AMERICAN UNIVERSITY
WASHINGTON, DC

American University
Integrated Pest Management Plan
LEED for Existing Buildings: Operations & Maintenance
Effective February, 2013

SECTION 1: SCOPE

This plan provides guidelines for protecting and enhancing the natural diversity of American University's campus site, while also supporting high-performance building operations and developing synergies between the building and its environmental context. The campus is located at 4400 Massachusetts Avenue NW, Washington, DC 20016. The Integrated Pest Management (IPM) Plan covers the entire campus grounds and all LEED Volume buildings.

SECTION 2: GOALS

AU's IPM goals are to prevent, manage, and/or periodically eliminate pest populations that occur in and around facilities while minimizing the impact of site management practices on the local ecosystem, and reducing exposure of occupants, staff and maintenance personnel to potentially hazardous chemical, biological and particle contaminants.

The Plan addresses environmental best practices for:

- Outdoor integrated pest management
- Indoor integrated pest management

SECTION 3: RESPONSIBLE PARTIES

Mark Feist, the Assistant Director of Facilities Management, with support from Stephanie DeStefano, Grounds Operations Coordinator, is responsible for developing and managing the implementation of the IPM Plan. Contracts with pest and landscape management vendors shall include extensive language describing their role in the building's Plan. Contractors involved with various elements of the Plan shall carry out their tasks according to their contracts, and report all relevant activities to the aforementioned parties. On occasion, several contractors may be engaged simultaneously in various elements of the Plan at the building and grounds. To ensure an effective and coordinated effort, the building staff responsible for overseeing the Plan shall review all proposed activities before implementation.

IPM strategies for the entire property include actions performed by the following contractors*:

Function	Company Name	Primary Contact	Phone
Pest control	Innovative Pest Management	Josh Kramer	301-570-3900

*Contractors may change and necessitate updates to the plan.

SECTION 4: QUALITY ASSURANCE CONTROL PROCESS

The party(s) responsible shall periodically evaluate the success of the Plan. This evaluation may include producing and providing a report on an annual basis to senior management. Whenever possible, the annual reports shall include an evaluation of the performance, safety, cost and environmental/public health benefits achieved as a result of its implementation.

Prior to implementation, service providers involved in the building's Plan shall submit all proposed pest management activities to the responsible parties, listed in Section 3. Upon reviewing proposed activities, the responsible parties shall determine if they meet the criteria of the Plan and approve or deny action.

The responsible parties, listed in Section 3, shall regularly communicate with all service providers, and conduct regular site inspections and evaluations to ensure that the Plan is in place and functioning as intended. In addition to ongoing quality control measures, the Assistant Director of Grounds, Vehicle Maintenance, and Support Services within Facilities Management will review all practices and products prior to contract renewal (typically annually) to identify opportunities for improvement and expansion of environmentally-friendly practices.

SECTION 5: PERFORMANCE METRIC

This IPM Plan shall govern all components of pest management at the project building and site. Conventional IPM is AU's adopted minimum goal with movement toward no toxic pesticides being used on campus as the eventual goal to reduce exposure of to carcinogens, reduce leeching of toxic chemicals into ground and surface water, and protect soil biology.The practices identified in this Plan shall be wholly adopted and used in 100 percent of the pest management scenarios at American University.

SECTION 6: IPM STRATEGIES AND PRACTICES

Integrated Methods

Integrated methods that make use of monitoring and non-toxic preventative measures (e.g., site inspection and maintenance, cultural controls, pest inspection and population monitoring) will be used to proactively manage and minimize pest issues. In the event that monitoring activities reveal a need for the use of pest controls, appropriate control options will be evaluated, and the least-toxic option likely to be effective will be employed.

Least-toxic Pesticides

Least-toxic pesticides are defined by the City of San Francisco's Hazard Tier 3 criteria (least hazardous):
http://www.sfenvironment.org/sites/default/files/fliers/files/sfe_th_products_screened_by_sfe_ipm.pdf .

Least-toxic pesticide status also applies to any pesticide product, other than rodent bait, that is applied in a self-contained, enclosed bait station placed in an inaccessible location, or applied in a gel that is neither visible nor accessible.

Rodent baits may only be used when necessary and only solid blocks secured in locked and secured tamper resistant outdoor bait stations are used. Rodent baits should not be used on the building exterior unless non-toxic, such as peanut butter on a rat trap.

Zero Use of Neonicotinoid Chemicals
As the neonicotinoid class of insecticides continues to receive the greatest attention from scientists and beekeepers related to the ongoing decline of honey bees and wild pollinators, AU shall prohibit the use of neonicotinoid chemicals on campus.

Emergency Conditions
Conventional IPM is AU's adopted minimum goal with movement toward no toxic pesticides being used on campus as the eventual goal to reduce exposure of to carcinogens, reduce leeching of toxic chemicals into ground and surface water, and protect soil biology. In the event of an emergency, pesticides may be applied on the grounds without complying with the earlier stipulations for use of integrated and least-toxic methods.

Emergencies are defined as extreme conditions or infestations that cannot be controlled through least-toxic application methods, normal IPM strategies and/or situations and require immediate action. An emergency situation is one that presents a health or hazardous risk to occupants.

Universal Notification
American University has adopted a universal notification system if a pesticide, other than a least-toxic pesticide as defined above, must be applied on site. This strategy requires American University and its vendors to notify building occupants at least 72 hours in advance of a pesticide application under normal circumstances and no more than 24 hours after an emergency application through posted signs or other means of reaching 100 percent of occupants. This notification system enables occupants and staff, and especially high-risk occupants such as children, pregnant women and the elderly, to modify their plans based on pesticide use at the building.

Notification must include the following:
- Pesticide product name
- Active ingredient
- Product label signal word (e.g., "caution", "danger")
- Time and location of application
- Contact information for persons seeking more information

Recordkeeping
Recordkeeping is required to demonstrate ongoing compliance with the IPM plan. All applications of pesticides (including least-toxic options) shall be logged. The pesticide application log shall include the following information:
- Universal Notification to Occupants
    - Date
    - Time
    - Method
- Pesticide Application Date and Time
- Application Manager

- Location
- Target Pest
- Pesticide Trade Name
- Pesticide Active Ingredient
- EPA Registration Number
- Least-toxic status (Y/N)

Cleaning Practices
In the event that cleaning products are used as a component of IPM, they shall meet LEED-EBOM criteria for sustainable cleaning products.

Animal & Vegetation Pest Control IPM Best Practices
Environmental best practices described below are incorporated into vendor contracts / SOP language as appropriate.

AU uses the following processes in carrying out the IPM program:

- Inspect the property
- Identify the pest and all the life stages that are present
- Determine the distribution and density of the pests in and around the structure
- Determine the origin of the infestation – how pests entered
- Map the structure and its surroundings
- Determine the age of the infestation
- Identify conditions conducive to the infestation in, on and around the structure
- Determine the operational activities and occupant behaviors sustaining pest activity
- Locate the key sites or critical control points in the facility
- Determine the factors or conditions that may affect pesticide selection, use, and performance
- Document the findings of the inspection in writing and/or visually
- Educate building owners/occupants

CHEMICAL STORAGE PRACTICES	
Storage Areas	▪ Storage areas must be dry, frost-free, well-ventilated and secure. ▪ Storage areas must be situated away from other buildings, especially residential buildings or areas where food or flammable materials are stored. ▪ Storage must be built to resist foreseeable accidents, including leakage and spillage, fires and the weather. Ensure there is no risk of spills polluting ground water and local bodies of water. Floors must be impervious to liquids, anti-slip, chemical-resistant, washable and with a means of diverting spills. Drains must lead to sumps or tanks large enough to contain any foreseeable leaks. ▪ Shelving must be appropriate for the size of the containers stored in them.

	Flammable pesticides must be separated from other pesticides. Consideration must be given to possible reactions between chemicals coming in contact with each other. ▪ Pesticide storage is fenced and locked to limit access to non-authorized users.
Labels	▪ Make sure all pest control chemicals are clearly labeled and that the manufacturer's instructions for use are kept with them. ▪ Chemicals must never be placed in unmarked containers.
Product Information	▪ Effective first-aid provisions must be available together with data sheets on all the products in the storage room as well as the Environmental Health and Safety Department with the chemical safety precautions. ▪ Emergency telephone numbers must be listed in a key location in the storage facility. These numbers and other emergency facilities must be checked and updated as necessary.
Signage	▪ Display warning signs without attracting unwanted attention.

CHEMICAL PREPARATION & HANDLING PRACTICES	
Choosing Chemicals	▪ Identify which pesticides and herbicides are being used and the exact problems they are intended to resolve with the manufacturer labels. The more that is known about the problem, the less chance there is of making a mistake. The words organic, natural and biodegradable in this context do not guarantee that they are safe.
Mixing Chemicals	▪ The only mixing of chemicals are pesticides with water to the proper dilution rate and this is done in a designated safe area on a concrete pad.
Health Precautions	▪ Operators must be provided with and adequately trained in the use of the necessary equipment and protective clothing. ▪ Proper health surveillance must be available to all those working with pesticides and herbicides. ▪ Others in the area must be warned of the spraying program in advance of and during applications.
Chemical Transport	▪ Only the appropriate quantity of pesticide and herbicide must be removed from the pesticide store for immediate use. ▪ Do not transport chemicals in vehicles used for carrying people or food.

CHEMICAL APPLICATION PRACTICES

User Qualifications	▪ In many instances it will be necessary to call on outside expertise to advise on pest-management problems, particularly in the creation of customized integrated pest management problems, which may require detailed knowledge of the biology and ecology of a particular species. ▪ If pesticides are required, the IPM specialist shall communicate with the Grounds Operations Coordinator to determine the best product and application in accordance with approval requirements. ▪ A certified pesticide applicator must supervise and control the preparation and use of chemical applications.
Species Considerations	▪ Time the treatment to coincide with the presence of the pest. ▪ Use a selective chemical that has the least effect on non-target species and treat only the area affected.
User Safety	▪ Users must wear protective clothing and headgear as indicated on the product label, and change clothing and wash thoroughly with soap and water after applying pest control chemicals. ▪ Ensure that anyone handling toxic chemicals never works alone and that the work area is well-ventilated. ▪ Wear a respirator for outdoor spraying or dusting of organic phosphorus compounds ▪ Eating, drinking and smoking must be prohibited when using or handling chemicals ▪ Users must be familiar with the effects on the body of the chemicals they are likely to be using, and how the chemicals may enter the body. ▪ Users must be aware of the signs and symptoms of acute poisoning related to chemicals they are using. They must stop work if they are feeling ill and seek medical advice.
Limited Access	▪ The area of application must be clearly marked, and unnecessary access prevented while spraying is in progress. ▪ Building occupants must be informed of any pest-control management systems. When application or spraying is in progress, they must be warned of this activity and kept away from the area in which it is taking place. ▪ Control the reentry of people into the treated area.
Equipment	▪ Equipment must be frequently checked and properly maintained, both for health and safety reasons and to minimize spray drift.
Weather/Time Restrictions	▪ Spraying must not be carried out in unsuitable weather. Anyone operating sprayers check the wind speed before applying the chemical and follow all label directions. ▪ Hours of work must be controlled so that building occupants are not exposed.

CHEMICAL DISPOSAL PRACTICES

Conditions of Disposal	As most pesticides and herbicides are extremely toxic, proper disposal of unused chemicals is paramount to maintaining the health of building occupants and the safety of the environment. Disposal methods will depend on: ▪ Quantity of waste for disposal ▪ Chemical and biological degradability of the active ingredients ▪ Toxic properties ▪ Concentration ▪ Physical form of the waste ▪ Disposal options available
General Guidelines	▪ Always follow the manufacturer's and/or supplier's instructions even when disposing of empty containers. ▪ Landfilling or incinerating pesticides and herbicides is not an environmentally sound option. ▪ Segregate pesticide/herbicide wastes from general building wastes.
Containers/ Labels	▪ Never transfer pesticides to unlabelled or mislabeled containers. Keep the chemicals in clearly labeled containers even when disposing of them. ▪ Do not reuse pesticide/herbicide containers. ▪ Puncture containers after they have been used to prevent reuse.
Authorization	▪ Use an authorized waste-disposal contractor. ▪ Use an authorized disposal site.

BASIC VEGETATION PEST CONTROL PRACTICES	
Maintenance	▪ Keep the building grounds well-maintained at all times. ▪ Maintenance personnel shall apply mulch to plant beds, warding off weeds and other pests.
Manual Controls	▪ Landscaping shall be mulched and hand weeded and chemical control shall be kept to a minimum. This measure prevents human and environmental exposure to hazardous chemicals.
Chemical Controls	▪ When chemical use is necessary, replace hazardous substances with least-toxic chemicals as defined by the 2007 San Francisco Reduced-Risk Pesticide List.

BASIC ANIMAL PEST CONTROL PRACTICES	
Site/Building Cleanliness	▪ Manage pest attractants (e.g., trash receptacles) ▪ Pay attention to sanitary practices around the garbage containers free of spillage or garbage to prevent the collection of trash or debris on the ground around or underneath the containers.
Structural Integrity	▪ Maintain exterior envelope to deter pests around perimeter of building ▪ Seal exterior cracks and crevices in building exterior (exclusion) ▪ Maintain the building exterior in good repair with no holes or openings larger than ¼ inch including, but is not limited to, windows, doors, fans, vents, etc. Structural repairs prevent pests from entering the building. ▪ Address any deficiencies in the building exterior with corrective measures, i.e.,

	cementing, screening, caulking, installing stripping on door bases, etc. ▪ Maintain door sweeps on all applicable doors to produce a good seal to the ground.
Inspection Schedule and Location	▪ Routine inspections, monitoring and recordkeeping ▪ Pest control applicator performs inspections and responds to any pest reports at least twice weekly and any problem areas are identified, treated if necessary, and followed-up with recommendations. ▪ Decision to use a pesticide other than a least-toxic option is based on an escalation of a pest problem as indicated by increased work orders in a given room or building; feedback from customers and building managers such as Housing & Dining Programs for the residence halls or Bon Appetite for food service facilities; feedback from the pest control technician indicating that first-course and preferred methods are not resolving the problem; and/or emergency outbreak of highly damaging and distressing pests such as bed bugs. The decision to implement a pesticide other than a least-toxic option is made by the Grounds Operations Coordinator within Facilities Management who oversees the IPM contract. The Grounds Operations Coordinator then activates universal notification within the building where the action is needed.

SPECIES-SPECIFIC ANIMAL CONTROL STRATEGIES	
Ants	▪ In areas where ants are present, wipe the areas down with soapy water in order to prevent the formation of major scent trails. If there already is an established trail, wipe backwards from the food source to the entrance of the trail. ▪ Always keep opened foodstuffs in sealed containers or store them in the refrigerator or freezer. Clean out kitchen cabinets, drawers and shelves to remove crumbs and stains. Keep sinks and worktops clean and dry. ▪ Baits are best put in the path of an ant trail and then removed after the ant activity stops, before they lure ants from another colony to the area. ▪ Prune branches close to the building and removed fences or anything that might create a bridge for the ants to cross.
Aphids	▪ Manage sap-sucking pest mites and whiteflies by releasing predatory mites, ladybugs and lacewings onto the grounds several times over a period of weeks. ▪ Consider using parasitic wasps to control scales on trees, shrubs and flowers ▪ If it is difficult to obtain supplies of beneficial insects for release into the garden, then it is possible to purchase a branded lure that simulates the scent of aphids and attracts ladybugs and lacewings to the area
Bed Bugs	▪ If a bed bug infestation is detected, the most effective course of action is to enlist professional help to inspect the entire building for the presence of bed bugs and treat the affected areas.
Caterpillars	▪ Bacterial insecticides derived from natural ingredients are available to control caterpillars.

Cockroaches	▪ Cockroaches contaminate food with their excrement and secrete and unpleasant odor that can permeate the indoor environment. ▪ There are five main species of cockroaches and effective control depends on identifying them correctly. ▪ Integrated pest management measures for controlling cockroaches include effective hygiene and exclusion practices, sticky traps lined with pheromones, and insect growth regulators. ▪ All food handling areas should be cleaned frequently. ▪ Cockroach control is best done by a professional on a contract basis, through the application of least-toxic pesticides. ▪ Control is necessary on a regular basis because of the mobility, reproduction, longevity, and behavior of cockroaches. ▪ Ensure that you know what pesticides are being used by the professional contractor and do not assume they are using an environmentally appropriate chemical.
Dust Mites	▪ Fabrics, bedding and carpets attract and generate dust and dust mites. To keep dust mites at bay, keep building well-ventilated and dry.
Flies	▪ Flies reproduce more readily in waste and manure, which is where control should begin. In warm weather conditions, the reproduction cycle – from egg, to larva, to pupa, to adult winged fly – requires approximately one week. ▪ Collection of waste and residues should be carried out at least twice a week. ▪ Keep refuse areas clean to avoid providing flies with breeding grounds ▪ Ensure dustbin lids fit tightly and the interiors of bins are cleaned regularly to keep surfaces free of food material. ▪ Use fine mesh window and door screens as a barrier against entry by any flying insect. ▪ Ultra-violet (UV) fly killing equipment is very effective so long as it is situated correctly. ▪ UV equipment disguised as uplighters in dining and lobby areas are discreet and highly effective because they attract and eliminate flies quickly and silently. ▪ In food preparation areas, UV equipment should only be used once all possible precautions have been taken to keep flying insects out. ▪ Position the UV equipment close to an entry point, at right angles to the nearest competing light source such as a window. In many catering establishments, poorly-situated UV equipment poses a greater food hygiene hazard than lacking pest repellants altogether. This is because when placed next to the food preparation area, they draw flies to the food which they are likely to contaminate before being killed. ▪ Natural chemical treatments include pyrethrum extracted from the Chrysanthemum cinerariaefolium plant that can be used in kitchens and restaurants.
Mosquitoes	▪ The best control method for mosquitoes is to eradicate their habitat. ▪ Because they like moisture and lay their eggs in standing water, it is important not to leave flower pots, buckets, plastic sheeting or other open containers outside collecting water. Ensure that any rainwater collectors are fitted with

	lids. ▪ Clear debris from gutters and drains to ensure there is no standing water after rain and drain unused pools or fountains so that the water cannot become stagnant. ▪ Drain or fill depressions, mud flats, and other areas that might hold water. ▪ Repair leaking taps and air-conditioning units so that puddles cannot form and ensure that septic tanks and sewage systems are properly maintained and in good working order. ▪ Avoid over-irrigating lawns and gardens, and keep weeds and grass (where the insects rest) well-clipped. ▪ If you have a pond or lake on the building grounds, fill it with mosquito-eating fish such as top-feeding minnows or goldfish – they will eat the mosquito larvae before they mature into adults. ▪ Some buildings have successfully reduced the number of mosquitoes and other insects by attracting bats to their property. A simply-built bat house will usually accommodate up to 100 bats. ▪ To prevent mosquitoes from coming indoors, fit fine-mesh screens to porches, doors and windows.
Fabric/ Clothing Moths	▪ Moth larvae feed on a wide variety of natural and synthetic materials. They can be found in kitchens, food storage areas, clothing, carpets, blankets and upholstery. ▪ Fabrics should be washed and then put in bags and placed in a freezer. When taken out to thaw, shake the fabrics vigorously to remove dead larvae. ▪ Clean the areas where fabrics have been stored with vinegar and water. ▪ For acute moth problems, re-usable traps can be baited with a controlled-release pheromone system to lure moths into the trap and disrupt their mating cycle. ▪ Mothballs not only have an unpleasant odor, but they are also poisonous; avoid them if possible. Insect foggers are not recommended as they can pose a health threat and are not always effective.
Pantry Moths	▪ Clean affected areas by vacuuming all surfaces, walls, shelves, cabinets and floors. Scrub hard surfaces rigorously with hot water and detergent, especially in corners and around the edges of removable shelves. Clean all surfaces that come into contact with food. ▪ Rinse the affected areas with white vinegar, either in a spray or by wiping with a cloth. ▪ Throw away all grain-based food items as well as nuts, raisins, flour and tea, even if it is in sealed containers. ▪ Remaining food items and containers should be thoroughly cleaned with a detergent and water solution and wiped down with a vinegar rinse before being put back. Use air-tight containers made of hard plastic, glass or metal and not plastic bags. ▪ Kill any moths with a fly swatter or moth traps.
Rodents	▪ Rodent control should start with a survey to determine the source of the problem and the conditions that encourage the infestation. Following the

	survey, implement a program to kill the rodents, removing their sources of food and water, eliminating their place of refuge and making it rodent-proof, and educating and obtaining the cooperation of employees. If the food supply is removed before you eradicate them, the rodents will migrate to other areas, making elimination more difficult. ▪ Openings in building foundations and walls should be closed or screened with wire mesh that has holes not more than 1.25 cm (0.5 in) wide. Where pipes enter masonry, force heavy hardware cloth or steel wool into the opening, then fill it with concrete. ▪ Continuous surveillance is necessary, and places where rodents have been gnawing to gain entry to a building should be sealed with metal flashing. ▪ Doors are particularly vulnerable to rodent entry so ensure that external doors and windows close tightly with no gaps at the bottom. ▪ Materials stored in the open, in sheds or in building should be stacked at least 30 cm (1 ft.) above the ground. ▪ Traditional mouse and rat traps, or snap traps, kill instantly. If trapping efforts fail, it is usually due to too few traps being used. ▪ Bait should be sticky to ensure that the mouse triggers the trap mechanism even if it only lightly touches the bait. Mice prefer peanut butter or chocolate to cheese. Bacon, oatmeal or apples can also be used as bait.
Wasps and Hornets	▪ Wasps and hornets are dealt on a case by case basis depending on the risk to humans.