SECTION 017419

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within SECTION 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 includes administrative and procedural requirements for salvaging, recycling and disposing of construction and demolition waste.

1.03 RELATED WORK

A. Section 013543 – ENVIRONMENTAL PROTECTION

B. Section 015000 – TEMPORARY FACILITIES AND CONTROLS

C. Section 024100 – BUILDING AND ANCILLARY STRUCTURES DEMOLITION

D. Section 024119 – SELECTIVE DEMOLITION AND SALVAGED MATERIAL

E. Section 026000 – MISCELLANEOUS HAZARDOUS MATERIAL REMOVAL

F. Section 028200 – ASBESTOS ABATEMENT AND RELATED WORK

G. Section 028300 – LEAD-BASED PAINT ABATEMENT AND RELATED WORK

H. Section 311000 – SITE PREPARATION

1.04 REFERENCES

A. The publications listed below form a part of this specification to the extent referenced. The publications are 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 Department of Environmental Protection, 310 CMR 16.00, Site Assignment for Solid Waste Facilities.

b. Massachusetts Department of Environmental Protection, 310 CMR 19.000, Solid Waste Management Facility Regulations.

c. [City of Cambridge, Inspectional Services Department, Chapter 8.25 of the Cambridge Municipal Code, January 2010]

1.05 DEFINITIONS

A. Asphalt Pavement, Brick, and Concrete (ABC) Rubble: Rubble that contains only weathered (cured) asphalt pavement, clay bricks and attached mortar normally used in construction, or concrete that may contain rebar. The rubble shall not be mixed with, or contaminated by, another waste or debris, including ***coated*** ABC materials.

B. Coated ABC: Coated brick, concrete and concrete masonry units. Coatings shall include, but not be limited to: paint, stucco applications, plaster, etc.

C. Construction Debris: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction debris includes packaging.

D. Contractor: Refers to the General Contractor and/or Subcontractor responsible for the Work under contract with Project Manager.

E. Demolition Debris: Building and site improvement materials resulting from demolition or selective demolition operations.

F. Disposal: Removal off-site of demolition and construction debris and subsequent sale, recycling, reuse, or deposit in a permitted solid waste landfill or incinerator acceptable to authorities having jurisdiction.

G. EH&S: Harvard University Environmental Health & Safety

H. Engineer: Authorized representative of the Harvard Project Manager. Engineer shall be the Architect or Designer of Record for the project.

I. Harvard University Project Manager (HUPM): A representative of the Property Owner, President and Fellows of Harvard College.

J. LEED: Leadership in Energy and Environmental Design

K. MassDEP: Massachusetts Department of Environmental Protection

L. Non-Hazardous Construction Waste: Construction waste which does not contain asbestos, lead-based paint or oil and hazardous materials.

M. Recycle: Diversion of demolition and construction debris from the landfill for reuse.

N. Salvage: Recovery of demolition or construction debris and subsequent sale or reuse in another facility.

O. Salvage for Reuse: Recovery of demolition or construction debris and subsequent incorporation into the Work.

P. WMP: Waste Management Plan

1.06 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: The Refrigerant Recovery Technician shall use recycling/recovery equipment that has a current EPA Registration.

B. Regulatory Requirements: Comply with waste collection, segregation, hauling, reuse, recycling, and disposal regulations of authorities having jurisdiction, including but not limited to, Massachusetts solid waste regulations contained in 310 CMR 19.000 [and the City of Cambridge/Boston].

C. Waste Management Conference: Conduct conference at Project site. Review methods and procedures related to waste management including, but not limited to, the following:

a. Review and discuss waste management plan including responsibilities of Waste Management Coordinator.

b. Review requirements for documenting quantities of each type of waste and its disposition.

c. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.

d. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.

e. Review waste management requirements for each trade.

f. Provide recycling education and recycling information to Contractor and subcontractor employees working on the project.

1.07 PERFORMANCE REQUIREMENTS

A. General: Develop Waste Management Plan that clearly states the target end-of-Project salvage/recycling waste diversion rate generated by the Work. Refer to Harvard Green Building Standards for salvage recycling rates.

B. Recycle Requirements: **Clean Gypsum Wallboard** (clean gypsum wallboard material without any existing attached material, i.e., paint, mastic, wallpaper, etc.) **must** be diverted from disposal to recycling and/or reuse outlets.

C. Salvage/Recycling Goals: The Contractor is responsible to salvage and recycle as much *non-hazardous non-coated* construction waste as possible including the following materials:

a. Asphaltic concrete paving.

b. Concrete and concrete reinforcing steel.

c. Brick and concrete masonry units.

d. Wood studs, wood joists, plywood, oriented strand board, paneling and trim.

e. Casework and cabinetry.

f. Structural steel, miscellaneous steel and rough hardware.

g. Roofing.

h. Insulation.

i. Doors, door frames and door hardware.

j. Windows and glazing.

k. Metal studs.

l. Gypsum board

m. Ceiling Panels

n. E-Waste (i.e. computer CPUs, monitors, etc.)

o. Acoustical tile and panels.

p. Carpet and carpet pad.

q. Demountable partitions.

r. Equipment.

s. Plumbing fixtures, piping, supports, hangers, valves and sprinklers.

t. Mechanical equipment and refrigerants.

u. Electrical conduit, copper wiring, lighting fixtures, lamps, and ballasts.

v. Electrical devices, switchgear, panel boards and transformers.

w. Packaging: 100 percent of the following uncontaminated packaging materials: Paper, cardboard, boxes, plastic sheet and film, polystyrene packaging, wood crates, plastic pails.

x. Glass

y. Slurry Wall Materials

D. In the event the Contractor encounters previously unidentified material that is reasonably believed to be hazardous, asbestos containing, coated with lead-based paint or other hazardous material, or oily debris, the Contractor shall immediately stop work in the affected area and report the condition to the Engineer, Harvard EH&S and the Project Manager. At no time shall such material be handled or disposed of by the Contractor. The Contractor agrees to cooperate with Harvard EH&S and any consultants engaged by Harvard EH&S to perform services with respect to the analysis, detection, removal, containment, treatment and disposal of such regulated materials.

E. The Contractor is responsible for obtaining any and all state and local permits and/or licenses issued by the City of Cambridge [City of Boston] relating to the management, storage and disposal of solid waste materials, including construction and demolition debris, generated, removed, stored or disposed on the project site.

F. The Contractor is responsible for coordination with Harvard's Office of Sustainability and meets the requirements for construction materials. This information is provided at http://green.harvard.edu/theresource.

1.08 SUBMITTALS

A. **Waste Management Plan** - Prior to initiating demolition activities the Contractor shall develop and submit a Waste Management Plan (WMP) identifying the types and quantities by weight of construction and demolition material and solid waste expected to be reused, sold, donated, recycled, disposed or incinerated. The Plan shall include separate sections for demolition and construction waste management. The Waste Management Plan shall include the following information:

a. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction materials generated by the Work. Include estimated quantities and assumptions for estimates.

b. Waste Reduction: For each C&D material-type, the Contractor shall identify whether the material will be salvaged, reused, recycled, disposed in a landfill and/or incinerated. Include points of waste generation, estimated total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

i. For C&D materials which will be reused on-site, sold, and/or donated off-site, the following information shall be provided:

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.

2. Salvaged Materials for Sale: For each type of material that will be sold to individuals and organizations, provide a list of names, addresses, and telephone numbers.

3. Salvaged Materials for Donation: For each type of material that will be donated to individuals and organizations, provide a list of names, addresses, and telephone numbers.

ii. For C&D materials, ***excluding*** coated ABC, universal waste, and hazardous waste, which will be managed off-site for reuse, recycling, disposal and/or incineration:

1. Provide the name, address, and facility contact telephone number for the receiving facility of each identified waste stream.

iii. For C&D materials, ***including*** coated ABC, universal waste, and hazardous waste, which will be managed off-site for reuse, recycling, disposal and/or incineration:

1. ***For Facilities on the "Harvard University Approved Disposal Facilities List"***

   For each of the regulated selected off-site recycling, disposal, or treatment facilities, which are identified on the "Harvard University Approved Disposal Facilities List" at the EH&S website: https://www.ehs.harvard.edu/programs/chemical-waste, the Contractor shall provide:

   a. A letter from the receiving facility confirming that the facility will accept the C&D materials for disposal, reuse, recycling or treatment;

   b. Certification from the receiving facility's corporate representative that the facility is operating in compliance with all applicable federal, state and municipal laws, regulations, policies and guidance for the reuse, processing, recycling, disposal and/or treatment;

   c. A Statement from the receiving facility identifying any violation or complaint filed against the facility, within the past 5 years, by a municipal, state or federal agency including a description of the violation(s), date(s) of the violation, how the violation was addressed/corrected and the current status. The statement shall also include whether a financial penalty was assessed and the amount for each violation; and

   d. Current Certificate of Insurance naming the President and Fellow of Harvard College as the Certificate Holder and as an additional insured.

2. ***For Facilities <u>not</u> on the "Harvard University Approved Disposal Facilities List"***

   Should the Contractor propose an off-site reuse, disposal, recycling or treatment facility for regulated materials which is <u>not</u> listed on the "Harvard University Approved Disposal Facilities List" at the EH&S website, the Contractor shall provide the following information:

   a. Names, address, contact person and contact information;

   b. Copies of all permits (federal, state and local), consent orders and other applicable documentation under which the facility is operating;

   c. A facility Certificate of Insurance naming "The President and Fellows of Harvard College" as the Certificate Holder and as an additionally insured;

d. Statement from the facility owner and operator that the facility is operating in compliance with applicable municipal and state laws, regulations, policies, and guidance for the recycling and processing of C&D materials. Included with this Statement shall be the following documentation.

    i. Copies of all enforcement actions taken by municipal, state or federal regulatory officials for all operations conducted on the property including, but not limited to: administrative and unilateral consent orders(s), notices, complaints, cease and desist orders, and any other applicable documentation.

    ii. A brief statement shall be provided for each violation or complaint filed against the facility by municipal, state or federal agencies, describing the violation(s), date(s) of the violation, how the violation was addressed/corrected and the current status. The statement shall also include whether a financial penalty was assessed and the amount for each violation.

e. Description of the process and facility operations including:

    i. Type of material being processed and processing operations conducted at the facility;

    ii. Identification of the secondary market to which the processed material will be shipped and for what purpose (i.e. energy facility, fill material);

    iii. If not all the material is processed/recycled at the primary facility (i.e., processing facility/transfer station) and deferred to a secondary facility, the Contractor shall provide the name and address of the facility to which the waste materials will be shipped, contact information and type of final deposition (i.e., landfill, incineration, recycling).

f. Facility Audits: Where a Contractor proposes a facility or facilities which are not on the "Harvard University Approved Disposal Facilities List", EH&S will review the information provided by the Contractor and retain a third party consultant to conduct an audit of the facility to determine whether the facility meets Harvard's criteria as an off-site waste management facility. The Contractor must engage EH&S early in the Project and provide ample time (up to 90 days) for EH&S's review and facility audit.

3. Waste Disposal/Incineration: The Contractor shall provide the name, address, contact information of the off-site waste disposal/incineration facility. A copy of the facilities current solid waste management facility permit, in accordance with 310 CMR 19.000, shall be included in the Waste Management Plan.

4. Non-Coated Asphalt, Brick & Concrete: The Contractor shall provide the name, address, and contact information for all off-site ABC rubble crushing and/or recycling facilities. For each selected facility, the facility shall also provide a copy of the facility's current solid waste management facility permit in accordance with 310 CMR 19.000, and air quality permit, if applicable. If the facility operations are exempt from the solid waste regulations (per 310 CMR 16.05 (3) (e)), documentation from the facility, identifying the specific exemption that applies to the facility operations shall be made together with notifications made to municipal authorities.

5. Coated Asphalt, Brick & Concrete: Painted, coated, or impregnated brick and concrete can be disposed of only at a Massachusetts Solid Waste Landfill or other facilities on the Harvard approved Disposal Facility list; unless facility-specific approvals are obtained through MassDEP (i.e., Beneficial Use Determination (BUD)) and providing that the material is not determined through analytical testing to be a hazardous waste (i.e. lead-based paint) or asbestos-containing material. Harvard must be notified prior to collecting material samples for laboratory analysis. If analytical testing is performed on the coated brick and concrete material and the data indicates that the material is a hazardous waste (i.e., due to lead-based paint), then the coated debris must be handled, packaged, transported and disposed in accordance with the Massachusetts Hazardous Waste Regulations at 310 CMR 30.000 and at a Harvard approved facility. If the coated material is determined to be asbestos-based (i.e., mastic materials), the coated brick and concrete must be handled, transported and disposed in a permitted and Harvard approved asbestos waste management facility.

6. Cost/Revenue Analysis: The Waste Management Plan shall include a cost/revenue analysis for the management of C&D demolition and construction materials.

7. Source Separation: Harvard strongly encourages source separation of C&D materials, where feasible. For all C&D materials, the Contractor shall identify in the Waste Management Plan the handling and transportation procedures which will be used for conducting source separation of recyclable materials including sizes of containers, container labeling, and designated location on Project site where materials separation will occur.

8. Waste Management Coordinator: The Contractor shall identify an employee who will be the Waste Management Coordinator for the project. The Waste Management Coordinator will be responsible for implementing, monitoring, and reporting status of waste management work plan.

9. Qualification Data: The Contractor shall identify a Refrigerant Recovery Technician(s) certified by an EPA-approved certification program; the Contractor shall provide a copy of current certification to the Engineer prior to starting work.

10. Waste Management Plan Approval: The Waste Management Plan must be prepared during the pre-planning stage of the Project and submitted to the HUPM and EH&S for approval within fourteen days of the date established for the Notice to Proceed. Once the Plan is approved, the Contractor is responsible to distribute copies of the Plan to the Job Site foreman and to each subcontractor on the project. **Any deviations from this Plan approval requires prior approval from HUPM and EH&S.**

iv. **Waste Management Final Report –** Prior to Substantial Completion, the Contractor shall submit a written Waste Management Final Report summarizing the types and quantities of materials reused, recycled, salvaged, treated and disposed under the Waste Management Plan. This report shall be a cumulative Waste Management Report to be submitted with the following attachments:

1. A record of the type and quantity, by weight, of each material salvaged, reused, recycled, treated, or disposed.

2. Point of generation of each material.

3. Total quantity of waste recycled as a percentage of total waste.

4. Record Keeping for Donations, Reuse, Recovery, Recycling and Landfill Disposal: Documentation shall be submitted by the Contractor and include the following:

   a. Records of Donations: Indicate receipt and acceptance of salvageable materials donated to individuals and organizations. Indicate whether organization is tax exempt.

   b. Records of Sales: Indicate receipt and acceptance of salvageable materials sold to individuals and organizations. Indicate whether organization is tax exempt.

   c. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable materials including ABC materials by recycling and processing facilities licensed to accept them. Include manifests, weight

tickets, receipts, and invoices. Include documentation for back-charge fees, if any, for improperly segregated materials.

d. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept waste materials. Include manifests, weight tickets, receipts, and invoices.

e. Statement of Refrigerant Recovery: The Refrigerant Recovery Technician responsible for recovering refrigerant shall prepare and sign a document stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations and using equipment that has a current EPA Registration. The document shall include the name and address of technician, date refrigerant was recovered, amount of refrigerant recovered and shipped, and date of receipt of shipment by the reclaimer.

5. LEED Submittal: The Contractor is required to complete all LEED-Online documentation related to Materials and Resources credits and prerequisites associated with Construction and Demolition Waste Management and Management Planning at compliance levels consistent with the Harvard Green Building Standards. Contractor must complete all associated online forms, signatures, and supporting documentation.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. General: Implement Waste Management Plan as approved by the Harvard Project Manager. Provide containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Training: Tool-box training shall be provided to all workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site. Documentation of training shall be provided to the HPM.

a. Distribute Waste Management Plan to everyone concerned within three days of HPM and EH&S Plan approval.

b. Distribute Waste Management Plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

c. Clearly identify the Waste Management Coordinator and explain the Coordinator's responsibilities to all Project workers.

d. Review and finalize procedures for material separation and verify availability of containers and bins needed to maintain production.

e. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.

f. Provide recycling education for all workers, subcontractors and suppliers engaged in on-site activities.

g. Distribute recycling educational literature.

h. Provide appropriate recycling signage for containers and workspaces.

C. Site Access and Temporary Controls: Waste management operations must not interfere with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

a. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.

b. Comply with project requirements for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING CONSTRUCTION AND DEMOLITION WASTE

A. General

a. Separate recyclable waste listed below in 3.02.B and 3.02.C from other waste materials, trash, and debris. Conduct source separation of recyclable material by type at Project site, if feasible. For waste, which cannot be source separated at Project site, co-mingle only with waste which is to be separated later at a recycling facility. Contamination of recycling containers with trash or other contaminants will be addressed by the Contractor and who will be solely responsible for payment of all fines and penalties.

i. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin. Inspect containers and bins for contamination and remove contaminated materials if found.

ii. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.

b. Stockpile materials away from construction area. Do not store within drip line of remaining trees.

c. Store components off the ground and protect from the weather.

d. Remove recyclable waste off Harvard's property and transport to recycling receiver or processor.

B. RECYCLING CONSTRUCTION WASTE

a. Packaging:

i. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.

ii. Polystyrene Packaging: Separate and bag materials.

b. Pallets: Require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.

c. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

d. Concrete: Deposit all debris in designated container to be transported to an approved aggregate recycling facility to be crushed and screened for use as satisfactory soil for fill or sub-base.

e. Clean Gypsum Board: Deposit clean gypsum scrap into source separated containers. Protect from weather. Remove edge trim and sort with other metals. Remove and dispose of fasteners and other contaminants. Clean gypsum shall be diverted to recycling and reuse outlets.

f. Metals: Separate metals by material type if practical. Stack salvageable structural steel members according to size, type of member, and length.

g. Wood Materials:

i. Clean Cut-Offs of Lumber: Deposit into designated clean wood container to be transported to designated recycling facility for use mulch or bio-fuel.

ii. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

iii. Sawdust that is generated from painted or treated wood shall be handled in accordance with Section 02600 – Miscellaneous Hazardous Material Removal and Section 028300 – Lead-based Paint Removal and Related Work.

C. RECYCLING DEMOLITION WASTE

a. Asphaltic Concrete Paving (Non-Coated): Break up and transport pavement to asphalt-recycling facility.

b. Brick and Concrete (Non-Coated): Salvage/Recycle/Dispose in accordance with SECTION 024100 – BUILDING AND ANCILLARY STRUCTURES DEMOLITION.

c. Masonry: Clean and stack undamaged whole masonry units on wood pallets for reuse. All damaged masonry shall be salvaged/recycled/disposed in accordance with SECTION 024100 – BUILDING AND ANCILLARY STRUCTURES DEMOLITION.

d. Wood Materials (non-coated): Sort and stack salvageable members according to size, type, and length. Separate lumber waste and deposit into appropriate container. Separate engineered wood products, panel products, and treated wood materials into designated containers.

e. Metals: Separate metals by type if practical. Stack salvageable structural steel members according to size, type of member, and length.

f. Asphalt Shingle Roofing: Organic and glass-fiber asphalt shingles and felts shall be disposed of at a facility permitted by Mass DEP to process post-consumer (used) asphalt shingles. Recycle nails, staples acceptable, flashing trim and accessories as metals.

g. Asbestos containing shingles shall be pre-abated and properly disposed of by a Massachusetts licensed asbestos abatement Contractor, in accordance with all applicable regulations and Section 028200 – ASBESTOS ABATEMENT AND RELATED WORK. [Asbestos abatement work, including disposal of asbestos contain materials, is not included in the Scope of the Work and will be performed by others.]

h. Clean Gypsum Board: Sort and deposit used gypsum wallboard material with attached material, (i.e., paint, mastic, wallpaper, etc.) into separate container. Off-site management of used wallboard includes recycling or disposal.

i. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets, stretch wrap and store in a dry location. Separate suspension system, trim, and other metals from panels and tile and sort with other metals.

j. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips. Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation agency or carpet recycler.

k. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

l. Plumbing Fixtures: Separate by type and size fixtures suitable for reuse. Deposit all other fixtures into designated containers by material type to be transported to an approved recycling facility.

m. Piping: Separate piping materials by material composition. Deposit in designated containers. Separate supports, hangers, valves, sprinklers, and other components by material type and deposit in designated containers for transport to approved recycling facility.

n. Lighting Fixtures: Separate lamps by type and protect from breakage.

o. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panel boards, circuit breakers, and other devices by type.

p. Conduit: Deposit conduit and fittings into designated container.

q. Site-Clearing Wastes: Chip brush, branches, and trees on-site.

3.03 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and dispose/incinerate the materials in accordance with federal, state, and local regulations and at Harvard approved facilities as required.

a. Except as otherwise specified, do not allow waste materials that are to be disposed of to accumulate on-site.

b. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

c. The Contractor shall dispose and/or incinerate of solid waste materials in accordance with the Massachusetts Solid Waste Management Regulations at 310 CMR 19.000.

B. Burning: Do not burn waste materials on-site.

END OF SECTION

Waste Management Tracking Form

Service Date	Slip No.	Type of Material	Accepting Facility	Weight (Tons)	Management Method				
					Recycled	Landfilled	Incinerated	Reuse	Other

NOTES:

The General Contractor shall complete this form for the off-site management of all solid waste materials including: construction and demolition debris and solid waste materials.