



SECTION 015716

PEST CONTROL – Construction Integrated Pest Management Standard v.20180330

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of the CONTRACT AND GENERAL CONDITIONS.

1.02 DESCRIPTION OF WORK

- A. This Section specifies rodent control and general pest control requirements within construction, laydown, dump, and bordering areas. This work is to be performed prior to demolition, excavation, and site preparation as well as throughout construction, so that rodents (such as rats and mice) and other pests (such as cockroaches and flies) are not unduly attracted to, fostered or permitted to disperse from construction areas.
- B. The Contractor must develop and implement an integrated pest management (IPM) program. As part of that program, the Contractor must cooperate with, and be responsive to, the Harvard University project manager, representatives of Harvard University's Department of Environmental Health and Safety (EH&S) and with officials from federal, state and municipal agencies as well as with management representatives of neighboring properties. As part of this IPM effort, the Contractor must engage services of a State-licensed and Harvard-qualified pest control operator to conduct an Initial Program to monitor, suppress and contain populations of existing rodents and other pests prior to any site disruptions, followed by a Maintenance Program for continued control throughout the duration of construction until occupancy.
- C. **The Contractor agrees to adhere to requirements set forth within this document, and assumes responsibility for the actions by subcontractors performing services in support of the Contractor's efforts.**
- D. The Contractor will ensure that all orifices and penetrations within the zone of construction / renovation resulting from the construction activities are sealed to exclude pests and prevent their dispersal within the structure. In the case of a major / capital project, Contractor will further ensure that pre-existing penetrations are sealed to prevent passage of pests.
- E. The Contractor assumes responsibility for sanitation within the work zone and agrees to secure all food and food wastes on site in accordance with the requirements set forth within this document.



1.03 RELATED SECTIONS

- A. Section 013543 – ENVIRONMENTAL PROTECTION
- B. Section 017419 – CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT
- C. Section 024113.23 UTILITY LINE REMOVAL
- D. Section 078413 - FIRESTOPPING
- E. Section 080000 - DOORS AND WINDOWS
- F. Section 220000 – PLUMBING
- G. Section 230000 – HVAC
- H. Section 260000 - ELECTRICAL
- I. Section 310000 – UTILITIES
- J. Section 312000 –EXTERIOR IMPROVEMENTS
- K. Section 01524 – CONSTRUCTION WASTE MANAGEMENT
- L. Section 01841 – THROUGH-PENETRATION FIRESTOP SYSTEMS
- M. Section 02930 – PLANTING
- N. Section 02970 – LANDSCAPE MAINTENANCE
- O. Section 312500 – EROSION AND SEDIMENTATION CONTROL

1.04 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications may be referenced in text by basic designation only. The list provided below is not intended to be all inclusive of each regulation prevailing over the work. The **latest** version of the document listed shall govern the work performed.

- A. Massachusetts State Building Code 780 CMR, Ninth Edition.
- B. Massachusetts State Sanitary Code, Ch 1, 105 CMR 400.100 and Ch. II CMR 410.550
- C. City of Boston Municipal Code Chapter XVI, Article 16, Section 31 Rodent and Insect Prevention Measures at Construction Sites.
- D. M.G.L. Chapter 132B: Massachusetts Pesticide Control Act
- E. Massachusetts Pesticide Examination and License Information
- F. Cambridge Municipal Code 1329, Chapter 8.25 Dumpster Licenses
- G. 321 CMR 2.00: Miscellaneous Regulation Relating to Division of Fisheries and Wildlife



1.05 DEFINITIONS

- A. EPA: United States Environmental Protection Agency
- B. Contractor: Refers to the General Contractor responsible for the Work under contract with Harvard Project Manager. The General Contractor assumes responsibility for all activities performed by subcontractors on site.
- C. Harvard Project Manager: A representative of the Property Owner, President and Fellows of Harvard College
- D. IPM: Integrated Pest Management
- F. EH&S: Harvard University, Department of Environmental Health and Safety, Environmental Public Health Program

1.06 QUALIFICATIONS

- A. The Contractor must hire a pest control operator to perform pest management services on the work site. The Contractor will ensure that:
 - 1. The pest control operator is selected from the current list of those pre-qualified by the Harvard University Department of Environmental Health and Safety (EH&S). These contractors have been vetted by the Environmental Public Health program representatives, and have agreed to abide by procedures that may be more restrictive than those allowed by federal, state and municipal regulations;
 - 2. The pest control operator and any of their personnel working on Harvard property must have relevant training and experience with: commercial and residential accounts; construction and demolition projects; integrated pest management relevant to rodents and arthropods; and with means to reduce non-target hazards;
 - 3. The pest control supervisor must be certified by the Massachusetts Pesticide Bureau in General Pest Control (category 41). The supervisor must have specific training and experience in vertebrate pest management, commercial rodent control, general pest control, and integrated pest management;
 - 4. Pesticide applicators must be licensed by the Massachusetts Pesticide Bureau in General Pest Control (category 41) and have specific training and experience in commercial rodent control and integrated pest management;
 - 5. Any pest control representative engaging in the management of bats, birds, or mammals other than rats and mice must be certified as a Problem Animal Control (PAC) agent by the MA Department of Fish and Wildlife;
 - 6. The pest control supervisor and applicators must be skilled in written and electronic record keeping and data management, and be able to communicate effectively with Harvard representatives and with the Contractor;
 - 7. The pest control supervisor and applicators shall provide evidence of training relevant to: OSHA construction site safety, asbestos and other hazardous materials awareness, confined space, ladder safety, elevator control room and shaft safety, spill prevention, and any other requirements as set forth by regulatory authorities, the Contractor and EH&S.



1.07 COORDINATION

- A. Demolition and/or construction Work shall not proceed until approved in writing by Harvard's Project Manager.
- B. An Initial Program to monitor and control rodents must be established with adequate timing to achieve control before environmental disruptions and site work begins. A Maintenance Program shall be in force until construction is completed and all equipment and materials are removed, as determined by the Harvard Project Manager.
- C. The Work must be performed in accordance to the preliminary schedule described in this Contract and as revised by the Harvard Project Manager. Estimated durations and start dates may be changed by the Harvard Project Manager to suit changes in construction schedules and field conditions. The Work could potentially require performance any day of the week and any hour of the day or night, regardless of weather, as authorized by the Harvard Project Manager. This Work must be performed in such a manner to minimize risks of toxicants or other control tools to persons, non-target animals and the environment.
- D. All pest management efforts shall be coordinated with Harvard University's Project Manager, EH&S Environmental Public Health Officers and the selected pest control subcontractor(s). The pest control operator will maintain electronic records of each site visit that detail the date and time on site, the identity of pest control personnel, the specific activities performed, and the description of any deficiencies identified and recommendations for corrective actions. Reports of each visit will be provided to the Contractor, the Harvard Project Manager and to EH&S. The Contractor is responsible ensure that corrective actions are performed promptly and to the satisfaction of the Project Manager and EH&S.

1.08 PERMITS

- A. The Contractor will obtain and maintain appropriate permit(s) from city, state or federal agencies for pest control activities associated with this Work.
- B. The Contractor will obtain and maintain, in coordination with the Harvard Project Manager, all right-of-entry permits required for the performance of pest control activities. This includes entry to all utilities and private properties to which entrance is required, as approved by the Harvard Project Manager.

1.09 PRODUCTS

- A. The Contractor will ensure that the pest control operator only apply pesticide formulations registered by the U.S. EPA and the Massachusetts Department of Agricultural Resources, that these are used in accordance with the label directions, and as acceptable to the Harvard Project Manager and to EH&S. Any pesticide on site must be supplied, deployed and discarded solely by a licensed pesticide applicator.
- B. The Contractor will ensure that the pest management operator furnish and use devices and supplies (e.g., traps and bait stations) to facilitate the management and effectiveness of the pest control program, where appropriate and according to label directions, and in manners acceptable to the Harvard Project Manager and EH&S. Each trap or trap station is to be labeled by the pest control operator to identify the pest control operator, the contact information for the pest control operator, and a unique code number for the device. The location of each trap is to be recorded in a database and/or marked on a site map.



1.10 MEETINGS

- A. The Contractor will communicate with the pest control operator weekly to review pest-related issues, pest control activities and to facilitate resolution of new or continuing problems (e.g. site sanitation) that may contribute to pest issues. The Contractor will ensure that detailed pest service reports are automatically sent to the Harvard Project Manager and EH&S.

1.11 SURVEY

- A. Before rodent suppression efforts begin, the Contractor will ensure the pest control operator conducts a thorough baseline survey of the proposed construction area and accessible or observable bordering areas, and records signs of rodent activity and sanitation deficiencies. This survey includes inspection of all embankments, edge areas, and properties within and adjoining the construction area. Survey records are to be maintained in the manner described in 1.16.
- B. During the construction phase of the project, the Contractor will ensure the pest control operator conducts weekly thorough inspections of construction areas and accessible or observable bordering areas designated on the Plans, and any nearby areas designated by the Harvard Project Manager, for rodent activity and sanitation deficiencies. This weekly survey is to include every premises and relevant underground structures (including, but not limited to manholes and catchbasins) within the areas designated. Inspections of confined spaces and underground utilities are to be coordinated with the Harvard Project Manager. Inspection records are to be maintained in the manner described in 1.16.
- C. The Contractor will facilitate efforts by the pest control operator, and allocate resources based on survey and inspection data to minimize pest intrusions and infestations.
- D. The Contractor will facilitate periodic inspections by EH&S personnel to assess the extent of pest and sanitation conditions as well as pest management efforts on the work site. Such inspections may be scheduled or non-scheduled with the Contractor and Project Manager. The Contractor will assign personnel to accompany EH&S personnel during each inspection.

1.12 PESTICIDE APPLICATIONS

- A. The Contractor will ensure that the pest control operator:
 - i. Applies pesticides (including insecticides and rodenticides) in strict accordance with EPA-approved label directions, the Rules and Regulations of the Massachusetts Department of Agricultural Resources, and only after receiving specific approval by EH&S. The Contractor and pest control operator will maintain records of all pesticide placements in the manner described in 1.16.
 - ii. Contains pesticides within properly secured and tamper-resistant stations consistent with EPA regulations. All traps and rodenticide stations are to be individually numbered and properly identified as acceptable to the Harvard Project Manager and EH&S.
 - iii. Confirms the presence of recent rodent activity prior to application of rodenticides, inspects treated sites at least weekly to ascertain when rodent activity has ceased, and collapses or fills all inactive burrows.
 - iv. Coordinates with the Harvard Project Manager, EH&S and relevant municipal authority (if municipally-owned) the inspection and pesticide treatment within manholes, catchbasins



or other underground utility sites, as well as within waste plumbing and other conduits, as appropriate.

- v. Performs an initial intervention to rid the construction area of all detectable rodents, to the extent practical, before construction begins. This effort will include efforts to: trap and/or treat active rodent burrows and collapse burrows considered inactive; install and maintain secure attractant stations (containing traps, detection blocks or rodenticides) at regular and appropriate intervals and locations; and document rodent activity (live animals, burrows, droppings, bait consumed, carcasses, and rodent-associated damage).
- vi. Establishes a maintenance trapping and/or treatment program in construction areas and accessible bordering areas designated on the Plans prior to site disruption, and while the site is under construction. This includes treatment or trapping of any new or otherwise active rodent burrows, and continued use of attractant stations as necessary to ensure that rodents will not re-colonize the site.
- vii. Removes visible rodent carcasses and disposes of them consistent with pesticide label directions and applicable codes, laws, and regulations.
- viii. Notifies the Contractor, Harvard Project Manager and EH&S within 24 hours whenever rodents (rats or mice) or signs of rodent activity (burrows or droppings) are observed in construction or laydown areas.
- ix. Removes (upon completion of construction efforts) remaining rodenticides and disposes of them according to the pesticide label and applicable codes, laws, and regulations.

1.13 SANITATION

- A. The Contractor, with the assistance of the pest control operator, is to conduct weekly surveys and inspections to identify actual and potential harborage and food sources available to rodents or other pests on the construction site and in observable bordering areas designated on the Plans. This includes any littering, improper or insufficient use of refuse containers, piles of debris, weed growth, and unnecessary or deteriorated hay/straw bales / silt socks in construction areas. It also includes any bordering areas with sanitation conditions or structural deficiencies that violate municipal or state sanitary codes. The Contractor is responsible for promptly mitigating harborage areas and securing food and refuse.
- B. The Contractor will, at the direction of the Harvard Project Manager and EH&S, provide dedicated areas for food consumption by construction personnel. The Contractor is responsible to ensure that no food or food waste is stored, consumed or discarded outside of the dedicated area, and that no non-secured food or food-associated refuse is permitted to remain within the construction zone overnight. The Contractor must assign personnel to inspect the entire work site at the end of each work day, and remove and secure any food or food waste. The Contractor is to maintain daily records that document the completion of these efforts.
- C. The Contractor must supply and maintain rodent-resistant refuse receptacles labeled solely for food wastes deposited within during the workday. The Contractor must ensure these are kept clean, closed, and are emptied daily.
- D. The Contractor is responsible to have any rodent droppings removed from the construction site after documenting their kind (rat, mouse or other), location and abundance.



1.14 COMPLAINT CALLS

- A. During construction, the Contractor is to respond to pest-related complaints from the adjacent neighborhood within one day when directed by the Harvard Project Manager. If the Project Manager and EH&S find insufficiently mitigated pest and/or sanitation issues on the work site, the Contractor must promptly correct such deficiencies to the satisfaction of the Project Manager and EH&S, and agree to provide pest control services to abutters as specified by the Project Manager.
- B. The Contractor is to maintain records of all complaints investigated, in the manner described in 1.16. This includes location, contact person, inspection results, and actions taken.

1.15 GENERAL PEST CONTROL

- A. The Contractor, with guidance from the Project Manager, EH&S and pest control operator, is to develop intervention plans for any pest problem, submit such plans to the Project Manager and EH&S for approval, and pursue efforts to mitigate the problem to the satisfaction of the Project Manager and EH&S. This could include control of insects, other arthropods (such as mites, ticks and spiders) or vertebrates (such as birds and mammals).
- B. The Contractor is to maintain records of general pest control activities in the manner described in 1.16.

1.16 RECORD KEEPING

- A. The Contractor is to ensure the pest control operator uses industry standard computerized pest service reports to maintain accurate records of the date, time period of work, locations, and type and amount of pesticides or other control devices (e.g., traps) deployed or applied. This includes records of surveys, inspections, baiting, changes in pest activity, sanitation conditions, and complaint calls. Submit data in a format acceptable to the Harvard Project Manager and as required under 1.17

1.17 SUBMITTALS

- A. Prior to initiating demolition or construction work, the Contractor is to submit to the Harvard Project Manager and EH&S documentation that identifies the Harvard-qualified pest control operator retained;
- B. After performing the baseline survey described herein, the Contractor is to submit to the Harvard Project Manager and EH&S a written IPM plan that includes survey results and pest control procedures, indicating materials, quantities, methods, and time schedule. This plan shall include proposed locations for initial trapping and pesticide applications, and a list of properties where right-of-entry is assumed necessary. For each pesticide to be used, submit a copy of the pesticide manufacturer's EPA-approved pesticide label as well as the Safety Data Sheet (SDS) of the product. This plan shall be submitted within 14 days of the Notice to Proceed and must be approved by the Harvard Project Manager before pest control is initiated.
- C. The Contractor is to ensure that the Harvard Project Manager and EH&S each receive documentation of pest control activities and results as follows:
 - 1. Submit electronic pest service reports for each visit by the pest control vendor within 2 business days of each visit. Such reports must detail: survey and inspection results, sites treated, pesticides and pest control devices used, assessment of sanitation conditions, a record of complaint calls investigated, and a description of any other pest-related problem observed or made known to the pest control operator.



2. Within each pest service report, the pest control operator is to recommend strategies and means to mitigate each deficiency identified that contributes or may contribute to a pest problem.
3. The Contractor is to respond, in writing, to the Project Manager and EH&S with a proposed plan of action to mitigate each deficiency identified by the pest control operator. Such proposals, or confirmation that the effort has been pursued, shall be submitted within three business days from receipt of the pest service report.

PART 2 – PRODUCTS

- A. Pesticides: Any pesticide applied must be approved for the specific intended use by the US EPA, the Massachusetts Pesticide Board, and a representative of the Harvard University Environmental Health Program (within EH&S).
- B. Sealants: Products used to seal penetrations and orifices shall be selected and applied to meet or exceed current regulatory requirements for firestopping or as smoke barriers. This pertains to penetrations to the exterior of the building as well as to interior walls, floors and ceilings. All MEP/IT or other penetrations shall be sealed on both sides of a partition, including those not specifically requiring such sealing according to national or state fire codes. All conduits are to be sealed with firestopping products in accordance with the manufacturers' directions. Permanently flexible silicone-based sealants are to be used in place of caulking compounds whenever practical.
- C. Exclusion products / devices: Non-oxidizing metal meshes are to be selected and applied, according to manufacturers' directions, to exclude pests from penetrations not sealed by other means. This may include MEP/IT penetrations, louvers/vents, pipe chases, windows (as screens), window wells and other openings. Rodent resistant door sweeps/bottoms shall be fitted to all exterior doors, as well as interior doors serving stairwells, mechanical rooms/tunnels, and food service operations. Refer to the Appendix of this document for further guidance.

PART 3 – EXECUTION

3.1 INSPECTIONS

- A. The Contractor will coordinate with the pest control operator, the Project Manager and EH&S to schedule a regular series of inspections of the work site, and to permit and facilitate non-scheduled inspections by EH&S. These will include assessments of sanitation issues, pest activity, monitoring and trapping/treatment activities, exclusion efforts, and sealing of penetrations that have the potential for rodent or pest infiltration. EH&S and Harvard's Project Manager will identify any deficiencies and convey them to the Contractor. The Contractor is responsible for ensuring that any deficiencies are promptly corrected prior to being enclosed by any additional construction materials. The Contractor's pest control vendor shall inspect such sealed penetrations and confirm in writing to the Project Manager that these are appropriately blocked to prevent passage of pests.

SECTION 015716

PEST CONTROL – Construction Integrated Pest Management Appendix

Overview

This document provides integrated pest management (IPM) guidelines for the control of insects, mice, rats, birds, bats and other pests at new construction projects, renovations and building demolitions at Harvard University. Project managers, Harvard-qualified pest management vendors, construction companies and Environmental Health & Safety (EH&S) all have responsibilities and roles that support a construction environment where pests are effectively abated or mitigated.

Construction contractors must retain a pest management vendor that is licensed by the Massachusetts Department of Agricultural Resources and qualified by Harvard's EH&S. Pest management vendors are required to follow legal, safe, effective and economical practices.

EPA regulates pesticides to protect the public health and the environment. The Commonwealth of Massachusetts further regulates the use of pesticides through its own laws and regulations. Massachusetts State laws and regulations may be more restrictive than those from federal agencies. In addition, the Inspectional Services Departments of Boston and Cambridge require all construction companies to contract for pest control services during demolition of existing structures and to adhere to all applicable building code requirements and other city ordinances. Harvard properties within other municipalities are subject to applicable local regulations within those communities.

Integrated Pest Management

Harvard University is committed to providing safe and effective pest control for all of its construction projects, and as such, EH&S requires all vendors to adhere to the tenets of Integrated Pest Management (IPM) and to other conditions as described in the Master Services Agreement. IPM considers and weighs all legal, practical and economical means to prevent, contain and suppress pest populations. Interventions will thereby be designed and performed to modify or reduce sources / habitats that harbor or attract pests, deploy and maintain traps to monitor for pests and reduce their abundance, and/or apply environmentally appropriate pesticides to contain and suppress pests. Synthetic and natural toxicants will be relied upon if they are judged to be appropriate to abate a pest problem, and only if other means are deemed inappropriate, impractical or have been unsuccessful. In selecting any pesticide, best management practices dictate that the products selected and their means of application should provide the greatest benefit while posing the least risk to persons, non-target organisms and the environment.

The IPM program will include periodic inspections of construction sites by EH&S-qualified pest control vendors, and specifies required best management practices for these vendors. Project managers, construction contractors / sub-contractors, and pest control vendors will pursue proactive and reactive efforts to prevent and abate pest issues as outlined in this document. In addition, the EH&S Senior Environmental Public Health Officer will assist to identify pests and guide decisions and actions by project managers and pest control service vendors should the need arise.

Surveillance and abatement of certain pests of public health significance may involve coordination by the project manager with the pest management vendor, EH&S, state and municipal authorities such as: the Massachusetts Departments of Public Health (MDPH) Agricultural Resources (MDAR), and Environmental Protection (MDEP); the Boston Department of Inspectional Services (Boston ISD); the Cambridge Departments of Public Works, Inspectional Services and Public Health; the Suffolk County and East Middlesex Mosquito Control District, and other agencies/organizations, as appropriate.



Responsibilities:

General Contractors are required to:

- Comply with federal, state and municipal regulations, and abide by practices set forth in this document.
- Comply with site- and project-specific requirements outlined within the project specifications.
- Promptly report sightings of pests and pest-related damage and evidence (including rodent droppings) to Project Managers, the pest management vendor and EH&S via email and/or direct telephone communications, and include the observations and responses in a written log book maintained on site or in a computerized database accessible to the pest management vendor and to EH&S. Such reports should be as specific as possible to include the identity of the reporter, precise location, date and time of the observation, and details regarding the pest and pest-associated damage. Such reports should, whenever possible, include digital images to further document the issue.
- Secure foods and food wastes in containers that prevent entry by rodents and insect pests. All foods and beverages (other than water) are to be consumed solely in designated areas of the work site. If construction personnel are permitted to eat within the work site, the Construction Contractor shall provide dedicated labeled food waste containers at strategic sites on each level, and ensure these are kept closed, clean, lined with disposable bags, and emptied at the end of each day. The presence of non-secured foods, food wastes or food/beverage containers shall be considered a critical violation of this Standard. The Contractor is to assign personnel to perform these efforts daily, and document that the tasks have been completed. The Contractor is ultimately responsible to ensure that sanitation is maintained on the work site.
- Abide by project specifications to ensure that the building's exterior perimeter (including roof, walls and foundation) is as pest-proof as practical during and upon completion of construction.
- Ensure that the building interior components and partitions, such as MEP/IT and other penetrations are properly sealed to restrict passage of pests.
- Contract services of a State-licensed and Harvard-qualified pest management vendor to regularly monitor the work site, report deficiencies, perform necessary interventions and recommend actions by the Contractor.
- Contact EH&S for additional assistance if pest problems are not satisfactorily resolved.

Harvard Project Managers agree to:

- Comply with the practices set forth in this document.
- Promptly report to the Contractor, the pest control vendor and EH&S the presence of rats or other unusual pest activity that could adversely affect the construction site or neighboring community.
- Report to EH&S the presence of infestations (other than rats) that remain unresolved for more than 7 days.
- Promptly report to the Construction Company and EH&S conditions that promote the presence of pests, such as unsecured food and food wastes that may contribute to rodent activity.
- Ensure that construction contractors retain a Harvard-qualified pest management vendor for all relevant services, that such vendors are granted the access they require to perform periodic inspections, and that the items detailed on the pest management punch list are completed promptly and to the satisfaction of the pest management vendor and EH&S.
- As part of the design phase, provide the EH&S Environmental Public Health group with plans of construction, renovation, demolition and landscaping, and diagrams of sewage / stormwater



structures and utility networks on and adjacent to the work site. Generally, such plans should be provided at least two months before any demolition or construction work is anticipated on the site.

Pest Management Operators agree, that for any property owned, operated or managed by Harvard University that they will:

- Comply with all applicable regulations as well as with the practices set forth in this document, within the Harvard EH&S Memorandum of Agreement pertaining to pest management vendors, and the Harvard Master Services Agreement.
- Wear required PPE and vendor identification on site, and announce / log their presence before entering the worksite or engaging in pest control activities.
- Ensure that their service technicians are appropriately trained and certified to safely work on construction sites, and conduct themselves in manners consistent with requirements of the Contractor, OSHA and other regulatory authorities.
- Respond to all requests for emergency service within two hours, and pursue all reasonable efforts to provide same day service, as appropriate.
- Deploy attractant-baited snap traps and/or glue boards to monitor for the presence of rodents. Whenever possible, such sampling devices are to be placed in secure boxes or otherwise protected, and visited at appropriately frequent intervals.
- Obtain approval from the construction supervisor and EH&S prior to using any pesticide. Any other method of rodent control that has not been specified in this document must also be approved of in writing by EH&S and the project manager prior to implementation.
- Promptly report to the Construction Contractor, Project Manager and EH&S the presence of rats or unusual pest activity that could adversely affect the construction site or neighboring community.
- Report to the project manager and EH&S the presence of infestations (other than rats) that remain unresolved for more than 7 days.
- Promptly report to the Construction Contractor, Project Manager and EH&S conditions that promote the presence of pests, such as the presence of unsecured food and food wastes that may contribute to rodent activity.
- Maintain an electronic report / database, available 24/7 to the Construction Contractor, Project Manager and EH&S. This resource must detail the date and time of every visit by the pest control personnel, identify the specific person visiting, specify the activities performed, the observations made and trap results, document deficiencies, and detail recommendations for the Construction Contractor. The location of all traps shall be maintained in a database and/or map of the worksite.
- Perform periodic site inspections of the exterior and interior of any building or structure under construction or renovation, and provide to the Construction Contractor, Project Manager and EH&S a dynamic punch list relating to pest management issues. Such items may include, but are not limited to: penetrations or other openings requiring sealing, sewage lines and stacks requiring capping and/or treating, documenting the presence of food / beverages or containers where they are not permitted, and the presence of construction materials / debris / wastes arrayed in a manner that would encourage pests. Deficiencies (and resolved issues) may be documented with digital images.

Environmental Health & Safety is available to:

- Provide assistance by reviewing plans for construction, renovation, demolition, waste management and landscaping with the intent of ensuring that these activities will not create an environment that will unnecessarily attract, disperse or foster pests.
- Provide assistance if the project manager or pest management vendor reports that a pest problem is not being resolved in a timely manner.



- Provide a list of pest management vendors qualified to work on Harvard properties.
- Will periodically review pest service logs and other pest management service records, and will perform scheduled as well as unannounced site visits, as appropriate.
- Review municipal demolition permits that verify the presence of a pest management program.
- Periodically review and update this document.

Engineering and Operational Practices for Pest Control

Pest Monitoring Devices:

Pest monitoring devices shall be selected, deployed and maintained (usually by the pest management vendor) as part of a surveillance program for insects, rodents and other pests, as appropriate. Such devices are to be used to ascertain the presence, abundance and distribution of certain pests, to provide data that may trigger intervention decisions, as means to suppress pest abundance, and to assess the efficacy of an intervention.

Generally, traps are baited with suitable attractants, and the attractant refreshed at appropriate intervals. Rodent traps should be baited with an array of different attractants, and these rotated between trap location to discourage rodents from becoming trap / bait fatigued. To enhance long term trapping efficacy, snap traps and live traps may initially be deployed with the trigger mechanism inactivated, but with an attractive bait. This aims to encourage wary animals to approach and visit such traps. Once it is confirmed that pests are visiting traps, the triggers may be set, and this generally improves trap efficiency.

Glue traps are deployed mainly to monitor for insects and other arthropods, but they may also be used to target rodents. Such traps should be sited in manners to limit their contact with equipment and foot traffic.

Non-toxic rodent detection blocks may be deployed, usually within secure rodent control devices or tethered within confined spaces or other locations. The extent of gnawing can inform the pest control operator as to the kind of rodent present and the frequency of their feeding. Non-toxic rodent monitoring baits may also include dyes useful for tracking movements of animals that fed upon the source.

Termite detection devices, and pheromone traps for pest species of beetles and moth,s may be deployed by the pest control operator, usually after construction activities have ended. In each case, those devices are to be installed and serviced by the licensed pest control operator.

Flying insects may be disoriented by lamps within special traps that capture insects on glue boards or disable them when they contact an electrically energized grid. These traps may be installed and periodically serviced by the pest control operator.

Pest monitoring traps should each be labeled to indicate the vendor's name and contact information, the date each was deployed, and its location. A coded label may be used, but the code (and associated data) must be readily searchable by EH&S. A record is to be maintained by the pest management vendor that details the kind(s) of traps deployed, the locations and dates of their deployment, the identity of the person who placed the trap, the expected sampling interval, and an accounting of pest captures at each location. This information will ideally be included on the service report form and/or in the database that is available to EH&S. Traps are to be visited and examined at appropriate intervals, the findings recorded, and the traps replaced as needed. Any non-functional or abandoned traps are to be removed by the pest management vendor. The pest control operator is encouraged to provide a map that clearly indicates the position of each rodent station on the site. That position of each trap should be listed on the pest service reports, and the

capture data linked to the trap and position.

Record Keeping:

Service Reports: The pest control operator must maintain digital records for each work site, using industry-standard computer programs, and with data redundantly backed up, ideally to a cloud-based server that is readily accessible to, and searchable by, EH&S and other authorized personnel. The database is to document the initial report of a pest problem, describe the monitoring effort, detail actions taken to investigate the cause and extent of any problem, and clearly describe the measures pursued to abate or mitigate a pest problem. A pest management technician will complete or update a Service Report entry for each visit to the facility. All service reports are to be uploaded to a database accessible by the project managers and EH&S. A printed copy may be provided to the Construction Contractor and maintained in a logbook if so desired. Traditional handwritten notes on paper are discouraged. If handwritten, all notations must be complete, clearly legible and readily understood by any other person.

Sign-in and Sign-out Form: This form will be used to record the dates, arrival and departure times and identity of each pest management representative who visits the site for any reason. The form is to be maintained in a clearly labeled logbook on location, usually at the security desk or in the Contractor's office.

Safety Data Sheet (SDS): The pest control vendor will maintain and update within the logbook and/or computer database, the current specimen label and SDS for every pesticide authorized for use at that specific Harvard location.

Disposal & Relocation of Pests:

Carcasses of small mammals, birds and arthropods (insects, spiders, ticks, mites, etc.) shall be disposed of in a manner consistent with applicable regulation and so as not to create concern or objectionable odor. Captured pests, if alive, shall be killed by appropriate and legal means before disposal. The carcasses are to be sealed in a suitable bag or other container, and disposed of in an outside secured trash receptacle or by other means if required. If requested, certain pests may be reserved for laboratory analysis. No captured animal shall be released on or off site unless specified by, and in accordance with, federal, state or municipal regulation.

Whenever possible and practical, bats are to be unmolested, as is often required by law. Licensed wildlife personnel may install exclusion devices (one-way gates), and then may seal the opening after the bats have exited. Bat roosts present special challenges because of the risks of the insects, ticks and microbes associated with the living animals, as well as their carcasses and excreta. Bat roosts must be evaluated by qualified and licensed wildlife managers, and risks abated in a timely manner. The roost sites may require treatment to kill insects and ticks, and the guano may need to be removed and decontaminated to mitigate risks of respiratory infection. In all cases involving bats, EH&S must first be consulted, and any bat abatement efforts are to be performed by a Massachusetts-licensed Problem Animal Control (PAC) agent (<http://www.mass.gov/eea/agencies/dfg/dfw/fish-wildlife-plants/pac-agents-districts.html>). Not all pest management companies are licensed to handle bats and other wildlife.

Honey bees may swarm and rest upon or nest on or within structures. Whenever practical, swarms should be allowed to remain unmolested, as the bees will soon likely relocate. If nests occur within walls or in locations where they present a significant stinging risk to personnel or may pose damage to the dwelling, local beekeepers are to be contacted to examine the sites and remove the bees if they find them of value. If it is impractical to remove the nests intact, then licensed pest management vendors may treat the site to kill bees. The nest site would then require inspection by the project manager to assess and facilitate the repair



of damage. EH&S is available to assist with the evaluation of bat and bee infestation issues, and to recommend control measures.

Pesticides:

- Are to be applied on or within Harvard properties solely by those persons who hold a valid and appropriate pesticide applicator certification issued by the Commonwealth of Massachusetts, and in a manner consistent with applicable regulations.
- Are limited to products that are approved for use within the Commonwealth of Massachusetts (or other relevant governmental unit).
- Every product that is applied on Harvard properties must be pre-approved by Harvard EH&S. Furthermore, the following information must be provided to EH&S prior to any application:
 - Target pest(s)
 - Location of application
 - Date and time of proposed application
 - Product name, formulation, application rate and locations
 - SDS form and product label
 - Identity of applicator (including license number)
 - Confirmation of posting to notify personnel, or signed waiver

Storage and Disposal of Pesticides:

Pesticides used by pest management vendors will be stored and disposed of at sites off of Harvard owned or managed locations, and in accordance with all applicable regulations. Exceptions will be considered solely on a case-by-case basis. Decisions will be provided in writing from EH&S.

Spills, Accidental exposures, Misapplications, Injuries:

Any spill, accidental exposure, misapplication or injury associated with a pesticide application must be reported immediately to Harvard EH&S, and (if applicable) to the relevant state or municipal authorities.

Engineering efforts to exclude or otherwise mitigate pests

1. **Penetrations:** Whether pre-existing or created for new mechanical, electrical, plumbing or ventilation purposes, each penetration – **whether or not required by code** - should be sealed by an appropriate method that not only preserves the fire / smoke rating of the penetrated structure but also sustainably prevents the entry and passage of insect and rodent pests. Escutcheon plates are acceptable only if the penetration behind is first sealed. Weep holes in the building's exterior façade shall be protected by an insect- and rodent-resistant device or product that will permit flow of air and water. To exclude rodent and insect pests, penetrations in masonry may be packed with cement or grout. If firestopping compounds are used in masonry, wall board or other partitions, the openings might first be tightly packed, as practical, with non-oxidizing metal meshes such as stainless steel mesh pads (e.g. 'Xcluder' brand blocks or fabric) or copper mesh (e.g. 'Stuf-Fit' brand). Guidance on such product application is available from the Harvard University EH&S Senior Environmental Public Health Officer and from the pest control vendor.



2. **Plumbing drains:** Whether pre-existing or newly installed, traps serving floor drains, floor sinks, as well as those serving sinks, showers and toilets, are to be maintained filled, whenever practical, by use of automatic priming systems. Furthermore, waste pipes shall, whenever practical, be protected from pest intrusion by: a) installing a backwater flow valve on the main sanitary line for the building; and b) fitting drains with grates sized to restrict passage of pests. Where floor drains are provided beneath cabinetry or islands in food service establishments, those drains shall be sited so they are readily accessible for inspection and cleaning purposes, and each fitted with an easily removable and cleanable strainer that will collect debris while preventing the passage of pests.
3. **Plumbing vents:** Roof-top vent stacks should be protected from pest and debris entry by fitting the opening with a non-oxidizing metal mesh. A cap may be formed of stainless steel hardware cloth (ideally with ¼ inch openings), and secured with a ring clamp.
4. **Sumps and Ejector Pits:** Sumps and ejector pits shall be sealed by appropriate covers or protected by intact screening to restrict access by insect and rodent pests. Covers shall be securely sealed to the floor by means of flexible sealant or a gasket, and the access hatches installed and maintained so that pests cannot pass.
5. **Doors:** Entryways to buildings, corridors shall be fitted with self-closing doors. To prevent pest passage, doors shall be set so that no horizontal or vertical opening exceeds ¼ inch. Ideally, no light should be seen between or beneath doors when properly installed. Where practical, thresholds shall be installed with minimal tolerance. Elsewhere, doors shall be protected with rodent-resistant sweeps, such as those containing stainless steel mesh (e.g. Xcluder brand), or designed to drop automatically (see partial list below) so that they seal sufficiently well to restrict access by rodent and insect pests. Vertical gaps between double doors shall be minimized by installation of pest-resistant astragals (e.g. Xcluder brand). Because loading dock doors may be kept open for prolonged intervals, the space should be protected, whenever appropriate, by installation of automatically-activated air curtains and/or overlapping full-length plastic or mesh strips that cannot be tied up. Roll up doors for loading docks and garages should, whenever possible, be automatically activated to open only as long as needed to allow vehicles to pass, and are best constructed of solid panels rather than formed of an open mesh. Roll-up door bottoms shall be protected by tightly-fitting rodent-resistant seals (e.g. Xcluder brand). Doors and door frames for walk-in coolers serving food preparation facilities must be protected by sufficiently robust guards to survive the frequent battering by service carts and by rodent-resistant sweeps. Interior roll-up and pocket doors present special challenges to prevent rodents and insect pests from accessing wall and ceiling voids. Whenever possible, the cavity in which such doors are installed should be framed and sealed in a manner that prevents pests from dispersing within wall voids.

Rodent resistant sweeps, astragals and automatic door bottoms

Xcluder

<http://www.getxcluder.com/products>

Pemko (Assa Abloy)

<http://www.pemko.com/index.cfm?event=products.productListing&searchName=Lookup+by+Category&ratingIds=&categoryId=894&subcategoryId=&productMaterialId>



Zero international

<http://www.zerointernational.com/content.aspx?p=10>

National Guard Products, Inc.

<https://www.ngp.com/ngp/cache/file/C8124823-4EA0-4508-B357A58ADC639ECB.pdf>

6. **Ventilation openings:** Whenever possible, ventilation intakes shall be protected by well-fitting and permanent or readily replaceable screening or filters. External vents should be protected by ¼ inch metal (ideally welded stainless steel) mesh to exclude bird nesting and rodent entry. When design plans rely upon an open plenum between rooms for return air circulation, these should ideally be limited to transfer grates protected with metal mesh (openings no greater than ¼”). Penetrations around ductwork should be sealed.
7. **Landscaping considerations:** Whenever possible, trees and bushes shall be selected, planted and maintained so that, when mature, they will not contact the side of the building or overhang the roof. A non-vegetated stone barrier (ideally >18 inches wide and ~6 inches deep composed of 1.5 inch sharp-edged stone) should be maintained whenever possible around the building exterior to prevent burrowing by rats. Alternatively, rodent nesting and burrowing can be virtually eliminated by installation of non-woven stainless steel landscape fabric (e.g. Xcluder brand geomesh) buried about 4 inches below ground level. Such fabric should be adhered to the building exterior and extend about 4 or more feet into the landscaped area. Wood / bark chips shall not be applied within 6 feet of the sides of buildings to reduce risks of termites, carpenter ants and fouling of the façade by spores of artillery fungi.

Proposed roof gardens require specific consideration to evaluate the potential for contributing to pest problems and to craft a strategy for monitoring and abatement. Ivy or other climbing vines shall be discouraged from growing on the sides of buildings, as these plants damage the building and provide opportunities for pests to nest or access the building.

Constructed swales, pits, detention and retention basins should be reviewed with EH&S to ensure that these remain perennially flooded, or drain to dryness within 7 days to prevent mosquito development. If to be maintained flooded, the sites are to be reviewed and registered for periodic inspection and application of mosquito larvicides, as needed.

Hedges should be selected and installed in a manner to discourage rat burrowing. Yews and junipers, in particular, are highly attractive to rats, and these pests frequently burrow between and beneath the roots. All existing and proposed hedges should be reviewed by the EH&S Environmental Public Health officer to assess these designs for current and future pest issues, and to recommend modifications, as appropriate.

8. **Tunnels (steam and mechanical):** Entrances to mechanical and steam tunnels shall be secured with sealed doors or fine mesh ventilation panels that will prevent passage of pests. Such doors should be fitted with rodent-resistant sweeps as described above.
9. **Sunshades, porticos, ledges and balconies:** Protuberances that may be exploited by birds or rodents shall be configured, whenever practical, to discourage these animals from roosting or nesting upon or



otherwise traversing the structure. Ledges may be sloped or fitted with diverse bird-repelling devices. Architectural features that may be used by birds should ideally be readily accessed by personnel to remove nesting material when necessary.

10. **Termite / insect shield:** The foundation sill plate shall sit upon a continuous band of smooth non-oxidizing sheet metal that forms a barrier to termites and other pests that might otherwise readily climb up the exterior walls. The shield is to be formed with a downward slope of about 45 degrees, and extend outwards at least one inch from the exterior wall.
11. **Windows:** Whenever permitted by architectural codes, operable windows shall be fitted with securely fitted insect screens sized to exclude insects and other pests. Window wells and grates shall be further protected by installing non-oxidizing metal mesh, such as stainless steel welded hardware cloth (with openings no larger than ¼ inch). The mesh is to be affixed to the surrounding foundation and well walls in a manner that will prevent passage of rodents into the well.
12. **Chimneys:** Chimney flues shall be protected with non-oxidizing metal screened caps or mesh to prevent entrance of birds, bats and other pests. Openings in mesh should be no smaller than ½ inch in size, and the mesh or cap is to be secured in a manner to prevent pests from bypassing the barrier.
13. **Air conditioning units:** The cabinets / cowling of through-window or –wall air conditioner units shall be sealed to the window or wall to prevent pest passage. Acceptable materials for sealing may include silicone sealants and non-oxidizing sheets of metal or mesh installed to be sufficiently secure. Unacceptable means of sealing around these units include use of expanding or compressible foam, tape, fiberglass or similar insulation and materials that can be readily removed or breached by pests. Spaces formed between the upper and lower sashes of double hung windows (resulting from the installing of an air conditioning unit) shall similarly be protected by a wood or metal barrier to exclude pests.
14. **Insulation:** Fibrous panels and batts for thermal or acoustic insulation shall, whenever practical, be isolated, encased or sealed by masonry, GWB or other means to prevent rodents from burrowing into and through such panels. Expanding spray foam shall, whenever practical, be installed to full depth to completely fill wall cavities, encasing all plumbing and wiring within such voids. To facilitate inspections and to reduce mold growth and insect harborage, all insulation should be protected from direct contact with the ground or moist surfaces.
15. **Utility chases:** All chases that extend between floors shall be fully sealed with pest-resistant material and/or firestopping at each ceiling/floor partition to prevent passage of pests between floors. MEP/IT penetrations between utility chases and FTU/FCU/radiator units shall similarly be sealed to prevent pest harborage and passage.
16. **FTU/FCU enclosures:** Casework and formed enclosures for fin tube units, fan coil units and radiators shall be designed and installed to prevent pests from entering through MEP/IT/HVAC penetrations as well as through supply and return openings or grates. Such openings between the enclosure and room shall be fitted with a secure robust non-oxidizing metal grate with openings no larger than 1/4 inch.



17. **Water retention / detention basins, catch basins, roof drain depressions, walkway / garden drains:** Depressions around drains shall be configured and installed so that they do not retain a pool of water. Retention and detention basins or reservoirs (including those installed within a building) shall be designed to drain completely in less than one week or constructed to exclude mosquitoes and other pests that would develop within such sites. Ornamental ponds or fountains are generally acceptable if the water is sufficiently circulated or agitated, or contains sufficient natural predators. Landscaping plans (including interior gardens) that include any such features shall be reviewed by EH&S to evaluate their potential to attract and maintain pests.
18. **Refuse / garbage / compost collection and transfer sites:** Rolling doors shall securely seal to the floor, and constructed of solid panels to exclude pests. A hose connection is to be made available for rinsing bins. The rinsing area shall drain either to 1) a temporary-use sanitary drain fitted with a water-tight cover, so that it can be closed to prevent entry of stormwater when not in use, and an easily cleaned fine grate and catch basin to collect particulates and debris; or 2) a dual-drain system fitted with valves and/or removable plugs to direct rainwater to the stormwater system and washings to the sanitary sewer system. Specialized can washing sanitary floor drains are to be considered (e.g. Sani-Ceptor brand, Jay R. Smith Mfg, 3370, 3371). Dumpsters and compactors must be maintained in good condition, and otherwise closed and secured to prevent entry by pests. Dumpster and compactor drains must be securely closed to prevent rodent entry. Dumpsters and compactors shall be sited on paved surfaces to prevent rodent burrowing beneath, and sloped to drain. Refuse accumulating around dumpsters shall be cleaned up daily.
19. **Demolition:** Pest management personnel shall inspect and treat (as appropriate) waste/sewage lines and vent stacks prior to their being cut or dismantled. Construction personnel shall securely cap all such lines immediately, thereafter.
20. **Construction / traffic barriers:** Forklift or other slots or channels beneath the base of ‘Jersey’ or similar barriers are to be modified to eliminate rodent entry. If water drainage through such barriers is needed, the channels are to be protected with rodent-resistant mesh. If such drainage is not required, and if the barriers are to be on site for more than three months, then the slots are to be protected by metal mesh and/or packed with asphalt or rocks that cannot be breached by rodents. Plastic barriers must remain water-tight to exclude mosquitoes. Any damaged barrier must be repaired or replaced within one week.
21. **Design considerations:** Additional guidance is available in the document: Pest Prevention by Design https://sfenvironment.org/sites/default/files/fliers/files/final_ppbd_guidelines_12-5-12.pdf

For further information about this plan, contact ehs@harvard.edu.