HABEEB & ASSOCIATES
ARCHITECTS

FACILITY CONDITION ASSESSMENT

NORTH MIDDLESEX REGIONAL SCHOOL DISTRICT

Ashby Elementary School

911 Main Street, Ashby, MA 01431

July 7, 2020
H&A JN 1919.01

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North Middlesex Regional School District

Ashby Elementary School

Superintendent of Schools

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Principal, Ashby Elementary School

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Description of scope:

Habeeb & Associates Architects conducted a Facility Condition Assessment for North Middlesex Regional School District at the Ashby Elementary School.

Purpose of report:

The Facility Condition Assessment was developed to address the physical structure and mechanical, electrical, plumbing, and water service system of the Ashby Elementary School in Ashby, MA. The school includes the 1950 original building, the abandoned 1960 addition, the 1989 classroom wing addition, and the associated parking areas. This Assessment shall describe current conditions and provide priority recommendations and budget estimates for repair or replacement of deficient building components and systems that shall be used for short and long term capital planning. It is recommended that this Assessment be used in context with the facilities goals as defined by the North Middlesex Regional School District for the development of a long range Capital Plan.

Methodology:

The Assessment is based upon visual inspection, review of available documents, and interviews with Facilities personnel. Habeeb & Associates Architects conducted an interview with Nancy Haines, Business Manager, Oscar Hills, Director of Buildings/Grounds, Ann Cromwell-Gapp, Ashby Elementary School Principal, and Daniel Johnson, Custodial Day Lead Buildings/Grounds on January 22, 2020, followed by a tour of the facility. Existing deficiencies and concerns were observed, noted, and photographed by the design team.

The team was provided with drawings prepared by Earl R. Flansburgh + Associates, Inc. in 1989 describing renovations and additions to the original building. Drawings of the original 1950 and the abandoned wing of the1960 addition were not available.

The deficiencies observed were related to age of building systems and components, usage, newer code requirements and improvements recommended to provide an environment suitable for 21st Century learning practices.

The spreadsheets and photographs included in the Facility Condition Assessment detail the recommendations and associated costs for addressing the deficiencies identified. Estimated costs for projects to be completed in future years contain escalation factors to account for inflation.

BUILDING DATA

GENERAL INFORMATION:	
Building:	Ashby Elementary School
Address:	911 Main Street, Ashby, MA 01431
Title of Main Contact:	Nancy Haines, Business Manager
Title of Facilities Contact:	Oscar Hills
CODE CLASSIFICATION:	
Occupancy:	Group E Education
Construction Type:	IIB Unprotected
BUILDING HISTORY:	
Original Building:	1951 22,500 SF
Addition:	1960 10,400 SF
Addition:	1989 19,900 SF

SITE / BUILDING AREA:		SITE COMPONENTS:	
Site Area:	465,221 SF (10.68 Acres)	Lighting:	No lighting at parking lot. Wall mounted around the building and at the exterior doors.
Total Building Area:	52,800 SF	Storm Drainage:	Area drains with catch basins at paved playground and parking lot. Discharge to a nearby drainage pond.
Lower Level Area:	5,900 SF - 1951 4,000 SF - 1960	Sanitary System:	Onsite septic system with two sets of pumps in below grade chambers by the gym. Pumps discharge to leaching fields behind the baseball field.
First Floor Area:	33,200 SF – 1951, 1960, 1989	Irrigation:	No irrigation system on site.
Second Floor Area:	9,700 SF - 1989	Play Areas:	2 playground areas; 1 paved and 1 dirt with equipment. Ball fields are not part of this study.
SITE COMPONENTS:		MECHANICAL / ELECTRICAL COMPONENTS:	
Parking/Driveways:	Bituminous paving.	Water Service:	Well in water protected zone 1 – 250’ radius with 3" line connection to the building.
Walkways:	Bituminous walkways at main entrance and bus drop-off.	Domestic Hot Water:	Natural gas.
Stairs:	Cast-in-place concrete stair at main entrance and at exterior door by the 1960 addition.	Fire Suppression:	None.
Ramp:	Cast-in-place concrete ramp at main entrance.	Heating Systems:	Steam heat with unit ventilators – 1950; hot water with unit Ventilators – 1989.
Handrails/Guardrails:	Painted steel at exterior stairs and ramp.	Cooling Systems:	Three window units in the office area.
Canopy:	Painted steel at the main entrance.	Electric Service:	1200 amp main service.

BUILDING DATA (CONTINUED)

ARCHITECTURAL COMPONENTS:	
Foundation:	Reinforced concrete.
Super Structure:	Structural steel.
Floor Structure:	Structural concrete slab on-grade; and elevated slab at the 1989 addition.
Roof Structure:	Mostly flat roofs; Sloped roof over the computer lab and library at the admin wing.
Exterior Walls:	Mostly 8” CMU w/ 4” brick veneer – 1951; metal panel – 1960; Metal stud framing w/ CMU block veneer – 1989 addition.
Roofing:	PVC membrane w/ metal roof edge. EPDM at the 1960 addition.
Window Systems:	Replaced in 2012; aluminum frame w/ double pane glazing and translucent panels on top in some areas.
Exterior Doors	Replaced in 2012; mostly painted aluminum doors and frames.
Interior Doors	Mostly wood door w/ hollow metal frames.
Stairs:	Concrete filled steel pan.
Floor Finishes:	9x9 Asbestos Floor Tile, Carpet, 12x12 VCT, Ceramic Tile, Painted Concrete, Quarry Tile, Sheet Rubber, Wood.
Interior Walls:	Plaster and CMU shaft walls – 1951; Metal stud and drywall – 1989.
Wall Finishes:	Paint over plaster; CMU; and drywall.
Ceiling Finishes:	1x1 ACT – 1951 & 1960; and 2x4 ACT at the 1989 addition.
Conveying Systems:	Chair lift at stair connecting admin wing to cafeteria (lower level below gymnasium), and an elevator in the 1989 addition.

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This Summary categorizes the recommended capital improvements for the Ashby Elementary School and site elements based on staff interviews, observations, and review of available drawings. The original steel framed building consists of 22,500 square feet on two levels and was completed in 1950. Steel framed additions were added to the west side of the building in 1960, and a classroom wing was added in 1989, increasing the total area to 52,800 square feet. The ball fields are not included in this Assessment.

Work items identified by this Assessment are assigned a Scope category based on urgency, ongoing maintenance, life-cycle costs, and other concerns that compromise the teaching environment. In summary, scopes are categorized by the following descriptions:

Scope 1 – Necessary/Not Yet Critical

Scope 2 – Recommended

Scope 3 – Does Not Meet Current Codes or Accessibility Regulations for New Construction

Refer to Section 4, How to Read This Assessment, for detailed Scope descriptions and calculation methodology.

Scope 1 priority has been assigned to Work Items that present an immediate safety risk, such as asbestos abatement, deteriorated exterior walkways, and egress stairs. Building envelope items such as foundation wall leakage and leakage through the chimney that present ongoing maintenance and repair issues have also been assigned highest priority.

In addition, the recommendations include replacement of the pneumatic controls for the classroom wing, which currently does not allow temperature adjustment at various spaces in the building. The recommended building envelope and mechanical system improvements also have the added benefit of reducing operational costs by increasing efficiency and making the space more comfortable for students and faculty.

Scopes 2 and 3 priorities address other, less critical Work Items that are not immediately necessary, but will continue to deteriorate without maintenance, repair or replacement, such as painting of the canopy at the main entrance, and replacing the cafeteria floor. Other high priority items are recommended for the complete renovation of the toilets and the demolition of the abandoned wing.

Longer term consideration is recommended for replacement of the obsolete kitchen equipment and install new multipurpose gymnasium floor. Finally, new bituminous pavement and site lighting at the parking lot is recommended.

Category	Scope 1	Scope 2	Scope 3	Total
Building Summary				**Ashby Elementary School**
1. SITE	47,931	112,710	271,635	432,276
2. BUILDING ENVELOPE	307,775	3,250	0	311,025
3. BUILDING INTERIORS	513,110	624,234	290,524	1,427,868
4. MECHANICAL	129,350	1,083,420	234,000	1,446,770
5. ELECTRICAL	146,250	374,693	0	520,943
[1]Total:	1,144,416	2,198,307	796,159	4,138,882
[1]Total Inflated @ 4% Compounded Annually	1,237,800	2,674,577	968,649	4,881,026

[1]Totals include Soft Costs (30%): Contingency, Administration and A/E Fees.

EXECUTIVE SUMMARY

The *Executive Summary* recaps the *Total Inflated* row from the bottom of the Building Summary sheets. These costs are then totaled at the bottom to indicate a combined proposed capital expenditure per scope. This is intended to make it easier for the reader to review and compare the overall costs for each of the scopes.

SUMMARY

The *Summary* recaps the *Total* row from the bottom of each category for the subject building, separated into scopes. This is intended to make it easier for the reader to review and compare the overall costs for each of the categories together with the scopes for the subject building.

FACILTIY CONDITION ASSESSMENT

The following is a list and brief description of the column and row headings of the Capital Asset Assessment sheets.

Description

The *Descriptions* are the work items identified during our inspection. They usually consist of the building component and its deficiencies; and a recommendation for correcting the deficiency.

Quantity

The number of items: (For example, if the work item is for ”unit ventilators replacement” the building in question may have a *Quantity* of 60 unit ventilators to be replaced).

Unit

The *Units* are identified by a two-letter code. The unit codes are as follows:

SF – Square Foot
SY – Square Yard
LF – Linear Foot
LS – Lump Sum
EA – Each.

Unit Cost
The *Unit Cost* is the cost of one *Quantity* of a work item. Unit costs are preliminary construction cost estimates only and are generally based on the following references: *Means Square Foot Cost Data; Means Construction Costs Data*; in house cost data; professional experience; and information provided by various contractors and suppliers.

Total
The *Total* column is determined by the following equation: QUANTITY x UNIT = TOTAL.

Total with Soft Costs
This assessment provides preliminary construction costs associated with *Soft Costs*. *Soft Costs* generally include a contingency, (typically 10% to 15%) for unforeseen conditions; indirect administrative expenses such as legal costs, printing and advertising (typically 5% to 10%); and architectural and engineering costs (typically 10% to 15%) for a total soft cost estimate. We used a *Soft Cost* of 30% of the *total* cost in this assessment. The *Total with Soft Costs* is determined by the following equation: TOTAL x 1.30 = TOTAL W/ SOFT COST.

Some projects may require higher or lower *Soft Costs* depending on the type and extent of project selected. Work items listed are provided as a guide to develop repair and renovation projects with preliminary construction cost estimates. The actual scope of a project could include a combination of work items, i.e. new ceilings and new lighting. Some other projects may require finishes, e.g. painting, which may not necessarily be broken out for that project.

Scope 1 – Necessary/Not Yet Critical
- Predictable deterioration
- Potential downtime
- Associated damage or higher costs if deferred further

Scope 2 – Recommended
- Sensible improvements to existing conditions that are not required for the basic function of the facility
- Overall usability improvement
- Long term maintenance cost reduction

Scope 3 – Does Not Meet Current Codes for new construction but “Grandfathered”
- No action required at this time. However, if a substantial renovation or a substantial building addition is performed in the future, building codes may require this corrective work in addition to the work planned.

Totals Column (work items)
The *Totals* column is the sum of the Scopes columns *1, 2,* and *3,* for each work item. The *Totals* column also shares the sum of the *Total* row and *Total Inflated* rows at the lower right corner.

Total Row (scopes)
The *Total* row is the sum of the Scopes columns *1, 2, 3,* and *Totals* column, for each category. The *Total* row and *Total Inflated* rows are totaled at the lower right corner.

Total Inflated Row
The *Total Inflated* row is the sum of the Scopes columns *1, 2, 3,* and *Totals* column for each category multiplied by a coefficient to determine the inflated cost at a rate of 4% and compounded annually.

Scope 1 is shown with an inflation factor for work to be performed within a 2 yr period.
Scope 2 is shown with an inflation factor for work to be performed within a 5 yr period.
Scope 3 is shown with an inflation factor for work to be performed within a 5 yr period.

The *Total* row and *Total Inflated* rows are totaled at the lower right corner.

The Assessment is broken into five categories with specific evaluation concerns in each:

1. Site
- Storm Drainage
- Drives and Walks
- Landscaping
- Site Improvements
- Play Areas
- Sanitary System
- Accessible Parking and Entrance Approach

2. Building Envelope
- Roofs
- Exterior Walls
- Windows
- Exterior Entrances and Doors
- Thermal Insulation
- Accessible Egress and Ingress
- Building Structural System

3. Building Interiors
- Floor Finishes
- Wall Finishes
- Ceiling Finishes
- Interior Doors and Exitways
- Code Compliance Issues
- Accessibility for the Disabled
- Hazardous Material Remediation

4. Mechanical
- Domestic Hot Water Generation
- Cold Water Services
- Gas Services
- Piping for Plumbing Systems
- Plumbing Fixtures
- Heat Generation
- Cooling System
- Piping for Heating Systems
- Temperature Controls
- Ventilation
- Accessible Plumbing Fixtures

5. Electrical
- Main Services and Distribution
- Convenience Power
- Fire Alarm Systems
- Lighting Systems
- Emergency Lighting Systems
- Communications Systems
- Computer Network & Technology Systems
- Site Lighting
- Electrical Features for the Disabled
- Security System

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Category	Scope 1	Scope 2	Scope 3	Total
Building Summary				**Ashby Elementary School**
1. SITE	47,931	112,710	271,635	432,276
2. BUILDING ENVELOPE	307,775	3,250	0	311,025
3. BUILDING INTERIORS	513,110	624,234	290,524	1,427,868
4. MECHANICAL	129,350	1,083,420	234,000	1,446,770
5. ELECTRICAL	146,250	374,693	0	520,943
[1]Total:	1,144,416	2,198,307	796,159	4,138,882
[1]Total Inflated @ 4% Compounded Annually	1,237,800	2,674,577	968,649	4,881,026

[1]Totals include Soft Costs (30%): Contingency, Administration and A/E Fees.

Work Item Description	Qty	Unit	Unit Cost	Total	[1]Total w/ Soft Costs	Scope 1	Scope 2	Scope 3	Totals
1. SITE								**ASHBY ELEMENTARY SCHOOL**	
1.1 Bituminous Paving at Existing Parking Area: New bituminous paving at the existing gravel parking lot. Cost includes painted striping and directional markings/crosswalks.	4,500	SY	30.00	135,000	175,500			175,500	175,500
1.2 Bituminous Paving at New Accessible Parking: Bituminous paving for three new accessible parking spaces including one accessible van near the existing ramp by the main entrance. Cost includes painted striping and directional markings/crosswalks. Regrade to create flat area for new parking.	350	SY	50.00	17,500	22,750			22,750	22,750
1.3 Provide Exterior Signage: Provide post mounted signage to identify accessible parking, and building mounted signage to locate accessible entrance at the front entrance.	5	EA	290.00	1,450	1,885			1,885	1,885
1.4 Site Lighting: Install site lighting at the new paved parking lot.	10	EA	5,000.00	50,000	65,000			65,000	65,000
1.5 Non-compliant Galvanized Painted Steel Handrails: Exterior galvanized painted steel handrails are missing extensions or not continuous. Modify/Replace/Add new galvanized painted steel handrails and guardrails.	1	LS	5,000.00	5,000	6,500			6,500	6,500
1.6 Paint Canopy at the Main Entrance: Existing steel canopy structures are flaking. Prepare, prime and paint existing steel canopy and supporting structures.	300	SF	15.00	4,500	5,850		5,850		5,850
1.7 Water Infiltration at Foundation Walls: It is reported that water is penetrating building below grade foundation at the cafeteria, the main electrical room, and the boiler room. Excavate and install water proofing.	150	LF	235.00	35,250	45,825	45,825			45,825

Work Item Description	Qty	Unit	Unit Cost	Total	[1]Total w/ Soft Costs	Scope 1	Scope 2	Scope 3	Totals
1. SITE									**ASHBY ELEMENTARY SCHOOL**
1.8 Replace Bituminous Concrete Pads: Existing bituminous concrete pads at end wall of the 1989 addition are heaving and preventing door from opening. Remove and replace.	14	SY	30.00	420	546	546			546
1.9 Ponding and Leaks at the 1989 Addition Connecting Corridor: Regrade the bituminous paving area along the connecting corridor to slope away from the building.	40	SY	30.00	1,200	1,560	1,560			1,560
1.10 Replace Existing 3" PVC Water Line: Replace existing 3" water line from the domestic water well to the building with 6" line.	400	LF	78.00	31,200	40,560		40,560		40,560
1.11 Install Water Filtration System: It is reported that well water contains high levels of magnesium, causing issues with kitchen equipment. Install filtration to remove magnesium.	1	EA	51,000.00	51,000	66,300		66,300		66,300
Total						47,931	112,710	271,635	432,276
Total Inflated @ 4% Compounded Annually						51,842	137,129	330,486	519,457

[1]Total includes Soft Costs (30%): Contingency, Administration and A/E Fees.

Work Item Description	Qty	Unit	Unit Cost	Total	[1]Total w/ Soft Costs	Scope 1	Scope 2	Scope 3	Totals
2. BUILDING ENVELOPE								**ASHBY ELEMENTARY SCHOOL**	
2.1 Staining and efflorescence on masonry walls - 1989 addition: Power wash and clean.	500	SF	5.00	2,500	3,250		3,250		3,250
2.2 Paint Rusted Boiler Flue: Existing steel boiler flue is heavily rusted. Prepare, prime and paint existing steel boiler flue.	400	SF	15.00	6,000	7,800	7,800			7,800
2.3 Snow Guard at Canopies: Install snow guard at canopies over egress doors	1	LS	750.00	750	975	975			975
2.4 Demolish 1960 addition: The 1960 addition has not been used and has been abandoned for over 15 years.	1	LS	230,000	230,000	299,000	299,000			299,000
Total						307,775	3,250	0	311,025
Total Inflated @ 4% Compounded Annually						332,889	3,954	0	336,844

[1]Total includes Soft Costs (30%): Contingency, Administration and A/E Fees.

Work Item Description	Qty	Unit	Unit Cost	Total	[1]Total w/ Soft Costs	Scope 1	Scope 2	Scope 3	Totals
3. BUILDING INTERIORS								**ASHBY ELEMENTARY SCHOOL**	
3.1 Replace Asbestos Containing Floor Tiles, and Linoleum: The AHERA report dated 7/18/17 indicates that 9"x9" floor tiles, linoleum, and mastic contain ACM. Abate ACM tile, linoleum and mastic and provide new VCT tile flooring and vinyl base. (Note, 378 SF of asbestos floor tiles were removed in July 2019).	5,838	SF	15.00	87,570	113,841	113,841			113,841
3.2 Replace Asbestos Containing Ceiling Tiles: The AHERA report dated 7/18/17 indicates that ceiling tiles contain ACM. Abate ACM tile and provide new ACT tile.	9,238	SF	15.00	138,570	180,141	180,141			180,141
3.3 Replace Asbestos Containing Pipe Insulation: Per AHERA report dated 7/18/17. Abate and provide new pipe insulation.	1,050	LF	9.00	9,450	12,285	12,285			12,285
3.4 Replace Asbestos Containing Fire Doors: Per AHERA report dated 7/18/17. Remove and replace.	22	EA	1,000.00	22,000	28,600	28,600			28,600
3.5 Replace Asbestos Containing Duct Flex Joints: Per AHERA report dated 7/18/17. Remove and replace.	6	EA	150.00	900	1,170	1,170			1,170
3.6 Replace 1x1 Ceiling Tiles: Existing 1x1 acoustical ceiling tiles are sagging at the front lobby. Remove and replace with 2x4 ACT tile with new suspension grid.	560	SF	8.00	4,480	5,824		5,824		5,824
3.7 Leaking Roof Drain Leader: Remove and replace roof drain leader behind the proscenium wall at the gymnasium.	1	LS	2,500.00	2,500	3,250	3,250			3,250
3.8 Roof Leak through Chimney: Remove existing chimney flashing and install new flashing.	1	LS	1,000.00	1,000	1,300	1,300			1,300

Work Item Description	Qty	Unit	Unit Cost	Total	[1]Total w/ Soft Costs	Scope 1	Scope 2	Scope 3	Totals
3. BUILDING INTERIORS									**ASHBY ELEMENTARY SCHOOL**
3.9 Renovate Toilet Rooms: Renovate toilets rooms in the 1950 building.	2	LS	36,850.00	73,700	95,810		95,810		95,810
3.10 Gymnasium Floor: Remove the existing gymnasium wood floor. Install new rubber flooring.	4,600	SF	25.00	115,000	149,500			149,500	149,500
3.11 2x4 Mineral Fiber ACT in 1989 Addition: Existing 2x4 ACT tiles in the 1989 addition are warped and sagging. Replace existing ceiling tiles with new moisture resistant mineral fiber acoustic ceiling tiles in existing suspension grid.	19,900	SF	8.00	159,200	206,960		206,960		206,960
3.12 Non-compliant Handrails/Guardrails on Stairs in 1989 Addition: Existing handrails are not continuous and not at the right height and missing the extensions. Guarding is only on one side of stair. Modify and/or add to the existing handrails/guardrails.	150	LF	45.00	6,750	8,775			8,775	8,775
3.13 Rubber Stair Treads and Risers - 1989 Addition: Existing rubber stair treads and risers are discolored. Replace in kind.	160	LF	50.00	8,000	10,400		10,400		10,400
3.14 Classroom Sinks - 1989 Addition: Classroom sinks are not wheelchair accessible. Modify cabinet, and install new ADA compliant sink.	16	EA	2,500.00	40,000	52,000			52,000	52,000
3.15 Doors Between Corridor and Rooms - 1950 Building: Doors between corridor and rooms are recessed and do not have no-pull side dimension for ADA clearance. Reconfigure door recess to compliant with ADA clearance.	4	EA	2,500.00	10,000	13,000			13,000	13,000
3.16 Nurse's Office Toilet: Toilet room in the nurse office is not ADA compliant. Demolish and rebuild to compliant.	1	LS	15,000.00	15,000	19,500			19,500	19,500

Work Item Description	Qty	Unit	Unit Cost	Total	[1]Total w/ Soft Costs	Scope 1	Scope 2	Scope 3	Totals
3. BUILDING INTERIORS								**ASHBY ELEMENTARY SCHOOL**	
3.17 Handrail on Mezzanine Ramp in Cafeteria: Existing handrail on ramp is missing top extensions. Modify or add new handrail with extensions.	32	LF	45.00	1,440	1,872			1,872	1,872
3.18 Handrail on Stair to Mezzanine: Existing handrail on stair to mezzanine is missing extensions. Modify or add new handrail with extensions.	10	LF	45.00	450	585			585	585
3.19 VCT Tiles in Cafeteria: Existing 1x1 VCT tiles in cafeteria are buckling and not adhering to the floor. Remove and replace in kind.	10,600	SF	8.00	84,800	110,240		110,240		110,240
3.20 Existing Kitchen: The existing kitchen equipment is old and obsolete. Complete renovation of the kitchen with new equipment.	1	LS	150,000	150,000	195,000		195,000		195,000
3.21 Kitchen Staff Toilet: Kitchen staff toilet is not ADA compliant, modify/demolish and rebuild.	1	LS	15,000.00	15,000	19,500			19,500	19,500
3.22 Gymnasium Egress Stairs: Existing handrails and guardrails on gymnasium stairs are non-compliant with no extensions. Modify or add new compliant handrails.	32	LF	45.00	1,440	1,872			1,872	1,872
3.23 Gymnasium Stage: Existing gymnasium stage is not wheelchair accessible. Install new chair lift.	1	LS	15,000.00	15,000	19,500			19,500	19,500
3.24 Lobby Double Doors: The lobby double wood doors are not compliant, single door does meet minimum clear width. Remove and replace with new uneven leaf doors.	1	LS	2,500.00	2,500	3,250			3,250	3,250
3.25 Handrail on Lobby Stair to Cafeteria: Handrails on stair to cafeteria are missing top extensions. Modify/add new handrails.	20	LF	45.00	900	1,170			1,170	1,170

Work Item Description	Qty	Unit	Unit Cost	Total	[1]Total w/ Soft Costs	Scope 1	Scope 2	Scope 3	Totals
3. BUILDING INTERIORS								**ASHBY ELEMENTARY SCHOOL**	
3.26 Remove Asbestos Containing Floor Tiles, and Linoleum: (Abandoned Wing) The AHERA report dated 7/18/17 indicates that 9"x9" floor tiles, linoleum, and mastic contain ACM. Abate ACM tile, linoleum and mastic.	7,114	SF	10.00	71,140	92,482	92,482			92,482
3.27 Remove Asbestos Containing Ceiling Tiles: (Abandoned Wing) The AHERA report dated 7/18/17 indicates that ceiling tiles contain ACM. Abate ACM tile.	6,145	SF	10.00	61,450	79,885	79,885			79,885
3.28 Remove Asbestos Containing Thermal System Insulation Fittings: (Abandoned Wing) Per AHERA report dated 7/18/17. Abate insulation.	6	EA	20.00	120	156	156			156
Total						513,110	624,234	290,524	1,427,868
Total Inflated @ 4% Compounded Annually						554,980	759,476	353,467	1,667,923

[1]Total includes Soft Costs (30%): Contingency, Administration and A/E Fees.

Work Item Description	Qty	Unit	Unit Cost	Total	[1]Total w/ Soft Costs	Scope 1	Scope 2	Scope 3	Totals
4. MECHANICAL									**ASHBY ELEMENTARY SCHOOL**
4.1 Replace Air Handling Unit: Replace steam air handler at the gymnasium with new hot water unit.	1	EA	150,000	150,000	195,000		195,000		195,000
4.2 Replace Pneumatic Control: Replace the existing pneumatic control of the 1989 unit ventilators.	19,900	SF	5.00	99,500	129,350	129,350			129,350
4.3 Remove Window Unit Air Conditioner: Remove three window unit air conditioners in the office area. Install new split system.	3	EA	12,000.00	36,000	46,800		46,800		46,800
4.4 Replace Domestic Water Piping: Existing domestic water piping in the 1950 building may contain lead.	22,500	SF	8.00	180,000	234,000			234,000	234,000
4.5 Old Septic pumps: Two sets of pumps in below grade pump chamber are old and at the end of their lifecycle. Remove and replace in kind.	2	EA	1,200.00	2,400	3,120		3,120		3,120
4.6 Replace the Heating and Ventilation System in the Original 1950 Building: Remove the entire steam heating system. Replace with high efficiency condensing boilers**.**	22,500	SF	22.00	495,000	643,500		643,500		643,500
4.7 Replace non-functioning boiler: Only one boiler is working which was replaced about two years ago. The other one is not functioning and used for parts salvaging.	1	LS	150,000	150,000	195,000		195,000		195,000
Total						129,350	1,083,420	234,000	1,446,770
Total Inflated @ 4% Compounded Annually						139,905	1,318,146	284,697	1,742,748

[1]Total includes Soft Costs (30%): Contingency, Administration and A/E Fees.

Work Item Description	Qty	Unit	Unit Cost	Total	[1]Total w/ Soft Costs	Scope 1	Scope 2	Scope 3	Totals
5. ELECTRICAL									**ASHBY ELEMENTARY SCHOOL**
5.1 Upgrade Data Cabling: Upgrade existing data cabling and add wireless routers throughout school. The construction cost does not include technology equipment or network electronics.	22,500	SF	3.81	85,725	111,443		111,443		111,443
5.2 Security Camera and Intrusion Alarm System: School needs security camera and intrusion alarm upgrades.	22,500	SF	5.00	112,500	146,250	146,250			146,250
5.3 Intercom System: Intercom system needs to be upgraded as the existing system is old and obsolete, with parts for repair hard to find.	22,500	SF	3.00	67,500	87,750		87,750		87,750
5.4 Electrical Services in the 1950 Wing: Electrical services for the 1950 wing need to be upgraded.	22,500	SF	6.00	135,000	175,500		175,500		175,500
Total						146,250	374,693	0	520,943
Total Inflated @ 4% Compounded Annually						158,184	455,871	0	614,055

[1]Total includes Soft Costs (30%): Contingency, Administration and A/E Fees.

1. SITE

1.1 Parking lot at front of school

1.5 Non-Compliant handrails

1.6 Canopy at main entrance

1.7 Exterior wall at electrical room

1.8 Bituminous concrete pad at exit door

2. BUILDING ENVELOPE

2.1 Staining and efflorescence on masonry wall

2.2 Rusted boiler flue

2.3 Canopy at exit door

2.4 The abandoned 1960 addition

3. BUILDING INTERIORS

3.1 9”x9” asbestos floor tiles

3.6 Sagging acoustical ceiling tiles

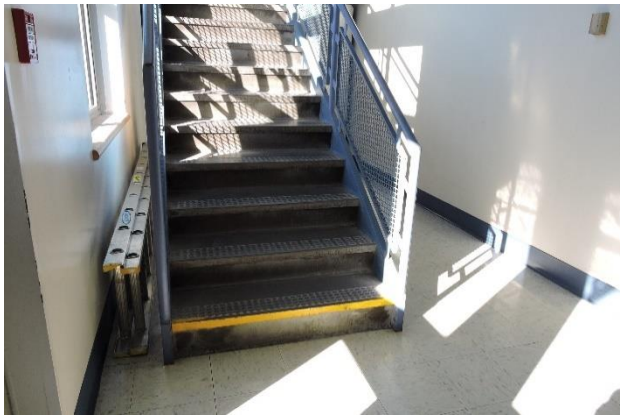
3.7 Leaking interior roof drain leader

3.8 Roof leak through chimney

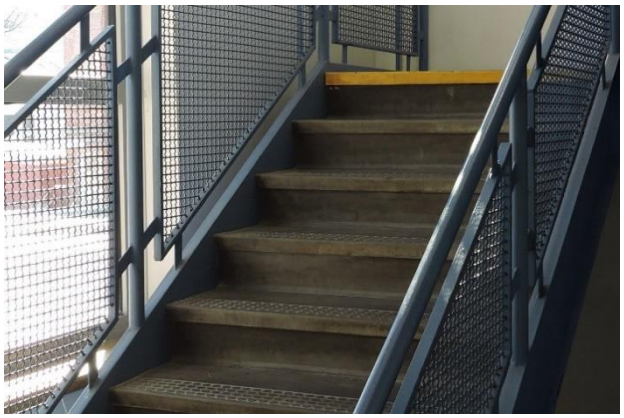
3.9 Toilet rooms in the 1950 building

3.10 Gymnasium wood floor

3.11 2x4 ACT tiles in the 1989 addition are warped and sagging



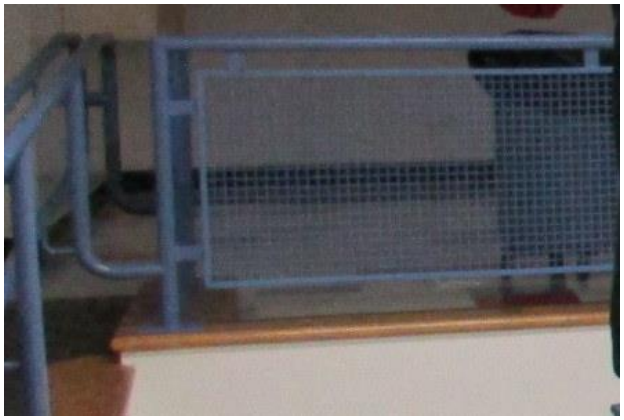
3.12 Non-compliant Handrails/Guardrails on Stairs in 1989 Addition



3.13 Rubber stair treads and risers are discolored

3.14 Classroom sinks are not wheelchair accessible

3.15 Doors between corridor and rooms – 1950 building



3.17 Handrail on ramp is missing top extension

3.19 VCT tiles at Cafeteria

3.20 Existing kitchen

3.22 Gym egress stair

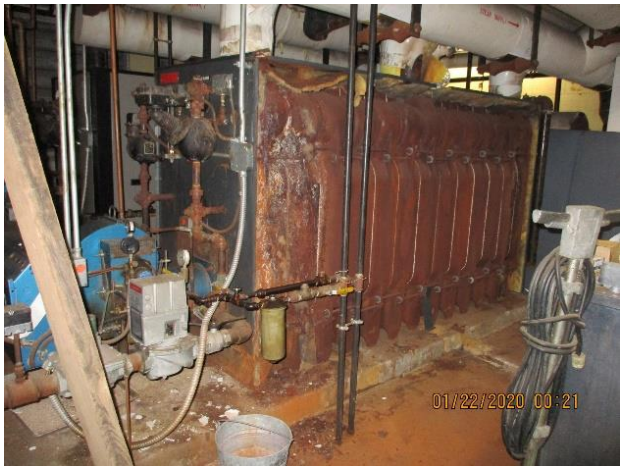
3.24 Lobby double doors

3.25 Handrail on lobby stair to cafeteria

4 MECHANICAL

4.2 Air compressor tank for pneumatic control

4.6 Unit ventilator in 1950 building



4.7 Non-functioning boiler

5 ELECTRICAL

5.2 Security camera at front entrance

5.4 Main electrical room

APPENDICES

Appendix A:

Asbestos Operations and Maintenance Plan, Ashby Elementary School (partial)
Prepared by Terracon, July 18, 2017 A-1 - A-26

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Terracon

ASBESTOS OPERATIONS AND MAINTENANCE PLAN

Ashby Elementary School
911 Main Street
Ashby, Massachusetts

Terracon Project No. J1177087
July 18, 2017

Prepared for:

North Middlesex Regional School District

Pepperell, Massachusetts

Prepared by:

Terracon
Manchester, New Hampshire

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ASBESTOS OPERATIONS AND MAINTENANCE PLAN
Ashby Elementary School
911 Main Street
Ashby, Massachusetts

Terracon Project No. J1177087
July 18, 2017

INTRODUCTION

Terracon Consultants, Inc. (Terracon) has prepared this Asbestos Operations and Maintenance (O&M) Plan for North Middlesex Regional School District (NMRSD) to establish guidelines for the in-place management of asbestos-containing material (ACM) identified at Ashby Elementary School, 911 Main Street, Ashby, Massachusetts (hereinafter referred to as "the site").

Based on the historical data as reviewed by Terracon, the following materials at the site have been confirmed or assumed as ACM:

Material Description	Location	Estimated Quantity	Condition	Friable
Thermal System Insulation Fittings	Old Boiler Room	56 Each	Good	Yes
Thermal System Insulation Fittings	Room 12, Lower Floor	2 Each	Good	Yes
Thermal System Insulation Fittings	Room 13, Lower Floor	2 Each	Good	Yes
Thermal System Insulation Fittings	Room 14, Lower Floor	2 Each	Good	Yes
Boiler Insulation	Old Boiler Room	124 SF	Good	Yes
Breaching	Old Boiler Room	12 LF (2' round)	Good	Yes
Pipe Insulation	Crawl Space	1,050 LF	Good	Yes
Fire Doors	Throughout the School	22 Each	Good	No
9" x 9" Floor Tile	Room 1 (501)	1,050 SF	Good	No
9" x 9" Floor Tile	Room 5 (507)	1,024 SF	Good	No
9" x 9" Floor Tile	Room 6 (509)	1,024 SF	Good	No
9" x 9" Floor Tile	Hallway and Exit	846 SF	Good	No
9" x 9" Floor Tile	Room 12, Lower Floor	702 SF	Good	No
9" x 9" Floor Tile	Room 13, Lower Floor	768 SF	Good	No
9" x 9" Floor Tile	Room 14, Lower Floor	756 SF	Good	No
9" x 9" Floor Tile	Old Reception Area	252 SF	Good	No
9" x 9" Floor Tile	Old Principal's Office	126 SF	Good	No
9" x 9" Floor Tile	Teacher's Room (speech) (504)	272 SF	Good	No
9" x 9" Floor Tile	Teacher's Work Room (Copier) (506)	272 SF	Good	No
9" x 9" Floor Tile	Old Main Hallway	1,350 SF	Good	No
9" x 9" Floor Tile	Room 7 (603)	810 SF	Good	No
9" x 9" Floor Tile	Room 8 (605)	961 SF	Good	No

Material Description	Location	Estimated Quantity	Condition	Friable
9" x 9" Floor Tile	Room 9 (604)	961 SF	Good	No
9" x 9" Floor Tile	Room 10 (602)	930 SF	Good	No
9" x 9" Floor Tile	Room 11 (600)	567 SF	Good	No
9" x 9" Floor Tile	Room 601	124 SF	Good	No
9" x 9" Floor Tile	Art Room (603)	448 SF	Good	No
Ceiling Tile	New Hall	322 SF	Good	Yes
Ceiling Tile	New Stairwell	120 SF	Good	Yes
Ceiling Tile	Old Reception Room	252 SF	Good	Yes
Ceiling Tile	Principal's Room	126 SF	Good	Yes
Ceiling Tile	Lobby	798 SF	Good	Yes
Ceiling Tile	Teacher's Room (304)	272 SF	Good	Yes
Ceiling Tile	Nurse (502)	289 SF	Good	Yes
Ceiling Tile	Old Hallway	1,350 SF	Good	Yes
Ceiling Tile	Source Room (600)	240 SF	Good	Yes
Ceiling Tile	Room 7 (603)	870 SF	Good	Yes
Ceiling Tile	Room 1 (501)	1,024 SF	Good	Yes
Ceiling Tile	Room 5 (507)	1,024 SF	Good	Yes
Ceiling Tile	Room 6 (509)	1,024 SF	Good	Yes
Ceiling Tile	Reading Room	361 SF	Good	Yes
Ceiling Tile	New Hallway	862 SF	Good	Yes
Ceiling Tile	Room 12	756 SF	Good	Yes
Ceiling Tile	Room 13	89 SF	Good	Yes
Ceiling Tile	Room 14	756 SF	Good	Yes
Ceiling Tile	Hall Storage	168 SF	Good	Yes
Ceiling Tile	Room 8 (605)	961 SF	Good	Yes
Ceiling Tile	Room 9 (604)	961 SF	Good	Yes
Ceiling Tile	Room 10 (602)	616 SF	Good	Yes
Ceiling Tile	Room 11 (600)	448 SF	Good	Yes
Ceiling Tile	Art Room (603)	448 SF	Good	Yes
Ceiling Tile	Principal's Room	1,246 SF	Good	Yes
Duct Flex Joints	Cafeteria	2 Each	Good	No
Duct Flex Joints	Stairway	4 Each	Good	No
Linoleum	Sink Room 13	10 SF	Good	No
Linoleum	Sink Room 14	15 SF	Good	No
Linoleum	Sink Room 8 (605)	25 SF	Good	No
Linoleum	Sink Room 9 (605)	25 SF	Good	No
Linoleum	Sink Room 11 (600)	12 SF	Good	No

SF = square feet LF = linear feet

An O&M Plan is designed to be a proactive program of training requirements, on-going surveillance, specialized cleaning and work practices established to maintain ACM in good condition in a building. This document provides building owners, managers, workers and other key building staff with basic information required to effectively manage ACM in place. The practices and procedures described herein apply specifically to the ACM identified at the site. An overview of asbestos, and asbestos hazards, are provided in the following sections.

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ORGANIZATION OF O&M PROGRAM

NMRSD has designated the following individual to serve as the O&M Asbestos Program Manager (APM) for the Site.

O&M Program Manager (APM)	Telephone No.	Emergency Telephone No.
Oscar Hills	978-743-4986	978-743-4986

NMRSD has granted the APM the authority to oversee all asbestos-related activities on the site including inspections, surveillance and all O&M management activities. To the greatest extent possible, the APM will ensure that this O&M Plan is incorporated into the overall building maintenance program for the Site. In addition, the APM will oversee the custodial and maintenance staff, contractors and any outside service vendors with regard to all activities which may potentially disturb the confirmed and/or assumed ACM at the Site. The APM Manager will ensure that no new ACM is introduced into the site as a result of future repair or renovation work. The APM will also maintain all records required by this O&M Pan.

The APM will assure that maintenance personnel are trained to successfully complete tasks as outlined in this O&M Plan. The APM will also be responsible for determining whether asbestos-related work may be done with in-house resources or by appropriately trained contract personnel. The APM should have a background in engineering and/or industrial hygiene, and shall receive, at minimum, 16-hour O&M Worker training as defined herein.

EMERGENCY ASBESTOS INDIVIDUAL

In the event of major fiber release episodes and projects requiring ACM removal or disturbance of more than 3 square feet (3 ft^2) or 3 linear feet of confirmed or assumed ACM, the following individual will be notified. Only appropriately trained contractor personnel will conduct Class I, Class II or Class III operations at the Site.

Asbestos Abatement Contact

Contact Person	Telephone No.	Emergency Telephone No
Oscar Hills	978-743-4986	978-743-4986

1.0 BACKGROUND

1.1 What is Asbestos?

The word "asbestos" describes several naturally occurring fibrous minerals found in certain types of rock formations. Of that general group, the minerals chrysotile, amosite, and crocidolite have been most commonly used in building products. Use of asbestos can be traced back to ancient civilizations such as the Greeks and the Romans. In the United States, its commercial use began in the early 1900s and peaked in the period from World War II into the 1970s. Asbestos became a popular commercial product because it is strong, will not burn, resists corrosion, and is a good insulating material.

When mined and processed, asbestos is typically separated into fibers so small and thin they are invisible to the naked eye. The processed fibers are then mixed with binding agents and other components to create what has been estimated at over 3,000 asbestos-containing materials (ACM). Asbestos fibers released to a building atmosphere by an ACM can remain airborne for hours or even days and can potentially be inhaled by building occupants.

1.2 Exposure to Asbestos

Inhalation of asbestos fibers is a proven cause of certain respiratory diseases. Three specific diseases: asbestosis (a fibrous scarring of the lungs); lung cancer; and mesothelioma (a cancer of the lining of the chest or abdominal cavity) have been causally linked to asbestos exposure. These diseases do not occur immediately after inhalation of asbestos fibers; but may take 20 or more years or more before symptoms develop.

In general, the more asbestos fibers a person inhales the greater the risk of developing an asbestos-related disease. No safe limit for asbestos fiber exposure has yet been established. The regulatory approach has therefore been to prevent or strictly limit the potential for asbestos fiber exposure to building occupants and workers who work with asbestos-containing materials.

1.3 When Asbestos is a Problem

The fact that some ACM may be present in a building does not necessarily mean the health of building occupants is at risk. ACM that is in good condition and that is not being damaged through normal building occupancy renovation or maintenance activities is not likely to release asbestos fibers into the air. When ACM is properly managed, the risk of asbestos fiber release is significantly reduced. However, ACM that has become damaged

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or which deteriorates over time can pose a potential fiber release hazard to building occupants and maintenance personnel.

1.4 Asbestos Regulations

As a consequence of the health hazard from inhalation of asbestos fibers, a body of federal and state regulations has developed. Federal regulations pertaining to asbestos are included in AHERA (Asbestos Hazard Emergency Response Act) US EPA 40 CFR 763, Subparts E, F; NESHAP (National Emissions Standards for Hazardous Air Pollutants (EPA 40 CFR 61); OSHA Asbestos Standards (29 CFR 1910.1001 and 29 CFR 1926.1101), and ASHARA (Asbestos School Hazard Abatement Reauthorization Act). Many states have additional requirements including state-specific licensing and certification.

1.5 Purpose of an O&M Plan

The principal objective of this O&M Plan is to reduce the potential for fiber release from confirmed or assumed ACM present in the building. The O&M Plan includes work practices to maintain ACM in good condition, describes work techniques to properly clean-up asbestos debris, identifies training and personal protective equipment requirements for maintenance and custodial personnel who could disturb the ACM, and specifies the periodic re-evaluation of the condition of ACM present in the building.

This O&M Plan provides guidelines for conducting the following activities in buildings with confirmed or assumed ACM:

- Activities which are unlikely to involve direct contact with or disturbance of ACM.

Such activities include routine cleaning of carpeting, desks, counter tops, floors, or other surfaces in the building (provided no ACM debris is present). Generally, such activities would not be expected to directly disturb ACM.

- Activities which may cause accidental disturbance of ACM

These activities include work such as accessing attic crawl spaces or servicing mechanical systems where asbestos-containing insulation may be present, as well as activities such as replacing fluorescent light tubes or painting walls in an area where asbestos-containing acoustical ceiling texture may be present.

- Activities which intentionally result in the disturbance of small areas of ACM.

Such activities include the intentional disturbance of less than 3 ft^2 of ACM while performing maintenance, repair or installation projects. Examples of such activities include the installation of new light fixtures on asbestos-containing acoustical ceiling surfaces or the disturbance of a section of asbestos-containing gypsum wall board to access a pipe chase.

Activities which disturb more than 3 ft^2 or projects performed for the sole purpose of removing ACM must be considered asbestos abatement projects. These projects and activities will require asbestos control and abatement procedures that are outside the scope of this O&M Plan. Before attempting ACM removal, the Owner must consult an appropriately licensed or accredited asbestos consultant for advice on asbestos removal solutions and applicable regulatory requirements. Asbestos abatement projects must be performed by an appropriately licensed or accredited asbestos contractor in accordance with applicable asbestos control regulations.

1.6 Implementation of the O&M Plan

A successful O&M Plan requires the following program elements:

- Appointment of a Program Manager responsible for compliance with O&M Plan requirements.

- Consistent and conscientious implementation of O&M Plan requirements.

1.6.1 Asbestos Program Manager Responsibilities

The APM position is frequently held by the building engineer, superintendent, facilities manager, or safety and health director. In a small organization, the property Owner or their immediate designee may assume this role. Regardless of who assumes this role, the Program Manager should be appropriately trained in and actively involved with all asbestos-related activities within the building. Attendance of an Asbestos Hazard Emergency Response Act (AHERA)-accredited Building Inspector/Management Planner course is recommended.

If not adequately qualified at the time of initial assignment, the APM must receive training necessary to implement the provisions of the O&M Plan. If the Owner chooses not to adequately train an employee to serve as APM, then the responsibility for administering the O&M Plan must be contracted to a qualified outside consultant.

In general, the APM will have the authority to oversee asbestos-related activities in the building including repairs, improvements, material evaluations, O&M activities, and abatement response actions. In addition, he or she will oversee the work staff, contractors,

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and outside service vendors with regard to all asbestos-related activities. If the Owner hires an outside contractor to perform work on the property, the APM will ensure that the contractor is notified of the ACM areas and is qualified to conduct work that may involve ACM disturbance. Before hiring an outside contractor, the APM will determine whether the contractor's staff is qualified, trained and equipped to comply with asbestos O&M activities.

The APM will also monitor the work performed in the building by both in-house maintenance staff and outside contractors who might inadvertently disturb ACM. Instituting a work permit system, as discussed in Section 4.2, may prevent accidental disturbances of ACM. Under this system, the work staff and contractors must be issued a work permit from the APM before commencing work. At that time, the APM will inform the work staff and/or contractor whether the project could disturb ACM and provide special instructions to make sure the work is completed properly. OSHA regulations require the property Owner to inform outside contractors of confirmed ACMs prior to their disturbance. Communication between the APM and the work staff and/or contractors is essential to prevent activities that might compromise this O&M Plan.

In addition, the APM will routinely and frequently check the work being performed in the building by the work staff and contractors to observe if their work is disturbing ACM. By maintaining close surveillance over these activities, the APM can determine whether work that could disturb ACM is being completed safely. The work staff will be required (by legal agreement or understanding) to notify the APM before conducting even small repairs or renovations. This will help in preventing the work staff from unknowingly disturbing ACM.

The APM will periodically review this O&M Plan to determine whether it should be updated. For example, if all ACM was removed from a specific room or area in the site during a recent renovation, or if some ACM was damaged, this O&M Plan will be revised accordingly. This O&M Plan must remain in effect as long as there is ACM present in the building.

The renovation of a building area at the site or maintenance activities on mechanical equipment in which ACM may be disturbed increases the potential for asbestos exposure. Before conducting any renovation or maintenance work, the APM will review asbestos inspection and assessment records to determine where ACM may be located, visually re-inspect the area, and evaluate the likelihood of disturbing ACM. Suspect or assumed ACM that could be disturbed during the work will either be sampled and analyzed to determine whether it contains asbestos, or the work must be carried out as if the materials contain asbestos.

Confirmed or assumed ACM must be removed prior to intentional disturbance during planned renovation activities.

When ACM removal must occur, it is important that the APM use only appropriately licensed or accredited asbestos project designers and abatement contractors. An independent project designer and a project monitor should be retained to oversee the asbestos abatement work. The project monitor will conduct visual and/or air clearance before the area may be re-occupied.

1.6.2 Incorporation of O&M Plan into Overall Bldg. Management Program

A well developed O&M Plan is ineffective unless the building Owner is committed to its implementation. The Owner must convey this commitment to key personnel involved in the building's management and operations. The safe, in-place management of ACM is contingent upon key personnel understanding the O&M Plan and effectively incorporating the provisions of the Plan into the existing system for managing the building's operations.

1.7 Notification of Tenants and Workers

The Owner must inform maintenance and custodial personnel as well as outside contractors of the location and physical condition of the ACM and stress the need to avoid disturbing the material. Building maintenance staff and contractors must be notified for two reasons: 1) to notify them of the potential asbestos exposure hazard; and 2) because informed persons are less likely to unknowingly disturb the material and cause fibers to be released into the air.

The Owner may elect to inform commercial occupants about the presence of ACM by distributing written notices, posting signs or labels in a central location where they may be reviewed or by holding awareness and information sessions. The methods used may depend on the type and location of the ACM, and on the number of people affected.

Information sessions reinforce and clarify written notices and signs, and provide an opportunity to answer questions. Maintenance staff and commercial tenants likely to disturb ACM will be included in the notification program on a regular basis. The Owner will provide additional signs and information to non-English speaking workers or commercial tenants. It is important that the Owner establish clear lines of communication with employees, contractors and commercial tenants regarding asbestos issues. People who are informed of the presence, location and condition of ACM in a building where they work, who understand that the mere presence of ACM is not necessarily hazardous to them, and who accept that ACM can often be managed effectively in place, can be very helpful to the APM in eliminating or reducing unwarranted fears or "hysteria." If and when asbestos fiber release incidents occur, it is important for the APM to deal with employees, contractors and commercial tenants openly and honestly in an attempt to maintain confidence in both the Program Manager and the overall O&M Plan.

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2.0 ACM SURVEILLANCE

2.1 Re-inspection and Periodic Surveillance

A visual re-inspection of the ACM present at the facility must be conducted by the Asbestos Program Manager at regular intervals as part of this O&M Plan. Combined with ongoing reports of changes in the condition of the ACM made by workers, re-inspections assist in detecting and correcting ACM damage or deterioration which may occur over time. As part of this O&M Plan, annual re-inspections of the ACM materials is recommended. Terracon recommends that re-inspection of asbestos-containing materials and a review of the O&M Plan be conducted by an independent third party (appropriately accredited/licensed Asbestos Management Planner) every three years.

EPA recommends that both a visual and physical evaluation of ACM be performed during re-inspections to note the condition and physical characteristics of the materials. The purpose of the re-inspection is to determine the relative degree of damage and assess the likelihood of future fiber release. Maintaining a set of visual records (photos or video tape) of the ACM over time can be of great value during re-inspections. A recommended form for use in documenting ACM re-inspections is included as Appendix A, Form 1.

2.2 Risk Assessment

An assessment of the risk posed by ACM should be conducted as part of the re-inspection process. The risk assessment process considers both the physical condition and the accessibility (potential for disturbance) of each ACM. The physical condition of ACM is assessed based on a combination of the quality of the installation, adhesion of the material to the underlying substrate, deterioration, vandalism and normal wear and tear of the material. Accessibility of the ACM is included in the assessment process to evaluate the potential for disturbance of the material.

The risk assessment protocols outlined in AHERA (40 CFR 763) will be utilized in conducting the risk assessment of ACM. Under these protocols, the ACM is classified as damaged or not damaged. AHERA then specifies that the ACM be classified as either: good, damaged or significantly damaged. The three AHERA condition categories are defined as follows:

- ***Good*** condition is defined as "material with no visible damage or deterioration, or showing only very limited damage or deterioration".

- ***Damaged*** asbestos is defined as "material with less than 10% of damage over the entire homogeneous area or less than 25% damage over a localized area".

- ***Significantly damaged*** asbestos is defined as "material with approximately 10% or more damage over the entire homogeneous area or 25% or more over a localized area".

Water is the most common cause of damage to asbestos-containing materials. Water can dislodge, delaminate, and deteriorate ACM that were otherwise in good condition. Water can also carry fibers in a slurry to other areas of the building. Upon evaporation, a collection of fibers is left behind that can become airborne upon future disturbance. Other examples of ACM damage include crumbling, blistering, gouge marks, surface de-lamination, puncture marks. The custodial and maintenance personnel must be familiarized with these types of damage potential in order to protect themselves and co-workers from potential exposure to asbestos. Damage to all ACM must be reported to the Asbestos Program Manager and repaired/remediated in accordance with this O&M Plan.

Accessibility, or potential for disturbance, should be ranked as high, medium or low. The likelihood that the ACM could be disturbed in the future is related to:

- Potential for contact,

- Influence of vibration, and

- Potential for water damage or air erosion.

3.0 WORKER PROTECTION PROGRAM

For those employees whose normal work activities do not include contact with ACM, a two-hour asbestos awareness course will be required. The contents of the two-hour asbestos awareness training course are outlined in Section 3.1.1. Custodial and maintenance employees, contractors or commercial tenants performing work which will intentionally disturb small areas (<3 ft^2or 3 linear feet) of ACM during their normal work activities will require:

- Two-Hour Asbestos Awareness Training, plus

- An additional 14 Hours of O&M Worker training (See Section 3.1.2)

- Enrollment in a Medical Surveillance Program

- Participation in a Respiratory Protection Program

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3.1 Training

Training will be provided on two levels. The first level (General Awareness) is for the APM, employee supervisors, general work staff, and company representatives. This course is considered to be an introductory course and takes approximately two hours to complete. The second level (O&M Worker) is for those individuals directly involved with ACM removal and maintenance activities and those who oversee their work. This training is more extensive. The training may be performed by a qualified consultant or qualified safety and health professional at the site or at an appropriate training site.

3.1.1 Awareness Training

Prior to the implementation of this O&M Program, the Owner must ensure that all employees and work staff who work in a building containing ACM receive 2-hour asbestos awareness training, whether or not they are required to work with ACM. New work staff and maintenance employees will be trained within 30 days after commencement of employment. This training will consist of the following topics:

- General information on asbestos.
- Health effects of asbestos exposure.
- The location of ACM identified in the workplace.
- How to avoid disturbing ACM.
- Recognition of damage, deterioration, and delamination of ACM and how to report damage.
- The worker protection program in use.
- How to respond to a fiber release episode.
- The name and telephone number of the Program Manager designated by the Owner.
- The availability and location of this O&M Plan.

An Acknowledgment of Instruction form for use by workers attending general asbestos awareness training is provided as Form 2 in Appendix A.

3.1.2 O&M Worker Training

If applicable, the APM will require that members of the custodial or building maintenance staff who conduct activities involving the intentional disturbance of small amounts of ACM (less than 3 ft^2 or 3 linear feet) receive the awareness training outlined in Section 3.1.1 above and an additional 14-hours of O&M training. This level of training usually involves more detailed discussions of the topics included in the general asbestos awareness training as well as:

- Applicable federal, state, and local asbestos regulations.
- Proper asbestos-related work practices.
- ACM waste handling and disposal procedures.
- Proper respirator use.
- Protective clothing use.
- Worker decontamination procedures.
- Hands-on exercises to demonstrate specialized techniques for a typical maintenance project involving disturbance of small areas of ACM.

3.1.3 Abatement Worker Training

This level of training is required for individuals who conduct asbestos abatement or who will be required to intentionally disturb > 3 ft^2 or 3 linear feet of ACM. ***This work involves direct, intentional contact with ACM and requires additional training, asbestos control and abatement procedures that are outside the scope of this O&M Plan.***

3.1.4 Outside Contractor Training

The APM must familiarize outside contractors who will perform work in proximity to known ACM or who may disturb known or assumed ACM with this O&M Plan It is recommended that an appropriately trained member of the in-house staff familiar with this O&M Plan be assigned to oversee work performed by outside contractors which could disturb known or assumed ACM.

3.2 Medical Surveillance Program

If the Owner elects to have personnel trained at the Asbestos Worker level to engage in the deliberate removal or disturbance of ACM, these personnel must be enrolled in a medical surveillance program as required by the OSHA Asbestos Standard for

Construction (29 CFR §1926.1101). Additionally, any employee required to wear a respirator in the course of his/her job must also be included in a respiratory protection program. The use of respirators will dictate involvement in the medical surveillance program for most maintenance workers. Although fiber levels may not be high enough to require a respiratory protection program, establishing such a program is recommended if workers will be involved in asbestos maintenance activities.

The purpose of the medical surveillance program is to establish an employee's fitness to wear a respirator and other personal protective equipment, and to detect changes in the respiratory system which may result from working in asbestos-contaminated areas. Such changes act as an early warning in the detection of asbestos-related disease. A medical surveillance program requires a baseline examination prior to initial exposure, and annual, follow-up examinations.

3.3 Respiratory Protection Program

A written respiratory protection program is needed if the site Owner elects to have the maintenance staff trained for tight-fitting respirator use during asbestos abatement activities. Components of the Respiratory Protection Program must include written operating procedures for respirator use; training in the use and limitations of respirators, the person responsible for respirator cleaning, storage and repair; medical examinations, respirator fit testing respirator cleaning and care procedures. Regulatory standards for respirator use are detailed by OSHA in 29 CFR 1910.134 and 29 CFR 1926.1101.

Proper respiratory protection is an integral part of all custodial and maintenance activities involving potential exposure to asbestos. When in doubt about potential exposure during a certain work activity involving ACM, the Owner will provide respiratory protection to the work staff performing the work. OSHA regulations require respirators for protection against airborne asbestos fibers at or above the PEL. At a minimum, respirators will be half-face negative pressure air-purifying respirators equipped with replaceable, high-efficiency filters (NIOSH N-100 designation).

3.3.1 Respiratory Protection Program Evaluation and Record Keeping

The respiratory protection program must be evaluated at least annually and revised, as appropriate, to reflect air sampling or other evaluation results. The program will be reviewed for respirator selection, purchase of approved equipment, medical screening of employees, fit testing, issuance of equipment and associated maintenance, storage, repair and inspection. Surveillance of work area conditions will also be performed to determine if respiratory protection is appropriately worn.

Attention must be given to proper record keeping. Mandatory records which must be retained include the names of employees trained in respirator use, documentation of the care and maintenance of respirators, medical reports of each respirator user, documentation that each employee wearing a respirator is fit-tested annually, airborne asbestos monitoring data including personal samples and documentation of any problems encountered during projects with regard to respiratory equipment. A checklist for self-evaluation of a respiratory protection program is presented in Appendix A, Form 3. If applicable, the APM will review and complete this form on an annual basis. OSHA requires medical information obtained during mandatory medical surveillance examinations be maintained for 30 additional years following the last day of employment.

4.0 DOCUMENTATION AND PERMITTING SYSTEM

This section addresses the documentation required for the effective administration of an O&M Plan. Administration of a work permit system is a management tool for limiting liability associated with employee exposure to ACM at the site. The following sections describe the documentation required for managing a fiber release episode and recommendations for an effective work permit system.

4.1 Fiber Release Episodes

A fiber release episode can result from disturbance of ACM during maintenance activities or renovation projects. If an episode should occur, employees and/or maintenance workers must be instructed to report the presence of ACM debris discovered on floors, water or physical damage to areas of known or assumed ACM or any other evidence of potential fiber release to the APM. The APM must contact an abatement contractor or assign an appropriately trained, in-house team to clean up the debris and make repairs as soon as possible. If an in-house team will not be trained for rapid response to a fiber release episode, an abatement contractor to be used for such responses must be retained as a component of this O&M Plan. The telephone number of the abatement contractor to be contacted in the event of a fiber release emergency must be included in this document.

The APM will document each fiber release episode using Form 4 in Appendix A. Following all fiber release episodes, a visual examination and final clearance air sampling (Section 6.4) must be conducted after completing the clean up and prior to permitting re-occupancy of the area.

4.2 Work Permitting

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Establishing a system to route work orders or maintenance requests through the APM can help prevent the inadvertent disturbance of known or assumed ACM in the building.

4.2.1 Job Request Form/Work Authorization Form

Requests for maintenance and renovation activities that may disturb or remove ACM must be directed through the APM prior to commencing the work. The requests will be documented by completing a Job Request Form, available as Form 5 of Appendix A., Upon receipt of a work permit, the APM will check the building's asbestos records (e.g. files, specifications, etc.) to determine if ACM is present in the vicinity of work to be performed. APM must then physically survey the area of potential disturbance to confirm that the asbestos records reflect actual site conditions.

If the required maintenance work can be performed by trained work staff the APM will complete and sign a Work Authorization Form (Appendix A, Form 6). The Work Authorization Form identifies the following:

- Type of work authorized.
- Presence of ACM.
- Work practices to be employed.
- Personal protection requirements.
- Submittal of notifications.
- Special practices or equipment required.
- If an area of ACM > than 3 ft^2 or 3 linear feet must be disturbed or removed, the Program Manager will assign an employee trained at the Asbestos Worker level, or will retain the services of a qualified abatement contractor.

If ACM is present, but is not expected to be disturbed during the work, the APM will sign the Work Authorization Form, identify that ACM's are present, and stress that the materials must be avoided during the scheduled maintenance or repair activities. The workers performing the work and their supervisor must sign the Work Authorization form indicating that they are aware of the presence of asbestos containing materials and the work practices required to safely complete the work.

4.2.2 Evaluation of Work Form

An Evaluation of Work form (Form 7 in Appendix A) should be completed on at least 10% of those projects on which a Work Authorization Form was prepared. This evaluation

provides the APM feedback as to how effective the work practices are in preventing disturbance of ACM and may suggest where improvements to the program may be required. The APM must retain file copies of all Job Request forms, Work Authorization forms and Evaluation of Work forms.

5.0 ACM WORK PRACTICES

5.1 Initial and Periodic Cleaning

Reducing and/or eliminating airborne asbestos dust within a site is one of the primary objectives of the O&M Plan. Dry brooms, mops, dust cloths, and standard vacuum cleaners simply re-suspend asbestos fibers into the air. Therefore, it is essential that specialized cleaning procedures be implemented when ACM debris is encountered.

5.1.1 Initial Cleaning Procedure

If asbestos contaminated areas are identified in the site, appropriately trained and properly equipped workers will conduct a thorough initial cleaning in the contaminated building area as soon as possible. These workers will wear air-purifying respirators equipped with N-100 or P- -100 cartridge filters and protective clothing. A combination of wet mopping, wiping, and HEPA vacuuming will be used to clean all surfaces within the area.
Other surfaces, such as walls, non-carpeted floors, light fixtures, equipment housings, and the exterior of air handling ducts, will be cleaned using mops and/or dust cloths and rags that are wetted. Asbestos-contaminated mops, dust cloths, and rags will be stored in appropriately labeled bags between uses, and disposed as ACM waste when discarded.

5.2 Removal Work Practices and Engineering Controls

When ACM is removed, OSHA requires the use of certain engineering and work practice controls capable of reducing employee exposures to asbestos below the permissible exposure limit (PEL) of 0.1 f/cc. Various work practice controls, used either individually or in combination, can be effectively employed to reduce asbestos exposures during maintenance or removal actions. These include:

1. An enclosure to isolate the regulated area.
2. High efficiency particulate air (HEPA) filtration equipment for ventilation.
3. Wet methods.
4. HEPA-filtered vacuum systems.
5. Prompt clean-up and disposal of wastes.

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OSHA classifies ACM removal/maintenance activities into four categories and specifies the work practices that must be followed for each level of work. The four OSHA categories of ACM work are as follows: 1) Class I asbestos work which includes the removal of friable thermal system insulation (TSI) and surfacing ACM (acoustical ceiling or fireproofing material); 2) Class II asbestos work which includes the removal of other types of asbestos; 3) Class III asbestos work which includes the repair and maintenance operations where any type of ACM is likely to be disturbed; and 4) Class IV asbestos work consists of maintenance and custodial activities in which employees will contact ACM and/or will clean-up ACM waste and debris.

For the purposes of this O&M Plan, Site employee's will conduct only Class III asbestos work (provided the maintenance workers have had the 14-hour O&M Worker training) or Class IV asbestos work (provided the maintenance workers have had the 2-hour general awareness training). When large-scale removal of ACM (Class I or Class II) is performed, a qualified asbestos abatement contractor and consultant must be retained.

5.3 Emergency Response Activities

As long as ACM remains in the building, a fiber release episode could occur. Workers at the site should report a release episode to the APM. Reportable events include the presence of ACM debris on the floor, water or physical damage to the ACM, or any other evidence of a possible asbestos fiber release. Fiber release episodes can also occur during maintenance or renovation projects. The APM will either contact an abatement contractor or assign a properly trained, in-house team to clean-up debris and make repairs as soon as possible

5.3.1 Minor Release Episodes

A minor release episode consists of the falling or dislodging of less than 3 ft^2 or 3 linear feet of ACM. Examples of minor episodes would be if a small section of pipe insulation was accidentally damaged by some un-controlled maintenance activity. A minor episode can be remediated with properly trained, in-house workers using standard wet cleaning and HEPA vacuum techniques (Class IV asbestos work). In the alternative, an asbestos abatement contractor may be contacted to conduct the clean up and repair.

5.3.2 Major Release Episodes

Major fiber release episodes must be considered serious events. The disturbance of large amounts of ACM could contaminate the entire building with asbestos fibers. A major release episode could potentially occur if pipe insulation was removed without asbestos specific work control practices. A breach in a containment barrier during a repair or maintenance could also result in a major episode.

If more than 3 ft^2 or 3 linear feet of ACM is dislodged from its substrate, the episode must be considered a major fiber release episode. At a minimum, the following response procedures will be initiated whenever a major fiber release episode occurs:

- Immediately following discovery of a major fiber release episode, isolate the spill area.
- Shut down or modify the air handling system to prevent spread of asbestos fibers from the release area to other areas of the building. Seal off doors, windows, and air registers with two layers of 6-mil thick plastic sheeting and duct tape.

- OSHA requires that warning signs then be posted to prevent unauthorized personnel from entering the work area The OSHA mandated warning signs must read as follows: "DANGER - ASBESTOS; CANCER AND LUNG DISEASE

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HAZARD; AUTHORIZED PERSONNEL ONLY; RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA."

- The procedures and work practices specified by OSHA for large-scale ACM removal (Class I and II asbestos work) must be used to remediate a major fiber release. These include establishment of containment barriers and negative pressure enclosures, the use of personal respiratory protection and protective clothing, air monitoring and decontamination facilities.

A licensed or accredited asbestos consultant will be hired to conduct final clearance air sampling following the completion of a major fiber release episode. The APM will prevent re-occupancy of the area until final air clearance testing is completed, and will maintain documentation of final air clearance testing results (see Section 6.4).

6.0 AIRBORNE FIBER CONCENTRATION DOCUMENTATION

As part of an O&M Program, a carefully designed air monitoring program to detect and evaluate airborne asbestos fibers may provide useful supplemental information when conducted with a comprehensive visual and physical assessment of ACM and a re-inspection program. If an Owner chooses to use air monitoring in an "early warning" context, a knowledgeable and qualified individual will be consulted to design a proper sampling strategy.

The most accurate method of air sample analysis uses Transmission Electron Microscopy (TEM). TEM sampling is recommended for clearance testing in most cases prior to reoccupation of a work area after asbestos abatement. Phase contrast microscopy (PCM), commonly used for personal air sample analysis and as a screening tool for area air monitoring, cannot distinguish between asbestos fibers and other kinds of fibers which may be present in the air. However, PCM is the accepted method of analysis by OSHA and most states for monitoring airborne asbestos fibers.

Please note that air monitoring and laboratory analysis should be performed only by qualified professionals and a NVLAP-accredited laboratory. It is beyond the scope of this O&M Plan to define air monitoring procedures or analytical methods.

6.1 Periodic Monitoring

Based on the identification of damaged materials in routine maintenance areas, the Owner may elect to have an asbestos consultant or laboratory perform periodic air monitoring to establish baseline conditions and evaluate existing airborne fiber levels. Monitoring may be performed on a periodic basis thereafter.

6.2 Personal Air Monitoring

Personal sampling (required by OSHA) is designed to measure a worker's exposure to airborne fibers. A sampling device is worn by the worker and positioned so that it samples air in the worker's breathing zone. Personal air sampling is not the same as area air monitoring.

Personnel monitoring should be conducted after implementation of the O&M Plan, during Class III and IV asbestos work, to establish proper respiratory protection requirements and obtain exposure assessment data. Personal samples will be analyzed by PCM. OSHA requires records of personal air sampling to be kept for at least 30 years after termination of employment.

6.3 Area Air Monitoring

Area air sampling is conducted to evaluate the airborne asbestos fibers present in a work area during a fiber release episode, planned removal action, or cleaning. It is used as an assessment tool in evaluating the potential hazard posed by asbestos fibers in the work area. Area samples will be taken from locations outside a Class III asbestos work area and major abatement work areas. Area monitoring gives an indication of whether or not the engineering controls and barriers are effective in reducing fiber migration to unprotected areas.

6.4 Final Clearance Air Monitoring

Following an asbestos abatement action (removal, repair, or encapsulation) or a major fiber release episode and clean-up, a visual examination and final clearance monitoring using aggressive sampling methods will be performed within the containment barriers prior to the re-occupancy of the abatement work area. Final clearance sampling must follow asbestos abatement actions, including clean up of major fiber release episodes. Final clearance samples associated with each fiber release episode will be documented on Form 4 of Appendix A. Asbestos abatement contractors retained to conduct removal activities will be notified that the abatement and clean up activity will not be considered complete until the airborne fiber concentration is equal to or less than either 0.01 fibers per cubic centimeter of air (f/cc) by PCM analysis or equal to or less than an average of 70 structures per square millimeter (s/mm^2) by TEM analysis. The clean up or removal contract will clearly state that additional cleaning required to pass final air clearance testing will be performed at the contractor's expense.

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7.0 RECORD KEEPING

The APM will establish files to document the activities required by this O&M Plan. A summary of O&M Plan elements requiring documentation is provided below:

- A list of the types and locations of asbestos-containing materials identified at the site.
- Employee training records.
- Copies of the Certificates of Worker's Acknowledgment to asbestos.
- Periodic Surveillance Inspection Reports.
- Fiber Release Records.
- Copies of Job Request Forms, Work Authorization Forms, Reassessment Evaluation Forms, and Work Evaluation Forms.
- A copy of all laboratory reports and all correspondence with laboratories concerning sample analysis.
- Copies of contractor bids, project submittals, proof of contractor worker training, NESHAP notifications, waste manifests, and insurance coverage.
- Respiratory Protection Program, if applicable.
- Medical Surveillance Program, if applicable.

8.0 ASBESTOS WASTE DISPOSAL PROCEDURES

Whenever ACM is removed from the building, the following special handling and disposal procedures will be required.

8.1 Waste Packaging

All asbestos-containing wastes must be packaged in two 6-mil thick plastic bags and sealed with duct tape. Disposal bag labels must be prepared in accordance with OSHA and EPA regulations and must bear the name of the Owner and location from which the material was removed.

8.2 Disposal Documentation

EPA regulations require that asbestos waste shipments be documented by a hazardous waste manifest. Waste manifests are chain-of-custody waste tracking sheets that must be signed by the site Owner (or duly authorized agent), the waste transporter, and the landfill operator who accepted the waste for disposal. The O&M Program Manager will retain copies of all hazardous waste manifests prepared for the disposal of ACM from the facility.

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9.0 SUMMARY OF KEY O&M WORK PRACTICE CONTROLS

This table summarizes the activities that should be performed if identified ACMs are likely to be impacted:

LIKELIHOOD OF ACM DISTURBANCE			
	Contact Unlikely	Accidental Disturbance Possible	Disturbance Intended or Likely
MANAGEMENT RESPONSIBILITIES			
Need Pre-Work Approval from Program Manager	Review by Program Manager [1]	Yes [1,2]	Yes [1,2]
Special Scheduling or Access Control	No	Yes	Yes
Supervision Needed	No	Initial, At Least	Yes
Heating, Ventilation and Air Conditioning (HVAC) System Modification	None	As Needed [3]	Shut Down [3]
Area Containment	None	Drop Cloths, Mini-enclosures	Yes [4]
Air Monitoring Required	No	Yes [5]	Yes [5,6]
PERSONAL PROTECTION			
Respiratory Protection	Available For Use	Yes	Yes
Protective Clothing	None	Review by Program Manager	Yes
WORK PRACTICES			
OSHA Class III	Yes	Yes	Yes
OSHA Class IV	Yes	Yes	not applicable

Notes:
1) Job Request Form and Work Authorization Form
2) Work Evaluation Form
3) In the area where work takes place
4) Type of containment may vary
5) Initial (periodic) and personal monitoring
6) Area and final clearance air sampling