ATTACHMENT E: Analysis of Brownfield Cleanup Alternatives (ABCA) - Preliminary Evaluation Asbestos Removal and Remediation

PROJECT: Mill 11 - Window Glazing, Pipe Insulation, Joint Compound & Flooring
Ludlow Mills Complex, 100 State Street, Ludlow, MA 01056

This Analysis of Brownfield's Cleanup Alternatives (ABCA) is intended to provide a cleanup project summary outline in support of a pending Grant Application to the FY 2024 US EPA Brownfield Cleanup program.

Release Tracking Number
The Massachusetts Department of Environmental Protection (MADEP) does not assign specific tracking numbers to asbestos abatement projects such as the one proposed for Ludlow Mills. Release Tracking Numbers (RTNs) however were issued related to the AAI- ASTM Phase I and Phase II Environmental Site Assessment Reports and several other sites at Ludlow Mills where contamination has been cleaned up with State Site Remediation Grant funds. That remediation work was completed in June of 2014.

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I. INTRODUCTION & BACKGROUND

a. Site Location

The project is located at 100 State Street in Ludlow, Massachusetts within the historic Ludlow Mills Complex and specifically involves one large mill building known as **Mill 11** located in the central portion of the mill complex.

b. Previous Site Uses and any Previous Site Cleanup / Remediation

Previous Site Use(s):

The project area on the Chicopee River has been utilized by industry since the late eighteenth century. Between 1812 and 1844 the site supported operation of textile and cotton mills. Gun barrels were manufactured at the site of the current Mill No. 8 building from 1840 to 1846. Between 1846 and 1848 the building was used for the manufacturing of textile machinery. Starting in 1850, Jute products were produced on the property and the Ludlow Manufacturing Company was established in 1856, later named the Ludlow Mills Company. Jute manufacturing remained the primary activity on the site into the mid-20th century. A majority of the historic mill buildings, including **Mill 11,** remain from the early 20th century having been built starting in 1900 with significant mill expansion over time. The historic mill complex is approximately 52 acres in size and contains approximately 35 structures with a total floor space of approximately 770,000 square feet. Since the 1960s the complex has been a multi-tenant industrial park and contains a large number of commercial and industrial operations. Of the site's extant mill buildings, five are large multi-story structures (Mill #s 8, 9, 10 and 11, and the 300s Warehouse buildings along State Street). The additional buildings consist of a series of small (approximately 6,000-12,000 SF), single story, brick block stockhouses located along the Chicopee River in the south and eastern portion part of the site; the former locomotive building and associated maintenance building (Buildings 46/58) and the former carpentry building (#44). The Ludlow Mills complex is

included within the Ludlow Village National Historic District (LUD.F) and listed in the State and National Registers of Historic Places.

Previous Site Clean-up and Remediation:
Under the previous site ownership of Ludlow Industrial Realty Inc., a Phase 1 Environmental Site Assessment (ESA) was prepared in March 2009 by Advanced Environmental Solutions, Inc. (AES) for the US Environmental Protection Agency (EPA). That Phase 1 ESA was updated by AES in August 2011. In addition, AES prepared a Phase II ESA for the property between September 2010 and June 2011.

The Phase II Environmental Site Assessment (ESA), performed in 2010 and 2011, identified several Recognized Environmental Conditions (RECs). Subsequent environmental assessment activities including limited testing were conducted. The results were compiled in the Phase II ESA dated August 2011, in which 18 RECs existed. These RECs related to industrial use of the property and other subsequent tenants, the illegal disposal of materials, and the use of an up-gradient property as a gasoline station. The report indicated recommendations for additional assessment.

Known releases at the Ludlow Mills property identified in the Phase I and Phase II ESAs include releases of polychlorinated biphenyl (PCB) from transformers, #6 fuel oil from the use and storage of heating oil, and diesel fuel from a delivery truck. Releases of PCBs were concentrated around electrical substations to the north of Mill building 10 and on the bank of the Chicopee River. Contaminated soil that was accessible at the time was removed from these areas, however, residual contamination remained underneath the substations and an Activity and Use Limitation (AUL) is in place in order to limit exposure should the contaminated soil be disturbed. The AUL was terminated in 2014. Historically, several releases of fuel oil were reported near stockhouse #205, which served as the Boiler Building, as a result of filling operations of the two 15,000-gallon fuel oil underground storage tanks (USTs) used for fuel oil storage. Soil in the immediate area around the tanks was excavated and impacted water in storm drains was cleaned up. The two USTs were removed in April 2012.

Westmass and its consultant at that time, O'Reilly, Talbot and Okun Associates, Inc. (OTO), developed a Remediation Plan, (excluding asbestos) for implementation. The estimated cost of implementation of the Remediation Plan for the Recognized Environmental Concerns identified in the Phase I and II reports was estimated to be $1,500,000. Funding was secured from the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) through a $1,500,000 grant awarded to Westmass for site remediation of the Ludlow Mills property. Westmass actively implemented the Remediation Plan and finalized this remediation work in June of 2014.

c. Site Assessment Findings – Hazardous Materials

In October 2023, KGSNE JV II, LLC completed a Final Targeted Brownfields Assessment Report for EPA Region 1 to determine other sources of asbestos contamination. Westmass analyzed the Report for **Mill 11** and found confirmation of ACM in window glazing, door caulk, flooring and other adhesives and insulation.

Mill 11 is a 345,000 SF, five-story brick building completed in 1913. The building is currently vacant on the upper 4 floors but has a commercial tenant on the first floor.

Asbestos-containing materials (ACM) have been identified in the caulk and glazing of 506 windows; 630 SF of flooring; 2,500 SF of joint compound and gypsum board and in small areas of pipe insulation and residual black tar. In addition, lead based paint has been identified on interior walls and flooring and PCBs were identified in industrial window caulk on the 5th floor.

d. <u>Project Goal</u>

The Ludlow Mills Preservation and Redevelopment Project continues to reverse years of neglect at the mill complex and will continue to spur local and regional economic activity and job creation. By remediating numerous environmental hazards & asbestos contamination, the project will protect sensitive environmental resources and provide the community with public access to the Chicopee River for passive recreation.

Redevelopment and revitalization of the Ludlow Mills complex is a regionally significant economic development project and has been cited within the 2019 Annual Comprehensive Economic Development Strategy (CEDS) report of the Pioneer Valley Plan for Progress, as a regional "High Priority Project". The intent is to serve areas meeting US Economic Development Administration Economic Distress Criteria according to the Pioneer Valley Planning Commission.

Westmass plans to redevelop the complex with green technologies including solar and low impact development storm water (LID) systems. The overall project embraces sustainable development principles and seeks to meet USGBC LEED quality standards for new construction at the site. The project's primary focus will be on commercial and industrial development but with a number of residential housing units created in the larger mill buildings (including **Mill 11**) where possible.

Westmass has been successful in obtaining assistance and cooperation from several sources at the Federal, State and Local levels as well as private utilities for redevelopment efforts. The direct involvement and support from the start of this regionally significant project by federal and state officials, numerous elected officials and the community of Ludlow have been instrumental. Westmass is committed to seeing that the Ludlow Mills once again becomes a major contributor to the economic prosperity of the region.

To date, the Ludlow Mills Preservation and Redevelopment Project has achieved numerous milestones highlighted below:

- In 2023 Winn Development, utilizing Historic Tax Credits as part of the financing package, purchased Mill 8 for adaptive reuse into 95 units of Senior Independent Living. Construction has started and completion is anticipated in summer 2024.
- In 2023, the EPA awarded Westmass a $740,000 Brownfields Cleanup Grant for the abatement of ACM in the 300s Warehouses and Mill buildings 46 and 58.
- In 2022, Westmass was awarded two grants from MassDevelopment through the Massachusetts Community One Stop for Growth Program. $500,000 was awarded for Electrical upgrades and $500,000 was awarded for new roofs.
- In 2021, Westmass received two grants from MassDevelopment through the Massachusetts Community One Stop for Growth Program. $650,000 was received from the Site Readiness Program to fund the design and engineering of infrastructure improvements within the mill complex and $250,000 was received from the Underutilized Properties Program to fund capital

improvements on several stockhouse buildings.

- In 2021, Westmass also received an EPA Brownfields Cleanup Grant to remediate ACM in the roofing of several historic stockhouses as well as the former Carpentry Building.
- With a $7 million investment, the Town of Ludlow is completed a new Ludlow Senior Center State Street on mill land formerly owned by Westmass on State Street.
- In 2019, the Town of Ludlow, in partnership with Westmass, received $6.6 million in grant funds from the MassWorks Infrastructure Program and the US Department of Commerce Economic Development Administration to construct a 4,200 linear foot roadway and associated infrastructure within the mill complex to advance revitalization efforts.
- Westmass has received $2 million of private financing for project development from a consortium of regional lenders.
- Westmass has received approval of the delineation of wetlands and riverfront area under the Massachusetts Wetlands Protection Act from the Ludlow Conservation Commission.
- Westmass secured State permitting from MEPA for the Final Environmental Impact Report in September 2017 with the issuance of a Certificate of the Secretary of Energy and Environmental Affairs.
- With input from Westmass, the Town of Ludlow voted to change the zoning for the site from Industrial A to Mill Redevelopment District, to allow mixed use development. In addition, the Town created a Smart Growth Overlay District, Ludlow Mills Sub-District.
- The Town of Ludlow received $3.7 million in funding for the reconstruction of State Street and First Avenue, replacement of water lines, and installation of streetscape improvements and a sewer pump station.
- In 2017 Winn Development, utilizing Historic Tax Credits as part of the financing package, completed a $24 million, adaptive reuse of Mill #10 to provide 55 units of Senior Independent Living.
- The $27 Million dollar HealthSouth Rehabilitation Hospital Project (Private) was completed in November 2013 and achieved LEED HC Gold certification.
- Westmass received a $1.5 million grant from the Massachusetts Executive Office of Energy and Environmental Affairs (EOEEA) for environmental remediation work (excluding asbestos) at Ludlow Mills.
- Westmass was awarded a total of $400,000 with two separate FY13 US EPA Brownfield Cleanup Grants for the Phase II portion of the Ludlow Mills Asbestos Abatement and Removal involving ACM abatement and demolition of Storehouse building 286-291 and Storehouse building 292-296.
- In 2012, Columbia Gas invested in excess of $600,000 to complete construction of a new intermediate pressure natural gas line along the length of State Street.
- Westmass was awarded a $200,000 FY12 US EPA Brownfield Cleanup Grant for the Phase I portion of the Ludlow Mills Asbestos Abatement and Removal involving ACM Pipe Wrap on existing abandoned steam piping in mill buildings #s8 and 11 and the #300s warehouse buildings.
- Westmass Area Development Corporation purchased the property on August 24, 2011.
- Between 2009 and 2011, the Project received $231,000 in funding from the U.S. Environmental Protection Agency for environmental site assessment.

II. APPLICABLE REGULATIONS AND CLEANUP STANDARDS

Cleanup Oversight Responsibility – Westmass Area Development Corporation will be responsible for oversight of the Asbestos and other Hazardous Materials Removal and Remediation. In a public bid process following set procurement guidelines, Westmass will solicit and select a Qualified Environmental Professional (QEP) for project planning, oversight and assistance with the selection of a Licensed Abatement Contactor with a Licensed Inspection / Testing Firm. Selections will be based both on qualifications and costs.

a. Cleanup Standards for Major Contaminants

Laws and regulations are applicable to the removal and disposal of Asbestos and other hazardous materials as Hazardous Waste. These standards are in place to prevent it from becoming airborne and harmful to workers or the public. Regulations include Federal laws and worker protection standards from exposures, address transportation of asbestos waste, and limit air pollutants under National Emissions Standards for Hazardous Air Pollutants.

Massachusetts Laws and Regulations require notification and work practices to avoid fiber release for asbestos handling, removal, storage, transport, and disposal. Regulation also requires inspection of demolition/renovation and manufacturing operations and special waste landfilling of asbestos and asbestos-containing material.

b. Laws and Regulations Applicable to the Cleanup

Federal Regulations

- Federal Small Business R
- Brownfields Revitalization Act
- Davis / Bacon Act
- OSHA: Regulations: 29 CFR Parts 1910 & 1926.
- DOT: Title 49, section 173.1090.
- EPA: (NESHAP)**:** 40 CFR Part 61 Subpart M.
- Emergency Response Act (AHERA) 40 CFR Part 763
- Toxic Substances Control Act (TSCA).

Massachusetts Regulations

- 310 CMR 7.00: AIR POLLUTION CONTROL specifically section 7.09: Dust, Odor, Construction and Demolition,
- Regulations: 310 CMR 4.00 (Air quality notification approval timelines and fees), 7.00, 7.09(5), 7.15 (Air quality asbestos regulation) and 310 CMR 19.061 (disposal requirements) and 310 CMR 16.00 (landfill siting; asphalt-brick-concrete recycling).
- Massachusetts Department of Environmental Protection and its Bureau of Waste Site Cleanup (DEP-BWSC), regulates cleanup of hazardous materials. Material containing asbestos must be reported if released to the environment or if it poses a threat of release, Regulations: 310 CMR 40.0000.
- The Massachusetts Department of Public Health's (DPH) State Sanitary code requires that property owners must maintain asbestos in good repair. Any repair and removal of asbestos must be done in accordance with all DEP and DPH asbestos regulations, Regulations: 105 CMR 410.353 (Sanitary Code) 105 CMR

670 (Community Right-to-Know).

- Mass Department of Occupational Safety (DOS) prescribes training, certification and/or licensing requirements for persons and firms engaged in asbestos work, inspections, monitoring, laboratories and training providers. DOS also prescribes project notification and work practice requirements for asbestos work.

Local Regulation and Project Coordination

Westmass, along with its Licensed Abatement Contactor and Licensed Inspection / Testing Firm, will coordinate with the Ludlow Building Commissioner and the Ludlow Board of Health as applicable for this cleanup. Westmass, and its contractors, will obtain required sign offs and will take all cautions practicable to prevent any condition that may affect the health or safety of the public or occupants of Ludlow Mills.

Other applicable regulations include Federal, state, and local laws regarding procurement of contractors conducting the cleanup will be followed. In addition, all appropriate permits will be acquired prior to the work commencing such as Dig Safe, Transport and other Asbestos MADEP Asbestos Abatement Notification filings.

III. EVALUATION OF CLEANUP ALTERNATIVES

a. Cleanup Alternatives Considered

To address contamination at the Site, three different alternatives were considered as follows:

- Alternative #1: No Action,
- Alternative #2: Repair, Encapsulation and Ongoing Maintenance, and
- Alternative #3: Removal and Offsite Disposal.

b. Effectiveness, Implementability & Cost of Cleanup Alternatives

Effectiveness

Alternative #1: No Action: This Alternative is not an effective option in controlling or preventing the exposure of persons or the environment to contamination at the site. No Action is included in this evaluation in order to compare and contrast any significant reduction in site risk to other remedial actions to.

The No Action Alternative would severely restrict the ability of Westmass to move forward with the adaptive reuse of some mill buildings as well the demolition of buildings impeding other significant redevelopment projects. As outlined previously there has been significant investment to date from both public and private funding for the Ludlow Mills project which would be significantly impacted and stranded.

The No Action Alternative does not meet the goal of the redevelopment of the Ludlow Mills because adaptive reuse of the buildings or removal of unusable or unstable buildings cannot occur unless the asbestos is removed.

Alternative #2: Repair, Encapsulation, Operation and Maintenance (O&M): Repair and encapsulation could be an effective way to prevent persons from coming into direct contact with asbestos in the Mill Area if the encapsulation is maintained. However, encapsulation is not an effective means to control other exposures, such as direct contact risks for occupants of the site over time as well as workers performing the adaptive reuse

work planned to revitalize Ludlow Mills. Repair and encapsulation limits the reuse options to those without occupied space such as storage and is not a viable option when demolition of the building is necessary.

Asbestos encapsulation is the process of using a product that either coats or creates a membrane to prevent the asbestos fibers from getting into the air or penetrates the asbestos containing material binding the components together. Asbestos encapsulation can also be done by sealing off any areas containing asbestos with an air proof barrier. In some cases asbestos encapsulation can be used in order to avoid the high cost of asbestos removal. Asbestos encapsulation is a cheaper option, and is safe as long as the area does not need to be disturbed.

During repair and encapsulation the Abatement contractor will isolate the portion of the building where repair and encapsulation is taking place most likely with sheets of plastic, and provide self-contained showers and throwaway protective suits to prevent contamination of the workers. All tools and materials used must be sufficiently cleaned and all waste containing asbestos generated by the project such the protective suits will be bagged in plastic, and properly disposed of.

The Environmental Protection Agency does not recommend asbestos encapsulation where the asbestos is more than one inch thick, water damaged, has poor cohesive strength or where the asbestos is accessible to the people who are using the building. In these instances, it is better to remove the asbestos to minimize the risk to the occupants of the building.

Alternative #2 would severely restrict the ability of Westmass to move forward with the redevelopment of Ludlow Mills and specifically the demolition of the 300 Series Warehouse.

Alternative #3: Removal and Offsite Disposal: Removal and offsite disposal is the most effective way to eliminate risk to humans and the environment at the site, since ACM and other hazardous materials contamination will be removed and the exposure pathways will no longer exist. All asbestos-containing and hazardous materials are totally removed from Mill 11 which will facilitate redevelopment activities. No further monitoring or maintenance of the asbestos-containing materials is needed.

The Abatement contractor will isolate and remove the portion of the buildings where the asbestos removal is taking place with sheets of plastic and provide self-contained showers and throwaway protective suits to prevent contamination of the workers. All asbestos-containing materials will be bagged in plastic, and proper disposal arranged.

An important aspect of asbestos-removal is air quality monitoring by an inspector who will be at the site throughout the abatement work. The selected firm monitoring the project will be completely independent from the contractor performing the work to provide oversight. This independent firm will set up an air monitoring station to ensure that the concentrations of asbestos fibers both inside and outside the work area do not increase beyond standards required by MA DEP.

The Environmental Protection Agency recommends asbestos removal as the best method to minimize the risk to workers or the occupants of the building the public and visitors to

the Ludlow Mills complex.

Implementability
Alternative #1: No Action: No Action is a simple alternative to implement since no actions need to be undertaken by the owner.

Alternative #2: Repair, Encapsulation, Operation and Maintenance (O&M): These actions require significant effort and expense to implement given the extent of asbestos contamination in the windows in Mill 11. Repair and encapsulation will require access to all outside and confined spaces that were identified to have asbestos contamination. Testing will be required when the work is being performed. In addition, this alternative may require the long-term installation and monitoring of air quality monitoring stations. Because the site is active with diverse tenants and leasing space and adaptive reuse being planned for the structures throughout the mills, ongoing air sampling equipment, monitoring and maintenance of the encapsulation would require periodic testing and reporting. Because of these reasons this alternative is considered very difficult to implement over the long term.

Alternative #3: Removal and Offsite Disposal: Removal and offsite disposal is moderately difficult to implement. Coordination and testing will be required during cleanup activities (e.g., site control and air handling enclosures, dust suppression and monitoring). A minor increase in traffic will result from additional trucks transporting materials offsite. Testing will be required when the abatement work is being performed however long-term monitoring and maintenance will not be required after offsite disposal. By taking advantage of the asbestos removal, alternative the hazardous materials can be removed intact, placed in bags, sealed, transported and disposed of offsite. An opportunity currently exists within Mill 11 as the building is vacant except for the first floor so remediation work can be performed efficiently.

One significant advantage of the Ludlow Mills Asbestos Removal and Offsite Disposal Alternative for Mill 11 is that it is essentially a separate structure that can be abated and demolished in a controlled operation. The result of the cleanup and potential demolition would be advantageous to the overall Ludlow Mills Preservation and Redevelopment project and consistent with the approved Ludlow Mills Master Plan, approved Local Comprehensive Plan and Massachusetts Environmental Policy Act (MEPA) permitting.

Cost
Alternative #1: No Action: No direct costs are associated with the "No Action" alternative.

Alternative #2: Repair, Encapsulation, Operation and Maintenance (O&M): Direct costs would be incurred from relocation of business or uses of the buildings being remediated. No new use is projected for these buildings if the asbestos was abated via encapsulation in Alternative #2. An extensive Operation and Maintenance Plan and associated costs will be required. Major private investment and public funding for adaptive reuse and redevelopment, which are enabling other Mill buildings to be revitalized, would not be leveraged if the asbestos contamination remains in place. In addition, asbestos encapsulation typically just defers the time when the asbestos will

need to be removed. All future renovations to an area which has asbestos encapsulation will require the removal of the asbestos, adding that cost to the planned renovation.

Alternative #3: Removal and Offsite Disposal: The estimated cost is approximately $260,200 for remediation and removal of the ACM in the windows, door caulk and adhesive and insulation and other hazardous materials. Some costs may be offset by salvaged materials and recycling.

Recommended Cleanup Alternative

The recommended cleanup alternative is **Alternative #3: Removal with Offsite Disposal.**

Alternative#1: No Action

The No Action alternative cannot be recommended since it does not effectively address public health risks posed by the Hazardous Materials when the site is redeveloped. In addition, this alternative does not allow the achievement of the project goal of reuse, redevelopment and job creation. Extensive redevelopment of the historic mill and the adaptive reuse of several historic buildings could not occur.

Alternative #2: Encapsulation, Repair and Maintenance

The encapsulation, repair and maintenance alternative cannot be recommended since it does not address site risks posed by the hazardous materials. Although Alternative #2 is less expensive than removal and offsite disposal, it would require ongoing costs potentially including air monitoring and maintenance. Using asbestos encapsulation also only defers the time when the asbestos will need to be removed. Any proposed renovations for adaptive reuse and redevelopment to buildings or areas containing asbestos after encapsulation will require the removal of the asbestos, adding to the cost of renovation for the adaptive reuse or demolition planned. This makes Alterative #2 more difficult to implement than Alternative #3. In addition, this alternative does not enable the achievement of the project goals.

Alternative #3: Removal and Remediation with Offsite Disposal

This Alternative would achieve a permanent solution of preventing exposure by removing contamination at the site. Removal of the asbestos and other hazardous materials from the windows and interior spaces in Mill 11 will enable the adaptive reuse redevelopment program at the Mills to proceed. Costs of ACM removal will not be included piece meal as buildings are rehabilitated and there may be cost savings from bidding a larger project. The removal and remediation with offsite disposal of asbestos and other hazardous materials is an eligible cleanup cost under the EPA grant.

Alternative #3 protects public health to the greatest extent and has the benefit of achieving the desired results for the long-term benefits of the project. For these reasons, Westmass has selected **Alternative #3: Removal and Remediation with Offsite Disposa**l and complete cleanup as the preferred Alternative and will be submitting this Alternative as a Grant Application to the FY 2023 US EPA Brownfield Cleanup program.

Sources:

Final Targeted Brownfields Assessment Report, KGSNE JV II, LLC, October 2023. Prepared for EPA Region 1.