PREPARATION AND TOPSOILING SPECIFICATION

HOYLAND WEST

Hoyland

Barry Chinn Associated Limited
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Reference:	HOY-BCA-ELS-XX-SP-L-S8-2044/20-SP02-P1
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1.0 DRAWING REFERENCES

This Specification is to be read in conjunction with Newlands Developments Ltd. Preparation & Topsoiling Drawings to be prepared by Barry Chinn Associates Ltd. once the Infrastructure/ Building Contractor has commenced works on site.

2.0 EXISTING SITE TOPSOIL

If there is existing soil available on site, it must be tested in accordance with the criteria set out in this specification.

The Infrastructure/Building Contractor shall appoint an approved soil science consultancy to carry out soil testing of the proposed soil resource (whether from on site or imported material) at the earliest opportunity. The results of survey work and laboratory analysis shall be presented in an interpretive report to be provided by the soil science consultancy. This will provide the necessary information to establish the locations and depths of existing site topsoil prior to stripping or excavating for re-use and shall include chemical and physical soil analysis in accordance with the list of parameters given in clause 6.0 'Soil Analysis'.

A copy of this specification and where available the proposed planting list/drawings shall be provided for the soil scientist to carry out his work.

The report shall comment on the suitability or the proposed topsoil and subsoil for the proposed landscape scheme, with reference to the sizes and species of plants, tuft, seed species mixes proposed. The report shall take into account the implications that extensive earthworks and soil handling will have on soil quality and shall identify the best quality soils for re-use where applicable, along with recommendations as to how soils may be improved if necessary including cultivation techniques and fertiliser/ lime/ compost application types and rates.

NOTE:

On completion of the Infrastructure/ Building Contract, the Infrastructure/ Building Contractor must confirm to Newlands Developments Ltd. in writing that preparation and topsoiling has been carried out in accordance with the preparation and topsoiling specification and earthworks drawings.

This will facilitate the defects liability clause for subsequent planting contract works with Whiting Landscape Ltd.

3.0A IMPORTED TOPSOIL (IF REQUIRED)

Imported topsoil shall have the following characteristics:

1. <u>Texture</u>

   Sand (0.063-2.00mm) - maximum 85%, minimum 50%
   Silt (0.002-0.063mm) - maximum 45%, minimum 5%
   Clay (< 0.002mm) - maximum 27%, minimum 5%

2. Stone Content

Stone content to be not more than 35% by dry weight of which the fraction 2 mm - 5 mm must not exceed 20% by dry weight. Maximum particle size in any dimension 50mm for trees and shrubs, and 20mm for turfing or seeding.

3. Organic Matter

Organic content to be 4-15% by dry weight to BS3882:2015 method.

4. Soil Reaction

pH to be between 5.5 and 8.5.

5. Electrical Conductivity Values

Conductivity to be between 100-1500 microSeimens per cm when expressed on a 1:2.5 (w/v) soil/water extract.

Conductivity to be below 3300 microSeimens per cm when expressed on a 1:2 (w/v) soil/$CaSO_4$ extract.

6. Nitrogen

Nitrogen (N) content to be not less than 0.15% by the Dumas method.

7. Phosphorus

Extractable phosphorus (P) content to be between 26 - 100 mg/kg by the MAFF Handbook RB 427 method.

8. Potassium

Extractable potassium (K) content to be between 240 – 1500 mg/kg by the MAFF Handbook RB 427method.

9. Magnesium

Extractable magnesium (Mg) content to be not less than 50 mg/kg by the MAFF Handbook RB 427 method.

10. Foreign Matter

Soil to be free from non-soil material, brick and other building materials and wastes, potential sharps, hydrocarbons, plant matter, roots of perennial weeds and any other foreign matter.

11. Structure

Soil to have a clearly defined crumb, granular or blocky structure and not to be waterlogged, anaerobic or over compacted.

12. Potential Contaminants

The Soil Analysis suite specified in Clause 6.0 includes commonly occurring potential contaminants. In accordance with BS3882:2015 Table 1, Notes 3 and 4: *concentrations of*

contaminants shall not present excessive risk to human health or the environment. The contaminants analysed should reflect the intended end use of the site where the topsoil is to be used, for example residential or commercial use.

(See Appendix A for list of Generic Assessment Criteria for commercial and residential use. Exceedance of relevant criteria should be reviewed by soil consultancy through quantitative risk assessment relating to site end use).

3.0B IMPORTED SUBSOIL (IF REQUIRED)

Imported subsoil shall have the following characteristics:

1. Texture

   Sand (0.063-2.00mm) - maximum 90%, minimum 65%
   Silt (0.002-0.063mm) - maximum 35%, minimum 5%
   Clay (< 0.002mm) - maximum 20%, minimum 5%

2. Stone Content

   Stone content to be not more than 35% by dry weight. Maximum particle size in any dimension 75mm.

3. Organic Matter

   Organic content to be less than 1.5% by dry weight to BS8601:2013 method.

4. Soil Reaction

   pH to be between 5.5 and 8.5.

5. Electrical Conductivity Values

   Conductivity to be below 1500 microSeimens per cm when expressed on a 1:2.5 (w/v) soil/water extract.

   Conductivity to be below 3300 microSeimens per cm when expressed on a 1:2 (w/v) soil/CaSO4 extract.

6. Foreign Matter

   Soil to be free from non-soil material, brick and other building materials and wastes, potential sharps, hydrocarbons, plant matter, roots of perennial weeds and any other foreign matter.

7. Structure

   Soil to have a clearly defined crumb, granular or blocky structure and not to be waterlogged, anaerobic or over compacted.

8. Potential Contaminants

   The Soil Analysis suite specified in Clause 6.0 includes commonly occurring potential contaminants. In accordance with BS8601:2013 Clause 4.2, Notes 2 and 3: concentrations of contaminants shall not present excessive risk to human health or the environment. The

contaminants analysed should reflect the intended end use of the site where the subsoil is to be used, for example residential or commercial use.

(See Appendix A for list of Generic Assessment Criteria for commercial and residential use. Exceedance of relevant criteria should be reviewed by soil consultancy through quantitative risk assessment relating to site end use).

4.0 SOURCE

The Infrastructure/ Building Contractor shall advise Newlands Developments Ltd. (Project Manager/Agent) of the supply source and existing use of the topsoil and if requested shall provide opportunity for the proposed topsoil to be viewed at source.

5.0 TOPSOIL ASSESSMENT

Each source shall be analysed by an approved soil science consultancy. A copy of this document, together with details of the proposed landscape design (drawings, planting list, etc) and any ground investigation reports, shall be provided with the samples for review by the soil scientist and for reference within the topsoil/subsoil assessment report.

Each sample shall be truly representative of the topsoil/subsoil being offered. A composite sample shall be taken for every 1000m^3 of soil being offered, with a minimum of 3 No. samples per source. Each composite sample is to be made up of 10 No. sub-samples taken from evenly spaced locations across the field / stockpile. The sub-samples shall be mixed together to form a 2kg composite sample.

The Infrastructure/ Building Contractor shall obtain a sample load of each approved topsoil source of not less than five cubic metres for inspection Newlands Developments Ltd. (Project Manager/Agent). The accepted sample is to be retained on site for comparison with the subsequent loads. Prior to inspection by Newlands Developments Ltd. (Project Manager/Agent) the sample must have been analysed in accordance with the requirements of the topsoil analysis clause below.

6.0 SOIL ANALYSIS

The Infrastructure/ Building Contractor shall provide a topsoil/subsoil analysis report from the soil science consultancy. Each composite topsoil/subsoil sample shall be placed in a plastic bag, labelled with name and details of origin and sent to the soil science consultancy with a request for the following tests to be carried out:

1. Visual examination to record: Munsell colour, structure, consistency, stone size and shape, presence of any deleterious materials
2. pH Value
3. Electrical Conductivity (water and calcium sulphate extracts)
4. Mechanical Analysis (clay, silt, sand)
5. Stone Content (>2mm, >20mm, >50mm)
6. Total Nitrogen (topsoil only)
7. Extractable Phosphorus, Potassium & Magnesium (topsoil only)

8. Organic Matter

9. Heavy Metals - As Cd Cr Pb Hg Se Cu Ni Zn B

10. Total Cyanide

11. Phenol

12. PAHs (speciated US EPA 16)

13. Aliphatic and aromatic TPH banding (C5-C35)

The results shall be presented in an interpretive report which shall comment on the suitability of the topsoil/subsoil for the proposed landscape design. The report shall also provide recommendations to improve the topsoil/subsoil, where necessary, including compost, fertiliser and lime applications.

Newlands Developments Ltd. (Project Manager/Agent) may ask for additional tests (eg. permeability, detailed sand analysis, porosity), should it be considered necessary.

7.0 APPROVED SOIL SCIENCE CONSULTANCIES

Tim O'Hare Associates LLP
Howbery Park
Wallingford
Oxon
OX10 8BA
T: 01491 822653
E: tim.ohare@toha.co.uk
W: www.timohare-associates.com
Contact: Tim O'Hare

Land Research Associates Ltd.
Lockington Hall
Lockington
Derby
DE74 2RH
T: 01509 670570
E: mike.palmer@lra.co.uk or laura.thomas@lra.co.uk
W: www.lra.co.uk
Contact: Mike Palmer or Laura Thomas

8.0 VEGETATION TO BE RETAINED

The Infrastructure/ Building Contractor shall take the necessary measures to prevent damage to existing vegetation, and unless otherwise instructed, retain existing levels beneath the canopy of existing trees (unless identified specifically for removal) and shall protect existing trees and vegetation by the erection of fencing in accordance with the Tree Protection Plans or in accordance with BS 5837:2012 'Trees in Relation to Design, Demolition and Construction - Recommendations.

9.0 TOPSOIL STRIP

The site topsoil which is to be retained for later use shall be stripped and stock piled. The following method shall be used as instructed by Newlands Developments Ltd. (Project Manager/Agent).

1. The existing vegetation shall be treated with herbicide in accordance with the clause for herbicide treatment.

2. The Infrastructure/Building Contractor should seek advice on how to dealt with any injurious or notifiable weeds if found on site and carry out eradication methods in accordance with applicable environmental legislation.

3. The site shall be cleared of foreign materials.

4. The topsoil shall be stripped down to its full natural depth, taking care to avoid contamination with subsoil or foreign materials.

NOTE

The risk of damage to soil structure is to be managed by the Infrastructure/ Building Contractor by planning preparation and topsoiling operations during appropriate weather conditions. It is the responsibility of the Infrastructure/ Building Contractor to provide the planting medium suitable for plant establishment.

10.0 TOPSOIL STORAGE

Storage Period

Topsoil for use on the site shall be stored for as short a period as practicable. Existing topsoil shall not be stored for more than 18 months.

Stockpile

Topsoil stockpiles shall be graded to shallow falls over as large an area as practical, to a maximum height (depth) of 2 to 5 metres, unless otherwise instructed by the Soil Scientist.

Weed Control

The Infrastructure/Building Contractor shall carry out broad-leaved weed control to the topsoil storage mound using a suitable selective, translocated, non-residual herbicide spray. Herbicide spray to be carried out 3 no times during early May, early July and early September. Refer to clause for herbicide treatment.

11.0 FORMATION LEVEL AND SUBSOIL PREPARATION

Prior to preparation of formation level, the subsoil shall be completely cleared of all weed growth by the main contractor using an approved herbicide in accordance with the clause for herbicide treatment below.

The site shall be brought to formation level by the Infrastructure/Building Contractor using a suitable subsoil material. All soil handling should be carried during appropriate weather conditions to ensure that soils do not become plastic in consistency.

The subsoil shall be decompacted to a depth of at least 300mm in grass and ornamental shrub areas and 300mm in woodland/thicket/hedge planting areas (increased to 600mm in heavy/ clay soils) to ensure the areas are free draining and be completely free of all rubbish, bricks and concrete.

For small planting beds and areas of restricted access, decompaction may be carried out by hand or a small (1-5 tonne) to medium sized (13 tonne) tracked excavator, fitted with a ripper tine attachment, shall be used. On larger, open areas a tractor mounted rigid tine harrow (300mm depth) or subsoiler (600mm depth) shall be used.

At completion of preparation and topsoiling works, all proposed planting and grassed areas shall be completely free of all rubbish, bricks and concrete.

The base of tree pits should be decompacted to a depth of at least 300mm and checked to ensure that they are free draining.

The Infrastructure/ Building Contractor shall obtain Newlands Developments Ltd. (Project Manager/Agent) acceptance of formation levels and subsoil preparation prior to the commencement of topsoiling.

12.0 TREE PITS

The Infrastructure/ Building Contractor shall install tree pits in accordance with the earthworks drawings and provide short stakes to mark the exact positions of tree pits for acceptance by Newlands Developments Ltd. (Project Manager/Agent) prior to pit excavation and retain in the same position after topsoiling.

(If site specific earthworks drawings are not available, refer to Appendix C; Typical Tree Pit Detail In Soft Landscape).

Tree pits are to be:

1000 x 1000 x 750 overall depth; (14-16cm trees)

1500 x 1500 x 900 overall depth; (16-18, 18-20, 20-25, 25-30cm)

2000 x 2000 x 1000 overall depth; (Semi-mature >40cm)

2500 x 2500 x 1000 overall depth; (Trees in Hard Surface Areas-edit as required)

On sloping ground; maintain horizontal bases and vertical sides with no less than minimum depth across base. The base of tree pits should have slightly raised centre and be de-compacted to a depth of at least 300mm. Backfilling material to be as dug topsoil or quarried sand below rootball subject to soil consultants recommendations.

Protection of Tree Pits

All excavated tree pits must be rendered safe particularly when close to public thoroughfares and must not be left open or unmarked.

Tree Pit Rootbarriers

To be installed by the Infrastructure/ Building Contractor if identified on preparation & topsoiling drawings or as required to protect paving or underground services. Manufacturer and product reference to be as Infrastructure/ Building Contractor's choice (appropriate to depth/type of services/apparatus to be protected). Depth of top of rootbarrier below finished soil level to be 50mm to be installed in accordance with suppliers recommendations with sides vertical and deflecting ribs (if incorporated) facing the tree.

Tree Pit Drainage

The base of tree pits should be de-compacted to a depth of at least 300mm and flood tested by the Infrastructure/ Building Contractor to ensure that they are free draining. If required, tree pit to be over excavated to enable installation of drainage layer consisting of 150mm depth clean gravel or broken stone with no fines, graded 40-20mm. Within this layer, 80mm diameter perforated plastic pipe to be laid around the perimeter of the pit with connection to soakaway, ditch or land drains as directed by drainage Engineer. Geotextile filter membrane to be placed over drainage layer before backfill material of as dug topsoil or quarried sand below rootball subject to soil consultant's recommendations.

13.0 SPREADING TOPSOIL

Soil Handling & Weather

Soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency (at least 5% below the Lower Plastic Limit).

Topsoil shall not be unnecessarily compacted by trampling or trafficking by site machinery. Topsoil handling shall be stopped during and after heavy rainfall, and not continued until the soil is again non-plastic in consistency.

Soil Depths

Topsoil depths and finished levels are to be as indicated on the Earthworks Layout and Sections drawings.

Minimum subsoil depths are to be as follows:

i in shrub bed areas 300mm

ii in thicket areas 600mm

iii in grassed areas 300mm

Topsoil depths are to be as follows:

i in tree pits 300mm

ii in shrub bed areas 300mm

iii in thicket areas 300mm

iv in grassed areas 150mm

Ground Modelling

(Refer to Appendix B; Typical Section Through Ground Modelling). There shall be no ponding hollows within ground modelling.

Gradients

Finished gradients are to be smooth, flowing, free of minor hollows and high spots and marry in neatly with paving, kerbs, edgings, manhole covers and existing levels. Refer to Earthworks Layout and Sections drawings for landform levels and profiles.

Inspection Covers

Inspection covers to be inclined to marry with adjacent earthworks profiles and levels. The minimum topsoil depth to be achieved over concrete manhole slabs (where constructed) shall be 300mm depth in shrub areas and 150mm depth in grass areas. This should be achieved by raising covers on brickwork (refer to Appendix B typical section through ground modelling). Inspection covers should be located in either shrub or grass areas a minimum of 750mm from the edge of either finish. If the covers are square or rectangular they should be positioned so they are parallel to the adjacent edge (grass

edge, kerb edge, footpath edge, building line, etc.). If distant from edges covers shall be parallel to the contours.

Contamination

Any areas of topsoiling that are contaminated with subsoil, rubbish, bricks, concrete, tarmac and other deleterious material shall be removed by the Main Contractor in the course of carrying out the earthworks.

The Main Contractor shall be required to carry out stone picking to all topsoiling to ensure it is free from all stones greater than 50mm.

Compaction

Topsoiled areas shall be in an uncompacted and uncontaminated state prior to setting out of shrub and grass areas.

15.0 SUBSOIL MATERIAL FOR WILDFLOWER/GRASSLAND AREAS

Areas to be wildflower seeded are to be covered with 300mm depth well graded selected low fertility material which shall be suitable for the cultivation operations proposed, to achieve a fine tilth for seeding. Proposed material may be tested to confirm that it is suitable for use for the specified seed mixes and free from contamination and injurous, notifiable or noxious weeds.

The subsoil shall be decompacted to a depth of at least 200mm to ensure the areas are free draining and be completely free of all large lumps of clay, rubbish, bricks and concrete. Subsoiled areas shall be completely cleared of all weed growth using an approved herbicide in accordance with the clause for herbicide treatment below.

A sample area of subsoil shall be prepared for approval prior to preparation of remaining areas.

16.0 HERBICIDE TREATMENT

Use of chemicals shall comply with the **Plant Protection Products (Sustainable Use) Regulations 2012** and **Codes of Practice** prepared jointly by the Department for Environment, Food and Rural Affairs (DEFRA), the Health and Safety Commission (HSC) and the National Assembly for Wales Environment, Planning and Countryside Department. All herbicides shall be on current list of approved products.

Storage, handling and application of chemical shall be in accordance with the manufacturers' instructions. The Contractor shall be responsible for any damage caused by spray drift and will make good at own expense.

Sufficient time for herbicide to be effective shall be allowed to elapse between application of herbicide and the commencement of any stripping or grading works.

APPENDIX A; POTENTIAL CONTAMINANTS – GENERIC ASSESSMENT CRITERIA (GAC)

The following Generic Assessment Criteria (GAC) should be used as Tier 1 screening values for the assessment of topsoil and subsoil, unless Site-Specific Assessment Criteria (SSAC) are available for the site where the soil(s) is to be used. In circumstances where any of these values are exceeded, further risk assessment and/or testing should be undertaken to confirm the significance of the non-compliance.

	Commercial mg/kg	Residential mg/kg
Inorganic Arsenic	<640	<37
Cadmium	<190	<11
Chromium III	<8600	<910
Chromium VI	<33	<6
Lead	<2330	<200
Inorganic Mercury	<58	<1.2
Selenium	<12000	<250
Copper	<100	<100
Nickel	<60	<60
Zinc	<200	<200
Soluble Boron	<3	<3
Total Cyanide	<20	<20
Phenol	<760	<550
Acenaphthene	<84000	<210
Acenaphthylene	<83000	<170
Anthracene	<520000	<2400
Benz[a]anthracene	<170	<7.2
Benzo[a]pyrene	<35	<2.2
Benzo[b]fluoranthene	<44	<2.6
Benzo[ghi]perylene	<3900	<320
Benzo[k] fluoranthene	<1200	<77
Chrysene	<350	<15
Dibenzo[ah]anthracene	<3.5	<0.24

Fluoranthene	<23000	<280
Fluorene	<63000	<170
Indeno[123-cd]pyrene	<500	<27
Naphthalene	<190	<2.3
Phenanthrene	<22000	<95
Pyrene	<54000	<620

Petroleum Hydrocarbons

	Commercial mg/kg	Residential mg/kg
Aliphatics		
EC 5-6	<3200	<42
EC >6-8	<7800	<100
EC >8-10	<2000	<27
EC >10-12	<9700	<130
EC >12-16	<59000	<1100
EC >16-35	<1600000	<65000
Aromatic		
EC 5-7 (benzene)	<26000	<70
EC >7-8 (toluene)	<56000	<130
EC >8-10	<3500	<34
EC >10-12	<16000	<74
EC >12-16	<36000	<140
EC >16-21	<28000	<260
EC >21-35	<28000	<1100

APPENDIX B: TYPICAL SECTION THROUGH GROUND MODELLING

Formation level shall be completely free off all rubbish, bricks and concrete and shall be decompacted using a tined ripper (300mm depth or subsoiler (which should be increased to 600mm depth for heavy/ clay soils) prior to any topsoiling taking place to ensure free drainage and plant root penetration. For small areas de-compaction may be carried out by hand or tracked excavator fitted with ripper tine attachment.

300mm depth topsoil to shrub, native thicket and hedge planted areas.

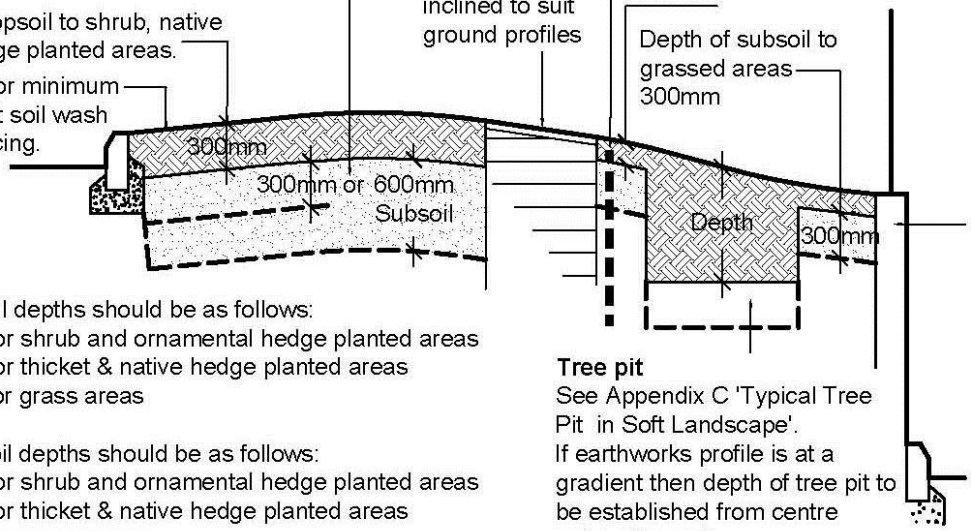
1 in 10 margin for minimum of 1m to prevent soil wash onto hard surfacing.

Rootbarrier installation if required to protect drainage apparatus, ducting or utilities if within 3m of proposed tree pits (Main Contractor site Engineer to confirm requirement)

Manhole covers inclined to suit ground profiles

Depth of topsoil to grassed areas 150mm

Depth of subsoil to grassed areas 300mm



Slopes to be concave, not convex, without ponding and hollows

Unless advised otherwise by Engineer: 1 in 3 max. gradient for slopes to accomodate grass/shrub planting, 1 in 3 max. gradient for slopes to accomodate tree planting.

Engineer to input advise on slope / topsoil stability at whatever gradient.

Slope stabilisation/retaining structure required if unsupported earthworks profile gradient exceeds 1 in 3 subject to landscape treatment.

Slope stabilisation/retaining structure to have specialist design input. Safety rail to top of structure to be provided if required.

Generally topsoil depths should be as follows:
300mm Depth for shrub and ornamental hedge planted areas
300mm Depth for thicket & native hedge planted areas
150mm Depth for grass areas

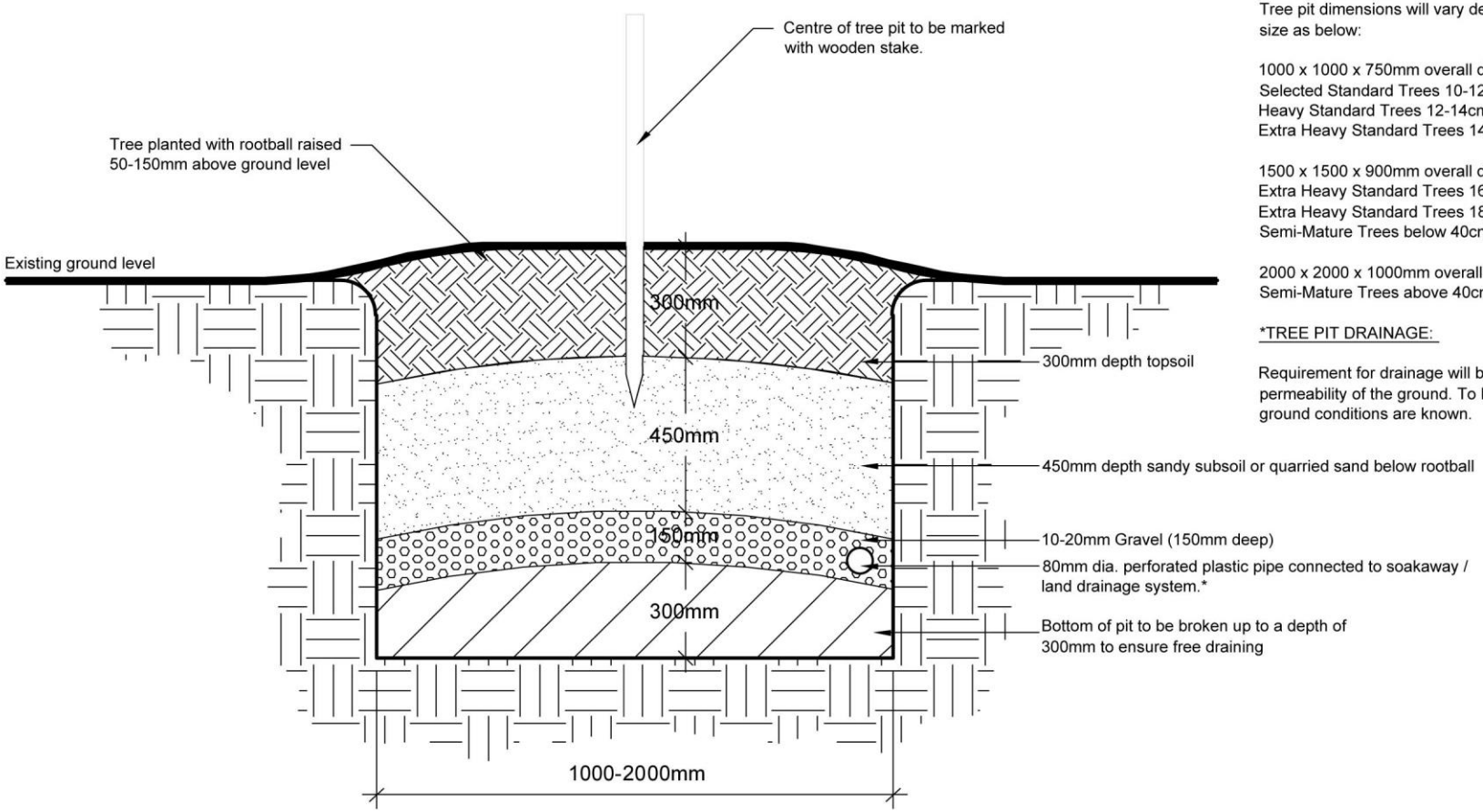
Generally subsoil depths should be as follows:
300mm Depth for shrub and ornamental hedge planted areas
600mm Depth for thicket & native hedge planted areas
300mm Depth for grass areas

Tree pit
See Appendix C 'Typical Tree Pit in Soft Landscape'.
If earthworks profile is at a gradient then depth of tree pit to be established from centre point of tree pit.

Finished levels are to be smooth and flowing, free of minor hollows and high spots, and to marry neatly with paving, kerbs, edgings, manhole covers and existing levels to be retained. Manhole covers to be inclined to marry with ground modelling.

Tree pit sizes to be as specification. To be 300mm depth topsoil with 450mm depth sandy subsoil or quarried sand below rootball (over 150mm depth gravel drainage layer if ground conditions require). Base of tree pit to be broken up/de-compacted to a depth of 300mm to assist free drainage

APPENDIC C: TYPICAL TREE PIT DETAIL IN SOFT LANDSCAPE



NOTE:

TREE PIT SIZES:

Tree pit dimensions will vary depending on rootball size as below:

1000 x 1000 x 750mm overall depth:
Selected Standard Trees 10-12cm stem girth;
Heavy Standard Trees 12-14cm stem girth;
Extra Heavy Standard Trees 14-16cm stem girth.

1500 x 1500 x 900mm overall depth:
Extra Heavy Standard Trees 16-18cm stem girth;
Extra Heavy Standard Trees 18-20cm stem girth;
Semi-Mature Trees below 40cm stem girth.

2000 x 2000 x 1000mm overall depth:
Semi-Mature Trees above 40cm stem girth.

*TREE PIT DRAINAGE:

Requirement for drainage will be dependent on permeability of the ground. To be confirmed when ground conditions are known.