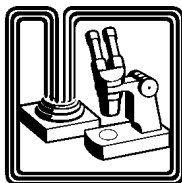


Appendix A: Paint Analysis Report



Welsh Color & Conservation, Inc.
Analysis of Historic Paints and Wallpapers

P.O. Box 767
Bryn Mawr, PA 19010-0767
Tel: 610-525-3564
E-mail: fswelsh@welshcolor.com

Website: www.welshcolor.com

MICROSCOPICAL PAINT AND COLOR ANALYSIS

PROJECT INFORMATION	CLIENT INFORMATION
<p>Name: Launch Control Building Location: Minuteman Missile National Historic Site</p> <p>Construction Date: 1962 Style: Single Story</p> <p>Owner: National Park Service</p>	<p>Name: Steve Jones Company: Quinn Evans Architects Address: Ann Arbor, Michigan</p> <p>Phone: 734-663-5888 Email: sjones@quinnevans.com</p>
<p align="right">Today's Date: 5/26/10</p>	
DESCRIPTION OF PROJECT	
<p>To investigate and determine the nature and color of the paint finishes on the exterior and selected interior rooms that are associated with 1973 conversion to Minuteman II, and the most recent paint colors that were applied prior to official transfer of the site to the National Park Service in 2002.</p>	
SCOPE OF PROJECT	SITE INVESTIGATION/SAMPLING
<ul style="list-style-type: none"> Space: Exterior and Rooms: 101, 108, 114, 118 & 123 Period of Significance: 1973 and ca. late 1990's Finishes analyzed for composition: <ul style="list-style-type: none"> <input type="checkbox"/> original <input type="checkbox"/> later <input checked="" type="checkbox"/> none Finishes analyzed for color: <ul style="list-style-type: none"> <input type="checkbox"/> original <input checked="" type="checkbox"/> later <input type="checkbox"/> none Color system used: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Federal Standard Color System <input checked="" type="checkbox"/> Munsell <input type="checkbox"/> none Finishes described by general color name only: <ul style="list-style-type: none"> <input checked="" type="checkbox"/> all, except 1973 & c. 1990's <input type="checkbox"/> all, including original Historic documents referenced: <ul style="list-style-type: none"> <input type="checkbox"/> photographs <input type="checkbox"/> illustrations <input checked="" type="checkbox"/> written <input type="checkbox"/> none 	<ul style="list-style-type: none"> Sampled by: Frank S. Welsh Date sampled: June 10, 2009 No. of samples taken: 48 No. of samples analyzed: <ul style="list-style-type: none"> <u>48</u> with stereomicroscope <u>0</u> with polarized light microscope (PLM) <u>0</u> with scanning electron microscope <u>0</u> with FTIR <u>0</u> crosssection photomicrographs

SUMMARY OF FINISHES

Introduction

The Launch Control Building was completed in the early 1960's. The available documentation for painting the building at this time is limited to the color schedule, which is dated 1961-1962. All of the colors were specified using the Federal Standard Colors 595 color system. This color system is still in use today.

With the conversion to Minuteman II, the facility was upgraded and the interior was repainted for the first time since 1962. Specifications for this painting, dated 1973, were also made available to us. Once again the Federal Standard Color 595 system was used. In addition, the types of paint were included in this specification. They called for the use of alkyd oil paints.

No relevant historic photos for the 1962 and 1973 periods were available at the time of our investigation; however, original floor plans were available.

The building was continually painted through the late 1990's, prior to the transfer to National Park Service in 2002. No records of the paints and colors used after 1973 were known to exist at the time of our research. The period that will be interpreted is the most recent – representing the point at which the National Park Service took possession of the site. The interior was repainted in 2004. The colors used appear to match those that were already on the surfaces.

The scope of our services for the investigation, analyses and reporting was limited; i.e. it did not include the entire building nor color matching all paint layers. The scope of the investigation and sampling was limited to 48 samples taken from the exterior and five interior spaces. The rooms selected by the National Park Service included the Security Office - 101, Dining and Recreation Room - 108, Kitchen - 114, Bedroom - 118 & Facility Manager's Bedroom -123. By contractual agreement, the scope of the lab analyses and reporting was limited to identifying the layer structure on each sample and color matching *only the 1973 and most recent schemes* using either the Federal Standard Color or Munsell Color systems. However, since the color specifications existed for the original period, Welsh Color & Conservation, Inc. included the analysis and reporting of the 1960's colors as well.

Our findings are summarized in the following narratives and tables. Because we found that the colors specified were not always the colors that were actually used, we incorporated the variations in the tables. The colors in these comparative tables (6 pages) are illustrated digitally, not with actual color samples. The visual color reference samples for the 1973 and late 1990's – 2004 (most recent) schemes are presented in a separate table. Additionally, all colors can easily be referenced in the Federal Standard Colors 595 fan deck and in the Munsell Book of Color. Information about obtaining the Federal Standard Colors 595 fan deck is available at: <http://www.fed-std-595.com/>.

At the end of this report we have appended our laboratory data sheets as well as the two paint color specifications from 1962 and 1973.

SUMMARY OF FINISHES

Exterior

Only four samples were taken from the exterior during our on-site investigation. They are from a metal door and trim and two metal vents. A sample of the original cement asbestos siding, salvaged by the NPS, and a sample of the 1980's pre-finished siding were sent to us at a later time. We did not take any samples from the more recent windows. Consequently, our information concerning the most recent paint colors on the exterior is only partially complete for the three periods of significance.

In 1962, the cement asbestos siding was painted green. The metal door, door trim and smaller ventilation hoods were painted white. The large ventilation hood at the rear of the building was painted black. This scheme was repeated in 1973, except for the large vent in the rear that was painted white.

In the late 1990's, the metal door trim and ventilation hoods were painted dark brown. The metal doors were painted grayish yellow. The ca. 1980's pre-finished metal siding retained its original yellowish gray color and the windows were painted white. (See photo below taken in June 2009.)

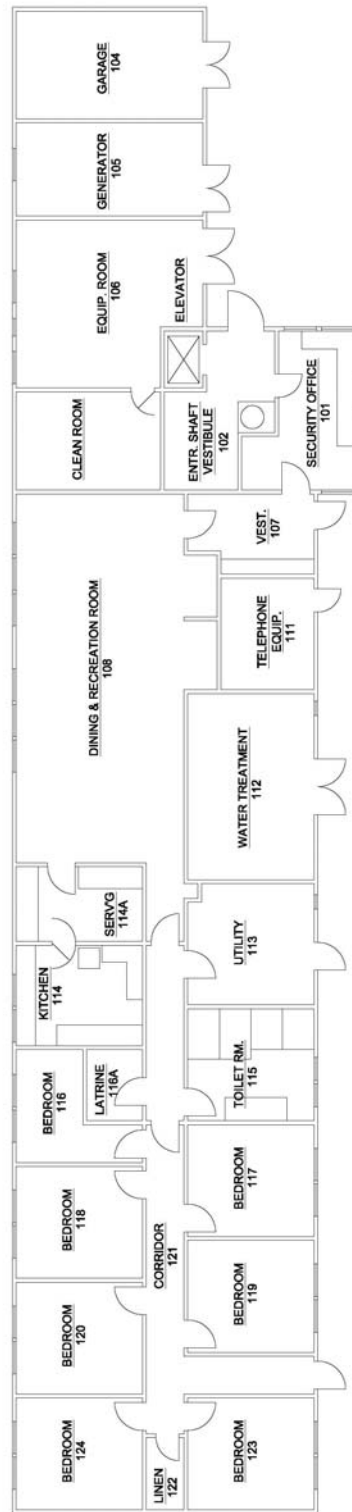
The paint colors used on the sampled features during the intervening years between 1973 and the 1990's are presented in the appended lab data sheets.



Interior

It is rare that original color specifications survive in the documents associated with historic buildings; accordingly, it is very fortunate that both the original 1962 and 1973 specifications were located for this project. They describe most of the exterior and almost all of the interior spaces. All five of the rooms selected for study in this effort are covered in both sets of specifications. The colors are specified by the unique five digit numbers in the Federal Standard Colors 595 system. Our analysis of the colors in the rooms studied discloses that the colors specified were not always used. This is especially true of the 1973 painting effort. Because of these variations we constructed a table that shows the colors specified and also the actual colors used in the spaces. There were no documents for the most recent paint colors; consequently there is no column in the table for comparison in this period.

SUMMARY OF FINISHES



LAUNCH CONTROL BUILDING
SUPPORT FACILITY



SUMMARY OF FINISHES

Room 101: Security Office

In this small but most visible interior space the original specifications called for light green walls and trim, a green wainscot and a white ceiling. Our analysis discloses that these colors were actually used. In 1973, the specified colors were spring green on the trim, doors and wainscot, green on the walls and white on the ceiling. Once again, these colors were in fact used. In the most recent painting of the room, everything was painted white with the exception of the dropped ceiling and the small alcove space separated by a metal screen partition. The walls in this alcove space were painted dark brown. We were not able to take samples from the wainscot, as it was not accessible because of the console and also the wainscot paneling.

Of all the rooms investigated, this room has been repainted the most – approximately a dozen times with the exception of the metal door to the Entrance Shaft Vestibule. This door has been painted almost twice as many times as the other features in the room. By-and-large the color schemes evolved from light greens to medium greens to a medium blue, then dark brown and orange yellow in the mid-to-late 1900's until arriving at the present simplified scheme of all white. The complete layer structure on the eight samples taken in this space is presented in the appended laboratory data.



Security Office (June, 2009)

SUMMARY OF FINISHES

Room 108: Dining and Recreation Room

In this large gathering space the original specifications called for light tan trim, a different light tan for walls, and off white on the ceiling. None of the specified colors were used. A different light tan was used on the trim, doors and walls, and a different white was used on the ceiling. In 1973, the specified colors were sand on the trim and doors, buff on the walls, and white on the ceiling. None of these colors were used. Instead one shade of light green was used on both the doors, trim and walls and the ceiling was painted a different white. In the most recent painting of the room, everything was painted white with the exception of the ceiling which now has a dropped ceiling installed.

Over the years the color schemes evolved from light and medium greens to yellowish whites and whites. Wallpaper in imitation of grass cloth was installed on the walls in the mid-to-late 20th century. It was removed and the walls painted white in the late 1990's – at the same time that the dropped ceiling was installed. The wallpaper survives above the dropped ceiling and also around the water cooler on the south wall.



Dining and Recreation Room (June, 2009)

Room 114: Kitchen

In the Kitchen the original specifications called for light tan on the walls, and off white on the ceiling. No color was specified for the trim. Only one of the specified colors was used. A light tan was used on the trim and walls; the off white specified was used on the ceiling. In 1973, the specified colors were sand on the walls, and bone white on the ceiling. Again, no color was specified for the trim. None of these colors were used. Instead light green was used on both the trim and walls and the ceiling was painted a different white. In the most recent painting of the room, the trim and ceiling were painted white and the walls were painted light blue.

Over the years the color schemes evolved from light to yellowish whites and whites. The light blue on the walls is a very recent change. The painted masonite on the walls may or may not be original; it is impossible to know without removal of a small section to ascertain whether or not the walls behind are painted. Painted masonite panels were available in the 1960's. They are painted white now.

SUMMARY OF FINISHES

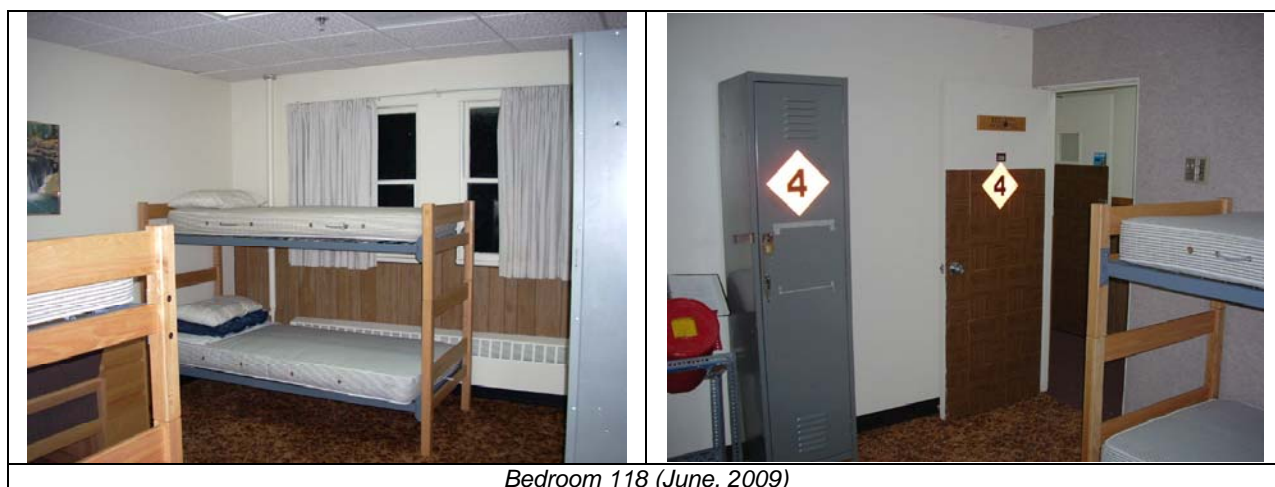


Kitchen (June, 2009)

Room 118: Bedroom

In this bedroom the original specifications called for light tan on the walls and trim and white on the ceiling. These colors were used. In 1973, they specified the same colors as in 1962. These colors; however, were not used. The walls and trim were painted light green; the ceiling white. In the most recent painting of the room, everything was painted white with the exception of the ceiling, which now has a dropped ceiling installed and the window glass, which is painted black.

Like other rooms, the color schemes in this bedroom have changed from the early light tans and greens to yellowish whites and now white.



Bedroom 118 (June, 2009)

SUMMARY OF FINISHES

Room 123: Facility Manager's Bedroom

In this bedroom the original specifications called for light tan on the walls and trim and white on the ceiling. These colors were used. In 1973, they specified the same colors as in 1962. These colors; however, were not used. The walls and trim were painted light green, the ceiling white. In the most recent painting of the room, everything was painted white with the exception of the west wall that was painted a medium gray and the ceiling, which now has a dropped ceiling installed.















Like other rooms the color schemes in this bedroom have changed from the early light tans and greens to yellowish whites and now white.



Facility Manager's Bedroom (June, 2009) Note the fabric on the north and east walls and the drop ceiling.










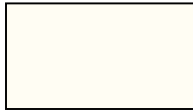




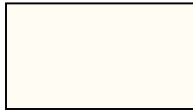

SUMMARY OF FINISHES

COLOR TABLE

Room Name and Number	Feature Painted	1960's Federal Standard Color Specified	1960's Actual Federal Standard Color Used	1973 Federal Standard Color Specified	1973 Actual Federal Standard Color Used	Most Recent Color Used (Federal Std. and/or Munsell Value)
Exterior	Doors	White 27875 	White 27875 	White 27875 	White 27875 	Grayish Yellow 10 YR 8/3 
Exterior	Trim	White 27875 	White 27875 	White 27875 	White 27875 	Dark Brown 20045 
Exterior	Siding (Cement asbestos up to ca. 1980's; then metal pre-finished siding was installed)	Not Specified	Green 34373 	None Specified	No evidence of 1973 paint on salvaged siding sample	1980's Metal Siding Yellowish Gray 13578 
Exterior	Roof Vents	Green 34373 	Not Accessible Not Sampled	Green 14260 	Not Accessible Not Sampled	Not Accessible Not Sampled





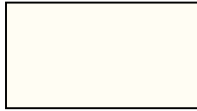

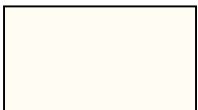








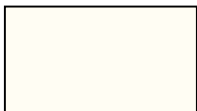
SUMMARY OF FINISHES

COLOR TABLE

Room Name and Number	Feature Painted	1960's Federal Standard Color Specified	1960's Actual Federal Standard Color Used	1973 Federal Standard Color Specified	1973 Actual Federal Standard Color Used	Most Recent Color Used (Federal Std. and/or Munsell Value)
Exterior	Ventilation Hoods in Front	Not Specified	White 27875 	Not Specified	White 27875 	Dark Brown 20045 
Exterior	Large Ventilation Hood in Rear (but now in storage)	Not Specified	Black 17038 	Not Specified	White 27875 	White 27875 
<u>INTERIOR SPACES</u>						
Security Office Room 101	Trim and Doors (1960's)	Light Green 24554 ¹	Light Green 24554 	Spring Green 24491 	Spring Green (Trim and Doors) 24491 	White 27780 
	Trim, Doors and Wainscot (1973)					
Security Office Room 101	Wainscot (1960's only)	Green 24373 	Not Accessible Not Sampled	Not Called Out	Not Accessible Not Sampled	Not Accessible Not Sampled






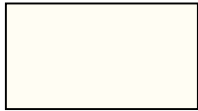











SUMMARY OF FINISHES

COLOR TABLE

Room Name and Number	Feature Painted	1960's Federal Standard Color Specified	1960's Actual Federal Standard Color Used	1973 Federal Standard Color Specified	1973 Actual Federal Standard Color Used	Most Recent Color Used (Federal Std. and/or Munsell Value)
Security Office Room 101	Walls	Light Green 24554 	Light Green 24554 	Green 24672 	Green 24672 	White 27780 
Security Office Room 101	Walls within alcove behind security screen	Same as above	Same as above	Same as above	Same as above	Dark Brown 10070 
Security Office Room 101	Ceiling	Off White 27886 	Off White 27886 	White 27875 	White 27875 	White 27875 
Dining & Rec. Rm. Room 108	Trim and Doors	Light Tan 13531 	Grayish Yellow 13740 	Sand 23617 	Light Green 24554 	White 27780 


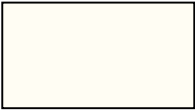










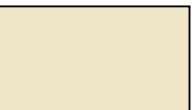
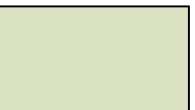
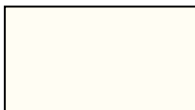



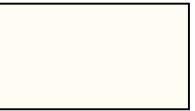
SUMMARY OF FINISHES

COLOR TABLE

Room Name and Number	Feature Painted	1960's Federal Standard Color Specified	1960's Actual Federal Standard Color Used	1973 Federal Standard Color Specified	1973 Actual Federal Standard Color Used	Most Recent Color Used (Federal Std. and/or Munsell Value)
Dining & Rec. Rm. Room 108	Walls	Light Tan 13531 ² 	Grayish Yellow 13740 	Buff 23690 	Light Green 24554 	White 27780 
Dining & Rec. Rm. Room 108	Ceiling	Off White 27886 	White 27875 	White 27875 	Off White 27886 	Drop Ceiling
Kitchen Room 114	Trim	Not Specified	Grayish Yellow 23617 	Not Specified	Light Green 24554 	White 27780 
Kitchen Room 114	Walls	Light Tan 13531 ² 	Grayish Yellow 23617 	Sand 23617 	Light Green 24554 	Light Blue 5 B 8/2 

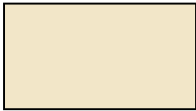
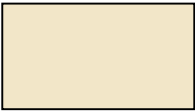
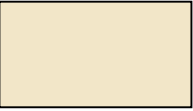
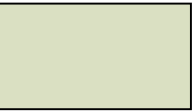
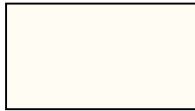




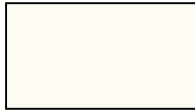
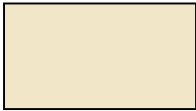
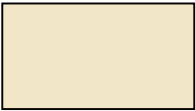
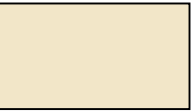






SUMMARY OF FINISHES

COLOR TABLE

Room Name and Number	Feature Painted	1960's Federal Standard Color Specified	1960's Actual Federal Standard Color Used	1973 Federal Standard Color Specified	1973 Actual Federal Standard Color Used	Most Recent Color Used (Federal Std. and/or Munsell Value)
Kitchen Room 114	Ceiling	Off White 27886 	Off White 27886 	Bone White 17886 	Off White 27886 	White 27780 
Bedroom Room 118	Trim and Doors	Light Tan 23717 ³ 	Light Tan 23717 	Light Tan 23717 	Light Green 24554 	White 27780 
Bedroom Room 118	Walls	Light Tan 23717 	Light Tan 23717 	Light Tan 23717 	Light Green 24554 	White 27780 
Bedroom Room 118	Ceiling	Off White 27886 	White 27875 	White 27875 	Off White 27886 	Dropped Ceiling

SUMMARY OF FINISHES

COLOR TABLE

Room Name and Number	Feature Painted	1960's Federal Standard Color Specified	1960's Actual Federal Standard Color Used	1973 Federal Standard Color Specified	1973 Actual Federal Standard Color Used	Most Recent Color Used (Federal Std. and/or Munsell Value)
Facility Manager's Bedroom Room 123	Trim and Doors	Light Tan 23717 	Light Tan 23717 	Light Tan 23717 	Light Green 24554 	White 27780 
Facility Manager's Bedroom Room 123	Walls (Most recently the east and north walls were covered with fabric)	Light Tan 23717 	Light Tan 23717 	Light Tan 23717 	Light Green 24554 	White 27780 (south wall only) 
Facility Manager's Bedroom Room 123	West Wall Only	Light Tan 23717 	Light Tan 23717 	Light Tan 23717 	Light Green 24554 	Medium Gray 26373 
Facility Manager's Bedroom Room 123	Ceiling	Off White 27886 	Off White 27886 	White 27875 	White 27875 	Dropped Ceiling

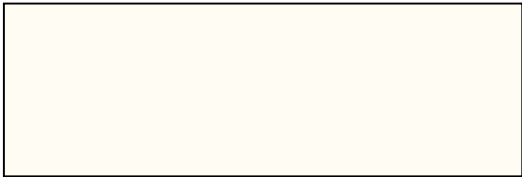
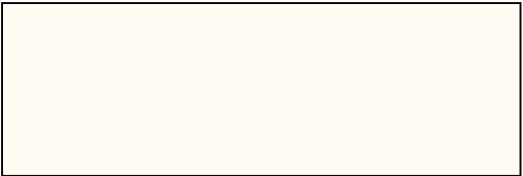
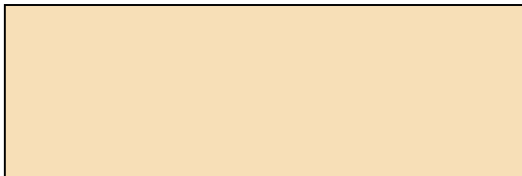







Notes:

1. The specification calls for color #14554, which appears to be a typo. There is no color in the Federal Standard system with that number. We assume that the color number was to be 24554, which is the same as called out for the walls.
2. The specification calls for color #23531 (light tan), which appears to be a typo. We assume that the color number was to be 13531, which is a light tan.
3. The specification calls for color #13717, which appears to be a typo. There is no color in the Federal Standard system with that number. We assume that the color number was to be 23717, which is the same as called out for the walls not only in the 1960's but also in 1973.

SUMMARY OF FINISHES

COLOR SAMPLES

VISUAL COLOR REFERENCE SAMPLES FOR 1973 AND LATE 1990'S PAINT SCHEMES

		
White: 27875		White: 27780
		
Off White: 27886		Grayish Yellow: 10 YR 8/3
		
Yellowish Gray: 13578		Light Green: 24554
		
Green: 24672		Spring Green: 24491
		
Light Blue: 5 B 8/2		Medium Gray: 26373
		
Dark Brown: 20045		Black: 17038

SUMMARY OF FINISHES

Recommendations

If additional research is planned for the future we recommend that it include analysis of the paints on the other interior spaces that are interpreted on the tour of the building, and also the spaces associated with the elevator and launch control room. They too will need to be maintained and preserved, so documented colors will be essential for accurate repainting and interpretation.

Appendix B: Code Analysis

Minuteman Missile National Historic Site

Historic Structures Report/Cultural Landscape Report/Environmental Assessment

9 April 2010



MEMORANDUM

From: PATRICK M. ROACH, AIA, LEED AP

To: STEVEN C. JONES, AIA



219½ N. MAIN STREET
ANN ARBOR, MI 48104
734 663 5888

RE: MINUTEMAN MISSILE NATIONAL HISTORICAL SITE
PHILIP, SOUTH DAKOTA
08119-00

Subject: Life-Safety and Accessibility Assessment

We have completed a conceptual-level assessment of the Delta-01 Launch Control and Support Facility with respect to barrier-free accessibility and life-safety issues. This analysis was based on Chapters 3 through 10 of the 2006 International Building Code (IBC) and the Americans with Disabilities Act Accessibility Guidelines (ADAAG). The project was not reviewed under the International Existing Building Code or under Chapter 34 of IBC.

The Delta-01 site consists of a one-story, ranch-style structure containing living quarters for the personnel at the site, a security office, and associated utility and support requirements. The structure is wood, platform framed, with a concrete foundation, qualifying as Type III B. The main floor is about 5,080 square feet. Constructed beneath this structure is an underground concrete capsule containing the missile launch control station. This underground capsule is accessed via an open elevator hoistway. Additionally, there are a number of communications structures on site and a detached heated vehicle storage facility. The vehicle storage facility and communications structures were not evaluated as part of this assessment.

The facility was de-commissioned by treaty and is now administered by the National Parks Service as a historical site. Public access to the site is currently limited to three groups of six individuals, escorted by ranger guides, at any time. While one group tours the above-ground launch support building, a second group tours the site, while the third group is escorted through the underground launch control facility. Permanent restroom facilities in the launch support building are not used. Temporary toilet facilities are available on site, and a comfort station near the site is contemplated by NPS to provide permanent barrier-free restroom facilities for the site.

Barrier-Free Issues

Because the launch support facility is a former military installation, it should not be surprising that the facility was not designed with accessible design in mind. Despite this, the building has few accessibility issues, owing mainly to the facts that it is a single story structure and that the existing restroom facilities within the structure are not available for public use. The two most significant barrier-free issues identified at the site are (1) the lack of barrier-free on-grade entrances and (2) the presence of narrow door openings in the building, which present obstacles to an accessible route through the building. Additionally, the elevator to the launch control capsule is not adequately sized to meet current barrier-free design requirements.

Although the building is a one-story structure, the finish floor is set a few inches above grade. Although there is a sloped grade up to the utility area doors adjacent to the elevator lobby entrance (Door 4) it appears that this grade still does not provide suitable barrier-free access. Accessible entry to the building could be easily provided by means of some subtle grade adjustments, either at Door 4 or Door 9, to create a level transition to the door while minimally

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Minuteman Missile National Historic Site

Historic Structures Report/Cultural Landscape Report/Environmental Assessment

9 April 2010
Page 2 of 3

affecting the appearance of the building. Other exterior entrance doors may be left as they are for historical interpretation purposes.

While there appears to be adequate width at the exterior entry doors and most interior doors along circulation paths, doors to the dormitory and security office spaces within the building, according to USAF as-built drawings, are 32 inches in width. In practice, this equates to about a 30 inch clear swing. Existing latrine doors are indicated to be 30 inches wide. The security office doors, which are the only available interior connection between the living quarters and the elevator lobby for the capsule, present an issue for the accessible route through the building. Approach clearances at doors vary throughout the building. Latch-side clearances are not always available, but maneuvering clearances generally are available.



A minimum clear swing of 32 inches is required for doors by ADAAG. In practical terms, a 36-inch door is required to provide this minimum opening. However, the fact that public access is limited to small, escorted groups provides the opportunity for the escorting ranger to provide assistance to visitors in wheelchairs, for whom the width requirements are intended. Provided that doors along the accessible route are not so narrow as to preclude wheelchair passage altogether, a reasonable accommodation could be made for these visitors by providing assistance through the door opening. If self-guided tours are contemplated for this facility, however, it is recommended that narrow doors along the accessible route be replaced with 36-inch doors of the same design and materials, to accommodate wheelchair users.

The existing elevator to the launch control capsule is very small, and its use as a barrier-free means of access is consequently very limited. The cab measures approximately three feet by five feet. Consequently, an individual in a wheelchair will take up most of the space within the elevator.

The location of the elevator within the structure, and its servicing of an underground structure, precludes the possibility of alteration of the hoistway. Therefore it is neither practical nor technically feasible to provide a larger elevator car. It should be possible for a wheelchair user to maneuver into the car, and an accompanying ranger can operate the elevator controls, so it is possible to accommodate wheelchair users with this elevator. However, it is unlikely that a wheelchair user can share this car with more than two or three standing individuals, due to the space limits in the car, and this operational issue will need to be addressed by NPS.

Life-Safety Issues

Exit access, capacity and remoteness in the above-ground facility meet or exceed the requirements of IBC, with three available exits remotely located. The facility is fully-sprinklered and equipped with smoke detectors. Height and area requirements fall well within parameters established by IBC for the construction type (IIIB) of the building.

The real challenge to life-safety compliance at this facility is the launch control capsule. A confined underground space, this chamber is accessible only by means of the elevator, which is served by an open hoistway. An emergency escape ladder is present adjacent to the hoistway, which leads up to the ground-level elevator lobby. Typically, ladders such as these are not considered a valid means of egress. Open elevator hoistways connecting different floors of a building are not permitted under the current IBC. In this case, the elevator lobby is fully enclosed and provided with a direct means of egress (via Door 4), which mitigates some of the life-safety risk from the interconnection created by the open hoistway.

Under Chapter 4 of IBC 2006, it appears that the launch control capsule qualifies as both an underground building (Section 405) and as a Special Amusement Building (Section 411). Under Section 405, the Capsule appears to comply with exceptions due to its size, occupant capacity and distance below grade, and therefore the special rules of Section 405 do not apply. As a Special Amusement Building, the capsule is required to have automatic fire detection, sprinklers, marked paths to exits, an emergency voice communications system, and Class A interior finishes. Fire detection systems and sprinklers have been installed in the capsule. However, the emergency voice communication system is not, so far as we are aware, installed. As the facility is relatively small, the issue with egress deals not so much with the path to the exit not being clear, so much as the means of egress itself being not readily available. Interior finishes generally consist of painted metals and concrete. It is unknown whether the historic acoustical fabric ceiling panels installed in the control center are treated to perform as a Class A interior finish material.

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Because the launch control capsule is a former military installation, and was not originally contemplated as a facility to be occupied by the general public, it is not surprising that this facility does not comply with the life-safety requirements. To attempt to provide a means of egress to this component of the facility which complies with current IBC requirements will be an enormously expensive undertaking requiring significant excavation and alteration of the historic launch control capsule. Moreover this change will necessarily require a significant intervention either in the support building above or on the adjacent site, which would irreversibly disrupt the historic fabric of the site. This structure is a unique case of a special-use historic building that IBC simply does not contemplate.

Given the limited public access into both the support building and the launch control capsule, and the unusual and historic nature of this structure, we believe that the NPS can occupy this facility with reasonable safety, provided that additional precautionary measures are taken to minimize safety risks to persons visiting the launch capsule. Therefore, we suggest that NPS consider obtaining a variance to permit the use of the structure in its current configuration, while employing additional safety measures to help protect visitors, such as:

1. Continue to limit public access to groups of six at a time, with an escort.
2. Train all rangers on site in emergency procedures, to assist visitors in exiting the capsule in the event of an emergency.
3. Provide emergency voice communications equipment as required by Section 411, and a two-way communications system to permit contact between the ranger escort in the capsule and NPS staff above ground.
4. Retrofit the existing elevator with standby power, connected to the facility's generator, to permit operation of the elevator under emergency conditions.
5. Develop and implement procedures to assist visitors, should it be necessary to evacuate the capsule by means of the emergency escape ladder.
6. Identify emergency exit locations within the capsule, in accordance with Section 411.

END OF MEMORANDUM

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Section and Info		IBC 2006		Comments	
		Section	Table		
GENERAL NOTES REGARDING THIS ANALYSIS					
This analysis covers deals with life-safety issues for above-ground and below-ground occupiable facilities at the "Delta-01" site only.					
Chapter 3: Use and Occupancy Classification					
<u>Use Group</u>		302			
A-3	Museum/Exhibit	302.3.1		- Assume any former utility or B-use space are part of the exhibit area. Any ancillary utility or service areas will be considered accessory or incidental to the primary use.	
<u>Incidental Use Areas</u>		302.1.1	302.1.1		
Furnace Rooms	1 Hour; or AFSS			Over 400,000 Btu	
Boiler Rooms	1 Hour; or AFSS			Over 15 psi and 10 HP	
Storage	1 Hour; or AFSS			Over 100 SF	
Waste and Linen Collection	1 Hour; or AFSS			Over 100 SF	
<u>Occupancy Classifications</u>		303.1			
Museum Exhibits	A-3			Uses will be non-separated. Capsule may be considered a B use per Section 411 for life-safety purposes.	
Special Detailed Requirements Based on Use and Occupancy					
Refer to Chapter 4 of IBC 2003 for complete requirements in these areas.					
<u>Underground Buildings</u>		405			
General: Underground capsule is covered under exception 5 of 405.1, and therefore compliance with Section is not required.	Floor area of capsule approx. 1080 SF	405.1		Includes Launch Control Capsule Exception applies when lowest story is the only one below grade, has an occupant load of less than 10, and a floor area of less than 1500 SF. Assumption that four groups of the capsule will be so limited.	
<u>Motor Vehicle-Related Occupancies</u>		406			
Classification	Garage is Type U	406.1.1		Garage is an accessory use to the building.	
Separation	1/2-inch GWB on garage side.	406.1.4			
<u>Special Amusement Buildings</u>		411			
General	Special Amusement Buildings of less than 50 occupants shall be considered a B use.	410.3.7		Applies to Capsule - see definition Capsule can be categorized as B use for life-safety purposes per this Section.	
Special Amusement Building, definition	"A special amusement building is any temporary or permanent building or portion thereof that is occupied for amusement, entertainment or educational purposes and that contains a device or system that conveys passengers or provides a walkway along, around or over a course in any direction so arranged that the means of egress path is not readily apparent due to visual or audio distractions or is intentionally confounded or is not readily available because of the nature of the attraction or mode of conveyance through the building or structure."	411.2		Capsule appears to meet the definition of a special amusement building given its educational purpose, the presence of the elevator as the sole means of conveyance to and from the capsule, and the nature of the alternative means of egress (ladder to escape hatch) which is a result of the nature of the structure.	
Automatic Fire Detection	Required, compliant with 907.	411.3		Required in capsule and capsule access areas only.	
Automatic Sprinkler System	Required throughout. 903.1.1.	411.4		Appears only to be required within the capsule and its access areas but recommend that entire facility be sprinklered.	
Emergency Voice/Alarm Communications System	Compliant with 907.2.11 and 907.2.12.2, also serving as a public address system and audible throughout the entire special amusement building.	411.5		This system should also be installed in the elevator and access areas. Recommend that it be installed throughout the building.	
Exit Marking	Exits must be marked, and paths to exits must be marked. If elements of the facility are designed to obscure the exits, then lighted exit signs shall be installed 8 inches above floor level which are activated upon activation of the fire detection and/or sprinkler system.	411.6		Recommend activation of lighted exit sign (if required for this facility) through the emergency communications system as well. However these special exit signs may not be required if exit access can be made clear, or is clear.	
Interior Finish	Class A, compliant with 803.1	411.7		Reductions for sprinklers not allowed within the special amusement building. Fabric ceiling panels are potentially an issue and are generally not allowed by current codes.	

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	Section	Table		
General Building Heights and Areas				
<u>Basic Height and Area Limitations</u>				
Basic Height Limit, Stories	1 story	503	Use Group A-3, Construction Type VB	
Basic Height Limit, Feet	40 feet	503		
Basic Area Limit, Square Feet	6000 SF per floor	503		
<u>Height Increases</u>				
Automatic Fire Suppression System	20 feet additional height 1 additional story	504 504.2	where building is equipped throughout with an approved automatic sprinkler system in accordance w/ Section 903.3.1.1	
Roof structures	20 feet	504.3		
Limitations on Height Increases	Can be used in addition to area increases in Section 506.2 and 506.3	504.2		
<u>Area Increases</u>				
Allowable Area per Floor	18000 SF	506	Only includes increase for sprinklers. Not calculated, increase not required.	
Frontage	N/A	506.1		
Automatic Fire Suppression System	300%	506.2		
Limitations on Area Increases	54000 SF Max	506.3	3 times allowable area per floor	
		506.4		
<u>Allowable Height and Area</u>				
Maximum allowable height after increases, stories	2 stories		Actual 1 story above grade Actual 13 feet average roof height Actual 5030 SF Actual 6110 SF Height and area increases are not required for the building to meet height and area requirements for Chapter 3. Sprinkler systems will be required for other purposes and the building's conformance within allowable limits is a demonstration of its overall safety.	
Maximum allowable height after increases, feet	60 feet			
Maximum allowable area after increases, square feet	18000 SF			
Maximum total allowable area after increases, square feet	54000 SF Max			
Construction Type				
<u>Construction Classification</u>				
Construction Type	VB	602 602.2	601	
<u>Required Fire Resistance Ratings for Construction Type</u>				
Structural Frame	0 hours		Separation Distances: East: 12 feet North: >30 feet South: >30 feet South: >30 feet	
Bearing Walls, Exterior	0 hours			
Bearing Walls, Interior	0 hours			
Non-Bearing Walls, Exterior	Varies with separation: 0 to less than 5 feet: 1 hour 5 to less than 10 feet: 1 hour 10 to less than 30 feet: 0 hour 30 feet or greater: 0 hours			
Non-Bearing Walls, Interior	0 hours			
Floors	0 hours			
Roofs	0 hours			
Fire Resistance Rated Construction				
<u>General</u>				
Refer to requirements for separations and fire resistance ratings for special occupancy requirements, incidental use separations, and construction type listed above.		701		
<u>Exterior Walls</u>				
Allowable area of Openings: Protected	0 to 3 feet: Not Permitted	704	Per 704.8.1 Limits for protected openings may be applied to non-protected openings for buildings equipped with AFSS. See above for separation distances. Verify window areas for elevations with sep. distances of 20 feet or less.	
	Greater than 3 to 5 feet: 15% Greater than 5 to 10 feet: 25% Greater than 10 to 15 feet: 45% Greater than 15 to 20 feet: 75% Greater than 20 feet: No Limit			
Allowable area of Openings: Not Protected	see protected openings	704.8.1		
<u>Fire Walls</u>				
Rating Requirement	2 hours	705	Exception from 3 hours for Type V.	
		705.4		
<u>Fire Barriers</u>				
Rating Requirement for Fire Areas	2 hours between fire areas	706	706.3.9	
		706.3.9		
<u>Shaft Enclosures</u>				
Connecting up to three stories	1 hour	707		
Connecting four or more stories	2 hours	707.4 707.4		
		707.4		
<u>Elevator Lobbies</u>				
Rated Elevator Lobbies	Not Required	707.14 707.14.1	per exception 4	
		707.14.1		
<u>Fire Partitions</u>				
Required Rating	1 hour unless superseded by Section 1017.	708 708.3		
<u>Smoke Barriers</u>				
Required Rating	1 hour	709 709.3		

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<u>Smoke Partitions</u>		710		
Required Rating	0 Hour	710.3		
<u>Horizontal Assemblies</u>	2 hour where separating uses, and not less than rating as required by construction type	711	302.3.2	
<u>Penetrations</u>		712		Refer to specific Code requirements
<u>Fire-Resistant Joint Systems</u>		713		Refer to specific Code requirements
<u>Fire Resistance Rating of Structural Members</u>		714		Refer to specific Code requirements
<u>Opening Protectives</u>		715		Refer to specific Code requirements for labeling, glazing, and other requirements for protection of openings.
Required Ratings: Fire Walls: 3 Hour Fire Barriers: 2 Hours Fire Barriers: 1 Hour Shaft and Exit Enclosures Fire Barriers: Other 1 Hour Fire Partitions: Corridor Fire Partitions: Other 1 Hour Fire Partitions: Other 1/2 Hour Smoke Barriers: 1 Hour	3 Hours 1-1/2 Hours 1 Hour 3/4 Hour 1/3 Hour 3/4 Hour 1/3 Hour 1/3 Hour		715.4	(2) 90-min. doors are acceptable See Section 715.4.3 for testing See Section 715.4.3 for testing
<u>Ducts and Air Transfer Openings</u>		716		Refer to specific Code requirements
<u>Concealed Spaces</u>		717		Refer to specific Code requirements
<u>Fire Resistance Requirements for Plaster</u>		718		Refer to specific Code requirements
<u>Thermal and Sound Insulating Materials</u>		719		Refer to specific Code requirements
<u>Prescriptive Fire Resistance</u>		720		Refer to specific Code requirements
<u>Calculated Fire Resistance</u>		721		Refer to specific Code requirements
<u>Interior Finishes</u>			803.5	
<u>Finish Classifications by Occupancy - Sprinklered</u>				Classifications per Group A-3 Class A finishes are required for capsule. Verify ceiling textures.
Vertical Exits and Passageways Exit Access corridors and other exitways Rooms and Enclosed spaces	B B C			
<u>Fire Protection Systems</u>				
<u>Automatic Sprinkler Systems</u>		903		
NFPA13 Sprinkler System	Required where the fire area is on a floor other than the level of exit discharge.	903.2.1.3		Note: Sprinkler systems have already been installed. Modifications, if required, shall comply with requirements.
<u>Standpipe Systems</u>	NOT REQUIRED	905		- Existing Building
<u>Portable Fire Extinguishers</u>		906		
Locate per requirements of International Fire Code		906.1		
<u>Fire Alarm and Detection Systems</u>	Generally not required, see notes	907		Automatic fire detection, alarm and voice systems are required for Capsule by Section 411. Manual pull boxes are not required.
<u>Emergency Alarm Systems</u>		908		Not required for A Use.
<u>Smoke Control Systems</u>		909		As required by other Sections only
<u>Smoke and Heat Vents</u>		910		As required by other Sections only
<u>Fire Command Center</u>		911		As required by other Sections only
<u>Fire Department Connections</u>		912		
Locations and Identification	As required by this Section	912.2		

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		Section	Table	
Means of Egress				
<u>Occupant Load</u>		1004	1004.1	
Design Area Requirements:				
Business/Office	100 SF Gross/Occupant			
Storage	300 SF/Occupant			
Assembly (Unconcentrated)	15 SF/Occupant			
<u>Special Restrictions on Occupant Load</u>	Building use is limited to tours of six persons plus one ranger in each level of the building at any time.	N/A		Capsule - limit of 10 or less per 405. Garage Exhibit/Gallery space. Exhibit space is shared between occupants and exhibits. It is unlikely that this site will experience such concentrated loads. This use restriction is not specifically covered by Code but so long as this restriction is enforced it seems within reason that an enforcement body might permit a variance from occupant load requirements by floor area, given the special nature of this facility.
<u>Design Occupant Load</u>		1004.1		
Launch Control Capsule (underground):				
Exhibit - Capsule	7			
First Floor:				
Exhibit - Launch Control Support Building	7			
<u>Gross Width - Solidified</u>		1005		
Stairs	44" Min/0.2 inches per occupant served		1005.1	AFSS throughout
Doors	32"/0.15 inches per occupant served		1005.1	AFSS throughout
Corridors and Other Components	44" Min		1005.1	AFSS throughout
<u>Accessible Means of Egress</u>		1007		
Number Required	Not Required	1007.1		Exception - Not required in alterations to existing buildings
<u>Special Exit Access Requirements</u>	Exit access from Launch Capsule is only provided by means of elevator. An escape ladder is available but opens into the elevator machine room. Recommend that elevator be equipped with standby power and emergency operation systems to permit its use during an emergency.			The Code does not technically permit this insofar as can be determined. However, given that the launch capsule is considered a special amusement building and will only be occupied by small groups with a trained guide, it seems within reason that an enforcement body might permit a variance for the type of exit provided, given the special nature of this facility.
<u>Exit Access</u>		1014		
Maximum Common Path of Travel	75 feet		1014.3	
<u>Exit and Exit Access Occupancy</u>		1015		
Number of Exits per Space	1-49 Occupants: 1. 50-500 Occupants: 2 501-1000: 3 1000+ 4	1014.1	1014.1 1018.1	
Arrangement	Minimum separation is one-half the diagonal measurement of the room or building footprint	1014.2		May be reduced to one-third with sprinkler system.
Boiler Rooms	2 exits required if room exceeds 500 SF and any piece of equipment exceeds 400,000 Btu	1014.3		
Chiller Rooms	3 exits required if room exceeds 1000 SF, with all areas within 150 feet of exit.	1014.4		
<u>Exit Access Travel Distance</u>		1016		
Required maximum distance to exit access	250 feet		1016.1	AFSS throughout
<u>Corridors</u>		1017		
Required rating	None		1017.1	AFSS Throughout
Minimum width subject to Occupant Load:	44 inches		1017.2	24" permissible for mech areas, 36" permissible if serves less than 50
Dead Ends	20 Feet		1017.3	
<u>Number of Exits</u>		1019		
Each Floor	2 minimum		1019.1	
Buildings with One Exit	1 story above grade, one below grade. Max 49 occupants and 75 feet travel distance.		1019.2	Multiple exits are required for the first floor due to travel distances. Travel distance is 60 feet within occupiable areas of launch capsule, to elevator.
<u>Vertical Exit Enclosures</u>		1020		
Up to 3 stories	1 hour		1020.1	Can elevator enclosure be upgraded to minimum 1 hour? Or enclosure and vestibule?
4 or more stories	2 hour		1020.1	

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Appendix C: Treatments Considered but Dismissed

Appendix C: Treatments Considered and Dismissed

Development of Treatment Alternatives

In October 2009, two action treatment alternatives were submitted to the National Park Service for review. A copy of the two action treatment alternatives, as presented in the October 2009 draft, is included in this Appendix. Upon review of the two alternatives, the need to further consider the programming needs of the park was apparent. To address this concern, a project workshop was held in March 2010. A copy of the agenda and notes from the workshop are included in this Appendix. Prior to the workshop, additional site design alternatives addressing possible solutions for visitor parking, comfort facilities, and large vehicle turn-around, were prepared. During the workshop, the attendees developed the site design scenarios presented in Chapter 6 as the preferred alternatives.

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October 2009 Treatment Alternatives

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Goals Common to All Action Treatment Alternatives

- Preserve the integrity of the cultural resources at Delta-01 and Delta-09.
- Improve the visitor experience at the park.
- Provide expanded facilities for visitors.
- Enhance interpretive opportunities related to the historic resources.

Treatments Common to All Action Treatment Alternatives

Delta-01 Spatial Organization Recommendation, Common to All Action Alternatives:

- *Develop a landscape management plan that addresses site needs.

Delta-01 Circulation Recommendations, Common to All Action Alternatives:

- *Provide a universally accessible route into the site and to the main building from the universally accessible parking area.
- *Consider providing maintenance on the portion of Jackson County Road CS23A that provides access to the site from the highway.

Delta-01 Topography and Views Recommendations, Common to All Action Alternatives:

- *Install splash blocks at downspouts to move water away from the south elevation of the main building. See building recommendations.
- *Work with adjacent landowners to develop agreements to protect significant views. Consider purchasing scenic easements to achieve this goal.

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1 *Delta-01 Small Scale Features Recommendations, Common to All Action Alternatives:*

2 **Table 6-1: Delta-01 Small Scale Landscape Features,**

3 **Common to All Action Alternatives**

Small Scale Features	Common to All Action Alternatives
Hardened high frequency transmit antenna (HS 104, IDLCS 100480)	*Preserve
Hardened high frequency receive antenna (HS 105, IDLCS 100481)	*Preserve
Hardened ultra-high frequency antenna (HS 106, IDLCS 100483)	*Preserve
Survivable low frequency communication system antenna (HS 107, IDLCS 100484)	*Preserve
Cathodic protection rectifier (HS 110, IDLCS 100485)	*Preserve
Two sewage lagoons (HS 108, IDLCS 100486)	*Preserve
Helicopter pad (HS 109, IDLCS 100485)	*Preserve
ICBM super-high frequency satellite terminal antenna	*Preserve if Contributing (discuss with NPS staff) consider removing if non-contributing
Television satellite dish (HS 121, IDLCS 398298)	*Preserve
HICS	*Preserve
Security fencing (HS 113, IDLCS 287263)	*Preserve
Sewage lagoon fencing / Livestock fencing	*Preserve
Cattle-guard	*Preserve
Electric fence	*Remove. Add livestock fencing that matches the fences around the sewage lagoons. If necessary, provide a gate at the rancher's easement.
Historic signage (HS 117, IDLCS 354856)	*Preserve
Protective bollards (HS 116, IDLCS 354857)	*Preserve
Access road and parking area (HS 119, IDLCS 390289)	*Preserve
Well and water tanks (HS 118, IDLCS 354851)	*Preserve
Flagpole (HS 120, IDLCS 398270)	*Preserve
Basketball goal (HS 112, IDLCS 287625)	*Preserve
Volleyball court (HS 115, IDLCS 287266)	*Preserve

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Horseshoe court (HS 114, IDLCS 287261)	<i>*Preserve</i>
Code burner (HS 111, IDLCS 287264)	<i>*Preserve</i>
Cell tower	<i>*Work with SHPO to encourage property owner to remove the tower.</i>
Ranch	<i>*Work with property owner to preserve the character of the ranch and views of the ranch from Delta-01.</i>

1

2 *Delta-01 Buildings Recommendations, Common to All Action Alternatives:*

3 ***Launch Control Support Building***

4 The Launch Control Facility is in very good condition due to the cyclical
5 maintenance provided by the Air Force personnel from Ellsworth Air Force Base and the
6 National Park Service. With the exception of the cathodic protection system, the
7 following treatment recommendations are not critical to the overall health of the
8 buildings and can be incorporated into the on-going cyclical maintenance of the facilities
9 as funding is available.

10 ***Exterior:***

- 11 • *At the time the asphalt apron adjacent to the south foundation wall needs
12 to be replaced, the grade should be adjusted to slope away from the
13 building.
- 14 • *Miscellaneous metal brackets from the old security system, abandoned
15 wiring, and abandoned conduit should be removed from the metal siding
16 and the anchorage holes repaired with an epoxy made for steel and painted
17 to match the siding color.
- 18 • *Repair the security light at door #13, south elevation.

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- 1 • *Remove the damaged and non-functioning speaker at door #13 and repair
2 anchorage holes, south elevation.
- 3 • *Replace extant louver back into the opening in the north wall of
4 Equipment Room 106. Block of the back of the louver if air is not required
5 to be drawn into the room.
- 6 • *All cracked and damaged vinyl glazing stops should be replaced on the
7 exterior face of all windows.
- 8 • *All damaged or missing metal door holders should be replaced with new
9 to match the original one still extant.

Interior

Generator Room 105

- 12 • *Repair water damaged drywall at the roof ventilator duct.

Women's Latrine 116A

- 14 • *The hole in the floor of the vinyl shower stall should be repaired with
15 epoxy filler tinted to match the color of the stall.

16

Mechanical, Electrical, and Plumbing Systems

- 18 • *No treatment recommendations required. If other systems such as
19 geothermal for heating and cooling or a variable refrigerant flow heat
20 pump system are to be considered, it would entail major remodeling of the
21 existing building.

22

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Launch Control Center

- *No treatment recommendations required.

Vehicle Heated Storage Building

- *Exterior: No treatment recommendations required.
- *Interior: No treatment recommendations required.

Cathodic Protection System

- *A new cathodic protection system should be installed. The current design and location of the system is adequate, and the location and number of anodes should be retained.

Delta-09 Spatial Organization Recommendation, Common to All Action Alternatives:

- *Develop a landscape management plan that addresses site needs.

Delta-09 Land Use Recommendations, Common to All Action Alternatives:

- *Remove the portable toilet from within the historic core.

Delta-09 Circulation Recommendations, Common to All Action Alternatives:

- *Allow visitors with mobility impairments to park on the access road near the security gate (universally accessible parking).

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- 1 • *Provide a universally accessible route into the site and to the viewing
2 enclosure from the universally accessible parking area. *Find out what
3 type of gravel was used during the POS. Add a layer of crushed stone over
4 the existing surface. Match the color of the stone to that present during the
5 period of significance. Use crushed stone and compact it to achieve a
6 universally accessible surface.

7

8 *Delta-09 Topography and Views Recommendations, Common to All Action Alternatives:*

- 9 • *Work with adjacent landowners to develop agreements to protect
10 significant views. Consider purchasing scenic easements to achieve this
11 goal.
12 • *Erosion at the south side of the historic core has caused deterioration and
13 the need for erosion control measures to be applied.

14

15 *Delta-09 Vegetation Recommendations, Common to All Action Alternatives:*

- 16 • *Determine the type of gravel that was present during the period of
17 significance, and apply a minimum six inch layer of gravel in areas that
18 are not identified as part of the universal access route.
19 • *If necessary, apply Garlon or similar herbicide as needed to control
20 weeds on the site.

21

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1 *Delta-09 Small Scale Features Recommendations, Common to All Action Alternatives:*

2 **Table 6-2: Delta-09 Small Scale Landscape Features,**

3 **Common to All Action Alternatives**

Small Scale Features	Common to All Action Alternatives
Glass viewing enclosure	*Maintain
Improved Minuteman Physical Security System (IMPSS) antenna (HS 903, IDLCS 100489)	*Preserve
Hardened UHF antenna (HS 904, IDLCS 100491)	*Preserve
Cathodic protection rectifier (HS 912, IDLCS 390310)	*Preserve
Two azimuth markers (HS 905, IDLCS 100492)	*Preserve
Two HICS marker posts (HS 907, IDLCS 345796)	*Preserve
Security fence (HS 906, IDLCS 295903)	*Preserve
Light posts (HS 908, IDLCS 354853)	*Preserve
Bollard (HS 909, IDLCS 354859)	*Preserve
Helipad & Markers (HS 910, IDLCS 354855)	*Preserve
Access Road and Maneuvering Area (HS 911, IDLCS 390310)	*Preserve
Antenna piers (HS 913, IDLCS 400831)	*Preserve
Transporter erector pylons (HS 914, IDLCS 412538)	*Preserve
Launch facility warning signs	*Preserve
Culvert	*Maintain
Drainage ditch	*Maintain

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1 *Delta-09 Buildings & Structures Recommendations, Common to All Action Alternatives:*

2 ***Delta-09 Launch Facility***

3 The Launch Facility is in very good condition due to the cyclical maintenance
4 provided by the Air Force personnel from Ellsworth Air Force Base and the National
5 Park Service. With the exception of the cathodic protection system, the following
6 treatment recommendations are not critical to the overall health of the structures and can
7 be incorporated into the on-going cyclical maintenance of the facilities as funding is
8 available.

- 9
 - *Replace caulking at the perimeter edge of the steel personnel access
10 hatch.

11

12 ***Structural Recommendations – General Concrete***

- 13
 - * The silo apron slabs show surface deterioration and a penetrating,
14 breathable sealant/consolidant is recommended below to mitigate this
15 aging. Other surfaces such as the vault topping slab and silo retaining
16 walls do not show the same surface deterioration; however, application of
17 such a sealant should be considered for those elements.

18 ***Structural Recommendations -- Equipment Vault***

- 19
 - *Topping Slab: Previous attempts to patch the cracking in the topping
20 slab appear to have been unsuccessful as the patch has worn off or is gone.
21 These cracks should be sealed with an epoxy injection if possible. There

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1 are limits to minimum crack width that injection systems can fill. Some
2 chemical companies (SIKA) promote gravity feed epoxy products which
3 may be applicable for fine cracks. If the cracks are too fine for either
4 injection or gravity feed then the cracks should be routed out and filled
5 with a modified epoxy gel.

- 6 • *Walls: Fine cracks were noted in the exterior walls exposed above grade.
7 These should be either epoxy injected or filled as with the slab above.

8 ***Structural Recommendations—Silo***

- 9 • *Apron Slabs: These slabs show signs of spalling and cracking. Cracks
10 should be sealed by epoxy injection. Loose spall should be removed and
11 patched with an epoxy modified cementitious patching material. It is
12 important to undercut the edges of patching areas as patching materials
13 should not be feathered at the edges. A good penetrating
14 sealant/consolidant (such as Prosoco H40) should be applied to the
15 exposed surface to minimize weathering deterioration. The sealant should
16 not entrap moisture within the concrete.
- 17 • *Minor Retaining Wall Cracks: Cracking should be sealed by injection or
18 routing and patching as discussed for the vault slab.
19

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1 ***Cathodic Protection System***

- 2 • *A new cathodic protection system should be installed. The current design
- 3 and location of the system is adequate, and the location and number of
- 4 anodes should be retained.

5

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Treatment Alternative 1: Preservation

This treatment alternative emphasizes preservation of the historic resources within the park. Figure 6-1: Delta-01 Treatment Alternative 1, and Figure 6-2: Delta-09 Treatment Alternative 1 illustrate the site recommendations described.

Delta-01, Treatment Alternative 1

Delta-01 Spatial Organization Recommendation, Treatment Alternative 1:

- *Develop a landscape management plan that addresses site needs.

Delta-01 Land Use Recommendations, Treatment Alternative 1:

- Do not allow visitors to utilize the basketball hoop, volleyball and horseshoe courts while waiting for tours. Treat these resources in the same way as the other resources and interpret their use.
- Remove the portable toilet.
- Retain the parking lot and interpretive wayside.

Delta-01 Circulation Recommendations, Treatment Alternative 1:

- Widen Jackson County Road CS23A near the point where it intersects with the site access road, and provide parallel parking along the County Road.
- Purchase an easement from the private property owner to utilize the ranch road as a turn-around for large vehicles.

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- 1 • Preserve the existing parking area and provide two universally accessible
2 parking spaces in this lot.
- 3 • *Provide a universally accessible route into the site and to the main
4 building from the universally accessible parking area.
- 5 • *Consider providing maintenance on the portion of Jackson County Road
6 CS23A that provides access to the site from the highway.

7

8 *Delta-01 Topography and Views Recommendations, Treatment Alternative 1:*

- 9 • *Install splash blocks at downspouts to move water away from the south
10 elevation of the main building. See building recommendations.
- 11 • *Work with adjacent landowners to develop agreements to protect
12 significant views. Consider purchasing scenic easements to achieve this
13 goal.
- 14 ○ Based on *Figure 4-17: Delta-01 Views and Ownership*, focus on
15 protecting views in areas where privately owned land is located
16 within the close views as indicated on the diagram. These are
17 mainly located in Sections 9, 15, and 16.

18

19 *Delta-01 Vegetation Recommendations, Treatment Alternative 1:*

- 20 • *Apply an approved herbicide as needed to control weeds on the site and
21 supplement the gravel in areas that are thin, adding enough so the gravel
22 surface is at least six inches thick.

23

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1 *Delta-01 Small Scale Features Recommendations, Treatment Alternative 1:*

2 **Table 6-3: Delta-01 Small Scale Landscape Features,**
3 **Treatment Alternative 1**

Small Scale Features	Treatment Alternative 1
Hardened high frequency transmit antenna (HS 104, IDLCS 100480)	*Preserve
Hardened high frequency receive antenna (HS 105, IDLCS 100481)	*Preserve
Hardened ultra-high frequency antenna (HS 106, IDLCS 100483)	*Preserve
Survivable low frequency communication system antenna (HS 107, IDLCS 100484)	*Preserve
Cathodic protection rectifier (HS 110, IDLCS 100485)	*Preserve
Two sewage lagoons (HS 108, IDLCS 100486)	*Preserve
Helicopter pad (HS 109, IDLCS 100485)	*Preserve
ICBM super-high frequency satellite terminal antenna	*Preserve if Contributing (discuss with NPS staff) consider removing if non-contributing
Television satellite dish (HS 121, IDLCS 398298)	*Preserve
HICS	*Preserve
Security fencing (HS 113, IDLCS 287263)	*Preserve
Sewage lagoon fencing / Livestock fencing	*Preserve
Cattle-guard	*Preserve
Electric fence	*Remove. Add livestock fencing that matches the fences around the sewage lagoons. If necessary, provide a gate at the rancher's easement.
Historic signage (HS 117, IDLCS 354856)	*Preserve
Protective bollards (HS 116, IDLCS 354857)	*Preserve
Access road and parking area (HS 119, IDLCS 390289)	*Preserve
Well and water tanks (HS 118, IDLCS 354851)	*Preserve
Flagpole (HS 120, IDLCS 398270)	*Preserve
Basketball goal (HS 112, IDLCS 287625)	*Preserve
Volleyball court (HS 115, IDLCS 287266)	*Preserve

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Horseshoe court (HS 114, IDLCS 287261)	<i>*Preserve</i>
Code burner (HS 111, IDLCS 287264)	<i>*Preserve</i>
Interpretive wayside	<i>Maintain</i>
Portable toilet	<i>*Remove.</i>
Concrete pad, transformer, and generator	<i>Maintain</i>
Cell tower	<i>*Work with SHPO to encourage property owner to remove the tower.</i>
Ranch	<i>*Work with property owner to preserve the character of the ranch and views of the ranch from Delta-01.</i>

1

2

3 *Delta-01 Buildings and Structures Recommendations, Treatment Alternative 1:*

4 ***Launch Control Support Building***

5 The Launch Control Facility is in very good condition due to the cyclical
6 maintenance provided by the Air Force personnel from Ellsworth Air Force Base and the
7 National Park Service. With the exception of the cathodic protection system, the
8 following treatment recommendations are not critical to the overall health of the
9 buildings and can be incorporated into the on-going cyclical maintenance of the facilities
10 as funding is available.

11

12 ***Exterior***

- 13 • **At the time the asphalt apron adjacent to the south foundation wall needs*
14 *to be replaced, the grade should be adjusted to slope away from the*
15 *building.*
- 16 • **Miscellaneous metal brackets from the old security system, abandoned*
17 *wiring, and abandoned conduit should be removed from the metal siding*

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- 1 and the anchorage holes repaired with an epoxy made for steel and painted
2 to match the siding color.
- 3 • *Repair the security light at door #13, south elevation.
 - 4 • *Remove the damaged and non-functioning speaker at door #13 and repair
 - 5 anchorage holes, south elevation.
 - 6 • *Replace extant louver back into the opening in the north wall of
 - 7 Equipment Room 106. Block of the back of the louver if air is not required
 - 8 to be drawn into the room.
 - 9 • *All cracked and damaged vinyl glazing stops should be replaced on the
 - 10 exterior face of all windows.
 - 11 • *All damaged or missing metal door holders should be replaced with new
 - 12 to match the original one still extant.

13 ***Interior***

14 *Generator Room 105*

- 15 • *Repair water damaged drywall at the roof ventilator duct.

16 *Women's Latrine 116A*

- 17 • *The hole in the floor of the vinyl shower stall should be repaired with
- 18 epoxy filler tinted to match the color of the stall.

19 ***Mechanical, Electrical, and Plumbing Systems***

- 20 • *No treatment recommendations required. If other systems such as
- 21 geothermal for heating and cooling or a variable refrigerant flow heat

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1 pump system are to be considered, it would entail major remodeling of the
2 existing building.

3 ***Launch Control Center***

- 4 • *No treatment recommendations required.

5 ***Vehicle Heated Storage Building***

- 6 • *Exterior: No treatment recommendations required.
7 • *Interior: No treatment recommendations required.

8 ***Cathodic Protection System***

- 9 • *A new cathodic protection system should be installed. The current design
10 and location of the system is adequate, and the location and number of
11 anodes should be retained.

12

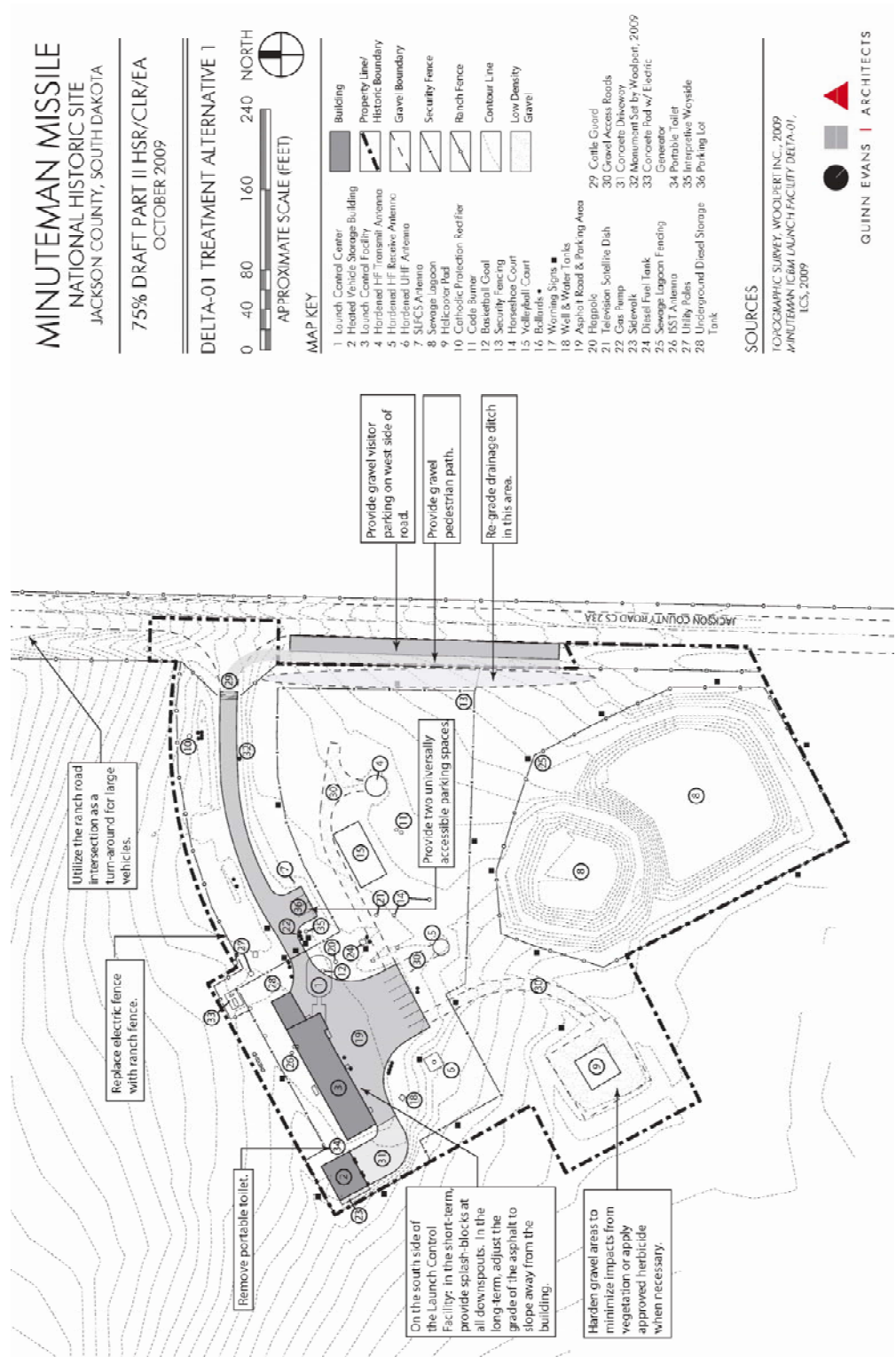
13 ***Next page:***

14 ***Figure 6-1: Delta-01 Treatment Alternative 1***

15

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1 ***Delta-09, Treatment Alternative 1***

2 *Delta-09 Spatial Organization Recommendation, Treatment Alternative 1:*

- 3 • *Develop a landscape management plan that addresses site needs.

4

5 *Delta-09 Land Use Recommendations, Treatment Alternative 1:*

- 6 • *Remove the portable toilet from within the historic core.

- 7 • Provide visitor parking and an interpretive wayside along the side of
8 County Road T512.

9

10 *Delta-09 Circulation Recommendations, Treatment Alternative 1:*

- 11 • Add visitor parking along the west side of County Road T512.

- 12 • Provide signs indicating that there is not adequate space for large vehicles
13 to turn around at the I-90 exit.

- 14 • *Allow visitors with mobility impairments to park on the access road near
15 the security gate (universally accessible parking).

- 16 • *Provide a universally accessible route into the site and to the viewing
17 enclosure from the universally accessible parking area. *Find out what
18 type of gravel was used during the POS. Add a layer of crushed stone over
19 the existing surface. Match the color of the stone to that present during the
20 period of significance. Use crushed stone and compact it to achieve a
21 universally accessible surface.

22

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1 *Delta-09 Topography and Views Recommendations, Treatment Alternative 1:*

- 2 • *Work with adjacent landowners to develop agreements to protect
3 significant views. Consider purchasing scenic easements to achieve this
4 goal.
- 5 ○ Based on *Figure 4-14: Delta-09 Existing Views and Ownership*,
6 focus on protecting views in areas where privately owned land is
7 located within the close views as indicated on the diagram.
- 8 ○ If possible, also address the privately owned property located in
9 Section 15 that is within the far views of Delta-09, as indicated in
10 Figure 4-14.
- 11 • *Monitor the area at the south side of the historic core that has had erosion
12 problems. Continue to maintain positive drainage away from the historic
13 resources.

14

15 *Delta-09 Vegetation Recommendations, Treatment Alternative 1:*

- 16 • *Determine the type of gravel that was present during the period of
17 significance, and apply a minimum six inch layer of gravel in areas that
18 are not identified as part of the universal access route.
- 19 • *If necessary, apply approved herbicide as needed to control weeds on the
20 site.

21

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1 *Delta-09 Small Scale Features Recommendations, Treatment Alternative 1:*

2 **Table 6-4: Delta-09 Small Scale Landscape Features,**
3 **Treatment Alternative 2**

Small Scale Features	Treatment Alternative 2
Glass viewing enclosure	*Maintain
Improved Minuteman Physical Security System (IMPSS) antenna (HS 903, IDLCS 100489)	*Preserve
Hardened UHF antenna (HS 904, IDLCS 100491)	*Preserve
Cathodic protection rectifier (HS 912, IDLCS 390310)	*Preserve
Two azimuth markers (HS 905, IDLCS 100492)	*Preserve
Two HICS marker posts (HS 907, IDLCS 345796)	*Preserve
Security fence (HS 906, IDLCS 295903)	*Preserve
Light posts (HS 908, IDLCS 354853)	*Preserve
Bollard (HS 909, IDLCS 354859)	*Preserve
Helipad & Markers (HS 910, IDLCS 354855)	*Preserve
Access Road and Maneuvering Area (HS 911, IDLCS 390310)	*Preserve
Antenna piers (HS 913, IDLCS 400831)	*Preserve
Transporter erector pylons (HS 914, IDLCS 412538)	*Preserve
Launch facility warning signs	*Preserve
Culvert	*Maintain
Drainage ditch	*Maintain
Portable toilet	Remove

4

5

6

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1 *Delta-09 Buildings and Structures Recommendations, Treatment Alternative 1:*

2 ***Delta-09 Launch Facility***

3 The Launch Facility is in very good condition due to the cyclical maintenance
4 provided by the Air Force personnel from Ellsworth Air Force Base and the National
5 Park Service. With the exception of the cathodic protection system, the following
6 treatment recommendations are not critical to the overall health of the structures and can
7 be incorporated into the on-going cyclical maintenance of the facilities as funding is
8 available.

- 9 • *Replace caulking at the perimeter edge of the steel personnel access
10 hatch.

11

12 ***Structural Recommendations—General Concrete***

- 13 • *The silo apron slabs show surface deterioration and a penetrating,
14 breathable sealant/consolidant is recommended below to mitigate this
15 aging. Other surfaces such as the vault topping slab and silo retaining
16 walls do not show the same surface deterioration; however, application of
17 such a sealant should be considered for those elements.

18

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Structural Recommendations--Equipment Vault

- *Topping Slab: Previous attempts to patch the cracking in the topping slab appear to have been unsuccessful as the patch has worn off or is gone. These cracks should be sealed with an epoxy injection if possible. There are limits to minimum crack width that injection systems can fill. Some chemical companies (SIKA) promote gravity feed epoxy products which may be applicable for fine cracks. If the cracks are too fine for either injection or gravity feed then the cracks should be routed out and filled with a modified epoxy gel.

- *Walls: Fine cracks were noted in the exterior walls exposed above grade. These should be either epoxy injected or filled as with the slab above.

Structural Recommendations--Silo

- *Apron Slabs: These slabs show signs of spalling and cracking. Cracks should be sealed by epoxy injection. Loose spall should be removed and patched with an epoxy modified cementitious patching material. It is important to undercut the edges of patching areas as patching materials should not be feathered at the edges. A good penetrating sealant/consolidant (such as Prosoco H40) should be applied to the exposed surface to minimize weathering deterioration. The sealant should not entrap moisture within the concrete.

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- 1 • *Minor Retaining Wall Cracks: Cracking should be sealed by injection or
2 routing and patching as discussed for the vault slab.

3

4 ***Cathodic Protection System***

- 5 • *A new cathodic protection system should be installed. The current design
6 and location of the system is adequate, and the location and number of
7 anodes should be retained.

8

9 ***Next page:***

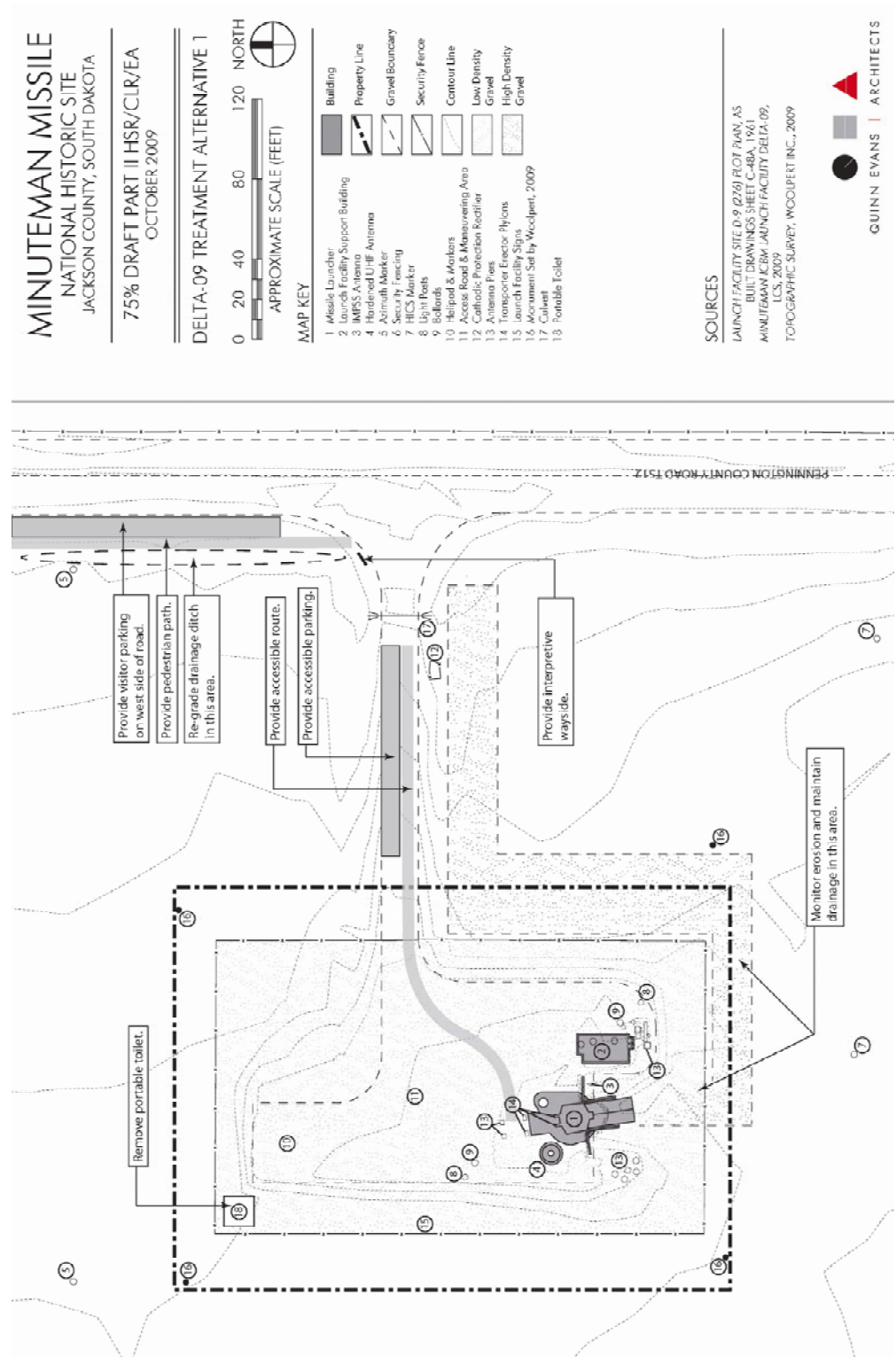
10 ***Figure 6-2: Delta-09 Treatment Alternative 2***

11

12

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Treatment Alternative 2, Rehabilitation

This treatment alternative emphasizes enhancement of visitor services while preserving the significant resources. Major differences between this alternative and the other two include the addition of a visitor parking lot at Delta-01 and a visitor parking lot and comfort station at Delta-09.

Delta-01, Treatment Alternative 2

Delta-01 Spatial Organization Recommendation, Treatment Alternative 2:

- *Develop a landscape management plan that addresses site needs.

Delta-01 Land Use Recommendations, Treatment Alternative 2:

- Allow visitors to utilize the basketball hoop, volleyball and horseshoe courts while waiting for tours. This activity is consistent with the way the missileers used the site.
- *Remove non-historic elements from within the historic boundary, including the portable toilet, parking lot and interpretive wayside.
- *Provide all visitor parking and interpretive waysides outside the historic boundary.

Delta-01 Circulation Recommendations, Treatment Alternative 2:

- Acquire land to the east of the site, on the eastern side of Jackson County Road CS 23A to use for a visitor parking area with fifteen car parking

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- 1 spaces and five spaces for recreational vehicles. Utilize topography to
2 reduce the visibility of this development.
- 3 • At the new parking area, include adequate space for busses and
4 recreational vehicles to turn around.
- 5 • Allow visitors with mobility impairments to park on the access road near
6 the security gate (universally accessible parking).
- 7 • *Provide a universally accessible route into the site and to the main
8 building from the universally accessible parking area.
- 9 • *Consider providing maintenance on the portion of Jackson County Road
10 CS23A that provides access to the site from the highway.
- 11
- 12 *Delta-01 Topography and Views Recommendations, Treatment Alternative 2:*
- 13 • *Install splash blocks at downspouts to move water away from the south
14 elevation of the main building. See building recommendations.
- 15 • *Work with adjacent landowners to develop agreements to protect
16 significant views. Consider purchasing scenic easements to achieve this
17 goal.
- 18 ○ Based on *Figure 4-17: Delta-01 Views and Ownership*, focus on
19 protecting views in areas where privately owned land is located
20 within the close views as indicated on the diagram. These are
21 mainly located in Sections 9, 15, and 16.
- 22

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1 *Delta-01 Vegetation Recommendations, Treatment Alternative 2:*

- 2 • In order to eliminate the encroachment of vegetation in gravel areas within
- 3 the historic core, install asphalt pavement under the existing gravel surface
- 4 and then cover the pavement with a minimum of six inches of gravel. The
- 5 result will be a surface that looks like the historic surface, but does not
- 6 require frequent use of herbicides or regular applications of gravel in order
- 7 to maintain the bare look that was present during the period of
- 8 significance.
- 9 • *Alternatively, apply approved herbicide as needed to control weeds on
- 10 the site and supplement the gravel in areas that are thin, adding enough so
- 11 the gravel surface is at least six inches thick.

12

13 *Delta-01 Small Scale Features Recommendations, Treatment Alternative 2:*

14 **Table 6-5: Delta-01 Small Scale Landscape Features,**

15 **Treatment Alternative 2**

Small Scale Features	Treatment Alternative 2
Hardened high frequency transmit antenna (HS 104, IDLCS 100480)	*Preserve
Hardened high frequency receive antenna (HS 105, IDLCS 100481)	*Preserve
Hardened ultra-high frequency antenna (HS 106, IDLCS 100483)	*Preserve
Survivable low frequency communication system antenna (HS 107, IDLCS 100484)	*Preserve
Cathodic protection rectifier (HS 110, IDLCS 100485)	*Preserve
Two sewage lagoons (HS 108, IDLCS 100486)	*Preserve
Helicopter pad (HS 109, IDLCS 100485)	*Preserve
ICBM super-high frequency satellite terminal antenna	*Preserve if Contributing (discuss with NPS staff) consider removing if non-contributing

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Television satellite dish (HS 121, IDLCS 398298)	<i>*Preserve</i>
HICS	<i>*Preserve</i>
Security fencing (HS 113, IDLCS 287263)	<i>*Preserve</i>
Sewage lagoon fencing / Livestock fencing	<i>*Preserve</i>
Cattle-guard	<i>*Preserve</i>
Electric fence	<i>*Remove. Add livestock fencing that matches the fences around the sewage lagoons. If necessary, provide a gate at the rancher's easement.</i>
Historic signage (HS 117, IDLCS 354856)	<i>*Preserve</i>
Protective bollards (HS 116, IDLCS 354857)	<i>*Preserve</i>
Access road and parking area (HS 119, IDLCS 390289)	<i>*Preserve</i>
Well and water tanks (HS 118, IDLCS 354851)	<i>*Preserve</i>
Flagpole (HS 120, IDLCS 398270)	<i>*Preserve</i>
Basketball goal (HS 112, IDLCS 287625)	<i>*Preserve</i>
Volleyball court (HS 115, IDLCS 287266)	<i>*Preserve</i>
Horseshoe court (HS 114, IDLCS 287261)	<i>*Preserve</i>
Code burner (HS 111, IDLCS 287264)	<i>*Preserve</i>
Interpretive wayside	<i>Relocate to new parking lot on east side of County Road CS23A.</i>
Portable toilet	<i>Remove. Replace with small comfort station on the east side of County Road CS23A.</i>
Concrete pad, transformer, and generator	<i>Consider relocating to a site that is not as visible to visitors.</i>
Cell tower	<i>*Work with SHPO to encourage property owner to remove the tower.</i>
Ranch	<i>*Work with property owner to preserve the character of the ranch and views of the ranch from Delta-01.</i>

1

2 *Delta-01 Buildings and Structures Recommendations, Treatment Alternative 2:*

3 ***Launch Control Support Building***

4 The Launch Control Facility is in very good condition due to the cyclical

5 maintenance provided by the Air Force personnel from Ellsworth Air Force Base and the

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1 National Park Service. With the exception of the cathodic protection system, the
2 following treatment recommendations are not critical to the overall health of the
3 buildings and can be incorporated into the on-going cyclical maintenance of the facilities
4 as funding is available.

5

6 ***Launch Control Support Building Exterior:***

- 7 • *At the time the asphalt apron adjacent to the south foundation wall needs
8 to be replaced, the grade should be adjusted to slope away from the
9 building.
- 10 • *Miscellaneous metal brackets from the old security system, abandoned
11 wiring, and abandoned conduit should be removed from the metal siding
12 and the anchorage holes repaired with an epoxy made for steel and painted
13 to match the siding color.
- 14 • *Repair the security light at door #13, south elevation.
- 15 • *Remove the damaged and non-functioning speaker at door #13 and repair
16 anchorage holes, south elevation.
- 17 • *Replace extant louver back into the opening in the north wall of
18 Equipment Room 106. Block of the back of the louver if air is not required
19 to be drawn into the room.
- 20 • *All cracked and damaged vinyl glazing stops should be replaced on the
21 exterior face of all windows.

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- 1 • *All damaged or missing metal door holders should be replaced with new
2 to match the original one still extant.

3

4 ***Launch Control Support Building Interior:***

- 5 • *Generator Room 105: Repair water damaged drywall at the roof
6 ventilator duct.
7 • *Women's Latrine 116A: The hole in the floor of the vinyl shower stall
8 should be repaired with epoxy filler tinted to match the color of the stall.

9

10 ***Mechanical, Electrical, and Plumbing Systems***

- 11 • *No treatment recommendations required. If other systems such as
12 geothermal for heating and cooling or a variable refrigerant flow heat
13 pump system are to be considered, it would entail major remodeling of the
14 existing building.

15

16 ***Launch Control Center***

- 17 • *No treatment recommendations required.

18

19 ***Vehicle Heated Storage Building***

- 20 • *Exterior: No treatment recommendations required.
21 • *Interior: No treatment recommendations required.

22

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Historic Structures Report/Cultural Landscape Report/Environmental Assessment

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Historic Structures Report/Cultural Landscape Report/Environmental Assessment

1 ***Cathodic Protection System***

- 2 • *A new cathodic protection system should be installed. The current design
- 3 and location of the system is adequate, and the location and number of
- 4 anodes should be retained.

5

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Historic Structures Report/Cultural Landscape Report/Environmental Assessment

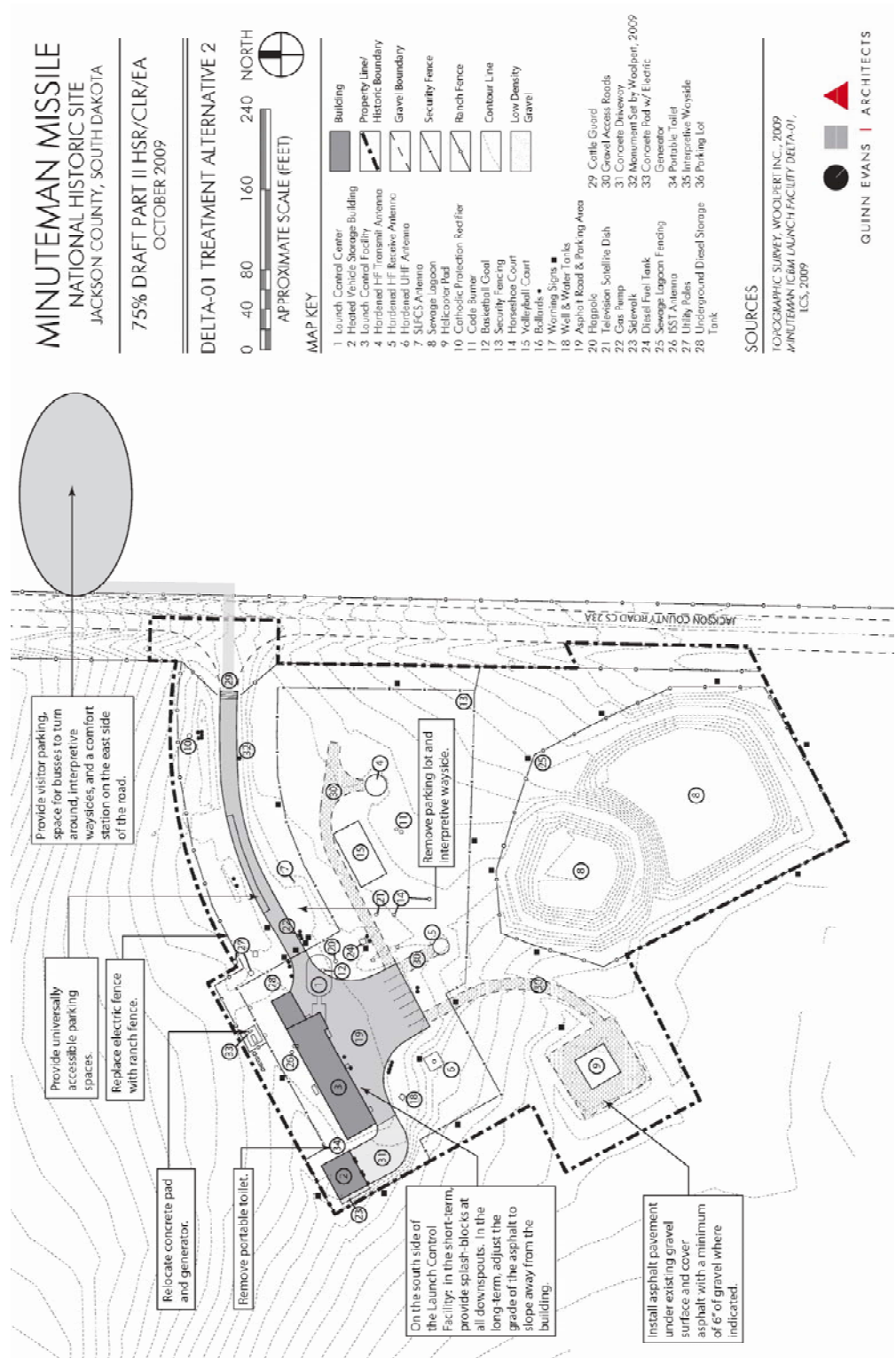
1 *Next page:*

2 *Figure 6-3: Delta-01 Treatment Alternative 2*

3

Minuteman Missile National Historic Site

Historic Structures Report/Cultural Landscape Report/Environmental Assessment



Minuteman Missile National Historic Site

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Historic Structures Report/Cultural Landscape Report/Environmental Assessment

Delta-09, Treatment Alternative 2

Delta-09 Spatial Organization Recommendation, Treatment Alternative 2:

- *Develop a landscape management plan that addresses site needs.

Delta-09 Land Use Recommendations, Treatment Alternative 2:

- *Remove the portable toilet from within the historic core.
- Provide a visitor parking lot and an interpretive wayside outside the historic boundary.
- Provide a small comfort station near the parking lot.

Delta-09 Circulation Recommendations, Treatment Alternative 2:

- Acquire land to the east of the site, on the eastern side of Pennington County Road T512 to use for a visitor parking area with fifteen car parking spaces and five spaces for recreational vehicles.
- At the new parking area, include adequate space for busses and recreational vehicles to turn around.
- *Allow visitors with mobility impairments to park on the access road near the security gate (universally accessible parking).
- *Provide a universally accessible route into the site and to the viewing enclosure from the universally accessible parking area. *Find out what type of gravel was used during the POS. Add a layer of crushed stone over the existing surface. Match the color of the stone to that present during the

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period of significance. Use crushed stone and compact it to achieve a
universally accessible surface.

Delta-09 Topography and Views Recommendations, Treatment Alternative 2:

- *Work with adjacent landowners to develop agreements to protect
significant views. Consider purchasing scenic easements to achieve this
goal.
 - Based on *Figure 4-14: Delta-09 Existing Views and Ownership*,
focus on protecting views in areas where privately owned land is
located within the close views as indicated on the diagram.
 - If possible, also address the privately owned property located in
Section 15 that is within the far views of Delta-09, as indicated in
Figure 4-14.
- *Monitor the area at the south side of the historic core that has had erosion
problems. Continue to maintain positive drainage away from the historic
resources.

Delta-09 Vegetation Recommendations, Treatment Alternative 2:

- *Determine the type of gravel that was present during the period of
significance, and apply a minimum six inch layer of gravel in areas that
are not identified as part of the universal access route.

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- 1 • *If necessary, apply approved herbicide as needed to control weeds on the
2 site.

3

4 Delta-09 Small Scale Features Recommendations, Treatment Alternative 2:

5 **Table 6-6: Delta-09 Small Scale Landscape Features,**
6 **Treatment Alternative 2**

Small Scale Features	Treatment Alternative 2
Glass viewing enclosure	*Maintain
Improved Minuteman Physical Security System (IMPSS) antenna (HS 903, IDLCS 100489)	*Preserve
Hardened UHF antenna (HS 904, IDLCS 100491)	*Preserve
Cathodic protection rectifier (HS 912, IDLCS 390310)	*Preserve
Two azimuth markers (HS 905, IDLCS 100492)	*Preserve
Two HICS marker posts (HS 907, IDLCS 345796)	*Preserve
Security fence (HS 906, IDLCS 295903)	*Preserve
Light posts (HS 908, IDLCS 354853)	*Preserve
Bollard (HS 909, IDLCS 354859)	*Preserve
Helipad & Markers (HS 910, IDLCS 354855)	*Preserve
Access Road and Maneuvering Area (HS 911, IDLCS 390310)	*Preserve
Antenna piers (HS 913, IDLCS 400831)	*Preserve
Transporter erector pylons (HS 914, IDLCS 412538)	*Preserve
Launch facility warning signs	*Preserve
Culvert	*Maintain
Drainage ditch	*Maintain
Portable toilet	Remove- replace with small comfort station at visitor parking area.

7

8

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1 *Delta-09 Buildings and Structures Recommendations, Treatment Alternative 2:*

2 ***Delta-09 Launch Facility***

3 The Launch Facility is in very good condition due to the cyclical maintenance
4 provided by the Air Force personnel from Ellsworth Air Force Base and the National
5 Park Service. With the exception of the cathodic protection system, the following
6 treatment recommendations are not critical to the overall health of the structures and can
7 be incorporated into the on-going cyclical maintenance of the facilities as funding is
8 available.

- 9
 - *Replace caulking at the perimeter edge of the steel personnel access
10 hatch.

11 ***Delta-09 Launch Facility Structural Recommendations***

- 12
 - *General Concrete: The silo apron slabs show surface deterioration and a
13 penetrating, breathable sealant/consolidant is recommended below to
14 mitigate this aging. Other surfaces such as the vault topping slab and silo
15 retaining walls do not show the same surface deterioration; however,
16 application of such a sealant should be considered for those elements.

17 ***Delta-09 Launch Facility Equipment Vault Structural Recommendations***

- 18
 - *Topping Slab: Previous attempts to patch the cracking in the topping
19 slab appear to have been unsuccessful as the patch has worn off or is gone.
20 These cracks should be sealed with an epoxy injection if possible. There
21 are limits to minimum crack width that injection systems can fill. Some
22 chemical companies (SIKA) promote gravity feed epoxy products which

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1 may be applicable for fine cracks. If the cracks are too fine for either
2 injection or gravity feed then the cracks should be routed out and filled
3 with a modified epoxy gel.

- 4 • *Walls: Fine cracks were noted in the exterior walls exposed above grade.
5 These should be either epoxy injected or filled as with the slab above.

6

7 ***Delta-09 Launch Facility Silo Structural Recommendations***

- 8 • *Apron Slabs: These slabs show signs of spalling and cracking. Cracks
9 should be sealed by epoxy injection. Loose spall should be removed and
10 patched with an epoxy modified cementitious patching material. It is
11 important to undercut the edges of patching areas as patching materials
12 should not be feathered at the edges. A good penetrating
13 sealant/consolidant (such as Prosoco H40) should be applied to the
14 exposed surface to minimize weathering deterioration. The sealant should
15 not entrap moisture within the concrete.
- 16 • *Minor Retaining Wall Cracks: Cracking should be sealed by injection or
17 routing and patching as discussed for the vault slab.

18

19

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Delta-09 Launch Facility Cathodic Protection System

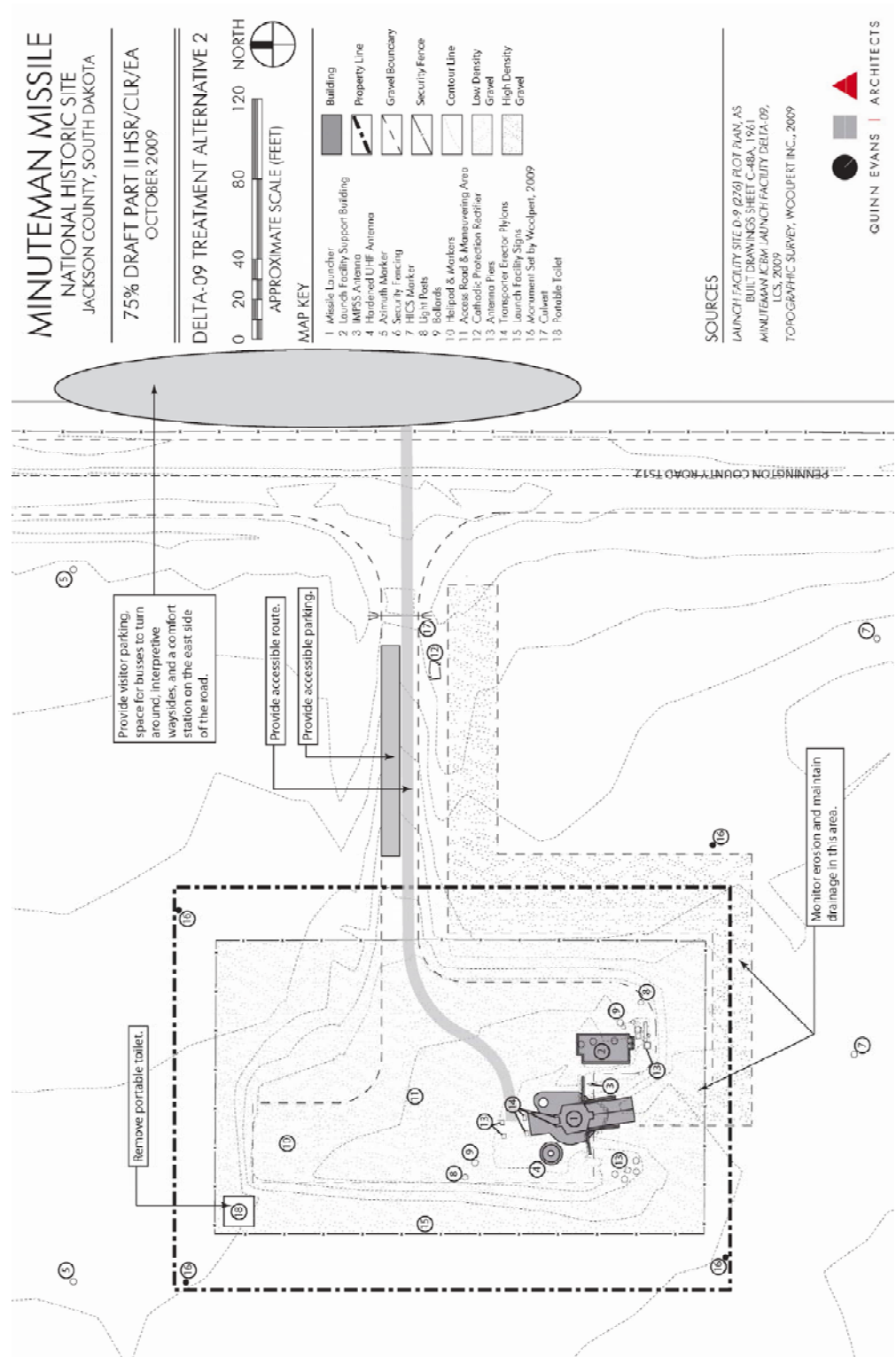
- *A new cathodic protection system should be installed. The current design and location of the system is adequate, and the location and number of anodes should be retained.

Next page:

Figure 6-4: Delta-09 Treatment Alternative 2

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March 2010 Project Workshop Agenda

9 March 2010



MEMORANDUM

From: BRENDA WILLIAMS

To: MARLA MCENANEY, MWRO
BILL HARLOW, MWRO
MIKE HOSKING, MIMI
PAM GRISWOLD, MIMI
JOHN BLACK, MIMI
AL O'BRIGHT, MWRO
STEVE JONES, QEA
WILL BALLARD, WOOLPERT
TONYA BRADLEY, MWRO

RE: HSR/CLR/EA
MINUTEMAN MISSILE NATIONAL HISTORIC SITE
PHILLIP, SD
Q6068080035
PN 08119.01

Subject: PROJECT WORKSHOP AGENDA

Tuesday March 9 Project team travels to South Dakota.

Wednesday March 10

8:30am Set up for project workshop

9:00am – noon Project Workshop at Park HQ

9:00-10:00am

- Introductions
- Overview of project to date (BW)
- Purpose and Need Statements – discuss and update (BW)
- Project Goals (BW)
- Discuss consultation and PEPC (MM and WB)

10:00am – noon

- Project Vision Alternatives & alternative materials treatment philosophy (BW & SJ)
- Draft Site Vision, Program and Design Alternatives (BW)
 - Alt #1
 - Alt#2
 - Alt#3
- Recommendations for preserving views (BW)
- Discuss Landscape Alternatives & Select/Develop Preferred Approach (all)
- Review Management Issues (BW & SJ)
 - Clarify existing and desired parking within fences at Delta-01 and Delta-09.

Noon-1:00pm Lunch

Afternoon Consultants work independently

- BW update alternatives and develop preferred landscape plan
- SJ site work at Delta-01



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9 March 2010
Page 2 of 2

Thursday March 11

9:00am -noon Workshop attendees meet at HQ

- Review revised landscape alternatives (BW)
- Review revised landscape preferred approach (BW)
- Project schedule (BW & SJ)
- Review impact topics (WB)
- Questions related to review comments (BW, SJ, WB)
 - Cathodic Protection Systems
 - Existing conditions – functioning?
 - Recommendations – repair or replacement options with pros and cons of both treatments?
 - Repetition of information from alternative to alternative. How to simplify?
 - What is the status of the Missileers oral history project?
 - Explain character-defining features, contributing, and non-contributing.
- Review options for report cover (BW)

Noon Project team departs

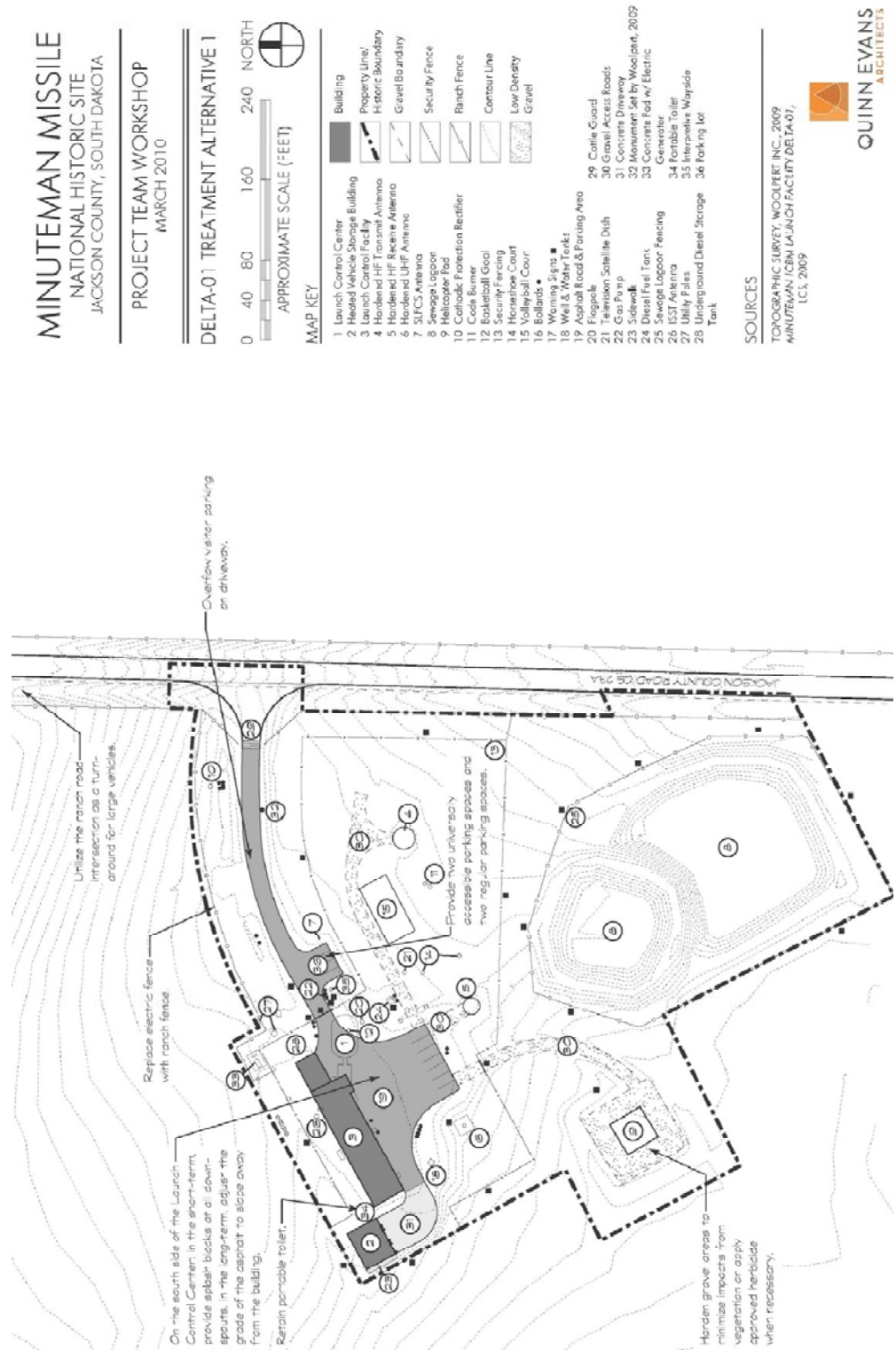
END OF MEMORANDUM



Minuteman Missile National Historic Site

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March 2010 Project Workshop Treatment Alternatives



Minuteman Missile National Historic Site

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MINUTEMAN MISSILE NATIONAL HISTORIC SITE JACKSON COUNTY, SOUTH DAKOTA

PROJECT TEAM WORKSHOP
MARCH 2010

DELTA-01 TREATMENT ALTERNATIVE 2

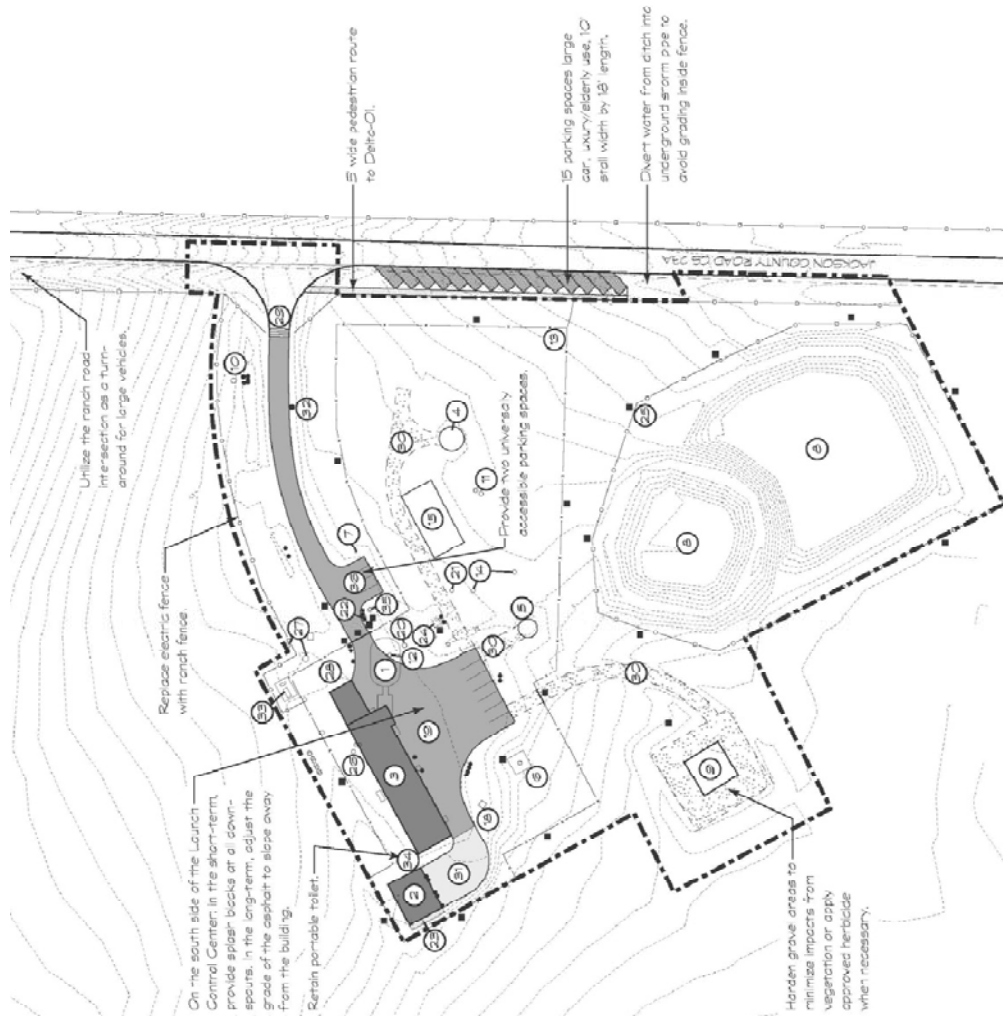


MAP KEY

- | | | |
|------------------------------------|------------------------------------|-----------------------------------|
| 1 Launch Control Center | 20 Television Satellite Dish | 29 Cattle Guard |
| 2 Hatched Vehicle Storage Building | 21 Ensignia | 30 Gravel Access Roads |
| 3 Launch Control Facility | 22 Gas Pump | 31 Concrete Driveway |
| 4 Hardened HF Transmitter Antenna | 23 Sewer | 32 Monument Set by Woolpert, 2009 |
| 5 Hardened HF Receiver Antenna | 24 Diesel Fuel Tank | 33 Concrete Pad w/ Electric |
| 6 Hardened UHF Antenna | 25 Sewage Lagoon Fencing | 34 Concrete Pad w/ Electric |
| 7 SIFCS Antenna | 26 155T Antenna | 35 Portable Toilet |
| 8 Sewage Lagoon | 27 Utility Poles | 36 Parking Lot |
| 9 Helicopter Pad | 28 Underground Diesel Storage Tank | |
| 10 Cathodic Protection Rectifier | | |
| 11 Code Bunker | | |
| 12 Basketball Goal | | |
| 13 Security Fencing | | |
| 14 Horseshoe Court | | |
| 15 Volleyball Court | | |
| 16 Bollards | | |
| 17 Warning Signs | | |
| 18 Warning Lights | | |
| 19 Access Road & Parking Area | | |

SOURCES

TOPOGRAPHIC SURVEY, WOOLPERT, INC., 2009
MINUTEMAN ICBM LAUNCH FACILITY DELTA-01,
LCS, 2009



Minuteman Missile National Historic Site

Historic Structures Report/Cultural Landscape Report/Environmental Assessment

MINUTEMAN MISSILE NATIONAL HISTORIC SITE JACKSON COUNTY, SOUTH DAKOTA

PROJECT TEAM WORKSHOP
MARCH 2010

DELTA-01 TREATMENT ALTERNATIVE 3



MAP KEY

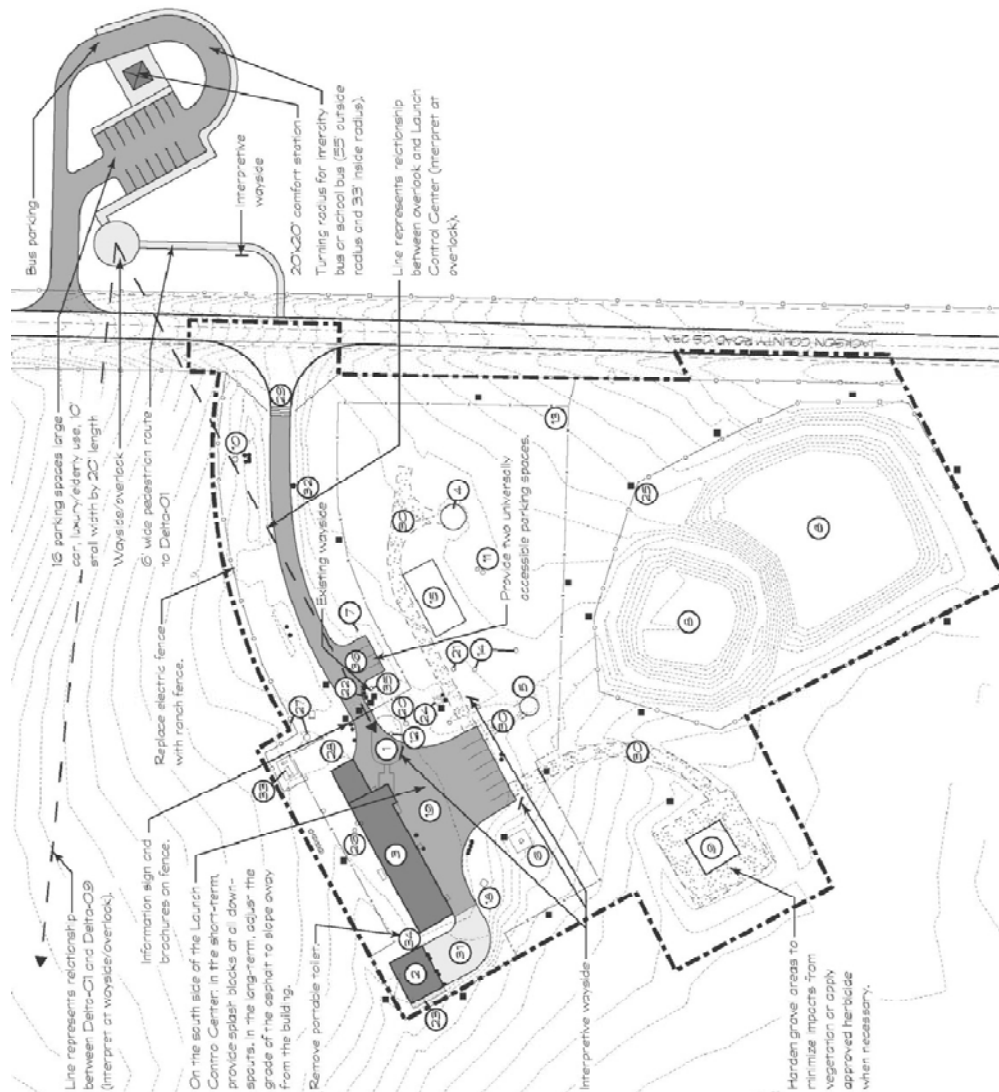
- | | | |
|-----------------------------------|------------------------------------|---------------------------------------|
| 1 Launch Control Center | 21 Television Satellite Dish | 29 Cattle Guard |
| 2 Launch Vehicle Storage Building | 22 Gas Pump | 30 Gravel Access Roads |
| 3 Launch Control Facility | 23 Sidewalk | 31 Concrete Driveway |
| 4 Hardened HF Transmitter Antenna | 24 Diesel Fuel Tank | 32 Monument Set by Woolpert, 2009 |
| 5 Hardened HF Receiver Antenna | 25 Sewage Lagoon | 33 Concrete Pad w/ Electric Generator |
| 6 Hardened UHF Receiver Antenna | 26 B57 Antenna | 34 Portable Toilet |
| 7 SIFCS Antenna | 27 Utility Poles | 35 Interpretive Wayside |
| 8 Sewage Lagoon | 28 Underground Diesel Storage Tank | 36 Parking Lot |
| 9 Helicopter Pad | | |
| 10 Cathodic Protection Rectifier | | |
| 11 Code Bunker | | |
| 12 Basketball Goal | | |
| 13 Security Fencing | | |
| 14 Horseshoe Court | | |
| 15 Volleyball Court | | |
| 16 Ballfield | | |
| 17 Warning Signal | | |
| 18 Watchtowers | | |
| 19 Access Road & Parking Area | | |
| 20 Escalade | | |

SOURCES

TOPOGRAPHIC SURVEY WOOLPERT INC. 2009
MINUTEMAN ICBM LAUNCH FACILITY DELTA-01,
LC5, 2009



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MINUTEMAN MISSILE NATIONAL HISTORIC SITE JACKSON COUNTY, SOUTH DAKOTA

PROJECT WORKSHOP
MARCH 2010

DELTA-09 TREATMENT ALTERNATIVE 1



MAP KEY

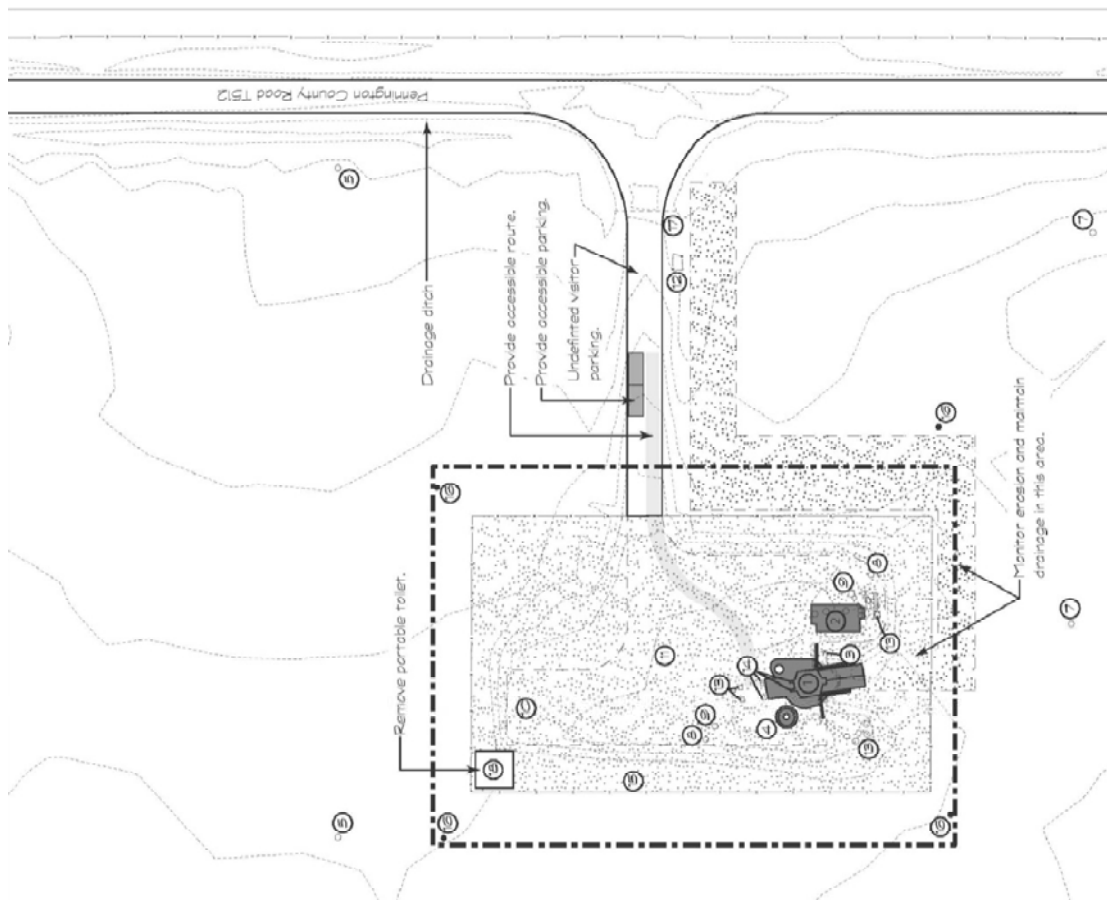
- | | |
|------------------------------------|---------------------|
| 1 Missile Launcher | Building |
| 2 Launch Facility Support Building | Property Line |
| 3 IMPS Antenna | Gravel Boundary |
| 4 Hardened UHF Antenna | Security Fence |
| 5 Admin/Mktr | Contour Line |
| 6 Security Fencing | Low Density Gravel |
| 7 HICS Marker | High Density Gravel |
| 8 Light Posts | |
| 9 Bollards | |
| 10 Helipad & Markers | |
| 11 Access Road & Maneuvering Area | |
| 12 Cathodic Protection Rectifier | |
| 13 Antenna Pylon | |
| 14 Transporter Erector Pylons | |
| 15 Launch Facility Signs | |
| 16 Monument Set by Woodport, 2009 | |
| 17 Culvert | |
| 18 Portable Toilet | |

SOURCES

LAUNCH FACILITY SITE D-9 (278) PLOT PLAN, AS
BUILT DRAWINGS SHEET C-48A, 1961
MINUTEMAN ICBM LAUNCH FACILITY DELTA-09,
LCS, 2009
TOPOGRAPHIC SURVEY, WOOLPERT INC., 2009

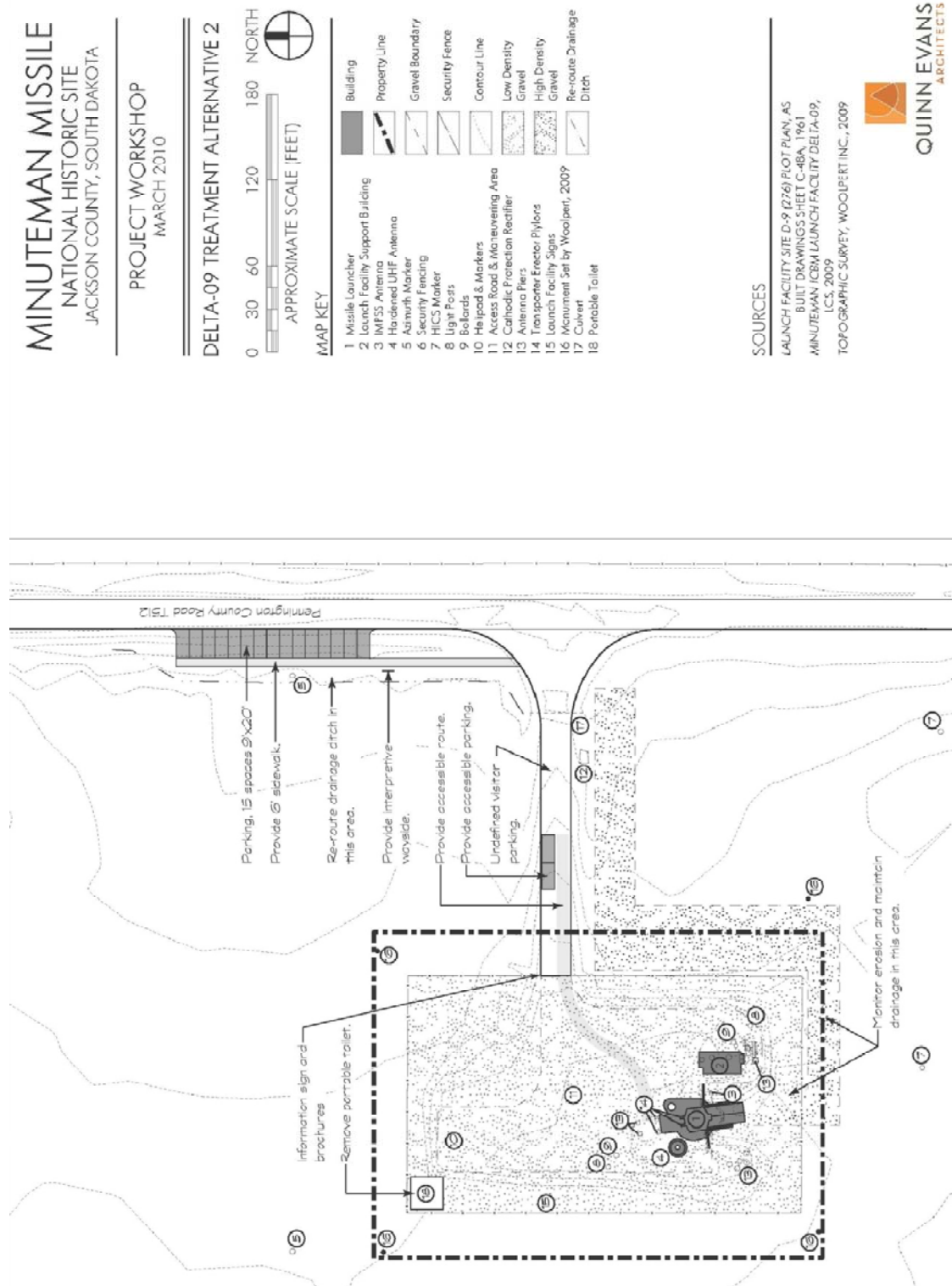


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MINUTEMAN MISSILE NATIONAL HISTORIC SITE JACKSON COUNTY, SOUTH DAKOTA

PROJECT WORKSHOP
MARCH 2010

DELTA-09 TREATMENT ALTERNATIVE 3

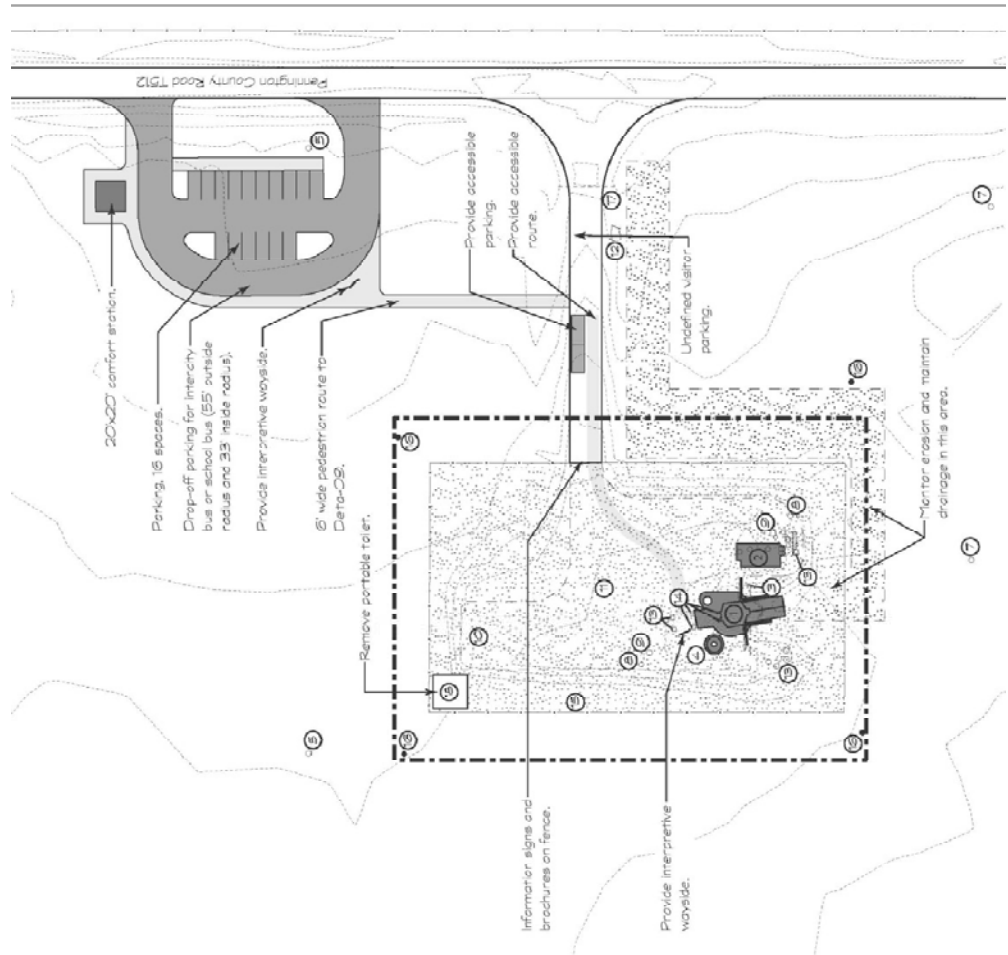


MAP KEY

- | | | |
|------------------------------------|-----------------------------------|--------------------|
| 1 Missile Launcher | 11 Access Road & Maneuvering Area | Building |
| 2 Launch Facility Support Building | 12 Cathodic Protection Backfill | Property Line |
| 3 IMPS Avenue | 13 Antenna Mast | Grave Boundary |
| 4 Hardened UHF Antenna | 14 Transporter Erector Pylons | Security Fence |
| 5 Ammunition Magazine | 15 Launch Facility Signs | Contour Line |
| 6 Security Fencing | 16 Launch Facility Sign | Low Density Grave |
| 7 HCC Building | 17 Culvert | High Density Grave |
| 8 Light Poles | 18 Portable Toilet | |
| 9 Ballasts | | |
| 10 Helipad & Markers | | |

SOURCES

LAUNCH FACILITY SITE D-9 (276) PIOT PLAN, AS
BUILT DRAWINGS, SHEET C-484, 1961
MINUTEMAN, ICBM LAUNCH FACILITY DELTA-09,
LCS, 2009
TOPOGRAPHIC SURVEY, WOOLPERT INC., 2009



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MINUTEMAN MISSILE NATIONAL HISTORIC SITE JACKSON COUNTY, SOUTH DAKOTA

PROJECT WORKSHOP
MARCH 2010

DELTA-09 TREATMENT ALTERNATIVE 4

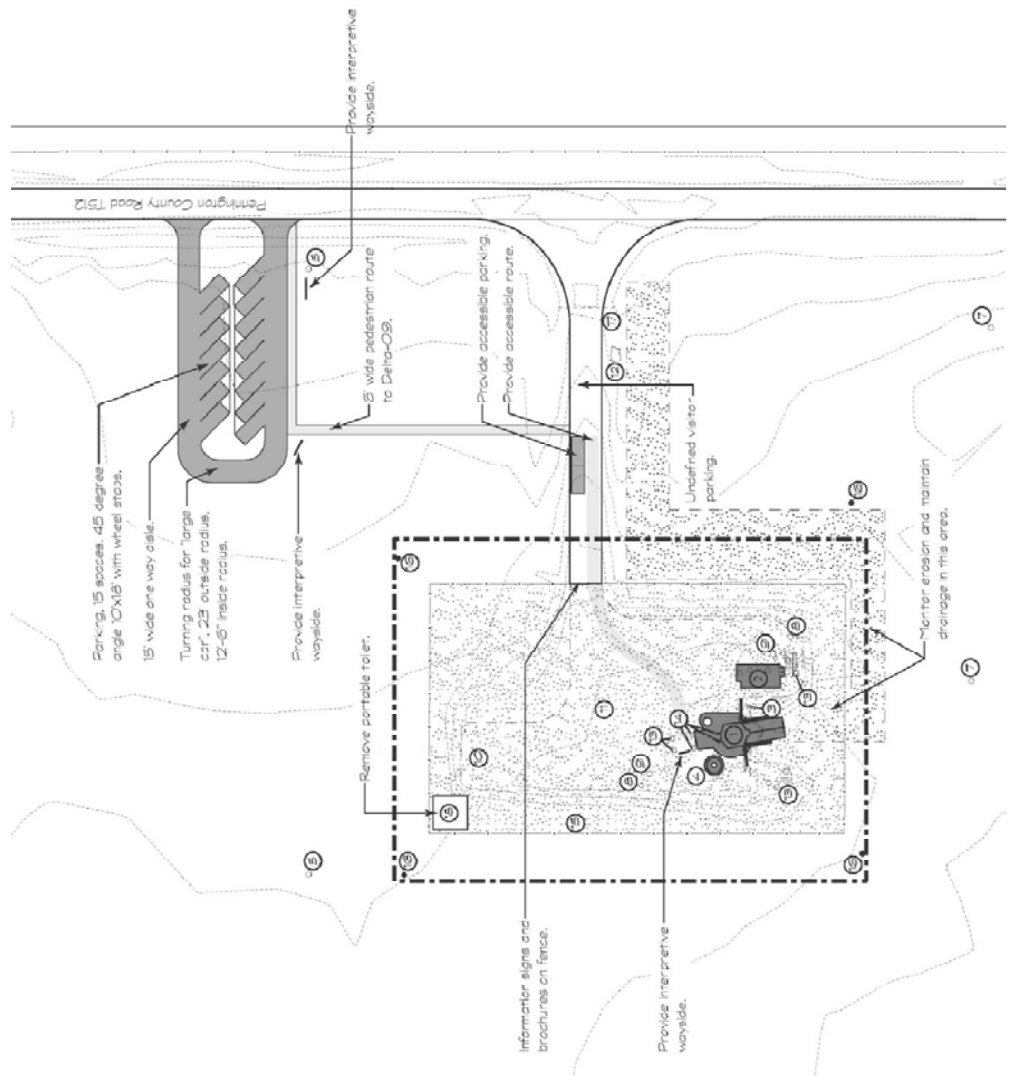


MAP KEY

- | | |
|------------------------------------|--------------------|
| 1 Missile Launcher | Building |
| 2 Launch Facility Support Building | Property Line |
| 3 IMPSS Avenue | Grave Boundary |
| 4 Hardened UHF Antenna | Security Fence |
| 5 Ammunition Storage | Contour Line |
| 6 Security Fencing | Low Density Grave |
| 7 HCCU Launcher | High Density Grave |
| 8 Light Posts | |
| 9 Ballroads | |
| 10 Railroad & Markers | |
| 11 Access Road & Warehousing Area | |
| 12 Cathodic Protection Rectifier | |
| 13 Antenna Mast | |
| 14 Transporter Erector Pylons | |
| 15 Launch Facility Signs | |
| 16 Monument Set by Woolpert, 2009 | |
| 17 Culvert | |
| 18 Portable Toilet | |

SOURCES

LAUNCH FACILITY SITE D-9 (276) PIOT PLAN, AS
BUILT DRAWINGS, SHEET C-484, 1961
MINUTEMAN ICBM LAUNCH FACILITY DELTA-09,
LCS, 2009
TOPOGRAPHIC SURVEY, WOOLPERT INC., 2009



Minuteman Missile National Historic Site

Historic Structures Report/Cultural Landscape Report/Environmental Assessment

March 2010 Project Workshop Notes

7 April 2010



MEMORANDUM

From: BRENDA WILLIAMS

To: MARLA MCENANEY, MWRO
BILL HARLOW, MWRO
MIKE HOSKING, MIMI
PAM GRISWOLD, MIMI
JOHN BLACK, MIMI
AL O'BRIGHT, MWRO
STEVE JONES, QEA
WILL BALLARD, WOOLPERT
TONYA BRADLEY, MWRO
NICK CHEVANCE, MWRO

RE: HSR/CLR/EA
MINUTEMAN MISSILE NATIONAL HISTORIC SITE
PHILLIP, SD
Q6068080035
PN 08119.01

Subject: PROJECT WORKSHOP NOTES



1037 SHERMAN AVENUE
MADISON, WI 53703
608 260 8020

A project workshop was held at park headquarters on 9 March 2010. In attendance on 9 March were: Mike Hosking, Pam Griswold, Marla McEnaney, Bill Harlow, Al O'Bright, Steve Jones, Will Ballard, and myself. Although the workshop was scheduled to continue at park headquarters on 10 March, dangerous road conditions caused a change in plans. Members of the project team met in Rapid City to complete the workshop agenda. Participants on 10 March included: Mike Hosking, Marla McEnaney, Bill Harlow, Al O'Bright, Steve Jones, Will Ballard, and myself.

The following topics were discussed:

- **Purpose and Need Statements**
 - The 75% draft covered "purpose" but not need.
 - The goals summarized below address "need:"
 - Preserve the integrity of the cultural resources in the park.
 - Improve the visitor experience at the park.
 - Provide expanded facilities for visitors.
 - Enhance interpretive opportunities related to the historic resources.
- **Project objectives were reviewed and refined to include the following:**
 - Part I Objectives
 1. Evaluation of viewsheds from and to Delta-01 and Delta-09.
 2. Assessment of conditions of modern building materials and systems.
 3. Documentation of physical changes that illustrate shifting responses to military technology. Include documentation of phases of physical change to the landscapes and buildings.
 4. Identification of missing features.
 5. Identification of changes in paint schemes and interior/exterior finishes and small scale features such as security elements, antennae, structures and fence configurations.
 6. Identify contributing and non-contributing landscape characteristics.
 - Part II Objectives
 1. Recommended approach for site interpretation, including placement of wayside exhibits and site signage.

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2. Development of schematic site planning for providing visitor services (including universal access, parking, pedestrian circulation, and restroom facilities).
3. Recommendations for addressing missing building or landscape features.
4. Recommended approach(es) for maintaining or replacing mid to late 20th century building materials and systems.
5. Recommended method for maintaining historic HVAC and Cathodic protection systems.
6. Recommendations for paint schemes and interior/exterior finishes and treating small scale features such as security elements, antennae, structure and fence configurations.
7. Recommendations for protecting significant views.
8. Recommendations for vegetation management and control.
9. Recommendations for erosion control at Delta-01 and drainage at Delta-09.
10. Recommendations for interpreting the overall missile project, other missile sites and the historic connection between Delta-01 and Delta-09.

- **Consultation and PEPC**

- The group agreed that the list of stakeholders from the GMP is a good starting place for the current project.
- Will Ballard touched base with Nick Chevance to find out if review should be conducted the same as for the GMP, or if it can be condensed. Nick indicated that park staff members need to go through the list and determine which parties need to be contacted in regard to this specific project.
- The park will consider putting a link to PEPC on the park web site when the report is out for public review.
- Review copies at 95% should be shared by NPS with:
 - SHPO
 - Air Force – Tim Pavak
- Notifications for the public review should be sent to the following (with cover letter from NPS):
 - National Grasslands- Mike to contact
 - Air Force (museum and base historian, Tim Pavak)
 - Fish & Wildlife- Woolpert has provided a draft letter and contact name to Mike Hosking so that the letter can be sent from the park.
 - State listed species- online data request is being conducted by Woolpert
 - SHPO – Mike will touch base with them ahead of time
 - Tribal groups—GMP provides basis—Will talked to Nick—park should send letters to all of the tribes that were contacted for the GMP.
 - Archeology –Marla will touch base with Steve Devore to let him know this project will be coming through for review. (in recommendations, make sure to include a note recommending that either archeological investigations be conducted prior to construction, or an archeologist be on site during earth moving activities).

- **Alternative materials treatment philosophy**

- Need to include a list of character defining materials for buildings—indicating each item that must be replaced in-kind (examples: mechanical units, elevator, ...).
- For landscapes, list "landscape features" (NOT character defining features, as this gets confused with "landscape characteristics") indicating elements that must be replaced in-kind (examples: antennas, code burner, gas pump, gate...)

- **Draft Site Vision, Program and Design Alternatives**

- Brenda Williams presented three site design alternatives for Delta-01 and four site design alternatives for Delta-09. The group discussed program needs for the sites, and the GMP recommendations.

Minuteman Missile National Historic Site

Historic Structures Report/Cultural Landscape Report/Environmental Assessment

7 April 2010
Page 3 of 4



- Park staff clearly communicated that no alternatives should include recommendations for purchase of land or easements unless specifically indicated in the GMP.
- On Thursday, the group agreed that only alternatives that fulfilled all of the program needs could be considered valid alternatives.
- As a result, the 95% draft report will include two alternatives for each site.
 - A current treatment/no action alternative will be included for both sites.
 - In addition, a preferred action alternative will be included for each site that provides all of the program requirements noted in the GMP, in the locations indicated in the GMP. These include (for both sites):
 - Universal accessibility
 - 15 parking spaces for large cars
 - Turn-around and drop-off for busses and recreational vehicles
 - Interpretive information outside the historic core
 - Small comfort station with vault toilet
- The previously considered alternatives that have been eliminated will be listed in the considered but rejected section of the report.
- **View analysis**
 - The group agreed that the view analysis diagrams accurately illustrate views important to both sites.
 - The wording on the view recommendations diagram should be changed to eliminate recommendations for purchasing scenic easements for any locations not indicated in the GMP.
- **Project schedule:** was discussed and revised. A copy is included at the end of this memorandum.
- **Impact topics and Cumulative Actions were discussed**
 - Impact Topics
 - Archeology – group does not think we need to address, but Marla will call Steve Devore to touch base and see what he says. The one concern is that the construction of the parking lots may be considered a potential impact on archeological resources. Also, if extensive digging is required for the replacement of the cathodic protection system, this could make archeology an impact topic that needs to be addressed.
 - Paleontological resources- the GMP did not address this topic, so the CLR should not have to. Will Ballard will touch base with a paleontological expert to confirm.
 - Fox need to be addressed.
 - Two asbestos reports have been done, Mike Hosking will forward copies to Steve Jones.
 - No information/testing for lead paint has been conducted. This is not include in the project scope.
 - Cumulative Actions
 - Land protection plan - views
 - Potential for wind farms was discussed – Brenda will try to find out if any criteria exist for determine an area's potential for wind farm development.
 - Local roads issue (paving/maintenance)
- **Questions related to review comments were clarified.**
- **Options for report cover**
 - Four optional layouts for the report cover were reviewed and one was selected. It will be included as the cover on the 95% submittal.

END OF MEMORANDUM

Minuteman Missile National Historic Site

Historic Structures Report/Cultural Landscape Report/Environmental Assessment

Appendix D: Asbestos Surveys

EAFB
LAUNCH CONTROL FACILITY D-1

ASBESTOS SERVICES
ASBESTOS SURVEY
PROJECT NO. 92-7025-4
ELLSWORTH AFB, SOUTH DAKOTA

JANUARY 3, 1994

Prepared by

INTERMOUNTAIN TECHNICAL SERVICES, INC.

4447 SOUTH CANYON ROAD, SUITE #5

RAPID CITY, SOUTH DAKOTA

STATEMENT OF ACCREDITATION

The following document which is called the "Asbestos Assessment Report" was prepared by Mr. James Almond, acting in conjunction with INTERMOUNTAIN TECHNICAL SERVICES, INC.

Mr. Almond is qualified to perform all of the duties required of him as an Asbestos Inspector and Asbestos Management Planner. This is true by virtue of his satisfactory completion of the required EPA approved training courses, and by virtue of his certification as an Asbestos Inspector and Asbestos Management Planner in the State of South Dakota.

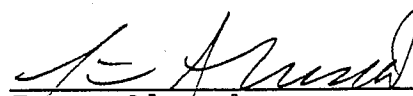
As the Asbestos Management Planner, Mr. Almond takes on the responsibility of providing the Federal Government with the appropriate statements of policy, and with the statements of information that are found in this document. Furthermore, Mr. Almond is the person who has made the recommended cost analysis.

As the Asbestos Inspectors, Mr. Almond and Mr. John Brothers inspected Launch Control Facility D-1 at Wall, South Dakota for asbestos-containing building materials from October 12, 1993 through November 2, 1993. Mr. Almond and Mr. Brothers did all the work involved in the inspection process, including the identification of the homogeneous areas, the taking of samples, the physical assessment of the material in the homogeneous areas and the assessment of potential exposure due to disturbance.

The State of South Dakota has adopted an accreditation program under Section 206 (b) of Title II of AHERA and any person or persons who inspect for ACM and who will design or carry out response actions shall be required to be certified by the State of South Dakota and have successfully completed the appropriate training in accordance with ARSD 74:31.

Below please find the Signature of Management Planner.

Signed



James Almond
Certificate #1345

Date

1-4-94

INSPECTION STATEMENT

Mr. James Almond and Mr. John Brothers, Certified AHERA Building Inspectors/ Management Planners, conducted an inspection of Launch Control Facility D-1. The inspection process began October 12, 1993, and was completed on November 2, 1993.

No exclusions have been declared as a result of any previous inspections, nor were any materials assumed to be Asbestos Containing Materials.

A review of the building plans and specifications was conducted. A walk-through inventory was also performed. The review and walk- through inspection resulted in the identification of the Homogeneous Areas Inventory. Samples of identified materials were randomly taken and a homogeneous physical assessment report was prepared.

The complete Inspection Report is included as a part of the final report.

LETTER OF TRANSMITTAL

INSPECTOR'S NAME, ADDRESS AND CERTIFICATE NUMBER:

- #1 JAMES ALMOND, INTERMOUNTAIN TECHNICAL SERVICES,
4447 SOUTH CANYON ROAD, SUITE #5, RAPID CITY, SD,
SD CERT 1471R
- #2 JOHN BROTHERS, INTERMOUNTAIN TECHNICAL SERVICES,
4447 SOUTH CANYON ROAD, SUITE #5, RAPID CITY, SD,
SD CERT 1346

INSPECTION DATA:

INSPECTION START DATE: October 12, 1993

INSPECTION COMPLETION DATE: November 2, 1993

OWNER INFORMATION:

(NAME ADDRESS AND PHONE NUMBER)

United States of America
Ellsworth Air Force Base
Ellsworth AFB, South Dakota

Civil Engineering Ph #: 1-605-385-2523

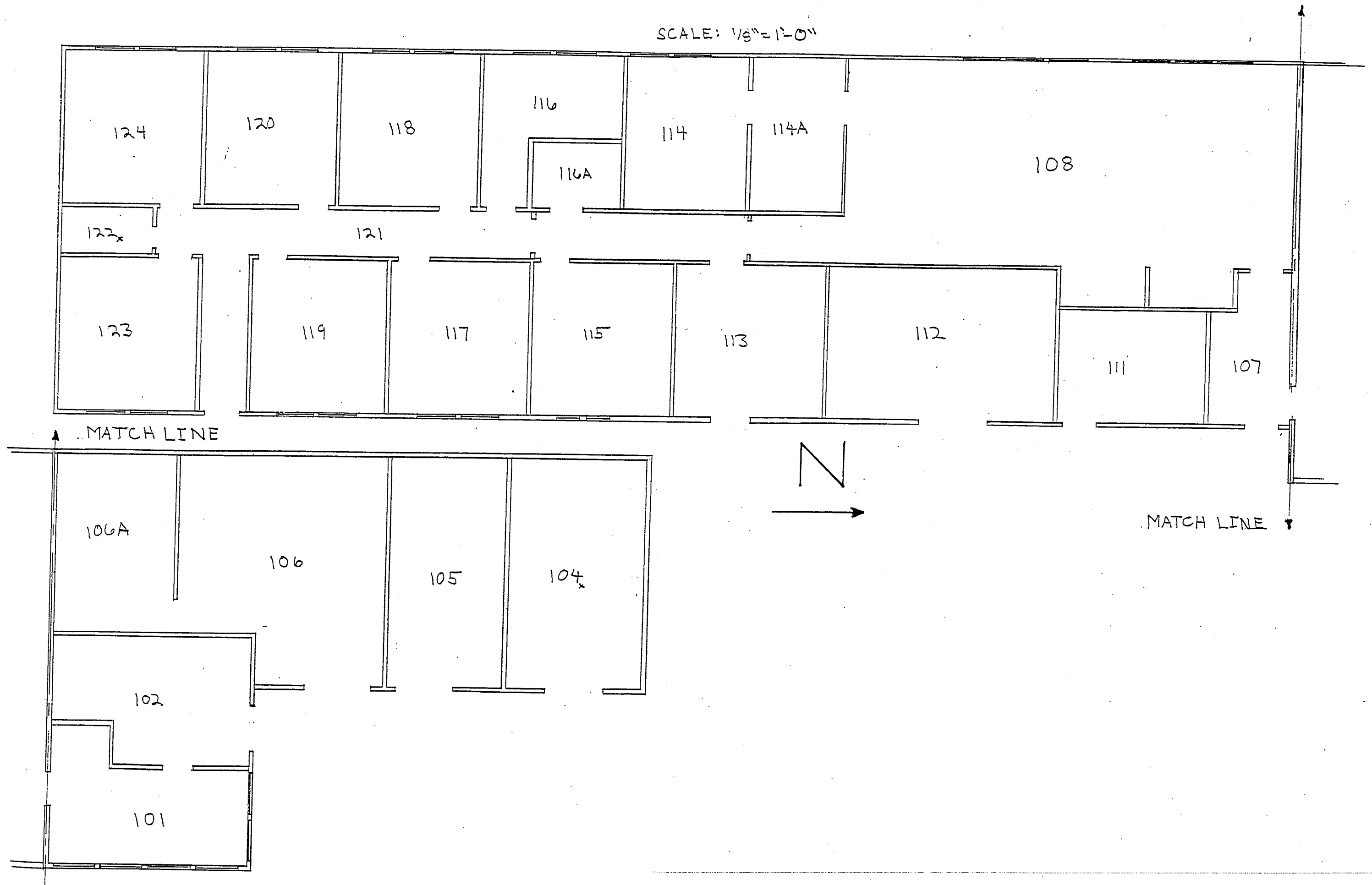
SIGNATURES:

INSPECTOR #1: 

INSPECTOR #2: 

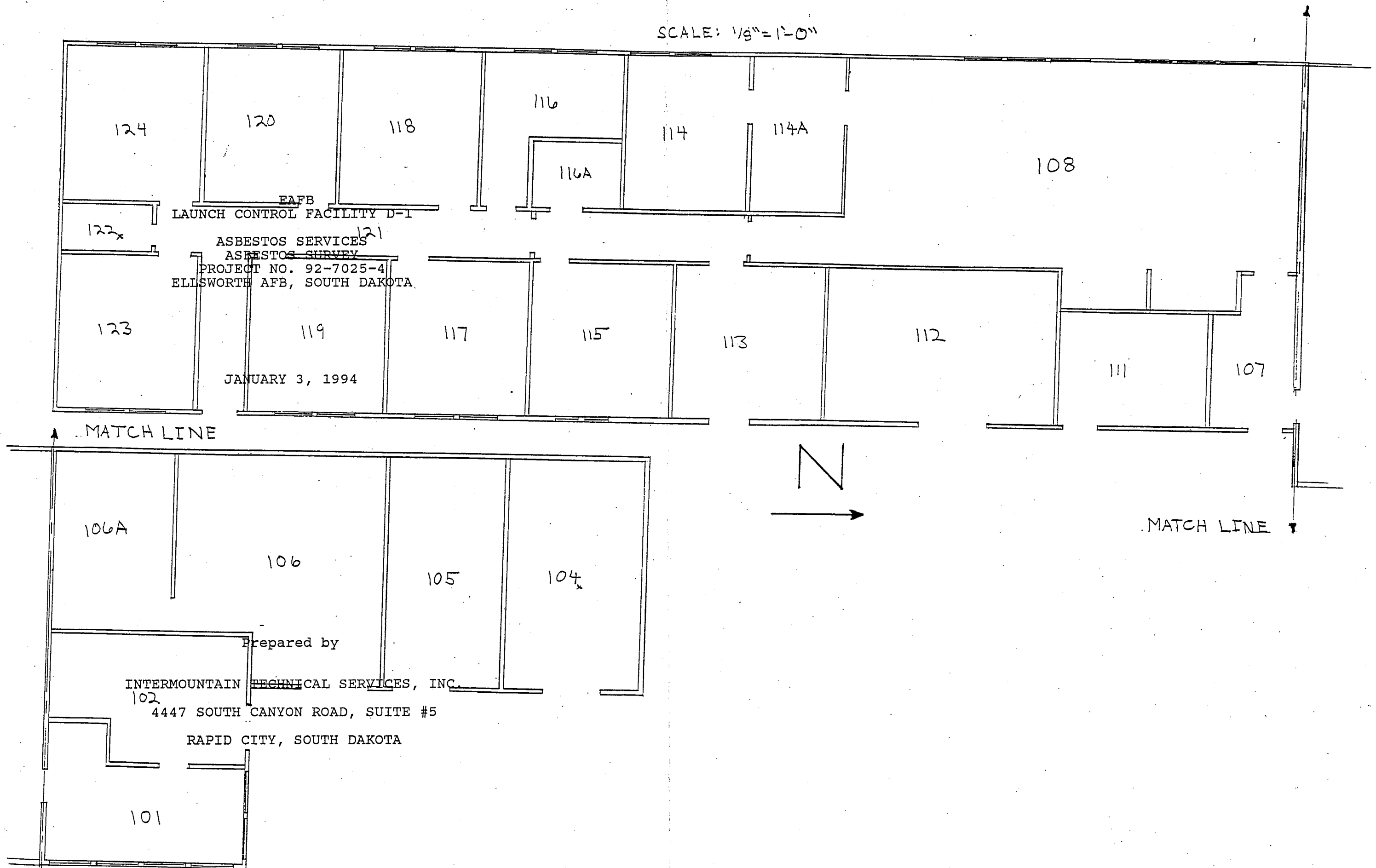
LAUNCH CONTROL FACILITY SITED-1

SCALE: 1/8" = 1'-0"



LAUNCH CONTROL FACILITY SITED-1

SCALE: 1/8" = 1'-0"



GARAGE SITE D-1 SCALE: 1/4" = 1'-0"

100
N ↑

101_x

102

BUILDING INFORMATION SHEET

PREPARED BY: James Almond

DATE: January 3, 1994

AHERA INSPECTOR: James Almond

AHERA CERTIFICATE:
SD CERTIFICATE: 1471R

BUILDING: Launch Control Facility D-1

BUILDING LOCATION: Wall, South Dakota

DATE OF ORIGINAL CONSTRUCTION: 1962

DATES OF RENOVATIONS: N/A

REVIEW OF EXISTING PLANS: Yes

NUMBER OF FLOORS: One

ESTIMATED FLOOR AREA: 4,935 sq.ft.

ORIGINAL OWNER: United States of America

PRESENT OWNER: United States of America

BUILDING CONSTRUCTION TYPE (STRUCTURE): Wood Frame & Concrete
Block

FLOOR CONSTRUCTION MATERIAL: Concrete w/ Floor Tile

CEILING CONSTRUCTION MATERIAL: Sheetrock & Ceiling Tile

WALL CONSTRUCTION MATERIAL: Sheetrock

HVAC SYSTEM DESCRIPTION: Steam from Boiler

THERMAL SYSTEMS INSULATED: Pipe Insulation - Fiberglass
Mudded Pipe Fittings - Wrapped

BUILDING USES: (Approximate Percentages)

USE # 1 Unoccupied

100% OF TOTAL AREA

BUILDING INFORMATION SHEET

PREPARED BY: James Almond

DATE: January 3, 1993

AHERA INSPECTOR: James Almond

AHERA CERTIFICATE:
SD CERTIFICATE: 1471R

BUILDING: Launch Control Facility D-1 Garage

BUILDING LOCATION: Wall, South Dakota

DATE OF ORIGINAL CONSTRUCTION: 1965

DATES OF RENOVATIONS: N/A

REVIEW OF EXISTING PLANS: Yes

NUMBER OF FLOORS: One

ESTIMATED FLOOR AREA: 1,260 sq.ft.

ORIGINAL OWNER: United States of America

PRESENT OWNER: United States of America

BUILDING CONSTRUCTION TYPE (STRUCTURE): Wood Frame & Concrete
Block

FLOOR CONSTRUCTION MATERIAL: Concrete

CEILING CONSTRUCTION MATERIAL: Wood

WALL CONSTRUCTION MATERIAL: Wood

HVAC SYSTEM DESCRIPTION: Heating Unit

THERMAL SYSTEMS INSULATED: N/A

BUILDING USES: (Approximate Percentages)

USE # 1 Unoccupied

100% OF TOTAL AREA

BUILDING INFORMATION SHEET
OPERATIONS BUILDING

AMOUNT OF MATERIAL	MATERIAL TYPE	NUMBER OF SAMPLES
13,966 SF	Sheetrock	7
2,487 SF	Ceiling Tile	5
28 SF	4" Brown Base Cove & Mastic	3
132 SF	4" Black Base Cove & Mastic	3
27 SF	4" Gray Base Cove & Mastic	3
964 SF	Carpet Panel	3
2,312 SF	Floor Tile & Mastic Under Carpet	5
36 SF	12" Brown Linoleum	3
570 SF	12" Brown Floor Tile & Mastic	3
12 SF	Yellow Floor Tile & Mastic (misc.)	3
260 SF	12" Gray Floor Tile & Mastic	3
169 SF	12" Lt. Brown Floor Tile & Mastic	3
202 SF	12" Lt. Gray Floor Tile & Mastic	3
32 SF	9" Tan Floor Tile & Mastic	1
88 EACH	Mudded Pipe Joints	3
3 EACH	Vibration Isolators	3
10 LF	Exhaust Stack Insulation	1
5,110 SF	Shingles Type 1	7
5,110 SF	Shingles Type 2	7
5,110 SF	Roof Felt	7
5 SF	Roof Caulk	3

BUILDING INFORMATION SHEET
GARAGE

AMOUNT OF MATERIAL		MATERIAL TYPE	NUMBER OF SAMPLES
406	SF	Sheetrock	3
10	SF	4" Black Base Cove & Mastic	1
2	EACH	Vibration Isolators	2
1,332	SF	Shingles Type 1	5
1,332	SF	Shingles Type 2	5
1,332	SF	Roof Felt	5
1	SF	Roof Caulk	1

INVENTORY OF HOMOGENEOUS AREAS

FOR BULK SAMPLING RESULTS

	<u>Homogeneous Area</u>	<u>Material</u>	<u>Status</u>	<u>Type</u>
1.	D1-SR-A	Sheetrock	Cleared	M
2.	D1-CT-B	Ceiling Tile 2'x2'	Cleared	M
3.	D1-BC-C	4" Brown Base Cove	Cleared	M
		& Mastic	Cleared	M
4.	D1-BC-D	4" Black Base Cove	Cleared	M
		& Mastic	Cleared	M
5.	D1-BC-E	4" Gray Base Cove	Cleared	M
		& Mastic	Cleared	M
6.	D1-CP-F	Carpet Panel	Cleared	M
7.	D1-FT-G	Floor Tile Under Carpet	10% Chrysotile	M
		& Mastic	Cleared	M
8.	D1-L-H	12" Brown Linoleum	Cleared	M
		& Mastic	Cleared	M
9.	D1-FT-I	12" Brown Floor Tile	Cleared	M
		& Mastic	Cleared	M
10.	D1-FT-J	Yellow (misc.) Floor Tile	Cleared	M
		& Mastic	Cleared	M
11.	D1-FT-K	12" Gray Floor Tile	Cleared	M
		& Mastic	Cleared	M
12.	D1-FT-L	12" Lt. Brown Floor Tile	Cleared	M
		& Mastic	Cleared	M
13.	D1-FT-M	12" Lt. Gray Floor Tile	Cleared	M
		& Mastic	Cleared	M
14.	D1-FT-N	9" Tan Floor Tile	10% Chrysotile	M
		& Mastic	3% Chrysotile	M
15.	D1-TSI-O	Mudded Pipe Joints	3% Chrysotile	TSI
			2% Amosite	
16.	D1-VI-P	Vibration Isolator	Cleared	M
17.	D1-TSI-Q	Exhaust Stack Insulation	<1% Chrysotile	TSI
			2% Amosite	
18.	D1-S-R	Shingles Top Layer	Cleared	M
19.	D1-S-S	Shingles Bottom Layer	Cleared	M
20.	D1-RF-T	Roof Felt	Cleared	M
21.	D1-C-U	Roof Caulk	35% Chrysotile	M
22.	D1G-SR-A	Sheetrock	Cleared	M
23.	D1G-BC-B	4" Black Base Cove	Cleared	M
		& Mastic	Cleared	M
24.	D1G-VI-C	Vibration Isolator	50% Chrysotile	M
25.	D1G-S-D	Shingles Top Layer	Cleared	M
26.	D1G-S-E	Shingles Bottom Layer	Cleared	M
27.	D1G-RF-F	Roof Felt	Cleared	M
28.	D1G-C-G	Roof Caulk	25% Chrysotile	M

S = Surfacing Material
 TSI = Thermal Systems Insulation
 M = Miscellaneous Material

COST ESTIMATE FOR REMOVAL OF
ASBESTOS CONTAINING BUILDING MATERIAL (ACBM)
FROM LAUNCH CONTROL FACILITY D-1

<u>Functional</u> <u>Space No.</u>	<u>Description of</u> <u>ACBM Identified</u>	<u>quantity</u>
F-7	Floor Tile Under Carpet & Mastic	2,262 SF
F-14	9" Tan Floor Tile & Mastic	32 SF
F-15	Mudded Pipe Joints	88 EACH
F-17	Exhaust Stack Insulation	10 LF
F-21	Roof Caulk	5 SF
F-24	Vibration Isolator	2 EACH
F-28	Roof Caulk	1 SF

Removal Cost

<u>Functional</u> <u>Space No.</u>	<u>Unit Cost</u>	<u>Total Cost</u>
F-7	4.50	10,179.00
F-14	4.50	144.00
F-15	25.00	2,200.00
F-17	15.00	150.00
F-21	25.00	125.00
F-24	20.00	40.00
F-28	25.00	25.00

Subtotal 12,863.00

Other Misc Costs* 5,145.00
(Average 40%)

TOTAL 18,008.00

- * The Removal Cost does not include other miscellaneous costs such as abatement design fees, contingencies and construction administration including required industrial hygiene surveillance and air monitoring. To account for these other miscellaneous costs, an additional 40% (average) has been added to subtotal costs for a total project abatement cost.

**LAUNCH CONTROL FACILITY D-1
ROOM FINISH SCHEDULE
OPERATIONS BUILDING**

ROOM	FLOOR	WALLS	N E S W	CEILING
101	CARPET OVER FLOOR TILE* (169 SQ. FT.)	GYPSUM BOARD	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE
102	CONCRETE	GYPSUM BOARD & WOOD BASE COVE	X X X X X X X X	GYPSUM BOARD
104	CARPET & 12" LINOLEUM	GYPSUM BOARD & 4" BROWN BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD
105	12" FLOOR TILE & MASTIC	GYPSUM BOARD & WOOD BASE COVE	X X X X X X X X	GYPSUM BOARD
106	12" FLOOR TILE & MASTIC	GYPSUM BOARD & WOOD BASE COVE	X X X X	GYPSUM BOARD
106A	CONCRETE	GYPSUM BOARD & WOOD BASE COVE	X X X X X X X X	GYPSUM BOARD
107	CARPET OVER FLOOR TILE* (93 SQ. FT.)	GYPSUM BOARD & 4" BLACK BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE
108	CARPET OVER FLOOR TILE* (802 SQ. FT.)	GYPSUM BOARD & WOOD BASE COVE	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE
111	12" FLOOR TILE & MASTIC	GYPSUM BOARD & WOOD BASE COVE	X X X X X X X X	GYPSUM BOARD
112	12" FLOOR TILE & MASTIC	GYPSUM BOARD & WOOD BASE COVE	X X X X X X X X	GYPSUM BOARD
113	12" FLOOR TILE & MASTIC	GYPSUM BOARD & 4" BLACK BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD
114	12" FLOOR TILE & MASTIC	GYPSUM BOARD & 4" GRAY BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD
114A	12" FLOOR TILE & MASTIC	GYPSUM BOARD & 4" GRAY BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE

**LAUNCH CONTROL FACILITY D-1
ROOM FINISH SCHEDULE
OPERATIONS BUILDING**

ROOM	FLOOR	WALLS	N E S W	CEILING
115	QUARRY TILE	GYPSUM BOARD & QUARRY TILE (1/3)	X X X X X X X X	GYPSUM BOARD
116	CARPET OVER FLOOR TILE* (118 SQ. FT.)	GYPSUM BOARD, CARPET PANEL & 4" BLACK BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE
116A	QUARRY TILE	GYPSUM BOARD & QUARRY TILE (1/2)	X X X X X X X X	GYPSUM BOARD
117	CARPET OVER FLOOR TILE* (169 SQ. FT.)	GYPSUM BOARD, CARPET PANEL & 4" BLACK BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE
118	CARPET OVER FLOOR TILE* (169 SQ. FT.)	GYPSUM BOARD, CARPET PANEL & 4" BLACK BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE
119	CARPET OVER FLOOR TILE* (169 SQ. FT.)	GYPSUM BOARD, CARPET PANEL & 4" BLACK BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE
120	CARPET OVER FLOOR TILE* (155 SQ. FT.)	GYPSUM BOARD, CARPET PANEL & 4" BLACK BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE
121	CARPET OVER FLOOR TILE* (302 SQ. FT.)	GYPSUM BOARD & WOOD BASE COVE	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE
122	9" FLOOR TILE* (32 SQ. FT.)	GYPSUM BOARD & 4" BROWN BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD
123	CARPET OVER FLOOR TILE* (169 SQ. FT.)	GYPSUM BOARD, CARPET PANEL & 4" BLACK BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE
124	CARPET OVER FLOOR TILE* (169 SQ. FT.)	GYPSUM BOARD, CARPET PANEL & 4" BLACK BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD & 2'X2' CEILING TILE

LAUNCH CONTROL FACILITY D-1
ROOM FINISH SCHEDULE

ROOM	FLOOR	GARAGE		N E S W	CEILING
		WALLS			
100	CONCRETE	WOOD & WOOD BASE COVE	X X X X X X X X	WOOD	
101	CONCRETE	GYPSUM BOARD & 4" BLACK BASE COVE & MASTIC	X X X X X X X X	GYPSUM BOARD	
102	CONCRETE	GYPSUM BOARD & WOOD BASE COVE	X X X X X X X X	GYPSUM BOARD	



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Telephone 606/299-6556

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Madisonville, Ky.
502/821-7375

Paducah, Ky.
502/444-6547
Pikeville, Ky.
606/432-3104

ANALYSIS REPORT

IN4447

Intermountain Technical Services
Attn: James Almond
4447 South Canyon Road
Suite 5
Rapid City, South Dakota 57702

Analyzed: 11/08/93

Project Name:
Ellsworth Air Force Base-Launch Control
Facilities
Building D1

Lab ID	Project ID	
9311265	D1-SR-A1	<1% Chrysotile 25% Cellulose 74% Binder Gray, powdery, fibrous. Sheetrock.
9311266	D1-CT-B1	60% Cellulose 25% Glass 5% Binder 10% Perlite Tan, fibrous, powdery. NO ASBESTOS DETECTED. Ceiling tile 2x2.
9311267	D1-BC-C1	<1% Cellulose 99% Binder Brown vinyl. NO ASBESTOS DETECTED. Brown base cover & mastic, 4".
9311268	D1-BC-D1	1% Cellulose <1% Glass 98% Binder Black vinyl. NO ASBESTOS DETECTED. Black base cove & mastic, 4".
9311269	D1-BC-E1	<1% Cellulose 99% Binder Gray vinyl. NO ASBESTOS DETECTED. Gray base cove & mastic, 4".
9311270	D1-CP-F1	60% Cellulose 20% Glass 5% Binder 15% Perlite Tan fibrous powdery. NO ASBESTOS DETECTED. Carpet Panel.
9311271	D1-FT-G1	10% Chrysotile 1% Cellulose 29% Binder 35% Quartz 25% Carbonates Tan, granular, fibrous. Floor tile & mastic under carpet.
9311272	D1-L-H1	3% Cellulose 32% Binder 40% Quartz 25% Carbonates Brown vinyl on granular. NO ASBESTOS DETECTED. Brown linoleum, 12".

Continued on next page.

Submitted by

David H. McRae



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Louisville: NIST (NVLAP) # 1224
Lexington/Louisville/Paducah - AIHA PAT # 42431/Member N

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ANALYSIS REPORT

IN4447

Intermountain Technical Services
Attn: James Almond
4447 South Canyon Road
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Rapid City, South Dakota 57702

Analyzed: 11/08/93

Project Name:
Ellsworth Air Force Base-Launch Control
Facilities
Building D1

Lab ID	Project ID	
9311273	D1-FT-I1	7% Cellulose 23% Binder 25% Quartz 45% Carbonates Beige, granular fibrous. NO ASBESTOS DETECTED. Brown floor tile & mastic, 12".
9311274	D1-FT-J1	7% Cellulose 21% Binder 25% Quartz 45% Carbonates 2% Mastic Yellow granular fibrous, mastic. NO ASBESTOS DETECTED. Yellow floor tile & mastic.
9311275	D1-FT-R1	5% Cellulose 30% Binder 25% Quartz 40% Carbonates Gray, granular. NO ASBESTOS DETECTED. Gray floor tile & mastic, 12".
9311276	D1-FT-L1	5% Cellulose 30% Binder 20% Quartz 45% Carbonates Beige, granular, fibrous. NO ASBESTOS DETECTED. Light brown floor tile & mastic, 12".
9311277	D1-FT-M1	5% Cellulose 15% Binder 35% Quartz 45% Carbonates Gray, granular, fibrous. NO ASBESTOS DETECTED. Light gray floor tile & mastic, 12".
9311278	D1-FT-N1	10% Chrysotile 33% Binder 20% Quartz 35% Carbonates 2% Mastic Tan, granular fibrous w/mastic. Tan floor tile & mastic, 9". Tile is approx. 10% asbestos, mastic is approx. 3% asbestos.
9311279	D1-TSI-01	3% Chrysotile 2% Amosite 15% Cellulose 35% Glass 45% Binder Tan, powdery, fibrous. Muddled pipe joints.

Continued on next page.

Submitted by

David H. McRae

In accepting analytical work, AMI warrants the test results to be of precision normal for the sample type and methodology employed for each sample submitted. AMI disclaims any other warranties expressed or implied, including warranty of fitness for a particular purpose and warranty of merchantability. AMI accepts no legal responsibilities for the purpose for which the client uses test results. Any analytical work must be governed by the terms and conditions set forth herein.



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ANALYSIS REPORT

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Rapid City, South Dakota 57702

Analyzed: 11/08/93

Project Name:

Ellsworth Air Force Base-Launch Control

Facilities

Building D1

Lab ID	Project ID	
9311280	D1-UI-P1	40% Glass 60% Binder White elastic on fibers. NO ASBESTOS DETECTED. Vibration isolators.
9311281	D1-TSI-Q1	<1% Chrysotile 2% Amosite 3% Cellulose 45% Glass 49% Binder Beige, powdery, fibrous. Exhaust stack insulation.
9311282	D1-S-R1	45% Cellulose 40% Binder 10% Quartz 5% Carbonates Black, granular, fibrous. NO ASBESTOS DETECTED. Shingles top layer.
9311283	D1-S-S1	48% Cellulose 37% Binder 10% Quartz 5% Carbonates Black granular fibrous. NO ASBESTOS DETECTED. Shingles bottom layer.
9311284	D1-RF-T1	85% Cellulose 15% Binder Black fibrous layer. NO ASBESTOS DETECTED. Roof felt.
9311285	D1-C-U1	35% Chrysotile 65% Binder Black fibrous tar layer. Roof caulk.

Continued on next page.

Submitted by

David H. McFarlane

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Analyzed: 11/08/93

Project Name:
Ellsworth Air Force Base-Launch Control
Facilities
Building D1G

Lab ID	Project ID	
9311286	D1G-SR-A1	35% Cellulose 65% Binder Gray powdery brown fibrous. NO ASBESTOS DETECTED. Sheetrock.
9311287	D1G-BC-B1	<1% Cellulose 99% Binder Black rubber material. NO ASBESTOS DETECTED. Black base cover & mastic, 4".
9311288	D1G-UI-C1	50% Chrysotile 45% Cellulose 5% Binder Gray fibrous rope-type material. Vibration isolator.
9311289	D1G-S-D1	48% Cellulose 32% Binder 15% Quartz 5% Carbonates Brown granular fibrous shingle. NO ASBESTOS DETECTED. Shingle top layer.
9311290	D1G-S-E1	48% Cellulose 32% Binder 15% Quartz 5% Carbonates Black granular fibrous. NO ASBESTOS DETECTED. Shingles bottom layer.
9311291	D1G-RF-F1	85% Cellulose 15% Binder Black fibrous felt tar layer. NO ASBESTOS DETECTED. Roof felt.
9311292	D1G-C-G1	25% Chrysotile 75% Binder Black fibrous tar layers. Roof caulk.

Continued on next page.

Submitted by

David H. McRae

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SCOPE OF ACCREDITATION

BULK ASBESTOS FIBER ANALYSIS

NVLAP LAB CODE 1224 00

Analytical Management, Inc.
2285 Executive Drive, Suite 200
P.O. Box 11279
Lexington, KY 40505
David H. McRae Phone: 606-299-6556

Accreditation Renewal Date: July 1, 1994

NVLAP Code Designation

18/A01

40 Code of Federal Regulations Chapter I (1-1-87 edition) Part 763, Subpart F, Appendix A or the current U. S. Environmental Protection Agency method for the analysis of asbestos in building materials by polarized light microscopy.



A handwritten signature in cursive script, reading "Robert D. Phalen", is written over a horizontal line.

For the National Institute of Standards and Technology

United States Department of Commerce
National Institute of Standards and Technology

NVLAP

Certificate of Accreditation

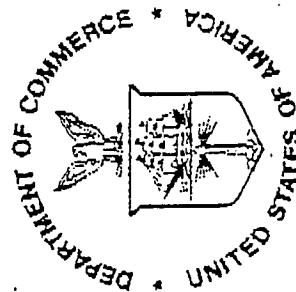
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BULK ASBESTOS FIBER ANALYSIS

July 1, 1994

Effective until



Albert D. Phillips
For the National Institute of Standards and Technology

ASBESTOS INSPECTION REPORT
BUILDINGS
DELTA-01 LAUNCH CONTROL FACILITY &
DELTA-09 LAUNCH FACILITY

MINUTEMAN MISSILE NATIONAL HISTORIC SITE
SOUTH DAKOTA

Inspection by:
Anderson Environmental Services
311 W. Custer St, #224
Belle Fourche, SD 57717
605-723-6374

LETTER OF TRANSMITTAL

INSPECTOR'S INFORMATION:

Anderson Environmental Services
Dave Anderson
311 W. Custer St. #224
Belle Fourche, SD 57717

INSPECTION DATES:

7/6/09

OWNER INFORMATION:

Minuteman Missile National Historic Site
South Dakota

SIGNATURE:

BUILDING INFORMATION SHEET

BUILDING NAME: Delta-0I Launch Control Facility and Delta-09 Launch Facility

BUILDING LOCATION:

TYPE OF STRUCTURE: Stick and Masonry Construction

DATE OF ORIG. CONST.: 1962

DATES OF RENOVATIONS: Various

HVAC DESCRIPTION: Hot Water Heat

NUMBER OF FLOORS: 2

ESTIMATED FLOOR AREA: Approximately 2,000 SF

BUILDING OWNER: US Government, NPS

AHERA INSPECTOR: Dave Anderson

DESIGNATED PERSON: John Black

BUILDING USES: Museum and Tours

TO THE BUILDING OWNER:

This report was prepared by trained and certified asbestos inspectors.

It is the professional opinion of the personnel that prepared the report that it contains only true, accurate, and error free information. However, the building owner should know the limitations of this report. In this regard it should be pointed out that various materials found in certain buildings were not sampled, assessed or in any way addressed as potential sources of asbestos fibers. These areas were left out of this report for two reasons: (1) The need to minimize destructive sampling in school buildings, and (2) the U.S. EPA has published a document that specifically identifies these areas as ones that need not be included in the AHERA inspection report. For the owners information, this document is: "100 COMMONLY ASKED QUESTIONS ABOUT THE NEW AHERA ASBESTOS IN SCHOOLS RULE" published by the Office of Toxic Substances, Office of Pesticides and Toxic Substances. U.S. Environmental Protection Agency, Washington, D.C. 20460 dated May 1988.

Specifically these areas are:

1. Cinder block
2. Concrete
3. Blackboards
4. Pressed wood
5. Wall or ceiling carpet
6. Exterior materials of all types
7. Auditorium curtains
8. Table tops and countertops
9. Suspected materials stored in the building
10. Fire proof clothing and blankets
11. Fire bricks and boiler cement

Obviously some of these materials may contain asbestos and could indeed be a real source of health hazard if conditions were such that fibers were released from them. For this reason the building owner is encouraged to be aware of the presence of these materials in all buildings and to take the appropriate action at those times when the potential for fiber release is made present.

PRE INSPECTION INFORMATION

DESCRIPTION OF PREVIOUS ASBESTOS INSPECTION
HISTORY:

N/A

DESCRIPTION OF PREVIOUSLY CONFIRMED ASBESTOS CONTAINING BUILDING
MATERIALS:

NONE

DESCRIPTION OF PREVIOUSLY COMPLETED SAMPLING
FOR ACM:

NONE

EXCLUSIONARY STATEMENT:

NONE

SUMMARY OF All HOMOGENEOUS AREAS IN THIS BUILDING

BUILDING NAME: Delta-01 Launch Control Facility

BUILDING LOCATION: Minuteman Missile National Historic Site

H.A. # ACBM DESCRIPTION & LOCATION

1	2x2 Ceiling tile, throughout the building	NA CON	
2	12" floor tile #1, tan with small flecks	NA CON	
3	12" floor tile #2, water room	NA CON	
4	12" floor tile #3, generator room	NA CON	
5	12" floor tile #4, recreation room	NA CON	
6	Mudded pipe joints, throughout	ACM CON	FR, D HPD
7	Sheetrock, throughout	NA CON	
8	shingles	NA CON	
9	Roofing felt	NA	
10	12" floor tile #5, gray	ACM CON	NF, D MPD

NA=non-asbestos

S=surfacing material

HPD=high potential for damage

ACBM=asbestos

TSI=thermal systems

MPD=moderate potential for damage

FR=friable

MISC=miscellaneous

LPD=low potential for damage

NF=non-friable

D=damaged

ASS=assumed

SD=significantly damaged

CON=confirmed

SUMMARY OF All HOMOGENEOUS AREAS IN THIS BUILDING

BUILDING NAME: Delta-01 Launch Control Facility

BUILDING LOCATION: Minuteman Missile National Historic Site

H.A. # ACBM DESCRIPTION & LOCATION

11	Metalbestos chimney	ACM CON	NF, D MPD
12	Vinyl flooring	NA CON	

13	9" floor tile, West closet	ACM ASS	NF, D MPD
14	Masonite board	NA CON	
15	Flat panels, (transite)	ACM CON	NF, D MPD
16	Furnace plenum	NA CON	
17	LCC vent insulation	ACM CON	NF, D MPD

NA=non-asbestos

S=surfacing material

HPD=high potential for damage

ACBM=asbestos

TSI=thermal systems

MPD=moderate potential for damage

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D=damaged

ASS=assumed

SD=significantly damaged

CON=confirmed

SAMPLE LOG

BUILDING NAME AND NUMBER: Delta-
01 Launch Control Facility

sample number	sample description/locat ion
------------------	------------------------------------

NPS-1	2x2 ceiling tile, East side of N-S hall by SCC room
NPS-2	12" floor tile #1 & mastic, under carpet by door to day room Tan with small flecks
NPS-3	12" floor tile #2, yellow, in the boiler room
NPS-4	12" floor tile #3, tan & gray, in the generator room
NPS-5	12" floor tile #4, wood grain, in the rec. room
NPS-6	12" Floor tile #5, gray, floor of the LCC
NPS-7	Sheetrock, East side the N-S hall by the SCC room
NPS-8	Sheetrock, mid-South wall of the rec. room
NPS-9	Sheetrock, West wall of the day room, by the kitchen
NPS-10	Sheetrock, in the facility manager's room

SAMPLE LOG

Building Name & Number: Delta-01 Launch Control Facility

SAMPLE#	SAMPLE DESCRIPTION & LOCATION
NPS-11	Sheetrock, in the SCC room on the East wall
NPS-12	Masonite Board, in the SCC room on the West wall
NPS-13	Asphalt shingle, from the attic space above the boiler room
NPS-14	Roofing felt, from the attic space above the boiler room
NPS-15	Mudded pipe joint, on the West wall of the boiler room
NPS-16	Mudded pipe joint, on the North side of the stack in the boiler room
NPS-17	Mudded pipe joint, on the pipe above the suspended ceiling in the N-S hall
NPS-18	Flat panels, (transite), in the weapons locker in the SCC room
NPS-19	Plenum gasket, on the exhaust plenum for the garage furnace
NPS-20	LCC vent insulation, beige – silver foil covered flex duct on top of the LCC
NPS-21	LCC vent insulation, gray – silver foil covered flex duct on top of the LCC

HOMOGENEOUS AREA ASSESSMENT SUMMARY

BUILDING OWNER: National Park Service

BUILDING NAME: Delta-01 Launch Control Facility

HOMOGENEOUS AREA #: 6

DESCRIPTION OF THE H.A.: Muddled Pipe Joints

The material in this homogeneous area was determined to be:

<input type="checkbox"/> Non-Asbestos Containing	<input type="checkbox"/> Undamaged
<input checked="" type="checkbox"/> Asbestos Containing	<input checked="" type="checkbox"/> Damaged
	<input type="checkbox"/> Significantly damaged
<input type="checkbox"/> Non Friable	
<input checked="" type="checkbox"/> Friable	
<input checked="" type="checkbox"/> TSI	<input type="checkbox"/> Surfacing
<input type="checkbox"/> Miscellaneous	

The potential for damage for the material in this H.A. was determined to be:

ACBM with potential for contact with occupants:	<input type="checkbox"/> potential is high
	<input checked="" type="checkbox"/> potential is moderate
	<input type="checkbox"/> potential is low
ACBM with potential for influence from vibration:	<input type="checkbox"/> potential is high
	<input type="checkbox"/> potential is moderate
	<input checked="" type="checkbox"/> potential is low
ACBM with potential for air erosion:	<input type="checkbox"/> potential is high
	<input type="checkbox"/> potential is moderate
	<input checked="" type="checkbox"/> potential is low

Comments on additional factors that may affect fiber release:

These muddled pipe joints are located throughout the building above the suspended ceiling and in the attic space as well as the boiler room.

INSPECTOR Dave Anderson

CERTIFICATION SD #3826

SIGNATURE _____ DATE _____

HOMOGENEOUS AREA ASSESSMENT SUMMARY

BUILDING OWNER: National Park Service
BUILDING NAME: Delta-01 Launch Control Facility
HOMOGENEOUS AREA #: 10
DESCRIPTION OF THE H.A.: 12" Floor tile gray

The material in this homogeneous area was determined to be:

<input type="checkbox"/> Non-Asbestos Containing	<input type="checkbox"/> Undamaged
<input checked="" type="checkbox"/> Asbestos Containing	<input checked="" type="checkbox"/> Damaged
	<input type="checkbox"/> Significantly damaged
<input checked="" type="checkbox"/> Non Friable	
<input type="checkbox"/> Friable	
<input type="checkbox"/> TSI	<input type="checkbox"/> Surfacing
<input checked="" type="checkbox"/> Miscellaneous	

The potential for damage for the material in this H.A. was determined to be:

ACBM with potential for contact with occupants:	<input type="checkbox"/> potential is high
	<input checked="" type="checkbox"/> potential is moderate
	<input type="checkbox"/> potential is low
ACBM with potential for influence from vibration:	<input type="checkbox"/> potential is high
	<input type="checkbox"/> potential is moderate
	<input checked="" type="checkbox"/> potential is low
ACBM with potential for air erosion:	<input type="checkbox"/> potential is high
	<input checked="" type="checkbox"/> potential is moderate
	<input type="checkbox"/> potential is low

Comments on additional factors that may affect fiber release:

This material was found only in the LCC.

INSPECTOR Dave Anderson

CERTIFICATION SD #3826

SIGNATURE _____ DATE _____

HOMOGENEOUS AREA ASSESSMENT SUMMARY

BUILDING OWNER: National Park Service

BUILDING NAME: Delta-01 Launch Control Facility

HOMOGENEOUS AREA #: 11

DESCRIPTION OF THE H.A.: Metalbestos chimney

The material in this homogeneous area was determined to be:

☐ Non-Asbestos Containing
☒ Asbestos Containing
☒ Non Friable
☐ Friable

☐ Undamaged
☒ Damaged
☐ Significantly damaged

☐ _X_TSI
 ☐ ____Surfacing
☐ ____Miscellaneous

The potential for damage for the material in this H.A. was determined to be:

ACBM with potential for contact with occupants:

☐ potential is high

☒_X_ potential is moderate

☐ potential is low

ACBM with potential for influence from vibration:

- ☐ potential is high
- ☐ potential is moderate
- ☒ potential is low

ACBM with potential for air erosion:

<input type="checkbox"/>	potential is high
<input type="checkbox"/>	potential is moderate
<input checked="" type="checkbox"/>	potential is low

Comments on additional factors that may affect fiber release:

INSPECTOR Dave Anderson

CERTIFICATION SD #3826

SIGNATURE _____ DATE _____

HOMOGENEOUS AREA ASSESSMENT SUMMARY

BUILDING OWNER: National Park Service
BUILDING NAME: Delta-01 Launch Control Facility
HOMOGENEOUS AREA #: 13
DESCRIPTION OF THE H.A.: 9" floor tile with black mastic

The material in this homogeneous area was determined to be:

<input type="checkbox"/> Non-Asbestos Containing	<input type="checkbox"/> Undamaged
<input checked="" type="checkbox"/> Asbestos Containing	<input checked="" type="checkbox"/> Damaged
	<input type="checkbox"/> Significantly damaged
<input checked="" type="checkbox"/> Non Friable	
<input type="checkbox"/> Friable	
<input type="checkbox"/> TSI	<input type="checkbox"/> Surfacing
<input checked="" type="checkbox"/> Miscellaneous	

The potential for damage for the material in this H.A. was determined to be:

ACBM with potential for contact with occupants:	<input type="checkbox"/> potential is high
	<input checked="" type="checkbox"/> potential is moderate
	<input type="checkbox"/> potential is low
ACBM with potential for influence from vibration:	<input type="checkbox"/> potential is high
	<input type="checkbox"/> potential is moderate
	<input checked="" type="checkbox"/> potential is low
ACBM with potential for air erosion:	<input type="checkbox"/> potential is high
	<input type="checkbox"/> potential is moderate
	<input checked="" type="checkbox"/> potential is low

Comments on additional factors that may affect fiber release:

This material was only found in the West hall closet. The inspector was told that the entire floor was Covered with 9" tile, but it had been removed and replaced by the previous owner.

INSPECTOR Dave Anderson

CERTIFICATION SD #3826

SIGNATURE _____ DATE _____

HOMOGENEOUS AREA ASSESSMENT SUMMARY

BUILDING OWNER: National Park Service

BUILDING NAME: Delta-01 Launch Control Facility

HOMOGENEOUS AREA #: 15

DESCRIPTION OF THE H.A.: Flat Panels - transite

The material in this homogeneous area was determined to be:

☐ Non-Asbestos Containing
☒ Asbestos Containing
☒ Non Friable
☐ Friable

☐ Undamaged
☒ Damaged
☐ Significantly damaged

☐ TSI
 ☐ Surfacing
☒ Miscellaneous

The potential for damage for the material in this H.A. was determined to be:

ACBM with potential for contact with occupants:	<input type="checkbox"/> potential is high
	<input checked="" type="checkbox"/> potential is moderate
	<input type="checkbox"/> potential is low
ACBM with potential for influence from vibration:	<input type="checkbox"/> potential is high
	<input type="checkbox"/> potential is moderate
	<input checked="" type="checkbox"/> potential is low
ACBM with potential for air erosion:	<input type="checkbox"/> potential is high
	<input type="checkbox"/> potential is moderate
	<input checked="" type="checkbox"/> potential is low

Comments on additional factors that may affect fiber release:

In the weapons storage in the SCC room.

INSPECTOR Dave Anderson

CERTIFICATION SD #3826

SIGNATURE _____ DATE _____

HOMOGENEOUS AREA ASSESSMENT SUMMARY

BUILDING OWNER: National Park Service
BUILDING NAME: Delta-01 Launch Control Facility
HOMOGENEOUS AREA #: 17
DESCRIPTION OF THE H.A.: LCC vent insulation – gray fiber

The material in this homogeneous area was determined to be:

<input type="checkbox"/> Non-Asbestos Containing	<input type="checkbox"/> Undamaged
<input checked="" type="checkbox"/> Asbestos Containing	<input checked="" type="checkbox"/> Damaged
	<input type="checkbox"/> Significantly damaged
<input checked="" type="checkbox"/> Non Friable	
<input type="checkbox"/> Friable	
<input type="checkbox"/> TSI	<input type="checkbox"/> Surfacing
<input checked="" type="checkbox"/> Miscellaneous	

The potential for damage for the material in this H.A. was determined to be:

ACBM with potential for contact with occupants:	<input type="checkbox"/> potential is high
	<input checked="" type="checkbox"/> potential is moderate
	<input type="checkbox"/> potential is low
ACBM with potential for influence from vibration:	<input type="checkbox"/> potential is high
	<input type="checkbox"/> potential is moderate
	<input checked="" type="checkbox"/> potential is low
ACBM with potential for air erosion:	<input type="checkbox"/> potential is high
	<input type="checkbox"/> potential is moderate
	<input checked="" type="checkbox"/> potential is low

Comments on additional factors that may affect fiber release:

INSPECTOR Dave Anderson

CERTIFICATION SD #3826

SIGNATURE _____ DATE _____

Anderson Environmental Services

311 W. Custer St. #224

Belle Fourche, SD 57717

605-723-6374(h)

605-580-6374(c)

tanker1@rushmore.com

December 15, 2009

Mr. John Black
Facility Operations Specialist
Minuteman National Historic Site
21280 Highway 240
Philip, South Dakota 57567

Mr. Black:

The Asbestos Inspection Report provided for the Delta-01 Launch Control Facility and the Delta-09 Launch Facility contains documentation of several areas of asbestos containing materials.

These materials are required to be handled in the following manner:

Mudded Pipe Joints – these joints must be removed by certified asbestos personnel. They are considered regulated asbestos containing materials.

Metalbestos Chimney – the chimneys are considered non-friable and may be removed by maintenance personnel as long as they are not crushed or crumbled and create airborne fibers.

Transite Panels – the panels are considered to be non-friable and may be removed by maintenance personnel if they are misted with water and removed without creating damage or dust.

Floor Tile – the floor tile and black mastic are considered non-friable and as such may be removed by non-certified personnel as long as they are not broken and do not create dust during any disturbance.

LCC Vent Insulation - this material may be removed as non friable material as long as there is no disturbance to the outer cover of the material.

If you have any questions, or if you need more information, please contact me at the numbers listed above.

Sincerely,

A handwritten signature in cursive script that reads "Dave Anderson". The signature is written in black ink and is positioned to the right of the word "Sincerely,".

Dave Anderson



COVER ILLUSTRATIONS

TOP IMAGE: The launch tube of Launch Facility Delta-09 as seen today through the viewing enclosure with a training missile in place. (NPS Photograph)

BOTTOM LEFT: Flight Security Controller's office at Delta-01 Launch Control Facility photographed prior to the shutdown of the site, 1993. (HAER Photograph HAER SD-50-A-46)

BOTTOM MIDDLE: A South Dakota Launch Facility being constructed by contractor, Peter Kiewit and Sons, 1961. (Courtesy of Peter Kiewit and Sons, Inc.)

BOTTOM RIGHT: Test launch of a Minuteman II missile at Vandenberg Air Force Base, California, 1963. ("Site Activation Chronology, Minuteman Project, Ellsworth Air Force Base, South Dakota, July 1963-October 1963," K243.012-40, in USAF Collection, AFHRA)

BACK ILLUSTRATIONS

TOP LEFT: Launch Control Center being constructed by contractor, Peter Kiewit and Sons, 1961. (Courtesy of Peter Kiewit and Sons, Inc.)

TOP RIGHT: Launch Facility Delta-09 with a Peacekeeper security response vehicle inside the compound, 2009. (NPS Photograph)

LEFT SIDE SECOND DOWN: Blast door protecting the Launch Control Center at Delta-01 Launch Control Facility, 1982. (Photograph by Mark Wilderman, MIMI 2363)

LEFT SIDE THIRD DOWN: Launch Control Facility Delta-01, 2007. (John Black, NPS Photograph)

LEFT BOTTOM: Personnel access hatch open at Launch Facility Kilo-09 ca. 1975. (Photograph by Alonzo Hall, MIMI 2941)

RIGHT BOTTOM: Launch Control Facility Delta-01 just after deactivation in 1993 with Interstate 90 in the background. (Photograph by Mathew Loughney)

