Pop-Up Surface Greening

Planting areas as unsealing measures with seating areas

Figure 1: Surface-mounted greenery in the inner courtyard - 'pop-up' without ground connection

Key Data

- LOCATION: Outdoor, Pop-Up or with floor connection
- TYPE OF GREENING: Surface greening, green roofs, unsealing
- VEGETATION: (Small-) Shrubs, perennials, grasses
- CONSTRUCTION: Edging (concrete blocks or wood), seat support/cladding (wood)
- IRRIGATION: Accumulation irrigation, automated irrigation

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Location Selection

- Determine the surface area of the installation site
  → **For defining the maximum dimensions and quantities of planting elements**
- Assess exposure and shading (e.g. from buildings)
  → **Important for plant selection**

- Irrigation:
  - Personnel for manual watering (including during holidays)
  - Water connection (for automated irrigation)
  - Power connection (for automated irrigation)
  - Drainage

Material

The following overview provides a rough estimate of the materials required—including approximate dimensions and quantities – for **a 2 x 2 meter greening area** including a seating bench. To estimate materials for individual projects, quantities can be scaled proportionally.

Exact lengths, quantities, and volumes must be determined based on a detailed plan adapted to the site-specific conditions. The listed measurements are intended as guidelines for ordering materials and assisting with construction. It is recommended to create a construction drawing or sketch that reflects the actual available component dimensions and any custom requirements.

For the wooden elements, it is generally recommended to use a local, easy-to-work, and durable type of wood. The surface should ideally be planed and untreated. For **outdoor installations**, the wood should be weather-resistant - larch, for example, is a suitable option.

The use of reclaimed or leftover wood is also an option. With proper surface preparation or intentional placement (e.g., best side facing out), materials can be saved and reused effectively. For example, the edging could be built not only from concrete blocks but also from reused solid beams or railroad ties.

Edging with Concrete Blocks

- **Concrete angle blocks**, **approx. 8 linear meters** – for edging
  - e.g. 24 pcs. @ 33.3/30/40 cm
  - Optionally: 4 corner angle blocks (in this case, fewer regular blocks needed)
- **Mortar as needed** – for levelling uneven ground or filling corners
  - **Ready-mix cement mortar**
  - or a **mix of cement + sand or gravel**

Edging with Wooden Beams or Sleepers

- Solid (reclaimed) **wooden beams** or sleepers, height > 200 mm, approx. **8 linear meters**
  - e.g. 8 pcs. @ 200 cm length, ~200 mm height
- **Metal connectors / building clamps** or **screws**
- **Spacers**, approx. **20 pcs**. (e.g. thin strips of metal or plastic) – used as support pads under the beams

Cladding and Seating Surface – Timber Construction

- **Square timber ~ 45/70 mm ~ 13 m** – for substructure
  - 16 pcs. ~ 40 cm each (cladding substructure) – only for concrete edging
  - 16 pcs. ~ 40 cm each (seat substructure)

- **Wooden decking boards ~ 26/140 mm** (or thicker) **~ 48 m** – for cladding and seat surface
  - 12 pcs. ~ 200 cm each (cladding) – only for concrete edging
  - 12 pcs. ~ 200 cm each (seat surface)

- **Screws**
  - **50 pcs. Screws + plugs** – for fixing substructure to wall (length < square timber + concrete block thickness)
  - **20 pcs. wood screws** – for connecting substructure elements
  - **200 pcs. wood screws** – for fastening decking boards (length < decking + substructure)

- **4 pcs. supporting concrete blocks** – for seat base within substrate
  - e.g. paving stones 150/150 mm

Vegetation Support Layer

- **Sealing (~300 x 300 cm** (pop-up) or **~50 x 850 cm strip** (for wood protection)
  - Dimpled membrane (construction supply)
  - or pond liner, e.g. made of EPDM
  - Protective fleece

<u>Required only for pop-up systems without direct ground connection:</u>

- **Inspection pipe**, diameter 100 mm, length ~500 mm
  → e.g. drainage pipe (PP) DN 100 + cap
- Optional: **tank valve** for controlled drainage

- **Drainage Layer (10 cm height ~ 400 litres)**
  - e.g. expanded clay, clay granules, or gravel
  - or drainage/water retention elements (used in green roofing)

- **Separation Layer – Fleece (~300 x 300 cm)**
  - e.g. recycled fleece (min. 200 g/m²)
  - or absorbent/capillary fleece (500 g/m²)

<u>Always Required:</u>

- **Substrate / Soil, approx. 1,200 litres**
  - e.g. intensive green roof substrate (for pop-up build-ups)
  - or planting substrate with mineral and organic components (peat-free)
  - or garden soil (for installations with ground connection)

- **Top layer / mulch material, 3 cm thick, approx. 150 litres**
  - e.g. garden fibre / wood fibre
    → Do not use bark mulch – it inhibits plant growth!

Automated Irrigation System

- Water connection
- Supply pipe (e.g. PE pipe 25 mm or 16 mm)
- Drip pipe, approx. 12 linear meters
  → e.g. PE pipe 16 mm or micro-drip line with emitter spacing ~20 cm
- Ground stakes for fixing the drip pipe
- Control unit (irrigation controller)
- Solenoid valve as needed (depending on controller model)
- Connectors (T, L, straight)
- Optional: water meter
- Optional: automatic drain valve
- Optional: frost sensor (for winter operation) + 2-core cable

Plants

- (Small) shrubs, perennials, grasses, herbs
  → **Pay attention to site exposure and moisture requirements!**

Tools

- Tape measure, folding ruler
- Marking square
- Pencil
- Spirit level
- Guideline string
- Stakes or marking rods
- Wood saw: circular saw or mitre saw
- Hammer drill – stone/concrete drill bits
- Cordless drill/driver + bit set
- Wood drill bits
- Optional: wood planer
- Sandpaper
- Utility knife
- Scissors (for cutting fleece)
- Pruning shears
- Shovels
- Rake
- Hand trowels
- Pry bar
- Chisel
- Hammer
- Rubber mallet
- Angle grinder with stone/concrete cutting disc
- Wheelbarrow

Step-by-Step

Once all materials have been procured and delivered, preparations and installation can begin.

Step 1: Planning Sketch and Measurements

Based on the determined overall dimensions, a planning sketch can be created and the exact component lengths calculated.

Figure 1: Visualisation of green areas ~ 5 x 9 m with cladding and wooden seat support

Step 2: Construction of Edging with Concrete Blocks

The angle blocks can be laid dry or set in a mortar bed (e.g. as a levelling layer). If the ground has a steep slope or significant unevenness, a formwork can be built to hold a thicker mortar bed.

1. First, mark the outer dimensions of the area and use a guideline string to define the outer edges of the edging (concrete angle blocks)
2. If the base is uneven, apply a **mortar bed** underneath the angle blocks → Use formwork boards for thicker mortar layers if needed
3. Place the outer **angle blocks** and align them level and straight using a spirit level and guideline
4. Either install **angle corner blocks**, or cut two regular angle blocks at a 45° angle and join them at each corner

5. Keep the **mortar bed** moist until it sets - Concrete blocks absorb water quickly! This is especially important in hot or dry weather

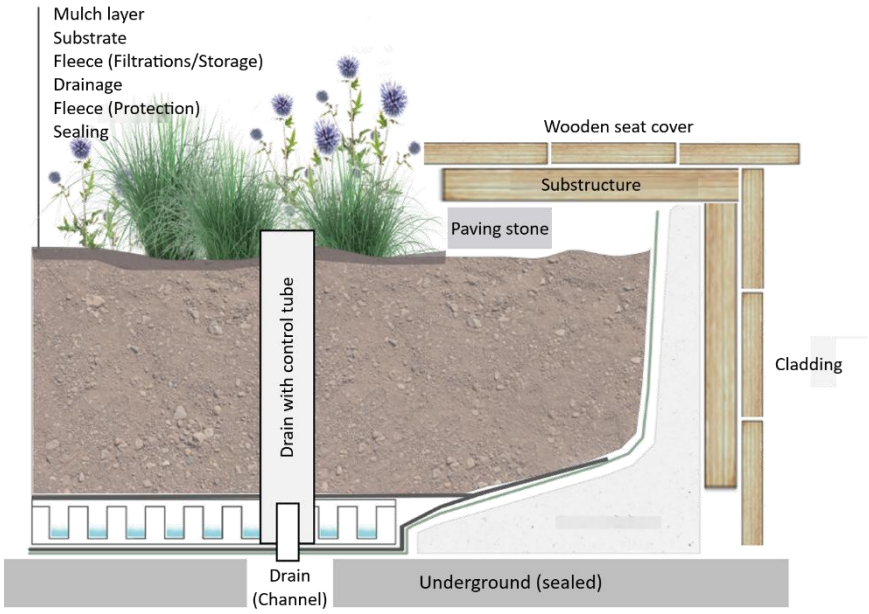

Figure 3: Construction of dense planting area as pop-up with concrete corner stones and wooden seat support

Step 3: Construction of Edging with Wooden Beams/Sleepers

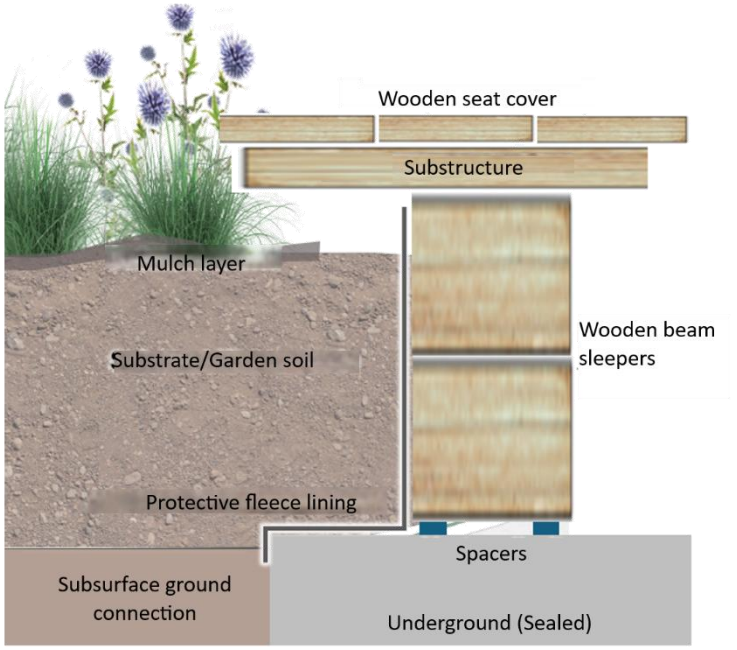

Figure 4: Construction of planting area with ground connection, wooden beams/sleepers and wooden seat support

1. Mark the outer dimensions of the edging area and lay out the **support bases**
2. Stack the **wooden beams** or **sleepers** vertically on top of the **supports**
3. At all joints and corners, connect and secure the **beams using metal connectors** or **screws**

Step 4: Sealing and Layer Construction

The following steps primarily apply to a pop-up construction on a sealed surface. If there is a direct ground connection or if the surface is de-sealed, the sealing steps can be skipped, and the space can be directly filled with substrate or garden soil.

4.1 Sealing / Lining and Installing Drainage

If the system is built with wooden beams and a ground connection, only step 1 is necessary to protect the wood. For a raised, sealed "pop-up" structure without ground connection, all steps are required:

1. Line the structure with **dimpled membrane** or **pond liner** (up to the top edge)
2. Lay **protective fleece** over the sealing layer
3. For controlled drainage (e.g. to a sewer), optionally install **tank valves or hoses**. Drill/cut openings 10 cm above the base (side-mounted) or at the bottom with 10 cm internal length (for water retention), insert, tighten, and seal properly
   → **A sealed planting area/tub in outdoor settings must have a proper drainage or overflow option**
4. For the **inspection pipe**: Drill multiple small holes in the lower section and wrap the perforated section in fleece to prevent substrate from entering
5. Place the **inspection pipe** above the drainage outlets

4.2 Filling / Layer Construction

If the area has a ground connection, you can start directly with Step 4.

1. Place the **inspection pipe** vertically over the drainage outlets and keep it upright
2. Fill in approx. 10 cm of **drainage material** or install drainage/water retention elements
3. Lay the **separation fleece**, cutting holes for the inspection pipes
4. Fill the area with **substrate** up to the top edge of the edging; optionally create a mounded shape toward the centre
5. Compact the substrate by stepping on it, then refill if necessary
6. Keep the substrate level slightly below the top edge near the outer borders; in the centre, raised areas can be formed to allow for deeper planting zones (e.g. for trees)

Figure 2: Substrate elevation (mound) in the centre of the planting area

Step 5 :Cladding and Seating Surface

First, transfer all measurements onto the wood ("marking out"), then cut and prepare the wooden parts. Start by mounting the substructure, then screw on the cladding and seating surface.

5.1 Cutting and Preparing the Wood

1. Transfer the length measurements and drill hole positions onto the wood
2. Cut the wood to the exact lengths
3. Chamfer or sand the edges (*only for decking boards*)
4. Pre-drill screw holes, keeping a minimum distance of > 2 cm from the end grain

5.2 Installing the Substructure

The substructure (UK) for the cladding should be flush with the top of the concrete angle blocks and start approx. 5 cm above the ground. The substructure for the seating surface should be positioned so that the seat boards overhang the cladding by about 1–2 cm.

1. For the cladding substructure, fix the **square timbers** to the sides of the concrete blocks using two screws + wall plugs per piece – install a substructure every ~50 cm
2. Fix the square timbers for the seating substructure on top of the concrete blocks with one screw + wall plug each, and additionally screw them to the cladding substructure
3. Once the substrate is in place, you can place **paving stones** underneath the part of the substructure that extends into the bed, for extra support
4. Screw the **wooden decking boards** onto the substructure (use two screws per connection)

5.3 Mounting Cladding and Seating Surface

1. Screw the **wooden decking boards** onto the substructure (use two screws per connection)
2. Leave a gap of approx. 5 mm between the boards
   → Use a consistent spacer (e.g. a coin, folding ruler, etc.)
3. Round off or sand all outer corners and edges for safety and finish

Step 6: Planting

1. Dig **planting holes**
2. Remove the **root ball** from the nursery pot and lightly score the bottom of the roots (to promote rooting)
3. Place the plant and fill with **substrate**
4. Press the substrate firmly into place all around
5. Apply approx. 3 cm of **mulch material**
6. **Water** thoroughly – the substrate absorbs a large amount of water initially

Plant Care and Maintenance

- Daily visual check → Are the plants healthy? Is the irrigation system working?
- Establishment Care:
    - Watering: approx. 5 times per week (less in cool/wet weeks)
      Once well-rooted: reduce to 2–3 times per week

    - Remove unwanted growth
    - Fertilise in spring/summer with compost or organic slow-release/granular fertiliser

- If using automated irrigation:
    - Perform function checks (daily visual inspection)
    - Adjust watering times and durations depending on seasonal needs (spring, summer, fall)
    - Winterize the system and restart annually

- Drainage and Waterlogging Check (~1× per month or as needed):
    - If a drain system is present, check functionality

- Pruning and Replanting
    - Prune shrubs as needed
    - Cut back perennials and grasses in early spring before new growth
    - In case of plant loss, remove and replace the entire root ball

Figure 6: Plant care

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