Preparation of Suitable Sub-Grades

1. Description of works

Preparation of a suitable sub-grades for hard surfaces. This is a typical, non-site-specific technical detail only. Setting out completed by TGL. Larger areas to be set out by a Setting Out Engineer. SOP to be read in conjunction with relevant job specifications, drawings and site-specific RAMS for additional health and safety information prior to commencement of works. SOP to be read in conjunction with Unbound Sub-Bases for Paved Surfaces (ref SOP 02).

2. Sequence of Events

2.1 Site Arrival & Induction

Appropriate site induction is to be carried out before commencing work for any staff members or contractors who have not previously visited the site.

- Toolbox talks are to be carried out before commencing work to familiarise staff and contractors with the expected schedule and work procedures.
- Staff and contractors are to be made aware of all welfare facilities.
- Staff and contractors are to be made aware of who the designated first aider is on site and of the location of the first aid kit.
- Staff and contractors are to be made aware of other people using the site and work to be carried out is to be communicated to others using the site as necessary.
- Associated RAMS to be read and signed by operatives prior to commencement of works

2.2 Setting out for Excavation

2.2.1) Review the relevant plan or drawing for the paved area if present with a setting out plan being the most desired.

2.2.2) Take note of finish measurements of the area (length and width), shape, levels, edging details, and drainage proposals.

2.2.3) Set out boundaries of the paved surface using offsets and triangulation with a measuring tape, ensuring the tape is kept level to ensure accuracy.

2.2.4) Mark the relevant points as an X on the ground with line marking spray, adding 100mm to the measurement to ensure the dig sits just outside of the working area.

2.2.5) Join the X's on the ground with marking spray to give the area for excavation.

2.3) Preparation of suitable sub grade.

Fig. 1: Typical ground layers

2.3.1) Use a laser level to establish a suitable datum point at the finished level (eg. door threshold or dpc).

2.3.2) Use a laser level to establish the fall in mm to the relevant boundary points marked with an X.

Fig. 2: Formation level for a typical hard surface.

2.3.3) Determine the minimum dig depth (reduction in level) by calculating thickness of surface material + depth of bedding layer + depth of sub-base. Over larger areas, the depth of falls must also be added to enable sub-base material to be laid to a fall. This layer is known as the formation level – the uppermost surface of the sub-grade. See fig. 2

2.3.4) If present at this step; strip the area of surface vegetation and rootzone layer past the marked line by 100-200mm. Move to the site of disposal. Check with office to see if material should be kept separate for muckaway/disposal purposes. Always store in a contained and compacted (to reduce water absorption during wet weather) mound.

2.3.5) If there is sufficient ground clearance at this stage, repeat steps 2.3.2 and 2.3.3 before setting up profiles.

2.3.6) If there is not sufficient ground clearance at this stage, continue excavating to your formation level (as determined in step 2.3.3) before completing setting up profiles.

2.3.7) The formation level should not contain topsoil, weak or soft spots. Where weak or soft spots exist, additional excavation is required in the identified areas until a solid formation level is reached. A capping or improvement layer of a suitable fill material such as 75mm down stone or 50-100mm recycled cobbles should be added to these areas prior to installing the sub-base. This can be compacted in layers of a maximum of 100mm (see fig. 4).

2.3.8) During wet weather, a sump should be excavated to where water will drain, allowing the area to be dewatered using a pump.

Fig. 3: Capping added to create formation level.

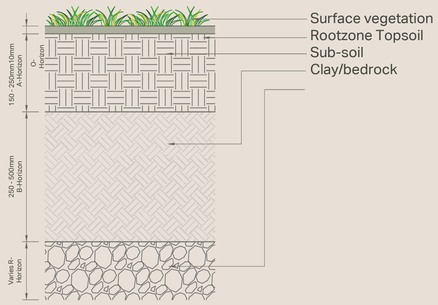

Fig. 1: Typical ground layers

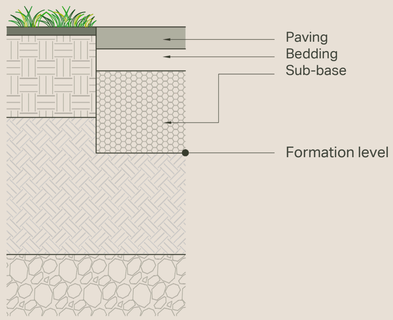

Fig. 2: Formation level for a typical hard surface

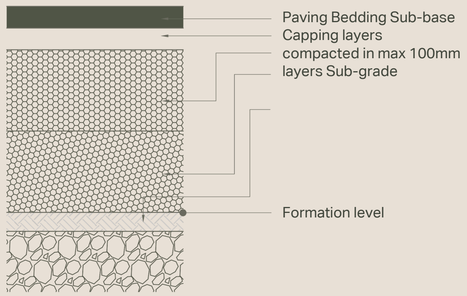

Fig. 3: Capping added to create formation level

Useful Information

· Endfall (Longitudinal Fall): The fall or gradient along the length of a pavement or surface
· Crossfall (Transverse Fall): The fall or gradient across the breadth of a pavement or surface
· Gradient = level difference (fall) / distance (run) expressed as percentage or ratio
· Using a 1:60 ratio fall as an example, this means 16.7mm of fall per metre (1000mm / 60 = 16.7mm)
· For ordering purposes, allow 10% overage for sub-base material

Table 1: Overview of falls

Percentage	Ratio	Typical Applications
1%	1:100	Minimum fall for surface water drainage
1.25%	1:80	Minimum Endfall for commercial paving Minimum fall for residential paving
1.67%	1:60	Typical fall for residential paving
2%	1:50	
2.50%	1:40	Minimum fall for foul water with no WCs Minimum Crossfall for commercial paving
5%	1:20	Max extended gradient for disabled access
6.66%	1:15	
8.33%	1:12	Max short span gradient for disabled access
10%	1:10	
15%	1:6.7	
20%	1:5	
33.30%	1:3	Max stable slope for unsupported soil

Table 2: Weights of typical materials handled by excavators

Material	Mass (kg/m3)
Clay compacted	1746
Clay, dry	1073
Clay, wet	1602
Earth, dense	2002
Earth, dry, loam	1249
Earth, moist	1442
Earth, wet	1602
Turf	400

Table 3: Bulkage of soils (after excavation)

Type of soil	Approximate bulking of 1m3 after excavation
Vegetative soil and loam	25-30%
Soft Clay	30-40%
Stiff Clay	10-20%

Tools List

Note: Appropriate PPE to be available for all tasks as per site specific RAMS.
It is assumed that all personnel will carry suitable pencils/markers.

Site Preparation and excavation

Breaker	Digging forks	Funnels	Leaf rake	Mattock	Secateurs (sharpened and oiled)
Chainsaw	Extension Lead	Ground mats	Loppers (sharpened and oiled)	Petrol and two stroke oil	Tarpaulin
Digging bar	Fuel cans	Hedging shears (sharpened and oiled)		Pruning saw	Wheelbarrows

Setting out

Makita Batteries	Electrical tape	Laser Level, staff, tripod (and batteries)	Road pins	Spirit Levels
Building square	Hand saw	Marking spray	Tape measures	String lines
Club hammer	Impact driver	Measuring reel	Timber profiles (2x1")	Wood screws (cheap)

Suppliers

Aggregates (Bulk Bags and Cement)

Parker Building Supplies, St. Leonards on sea (on account), Highfield Dr, St. Leonards-on-sea TN38 9TG, 01424 856800

Misc. disposable materials

Parker Building Supplies, St. Leonards on sea (on account), Highfield Dr, St. Leonards-on-sea TN38 9TG, 01424 856800

Aggregates Loose

Parker Building Supplies, St. Leonards on sea (on account. Reseller of quarried products), Highfield Dr, St. Leonards-on-sea TN38 9TG, 01424 856800

Robins Herstmonceux (includes recycled aggregate for general fill such as 75mm down or 100mm cobbles and grading sub-base such as Type 1 50mm down), 2 Chilsham Ln, Herstmonceux, Hailsham BN27 4Q, Tel: 01323 833181

Gardenscape Direct, The Wharf, Rye Road, Newenden TN18 5QG, 0800 654663

Tool and Plant Hire

Top Plant,The Stage, Stable Works, Climpsetts Farm, Robertsbridge TN32 5SP, Tel: 07527 164641

Waste Grab Hire (Muckaway)

GW Grab Hire (Gary), Tel: 07890 597147

Hollingdale Grab Hire, Tel: 07854 761328

Robins Herstmonceux (includes recycled aggregate for general fill such as 75mm down or 100mm cobbles and grading sub-base such as Type 1 50mm down), 2 Chilsham Ln, Herstmonceux, Hailsham BN27 4Q, Tel: 01323 833181

Waste Skip Hire

French's Skip Hire (local to Hastings and Bexhill), Tel: 01424 437 697

Omni Recycling (Tunbridge Wells and surrounding areas), Tel: 01892 617472

THE GARDEN LANDSCAPERS

Standard Operating Procedures

Hard Landscaping
Paved Surfaces

Preparation of suitable sub-grades (01)