tread and riser). Hazard warning paving to top and bottom of steps as clause 320.
- 315 CONCRETE FLAGS PAVING TYPE PT5: PCC SLAB PAVING TO FOOTWAYS AND TERRACES
- Standard: To BS EN 1339.
 - Manufacturer: Marshalls or similar approved.
 - Product reference: Conservation Smooth or similar approved.
 - Recycled content: Contractor's choice.
 - Colour: Silver Grey.
 - Finish: Coarse textured.
 - Nominal sizes: 450 x 450 x 50 mm.
 - Arrises: .
 - Water absorption and freeze/ thaw resistance class: .
 - Bending strength class: .
 - Abrasion resistance class: .
 - Slip/ Skid resistance: PTV to BS 7976-2 of 40.
 - Breaking load class: .
- 320 TACTILE FLAGS AND SLABS FOR TOP AND BOTTOM OF STEPS WHERE SHOWN
- Standard: To DD CEN/TS 15209.
 - Material: Precast concrete.
 - Manufacturer: Marshalls or Similar Approved.
 - Product reference: Textured Hazard Warning Paving.
 - Recycled content: Not applicable.
 - Nominal sizes: 400 x 400 x 50mm (2no. courses).
 - Colour: Buff.
 - Type of surface: Rib – type R2.
- 390 SAND FOR FLEXIBLE LAYING COURSE AND JOINTING OF CONCRETE FLAG PAVING PAVING TYPE PT5.
- Standard: To BS 7533-4, unbound construction laying course and jointing material.
 - Purity: Free from deleterious salts, contaminants, lime and cement.
 - Procurement: Obtain from one source and ensure consistent grading.
- 462 ACCESS COVERS
- Manhole covers to be recessed galvanised steel with suitable tray depth to accommodate paving. Rotate all access covers so that they are perpendicular to the main paving course. Blocks within the access covers are to run in the same direction as the surrounding paving. Size of access covers to be confirmed. Courses and bond to continue through cover. Small access covers where a recessed cover is impractical and drainage gullies - fix cover perpendicular with main paving course and minimise cuts to paving.

EXECUTION

- 610 MATERIAL SAMPLES
- Samples representative of colour and appearance of designated materials: Submit before placing orders.
 - Designated materials: All pavings.

- 615 CONTROL SAMPLES
- Sample areas: Complete as part of the finished work.
 - Types of paving: Natural stone slab paving and Natural stone sett paving.
 - Location: As directed by Landscape Architect.
 - Size (minimum): 3.0 x 3.0 m.
 - Included features: Edging.
 - 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: ± 6 mm.
 - Height of finished paving above features:
 - At gullies: +6 to +10 mm.
 - At drainage channels and kerbs: +3 to +6 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): 4 days.
 - Vehicular traffic (minimum): 10 days.
 - Access: Restrict access to paved areas to prevent damage from site traffic and plant.
- 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.

675 LAYING GEOTEXTILE SHEET EDGING STRIPS

- Location: Immediately below sand laying course, abutting features which interrupt the laying course, including:
 - Perimeters/ Edge restraints/ Kerbs.
 - Other types of paving.
 - Drainage fittings, e.g. channels and manholes.
- Edge detail: Turn sheet up to a height not less than thickness of sand bedding to form an upstand fitted neatly against features.
- Width: 1000 mm.
- Jointing: Lap by 300 mm.

680 LAYING GEOTEXTILE SHEET PATCHES OVER DRAINAGE HOLES

- Laying: Lay geotextile patches on the base, centred over each hole.
 - Size of patch: 500 x 500 mm.

710 LAYING FLAG AND SLAB PAVING - SAND LAYING COURSE AND JOINTING

- Standard: In accordance with BS 7533-4.
- Flag installation and cutting: To Interpave 'Concrete flag paving'.
- Laying course:
 - Nominal thickness after compaction: To engineer specification.
- Joint width: 2-5 mm.

COMPLETION**915 COMPLETION OF PAVING WITH DRY SAND OR FINE AGGREGATE FILLED JOINTS**

- Sand dressing: Leave a thin layer of dry jointing sand over the paving until opened to public access.
- Final compaction of the surface course: In accordance with BS 7533-3.
- Vacuum cleaning machines: Not allowed.

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
- 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.
- 341 WETPOUR RUBBER SURFACING
- Sub-base: Type 1 sub base, refer to Engineer Proposals.
 - Thickness: Refer to Engineer Proposals.
 - Base: DBM base to Engineer Specification.
 - Thickness: Refer to Engineer Proposals.
 - Surface course: Impact absorbing wetpour EPDM rubber.
 - Standard: To BS 7188.
 - Manufacturer: Playtop or similar approved.
 - Product reference: Playtop Safer Surfacing or similar approved.
 - Colour: EPDM Earth Blend.
 - Critical fall height when tested to BS EN 1177: 1.0 m.
 - 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.
- 430 EDGES
- Finish: Flush.
 - Edge detail: Metal edging as section Q10 111..

EXECUTION**COMPLETION**

- 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 and soil ameliorants

To be read with Preliminaries/ General conditions.

SYSTEM OUTLINE

110 NATURALLY OCCURRING TOPSOIL SYSTEM FOR PLANTING AREAS, TREE PITS AND AMENITY GRASS

- Topsoil: Imported topsoil to BS 3882.
- Ameliorants: None.
- Accessories: None.

PRODUCTS

300 PREPARATION MATERIALS GENERALLY

- Purity: Free of pests and disease.
- 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.

316 IMPORTED TOPSOIL TO BS 3882:2015 TO PLANTING BEDS AND GRASSED AREAS (EXCEPT PODIUM DECK PLANTING)

- Quantity: Provide as necessary to make up any deficiency of topsoil existing on site and to complete the work.
- Standard: To BS 3882.
- Classification: Multipurpose.
 - Grade: BS3882:2015 Multipurpose Grade. Textural class: Sandy Loam.
 - To be free of weed roots, large stones and foreign matter
- Source: Submit proposals.
 - Product reference: Contractor's choice.
- Depths:
 - Amenity grass areas: 150mm
 - Planting beds and tree pits: 300mm

331 IMPORTED MANUFACTURED SUBSTRATE TO PODIUM DECK PLANTING, INCLUDING RAISED PLANTERS

- Type: Lightweight Intensive Substrate.
 - Material: Recycled crushed brick, expanded clay, shale, composted pine bark.
- Maximum saturated weight: $\approx 1,250 \text{ kg/m}^3$
- Water storage by volume: 35%
- pH value: 6-8.5
- Source: Bauder or similar approved.
 - Product reference: Bauder (FLL Compliant) Intensive Substrate or similar approved.
- Depths:
 - Tree planting: min. 1000mm (mounded depth; see drg. 0950 detail 2)
 - Shrubs and perennials: 700mm
 - Amenity grass: 300mm with 25mm Seed Bed Substrate as Q28 332

332 IMPORTED MANUFACTURED SUBSTRATE SEED BED SUBSTRATE TO PODIUM DECK GRASS AREAS

- Type: Seed Bed Substrate.
 - Material: Recycled crushed brick, composted pine bark.
- Maximum saturated weight: $\approx 1,800 \text{ kg/m}^3$
- Water storage by volume: 35%
- pH value: 6.5-7
- Source: Bauder or similar approved.
 - Product reference: Bauder (FLL Compliant) Seed Bed Substrate or similar approved.
- Depths:
 - Amenity grass: 25mm, laid on 300mm Intensive Substrate as Q28 331

342 IMPORTED SUBSOIL TREE PITS WHERE SUITABLE SUBSOIL IS NOT PRESENT (EXCEPT TREE PLANTING ON PODIUM DECK)

- Type: Loamy sand subsoil.
 - Grade: BS8601 Subsoil. Textural class: Loamy Sand. Sample to be approved by landscape architect prior to delivery to site.
 - To be free of weed roots, large stones and foreign matter
- Source: Submit proposals.
- Depth: 700mm.

EXECUTION**611 TOPSOIL AND SUBSOIL ANALYSIS**

- Soil to be analysed: Imported topsoil and subsoil.
- Soil analyst: To be agreed with Landscape Architect prior to making use of the topsoil.
- Samples: Collect in accordance with BS3882:2015.
- Submit soil report in accordance with BS3882:2015:
 - Declaration of analysis: A description of the samples in terms of colour, structure, consistency, stone content, presence of foreign matter or evidence of pernicious weeds.
 - " A laboratory analysis detailing dry weight organic matter content, pH, fertility, physical and chemical characteristics.
 - " Interpretation of the results confirming the suitability of the material for landscape use, and recommendations of amelioration required to improve structure or nutrient content of the soil for its intended use.
 - " For as-dug subsoil, submit a ground investigation report from the donor site indicating the textural class, chemical composition, drainage characteristics and soil classification of the proposed soil..
 - Report detailing soil analyst's recommendations.

620 IMPORTING TOPSOIL

- Give notice: Before stripping topsoil for transfer to site.
 - Notice period: 5 days.

630 DOCUMENTATION FOR IMPORTED TOPSOIL FOR PLANTING AREAS AND LAWNS

- 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: 2.

650 NOTICE

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

655 MECHANICAL TOOLS

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

661 GRADING AND PREPARING SUBSOIL

- General: Grade to smooth flowing contours to achieve specified finished levels of topsoil. Complete the work immediately prior to laying topsoil and exclude all construction vehicles and personnel from the prepared site, to avoid re-compaction.
- Loosening:
 - Light and non-cohesive subsoils: When ground conditions are reasonably dry, loosen thoroughly to a depth of 450 mm with a single tine ripper.
 - Stiff clay and cohesive subsoils: When ground conditions are reasonably dry, loosen thoroughly to a depth of 600 mm with a single tine ripper.
 - Rock and chalk subgrades: Lightly scarify to promote free drainage.
- Areas of thicker topsoil: Excavate locally.
- Surface should be finished evenly graded, without large clods of earth or voids, avoiding compaction.

670 INSPECTING FORMATIONS

- Give notice: Before spreading topsoil for lawn areas and planting beds.
- Notice period: 7 days.

685 SURPLUS MATERIALS TO BE REMOVED

- Topsoil: Remove from site topsoil remaining after completion of all landscaping work.
- Subsoil, stones, debris, wrapping material, canes, ties, temporary labelling, rubbish, prunings and other arisings: Remove.

690 TOPSOIL STORAGE HEAPS

- Location: Submit proposals.
- Height (maximum): 2.0 m.
- Width (maximum): 4.0 m.
 - Formation: Loose tip and shape from the side only, without running machinery on the heap at any time.
- 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.

696 CULTIVATION

- Compacted topsoil: Break up to full depth.
- Tilth: Loosen, aerate and break up topsoil to a tilth suitable for fine grading.
 - Depth: 300 mm (planting areas), 150mm (seeding and turfing).
 - Particle size (maximum): 2-8 mm.
 - Timing: Within a few days before planting.
 - Weather and ground conditions: Suitably dry.
- Surface: Leave regular and even.
- Levels: 25 mm above adjoining paving or kerbs.
- Undesirable material brought to the surface: Remove visible weeds, roots and large stones with any dimension exceeding 50 mm.
- 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.
- 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 less 3%, to BS 1377-2.

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): 150mm lawns, 350mm planted areas.
- 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.

720 FINISHED LEVELS OF TOPSOIL AFTER SETTLEMENT

- Above adjoining paving or kerbs: 25 mm.
- Below dpc of adjoining buildings: Not less than 150 mm.
- Shrub areas: Higher than adjoining grass areas by 75 mm.
- Within root spread of existing trees: Unchanged.
- Adjoining soil areas: Marry in.
- Thickness of turf or mulch: Included.

820 APPLYING GENERAL FERTILIZER TO PLANTED AND SEEDED AREAS EXCEPT WILDFLOWER MEADOWS

- Locations: Planting beds, amenity grassland and formal lawns.
- Application: Spread evenly, carefully incorporating below mulch materials.
 - Timing: Immediately before cultivation.
 - Application rate: In accordance with manufacturer's instructions.
 - Other requirements: None.

840 APPLYING MYCORRHIZAL INOCULANT TO TREE AND FORMAL HEDGE PLANTING.

- Depth: To manufacturer's/ supplier's recommendations.

COMPLETION**905 APPLYING MAINTENANCE FERTILIZER**

- Time of year: March or April.
- Application: Evenly spread, carefully incorporating below mulch materials.
- Rate: To manufacturer's recommendations.

Q30 Seeding/turfing

To be read with Preliminaries/General conditions.

GENERAL INFORMATION/REQUIREMENTS

- 115 SEEDED AND TURFED AREAS
- Growth and development: Healthy, vigorous grass sward, free from the visible effects of pests, weeds and disease.
 - Appearance: A closely knit, continuous ground cover of even density, height and colour.
- 120 CLIMATIC CONDITIONS
- General: Carry out the work while soil and weather conditions are suitable.
- 145 WATERING
- Quantity: Wet full depth of topsoil.
 - Application: Even and without displacing seed, seedlings or soil.
 - Frequency: As necessary to ensure the establishment and continued thriving of all seeding/turfing.
- 150 WATER RESTRICTIONS
- Timing: If water supply is or is likely to be restricted by emergency legislation do not carry out seeding/turfing until instructed. If seeding/turfing has been carried out, obtain instructions on watering.
- 160 NOTICE
- Give notice before:
 - Setting out.
 - Applying herbicide.
 - Applying fertilizer.
 - Preparing seed bed.
 - Seeding or turfing.
 - Visiting site during maintenance period.
 - Period of notice: 1 week.
- 170 SETTING OUT
- Boundaries: Mark clearly.
 - Delineation: In straight lines or smoothly flowing curves as shown on drawings.

PREPARATION

TURFING

- 410 TURF TO BS 3969 FOR LAWNS
- Standard: To BS 3969, free from undesirable grasses and weeds.
 - Grade: General purpose utility turf with perennial ryegrass.
 - Source: Submit proposals.
 - Herbicide treatment: Apply not less than four weeks and not more than three months before lifting.
- 420 DELIVERY AND STORAGE
- Timing: Lay turf with minimum possible delay after lifting. If delay occurs, lay turf out on topsoil and keep moist.
 - Frosty weather or waterlogged ground: Do not lift turf.
 - Delivery: Arrange to avoid need for excessive stacking.
 - Stacking height (maximum): 1 m.
 - Dried out or deteriorated turf: Do not use.
- 423 INSPECTION OF TURF
- Give notice: Before lifting turf for all grassed areas.
- 428 COMPOST DRESSING FOR TURF
- Type: Sanitized and stabilized compost.
 - Supplier: Contractor's choice.
 - Product reference: Submit proposals.
 - Standard: To PAS 100.
 - 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): 100% passing screen mesh aperture of 5 mm.
 - Carbon:Nitrogen ratio (maximum): 20:1.
 - Texture: Friable.
 - Objectionable odour: None.
 - Composting Association certification: Not required.
 - Declaration of analysis: Submit.
 - Additional analyses: Not required.
 - Samples: Supply 5 kg sample before ordering.
 - Application rate: 2-4 kg/m².
 - Timing: Apply prior to cultivation.

430 TURFING GENERALLY

- Time of year: To be agreed.
- Timing of laying:
 - Spring and summer: Within 18 hours of delivery.
 - Autumn and winter: Within 24 hours of delivery.
- Weather conditions: Do not lay turf when persistent cold or drying winds are likely to occur or soil is frost bound, waterlogged or excessively dry.
- Working access: Planks laid on previously laid turf. Do not walk on prepared bed or newly laid turf.
- Jointing: Laid with broken joints, well butted up. Do not stretch turf.
- Edges: Whole turfs, trimmed to a true line.
- Adjusting levels: Remove high spots and fill hollows with fine soil.
- Consolidating: Lightly and evenly firm as laying proceeds to ensure full contact with substrate. Do not use rollers.
- Dressing, brushed well in to completely fill all joints: 35% Finely sifted topsoil, 35% Compost, 30% Sand.
- Watering: Thoroughly water completed turf immediately after laying. Check that water has penetrated into the soil below.

450 TRIMMING TURF

- Newly planted tree pits: Neatly cut away around individual trees.
 - Diameter: 800 mm.
 - Tree pit surface: Respread existing mulch.

PROTECTING/CUTTING**530 FIRST CUT OF GRASSED AREAS**

- Timing: When grass is reasonably dry.
 - Height of initial growth: 50 mm.
- Preparation:
 - Debris and litter: Remove.
 - Stones and earth clods larger than 25 mm in any dimension: Remove
- Height of first cut: 50 mm.
- Mower type: Contractor's choice.
- Arisings: Remove from site.

590 CLEANLINESS

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

MAINTENANCE**610 FAILURES OF SEEDING/TURFING**

- Duration: Carry out the following operations from completion of seeding/ turfing until: practical completion.
- Defective materials or workmanship: Areas that have failed to thrive.
 - Exclusions: Theft or malicious damage.
- Method of making good: Recultivation and reseedling/ returfing.
- Timing of making good: Submit proposals.

620A MAINTAINING LAWNS

- Duration: Carry out the following operations from completion of seeding/ turfing until: practical completion.
- Maximum height of growth at any time: 75 mm.
- Preparation: Before each cut remove all litter and debris.
- Cutting: As and when necessary to a height of 50 mm.
 - Arisings: Remove.
- Bulb planting areas: Do not cut until bulb foliage has died down.
- Trimming: All edges.
 - Arisings: Remove.
- Weed control: Substantially free of broad leaved weeds.
 - Method: Hand removal where possible. Notify Landscape Architect if chemical control is necessary.
- Stones brought to the surface: Remove regularly.
 - Size: Exceeding 25 mm in any dimension.
- Areas of settlement: Make good.
- Watering: Contractor's choice.

680 MAINTENANCE FERTILIZER FOR LAWNS

- Duration: Carry out the following operations from completion of seeding/ turfing until: practical completion.
- March application: 15:10:10 Spring turf fertilizer at 35 g/m².
- September application: 5:10:10 Autumn turf fertilizer at 50 g/m².

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 75 mm.
 - Contamination: Remove material containing toxins, pathogens or other extraneous substances harmful to plant, animal or human life.
 - Vegetation: Clear scrub to ground level by flail mowing and remove arisings; retain and protect trees indicated on drawings.
 - Large roots: Grub up and dispose of without undue disturbance of soil and adjacent areas.
 - Additional requirements: .
- 118 SOIL CONDITIONS
- Soil for cultivating and planting: Moist, friable and (except in 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: One week.
- 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:
 - Composted animal manures;
 - Sanitized and stabilized compost; and
 - Spent mushroom compost.
 - 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.
 - Standard: The National Plant Specification.
 - Species: True to name.
 - Origin/ Provenance: As plant schedule.
 - 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: .
- 246 LABELLING AND INFORMATION
- Standard: To BS 3936.
- 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: Coextruded polyethylene bags with black interior and white exterior.
 - Packaging of bulk quantities: Pallets or bins sealed with polyethylene and shrink wrapped.
 - Planting: Upright or well balanced with best side to front.
- 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.
- 285 PROTECTION OF EXISTING GRASS
- General: Protect areas affected by planting operations using boards/ tarpaulins.
 - Excavated or imported material: Do not place directly on grass.
 - Duration: Minimum period.
- 290 SURPLUS MATERIAL
- Subsoil, stones, debris, wrapping material, canes, ties, temporary labelling, rubbish, prunings and other arisings: Remove.
- PREPARATION OF PLANTING BEDS/ PLANTING MATERIALS**
- 305 WEED CONTROL FOR INVASIVE NON-NATIVE WEEDS
- Locations: All planting areas.
 - General: Prevent weeds from seeding and perennial weeds from becoming established, by hand weeding where possible, Landscape Architect to be advised if chemical control is found necessary.
- 375 CULTIVATION
- Compacted topsoil: Break up to full depth.
 - Cultivation: Loosen, aerate and break up soil into particles of 2-8 mm.
 - Depth: 150 mm.
 - Timing: Within a few days before planting.
 - Weather and ground conditions: Suitably dry.
 - Surface: Leave regular and even.
 - Levels: 25 mm above adjoining paving or kerbs.
 - Undesirable material brought to the surface: Remove visible weeds, roots and large stones with any dimension exceeding 50 mm.
 - Soil within root spread of trees and shrubs to be retained: Do not dig or cultivate.
- PLANTING SHRUBS/ HERBACEOUS PLANTS/ BULBS**
- 400 RANDOM PLANT LAYOUT TO PLANTING BEDS
- Spacing: As drawings / schedules.
 - Density: As plant schedule.

- 405 **SHRUB PLANTING PITS**
- Timing: Excavate 1-2 days (maximum) before planting.
 - Sizes: 150 mm wider than roots when fully spread and 200 mm deep.
 - Pit bottom improvement Not required.
 - Backfilling material: Reuse excavated material..
- 421 **CLIMBING PLANTS**
- Planting: 300 mm clear of supporting structure (e.g. wall/ fence) with roots spread outward.
 - Branches: Lightly secured to supports.
 - Wall climber supports: Three strand stainless steel rope verticals and horizontals (c.3mm diameter) with stainless steel tensioners. Refer to drg. 0951.
 - Base height: 350mm.
 - Extent: As indicated on Site Planting Plans.
 - Centres: 250mm vertical centres, 500mm horizontal centres
 - Distance from wall: 80 mm.
 - Fixings: Stainless steel wall mountings suitable for the weight and wind loading of the proposed climbers - for confirmation by project Engineer.
 - Centres: 500mm (horizontal) and min. 750mm (vertical).
 - Post climbers: Tie in climbers to posts, supporting and guiding plants to twine around the posts upwards towards the cables at the top.
- 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.
- 470A **FORMAL HEDGES**
- Shrubs for hedges: Consistent in species, cultivar and clone to ensure a uniform hedge.
To ensure adequate drainage, install a drainage layer of clean angular stone surrounding a perforated UPVC drainage pipe to surface water drainage system as described on drawing MWA-16.03-912.
 - Planting: In trenches large enough to take full spread of roots. Set out plants evenly as described on drawing MWA-16.03-900.
- 476 **SHRUB, HERBACEOUS AND BULB BACKFILLING MATERIAL PLANTING BEDS**
- Composition: Previously prepared mixture of topsoil excavated from pit and additional topsoil as required:
 - Ameliorant/ Conditioner: Composted bark.
 - Application rate: 5 kg per m³ of topsoil.
 - Fertilizer: Slow release.
 - Application rate: To manufacturer's/ supplier's recommendations.
- 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.
 - Depth: .
- 485 **MULCHING PLANTING BEDS**
- Material: Medium grade bark mulch.
 - Purity: Free of pests, disease, fungus and weeds.
 - Recycled content: Submit proposals.
 - Preparation: Clear all weeds. Water soil thoroughly.
 - Coverage: 50 mm depth.
 - Finished level of mulch: 50 mm below adjacent grassed or paved areas.

PLANTING TREES

- 506 **TREE PITS PLANTED ON EXISTING SUBSOIL**
- Size: 75 mm deeper than root system and wide enough to accommodate roots when fully spread.
 - Sloping ground: Maintain horizontal bases and vertical sides with no less than minimum depth throughout.
 - Backfilling material: Use excavated material.
 - Topsoil depth 300mm as Q28 316. Where underlying subsoil is found to be inadequate to support plant growth, or voids are created due to the removal of rubble or hard materials, replace with imported subsoil as Q28 342
 - Accessories:
 - Perforated plastics irrigation/ ventilation pipe;
 - Root barrier; and
 - Underground guying to BS 4043, Q31 513.
 - Tree pit surface: 50mm medium grade bark mulch.
- 507 **TREE PITS PLANTED ON CONCRETE DECKS AND CONCRETE PLANTERS**
- Size: 75 mm deeper than root system and wide enough to accommodate roots when fully spread.
 - Sloping ground: Maintain horizontal bases and vertical sides with no less than minimum depth throughout.
 - Backfilling material: Use excavated material as Q28 331, mixed with composted bark at 25% by volume.
 - Accessories:
 - Perforated plastics irrigation/ ventilation pipe;
 - Root barrier; and
 - Underground guying to BS 4043, Q31 513.
 - Tree pit surface: 50mm medium grade bark mulch.
- 510 **TREE PIT ROOT BARRIERS**
- Locations: As drawing 0950.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
 - Depth of top of root barrier below finished soil level: Flush.
 - Installation: With sides vertical.

510A TREE ROOT BARRIERS TO ADJACENT SERVICES

- Locations: Wherever an existing or proposed underground service route is within 3.0m of the installed rootball.
- Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Depth of top of root barrier below finished soil level: 150mm min..
- Installation: To top, sides and bottom of service trench to be protected, ensuring that joints are overlapped by min. 300mm and sealed with root barrier tape.

513 TREE PIT GUYING

- Locations: All trees.
- Manufacturer: Platipus or similar approved.
 - Product reference: RF1RDMP Platipus Deadman Fixing System or similar.
- Type: Deadman Anchors and below-ground guys.

590 MULCHING TREES

- Material: Medium grade bark mulch.
 - Purity: Free of pests, disease, fungus and weeds.
 - Recycled content: Submit proposals.
- Preparation: Clear all weeds. Water soil thoroughly.
- Coverage: In a circular area of 500 mm radius measured from the tree stem.
- Finished level of mulch: 50 mm below adjacent grassed or paved areas.

PROTECTING/ MAINTAINING/ MAKING GOOD DEFECTS**710 MAINTENANCE**

- Duration: Carry out the operations in the following clauses from completion of planting until practical completion.
- Frequency of maintenance visits: Submit proposals.

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: During the next suitable planting season.

730 PROTECTIVE FENCING

- Fencing type: Cleft chestnut pale fencing as section Q40.
 - Height: 1100 mm.
- Erection: On completion of planting.
- Removal: After planting is well established.

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: By use of approved non-residual herbicides.
- 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.
- Staking: Check condition of stakes, ties, guys and guards.
 - 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: At each scheduled maintenance visit.
- Firming up: Gently firm loosened soil around trees/ shrubs. Straighten leaning trees/ shrubs.
- Trees: Spray crown when in leaf during warm weather.
 - Timing: After dusk.
- Watering: Contractor's choice.

755 PLANTING MAINTENANCE - FERTILIZER

- Time of year: March or April.
- Fertilizer: Slow release.
 - Manufacturer: Contractor's choice.
 - Product reference: Contractor's choice.
- Application: Evenly spread, carefully incorporating below mulch materials.
- Application rate: To manufacturer's recommendations.

760 PLANTING MAINTENANCE - PRUNING

- General: Prune to promote healthy growth and natural shape.
 - Dead, dying, diseased wood and suckers: Remove.
 - Timing: As appropriate to the species.
 - 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 one full year: Provide a schedule of any ongoing maintenance problems experienced during the rectification period.

- 790
- FINAL MULCHING
- Timing: At end of the maintenance period.
 - Watering: Ensure that soil is thoroughly moistened prior to remulching, applying water where necessary.
 - Planting beds: Remulch.
Depth (minimum): 50 mm.
 - Trees: Remulch.
Depth (minimum): 50 mm.

Q35 Landscape maintenance

To be read with Preliminaries/ General conditions.

GENERALLY

- 110 NOTICE
- Give notice before:
 - Application of herbicide.
 - Application of fertilizer.
 - Watering.
 - Each site maintenance visit.
 - Period of notice: 2 days.
- 155 WATERING
- Supply: Potable mains water.
 - Quantity: Wet to field capacity .
 - 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.
- 175 DISPOSAL OF ARISING
- General: Unless specified otherwise, dispose of arisings as follows: Remove from site for recycling / disposal.
- 180 CHIPPING OR SHREDDING
- General: Not permitted on site.
- 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.

GRASSED AREAS

- 210 MAINTENANCE OF GRASSED AREAS
- General: Maintain turf in a manner appropriate to the intended use.
 - Soil and grass:
 - Condition: Maintain a healthy vigorous sward, free from disease, fungal growth, discolouration, scorch or wilt.
 - Waterlogging and compaction: Prevent.
 - Damage: Repair trampling, abrasion or scalping.
 - Ornamental lawns: Maintain reasonably free from moss, excessive thatch, weeds, frost heave, worm casts and mole hills.
 - Edges: Neat and well defined, in clean straight lines or smooth flowing curves.
 - Litter and fallen leaves: Remove regularly to maintain a neat appearance.
- 220 GRASS CUTTING GENERALLY
- Before mowing: Remove litter, rubbish and debris.
 - Finish: Neat and even, without surface rutting, compaction or damage to grass.
 - Edges: Leave neat and well defined. Neatly trim around obstructions.
 - Adjoining hard areas: Sweep clear and remove arisings.
 - Drought or wet conditions: Obtain instructions.
- 226 TREE STEMS
- Precautions: Do not allow nylon filament rotary cutters and other mechanical tools closer than 100 mm to the stem of any tree.
 - Operations close to stems: Complete using hand tools.
- 250 LEAF REMOVAL
- Operations: Collect fallen leaves.
 - Special requirements: Remove by hand raking.
 - Disposal: Remove from site for recycling.
- 255 FIRST CUT OF LAWNS
- Height of initial growth: 75 mm.
 - Preparation:
 - Debris and litter: Remove.
 - Stones and earth clods larger than 25 mm in any dimension: Remove
 - Height of first cut: 40 mm.
 - Mower type: Contractor's choice.
 - Arisings: Remove.
- 260 MOWING LAWNS
- Grass height: Maintain between 25 and 50 mm.
 - Arisings: Remove.

- 280 CUTTING SPRING FLOWERING WILD FLOWER MEADOWS
- Times of year/ Frequency of cutting: July, then monthly until October.
 - Height of cut: 75 mm.
 - Arisings: Remove.
- 320 LEVELLING HOLLOWS AND BUMPS IN TURF
- Standard: To BS 7370-3, clauses 12.4 and 12.5.
- 325 RELIEVING SURFACE COMPACTION IN TURF
- Standard: To BS 7370-3.
 - Method: Spiking.
 - Top dressing: Not required.
 - Depth: -.
- 351 FERTILIZER - SPRING APPLICATION
- Type: Slow release.
 - Application rate: 60 g/m².
 - Not to be used on rough / meadow grass areas
- 380 REINSTATEMENT OF DAMAGED LAWNS
- Damaged turf: Remove to a depth of 40 mm.
 - Preparation: Cultivate substrate to a fine tilth.
 - Reinstatement: Contractor's choice of returfing or topsoiling and reseeding:
 - Returfing: Quality and appearance to match existing.
 - Reseeding: Fill with fine topsoil to BS 3882 multi purpose class, free from stones, debris and weeds. Reseed with a seed mix to match existing grass in quality and appearance.
 - Protection and watering: Provide as necessary to promote successful germination and/ or establishment.

FLOWER BEDS/ SEASONAL BEDDINGS

- 460A BEDS OF PERENNIALS
- Gaps in planting: Refill by replanting.
 - Watering:
 - New plants: Before and after planting out.
 - Ongoing: As necessary for the continued thriving of all planting.
 - Operations at the end of growing season (Nov-Dec):
 - Lightly Trim: Stems of herbaceous perennials where these are collapsing or fall onto paved areas. Leave grasses and standing growth untrimmed for winter interest.
 - Remove: Litter, weeds, debris and arisings.
 - Cultivate: Fork over the soil, taking care not to cause undue disturbance to plants.
 - Operations in early spring (Feb-March):
 - Trim: Cut back dead growth of perennials and grasses to ground level.
 - Remove: Litter, debris and arisings.
 - Cultivate: Fork over the soil, taking care not to cause undue disturbance to plants.
- 470A FLOWER BEDS GENERALLY
- Operations:
 - Remove: Dead flower heads, fallen leaves, litter and debris.
 - Weeds: Prevent weed growth by maintaining full thickness of mulch, hand weeding, and spot treatment of persistent or troublesome weeds with systemic herbicide e.g. Roundup.
 - Trim: Clip grass edges.
 - Fungicide: Not required.
 - Insecticide: Not required.

SHRUBS/TREES/HEDGES

- 500 ESTABLISHMENT OF NEW PLANTING
- Duration: 1 year.
 - Weed control:
 - Method: Keep planting beds clear of weeds by maintaining full thickness of mulch, hand weeding, and spot treatment of persistent or troublesome weeds with systemic herbicide e.g. Roundup.
 - Area: Maintain a weed free area around each tree and shrub, minimum diameter the larger of 1 m or the surface of the original planting pit.
 - 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 to ensure successful establishment.
- 502 ESTABLISHMENT OF NEW PLANTING - FERTILIZER
- Time of year: March or April.
 - Type: Slow release.
 - Spreading: Spread evenly. Carefully lift and replace any mulch materials.
 - Application rate: As manufacturer's recommendations.
- 515 TREE GUY WIRES
- Inspection/ Maintenance times: In spring.
 - Operations:
 - Replace or resecure loose or missing guy wires.
 - Adjust to suit stem growth and to provide correct and uniform tension.
 - Removal: When instructed.
- 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.

- 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: As instructed.
 - Operations: Remove growth encroaching onto grassed areas, paths, roads, signs, sightlines and road lighting luminaires.
 - Special requirements: None.
- 555 PRUNING TREES AND SHRUBS
- Standard: To BS 7370-4.
 - Special requirements: None.
- 605A TRIMMING SLOWLY ESTABLISHING HEDGES
- Operations:
 - Timing: Trim sides of hedge in June and September to encourage bushy growth down to ground level. Trim top of hedge to a consistent height once the hedge has reached the planned height.
 - Form: Allow to reach planned dimensions only by gradual degrees, depending on growth rate and habit. Use string lines as guides. Avoid trimming top growth until planned height is reached.
- 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.
- 625 CLIMBING PLANTS
- Pruning: Remove excess growth, to ensure that signs, light fittings, doors and windows are kept clear at all times.
 - Insecure growth: Attach to supporting wires or structures using Plastics clips.
 - Supporting structures: Check and repair as necessary.
- 630 DEAD AND DISEASED PLANTS
- Removal: As soon as possible.
 - Replacement: Within 2 weeks.
- 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: Chemical.
 - Application rate: As manufacturer's recommendations.
- 645 WEED CONTROL GENERALLY
- Weed tolerance: Weed to clear ground every 2 weeks.
 - 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.
- 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): 50 mm.
 - Top up: Annually.
 - Mulch spill on adjacent areas: Remove weeds and rubbish and return to planted area.
 - Weeding: Remove weeds growing on or in mulch by hand weeding.

695 FERTILIZING ESTABLISHED TREES AND SHRUBS

- Time of year: During April or May.
- Type of fertilizer: Slow release e.g. CL Sierrablen Flora or similar approved..
- Application: Spread evenly.
 - Rate: 60 g/m² or as advised by manufacturer.

696 FERTILIZING PODIUM DECK PLANTING ON LIGHTWEIGHT SUBSTRATE

- Time of year: During April or May.
- Type of fertilizer: Slow release e.g. CL Sierrablen Flora or similar approved..
- Application: Spread evenly.
 - Rate: 100 g/m² or as advised by manufacturer.

700 SNOW REMOVAL FROM SHRUBS/ TREES

- Standard: To BS 7370-4.
- Plants subject to snow removal: All evergreens.
- Timing: Within 24 hours of snowfall.

705 WINTER LEAF REMOVAL

- Operations: Take down temporary leaf fences. Collect accumulations of drifted leaves from the vicinity and from planting beds.
- Arisings: Remove to recycling facility.

HARD LANDSCAPE AREAS/FENCING**900 SNOW CLEARANCE**

- Clearance: On reaching a depth of 5 mm.
- Deicing: To roads and car park.
 - Material: Rock salt to BS 3247.
 - Timing: When freezing precipitation is forecast.
 - Application rate: Spread evenly at a rate of 10 g/m².

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 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.

930 GRAFFITI REMOVAL

- Method: Pressure wash, or chemical poultice if ineffective.
- Subsequent treatment: Not required.
 - Finish: -.

Q40 Fencing

To be read with Preliminaries/ General conditions.

FENCING SYSTEMS

- 105 STATUS OF TENDER INFORMATION CONTRACTORS DESIGN AND FABRICATION
The Matthew Wigan Associates drawings and specifications indicate the design details in terms of height, indicative sizes of members and general arrangement. The contractor is responsible for determining final dimension of panels and components based on site measurement, and ensuring the detailed design including fixings and automation conforms to the relevant British Standards. This includes the loading requirements for balustrade railings in accordance with Building Regulations Part K. Automated or access control to gates to be confirmed with client, and designed by specialist supplier.
- Fabrication drawings are to be submitted to Matthew Wigan Associates for approval a minimum of 4 weeks prior to delivery of all components to site.
- 341 STEEL VERTICAL BAR FENCING R1 1100mm HT RAILINGS
- Manufacturer: Jackson's Fencing.
 - Product reference: Sentry Residential Railings (non-standard sizes).
 - Standard: To BS 1722-9.
 - Height: 1100mm.
 - Verticals: 19 mm diameter CHS.
 - Rails: RHS, 50 x 25 x 2mm.
 - Stiles: SHS, 60 x 60 x 2mm.
 - Centres of verticals: 119mm.
 - Posts: RHS, 60 x 60 x 2mm.
 - Finish: Powder coated to BS 1722-16.
 - Colour: RAL 7015.
 - Centres of posts (maximum): 3m.
 - Method of setting posts/ stays/ legs: Posts embedded 450 mm with minimum 100 mm concrete cover..
 - Accessories: Single gates as clause 561.
 - Conformity: Submit manufacturer's and installer's certificates, to BS 1722-9.
- 342 STEEL VERTICAL BAR FENCING R2 1800mm HT RAILINGS
- Manufacturer: Jackson's Fencing.
 - Product reference: Sentry Residential Railings (non-standard sizes).
 - Standard: To BS 1722-9.
 - Height: 1800mm.
 - Verticals: 19 mm diameter CHS.
 - Rails: RHS, 50 x 25 x 2mm.
 - Stiles: SHS, 60 x 60 x 2mm.
 - Centres of verticals: 119mm.
 - Posts: RHS, 60 x 60 x 2mm.
 - Finish: Powder coated to BS 1722-16.
 - Colour: RAL 7015.
 - Centres of posts (maximum): 3m.
 - Method of setting posts/ stays/ legs: Posts embedded 600 mm with minimum 100 mm concrete cover, intermediate supports in rammed earth.
 - Accessories: Single gates as clause 562 and double gates as clause 563.
 - Conformity: Submit manufacturer's and installer's certificates, to BS 1722-9.
- 343 STEEL VERTICAL BAR FENCING R3 800mm HT WALL MOUNTED RAILINGS
- Manufacturer: Jackson's Fencing.
 - Product reference: Sentry Residential Railings (non-standard sizes).
 - Standard: To BS 1722-9.
 - Height: 800mm (to provide min. 1100mm overall ht guarding including height of wall base).
 - Verticals: 19 mm diameter CHS.
 - Rails: RHS, 50 x 25 x 2mm.
 - Stiles: SHS, 60 x 60 x 2mm.
 - Centres of verticals: 119mm.
 - Posts: RHS, 60 x 60 x 2mm.
 - Finish: Powder coated to BS 1722-16.
 - Colour: RAL 7015.
 - Centres of posts (maximum): 3m.
 - Method of setting posts/ stays/ legs: Posts fixed to masonry with concealed fixings core drilled through coping, ends of panels fixed to masonry. Fixings to specialist supplier design, and to be approved by Landscape Architect and Engineer.
 - Accessories: Single gates as clause 561.
 - Conformity: Submit manufacturer's and installer's certificates, to BS 1722-9.

- 344 STEEL VERTICAL BAR FENCING R4 575mm HT WALL MOUNTED RAILINGS
- Manufacturer: Jackson's Fencing.
 - - Product reference: Sentry Residential Railings (non-standard sizes).
 - Standard: To BS 1722-9.
 - Height: 575mm (top of railing to be level with adjacent 1100mm ht railing).
 - Verticals: 19 mm diameter CHS.
 - Rails: RHS, 50 x 25 x 2mm.
 - Stiles: SHS, 60 x 60 x 2mm.
 - Centres of verticals: 119mm.
 - Posts: RHS, 60 x 60 x 2mm.
 - Finish: Powder coated to BS 1722-16.
 - Colour: RAL 7015.
 - Centres of posts (maximum): 3m.
 - Method of setting posts/ stays/ legs: Posts fixed to masonry with concealed fixings core drilled through coping, ends of panels fixed to masonry. Fixings to specialist supplier design, and to be approved by Landscape Architect and Engineer.
 - Accessories: Single gates as clause 561.
 - Conformity: Submit manufacturer's and installer's certificates, to BS 1722-9.

- 411 GLAZED PRIVACY SCREENS TO PRIVATE TERRACES
- Height: 1800mm with raked section to 1100mm as shown in drawings.
 - Materials: Opaque toughened glass to BS EN 12600.
 - - Finish: Frosted.
 - Colour: None.
 - Centres of posts (maximum): 1500mm.
 - Method of setting posts: Submit proposals.
 - Accessories: RHS galvanised steel framing and posts, galvanised steel powdercoated RAL 7015.

GATES, POSTS AND STILES

- 561 STEEL SINGLE PEDESTRIAN GATES, 1100mm ht
- Width: 1077m opening, Height: 1100mm
 - Manufacturer: Jackson's Fencing.
 - Standard:
 - Domestic gates: To BS 4092-1.
 - Steel palisade gates: To BS 1722-12.
 - Finish: Hot dip galvanized to BS EN ISO 1461 and Powder coated to BS 1722-16.
 - - Colour: RAL7015
 - Jointing: Welded.
 - Materials: To match vertical bar fencing
 - Slam posts and hanging posts 80 x 80 SHS, with 4-way weathered caps
 - Jointing: Welded.
 - Fittings: Manufacturer's standard hinge detail.
 - Finish: Powder coated to BS 1722-16.
 - Method of fixing: Concrete foundation, 450 mm square x 600 mm deep.
 - Accessories: Key operated gate locks.
- 562 STEEL SINGLE PEDESTRIAN GATE, 1800mm ht
- Width: 1077mm opening, Height: 1800mm
 - Manufacturer: Jackson's Fencing.
 - Standard:
 - Domestic gates: To BS 4092-1.
 - Steel palisade gates: To BS 1722-12.
 - Finish: Hot dip galvanized to BS EN ISO 1461 and Powder coated to BS 1722-16.
 - - Colour: RAL7015
 - Jointing: Welded.
 - Materials: To match vertical bar fencing
 - Slam posts and hanging posts 80 x 80 SHS, with 4-way weathered caps
 - Jointing: Welded.
 - Fittings: Self closing hinges to manufacturer's detail.
 - Finish: Powder coated to BS 1722-16.
 - Method of fixing: Concrete foundation, 450 mm square x 750 mm deep.
 - Accessories: Access control system agreed with client.
- 563 STEEL DOUBLE ACCESS GATES, 1800mm ht
- Width: 3000mm opening, Height: 1800mm
 - Manufacturer: Jackson's Fencing.
 - Standard:
 - Domestic gates: To BS 4092-1.
 - Steel palisade gates: To BS 1722-12.
 - Finish: Hot dip galvanized to BS EN ISO 1461 and Powder coated to BS 1722-16.
 - - Colour: RAL7015
 - Jointing: Welded.
 - Materials: To match vertical bar fencing
 - Slam posts and hanging posts 80 x 80 SHS, with 4-way weathered caps
 - Jointing: Welded.
 - Fittings: Manufacturer's standard hinge detail.
 - Finish: Powder coated to BS 1722-16.
 - Method of fixing: Concrete foundation, 450 mm square x 750 mm deep.
 - Accessories: Key operated gate locks, 1 drop bolt to each gate leaf with 2no. drop bolt socket for each leaf in open and closed position (to be core drilled and resin fixed in paving).

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.
 - NHSS Sector Scheme 2A sub categories: (a) and (b).
 - NHSS Sector Scheme 2C sub categories: Not required.

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.

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.

Q41 Barriers/ guardrails

To be read with Preliminaries/ General conditions.

12 STATUS OF TENDER INFORMATION CONTRACTORS DESIGN AND FABRICATION

The Matthew Wigan Associates drawings and specifications indicate the design details in terms of height, indicative sizes of members and general arrangement. The contractor is responsible for determining final dimension of panels and components based on site measurement, and ensuring the detailed design including fixings and automation conforms to the relevant British Standards. This includes the loading requirements in accordance with Building Regulations Part K.

Fabrication drawings are to be submitted to Matthew Wigan Associates for approval a minimum of 4 weeks prior to delivery of all components to site.

TYPES OF BARRIERS/ GUARDRAILS

240 HANDRAIL SYSTEMS FT6 HANDRAILS TO STEPS

- System manufacturer: Contractor's choice.
- Material: Stainless Steel.
 - Cross section: 38mm.
 - Finish: Satin.
- Height above ground surface (to upper surface of handrail):
 - Upper handrail: 900 mm .
 - Lower handrail: Not applicable.
- Accessories: None.

PERFORMANCE/ INSPECTION/ TESTING

INSTALLATION

405 COMPETENCE

- Operatives: Contractors must employ competent operatives.
- Qualifications: Submit certification of training.
 - UKAS Sector Scheme 2A sub categories: (b).
 - UKAS Sector Scheme 2C sub categories: (a).

410 WORK ON OR ADJACENT TO HIGHWAYS

- Requirement: Comply with the Department for Transport's 'Safety at street works and road works. A code of practice'. Retain a copy of this document on site at all times during the course of the works.

420 ALIGNMENT

- Erection: Fences/ barriers to present a flowing alignment. Tops of posts to follow ground profile.
- Tolerance: ± 30 mm of prescribed alignment and, within any 10 m length, ± 15 mm from the straight or required radius.

480 CONCRETE FOUNDATIONS FOR POSTS

- Excavations: To have vertical sides. Dispose of all arisings. Blind excavation bottoms with a 50 mm layer of concrete.
- Concrete mix: To BS 8500-2, Designated mix not less than GEN 4 or Standard mix not less than ST5. Do not use admixtures.
- Placing concrete: Fill holes to the specified depth and fully compact. Do not backfill for at least four days.
- Temporary support to posts: Provide for a at least four days after placing concrete.

COMPLETION

900 DOCUMENTATION

- Contents:
 - General product information.
 - Installation information.
 - Inspection and maintenance reports.
- Number of copies: 2.
- Submission: Two weeks prior to date when principal contractor expects work to be practically complete.

Q50 Site/street furniture/equipment

To be read with Preliminaries/ General conditions.

- 190 BOLLARDS FIXED
- Manufacturer: Marshalls or similar approved.
 - Product reference: 140mm diameter Geo Bollard GE-BL-00007 or similar approved.
 - Material: Stainless steel.
 - Finish as delivered: As manufactured.
 - Colour: None.
 - Height above ground: 1000 mm.
 - Special features: Shadow gap at top of bollard.
 - Method of fixing: Root, 300 mm below ground, set in concrete base.
- 191 BOLLARDS REMOVABLE
- Manufacturer: Marshalls or similar approved.
 - Product reference: 140mm diameter lift-out Geo Bollard GE-BL-00009 or similar approved.
 - Material: Stainless steel.
 - Finish as delivered: As manufactured.
 - Colour: None.
 - Height above ground: 1000 mm.
 - Special features: Shadow gap at top of bollard.
 - Method of fixing: Proprietary below ground socket fixing, set in concrete base.

SITE AND STREET FURNITURE

- 210 CYCLE STANDS
- Manufacturer: Broxap or similar approved.
 - Product reference: Broxap Sheffield BXMW/SS or similar approved.
 - Material: Stainless steel.
 - Finish: As manufactured.
 - Colour: None.
 - Number of stands: As shown on the drawings.
 - Accessories: None.
 - Method of fixing: Root, 300 mm below ground, set in concrete base.
- 220 BENCHES FT1 TIMBER SLATTED BENCH
- Manufacturer: Benchmark or similar approved.
 - Product reference: To Benchmark detailed design.
 - Material: Hardwood (Iroko) and galvanised steel base.
 - Finish: Base: primed and painted RAL 7015. Slats: As manufactured (planed and sanded with clear wood sealer / UV protector).
 - Colour: Base: RAL 7015. Slats: Natural.
 - Size: 2230mm long.
 - Accessories/ Special requirements: None.
 - Method of fixing: Metal base bolted to 400 x 400 x 400 mm concrete bases 100 mm below paving surface (to be confirmed by supplier).
- 226 SEATS FT4 LINEAR SEATING
- Manufacturer: Benchmark or similar approved.
 - Product reference: To Benchmark detailed design.
 - Material: Hardwood (Iroko) and galvanised steel base.
 - Finish: Base: primed and painted RAL 7015. Slats: As manufactured (planed and sanded with clear wood sealer / UV protector).
 - Colour: Base: RAL 7015. Slats: Natural.
 - Size: Continuous seating, refer to drawings for measurements.
 - Accessories/ Special requirements: Armrests and backrests to Benchmark design as indicated on the drawings. Radius sections as indicated on the drawings..
 - Method of fixing: Metal base bolted to 400 x 400 x 400 mm concrete bases 100 mm below paving surface (to be confirmed by supplier).
- 240 LITTER BINS FT2 FALCO KRONOS LITTER BINS
- Manufacturer: Falco.
 - Product reference: Kronos.
 - Material: Steel.
 - Finish: Hot dip galvanized to BS EN ISO 1461 and Polyester powder coated.
 - Colour: RAL 7015.
 - Accessories/ Special requirements: None.
 - Method of fixing: Root, 300 mm below ground, set in concrete base.
- 341 SCULPTURAL FEATURE COURTYARD A
- Layout: See drawing 1002.
 - Post Material: Galvanised steel, primed and painted RAL 7016.
 - Wires: 4mm stainless steel cable fixed to top of posts with welded lugs, with stainless steel tensioners and cable clamps where cables cross each other. Each post to be connected to 3 others as shown on the drawing.
 - Approximate height of posts: 3.5m.
 - No. of posts: 10no .
 - Method of fixing: Concrete foundations set 100mm below finished levels.

INSTALLATION

- 510 CONCRETE FOUNDATIONS GENERALLY
- Standard: To BS 8500-2.
 - Concrete: Designated, not less than GEN 1.
 - 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: 250 x 250 x minimum 300 mm deep.
- Components: Accurately positioned and securely supported.
- Concrete fill: Fully compacted as filling proceeds.
- Concrete foundations exposed to view: Compacted until air bubbles cease to appear on the upper surface, then weathered to shed water and trowelled smooth.
- Temporary component support: Maintain undisturbed for minimum 48 hours.

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.

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.

Q52 Play and sports equipment

To be read with Preliminaries/ General conditions.

GENERAL

105 STATUS OF TENDER INFORMATION, CONTRACTORS DESIGN AND FABRICATION

The Matthew Wigan Associates drawings indicate the design details in terms of height, cross dimensional sizes of members and general arrangement. The contractor is responsible for determining final dimension of panels and components based on site measurement, and ensuring the detailed design including fixings and automation conforms to the relevant British Standards. Automated gates and access control to all gates specialist supplier detailed design.

Fabrication drawings are to be submitted to Matthew Wigan Associates for approval a minimum of 4 weeks prior to delivery of all components to site.

116 PLAYGROUND COURTYARD A

- Equipment: As drawing 1002.
 - System manufacturer: Duncan and Grove Ltd.
- Surfacing: Rubber wetpour, as section Q26.
- Containment: Perimeter wall and Metal Edge as Q10 116.
- Layout: As drawing 1002.

SYSTEM PERFORMANCE

210 DESIGN

- Design: Complete the design of the footings and fixings for the timber beams.
- Proposals: Submit drawings, technical information, calculations and manufacturers' literature.
- Performance criteria: 30 years trouble free lifespan with safe operation.

215 PLAYGROUND DESIGN

- Design criteria: Sculptural feature for imaginative play and informal seating.
 - Age range: 2-5.
 - Population served: Local community.
 - Frequency of use: Continuous.

PRODUCTS

321 TIMBER BEAM HORIZONTALS

- Standard: To BS EN 1176-1.
- Manufacturer: Duncan & Grove or similar approved.
 - Product reference: .
- Age range: 2-5.
- Materials: Air Dried Oak.
 - Finish: Planed and sanded with clear wood preserver, or painted in accordance with supplier recommendations.
 - Colour: Natural (3no.), blue paint (3no.), and red paint (2no.).
- Length: 2m.
- Size: 250x250mm section.
- Features: None.
- Method of fixing: 4no. beams to be root fixed in concrete footings finished 100mm below wetpour surface. Specialist supplier to confirm fixing detail. Foundation design to be confirmed by Engineer. 4no. beams to be bolted to the ground fixed beams with countersunk anti-tamper bolts.

322 TIMBER BEAM VERTICALS

- Standard: To BS EN 1176-1.
- Manufacturer: Duncan & Grove or similar approved.
 - Product reference: .
- Age range: 2-5.
- Materials: Air Dried Oak.
 - Finish: Planed and sanded with clear wood preserver, or painted in accordance with supplier recommendations.
 - Colour: Natural (3no.), blue paint (3no.), and red paint (2no.).
- Length: 3m.
- Size: 200x200mm section.
- Features: Vandal proof fixings.
- Method of fixing: To be root fixed in concrete footings finished 100mm below wetpour surface. Specialist supplier to confirm fixing detail. Foundation design to be confirmed by Engineer.

323 TIMBER STEPPING LOGS - 200mm

- Standard: To BS EN 1176-1.
- Manufacturer: Duncan & Grove or similar approved.
 - Product reference: .
- Age range: 2-5.
- Materials: Air Dried Oak.
 - Finish: Planed and sanded. Painted in accordance with supplier recommendations.
 - Colour: Red.
- Height: 200mm .
- Size: 250x250mm section.
- Features: Vandal proof fixings.
- Method of fixing: To be root fixed in concrete footings finished 100mm below wetpour surface. Specialist supplier to confirm fixing detail. Foundation design to be confirmed by Engineer.

- 324 TIMBER STEPPING LOGS - 400mm
- Standard: To BS EN 1176-1.
 - Manufacturer: Duncan & Grove or similar approved.
 - Product reference: .
 - Age range: 2-5.
 - Materials: Air Dried Oak.
 - Finish: Planed and sanded with clear wood preserver.
 - Colour: Natural.
 - Height: 400mm .
 - Size: 250x250mm section.
 - Features: Vandal proof fixings.
 - Method of fixing: To be root fixed in concrete footings finished 100mm below wetpour surface. Specialist supplier to confirm fixing detail. Foundation design to be confirmed by Engineer.
- 325 TIMBER STEPPING LOGS - 600mm
- Standard: To BS EN 1176-1.
 - Manufacturer: Duncan & Grove or similar approved.
 - Product reference: .
 - Age range: 2-5.
 - Materials: Air Dried Oak.
 - Finish: Planed and sanded. Painted in accordance with supplier recommendations.
 - Colour: Blue.
 - Height: 600mm .
 - Size: 250x250mm section.
 - Features: Vandal proof fixings.
 - Method of fixing: To be root fixed in concrete footings finished 100mm below wetpour surface. Specialist supplier to confirm fixing detail. Foundation design to be confirmed by Engineer.

EXECUTION

- 710 PLAY EQUIPMENT INSTALLATION GENERALLY
- Standard: To manufacturer's written instructions provided in accordance with BS EN 1176-1.
- 720 CONCRETE FOUNDATIONS GENERALLY
- Standard: To BS 8500-2.
 - Concrete: Designated, not less than GEN 1 or Standard prescribed, 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.
- 725 SETTING COMPONENTS IN CONCRETE
- Holes: 250 x 250 x minimum 450 mm deep.
 - Components: Accurately positioned and securely supported.
 - Concrete fill: Fully compacted 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.
- 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.

COMPLETION

- 910 INSPECTION
- Standard: To BS EN 1176-1.
 - Timing: 2 weeks prior to date when work is expected to be practically complete.
 - Period of notice (minimum): 3 working days.
- 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: To BS EN 1176-1.
 - Contents:
 - Copies of test reports.
 - General product information.
 - Installation information.
 - Inspection and maintenance information.
 - Number of copies: 2.
 - Submission: 2 weeks prior to date when work is expected to be practically complete.

S

Piped supply systems

S14 Irrigation

To be read with Preliminaries/ General conditions.

12 STATUS OF TENDER INFORMATION CONTRACTORS DESIGN AND FABRICATION

The Matthew Wigan Associates specification and drawings indicate the areas to be provided with irrigation and an indicative specification. The contractor is responsible for determining final design and layout of the irrigation system, ensuring that adequate irrigation is provided for the establishment and ongoing viability of planting within raised planters and beds on podium decks, conforming to the relevant British Standards and local water authority requirements. The operation of the system should be agreed with the client and the site management company.

Fabrication drawings are to be submitted to Matthew Wigan Associates for approval a minimum of 4 weeks prior to delivery of all components to site.

GENERAL

110 IRRIGATION SYSTEM FOR BEDS AND RAISED PLANTERS ON PODIUM DECKS

- Source: Mains water supply.
- Water meters: Not required.
- Backflow prevention device: Submit proposals.
- Water storage tanks: Submit proposals.
- Pumps: Submit proposals.
- Pipelines: Submit proposals.
 - Insulation: Submit proposals.
- Draw-off taps/ valves: Submit proposals.
- Filters: Submit proposals.
- Outlets: Porous pipe system.
- Electrical supply: Submit proposals.
- Accessories:
 - Controllers ;
 - Electronic timer ;
 - Equipment enclosure ; and
 - Valve boxes .

PERFORMANCE

210 DESIGN AND DETAILING

- Requirement: Complete the design of the irrigation system.
- Proposals: Submit drawings (showing equipment positions and pipeline routes), technical information, calculations and manufacturer's literature.
- General: Design the irrigation systems to comply with the relevant parts of BS 7562, BS 8558, BS EN 805, BS EN 806-2, -3 and -5 and BS EN 12484-4, and in accordance with HSE publication 'The control of legionella bacteria in water systems. Approved code of practice and guidance', water supply regulations and the requirements of the water supply undertaker.

220 PIPELINE DESIGN

- Sizes: Calculate to suit probable simultaneous demand for the entire system and to ensure:
 - Flow rates (minimum): Submit proposals.
 - Suitable discharge rates at distribution points.

230 DISCHARGE REQUIREMENTS

- Fitting: Submit proposals .
- Operation of appliances: Provide adequate flow rates from available water pressure.

PRODUCTS

310 DEZINCIFICATION

- Fittings, pipelines and equipment located below ground or in concealed or inaccessible locations: Gunmetal or other material resistant to dezincification.

325 BACKFLOW PREVENTION DEVICES (IF REQUIRED BY LOCAL AUTHORITY)

- Standard: To BS EN 13959, type EC or ED.
- Type: Submit proposals. To conform with water authority requirements.
- Manufacturer: Contractor's choice.
 - Product reference: Submit proposals.
- Fluid Category: 4.

382 VALVES GENERALLY

- Types: Approved for the purpose by the local water supply undertaker and of the appropriate pressure rating.
- Location: Adjacent to equipment to be isolated and where they can be readily operated and maintained.
- Joints: To suit the pipe material.
- Operation:
 - Handwheels: For control purposes.
 - Lockshields: For isolation or regulation of circuits or equipment.

383 STOP VALVES AND DRAW-OFF TAPS FOR ABOVE GROUND USE

- Type: Copper alloy.

392 FLOW REDUCING SERVICING VALVES

- Manufacturer: Submit proposals.
 - Product reference: Submit proposals.

422 POROUS PIPE SYSTEMS

- Manufacturer: Submit proposals.
 - Product reference: Submit proposals.
- Pipe size: 19 mm.
- Depth: 75 mm.
- Operating pressure: 1-1.5 bar (100-150 kPa).
- Discharge: 2-3 L/m/h.
- Accessories: Barbed elbows, plugs and tees.

450 CONTROLLERS

- Type: Fully automatic with rain and moisture sensors.
- Manufacturer: Contractor's choice.
 - Product reference: Submit proposals.
- Power: Submit proposals.
- Features:
 - Automatic operation with manual override;
 - Fourteen day watering calendar;
 - Frost sensor; and
 - Moisture sensor .

460 EQUIPMENT ENCLOSURE FOR IRRIGATION SYSTEM CONTROLLERS

- Manufacturer: Contractor's choice.
 - Product reference: Submit proposals.
- Type: External.
- Material: GRP.
- Colour: Grey.
- Classification: IP44.
- Features: Submit proposals.

480 VALVE BOXES

- Manufacturer: Contractor's choice.
 - Product reference: Submit proposals.

EXECUTION**610 INSTALLATION GENERALLY**

- Standard: In accordance with the relevant parts of BS 7562-5, BS 8558, BS EN 805, BS EN 806-4 and BS EN 12484-4, water supply regulations and the requirements of the water supply undertaker.
- Generally:
 - Fixing: Secure and neat in locations and depths suitable for the purpose.
 - Outlets and valves: Adequately support to prevent pipes being strained during operation.
 - Open ends of pipes: Temporarily seal with purpose made plugs or blanking caps to prevent ingress of dirt, insects or rodents during installation.
- Equipment, components and accessories:
 - Store in original packaging in dry conditions.
 - Where appropriate, securely fix parallel or perpendicular to the enclosing structure.
- Corrosion resistance: In locations where moisture is present or may occur, provide corrosion resistant fittings/ fixings and avoid contact between dissimilar metals by use of suitable washers, gaskets, etc.
- Performance: Free from leaks and the audible effects of expansion, vibration and water hammer.
- Access: Allow adequate space for inspection, servicing and maintenance.

612 PIPELINE INSTALLATION

- Appearance: Install pipes straight, and parallel or perpendicular to walls, floors, ceilings, and other building 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. Do not run pipelines through electrical enclosures or above distribution boards, controllers or outlets.
- Insulation: Allow space around pipelines to fit insulation without compression.
- 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. Prevent noise or abrasion of pipelines caused by movement. Sleeve pipelines passing through walls, floors or other building elements.

614 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.

615 FITTING INSULATION TO EXTERNAL SUPPLY PIPELINES

- Location: Where exposed to air and where less than 750 mm below ground level.
- Installation:
 - Fixing: Securely and neatly in accordance with manufacturer's recommendations and with the split on 'blind' side of pipeline.
 - Over fittings and at supports: Continuous leaving no gaps.
 - Timing: Do not fit insulation until completion of testing.

617 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.

618 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.

630 SERVICE CONNECTIONS

- General: Covered elsewhere by a Provisional Sum.

COMPLETION**910 TESTING**

- Standard: To BS EN 12484-5.
- Notice (minimum): Three days.
- Condition of pipework and equipment prior to testing: Correctly installed, secure and clean.
- Pressure testing: Joints, fittings and components must be free from leaks and signs of physical distress when tested for at least one 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.
- Other test procedures: As recommended by the manufacturer and required by the water undertaker.
- Test results: Submit.

911 INSPECTION TESTING

- Standard: To BS EN 805, section 11.

912 FLUSHING AND DISINFECTION

- Standard: To BS EN 805, section 12.

920 COMMISSIONING

- Equipment: Check and adjust operation of equipment and controls.
- Outlets: Check operation of outlets for satisfactory rate of flow.

930 DOCUMENTATION

- Submit prior to completion:
 - Full technical description of each system installed.
 - Manufacturers' operating and maintenance instructions for all equipment and controls.
 - Manufacturers' guarantees and warranties.
 - Operating instructions for the system as a whole giving optimum settings for all controls.
 - Record drawings showing the location of circuits, fittings, pipes, apparatus and operating controls.
 - Electrical inspection and completion certificates to BS 7671.
- Number of copies: Two.

940 OPERATING TOOLS

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

Z

Building fabric reference specification

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.
- 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 EN 197-1 Sulfate resisting Portland cement, CEM I/SR and CE marked.
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.
- 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.

APPENDIX B – VALIDATION SAMPLE RESULTS



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Analytical Report Number : 22-39800

Project / Site name:	Weldale Street	Samples received on:	10/02/2022
Your job number:	112990	Samples instructed on/ Analysis started on:	15/02/2022
Your order number:	112990	Analysis completed by:	24/02/2022
Report Issue Number:	1	Report issued on:	24/02/2022
Samples Analysed:	1 soil sample		

Signed: *Karolina Marek*

Karolina Marek
PL Head of Reporting Team
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-39800
Project / Site name: Weldale Street
Your Order No: 112990

Lab Sample Number				2173586
Sample Reference				B3
Sample Number				None Supplied
Depth (m)				0.15
Date Sampled				10/02/2022
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	26
Total mass of sample received	kg	0.001	NONE	0.30

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DBU

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.1
Total Cyanide	mg/kg	1	MCERTS	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	510
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	180
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.088
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	87.6

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.1
Barium (aqua regia extractable)	mg/kg	1	MCERTS	44
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.67
Boron (water soluble)	mg/kg	0.2	MCERTS	1.3
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22
Lead (aqua regia extractable)	mg/kg	1	MCERTS	23
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	9.6
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	36
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	71

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0

Analytical Report Number: 22-39800
Project / Site name: Weldale Street
Your Order No: 112990

Lab Sample Number				2173586
Sample Reference				B3
Sample Number				None Supplied
Depth (m)				0.15
Date Sampled				10/02/2022
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	16
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	MCERTS	16

TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.001	MCERTS	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	7.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	9.9
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	11
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	59
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	MCERTS	86

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0
Chloroethane	µg/kg	1	NONE	< 1.0
Bromomethane	µg/kg	1	ISO 17025	< 1.0
Vinyl Chloride	µg/kg	1	NONE	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0
Trichloromethane	µg/kg	1	MCERTS	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0
Benzene	µg/kg	1	MCERTS	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0
Trichloroethene	µg/kg	1	MCERTS	< 1.0
Dibromomethane	µg/kg	1	MCERTS	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0
Tetrachloroethene	µg/kg	1	NONE	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0

Analytical Report Number: 22-39800
Project / Site name: Weldale Street
Your Order No: 112990

Lab Sample Number				2173586
Sample Reference				B3
Sample Number				None Supplied
Depth (m)				0.15
Date Sampled				10/02/2022
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
Ethylbenzene	µg/kg	1	MCERTS	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	< 1.0
Styrene	µg/kg	1	MCERTS	< 1.0
Tribromomethane	µg/kg	1	NONE	< 1.0
o-Xylene	µg/kg	1	MCERTS	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0
Bromobenzene	µg/kg	1	MCERTS	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0
Butylbenzene	µg/kg	1	MCERTS	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0

SVOCs

Aniline	mg/kg	0.1	NONE	< 0.1
Phenol	mg/kg	0.2	ISO 17025	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	< 0.2
Isophorone	mg/kg	0.2	MCERTS	< 0.2
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3
Naphthalene	mg/kg	0.05	MCERTS	< 0.05
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	< 0.1
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1

Analytical Report Number: 22-39800
Project / Site name: Weldale Street
Your Order No: 112990

Lab Sample Number				2173586
Sample Reference				B3
Sample Number				None Supplied
Depth (m)				0.15
Date Sampled				10/02/2022
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status	
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	< 0.2
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2
Fluorene	mg/kg	0.05	MCERTS	< 0.05
Azobenzene	mg/kg	0.3	MCERTS	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05
Carbazole	mg/kg	0.3	MCERTS	< 0.3
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2
Anthraquinone	mg/kg	0.3	MCERTS	< 0.3
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05

U/S = Unsuitable Sample I/S = Insufficient Sample



Analytical Report Number : 22-39800
Project / Site name: Weldale Street

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2173586	B3	None Supplied	0.15	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 22-39800

Project / Site name: Weldale Street

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO ₄ in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS

Analytical Report Number : 22-39800

Project / Site name: Weldale Street

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total



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Analytical Report Number : 22-49654

Project / Site name:	Weldale Street	Samples received on:	04/04/2022
Your job number:	112990	Samples instructed on/ Analysis started on:	04/04/2022
Your order number:	112990	Analysis completed by:	11/04/2022
Report Issue Number:	1	Report issued on:	11/04/2022
Samples Analysed:	5 soil samples		

Signed:

Adam Fenwick
Technical Reviewer
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 22-49654
Project / Site name: Weldale Street
Your Order No: 112990

Lab Sample Number				2226602	2226603	2226604	2226605	2226606
Sample Reference				A1	B1	B2	C1	D1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.15	0.15	0.15	0.15	0.15
Date Sampled				31/03/2022	31/03/2022	31/03/2022	31/03/2022	31/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	17	25	16	15
Total mass of sample received	kg	0.001	NONE	0.6	0.5	0.5	0.5	0.5

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	DBU	DBU	DBU	DBU	DBU

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.6	8.0	8.1	8.3	8.5
Total Cyanide	mg/kg	1	MCERTS	< 1.0	1.3	< 1.0	< 1.0	< 1.0
Free Cyanide	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Sulphate as SO ₄	mg/kg	50	MCERTS	380	430	410	380	610
Water Soluble SO ₄ 10hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.065	0.084	0.14	0.083	0.24

Total Phenols

Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.7	8.4	10	8.7	6.3
Barium (aqua regia extractable)	mg/kg	1	MCERTS	22	20	33	24	35
Beryllium (aqua regia extractable)	mg/kg	0.06	MCERTS	0.21	0.21	0.74	0.23	0.25
Boron (water soluble)	mg/kg	0.2	MCERTS	1	1.9	2.1	1.7	1.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	8.5	9.8	25	10	9.6
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.8	12	14	13	13
Lead (aqua regia extractable)	mg/kg	1	MCERTS	15	13	19	14	17
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	6.3	6.8	9.6	7.2	7.1
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vanadium (aqua regia extractable)	mg/kg	1	MCERTS	20	24	37	22	14
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	38	30	50	33	50

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Petroleum Hydrocarbons								
TPH-CWG - Aliphatic >EC5 - EC6 _{HS_1D_AL}	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8 _{HS_1D_AL}	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10 _{HS_1D_AL}	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12 _{EH_CU_1D_AL}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16 _{EH_CU_1D_AL}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35 _{EH_CU_1D_AL}	mg/kg	8	MCERTS	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
TPH-CWG - Aliphatic (EC5 - EC35) _{EH_CU+HS_1D_AL}	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC5 - EC7 _{HS_1D_AR}	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8 _{HS_1D_AR}	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10 _{HS_1D_AR}	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12 _{EH_CU_1D_AR}	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH-CWG - Aromatic >EC12 - EC16 _{EH_CU_1D_AR}	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
TPH-CWG - Aromatic >EC16 - EC21 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	< 10	< 10	< 10
TPH-CWG - Aromatic >EC21 - EC35 _{EH_CU_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	13	< 10	< 10
TPH-CWG - Aromatic (EC5 - EC35) _{EH_CU+HS_1D_AR}	mg/kg	10	MCERTS	< 10	< 10	22	< 10	< 10

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Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

VOCs

Chloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

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SVOCs

Aniline	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenol	mg/kg	0.2	ISO 17025	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Isophorone	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
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2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Azobenzene	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.25	< 0.05	0.35
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Carbazole	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Anthraquinone	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.76	< 0.05	0.53
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.66	< 0.05	0.44
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.34	< 0.05	0.23
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.3	< 0.05	0.23
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.4	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.16	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.37	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Analytical Report Number: 22-49654
 Project / Site name: Weldale Street
 Your Order No: 112990

Lab Sample Number				2226602	2226603	2226604	2226605	2226606
Sample Reference				A1	B1	B2	C1	D1
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.15	0.15	0.15	0.15	0.15
Date Sampled				31/03/2022	31/03/2022	31/03/2022	31/03/2022	31/03/2022
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

U/S = Unsuitable Sample I/S = Insufficient Sample

Analytical Report Number : 22-49654

Project / Site name: Weldale Street

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
2226602	A1	None Supplied	0.15	Brown clay and loam with gravel.
2226603	B1	None Supplied	0.15	Brown clay and loam with gravel.
2226604	B2	None Supplied	0.15	Brown clay and loam with gravel and vegetation.
2226605	C1	None Supplied	0.15	Brown clay and loam with gravel and vegetation.
2226606	D1	None Supplied	0.15	Brown clay and loam with gravel and vegetation.

Analytical Report Number : 22-49654

Project / Site name: Weldale Street

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Free cyanide in soil	Determination of free cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Information in Support of Analytical Results

Analytical Report Number : 22-49654
Project / Site name: Weldale Street

Water matrix abbreviations:

Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
----------------------	-------------------------------	-----------------------------	---------------	--------------------	----------------------

List of HWOL Acronyms and Operators

Acronym	Descriptions
HS	Headspace Analysis
MS	Mass spectrometry
FID	Flame Ionisation Detector
GC	Gas Chromatography
EH	Extractable Hydrocarbons (i.e. everything extracted by the solvent(s))
CU	Clean-up - e.g. by Florisil®, silica gel
1D	GC - Single coil/column gas chromatography
2D	GC-GC - Double coil/column gas chromatography
Total	Aliphatics & Aromatics
AL	Aliphatics
AR	Aromatics
#1	EH_2D_Total but with humics mathematically subtracted
#2	EH_2D_Total but with fatty acids mathematically subtracted
-	Operator - understore to separate acronyms (exception for +)
+	Operator to indicate cumulative e.g. EH+HS_Total or EH_CU+HS_Total

APPENDIX C – CLEAN COVER LAYER EVIDENCES

Gird Square	Representative Image	Details
A1		300mm topsoil 150mm subsoil Orange alert barrier
B1		230mm topsoil 110mm subsoil Orange alert barrier
B2		240mm topsoil 60mm subsoil Orange alert barrier
C1		260mm topsoil 40mm subsoil Orange alert barrier

Grid Square	Representative Image	Details
D1		400mm topsoil 250mm subsoil Orange alert barrier

APPENDIX D – IMPORT DELIVERY TICKETS

Invoice No
057672



Invoice Date
10/03/2022

INVOICE

Henry Construction Projects
Limited
Parkway Farm,
Church Farm,
Cranford,
Hounslow

Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161
Fax: 01322 619135
Email: vicky@freelandhorticulture.co.uk

Site: Henry Construction Projects Limited, Weldale St, Reading, RG1 7BX

Qty	Detail	Date	Ticket No	Order No	Unit Price	Line Total
15.00	✓ Cu Mt Topsoil - Beenham	04/03/22	160769 ✓	P1268/00658	29.90	448.50
15.00	✓ Cu Mt Topsoil - Beenham	04/03/22	160770 ✓	P1268/00658	29.90	448.50

All trading takes place on Freeland Horticulture Ltd Conditions of Sales; copies of which are available on request.

Registered in England: Roseland Nursery, College Road, Hextable, Kent BR8 7LT
VAT Registration No. 762 5393 14

Payment terms: Strictly 30 days net

Bank Details:
Barclays
Sort Code: 20-49-84
Account: 20805378

NETT AMOUNT	897.00
VAT	179.40
TOTAL	£ 1,076.40

212011



Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161
Fax: 01322 619135

Email: enquiries@freelandhorticulture.co.uk

Customer/Delivery Address

ORDER NOTE

Henry Construction Projects Limited

Delivey To
Weldale St
Reading
RG1 7BX

Customer Order No **P1268/00658**

Delivery Ticket No **160770**

Vehicle Registration **SM19 OMR**

Driver **Phillips**

Special Instructions

Delivery Date & Time Required

04/03/2022

QTY Unit Description

15.00 Metre Cu Mt Topsoil - Beenham

Weighbridge Signature

Hauliers Signature

Haulage Company **John Mould**

Received the above in good order and condition

Signed **[Signature]**

Print Name **K Price**

Customer ordering Vehicle off the Public Road do so entirely at their Own risk and will be liable for any damages incurred

212010



Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161
Fax: 01322 619135

Email: enquiries@freelandhorticulture.co.uk

Customer/Delivery Address

ORDER NOTE

Henry Construction Projects Limited

Delivey To
Weldale St
Reading
RG1 7BX

Customer Order No

P1268/00658

Delivery Ticket No

160769

Vehicle Registration

SM18 DEM

Driver

OCAR

Special Instructions

Delivery Date & Time Required

04/03/2022

QTY Unit Description

15.00 Metre Cu Mt Topsoil - Beenham

Weighbridge Signature

Hauliers Signature

Haulage Company **John Mould**

Received the above in good order and condition

Signed

Print Name

Customer ordering Vehicle off the Public Road do so entirely at their Own risk and will be liable for any damages incurred

Invoice No
057869



Invoice Date
17/03/2022

INVOICE

Henry Construction Projects
Limited
Parkway Farm,
Church Farm,
Cranford,
Hounslow

Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161
Fax: 01322 619135
Email: vicky@freelandhorticulture.co.uk

Site: Henry Construction Projects Limited, Weldale St, Reading, RG1 7BX

Qty	Detail	Date	Ticket No	Order No	Unit Price	Line Total
✓15.00	Cu Mt Topsoil - Beenham	09/03/22	161213 ✓	P1268/002	29.90	448.50
✓15.00	Cu Mt Topsoil - Beenham	09/03/22	161214 ✓	P1268/002	29.90	448.50

All trading takes place on Freeland Horticulture Ltd Conditions of Sales; copies of which are available on request.

Registered in England: Roseland Nursery, College Road, Hextable, Kent BR8 7LT
VAT Registration No. 762 5393 14

Payment terms: Strictly 30 days net

Bank Details:
Barclays
Sort Code: 20-49-84
Account: 20805378

NETT AMOUNT	897.00
VAT	179.40
TOTAL	£ 1,076.40

212826

Freeland

HORTICULTURE LIMITED

Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161

Fax: 01322 619135

Email: enquiries@freelandhorticulture.co.uk

Customer/Delivery Address

ORDER NOTE

Henry Construction Projects Limited

Deliver To

Weldale St
Reading
RG1 7BX

Customer Order No

P1268/002

Delivery Ticket No

161214

Vehicle Registration

SM18 DEN

Driver

J. C. A. R.

Special Instructions

Delivery Date & Time Required

09/03/2022

QTY Unit Description

15.00 Metre Cu Mt Topsoil - Beenham

Weighbridge Signature

Hauliers Signature

Haulage Company

Received the above in good order and condition

Signed

Print Name

Customer ordering Vehicle off the Public Road do
so entirely at their Own risk and will be liable
for any damages incurred

212827



Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161

Fax: 01322 619136

Email: enquiries@freelandhorticulture.co.uk

ORDER NOTE

Customer/Delivery Address

Henry Construction Projects Limited
Delivey To
Weldale St
Reading
RG1 7BX

Customer Order No

P1268/002

Delivery Ticket No

161213

Vehicle Registration

JMI8 DEN

Driver

OCCDEN

Special Instructions

Delivery Date & Time Required

09/03/2022

QTY Unit Description

15.00 Metre Cu Mt Topsoil - Beenham

Weighbridge Signature

Hauliers Signature

Haulage Company

Received the above in good order and condition

Signed

Print Name

Customer ordering Vehicle off the Public Road do
so entirely at their Own risk and will be liable
for any damages incurred

Invoice No
058249



Invoice Date
25/03/2022

INVOICE

Henry Construction Projects
Limited
Parkway Farm,
Church Farm,
Cranford,
Hounslow

Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161
Fax: 01322 619135
Email: vicky@freelandhorticulture.co.uk

Site: Henry Construction Projects Limited, Weldale St, Reading, RG1 7BX

Qty	Detail	Date	Ticket No	Order No	Unit Price	Line Total
15.00	Cu Mt Topsoil - Beenham	24/03/22	163232	P1268/002	31.52	472.80

All trading takes place on Freeland Horticulture Ltd Conditions of Sales; copies of which are available on request.

Registered in England: Roseland Nursery, College Road, Hextable, Kent BR8 7LT
VAT Registration No. 762 5393 14

Payment terms: Strictly 30 days net

Bank Details:
Barclays
Sort Code: 20-49-84
Account: 20805378

NETT AMOUNT	472.80
VAT	94.56
TOTAL	£ 567.36



J Mould Reading
Hydecroft Pit
Pingewood Road North
Burghfield Bridge

Conveyance/Delivery Note

Carrier Licence: CBDU173096

VAT Reg: GB-844 6704 12

Permit No: EPR/JB3132AR

Account No. FREEKENT**Site Address:**

FREELAND HORTICULTURE LIMITED COLLEGE ROAD SWANLEY HEXTABLE BR8 7LT	READNG C/O HENRY CONSTRUCTION WELDALE STREET READING RG1 7BX SITE CONTACT: LINDA	Ticket No: 216696 Ref: 3038 SIC Code: 41201 Vehicle Reg: JM18DEM Vehicle Type: Tipper	Date: 24/03/2022 Order No: 161232 163232
--	---	--	--

Qty	Unit	Product Type	Gross (KG)	Tare (KG)	Net (KG)
1.00	Load	Haulage Only	32000	13200	18800

Weighbridge	Date	Time	KG
Weighbridge Operator 163232	Ticket No: 216696		Gross 32000 Tare 13200 Net 18800

Producer / Carrier**Customer****Driver Name**

Charlie Ogden

Print Name

Kevin

W/b Op Name**Signature****Signature****Signature**

I, the producer/holder/transferor, confirm that I have fulfilled my duty to apply the waste hierarchy as requested by regulation 12 of the Waste (England and Wales) Regulations 2011.

Invoice No
058404



Invoice Date
30/03/2022

INVOICE

Henry Construction Projects
Limited
Parkway Farm;
Church Farm,
Cranford,
Hounslow

Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161
Fax: 01322 619135
Email: vicky@freelandhorticulture.co.uk

Site: Henry Construction Projects Limited, Weldale St, Reading, RG1 7BX

Qty	Detail	Date	Ticket No	Order No	Unit Price	Line Total
15.00	Cu Mt Topsoil - Beenham	25/03/22	163530		31.52	472.80
15.00	Cu Mt Topsoil - Beenham	25/03/22	163531		31.52	472.80

All trading takes place on Freeland Horticulture Ltd Conditions of Sales; copies of which are available on request.

Registered in England: Roseland Nursery, College Road, Hextable, Kent BR8 7LT
VAT Registration No. 762 5393 14

Payment terms: Strictly 30 days net

Bank Details:
Barclays
Sort Code: 20-49-84
Account: 20805378

NETT AMOUNT	945.60
VAT	189.12
TOTAL	£ 1,134.72



Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161
Fax: 01322 619135

Email: enquiries@freelandhorticulture.co.uk

Customer/Delivery Address

ORDER NOTE

Henry Construction Projects Limited
Delivey To
Weldale St
Reading
RG1 7BX

Customer Order No

Delivery Ticket No

Vehicle Registration

Driver

163531

Jm19 Jay

D. ABBOTT

Special Instructions

Delivery Date & Time Required

25/03/2022

QTY Unit Description

15.00 Metre Cu Mt Topsoil - Beenham

Weighbridge Signature

Hauliers Signature

Haulage Company John Mould

Received the above in good order and condition

Signed

Print Name

Customer ordering Vehicle off the Public Road do
so entirely at their Own risk and will be liable
for any damages incurred



Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161

Fax: 01322 619135

Email: enquiries@freelandhorticulture.co.uk

Customer/Delivery Address

ORDER NOTE

Henry Construction Projects Limited

Delivey To

Weldale St

Reading

RG1 7BX

Customer Order No

Delivery Ticket No

163530

Vehicle Registration

Driver

Special Instructions

Delivery Date & Time Required

25/03/2022

QTY Unit Description

15.00 Metre Cu Mt Topsoil - Beenham

Weighbridge Signature

Hauliers Signature

Haulage Company

Received the above in good order and condition

Signed

Print Name

Customer ordering Vehicle off the Public Road do
so entirely at their Own risk and will be liable
for any damages incurred

Invoice No
058581



Invoice Date
31/03/2022

INVOICE

Henry Construction Projects
Limited
Parkway Farm,
Church Farm,
Cranford,
Hounslow

Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161
Fax: 01322 619135
Email: vicky@freelandhorticulture.co.uk

Site: Henry Construction Projects Limited, Weldale St, Reading, RG1 7BX

Qty	Detail	Date	Ticket No	Order No	Unit Price	Line Total
15.00	Cu Mt Topsoil - Beenham	31/03/22	164475		31.52	472.80

All trading takes place on Freeland Horticulture Ltd Conditions of Sales; copies of which are available on request.

Registered in England: Roseland Nursery, College Road, Hextable, Kent BR8 7LT
VAT Registration No. 762 5393 14

Payment terms: Strictly 30 days net

Bank Details:
Barclays
Sort Code: 20-49-84
Account: 20805378

NETT AMOUNT	472.80
VAT	94.56
TOTAL	£ 567.36

Freeland

HORTICULTURE LIMITED

Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Tel: 01322 619161
Fax: 01322 619135

Email: enquiries@freelandhorticulture.co.uk

Customer/Delivery Address

Henry Construction Projects Limited
Delivey To
Weldale St
Reading
RG1 7BX

ORDER NOTE

Customer Order No

Delivery Ticket No

Vehicle Registration

Driver

164475

OM12 AEM

OACDEN

Special Instructions

Delivery Date & Time Required

31/03/2022

QTY	Unit	Description
15.00	Metre	Cu Mt Topsoil - Beenham

Weighbridge Signature

Hauliers Signature

Haulage Company

Received the above in good order and condition

Signed

Print Name

Customer ordering Vehicle off the Public Road do
so entirely at their Own risk and will be liable
for any damages incurred

APPENDIX E – PRE-IMPORTATION CHEMICAL TESTING

Freeland Horticulture Ltd
Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Attention : Philippa Lambourne

Our Ref: 1020-SA

8 March 2022

Dear Philippa

Topsoil Analysis Report : Beenham Topsoil –March 2022

We have completed the analysis of the topsoil sample recently taken from the above site and it has been forwarded to an approved laboratory for analysis and have the pleasure of reporting our findings. The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes and its compliance with the current British Standard for topsoil (BS3882).

SOIL SAMPLING & EXAMINATION

At the time of our sampling visit the topsoil was stored in a stockpile. A series of 10 hand augered trial holes were constructed across the stockpile for the purpose of soil examination and sample collection. As the soil examination confirmed a consistent topsoil composition, the ten samples were combined together to form one composite sample for analysis purposes. The soil was described as dark brown, slightly moist and friable with a well-developed, fine to medium granular structure. The soil contained a low fraction of small stones and no deleterious materials (eg. building waste materials, glass, roots or rhizomes of pernicious weeds) or unusual odours (eg. hydrocarbons) were recorded.

LABORATORY ANALYSIS

The topsoil sample was submitted to a UKAS and MCERTS accredited laboratory for routine physical and chemical parameters to confirm the composition and fertility of the soil. The following parameters were determined:

- ⊕ pH & electrical conductivity values;
- ⊕ major plant nutrients (N, P, K, Mg) & organic matter content;
- ⊕ particle size distribution and stone content;
- ⊕ heavy metals & potentially toxic elements (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, B);
- ⊕ sulphate, sulphur, sulphide;
- ⊕ total cyanide and total (mono) phenols;
- ⊕ speciated PAHs (US EPA16)
- ⊕ banded aromatic and aliphatic petroleum hydrocarbons (C₅-C₃₅).
- ⊕ Asbestos

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

COMMENTS

pH & Electrical Conductivity (salinity) Values

The sample was alkaline in nature (pH 8.5) with a pH value that would be considered suitable for general landscaping purposes.

The electrical conductivity (salinity) value using the soil:water extract was (1075 μ S/cm) indicating that soluble salts are not present at levels that would be harmful to plants.

The electrical conductivity values by CaSO₄ extract (BS3882 requirement) fell below the maximum specified value (3300 μ S/cm) given in BS3882:2015.

Organic Matter & Nutrient Status

The sample was rich in organic matter and all major plant nutrients. No further additions of compost or fertiliser are required, or indeed recommended, for at least the first growing season.

The C:N ratio of the sample was acceptable for general landscape purposes.

Particle Size Distribution & Stone Content

The sample contained 74% sand and fell into the Sandy loam texture class. This particle size distribution is considered suitable for a broad range of landscape applications, including tree and shrub planting, turfing and seeding.

The sample was Virtually free from stones of 50 mm and upwards in diameter and only contained a slight fraction of smaller stones (2.4%). As such, stones will not restrict the use of the soil for landscaping purposes.

Potential Contaminants

We are not aware of any specified contaminant levels set for the proposed end-use of this topsoil. This includes human health, environmental protection and metals considered toxic to plants. In the absence of any site-specific assessment criteria, the concentrations that affect human health have been compared with the 'residential with homegrown produce' land use in the Suitable For Use Levels presented in 'The LQM/CIEH S4UIs' for Human Health Risk Assessment (2015) and DEFRA SP1010: 'Development of Category 4 Screening Levels' for Assessment of Land Affected by Contamination – Policy Companion Document (2014).

Of the potential contaminants determined, none was found at levels that would exceed their respective guideline values.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes. From the soil examination and laboratory analysis, the soil is described as an alkaline, non-saline, Sandy Loam. The organic matter and nutrient levels are acceptable, and no significant contamination was found with respect to the parameters determined. This soil would adhere to the current BS3882 specification for 'multipurpose grade'.

To conclude, based on our findings, the topsoil would be considered well-suited to general landscaping purposes provided the physical condition of the soil is maintained.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if you have any queries or comments.

George Longmuir MSc Soil Sci. M.I Soil Sci.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Beenham, Berkshire
Month/Year	March 22
Our Ref	1020-SA
Date	08 March 2022

Composite sample

pH Value & Salinity

pH value (1:2.5 soil/water ext)	units
Electrical Conductivity (1:2.5 soil/water ext)	µS/cm
Electrical Conductivity (1:2.5 soil/CaSO ₄ ext)	µS/cm
Neutralising Value (CaCO ₃ equivalent)	%

8.5
1075
2979
4.7

Organic Matter & Nutrient Status

Organic Matter (LOI)	%
Organic Carbon (Derived)	%
Total Nitrogen	%
Carbon:Nitrogen Ratio	:1
Available Phosphorus	mg/l
Available Potassium	mg/l
Available Magnesium	mg/l

11.0
6.4
0.488
13.1
52.4
1226
128

Particle Size Analysis & Stones

Clay (<0.002mm)	%
Silt (0.063-0.002mm)	%
Sand (2.0-0.063mm)	%
Texture Class	UK Class

13
14
74
SandyLoam

Stones 2-20mm	% by DW
Stones 20-50mm	% by DW
Stones >50mm	% by DW

2.4
0.0
0.0

Potential Contaminants

Total Arsenic (As)	mg/kg
Total Cadmium (Cd)	mg/kg
Total Chromium (Cr)	mg/kg
Hexavalent Chromium (Cr ^{VI})	mg/kg
Total Copper (Cu)	mg/kg
Total Lead (Pb)	mg/kg
Total Mercury (Hg)	mg/kg
Total Nickel (Ni)	mg/kg
Total Selenium (Se)	mg/kg
Total Zinc (Zn)	mg/kg
Total Beryllium (Be)	mg/kg
Total Barium (Ba)	mg/kg
Total Vanadium (V)	mg/kg
Hot Water Soluble Boron (B)	mg/kg
Total Cyanide (CN)	mg/kg
Elemental Sulphur (S)	mg/kg
Easily Liberated Sulphide (S ²⁻)	mg/kg
Water Soluble Sulphate (SO ₄ ²⁻)	mg/l
Total Phenols Index	mg/kg
Asbestos Screen	-

10.8
0.18
15.0
1.2
14.3
20.6
<0.2
11.5
0.36
51.4
<1
44.9
24.7
1.4
<1
<5
<1
67.3
<1
N.D.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Beenham, Berkshire
Month/Year	March 22
Our Ref	1020-SA
Date	08 March 2022

Polyaromatic Hydrocarbons

Naphthalene	mg/kg	<0.05
Acenaphthylene	mg/kg	<0.05
Acenaphthene	mg/kg	<0.05
Fluorene	mg/kg	<0.05
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.05
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo[a]anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo[b]fluoranthene	mg/kg	<0.1
Benzo[k]fluoranthene	mg/kg	<0.1
Benzo[a]pyrene	mg/kg	<0.1
Indeno[1,2,3-cd]pyrene	mg/kg	<0.1
Dibenzo[a,h]anthracene	mg/kg	<0.1
Benzo[g,h,i]perylene	mg/kg	<0.1
Total PAHs sum US EPA 16	mg/kg	<1

Banded Petroleum Hydrocarbons

Aliphatic TPH >C ₅ -C ₆	mg/kg	<0.05
Aliphatic TPH >C ₆ -C ₈	mg/kg	<0.08
Aliphatic TPH >C ₈ -C ₁₀	mg/kg	<0.05
Aliphatic TPH >C ₁₀ -C ₁₂	mg/kg	<10
Aliphatic TPH >C ₁₂ -C ₁₆	mg/kg	<10
Aliphatic TPH >C ₁₆ -C ₂₁	mg/kg	<10
Aliphatic TPH >C ₂₁ -C ₃₅	mg/kg	<10
Aliphatic TPH >C ₃₅ -C ₄₄	mg/kg	<12

Aromatic TPH >C ₅ -C ₇	mg/kg	<0.05
Aromatic TPH >C ₇ -C ₈	mg/kg	<0.05
Aromatic TPH >C ₈ -C ₁₀	mg/kg	<0.05
Aromatic TPH >C ₁₀ -C ₁₂	mg/kg	<10
Aromatic TPH >C ₁₂ -C ₁₆	mg/kg	<10
Aromatic TPH >C ₁₆ -C ₂₁	mg/kg	<10
Aromatic TPH >C ₂₁ -C ₃₅	mg/kg	120
Aromatic TPH >C ₃₅ -C ₄₄	mg/kg	<12

Total Petroleum Hydrocarbons (C ₅ -C ₄₄)	mg/kg	120
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BTEX

Benzene	mg/kg	<0.02
Toluene	mg/kg	<0.2
Ethyl Benzene	mg/kg	<0.04
m- & p-Xylene	mg/kg	<0.2
o-Xylene	mg/kg	<0.1

APPENDIX F – ORANGE ALERT BRARRIER SPECIFICATION

- 1. Description** Thick needleponched nonwoven geotextile manufactured from 100% virgin polypropylene high tenacity fibres.
- 2. Applications** Typical applications for GEOfabrics' HPS Geotextiles include, but are not limited to:
 - Heavy duty soil filters in civil applications
 - A warning layer for future excavation
- 3. Features**
 - Optimised for maximum strength and performance – not mass
 - Available in wide widths to allow for minimal construction costs – up to 6m
 - Manufactured from a unique blend of high tenacity fibres providing class leading durability
 - 100% virgin polypropylene fibres for guaranteed durability
 - Vivid orange



	Test Standard	Unit	Mean Values
4. Mechanical Properties			
Static puncture (CBR)	EN ISO 12236	kN	6
Tensile strength (MD/CMD)	EN ISO 10319	kN/m	35
Tensile elongation (MD/CMD)		%	80
Cone drop	EN ISO 13433	mm	4
5. Filter Properties			
Apparent opening size	EN ISO 12956	µm	80
Water permeability v_{H50}	EN ISO 11058	l/(m ² ·s)	55
Coefficient of permeability		m/s	$5.7 \cdot 10^{-3}$
6. Physical Properties			
Thickness @ 2kPa (Nominal)	EN ISO 9863-1	mm	5.2
Standard colour			Orange
Polymer			100% virgin polypropylene

Notes:

- a) Mean values indicate the arithmetic mean derived from the samples taken for any one test as defined in the standard – usually an overall mean of five samples. Mean values are subject to tolerances based on 95% confidence limits as published on the product CE declaration of performance.
- b) Nominal Value (indicates an average manufacturing norm and not a controlled performance parameter).
- c) MD: Machine Direction (longitudinal to the roll).
- d) CMD: Cross Machine Direction (across the roll).
- e) Tensile testing is performed using extensometers.

	Test Standard	Values
7. Durability – Composite		
Weathering 50 MJ/m ² (1 month)	EN ISO 12224	>90% Retained Strength
Microbiological resistance	EN ISO 12225	No loss in strength
Resistance to acids & alkalis	EN ISO 14030	No loss in strength
Oxidation at 112 days (100 years)	EN ISO 13438	>90% Retained Strength

8. Needle Detection

During manufacture, the protection geotextile passes close to three sets of magnets which remove metal particles up to 12g and >2mm. Just before the roll up, the geotextile passes through an electronic metal detection field. Audio and visual alarms indicate if metal particles are detected. Rolls are sent to stock if they pass through the field without an alarm event or, in the case of an alarm event, the operator inspects the suspect area, locates any metal particles and removes them. If unsuccessful, or if any doubt remains as to the presence of metal particles, then the roll goes to the re-inspection facility.

9. Testing

All materials are tested every 6000m² in an UKAS accredited ISO 17025 laboratory to all mechanical properties prior to release.

10. Storage

The geotextiles are supplied in packaging designed to protect the product from damage during handling, storage and degradation as a result of UV exposure. The product should be kept in appropriate packaging until such time that it is required for installation. The product is clearly and indelibly marked with the product name along the edge of the roll at regular intervals no greater than 5m. The packaging is labelled clearly to identify the product supplied in accordance with EN ISO 10320: Geotextile and Geotextile related products – Identification on site. Use slings where provided. Product weights are given on roll tickets. Use equipment appropriate to weight and dimension. Store and handle in accordance with good occupational hygiene and safety practice.

	Unit	Values
11. Dimensions		
Standard roll length	m	150
Standard roll width	m	6
Approximate roll weight	Kg	530

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