Preliminary Sustainable Drainage System Maintenance Plan for Cuckoo's Nest Pub, Retail Unit and Apartments

This preliminary maintenance plan presents an outline plan of how the sustainable drainage system will function following implementation. It will ensure active control, management and monitoring of sustainable drainage systems associated with the proposed development during the operational phase.

This plan will be further developed by the chosen works contractor and implemented throughout the construction phase of the project and into operation.

Sustainable drainage systems (SuDS)

SuDS are a new environmentally friendly approach to managing rainfall that uses primarily landscape features to deal with surface water. SuDS aim to:

- Control the flow, volume and frequency of water leaving a development area.
- Prevent pollution by intercepting silt and cleaning runoff from hard surfaces.
- Provide attractive surroundings for the community.
- Create opportunities for wildlife.

SuDS at Cuckoo's Nest Pub, retail unit and apartments

The SuDS are designed to prevent flooding of the site and control the flow of water using landscape features.

The controlled outfall into the SuDS allows heavy rainfall to leave the site slowly as water will slowly soak into the ground as it travels along the SuDS. Exceptional storms or prolonged heavy rain can overflow into the attenuation tank / rainwater soakaway where the onward discharge to surface water sewer can be limited.

Managing the SuDS

The SuDS at Cuckoo's Nest pub, retail unit & apartments have been designed for easy maintenance to comprise:

- Regular day to day care - litter collection, regular maintenance of soft landscaping and checking the inlets and outlets where water enters or leaves a SuDS feature.
- Occasional tasks - removing any silt that builds up in the SuDS features.
- Remedial work - repairing damage where necessary.

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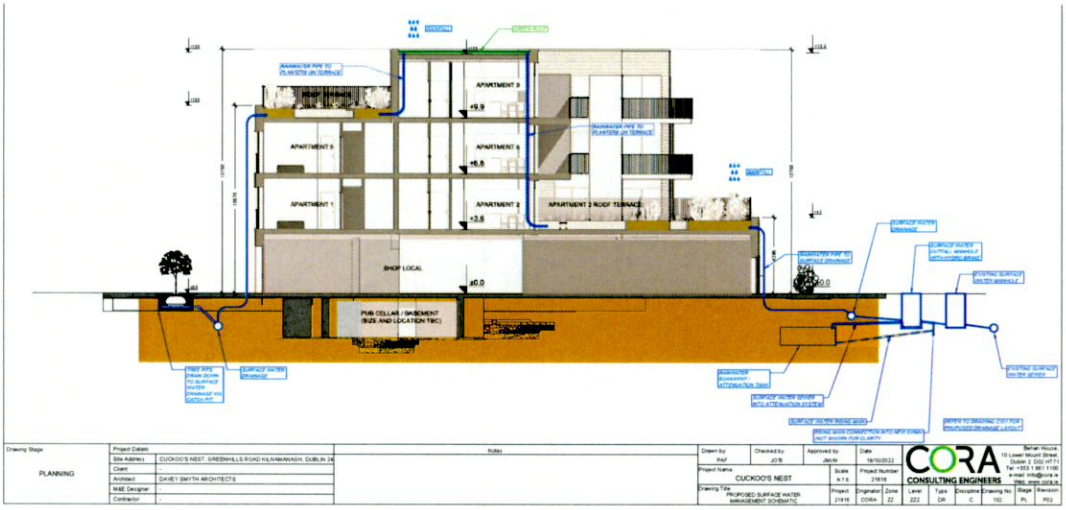
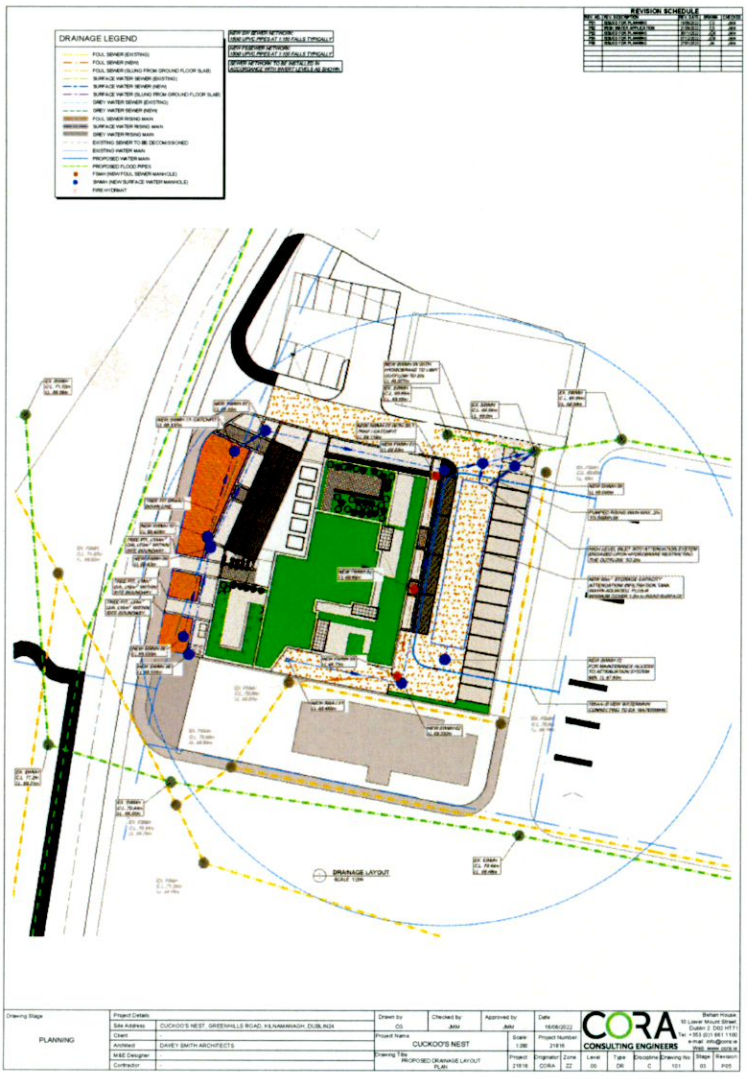
SuDS Diagramme – CORA Consulting Engineers



SuDS plan – CORA consulting engineers



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Cuckoo's Nest pub, retail unit & apartment SuDS management

The SuDS sequence begins at the uppermost roof where the planted roof which is designed to intercept and retain precipitation, reducing the volume of runoff and attenuating peak flows.

ACTION:

Carry out regular maintenance in accordance with planted roof system's recommendations (see Appendix 1).

Rainwater pipes carry water from the planted roof to greywater storage which will then be used to irrigate planters on roof terraces at third floor level & first floor level (see proposed surface water management schematic).

ACTION:

Monitor how the planting in planters develops and cut 30% of vegetation at 100mm each year during September – November, if required.

Annual checks that inlets and outlets are clear.

The planters will provide a home for wildlife and an opportunity to further reduce volume of runoff and attenuate peak flows. Rainwater pipes carry water from the planters & roof terrace surfaces to connect to new separate surface water below ground drainage pipes which all flow to a surface water outfall manhole with hydro brake and underground rainwater soakaway / attenuation tank which will limit outflow to existing surface water sewer to 2 litres per second.

ACTION:

Carry out regular maintenance in accordance with rainwater attenuation manufacturer's recommendations (see Appendix 2).

Annual checks that inlets and outlets are clear.

At ground level permeable paving system will be installed in footpaths, pedestrian priority areas and car parking spaces. Permeable paving reduces the volume of surface water discharging to the surface water sewer by allowing surface water to filter initially to a graded aggregate subbase and either be absorbed slowly locally thereafter or to flow into the surface water drainage system at a reduced flow rate. The permeable paving also filter pollutants which will help protect the environment downstream.

ACTION:

Carry out regular maintenance in accordance with permeable paving manufacturer's recommendations (see Appendix 3).

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Other landscape features such as the rear hedgerow, proposed wildflower planting to the front and miscellaneous planting strips allow for reduction of paved surfaces and / or increased absorption thus reducing surface water runoff.

ACTION:

Monitor how the planting develops and cut 30% of vegetation at 100mm each year during September – November, if required.

SuDS and Landscape Maintenance – Summary

		Frequency	Unit Rate	Total
	REGULAR MAINTENANCE			
1	LITTER MANAGEMENT			
1.1	Pick up all litter in SuDS and landscape areas and remove from site.	12 visits monthly.		
2	SOFT LANDSCAPE MAINTENANCE – all cuttings removed from site.			
2.1	In September (or mid-August if necessary) the wildflower meadow should be cut back when the petals have lost their colour and the seed heads have dried out. Cutting back should be to a height of 4-10cm. Cuttings can be left for a day or two to allow seeds to drop into the seedbed. After that the cuttings should be removed to keep the soil fertility low (wildflowers grow best in less fertile soil).	1 visit annually.		
2.2	Climbing plants clipped as per landscaping maintenance manual.	1 visit annually.		
2.3	Trees and shrubs (cutting back) – plants shall be cut back by one third size each February during the period of maintenance prior to new spring growth and after site inspection by the landscape architect. Trees and shrubs (pruning) – to ensure healthy growth plants shall be pruned to remove dead, damaged or discoloured branches, suckers or epicormic shoots. Pruning shall be with a sharp knife, saw or secateurs, cutting back to sound growth immediately above a healthy bud or stem. If pruning trees cut back so as to leave the branch bark ridge intact. Wounds exceeding 25mm diameter must be treated with an approved sealant such as Arbex.	1 visit annually. As required.		
2.4	Ground floor planted strips, roof terrace planters trimmed and dead headed as per landscaping maintenance manual.	As required or monthly.		

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	Fine grass cutting shall mean mowing to 25mm high. This operation is to be carried out in location in the area shown on the contract drawings, at 2 x ten-day intervals during the seasons of February to November. The grass is to be cut evenly over the whole area, with cutting left evenly spread over surfaces. Removal and disposal of stones and other obstructions, from the area of grass to be cut. A minimum of 2 cuts is involved per month (February to November). February - 2 cuts, March 3 cuts, April – 4 cuts, May 4 cuts, June 4 cuts, July 4 cuts, August – 5 cuts, September – 5 cuts, October – 3 cuts, November – 2 cuts – (total cuts = 36).			
3	INLETS AND OUTLETS			
3.1	Inspect monthly, remove silt and debris.	12 visits monthly.		
4	HARD SURFACES			
4.1	Sweep all paving regularly. Sweep and suction brush permeable paving in autumn after leaf fall.	52 visits weekly. 1 visit annually.		
	OCCASIONAL TASKS			
5	INSPECTION AND CONTROL CHAMBERS			
5.1	Annual inspection, remove silt and check free flow.	1 visit annually.		
6	PLANTING / TREES			
6.1	Remove lower branches where necessary to ensure good ground cover to protect soil profile from erosion. Inspect and maintain or replace planting / vegetation as necessary to ensure efficient water absorbtion rates are maintained.	1 visit annually. As required / annually.		
7	GREEN ROOFS			
7.1	Inspect and replace planting as necessary to ensure efficient water absorption rates are maintained.	As required / annually.		
8	SOAKAWAY / ATTENUATION SYSTEM			
8.1	CCTV inspection & cleaning if necessary, as per manufactuer's requirements.	After every major storm. Annually.		
9	SILT MANAGEMENT			
9.1	Inspection & removal of silts from source controls.	1 visit annually.		
10	CATCH PITS			
10.1	Inspection & removal of silts, solids and debris when necessary.	After every major storm. Annually.		

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11	REMEDIAL WORK			
11.1	Inspect SuDS system regularly to check for damage or failure when carrying out other tasks.	As required / monthly.		
11.2	Undertake remedial work as required.	As required.		

Sustainable Drainage Maintenance Specification

GENERAL REQUIREMENTS

Maintenance activities comprise:

- regular maintenance.
- occasional tasks.
- remedial work.

Avoid

- the use of weedkillers and pesticides to prevent chemical pollution.
- the use of de-icing agents wherever possible to allow bio-remediation of pollutants in permeable surfaces.

Protect all permeable, porous and infiltration surfaces from silt, sand, mulch and other fine particles.

PERMEABLE SURFACES

Permeable surfaces including permeable block paving, porous asphalt, gravel or free draining soils that allow rain to percolate through the surface into underlying drainage layers. They must be protected from silt, sand, compost, mulch, etc. Permeable block paving and porous asphalt can be cleaned by suction brushing.

PERMEABLE AND POROUS SURFACES	
Regular Maintenance	Frequency
Cleaning Brush regularly and remove sweepings from all hard surfaces.	 Monthly.
Occasional Tasks	Frequency
Permeable Pavements. Brush and vacuum surface once a year to prevent silt blockage and enhance design life.	Annually.
Remedial Work	Frequency
Monitor effectiveness of permeable pavement and when water does not infiltrate immediately advise Client of possible need for reinstatement of top layers or specialist cleaning.	As required.

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Jet washing and suction cleaning will substantially reinstate pavement to 90% efficiency.	

INLETS, OUTLETS, CONTROLS, AND INSPECTION CHAMBERS

Inlets and outlets structures may be surface structures or conveyance pipes with guards or headwalls. They must be free from obstruction at all times.

SuDS flow control structures can be protected orifices, slots weirs or other controls at or near the surface to be accessible and easy to maintain.

Inspection chambers and rodding eyes are used on bends or where pipes come together and allow cleaning of the system if necessary.

INLETS, OUTLETS, CONTROLS AND INSPECTION CHAMBERS	
Regular Maintenance	Frequency
Inlets, outlets and surface control structures Inspect surface structures removing obstructions and silt as necessary. Check there is no physical damage. Keep hard aprons free from silt and debris .	 Monthly. Monthly.
Inspection chambers and below ground control chambers Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn.	 Annually. Annually.
Remedial Work	Frequency
Repair physical damage if necessary.	As required.

OVERFLOWS

Overflows through gratings or within chambers must be kept clear at all times to protect areas from flooding. They allow onward flow when part of the SuDS system is blocked.

OVERFLOWS	
Regular Maintenance	Frequency
Overflows Jet pipes leading from overflow structures annually and check by running water through the overflow. Check free flow at next SuDS feature – inlet to basin or chamber.	 Annually.

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Overflows Remove any accumulated debris on top of overflows.	Monthly.
Remedial	Frequency
Overflows. If overflow is not clear then dismantle structure and reassemble to design detail.	As required.

ORNAMENTAL PLANTING AND EXISTING VEGETATION

Ornamental trees - all ornamental planting to be kept weed free and pruned using secateurs to keep the shrubs to an agreed and reasonable size.

Native Trees and Shrubs – All native planting to be allowed to grow freely removing overhanging branches as required.

PLANTING AND EXISTING VEGETATION	
Regular Maintenance	Frequency
Wildflower maintenance Wildflower areas strimmed to 50mm in Sept-Oct or Wildflower areas strimmed to 50mm July and Sept or Wildflower areas strimmed to 50mm on 3 year rotation 30% each year	 1 visit 2 visits 1 visit
Ornamental tree and shrub planting Weed all shrub beds as detailed spec as necessary. Cut back planting from lights, paths and visibility sight lines in late autumn and as necessary. Cut hedges slightly tapered back from base with flat top at specified height. Do not mulch planting adjacent to permeable/ porous paving surfaces. Remove stakes and ties from trees when no longer needed for support and within 3 years of planting. Protect from strimmer damage and remove competitive growth until well established.	 4 visits.
Trees & shrub planting.	 1 visit.

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Prune to shape in year 1. Protect trees from strimmer damage and remove competitive growth until well established. Remove stakes and ties from trees when no longer needed for support and within 3 years from planting.	
Remedial	Frequency
Replace trees and shrubs which fail in the first five years after planting. Carry out tree surgery as necessary.	As required.

SPILLAGE – EMERGENCY ACTION

Most spillages on development sites are of compounds that do not pose a serious risk to the environment if they enter the drainage in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommended by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.

In the event of a serious spillage, either by volume or of unknown or toxic compounds, then isolate the spillage with soil, turf or fabric and block outlet pipes from chamber(s) downstream of the spillage with a bung(s). (A bung for blocking pipes may be made by wrapping soil or turf in a plastic sheet or close woven fabric.)

Contact the Environmental Protection Agency immediately.

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APPENDIX 1

PLANTED ROOF MANUFACTURER'S MAINTENANCE RECOMMENDATIONS

IKO
Setting the Standard

IKO green®
Sustainable Roof Gardens

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916 -POST STALLATION MAINATAINCE

IKO advise the installing contractor to price into the tender, the cost of conducting post-installation maintenance for a contract period to be agreed with the client's representative. Following completion of the landscaping installation and handover, the responsibility for future on-going maintenance of the green/blue roof planting becomes the responsibility of the building owner or the Main Contractor, where this element forms part of the contract.

Roof Outlet Maintenance: It is important that the Roof Vertical Outlets and Roof Flow Restrictors are checked and maintained regularly to ensure there are no blockages that will affect the calculated flow rate. In addition to regular maintenance, inspecting the outlets should be conducted after a storm event.

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Maintenance services: IKO Ireland Ltd through its approved network of experienced green/blue roof technicians. Please contact our waterproofing@iko.ie Tel: 01 8855090. Alternatively, the work can be contracted to experienced landscape contractors of your choice.

920- COMPLETION:

- General: Leave the works in a clean, tidy condition.
- Surfaces: Clean immediately before handover.
- Outlets: Clean and clear of obstructions.
-Completed green roof: Protect from adjacent or high-level working.

930- DOCUMENTATION:

- Timing: Submit at handover.
- Contents: - Growing medium declaration of analysis.
- Manufacturers' guarantees and warranties.
- Procedures for maintenance of the green roof.
- Record drawings showing the location of planting and associated features.
- Number of copies as required.

940- COMPLETION CARE:

- Period: 12 – 15 months after installation. After the agreed contract period, the ongoing maintenance of the green roof becomes the responsibility of the building owner.
- Frequency: 1-2 times annually.
- Weeding: Removal of undesired growth.
- Watering: As required, depending on weather.
-Remove dead leaves and any refuse.
- Cutting: Mowing or trimming as required.
- Re-seeding or re-planting of any bare areas including re-filling of substrate where required.
- Fertilize: Optigreen Opticote as clause 840
- Removal of plant growth from borders, gravel areas and paved areas.
-Clean gutters, control chambers and roof outlets.

Water for irrigation to be provided on site.

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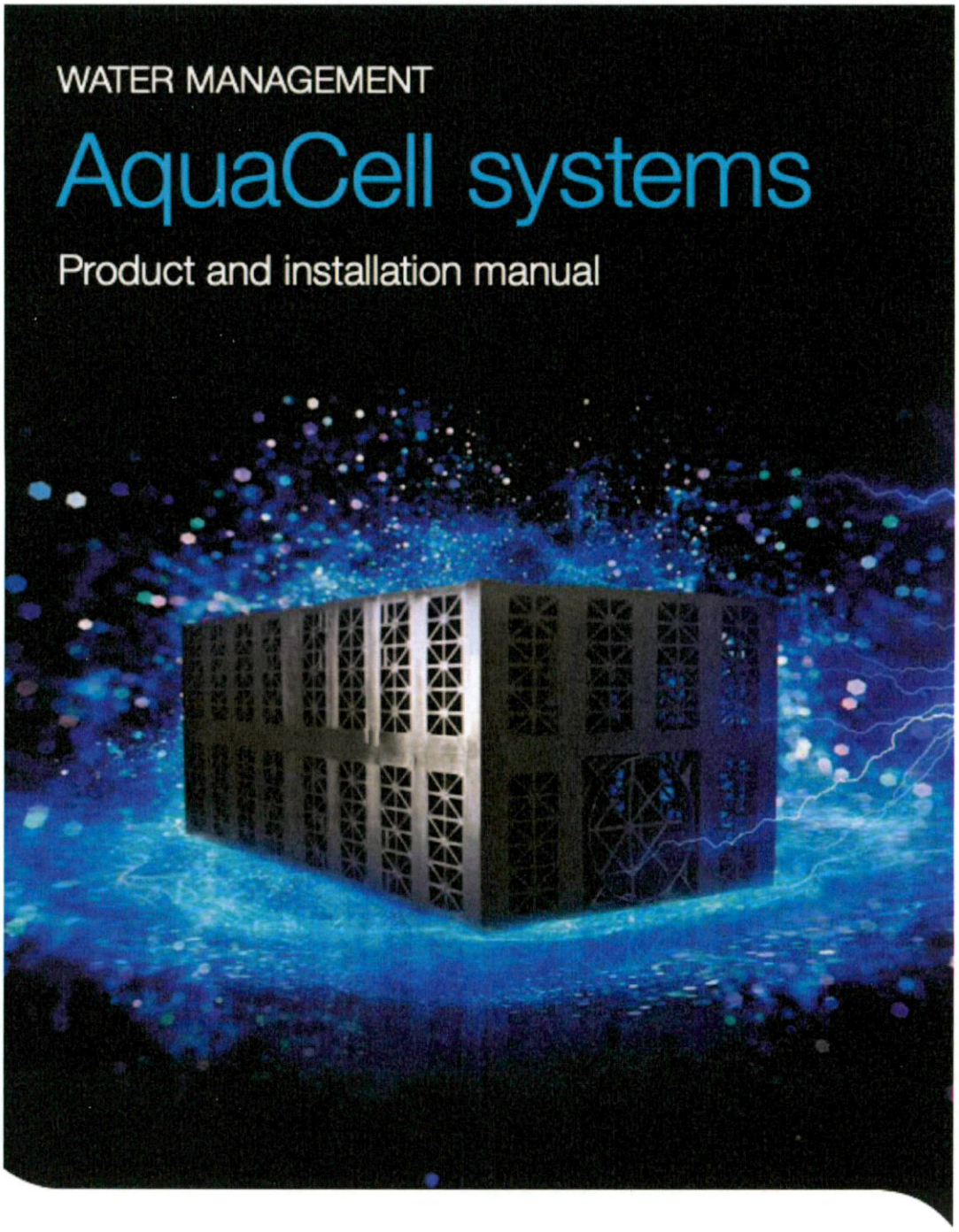
APPENDIX 2

ATTENUATION MANUFACTURER'S MAINTENANCE RECOMMENDATIONS



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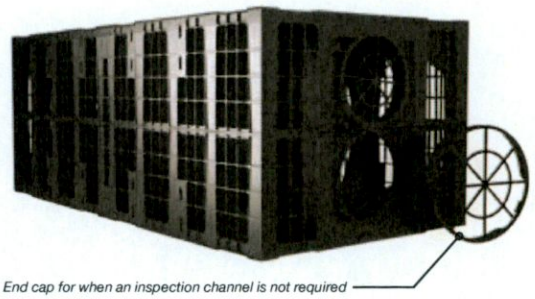
Inspection and maintenance

CCTV inspection at every inspection point is recommended:
- after every major storm
- at regular intervals according to the specific maintenance plan for the site

Silt traps prior to inlet pipework should be routinely inspected and cleaned out to minimise debris reaching the tank.
It is important to prevent construction silt from entering the AquaCell structure.



End cap for when an inspection channel is not required

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APPENDIX 3

PERMEABLE PAVING MANUFACTURER'S MAINTENANCE RECOMMENDATIONS

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GENERAL INFORMATION - MAINTENANCE

Cleaning & sealing of concrete paving units

All surfaces require some element of cleaning and maintenance, and paving is no dierent. Regular maintenance and cleaning will maintain the surface appearance and overall performance of both concrete paving and concrete paving ags.

Initial maintenance

During the very early life of the paving, the oints between the units should be regularly topped up with ointing sand. The paving should only be brushed by hand. Mechanical sweepers and sweepers with high suction forces should not be used, since there is a risk of loss of ointing sand from between the units which will cause the loss of interlock and failure of the paved surface.

Cleaning of pavements

There are four levels of cleaning that can be carried out on a paved area.

Prior to undertaking any maintenance cleaning, it is advisable to carry out a trial in a small inconspicuous area to ensure there are no adverse eects on the paving.

1. General dirt should be removed by regular dry brushing.
2. Where the paving has become dull showing a loss of colour, a wet wash with a stirbristle brush and garden hose can be adequate.
3. For more stubborn areas, a power washer can be used, taking care not to remove the ointing materials (sand or mortar). The washer should be on a medium pressure setting or lower, and should NOT be aimed directly at the paving surface, but at an angle of 30° approximately.
4. Cleaning detergents can be used, however, some detergents are acidic and overuse can damage some paving products. It is advisable to follow the manufacturers instructions and rinse the areas fully. The resulting runorshould be carefully channelled to either drainage points or containers from where it can be safely disposed of.

Replace any washed out ointing sand with new dried sand (available in 25 kg bags from Roadstone) once the paving has dried.

Weeds

Avoid the re-occurrence of weeds by removing them once they appear. If a weed killer is required, test in a small area prior to use. Always follow the manufacturers instructions.

Mosses & Lichens

Mosses and lichens will grow on most surfaces, particularly in shaded and north facing areas. There are several treatments that will deal with these growths on the market. The use of sulphate of iron is not recommended as it will stain the paving.

Oil stains

Oil penetrates readily into most concrete paving, therefore any spillages should be removed promptly with an absorbent material, e.g. paper towels, cloth or granules to prevent staining.

DO NOT wipe the oil - this drives it into the concrete and spreads the spill over a larger area.

A degreaser should be applied as soon as possible to break down the oil. Washing up liquid used neat is a good starting point while a suitable degreaser is being sourced. If the stain persists, then an emulsifying degreaser should be brushed onto the aected area, and left for a period of time, in accordance with the manufacturers instructions. The emulsied oil should be washed away with plenty of water. (Degreasers are available from your local Roadstone outlet and hardware stores)

Sealing

The use of certain sealers can prevent most stains occurring on the surface and aids cleaning. Sealants may require further applications depending on the frequency of use on the paved surface. Where the surface has been treated with a specialist prepolymer urethane sealer and stabiliser, it should be cured in accordance with the manufacturers recommendations before allowing tracking.

Permeable Paving Maintenance

The surface blocks have a design life equivalent to standard block paving. The surface blocks require routine maintenance and the surface should be brushed at least twice a year, either with a mechanical brush, ensuring that the vacuum is switched o, or by hand. It is recommended that this should be carried out in the spring and after leaf fall in autumn.

After the brushing, the 3mm grit should be re-applied to the surface where appropriate (available from Roadstone) and brushed back into the oints.

HEALTH & SAFETY

Always wear the recommended protective clothing.

Always work in a well ventilated area.

When using detergents and cleaners please ensure that you follow the manufacturers instructions fully.

NOTE

Prior to undertaking any maintenancecleaning, it is advisable to carry out a trial in a small inconspicuous area to ensure there are no adverse eects on the paving.

This advice is oered as a guide only Roadstone does not accept any liability for any damages occurring from its use.

For further details please visit www.roadstone.ie

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