



**San Francisco
Water Power Sewer**
Services of the San Francisco Public Utilities Commission

Urban Watershed Management Program
ATTN: Stormwater Review
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SAN FRANCISCO, CA 94102
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Annual Self-Certification Checklist

**Vegetated Roof (Extensive)
(AKA: living roof, eco-roof, green roof)**

Inspection Date: _____ **Address:** _____ **Block / Lot #** _____ **Installation Date:** _____
Inspected By: Name: _____ **Phone:** _____ Property Owner Site Manager Contractor Other: _____

INSTRUCTIONS: All inspections, maintenance tasks and repairs are to be completed prior to the beginning of the rainy season (October 15). Mark all status boxes with an S or U, where S = Satisfactory (no maintenance required), and U = Unsatisfactory (maintenance required). See the Green Roof Inspection instructions included in this packet for detailed descriptions of conditions requiring maintenance and further action. See note on page 2 for fall protection safety requirements.

Item #	Inspection Item Description	Status	Indicate Action Required or Action Planned	Indicate Action Taken (Include Date Completed)
1	Unpleasant odors			
2	Extended drawdown time (Ponded water on roof surface > 48 hrs.)			
3	Waterproofing or flashing damage – interior leaks			
4	Leaf or debris accumulation on roof surface			
5	Blockage of debris screen for gutter or overflow drain			
6	Irrigation system damaged, leaking or out of adjustment			
7	Erosion / reduced growing medium thickness			

Item #	Inspection Item Description	Status	Indicate Action Required or Action Planned	Indicate Action Taken (Include Date Completed)
8	Reduced vegetation coverage / bare spots			
9	Excessive weed growth			
10	Visible surface contaminants / pollution			
11	Unauthorized modifications			
12	Mosquitos or mosquito larvae observed*			

*If mosquitos or mosquito larvae are observed, please contact the San Francisco Environmental Health Vector Control Program at (415) 252-3806, or email EnvHealth.DPH@sfdph.org

SAFETY NOTE: Green roof inspection and maintenance tasks could involve working from elevations that require the use of fall protection equipment. OSHA requires that fall protection be provided at elevations of four feet in general industry workplaces and six feet in the construction industry. Refer to and follow all OSHA requirements and regulations before accessing roofs. Visit <https://www.osha.gov/SLTC/fallprotection> for more information.

Signature: _____ Date: _____



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NOTE: These instructions are intended to be a companion piece to the Annual Self-Certification Checklist. The information contained herein is to be used to help the preparer of the Annual Self-Certification Checklist accurately conduct an inspection and properly complete the form.

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Abbreviations: SMR: San Francisco Stormwater Management Regulations and Design Guidelines; SCP: Stormwater Control Plan; SMO: San Francisco Stormwater Management Ordinance; BMP: Best Management Practice (Green Roof); GI: Green Infrastructure

Item #	Inspection Item Description	Inspection Instructions and Explanation
1	Unpleasant odors	<p>Area of Concern: Several maintenance-related factors can lead to anaerobic soil conditions that create unpleasant odors in GI installations. Any installation that consistently fails to draw down completely within 48 hours can become anaerobic. The buildup of bacteria in anaerobic soils, along with decaying organic materials, can cause these odors.</p> <p>Maintenance Solution: For more information on ponded water and extended drawdown time, see Item #2 below.</p>

Item #	Inspection Item Description	Inspection Instructions and Explanation
2	Extended drawdown time (Ponded water on roof surface > 48 hrs.)	<p>Area of Concern: Ponded water resulting from extended drawdown times beyond 48 hours can lead to problems such as reduced filtration capacity, unpleasant odors, plant die-off, and creation of mosquito habitats.</p> <p>Ponded water and drawdown failure can be caused by the following:</p> <ul style="list-style-type: none"> • crusting or sealing of the green roof media surface • heavily compacted green roof soil • large amounts of sediment accumulation in the green roof media • blocked or clogged drainage membrane • blocked or clogged gutters or overflow structures • the improper use of geotextiles / wrong filter membrane material <p>Inspecting the drainage membrane for clogging can be done visually by looking for standing or ponded water on the green roof surface or by excavating a small inspection hole in the planting media so a visual inspection of the drainage membrane is possible.</p> <p>Maintenance Solution: Clogged gutters and overflow debris screens can be cleared by removing accumulated debris and sediment from the structure.</p> <p>If geotextile or filter fabric is determined to be the cause of ponding, removal and replacement of the fabric is required. The removal of clogged subsurface geotextiles requires the removal and replacement of the green roof media and plantings.</p>
3	Waterproofing or flashing damage – interior leaks	<p>Area of Concern: If interior leaks are detected, an inspection of the roof structure should be conducted, starting with Item #2 above to determine if the problem begins with an extended ponding period. If ponding or water retention in the planting media is not evident, continue to Item #4 below to determine if the problem is associated with a clogged gutter or blocked overflow drain that is causing water to be retained in the drainage membrane. The final item to inspect is the flashing, sealant, and caulking at roof edges and penetrations.</p> <p>The waterproofing membrane is much harder to inspect, due to the fact that it lies under the green roof system. If all other possible causes of leaks have been inspected and ruled out, then removal of the green roof section in the area of the leak is the only way to access the waterproofing membrane. This step should be undertaken only after all other possible causes of leaks have been ruled out.</p> <p>Maintenance Solution: Once the location and cause of the leak has been identified, a specialty roofing contractor with green roof experience should be engaged to conduct the necessary repairs.</p>
4	Leaf or debris accumulation on roof surface	<p>Area of Concern: Excessive trash or debris accumulation causes problems in green roof installations that extend beyond poor aesthetics. Trash and debris accumulation can inhibit plant growth, clog or inhibit the infiltration capacity of the green roof media and clog gutters and overflow pipes and screens. Clogged or inhibited infiltration capacity could lead to extended drawdown times. Clogged gutters and overflow pipes and screens can lead to overflowing and flooding.</p> <p>Maintenance Solution: All trash and debris should be removed from green roof planters before the start of the rainy season (October 15), or as frequently as site conditions dictate, and discarded at an appropriate facility.</p>



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Item #	Inspection Item Description	Inspection Instructions and Explanation
5	Blockage of debris screen for gutter/overflow drain	<p>Area of Concern: Trash, debris, and poorly sited or overgrown plant material can create blockages at the gutter or at the overflow structure of green roofs, inhibiting the flow of water off of the roof.</p> <p>Gutter and overflow structure blockages can create excessive ponding on the green roof, potentially leading to leaks and other property damage.</p> <p>Maintenance Solution: Blockages must be cleared before the start of the rainy season (October 15), before each forecast storm if site conditions require, and/or as frequently as site conditions dictate. Trash and debris must be removed by hand, or with hand tools, and discarded at an appropriate facility. Poorly-sited or overgrown plant material can be transplanted to another location on the roof or discarded as compost. Gutter and overflow structure blockages must be cleared of debris by hand or by hand tools.</p>
6	Irrigation system damaged, leaking or out of adjustment	<p>Area of Concern: Irrigation systems, including backflow prevention devices, must be maintained year-round by a qualified professional. It is recommended that irrigation systems in green roof planters are only utilized through the plant establishment and warranty phases of the project. Once the plant material has been established and out of warranty, continued irrigation should not be necessary if the proper plants were specified for the installation.</p> <p>Damaged or leaking irrigation systems are identifiable by the presence of ponded water or wet spots on the roof during dry periods and should be repaired immediately. Malfunctioning irrigation systems can also be identified by dry areas on the roof and evidence of browning or wilting plants that show signs of under-watering. Systems that are out of adjustment are identifiable by observation during the irrigation cycle.</p> <p>Maintenance Solution: Head patterns must be adjusted to ensure that the spray pattern does not deposit water on surrounding hard surfaces or nearby structures. Damaged and leaking irrigation systems should be repaired by a qualified irrigation contractor.</p>
7	Erosion / reduced growing medium thickness	<p>Area of Concern: Water movement across a green roof (especially more steeply sloped roofs) may cause erosion and scouring of the planter surface over time, or immediately after construction during the plant grow-in period. Some green roofs may also be susceptible to wind erosion, especially if the growing medium is based on lightweight aggregates.</p> <p>Erosion can be detrimental to the green roof media moisture retention capacity. Erosion can also cause damage to plants due to diminished media moisture retention and reduced root zones, and create blockages and clogging in underdrains and outflow structures.</p> <p>Maintenance Solution: Repair measures must include identifying and correcting the cause of the erosion, repairing the erosion damage and replanting any areas that have reduced vegetation coverage caused by the erosion process.</p>

Item #	Inspection Item Description	Inspection Instructions and Explanation
8	Reduced vegetation coverage / bare spots	<p>Area of Concern: Plants play an important role in the function of a green roof system. In addition to evapotranspiration, plant roots help aerate the soil and minimize soil compaction, replenish organic materials in the soil, and provide a habitat for beneficial bacteria that aids in the biological breakdown and mitigation of pollutants deposited by stormwater into the green roof medium.</p> <p>For a green roof to function properly, it needs consistent and healthy plant cover. Bare spots created by missing plants give invasive weeds an opportunity to grow. This invasive weed growth will crowd out the beneficial plant species over time, reducing the effectiveness of the green roof.</p> <p>Maintenance Solution: Dead, diseased, dying, or missing plants must be replaced. If a large amount of plants have died off, consult with a horticultural expert on the cause of the die-off and remedy the cause before replanting.</p>
9	Excessive weed growth	<p>Area of Concern: Noxious and invasive weeds must be removed when they cover more than 25% of the green roof surface. Best practices call for weed removal on a monthly basis, regardless of cover percentage. Noxious and invasive weeds are highly damaging to landscapes and the natural and built environment – these weeds interfere with the beneficial use of the land, degrade biodiversity, and reduce the effectiveness of the green roof.</p> <p>Maintenance Solution: Best practices call for weed removal on a monthly basis, regardless of cover percentage. Weed removal must include the entire root structure and the weeds must be disposed of at an appropriate facility to prevent spreading of invasive species. California’s Pest Prevention System (PPS) and the California Food and Agricultural Code (FAC) Appendix D set regulations and laws pertaining to weed removal and disposal.</p>
10	Visible surface contaminants / pollution	<p>Area of Concern: Visible surface contaminants and pollution can range from inert substances that can cause green roof media clogging to hazardous substances that impact plant, environmental, or human health.</p> <p>Examples of inert contaminants are wind-blown debris. Examples of hazardous contaminants are petroleum-based substances, caustic chemicals, pesticides, and herbicides. These pollutants can often be identified by sight or smell when they become deposited on the surface of a green roof.</p> <p>If pollutants are detected, investigations must be conducted to determine the source of the contaminant, mitigate that source, and then take steps to clean up the contamination.</p> <p>Maintenance Solution: For inert substances, cleanup can typically be conducted by regular maintenance personnel by simply scraping off and discarding the contaminated material at an appropriate facility. Hazardous substance cleanup will require specially trained and licensed contractors and special disposal requirements conforming to local and national laws and regulations.</p>
11	Unauthorized modifications	<p>Area of Concern: Unauthorized modifications consist of any changes to a green roof that deviate from the approved construction documents. These modifications can take place during construction (i.e., soil or plant substitutions with inferior components), or can happen over time, after the green roof is constructed (i.e., reducing the footprint of the green roof to accommodate cell phone antennas or other roof mounted equipment).</p> <p>The SMR Maintenance Agreement Exhibit B recorded on the deed of the property provides the original approved construction documents that can be referred to and used to determine if modifications have been made.</p> <p>Maintenance Solution: All unauthorized modifications must be corrected by returning the green roof to its original configuration, as described in the approved construction documents contained in the SMR Maintenance Agreement Exhibit B.</p>



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12	Mosquitos or mosquito larvae observed	<p>Area of Concern: Ponded water resulting from extended drawdown times beyond 48 hours may lead to the development of a mosquito habitat.</p> <p>Maintenance Solution: See Item #2 above for remedies to extended drawdown times. For more information on mosquito control visit http://www.sfdph.org/dph/eh/WestNile/default.asp or http://www.sfmosquito.org. If mosquitos or mosquito larvae are observed, please contact the San Francisco Environmental Health Vector Control Program at (415) 252-3806, or email EnvHealth.DPH@sfdph.org. Also, consult with a licensed professional pest control service for eradication, as appropriate.</p>