

Living Roofs – Ongoing Care

Version: 1.0

Date: 7th February 2025

Living, or green roofs provide clear environmental benefits however require focused ongoing care and management to reduce the risks of fire, water damage to structures and other related losses.

This Loss Prevention Standard provides guidance on maintaining and inspecting living roof systems to ensure longevity and reduce the risks of loss or damage.



Introduction

Loss Prevention Standard **Living Roofs - Design and Installation** provides an overview of the main risks associated with living roof systems, along with best practice guidance to help reduce the potential for loss or damage within the design specification, and during installation of the roof, supporting systems and architecture.

This Loss Prevention Standard summarises the main risks of fire and other material damage losses, related to maintenance and ongoing care, and provides useful guidance to help reduce the potential for loss and damage.



Note: This Loss Prevention Standard focusses on Property loss prevention and related risk management guidance. It is not intended to address Liability exposures. The presumption is that all regulatory requirements, such as Fire Risk Assessments and compliance with local building regulations, codes, or standards, have or will be met.

Understanding the Risks

Fire Risks

Failings or interruptions to maintenance and inspection regimes can lead to loss or damage in a number of ways including, but not limited to:

- **Hot works.** Poorly managed hot works such as brazing, welding, grinding etc., undertaken on or in proximity to living roofs, can ignite combustible roofing materials and dried foliage.
- **Arson.** Deliberate ignition of combustible materials or dry foliage.
- **Heating.** Inappropriate fixed or temporary heating systems can overheat or suffer electrical fault.
- **Smoking.** Discarded smoking waste can ignite vegetation and other combustible materials.
- **Electrical.** Damaged, faulty, incompatible, incorrectly installed or maintained electrical equipment can lead to ignition of foliage, particularly during dry spells.
- **Solar Photovoltaic Systems.** Faults or damage to panels or associated equipment can develop into fires and spread to the living roof planting.
- **Exposures.** Fire can spread from other sources e.g. from within the building, waste receptacles, adjacent property. Also:
 - ✓ **Fireworks.** Either accidentally or maliciously aimed at the living roof.
 - ✓ **Catering.** Outdoor kitchens and barbeques should not be permitted on living roofs.
- **Lightning.** Lightning strike can ignite combustible materials, damage infrastructure.

The potential for fire growth and spread can be aided by:

- **Combustibility.** Living roofs should be considered as combustible construction along with some membrane and moisture layers etc.
- **Irrigation Systems.** Irrigation systems can be damaged, under designed or perform poorly, potentially allowing planting to dry out and becoming susceptible to ignition, and aiding fire spread.
- **Manual watering.** This can be inadvertently neglected e.g. due to changes to job roles and responsibilities etc.
- **Fire Breaks.** Fire breaks built into the design to limit fire spread may be corroded over time or damaged etc.

Water Related Damage

Risks associated with living roof systems include:

Leaks. Undetected leaks from the irrigation system can lead to excessive watering, potentially causing structural damage or drainage issues. Damaged or faulty irrigation systems can also leak onto electrical equipment potentially leading to electrical fires.

Control System Failure. Loss or damage to control/monitoring equipment, wi-fi connectivity etc., could potentially lead to failure to water the roof potentially resulting in failure of the system and the creation of combustible dried plant material.

Rain & Inundation. Inadequate or faulty drainage can lead to the living roof perishing.

Other Risks

- **Collapse.** Living roof systems also impose significant weight loadings to buildings.
- **Root Damage.** Root systems can damage membrane systems if not properly maintained.
- **Windstorm.** Inappropriately secured roof systems can break free during storm conditions, potentially leading to water ingress and other structural property damage.
- **Roof Pitch.** Incorrect fixings for the roof pitch can lead to slippage, shearing and drainage issues.
- **Corrosion.** Some pesticides/feeds may be corrosive to system components.

Key Maintenance Considerations

A healthy living roof system will require regular maintenance to ensure the risks of loss or damage are managed and minimised.

General Arrangements

- Ensure adequately trained and experienced workers and/or companies are used for inspection, servicing, and maintenance.
 - ✓ Formal contractor controls and arrangements should be in place for approving works, issuing, and signing off permits to work, ensuring works have been satisfactorily completed, and fire detections and/or protections reinstated where previously isolated or covered.
- Ensure electrical installations, including lightning protection systems, are maintained in accordance with local regulatory requirements and the original equipment manufacturer (OEM) or installers recommendations.
 - ✓ In the United Kingdom fixed electrical installations should be maintained by a competent and qualified electrical contractor, who are members of a third party accreditation scheme for inspecting and testing electrical installation and issuing Electrical Installation Condition Reports (EICR) e.g. NICEIC, ECA, NAPIT etc.
 - ✓ In the United Kingdom lightning protection systems should be maintained in accordance with **BS EN 62305 pts 1 to 4 – Protection Against Lightning.**
- Produce a formal recorded maintenance plan and appropriate inspection checklists and timescales.
 - ✓ Routine auditing of a sample of completed maintenance documents to ensure compliance with site rules and procedures is recommended.
 - ✓ Refer to the Aviva Loss Prevention Standard **Maintenance Regimes** for further guidance.
- Ensure an emergency call out arrangement is in place in respect of irrigation systems, ensuring attendance within 72 hours.
 - ✓ This can significantly reduce the potential for the roof drying and the associated increased combustibility concerns.

- Ensure sufficient spares are retained to support servicing and prompt repairs.
 - ✓ Ensure like for like replacement parts are utilised wherever possible.
 - ✓ Where this is not possible, check the replacement parts are compatible with the system, and the agents in use e.g. fertilisers/feeds, treatment sprays etc., via the supplier.
 - ✓ Replacement parts should be non-combustible wherever possible.
- Review Fire Risk Assessments at least annually to ensure changes to occupancy, activities, local area, the living roof and building etc., are adequately risk assessed and fire safety arrangements remain suitable and sufficient.
- Business Continuity Plans should be reviewed at least annually to ensure disaster recovery and continuity arrangements remain adequate. Any actions generated should be addressed promptly.
 - ✓ Please refer to the Aviva Loss Prevention Standard **Business Continuity** for further guidance.
- Review emergency response plans, key roles and responsibilities, and training provision at least annually to ensure they remain adequate.
 - ✓ Please see the Aviva Loss Prevention Standard **Emergency Response Teams**.

Self-Inspection

At least Annually

- Thorough inspection of the living roof, self-weighting systems, parapet walling and substrate levels for signs of physical damage.
- Ensure there are no changes to the roof which impact the weight parameters stipulated in the original design.
 - ✓ Cutting back or replacement of more vigorous plants may be necessary as the roof matures.
 - ✓ Check tenants or occupiers have not added unsuitable furniture or fittings.
- Ensure the root structures are not damaging the waterproof membrane.
 - ✓ Remove any planting with overly aggressive root system growths.
- Review whether the fire performance of the living roof is changing as plants mature and some thrive more than others.
 - ✓ Cutting back or replacing such planting can help maintain the desired or expected fire performance.
- Review the 'Planting Plan' to ensure it remains suitable given any changes to the building and the immediate area e.g. new buildings that may obstruct the sun.
- Flush irrigation systems.
- Consider whether any new pesticides or fertilisers now in use are suited for the system.

At Least Six Monthly

- Irrigation systems should be serviced / maintained in accordance with original equipment manufacturer (OEM) guidance, or more frequently where recommended.
 - ✓ Components should be replaced at, or preferably prior to the advised timescales.
 - ✓ Adequate parts/spares should be held to help minimise downtime during repairs / servicing.
- Monitoring systems should be thoroughly inspected to ensure full and correct functionality.
- Drainage systems and chambers should be fully inspected for wear or damage.
- Assessment of the planting and lawned areas and removal of dead planting, overly tall planting, weeds, and other unwanted planting e.g. grasses etc.

Monthly

The living roof should be subject to a recorded monthly self-inspection programme to help identify areas of damage, faults, deteriorating planting, unwanted plant growth, condition of components, use of unapproved or incompatible components, water leaks, drainage issues, housekeeping concerns etc. The use of photographic evidence with such inspections can prove invaluable. Self-inspections should include:

- The living roof for signs of damage; drying; faults; invasive/unwanted planting; excessive moisture suggesting irrigation fault; or other hazards.
 - ✓ Repair or remediate promptly as necessary.
- Other fittings and furnishings to ensure they remain in good general condition. Repair promptly as necessary.
- Fire breaks have not been compromised or damaged.
- Irrigation systems and any tanks for signs of damage, leaks, or other issues. Any such issues should be investigated and repaired promptly.
- Any feed supply systems to check they are working correctly.
- Drainage systems for signs of blockages or waste accumulation.
- Automated monitoring systems to ensure they are working correctly.
- Use thermographic cameras to routinely check for any overheating electrical fitting and components in proximity to the living roof.
- Ensure housekeeping arrangements are satisfactory:
 - ✓ Plant rooms maintained sterile and clear of combustible goods.
 - ✓ Smoking rules are being followed.
 - ✓ Catering rules are being followed.
- Any Solar PV systems to ensure:
 - ✓ No damage, deterioration or issues are evident.
 - ✓ Lichen is not accumulating and cleaned/removed as necessary.
 - ✓ Planting is not interfering with components or fixings.
 - ✓ No nesting or detritus accumulation is noted beneath panels.

Note: Guidance for maintaining solar PV systems should be sought from the system installer. Aviva Loss Prevention Standards in relation of solar PV systems provide useful guidance in managing solar PV systems.

Refer to Aviva Loss Prevention Standard **Fire Safety Inspections** for further guidance.

Checklist

A generic **Living Roofs – Ongoing Care Checklist** is presented in Appendix 1 which can be tailored to your own organisation.

Specialist Partner Solutions

Aviva Risk Management Solutions can offer access to a wide range of risk management products and services at preferential rates via our network of Specialist Partners.

For more information please visit:

[Aviva Risk Management Solutions – Specialist Partners](#)

Sources and Useful Links

- [The Green Roof Organisation \(GRO\) Green Roof Code](#)
- [BS EN 1991-1-1 Eurocode 1. Actions on structures - General actions - Densities, self-weight, imposed loads for buildings](#)
- [BS EN 1991-1-3:2003+A1:2015 Eurocode 1. Actions on structures - General actions. Snow loads](#)
- [BS EN 1991-1-4:2005+A1:2010 Eurocode 1. Actions on structures - General actions - Wind actions](#)
- [BS EN 13501-2 - Fire classification of construction products and building elements - Classification using data from fire resistance and/or smoke control tests, excluding ventilation services](#)
- [BS EN 62305 pts 1 to 4 – Protection Against Lightning](#)
- [BS EN 12056-3: Gravity drainage systems inside buildings](#)
- [BS 6229:2018, Flat roofs with continuously supported flexible waterproof coverings](#)
- [BS 8616:2019 Specification for Performance Parameters and Test Methods for Green Roof Substrates](#)

Additional Information

Relevant Aviva Loss Prevention Standards include:

- **Living Roofs – Design and Installation**
- **Living Walls – Ongoing Care**
- **Living Walls – Design and Installation**
- **Roof Mounted Photovoltaic Solar Panel Systems – General Considerations**
- **Roof Mounted Photovoltaic Solar Panel Systems – Planning for Installation**
- **Roof Mounted Photovoltaic Solar Panel Systems – Installation and Construction**
- **Roof Mounted Photovoltaic Solar Panel Systems – Installed and Ongoing Care**
- **15 Top Tips for Roof Mounted Photovoltaic Solar Panel Systems**
- **Fire Safety Inspections**
- **Fire Compartmentation**
- **Escape of Water and Fluid Leakage**
- **Fire Safety Legislation**
- **Electrical Installations - Inspection and Testing**
- **Emergency Response Teams**
- **Housekeeping - Fire Prevention**
- **Maintenance Regimes**
- **Hot Work Operations**
- **Thermographic Surveys**
- **What is Environmental, Social and Governance**

To find out more, please visit [Aviva Risk Management Solutions](#) or speak to one of our advisors.

Email us at riskadvice@aviva.com or call 0345 366 6666.*

*The cost of calls to 03 prefixed numbers are charged at national call rates (charges may vary dependent on your network provider) and are usually included in inclusive minute plans from landlines and mobiles. For our joint protection telephone calls may be recorded and/or monitored.

Appendix 1 - Living Roofs – Ongoing Care Checklist



Location	
Date	
Completed by (name and signature)	

	Maintenance	Y/N	Comments
1.	<ul style="list-style-type: none"> • Are adequately trained and experienced workers and/or companies used for inspection, servicing, and maintenance of the living wall and associated systems? • Are formal contractor controls and arrangements in place in respect of: <ul style="list-style-type: none"> ✓ Approving works? ✓ Issuing, and signing off permits to work? ✓ Ensuring works have been satisfactorily completed? ✓ Fire detections and/or protections reinstated where previously isolated or covered? • Are permits to work routinely inspected to ensure compliance with rules and stipulated procedures? 		
2.	<ul style="list-style-type: none"> • Is the electrical installation, including lightning protection systems, maintained in accordance with local regulatory requirements and original equipment manufacturers (OEM) or installers recommendations? • Is there a process for ensuring replacement components are suitable for wet environments? • Is there a process for ensuring replaced lighting equipment is low heat emitting? 		
3.	<ul style="list-style-type: none"> • Is a formal recorded maintenance plan and inspection programme in place in respect of the living roof and associated systems? • Do you routinely audit completed maintenance documents to ensure compliance with site rules and procedures? 		

4.	<ul style="list-style-type: none"> • Where present Is the solar photovoltaic (PV) system subject to monthly on-site inspections to include: <ul style="list-style-type: none"> ✓ Panels – Ensuring panel surfaces are clean, no signs of visible cracking or scorch marks? ✓ Framing – Ensuring no signs of structural distress to the framing*/ballast* (particularly prior to and after strong winds or heavy snow)? ✓ Shading – Ensure shading of any kind is prevented or minimised? ✓ Cables – Ensure cables and seals for free of damage, deterioration, corrosion and are well secured? ✓ Inverters – Ensuring they are free from damage, moisture ingress, ventilating and cooling normally? ✓ Isolation Switches – Checking for signs of water ingress and/or other damage? ✓ Inverter Log - Checking for faults, alarms, or error messages. ✓ Energy Generation – Checking that generation is as expected? 		
5.	<ul style="list-style-type: none"> • In respect of the solar photovoltaic (PV) Installation: <ul style="list-style-type: none"> ✓ Is it formally inspected, tested, and maintained annually by an experienced and competent contractor, certified under the Microgeneration Certification Scheme (MCS) by an appropriate UKAS nationally accredited body? ✓ Is the Inspection and testing work undertaken by the contractor in accordance with the IET Regulations and Appendix F Maintenance Schedule of the MCS Standard Document MIS 3002 Issue 4.0 The Solar PV Standard? 		
6.	Is an emergency call out arrangement in place in respect of irrigation systems, ensuring attendance within at most 72 hours?		
7.	<ul style="list-style-type: none"> • Are sufficient parts/spares retained to support servicing and prompt repairs of the living roof systems including irrigation? • Are like for like replacement spares/parts utilised wherever possible? • Where this is not possible, are the replacement parts checked for compatibility with the system, and the agents in use e.g. fertilisers/feeds, treatment sprays etc., via the supplier? • Are checks made to ensure non-combustible parts are used wherever possible? 		

	Annual Inspections	Y/N	Comments
8.	<ul style="list-style-type: none"> Has the living roof, self-weighting systems, parapet walling and substrate levels been thoroughly inspected for signs of physical damage? Have any corrective actions been addressed? 		
9.	<ul style="list-style-type: none"> Have there been any changes to the roof which impact the weight parameters stipulated in the original design e.g. new structures, planters heavy furniture etc? 		
10.	<ul style="list-style-type: none"> Has the waterproof membrane system been checked for signs of root damage? If so, has this been repaired and planting changed to remove plants with aggressive root structures? 		
11.	<ul style="list-style-type: none"> Has the fire performance of the roof changed as plants mature and grow? If so, has planting been cut back or changed? 		
12.	Have irrigation systems been flushed?		

	Six monthly Inspections	Y/N	Comments
13.	Are irrigation systems being serviced / maintained in accordance with Original Equipment Manufacturer (OEM) guidance?		
14.	<ul style="list-style-type: none"> Have monitoring systems been thoroughly inspected to ensure full and correct functionality? Have any corrective actions been addressed? 		
15.	<ul style="list-style-type: none"> Have drainage systems and chambers been fully inspected for wear or damage? Have any corrective actions been addressed? 		
16.	<ul style="list-style-type: none"> Has an assessment of the planting and lawned areas been undertaken? Has any dead planting, overly tall planting, weeds, and other unwanted planting e.g. grasses etc. been removed? 		

	Monthly Inspections	Y/N	Comments
17.	<ul style="list-style-type: none"> Has the living roof been inspected for signs of damage, drying, faults, invasive/unwanted planting, excessive moisture suggesting irrigation fault, or other hazards? Have any corrective actions been addressed? Have automated monitoring systems been checked and working correctly? Are all alert/alarm systems working correctly? 		
18.	<ul style="list-style-type: none"> Have the irrigation systems, rooms and any tanks been checked for: <ul style="list-style-type: none"> ✓ Damage or leaks? ✓ Housekeeping issues? Note: plant rooms should be maintained sterile and clear of combustible items? ✓ Issues or faults with the feed supply systems? ✓ Damaged or missing lagging? ✓ Are any trace heating systems working correctly? ✓ Are any leak detection systems working correctly? Are irrigation systems, feeding systems and flow rate monitoring systems working correctly? Have any corrective actions been addressed? 		
19.	Have any feed supply systems been checked to ensure they are working correctly?		
20.	Have drainage systems been checked for signs of blockages or waste accumulation?		
21.	Is there any evidence of smoking rules being breached?		
22.	Have waste bins been installed on or near the living roof?		
23.	Are there any unauthorised/unapproved heaters in use?		
24.	<ul style="list-style-type: none"> Is any unapproved catering equipment present? Are any catering gas cylinders being stored outside of site rules? 		
25.	Are any plant rooms maintained sterile and clear of combustible goods?		

26.	Additional comments:
-----	----------------------

Please Note

This document contains general information and guidance only and may be superseded and/or subject to amendment without further notice. Aviva has no liability to any third parties arising out of ARMS' communications whatsoever (including Loss Prevention Standards), and nor shall any third party rely on them. Other than liability which cannot be excluded by law, Aviva shall not be liable to any person for any indirect, special, consequential, or other losses or damages of whatsoever kind arising out of access to, or use of, or reliance on anything contained in ARMS' communications. The document may not cover every risk, exposure or hazard that may arise, and Aviva recommend that you obtain specific advice relevant to the circumstances.

7th February 2025

Version 1.0

ARMSGI2302025

Aviva Insurance Limited, Registered in Scotland Number SC002116. Registered Office: Pitheavlis, Perth PH2 0NH.

Authorised by the Prudential Regulation Authority and regulated by the Financial Conduct Authority and the Prudential Regulation Authority.