Shortlist 1: SWEEP guidelines for tactical annual planning

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User group Shortlist 1: Planners and managers of open spaces with hard-surfaces in public areas and on industrial sites. **Apply points 1 - 13.**

Objective: To improve the sustainability of weed control on hard surfaces, by integrating effectiveness, environmental criteria, labour conditions, social aspects and budget, by drawing up an annual weed control plan within the SWEEP guidelines (from Shortlist 0 and 1) and legal frameworks, provisions and criteria.

Note: There are many types of hard surfaces (see www.dob-verhardingen.nl/nl/Publicaties/ 2005 Davies et al, 2005, Hard surfaces and weed infestation). SWEEP criteria apply mainly to pavements (slabs, bricks, block stones, etc.) that give fast run off of rain water to surface water.

1. **Methods**
Mechanical, thermal, chemical and biological weed control methods can be used in the SWEEP system, provided that they are legally permitted, their effectiveness has been proven (by e.g. field experiments) and that they are environmentally sound (by scientific evaluation (e.g. Life Cycle Assessment (LCA))). The manager of the site decides where, when, and how often which methods are to be used within the SWEEP boundary conditions. SWEEP mainly details specific restrictions for the use of herbicides (see points 2 – 11), for alternative non chemical methods, see points 12 and 13. Best practice technology is mandatory when herbicides are applied. Site specific application with weed sensor spray systems or weed wipers is preferred.

2. **Map**
* Prepare a plan for each area (this is a management unit, such as residential area, city district, industrial area, airport, port, etc.)
* Indicate on the map of the area where herbicides may and may not be used (see points 4, 5, 6, 7 and 8 for restrictions). Use of products on 'closed' (e.g. asphalt) pavements is in principle not required. Hand the map to the contractor.
* The manager of the site keeps the map for 5 years and continuously adds information about the actual weed control operations (for management evaluation and accountability purposes, see SWEEP registration module).
* The contractor gives the map to the weed control foreman who is aware of and understands its contents.

3. **Registration**
* Stipulate the required reporting between the contractor/foreman and the manager of the project regarding operations in the area (use the SWEEP registration module or the registration form). The use of herbicides must be recorded.
* The aim is registration (in writing or digital) of the information within two weeks after completion of the operational activities in a work area.

4. **Sweeping or brushing of streets**
* Sweeping or brushing is often carried out by third parties. Instruct the person responsible for street sweeping/brushing to intensify the brushing of street and kerb drains during brushing rounds. At least three brushing rounds per working area should be aimed for during the period early April to end October. It is recommended to carry out an intensive sweeping or brushing round in the area so that the pavement is clean when winter starts.
* Inform the weed control foreman about the brushing plan. Do not use herbicides shortly before or after sweeping.

5. **Surface water intake points for drinking water production**
* Do not spray herbicides on pavements with runoff to surface water which are via an open connection located 10 km or less upstream from the intake point for drinking water production. A distance of 1 km to the intake point is sufficient in case the flow rate is lower than 0.05 km/hour.
* Apply on these pavements alternative methods or a weed wiper * that gives > 90 % herbicide deposition on the plants (* or comparable technology that allows sole deposition of herbicide on the plant).

6. **Hard-surfaces alongside surface waters**
* Do not spray herbicides on pavement sections at a distance less than 1 m from surface waters, such as paved strips along or near canals and rivers.
* Apply on these pavements alternative methods or herbicide application technology comparable to a weed wiper.

7. **Water embankments**
* Do not spray herbicides on paved embankments sloping towards bodies of large waters such as a lakes, rivers, harbour waters or canal. Apply a spray-free zone of 1 m from the edge of the slope.
* Apply on these embankments alternative methods.

8. **Street and kerb drains (gully pots)**
No herbicides in the 1 m zone around street and kerb drains is preferred, but may be not manageable. The manager of the site must ensure that the contractor is particularly restrictive when spraying herbicides in the vicinity (1 m zone) of street and kerb drains.
Make sure that:
* the contractor endorses the need of such restrictions and explicitly conveys these to the foreman,
* the foreman optimally uses the technical possibilities at his disposal to selectively apply herbicide on the weeds (by using a weed wiper, selector, sensor-driven spraying technique) and as little as possible on the paved area,
* the spray lance is not used for quick and easy spraying of weeds from a distance (spray lance use only under those circumstances where less than 10% of the chemical solution can fall wide of the weeds),
* the product does not directly get into the drain during application.

9. **Precipitation**
* Do not spray herbicides if the forecast indicates >40% chance of rain with a precipitation of more than 1mm within the next 24 hours. A longer period may be agreed upon. A weather forecast of 12.00 o'clock on the day before the day on which spraying is intended, may be used. Consult a local, up-to-date and certified weather forecast, such as the Dutch DOB weather fax (see www.dob-

verhardingen.nl/nl/DOB+Producten/DOB-weerfax.htm). For improved application technology (weed wipers, Weed IT™ MKII, see shortlist 2) the 24 h rain free period can be shortened to 6 or 15 h, to be decided per country).
* Furthermore to forecasts, radar images of clouds and telephone advisory services may be used to check whether there are changes in compared to the forecast and whether this has consequences for operations. Radar images of a certified weather station are given on, e.g., www.mlhd.nl. Deviations should be recorded (via print of radar pictures or description with course, date and times).
* It is to be recommended to offer the contractor/foreman alternative work for 'unfavourable spraying days' or allow a non-chemical means of weed control.
* For non chemical methods, no weather restrictions apply, see also 12 and 13. Brushing may benefit from rainy conditions.

10. **Herbicides**
* Apply the guidelines of shortlist 2 for contractors/sprayers when using glyphosate or MCPA on paved areas. The lowest possible amount of product should be: a maximum of 360 gram a.i. per ha of hard surface per work round. Annual maximum is 720 gram a.i. per year. The number of treatments per year is not limited.
* On pavements where horizontal run off is not likely, such as course stones underneath rail road tracks, gravel paths, etc., the maximum use rate of glyphosate in SWEEP is 1440 gram a.i. per ha in stead of 720.
* MCPA: Maximum 50 gram a.i. per year spot treatment against troublesome weeds on slabs, bricks and block stones.
* Glufosinate ammonium: Maximum 720 gram a.i. per year on slabs, bricks and block stones and only as substitute for glyphosate.
* Other herbicides, no criteria available in SWEEP.

11. **Groundwater protection zones**
* Do not use MCPA and glufosinate ammonium in groundwater protection zones because the risk of infiltration of this product is high. There is no specific restriction on glyphosate for these areas, but it is recommended to avoid any unnecessary use in these areas.

12. **Thermal methods**
* Strip application of flaming and hot water treatment: maximum four treatments per year. If more, these methods have a poor LCA-score compared to SWEEP herbicide use. Use combinations with other methods if flaming or hot water is to be applied more then four times per year, or apply flaming and hot water as spot treatment with e.g. weed sensors. Do not apply flaming near fire sensitive places.

13. **Brushing**
* Apply at least one brushing or sweeping measure per year to clean the pavement. This removes substrate for weed growth.
* Brushing weed control: maximum four treatments per year. If more, this method has a poor LCA-score compared to SWEEP herbicide use. Brushing may damage the pavement. Use combinations with other methods if brushing is to be applied more then four times per year, or apply brushing as spot treatment.