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**M55 ROCKET DISPOSAL PROGRAM
STUDY
M55-CD-2
AIRFIELD CONSTRUCTION FEASIBILITY**

AD-A162 620

**US Army Corps
of Engineers
Huntsville Division**

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PREPARED FOR

**U.S. ARMY TOXIC AND HAZARDOUS MATERIALS AGENCY
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relocating and upgrading public roads, transporting over civilian roads, can all be avoided by staying on the installation. Upgrading of the civilian airports near Anniston Army Depot for C-141B use was found to be impractical. *Remarks: M-55 road.*

*Pine Bluff Arsenal, Arkansas. Toole Army Depot, Utah, A.
Transportation, Landing fields.*

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M55 ROCKET DISPOSAL PROGRAM STUDY
FOR
AIRFIELD CONSTRUCTION FEASIBILITY

Prepared By
U.S. Army Engineer Division, Huntsville
Huntsville, Alabama

For
U.S. Army Toxic and Hazardous Materials Agency
Aberdeen Proving Ground, Maryland

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EXECUTIVE SUMMARY

A study was conducted evaluating the feasibility of constructing airfields on each of the five U.S. installations now storing M55 rockets. Additionally, similar analyses were made for upgrading selected civilian airfields near the storage installations. The study assumed temporary-use airfields capable of handling movement of the M55 stockpile to a central disposal facility using C-141B military transports. Airfield criteria were developed using existing military technical manuals, advice of the Military Airlift Command, and in the absence of definite criteria, engineering judgement.

It was found feasible to construct airfields at each of the five installations. It was found impractical to build directly on the installation of Anniston Army Depot, but Pelham Range of Fort McClellan offers a site just a mile north of the storage site which allows for operation totally within federal property. Building on the Blue Grass Activity was believed more preferable to upgrading the Madison Airport, Madison County, Kentucky because the costs were practically the same; then, the difficulties of buying civilian property, relocating and upgrading public roads, transporting over civilian roads, can all be avoided by staying on the installation. Upgrading of the civilian airports near Anniston Army Depot for C-141B use was found to be impractical. The report provides layouts (see attachments 1 through 7), cost estimates, and narrative descriptions of findings for each airfield found feasible to construct. A summary of the costs and findings is provided in attachment 9 at the end of the report.

Attachment 8 provides land use compatibility requirements, and attachment 10 is a copy of the transmittal of the draft, including information on airfield operating personnel and crash rescue equipment requirements from Military Airlift Command.

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<u>Attachment</u>	<u>Title</u>
1	Class B Runway for C-141 Aircraft
2	Umatilla Depot Activity Site Layout
3	Pine Bluff Arsenal Site Layout
4	Tooele Army Depot Site Layout: West Site
4A	Tooele Army Depot Site Layout: East Site
5	Lexington-Bluegrass Depot Activity Site Layout
6	Anniston Army Depot Activity Site Layout
7	Fort McClellan Pelham Range Site Layout
8	Land Use Compatibility Requirements
9	Summary of Results from Airfield Construction Study
10	Transmittal of Draft With Enclosure 2

LIST OF ABBREVIATIONS AND ACRONYMS

ANAD	Anniston Army Depot
APZ	Accident Potential Zone
BGA	Blue Grass Activity
CAMDS	Chemical Agent Munitions Disposal System
EOD	Explosive Ordnance Disposal
L&N	Louisville and Nashville
LBDA	Lexington-Bluegrass Depot Activity
MAC	U.S. Air Force Military Airlift Command
PBA	Pine Bluff Arsenal
TEAD	Tooele Army Depot
TM	Technical Manuals
UMDA	Umatilla Depot Activity
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USGS	United States Geological Survey

CHAPTER 1

INTRODUCTION

1-1. BACKGROUND

At the request of the U.S. Army Toxic and Hazardous Materials Agency (USATHAMA), the U.S. Army Corps of Engineers, Huntsville Division conducted studies to determine if sites were available for constructing airfields for disposing of the M55 rockets by air transport. Sites investigated were Anniston Army Depot, Anniston, Alabama; Umatilla Depot Activity, Hermiston, Oregon; Lexington-Bluegrass Depot Activity, Richmond, Kentucky; Pine Bluff Arsenal, Pine Bluff, Arkansas; and Tooele Army Depot, Tooele, Utah. This report is a result of those studies.

1-2. SCOPE

A fully loaded C-141 aircraft is the transport vehicle used in the studies as directed by USATHAMA. Initially, criteria from Army Technical Manuals (TM) 5-330, Planning and Design of Roads, Airbases, and Heliports in the Theater of Operations; and 5-803-7, Airfield and Heliport Planning Criteria were considered. After conversations with the U.S. Air Force Military Airlift Command (MAC), it was determined that TM 5-803-7 should be used for airfield layout and design criteria. Runway length and width requirements and maximum gross aircraft weight were provided by MAC.

Use of a C-141 requires a Class B runway. The size of the clear zones, accident potential zones, and approach-departure zones for this class runway is based on the requirements in TM 5-803-7. Attachment 1 provides dimensions of the runway and required safety zones, and attachment 8 contains the land use compatibility requirements within these zones.

Per USATHAMA directions, cost estimates are based on the construction of a temporary airfield designed for the amount of traffic required to transport the M55 rockets only. A plan change that would include establishing a permanent airfield or using facilities for other missions would increase costs.

Reports summarizing studies at each of the above installations follow.

CHAPTER 2

UMATILLA DEPOT ACTIVITY

2-1. GENERAL

At Umatilla Depot Activity (UMDA) the study was conducted to determine if there is a site on the installation where an airfield could be located. The following is based on site information obtained from United States Geological Survey (USGS) 7.5 minute quadrangle topographic maps and from Umatilla Depot Activity master plan drawings.

2-2. REAL ESTATE

There is a large open area in the northwest corner of UMDA that could be used to construct an airfield. A site layout is provided by attachment 2. The area is large enough to provide space for the runway and most of the required clear zone. A small part of the clear zone at the end of the runway might lie outside of the depot boundary, depending on final siting of the runway. The depot does have a one-mile-wide land use restriction easement on the north side. Locating part of the clear zone in this area should be acceptable.

The Accident Potential Zones (APZ) would extend outside the depot boundary and the easement area. Since the land surrounding UMDA is primarily open farmland, present land use is probably within guidelines of land use compatibility per TM 5-803-7.

There does not appear to be any obstacles in the approach-departure clearance zones. There is, however, a possible conflict with other aircraft, as this zone extends into the Boardman Bombing Range west of UMDA. This might require coordinating flights with training exercises in this area.

Easements for the APZ and approach-departure zones would be required where these zones cross private property on both the west and north sides of the depot. The cost of obtaining these easements is not included in this report.

2-3. SITE CONDITIONS

The site is located in an area of the depot that is generally undeveloped. The terrain is relatively flat and vegetation is sparse. No physical restraints exist, as the few buildings in the area can easily be avoided. Foundation conditions in this area are anticipated to be good.

There are existing roads leading from the chemical storage area to the proposed cargo loading area, but their condition is not known. No costs for access roads are included in the construction estimate.

2-4. EFFECT ON UMDA OPERATIONS

Locating the runway, cargo loading area, and aircraft parking areas in the proposed location would require the installation to limit the maximum explosive storage in several of the Storage Block I igloos in order to meet quantity distance safety requirements.

Two primary access roads to the demolition pit area and to ammunition maintenance facility buildings would be cut off by the runway. Other roads in the area could possibly be used; however, these roads would be a more indirect route and their condition is not known. Some new road construction might be required. There are no costs included for road replacement.

2-5. COST

The following is the estimated cost of constructing a runway, taxiway, cargo loading area, and aircraft parking area. This estimate does not include costs for real estate, design, operations facilities, access roads, and demolition or replacement of facilities at the installation. The estimate is based on present day cost, since no projected construction date was given:

ITEM	COST
Grading and Drainage	\$ 1,519,730
Pavement	5,729,006
Fencing	318,750
Site Finishing	<u>122,800</u>
TOTAL	\$ 7,690,286

2-6. CONCLUSION

UMDA does have an area on which an airfield could reasonably be constructed. There are no apparent problems associated with actual construction or operation of an airfield with the exception of a possible conflict with Boardman Bombing Range. Problems that might be involved in obtaining real estate easements have not been investigated.

A detailed survey of the area would be required to confirm that there is no existing incompatible land use or obstacles in the approach-departure zone.

CHAPTER 3

PINE BLUFF ARSENAL

3-1. GENERAL

At Pine Bluff Arsenal (PBA) the study was conducted to determine if an airfield could be constructed on the installation. The study indicates that an area on which an airfield could be constructed does exist. The following is based on information obtained from Pine Bluff Arsenal master plan drawings and a drive-through survey of the area.

3-2. REAL ESTATE

The site selected is in the northeast corner of the installation. Attachment 3 provides location and airfield layout. This area will have the least effect on installation operation and also allows the best alignment based on wind conditions. The site would allow all of the clear zones to be located on PBA property. The Accident Potential Zones (APZ) at both ends of the airfield will be partially on private property. At the north end, all of APZ II and approximately one-third of APZ I will be on private lands. Approximately 60 percent of APZ II will be on private land on the south end. Land use compatibility should not be a problem as these areas are not developed. Easements for these zones and for approach-departure zones will need to be acquired. Real estate costs are not included in this report.

There is an electric power plant approximately 4 miles to the north, whose stacks may be an approach zone obstacle. The exact location and height of the stacks are not known. Further investigation of this obstacle is needed. An investigation is also needed to determine if there would be an airspace conflict with the Pine Bluff airport.

3-3. SITE CONDITIONS

The area selected is heavily wooded and has a gently sloping topography. When the BZ demilitarization facility is completed, there will be a paved roadway from the existing chemical storage area to a point near the selected site. Approximately 0.5 mile of new road would be required for access to the proposed cargo loading area. There is a large concrete pad located at the south end of the proposed runway, which could possibly be resurfaced and used for overrun and runway pavement. An Explosive Ordnance Disposal (EOD) team sweep of the area north of the concrete pad is recommended, as the slab was once used for a practice bombing target.

3-4. EFFECT ON PBA OPERATIONS

The proposed area is not heavily used at present. There is a small burning ground located at the south end of the proposed runway that would require relocation or close coordination of its use with the airfield use. The concrete slab at the south end of the runway is currently used for storing waste. This material is to be moved to the new hazardous waste facility now under construction. There are two structures within the clear zone that would require removal and possibly replacement. One is a concrete structure used as a personnel safety barricade at the burning pit, and the other building is located by one of the installation wells. Access roads to part of the installation boundary along the Arkansas River are cut off by the proposed runway. These may need to be relocated.

The PBA master plan has facilities proposed in and near the selected area. The aircraft parking and loading areas would be located within the explosive quantity distance arc of a production facility planned for 1988, and a new loading facility is planned for 1991 in an area occupied by the runway.

3-5. COST

The following is the estimated cost of constructing a runway, taxiway, cargo loading, aircraft parking, and loading area access road. This estimate does not include costs for real estate, design, operation facilities, or demolition and replacement of existing PBA facilities. The estimate is based on present day cost, since no projected construction date was given:

ITEM	COST
Clearing and Grubbing	\$ 734,000
Grading and Drainage	821,000
Paving	5,051,000
Fencing	351,000
Site Finishing	129,000
Access Road	<u>65,000</u>
TOTAL	\$ 7,151,000

3-6. CONCLUSION

PBA does have an area on which an airfield could feasibly be constructed. There are no apparent problems associated with actual construction. There are some possible approach-departure zone obstacles that should be investigated.

CHAPTER 4

TOOELE ARMY DEPOT

4-1. GENERAL

At Tooele Army Depot (TEAD) the study was conducted to determine if there is a site on the installation where an airfield could be located. The study indicates that two such areas are available. The two sites will be designated as East Site and West Site in this report. This study is based on limited information obtained from a general site map of the installation.

4-2. WEST SITE

a. Real Estate.

The site selected is on the west side of the Depot (South Area) near the Chemical Agent Munitions Disposal System (CAMDS) facility and near the Chemical Storage area. This is a large, open, flat area and would allow a great deal of flexibility in final site selection. Attachment 4 provides location and airfield layout.

All of the required clear zones can be located within the installation boundary, and because of the siting flexibility, a site could be selected so that all of the Accident Potential Zone (APZ) I at both ends of the runway would be within the boundary. A portion of the APZ II at both ends of the runway will occur on privately owned property. Land use compatibility within the APZ has not been determined because information on land use around the installation has not been obtained at this time. It also has not been determined if there would be any obstacles within the approach-departure zone.

Easements for the APZ and approach-departure zones would need to be acquired if the airfield is constructed. Real estate costs are not included in this report.

b. Site Conditions.

The area selected is flat and runs parallel with a large valley. There are no roads suitable for transporting the munitions in the proposed area. The closest paved road is approximately one mile away. There is an unsurfaced road along approximately half this distance that might be upgraded. Foundation conditions in this area are questionable as the water table is very high. This may require extensive fill placement for airfield construction. Cost for this anticipated fill placement is included in the estimate.

c. Effect on TEAD Activities.

The selected site should have very little effect on present operations, as there are no facilities in the area. A trail or earth road leading to the west installation boundary may need to be relocated around the end of the runway, as the proposed runway would cut it off. A site could be selected so that this road would not be affected. Installation master plan drawings were not available to determine if the airfield would conflict with future facilities.

d. Cost.

The following is the estimated cost of constructing a runway, taxiway, cargo loading, and aircraft parking area. This estimate does not include costs for real estate, design, operation facilities, or replacement of existing depot facilities.

ITEM	COST
Grubbing	\$ 316,000
Grading and Drainage	4,265,000
Paving	5,631,000
Fencing	315,000
Site Finishing	<u>175,000</u>
TOTAL	\$ 10,702,000

4-3. EAST SITE

e. Real Estate.

Though the West Site is the most convenient location for the airfield, an alternate site was selected because of questionable foundation conditions on the West Site. This alternate site is located on the east side of the depot (South Area). Attachment 4-A provides airfield layout and location. Although it is not as close to the chemical storage area as the West Site, better construction conditions might make it a more suitable location.

The East Site also allows all the clear zones and most of the Accident Potential Zone (APZ) I to be located on the installation. It would be possible to site with all of APZ I on the installation if necessary. Most of APZ II will not be on TEAD property. There should not be any land use compatibility problems, however, as the area around the installation is very sparsely populated. Easements for the areas that occur on private property would be required.

b. Site Conditions.

The site is near the base of a low hill and runs parallel with it. The topography is such that the earthwork would not be excessive. The aircraft loading area is near a paved road, which would make for easy access. There are no construction problems anticipated in this area.

c. Effect on TEAD Activities.

The site map indicates a rifle range on the south side of the installation. The runway approach-departure zone will cross the end of this range. Frequency of range use is not known, but TEAD should be able to coordinate activity in this area with airfield operation. Master plan drawings for this area were not available for determination of conflict with future facilities.

d. Cost.

A cost estimate for this site was not prepared. However, it should not vary significantly from the West Site.

4-4. CONCLUSION

There are two sites at TEAD on which the airfield could be constructed. A thorough analysis of both sites would be needed to determine which is the most suitable. An investigation of off-post conditions would also be needed to determine if any problems exist.

CHAPTER 5

LEXINGTON-BLUEGRASS DEPOT ACTIVITY

5-1. GENERAL

At Lexington-Bluegrass Depot Activity (LBDA) the study involved determining if an airfield could be constructed on Blue Grass Activity (BGA) of LBDA and if a local privately owned airport could be used. Reports on both studies follow.

5-2. BGA AIRFIELD ALTERNATIVE

The following is based on site information obtained from United States Geological Survey (USGS) 7.5 minute quadrangle topographic maps and from Lexington-Bluegrass Depot Activity (LBDA) master plan drawings.

a. Real Estate.

The size of the area for an airfield on which a C-141 can operate and the prevailing wind direction limits the feasible locations to one area on the east side of the installation, north of the block D magazine area.

The runway and clear zones can be located within the installation boundaries, which eliminates the need for construction on private property. Attachment 5 provides location and airfield layout.

The Accident Potential Zones (APZ) will extend outside the depot boundary. Some incompatible land use is expected in these zones. At the west end of the runway, APZ I is on depot property, but a very small part of APZ II will be outside the boundary and there is a possible compatibility problem in the APZ II. If a problem does exist it would be at the outer limits of the zone. Part of the installation administration, shop and maintenance areas are also within this zone. A detailed study of these areas would be required to determine compatibility. At the east end of the runway, approximately 40 percent of the APZ I and all of APZ II are on private property. USGS maps, dated 1979, do not show this area to be heavily developed, but the likelihood of incompatible use is high, particularly in APZ I. A ground survey of these areas would be necessary to determine what, if any, incompatible use exists.

There are obstacles in the approach-departure clearance zone that would need to be removed, or a waiver granted for them to stay. All the known obstacles are in the West Zone. There are approximately

35 earth-covered explosive storage magazines within the zone boundary. All explosives and munitions would have to be removed from these magazines. Approximately 25 magazines are in Block B, and approximately 10 are in Block A. There is also a water tower on the depot that would be 75 to 100 feet above the required approach slope clearance surface. The only known approach zone interference off the installation is a possible conflict with the airspace of other privately owned airfields. The West Approach Zone passes over the Madison County Airport about 7.5 miles out from the end of the proposed runway and intersects the approach zone of another small grass strip airport approximately 3.5 miles out. A thorough examination of the area would be needed to determine if other obstacles exist.

Easements for the APZ and approach-departure zones, on both the east and west sides, would be required where they occur on private property. The cost of obtaining these easements is not included in this report.

b. Site Conditions.

The site available for construction lies generally along the top of a wide ridge crossing several low hills. The area proposed for the runway is undeveloped and consists of pasture and woodland. It is currently outleased and used for pasture. The site is constrained on the east by the east loop of the main installation railroad and on the west by Muddy Creek. A change in the Muddy Creek channel would be necessary to provide room for the runway. This channel change would be approximately 2,000 feet in length.

Foundation conditions are a point of concern at this site. It is anticipated that soil strength will be relatively low, requiring a thicker pavement section; also, sink holes have been observed in the area. Rock will most likely be encountered during excavation, which will increase cost of gradework.

There are roads leading from the chemical storage area to the proposed cargo loading area. Generally, they should be usable, but some maintenance and upgrading will probably be required. No cost for access roads is included in construction estimate.

c. Effect On Installation.

Total storage capacity for explosives and munitions will be reduced because some magazines in Blocks A and B will have to be emptied, and storage capacity of several magazines in Block D would have to be limited because of safety quantity distance requirements.

Demolition of four buildings at the west end of the runway would be required, as they would be in the clear zone area. There are

also two earth-covered igloos in Block D that may require removal, as they may be in the lateral clear zone. Demolition costs are not included in the construction estimate.

Relocation of the installation tracer test range will be required, as the proposed runway would cut this range almost in half. New sites for the range were not investigated.

The access road to the north side of Block D storage area would be severed by the runway. Restoring this access would require approximately 0.6 mile of new road and a bridge across Muddy Creek. This restoration cost is not included.

Construction of the cargo loading area and aircraft parking area as proposed would conflict with operations at the ammunition maintenance facilities in Buildings 1180, 1181, and 1182. Safety quantity-distance requirements would not allow operation of this facility when the airfield is in operation. There is also a possibility that the loading and parking areas could not be sited as proposed because of safety reasons. Then, these areas could be located 1,200 feet northeast of proposed location. This would increase construction cost because the taxiway length would be increased. The cargo-loading area would also be 400 to 500 feet closer to the installation boundary.

d. Cost.

The following is the estimated cost of constructing a runway, taxiway, cargo loading area, and aircraft parking area. It should be noted that this estimate does not include costs for real estate, design, operations facilities, access roads, demolition, and replacement of facilities at the installation. The estimate is based on present day cost, since no projected construction date was given.

ITEM	COST
Clearing and Grubbing	\$ 660,000
Grading and Drainage	5,480,000
Paving	7,145,000
Fencing	300,000
Site Finishing	400,000
	<hr/>
TOTAL	\$ 13,985,000

e. Conclusion.

It appears BGA does have an area on which an airfield could be constructed. It is a confined area, and will require a creek channel change to provide space for the runway. There are several areas

that require indepth studies before a final determination could be made as to the acceptability of this site. These problem areas are discussed in previous sections of this report.

5-3. PRIVATELY OWNED AIRFIELD ALTERNATIVE

Two airfields near Blue Grass Activity were investigated. One was the Berea-Richmond Airport located 3 miles southwest of BGA, and the other was Madison Airport, 5.5 miles southwest of the depot.

a. Site Conditions.

The runway at Berea-Richmond Airport is a grass strip 2,450 feet long. Very few facilities exist at the airport. Extension of this runway to a length that would accommodate a C-141 aircraft is not feasible as there is a valley approximately 100 feet deep at each end of the strip. There is also a stream flowing through both valleys. Construction of a runway across either valley, combined with upgrading the existing strip, would not be cost effective when compared with constructing an airfield on LBDA property.

The Madison Airport has an asphalt concrete paved runway 4,000 feet long by 75 feet wide. Facilities at the airport consist of a small terminal building and a hangar for small privately owned aircraft. The airport is not served by commercial airlines on a regular basis.

The existing runway would not support C-141 operations; however, it could be extended south the required 3,500 feet. Extension to the north is not feasible as there is a deep valley at that end. The topography to the south is such that runway extension would be feasible. The area is also sparsely populated and consists mainly of farmland. In addition to the extension, the existing runway would have to be widened by 75 feet. The load capacity of the existing runway is not known, but it is doubtful that it would support a fully loaded C-141 aircraft. An overlay of the existing pavement would most likely be required.

Extension of the runway to the south would sever an existing county road. Construction of approximately 1.25 miles of new road would be required to replace this county road.

The amount of property owned by the Airport Authority is not known; however, it is estimated that some 450 acres would have to be acquired for the runway extension, clear zones, and service areas. Easements would also be required in the APZ's and approach-departure clearance zones. The APZ contains approximately 1,650 acres. It is also suspected that some land use incompatibility exists within the APZ. An indepth survey would be required to determine if any

obstacles exist in the approach-departure clearance zone. The south approach zone would pass over the west part of the city of Berea, Kentucky, which is 2.5 miles from the end of the proposed runway extension. However, deviation to the approach pattern might be approved to avoid this area.

The airfield runway, clear zones, and safety zones discussed are the requirements for airfields on military installations. It is assumed that the requirements would be the same if the airfield was expanded for the purpose of carrying out a military operation.

The most probable haul route from BGA to Madison Airport would be along State Highway 25 to a county road approximately 3.5 miles south of BGA. At present, the county road along the route is not suitable for this operation. Approximately 1 mile of this road is a one-lane road with a 10-foot-wide asphalt surface. Resurfacing and widening would be required to support loaded truck traffic. Realignment of part of this 1-mile portion may be needed, as approximately 0.25 mile of it is winding and on a steep grade, which could be a safety hazard. An additional 1.5 mile of road would probably require an asphalt overlay to support heavy truck traffic. A one-lane wood bridge structure over Ballard Branch would need replacing to support truck traffic. Access to the airport from the county road is along 2,000 feet of crushed stone surfaced road. Repeated truck traffic would create a need to resurface this road before the project is complete. There is also a one-lane underpass at the Louisville and Nashville (L&N) Railroad that has a 12-foot height limit. The container for hauling the rockets is now estimated at 9 feet high. A low bed trailer will need to be used for transportation. It is assumed that a trailer that meets the height requirement can be obtained. If not, there are two options. One is to construct a new railroad overpass with required clearance, and the other is to rework an additional 2.4 miles of road and bypass the obstacle. An alternate haul route would be to use Interstate Highway 75 and construct an entrance and exit ramp at county roads near the south end of the extended runway. This route would eliminate most of the county road upgrade cost and could possibly be the most economical approach. This option was not investigated because it would require hauling the munitions through the city of Richmond and would increase the risk factor.

b. Cost.

Cost estimates for expanding the existing airport and providing suitable access from BGA are provided. The reliability of these estimates are somewhat questionable, however, as the information upon which they are based is very general. Estimates are as follows:

(1) Relocate existing county road severed by runway extension: \$210,000

(2) Rework 1 mile of county road along haul route (widen and overlay existing pavement): \$150,000

(3) Overlay 1.5 miles of county road along haul route with asphalt concrete to increase load carrying capacity: \$150,000

(4) Remove and replace wooden bridge structure: \$85,000

(5) Pave existing gravel road from county road to airport: \$65,000

(6) Expand Airport - Runway, taxiway, cargo loading area, and aircraft parking:

ITEM	COST	
Clearing and Grubbing	\$ 95,000 -	110,000
Grading and Drainage	2,800,000 -	3,800,000
Pavement	6,750,000 -	7,500,000
Fencing	290,000 -	310,000
Site Finishing	170,000 -	200,000

Airport Expansion Total \$ 10,105,000 - 11,920,000

(7) Total Items (1) through (6) are \$ 12,580,000.

Should the railroad overpass prove to be an obstacle for the hauling equipment selected, costs for the two alternatives are provided. Road rework to bypass it is estimated at \$260,000, and the cost of replacing the overpass is estimated at \$80,000. The cost of overpass replacement does not include any compensation to L&N Railroad for disruption of their rail service during construction.

Real estate cost for the construction and clear areas is estimated at \$570,000, based on 450 acres at \$1,200 per acre plus \$30,000 procurement cost. This does not include any purchase or easements required in the accident potential and approach zones.

c. Conclusion.

The Madison Airport could be expanded to meet the requirements of this mission. The total estimated cost of 11.5 to 13.5 million dollars, however, is not significantly different from the estimated cost of constructing an airfield on LBDA property. A more detailed cost study of both alternatives is needed to determine which

is the most cost effective. An indepth economic analysis is recommended if removal-by-air could be the disposal method and if the risk analysis study does not show either alternative to have a decided advantage.

CHAPTER 6

ANNISTON ARMY DEPOT

6-1. GENERAL

Three alternatives were considered at Anniston Army Depot (ANAD). They included constructing an airfield on ANAD, using a local privately owned airport and constructing an airfield on Fort McClellan's Pelham Range property which adjoins ANAD on the north. Reports on the three studies follow.

6-2. ANAD AIRFIELD ALTERNATIVE

This study was to determine if an airfield could be located on ANAD. The study is based on information obtained from United States Geological Survey (USGS) 7.5 minute quadrangle maps, ANAD master plan drawings, and data from prior construction projects at ANAD.

a. Real Estate.

The runway and most of the clear zone area can be located within the installation boundary. A portion of the clear zone will overlap onto Pelham Range, north of the installation. The Accident Potential Zones (APZ) on the east end of the runway will also be partially located on Pelham Range. At the west end most of the APZ will be located on private property. The private property is very sparsely populated and should not present a land use compatibility problem. The APZ and approach-departure zone on the east end of the runway will occur over a firing range on Pelham Range, creating a probable hazard. This conflict would likely require close coordination with Fort McClellan. Easements will be needed for APZ and approach zones that occur on private property. Attachment 6 provides location and airfield layout.

b. Site Conditions.

The northern part of the installation is the only area that has enough undeveloped space to permit airfield siting. Aligning the runway to meet prevailing wind conditions and to avoid having the approach-departure zone over munition storage areas (a near east-west direction) further limits the available area to a narrow strip along the northern boundary. This area consists of a series of steep hills. Elevation differences along the length of the runway would vary from 125 feet to well over 200 feet, depending on location. In addition, the ends of the runways must be held at higher elevations in order to prevent other hills from obstructing the approach zone, which results

in having earthfill depths in excess of 100 feet in some areas along the runway. This, combined with the requirement for very flat slopes within the airfield clear zone, would produce cost prohibitive earthwork quantities. In addition, the soil at ANAD is not suitable for extensive earthwork operations.

The area available is also very heavily wooded and would require clearing 850 acres for the runway and clear zones and most likely several hundred more acres to provide approach zone clearance.

c. Effect On Installation.

The demolition pit, tank firing range, and possibly the recoilless rifle range and propellant disposal facility would be adversely affected by construction of the airfield. The demolition area would be partially covered by earthfill or be so near the runway that its operation would be limited. The approach zone would cross the tank firing range and limit its use. Depending on final site location, the propellant disposal facility would either need to be removed or possibly curtail operations during airfield operations. The recoilless rifle range would be in or very near the approach zone, again depending on airfield siting. All of these areas need further investigation should airfield construction be determined to be a feasible disposal alternative. Relocating any of these facilities would also increase cost of this alternative.

d. Cost.

The following is the estimated cost of constructing a runway, taxiway, cargo loading area, and aircraft parking area. This estimate does not include costs for real estate, design, operations facilities, or demolition and replacement of facilities at the installation. The estimate is based on present-day cost since no projected construction date was given:

ITEM	CCST
Clearing and Grubbing	\$ 1,028,000
Grading and Drainage	50,000,000
Paving	5,183,000
Fencing	296,000
Site Finishing	<u>544,000</u>
TOTAL	\$ 57,051,000

e. Conclusion.

There is an area at ANAD that is large enough to construct an airfield. Construction is not recommended, however, because of the

excessive amount of earthwork required. The soil in the area is not well suited for massive fills and the large quantity of earthwork is cost prohibitive.

6-3. PELHAM RANGE ALTERNATIVE

This study was made as a result of the unsuitable conditions found at ANAD. It indicates that areas do exist here that are more suitable for airfield construction than available areas at Anniston Army Depot (ANAD). The following is based on site information obtained from United States Geological Survey (USGS) 7.5 minute quadrangle topographic maps and a drive-through survey of the area.

a. Real Estate.

The site selected is approximately 1 mile north of the existing ANAD chemical storage area. There is a road from the storage area to the proposed aircraft loading area. It is, however, a narrow dirt and gravel surface road that would require upgrading for transporting the munitions. Attachment 7 provides location and airfield layout.

This site would allow all of the clear zones and most of the APZ's to be located on property owned by the U.S. Army. Only approximately one-third of APZ II at the west side of ANAD would be on private property. This private land is undeveloped and should not present any land use compatibility problem. Easements for this portion of APZ II and for the approach-departure zone on both ends of the airfield would have to be acquired. Real estate costs are not included in this report.

The runway would cut off public access to a cemetery located between the proposed site and the chemical storage area. Cemetery access would have to be reestablished. There are three possible means providing access: constructing a new road around the runway, allowing visitors to cross the runway when not in use, or providing access through ANAD property. Cost for cemetery is not included in this report.

There is possible conflict with the existing Talladega Airport located approximately 11 miles to the southwest. A direct approach into this airport would pass over the proposed site. This is a privately owned facility and not heavily used. The Anniston-Calhoun County Airport 9.5 miles southeast should not conflict, as its approach zone is nearly parallel with the proposed facility.

b. Site Conditions.

The site is located in an undeveloped area. The terrain is hilly and heavily wooded. Though the terrain is hilly, the site is much more suitable than ANAD. An existing road connects the ANAD chemical storage area with the proposed site. It would require rework to make it suitable for transporting munitions.

c. Effect On Fort McClellan Operations.

Pelham Range is used daily by Fort McClellan for troop training and/or range firing. Any location would interfere with operations. The site selected would occupy an area currently used for training and appears to have the least effect; however, it would still create a significant conflict with range firing operations. Approximately nine existing and eight proposed firing ranges would be affected. Use of approximately 16 training areas might also have to be limited. These ranges and training areas are used an average of 5 days a week and 2 weekends a year. Airfield and range operations would have to be closely coordinated to avoid the possibility of an aircraft being hit while crossing the impact or range area.

The site is also located within an area that is cleared when the Defense Nuclear Agency facility is in operation. These activities would also need to be coordinated with airfield operations.

d. Cost.

The following is the estimated cost of constructing a runway, taxiway, cargo loading, aircraft parking area, and upgrading an existing access road. This estimate does not include costs for real estate, design, operation facilities, or access to facilities cut off by the airfield. The estimate is based on present day cost since no projected construction date was given:

ITEM	COST
Clearing and Grubbing	\$ 1,001,000
Grading and Drainage	6,531,000
Paving	5,316,000
Fencing	250,000
Site Finishing	437,000
Access Road	128,000
TOTAL	\$ 13,663,000

e. Conclusion.

There is a site on Pelham Range where constructing an airfield would be more economical than construction on ANAD property. It would, however, require close coordination with Fort McClellan.

6-4. PRIVATELY OWNED AIRFIELD ALTERNATIVE

Two airfields near Anniston Army Depot (ANAD) were investigated. These were Talladega Airport, 4 miles southwest of ANAD, and Anniston-Calhoun County Airport, 5 miles southeast of the Depot.

a. Real Estate.

Talladega Airport is adjacent to Alabama International Motor Speedway; the airport is owned by the City of Talladega and leased to the corporation operating the speedway. It has a 6,000-foot-long, 100-foot-wide runway, which is paved with asphalt concrete. The airport is primarily used by privately owned aircraft. There are no regular scheduled commercial flights. Information obtained at the airport indicates it is capable of handling a C-130 aircraft. Use of a C-141 aircraft for the proposed transport operation would require an additional 3,500 feet of runway: 1,500 feet for runway and 2,000 feet for overruns per military criteria. An additional 50-foot width would also be required.

b. Site Conditions.

Extension of the runway does not appear feasible as there are substantial physical restraints on both ends. There is a 4-lane highway that provides access to the speedway, with Interstate Highway 20 on the northeast end and the speedway at the southeast end. Extending to the northeast would require cutting off the 4-lane road and relocating I-20; extending to the southeast would locate the runway approximately 200 feet from the speedway, which would not meet safety requirements. A straight approach from the northeast would pass directly over ANAD and violate the requirement for no explosives or munitions in the approach zone. Military airfield requirements for clear zones and safety zones would not be met if a C-130 was used on the existing strip. An investigation would be needed as to requirements for military operations on private airfields.

Talladega is a possible alternative if a C-130 could be used but does not appear feasible if a C-141 is required.

The Anniston-Calhoun County Airport is located just south of the city of Oxford, Alabama, and is owned by the City of Anniston, Alabama. The airport has a 7,000-foot-long runway, which is 150 feet wide and paved with asphalt concrete. The runway would accommodate

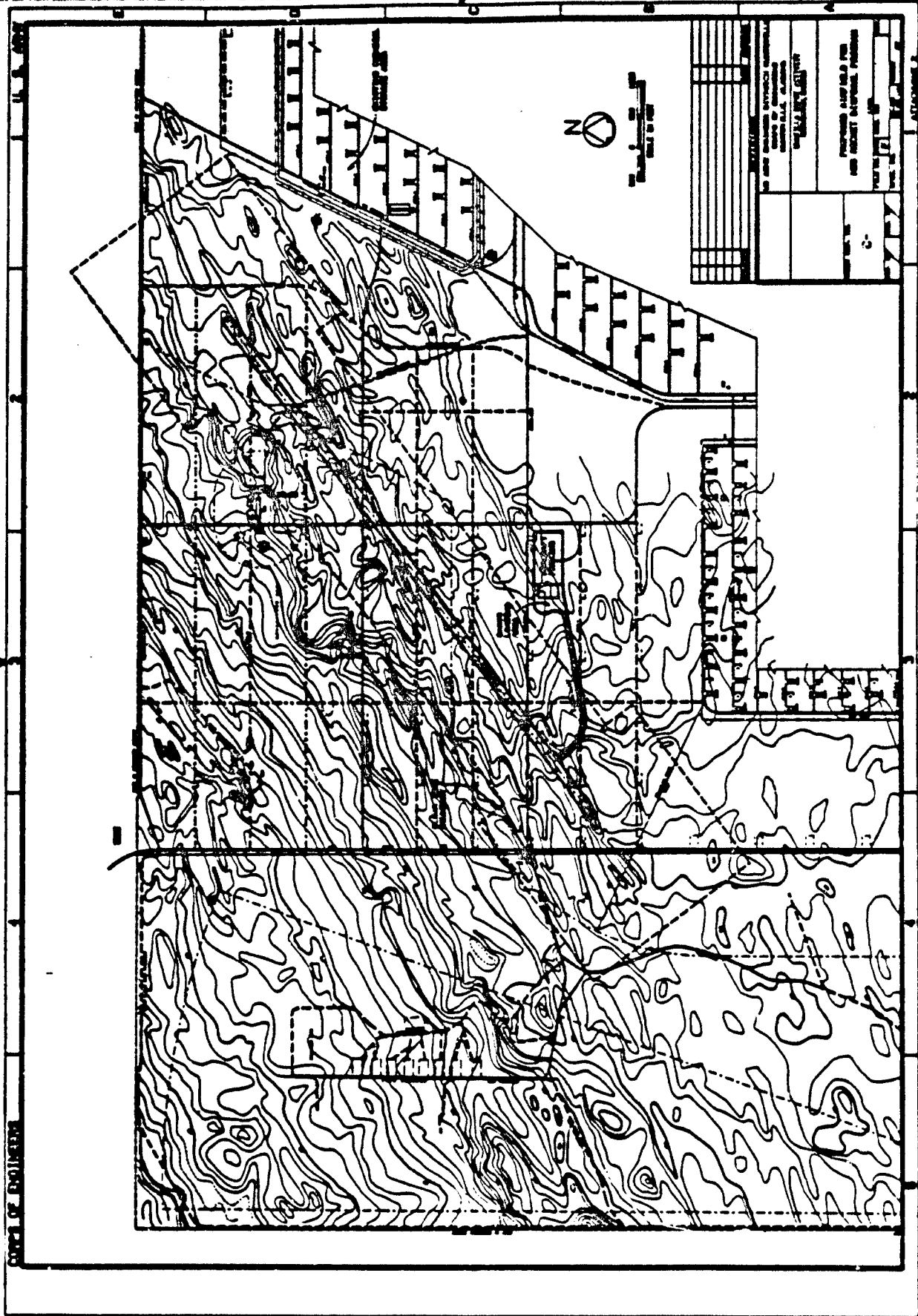
C-130 operations, assuming the military requirement for 1,000-foot overruns could be waived. A C-141 aircraft would require an additional 500 feet of runway plus 2,000 feet for overruns if overrun requirement was not waived. The area to the southwest is undeveloped and would be the most probable extension direction, as the area to the northeast is a highly developed residential and commercial area. An overlay pavement on the existing runway would most likely be needed to support the operation of fully loaded C-141 aircrafts.

The airport is served by a commercial airline, Atlantic Southeast, with three or four scheduled flights per day. The existing clear and safety zones do not, however, meet military requirements for a Class B runway, as severe conflicts exist between present land use adjacent to the airfield and the criteria given in attachment 8. The present approach glide slope of 25:1 also does not meet the 50:1 military requirement.

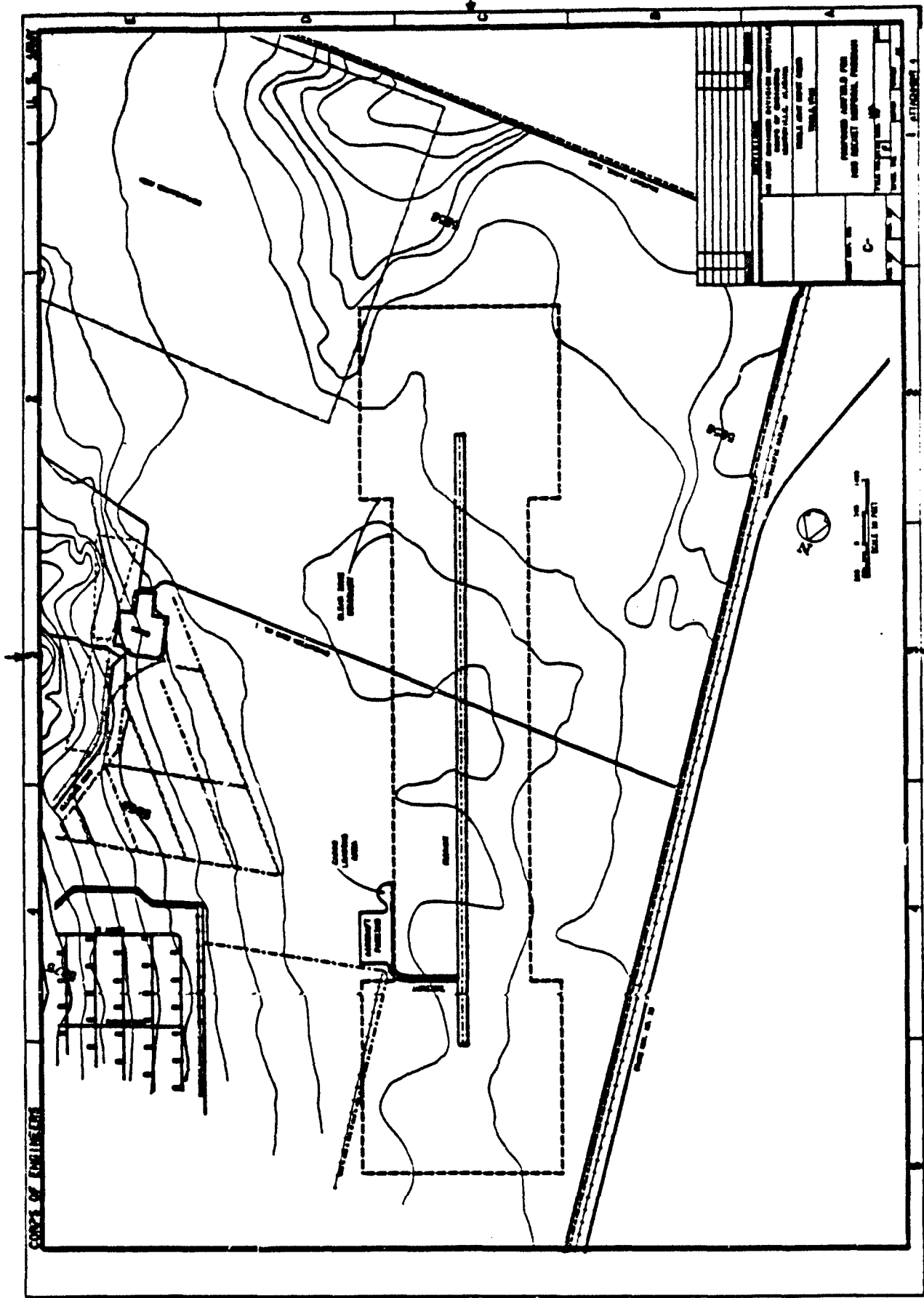
c. Conclusion.

If requirements for clear and safety zones are the same for military operations at a private airfield as they are for military installations, use of either of these airports is probably not feasible. Should some of these requirements be waived either one could be used by C-130 aircrafts as they exist. Anniston-Calhoun County Airport is the most likely candidate for expansion for C-141 aircraft, but this would also require waiver of standards. If C-130's are used, Talladega would be a better candidate as it is in a lightly populated area, and the route from ANAD to the airport is not nearly as populated as the route to Anniston-Calhoun County Airport. It is not known at this time if either of the owners would grant approval for use of the airport.

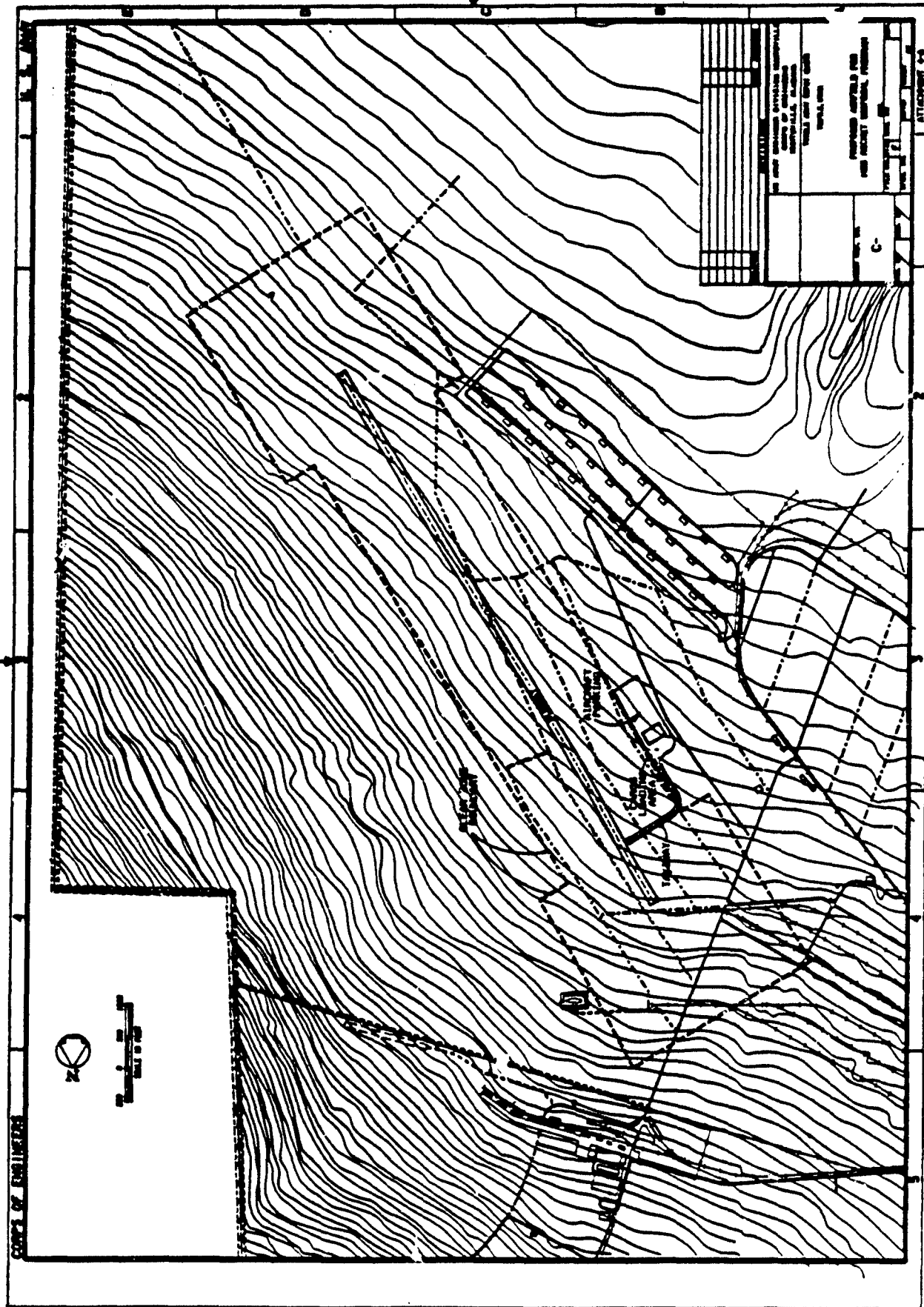
ATTACHEMENTS



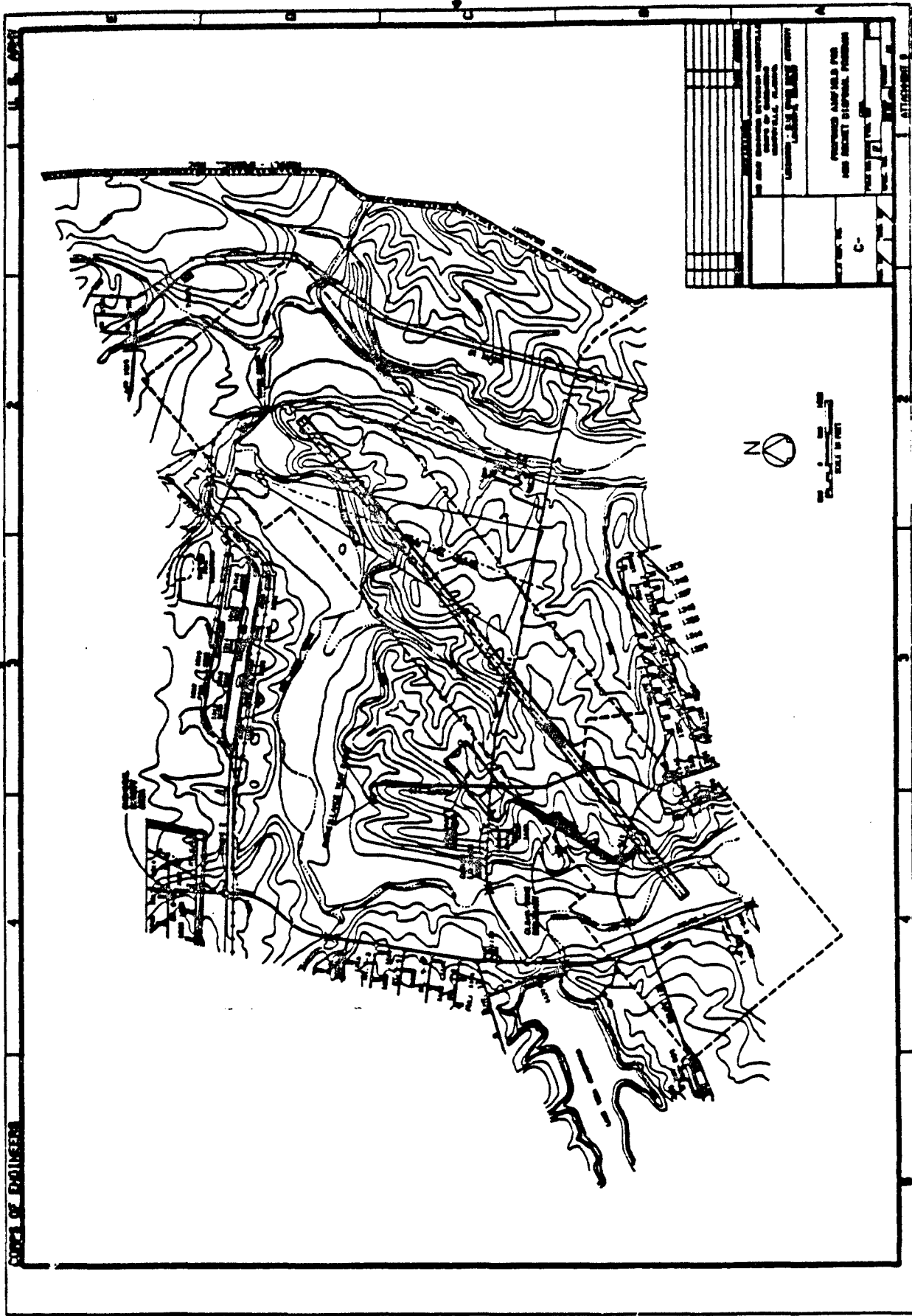
Attachment 2. Umatilla Depot Activity Site Layout



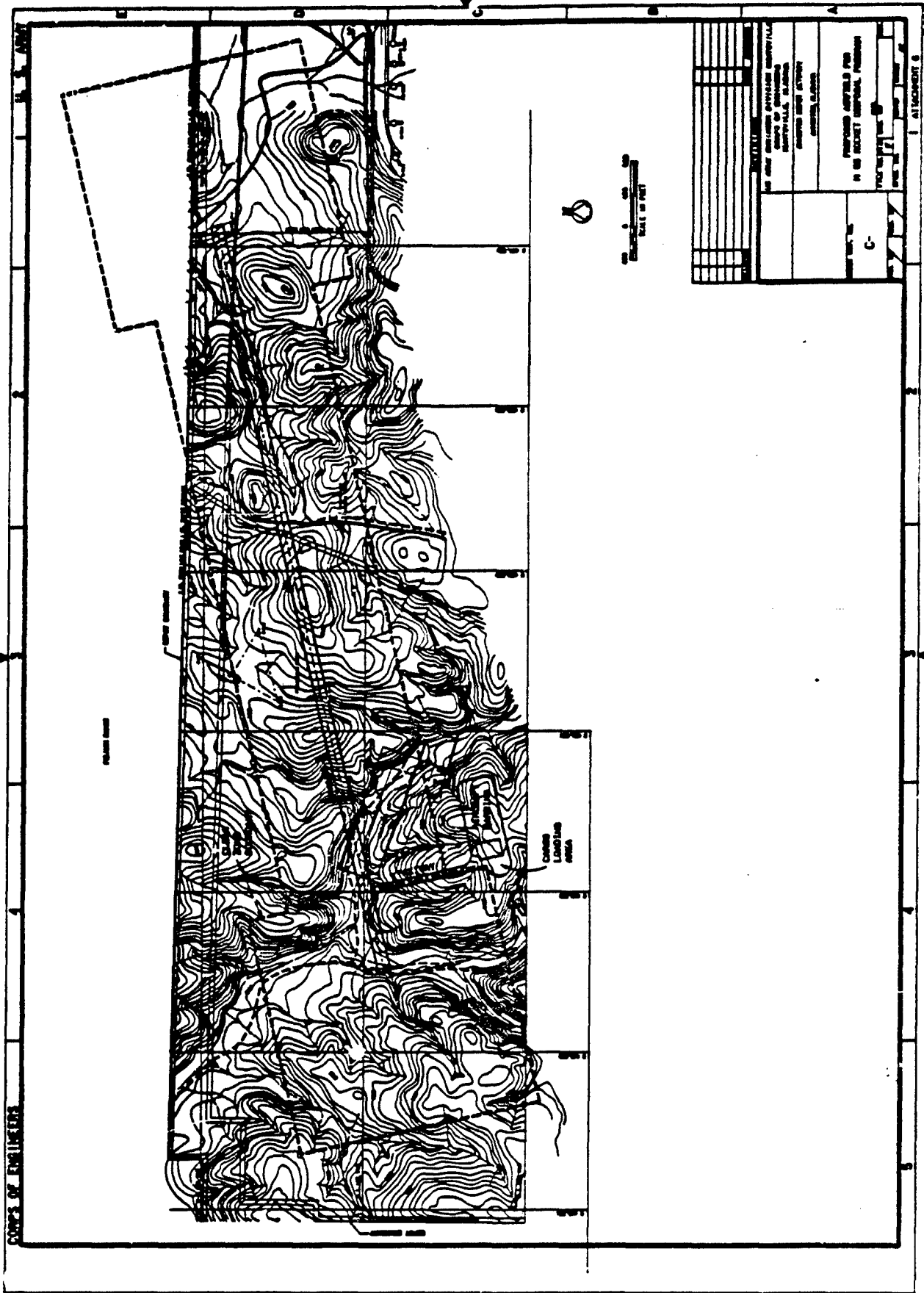
Attachment 4. Tooele Army Depot Site Layout: West Site



Attachment 4A. Tooele Army Depot Site Layout: East Site



Attachment 5. Lexington-Bluegrass Depot Activity Site Layout



Attachment 6. Anniston Army Depot Activity Site Layout

**DEPARTMENT OF DEFENSE
LAND USE COMPATIBILITY GUIDELINES FOR CLEAR ZONE
AND ACCIDENT POTENTIAL ZONES**

Land Use Category	Compatibility ¹		
	Clear Zone	APZ I	APZ II
Residential			
Single family	NO	NO	YES ¹
2-4 family	NO	NO	NO
Multifamily dwellings	NO	NO	NO
Group quarters	NO	NO	NO
Residential hotels	NO	NO	NO
Mobile home parks or courts	NO	NO	NO
Other residential	NO	NO	NO
Industrial and Manufacturing²			
Food and kindred products	NO	NO	YES
Textile mill products	NO	NO	YES
Apparel	NO	NO	NO
Lumber and wood products	NO	YES	YES
Furniture and fixtures	NO	YES	YES
Paper and allied products	NO	YES	YES
Printing, publishing	NO	YES	YES
Chemicals and allied products	NO	NO	NO
Petroleum refining and related industries	NO	NO	NO
Rubber and miscellaneous plastic goods	NO	NO	NO
Stone, clay, and glass products	NO	YES	YES
Primary metal industries	NO	YES	YES
Fabricated metal products	NO	YES	YES
Professional, scientific and controlling instruments	NO	NO	NO
Miscellaneous manufacturing	NO	YES	YES
Transportation, Communications and Utilities³			
Railroad, rapid rail transit (on-grade)	NO	YES ⁴	YES
Highway and street rights-of-way	YES ⁴	YES	YES
Auto parking	NO	YES	YES
Communication	YES ⁴	YES	YES
Utilities	YES ⁴	YES ⁴	YES
Other transportation, communications and utilities	YES ⁴	YES	YES
Commercial and Retail Trade			
Wholesale trade	NO	YES	YES
Building materials (retail)	NO	YES	YES
General merchandise (retail)	NO	NO	YES
Food—retail	NO	NO	YES
Automotive, marine, aviation (retail)	NO	YES	YES
Apparel and accessories (retail)	NO	NO	YES
Furniture, homefurnishing (retail)	NO	NO	YES
Eating and drinking places	NO	NO	NO
Other retail trade	NO	NO	YES
Personal and Business Services⁵			
Finance, insurance and real estate	NO	NO	YES
Personal services	NO	NO	YES
Business services	NO	NO	YES
Repair services	NO	YES	YES
Professional services	NO	NO	YES
Contract construction services	NO	YES	YES
Indoor recreation services	NO	NO	YES
Other services	NO	NO	YES
Public and Quasi-Public Services			
Government services	NO	NO	YES ⁶
Educational services	NO	NO	NO

Land Use Category	Compatibility ¹		
	Clear Zone	APZ I	APZ II
Cultural activities	NO	NO	NO
Medical and other health services	NO	NO	NO
Cemeteries	NO	YES ⁶	YES ⁶
Non-profit organizations including churches	NO	NO	NO
Other public and quasi-public services	NO	NO	YES
Outdoor Recreation			
Playground's neighboring parks	NO	NO	YES
Community and regional parks	NO	YES ⁶	YES ⁶
Nature exhibits	NO	YES	YES
Spectator sports including arenas	NO	NO	NO
Golf course ⁹ , riding stables ¹⁰	NO	YES	YES
Water based recreational areas	NO	YES	YES
Resort and group camps	NO	NO	NO
Entertainment assembly	NO	NO	NO
Other outdoor recreation	NO	YES ⁶	YES
Resource Production & Extraction and Open Land			
Agriculture ¹¹	YES	YES	YES
Livestock farming, animal breeding ¹²	NO	YES	YES
Forestry activities	NO	YES	YES
Fishing activities and related services ¹³	NO ¹⁴	YES ¹³	YES
Mining activities	NO	YES	YES
Permanent open space	YES	YES	YES
Water areas ¹⁴	YES	YES	YES

Footnotes

1. A "Yes" or "No" designation for compatible land use is to be used only for gross comparison. Within each, uses exist where further definition may be needed as to whether it is clear or usually acceptable/unacceptable owing to variations in densities of people and structures.
2. Suggested maximum density 1-2 dwelling units per acre, possibly increased under a Planned Unit Development where maximum lot covered less than 20 percent.
3. Factors to be considered: Labor intensity, structural coverage, explosive characteristics, air pollution.
4. No passenger terminals and no major above ground transmission lines in APZ I.
5. Not permitted in graded areas, except as noted in table 2-7.
6. Low intensity office uses only. Meeting places, auditoriums, etc., not recommended.
7. Excludes chapels.
8. Facilities must be low intensity.
9. Clubhouse not recommended.
10. Concentrated rings with large classes not recommended.
11. Includes livestock grazing but excludes feedlots and intensive animal husbandry.
12. Includes feedlots and intensive animal husbandry.
13. Includes hunting and fishing.
14. Controlled hunting and fishing may be permitted for the purpose of wildlife control.

SUMMARY OF RESULTS FROM AIRFIELD CONSTRUCTION STUDY

INSTALLATION	LOCATION	COST (\$ MILLIONS)	INSTALLATION IMPACTS	OFF-POST IMPACTS
Blue Grass Activity, (BGA), KY	On-Post	14.	Cuts roads, loss use of some bunkers, extensive grading and clearing.	Accident potential and approach zones go off the installation. Some incompatible uses could exist. Temporary enclosures of weilers required. Foundation conditions in the area make construction difficulties likely.
BGA, KY	Madison AP, Madison County, KY	11.5-13.5		Requires upgrade or relocation of several miles of civilian roads. Purchase of 450 acres required to extend runway with clear zones. Accident potential and approach zones all on private property; serious conflicts exist with present use. Cost does not include additional trans- portation cost for moving munitions on civilian roads. Cost of CAMPACDS and extra personnel will greatly increase total cost. This extra cost and the safety risk make this alternative less attractive than on-post construction.
Anniston Army Depot (ANAD), AL	On-Post	57.1	Construction on ANAD is con- sidered impractical. Serious problems would be expected in construction were this alter- native pursued.	

INSTALLATION	LOCATION	COST (\$ MILLIONS)	INSTALLATION IMPACTS	OFF-POST IMPACTS
AMAD, AL	Peihon Range, Ft. McClellan	13.7	Conflicts with some activities on Peihon Range. Criticality of the interference could not be identified.	Approach zones go off Government property.
AMAD, AL	Talladega, AL	Not Determined		Not feasible to extend runway for C-141 aircraft.
AMAD, AL	Anniston-Calhoun County AP	Not Determined		Conflicts in approach zones make use infeasible.
Wentzell Deput Activity (UWHA), OR	On-Post	7.7	Minimal upset expected because airfield located in remote area. Gate one road.	Accident potential and approach zones off-post onto farm land, but no serious conflicts expected.
Toonle Army Depot, UT	On-Post	10.7	No problems known.	Accident potential and approach zones extend off-post in isolated areas.
Pine Bluff Arsenal, AR	On-Post	7.15	Minimum impacts to existing operations. Large tree clearing effort.	Accident potential and approach zones go off-post. No known serious conflicts with existing use.

Attachment 9. Summary of Results from Airfield Construction Study (page 2 of 2)



DEPARTMENT OF THE ARMY
HUNTSVILLE DIVISION, CORPS OF ENGINEERS
P. O. BOX 1800
HUNTSVILLE, ALABAMA 35807

DEPLY TO
ATTENTION CO.

HNDA-D-K

22 APRIL 1985

**SUBJECT: Transmittal of Draft Final Report of the Airfield Construction
Feasibility Study**

Commander
US Army Toxic and Hazardous Materials Agency
ATTN: AMXIH-SE-S
Aberdeen Proving Ground, MD 21010-5401

1. Reference:

a. Letter, DKXIH-ES, US Army Toxic and Hazardous Materials Agency (USATHAMA), 9 August 1984, subject: M55 Rocket Program.

b. Message, R110830Z Oct 84, USATHAMA, subject: Concept Development of Onsite Airfields in Support of M55 Collocation Studies.

c. Letter, HNDED-FM, Huntsville Division, 6 November 1984, subject: Concept Development of Onsite Airfields in Support of M55 Collocation Studies.

2. As requested in references 1a and 1b, this office has conducted a study of the feasibility of building airfields at the five US installations now storing M55 rockets. This study also addresses the feasibility of upgrading civilian airfields near Blue Grass Activity, KY, and Anniston Army Depot, AL. A draft final report of our findings is provided at Inclosure 1 (10 copies). This report replaces the preliminary report issued with reference 1c.

3. This report contains the analyses requested in reference 1b, except for an environmental assessment of the construction at each site. As we discussed in our 6 November 1984 letter (reference 1c), this effort should be accomplished only on those transportation options selected for further study through a comparative analysis of alternatives. Even though we did not conduct this detailed analysis, there are two areas of interest which should be examined if environmental analyses are later conducted. First, the construction area at Pine Bluff Arsenal will probably impact on critical habitat of the endangered red cockaded woodpecker. Secondly, at Blue Grass Activity the construction will require moving a stream which will likely result in significant aquatic impacts.

**Attachment 10. Transmittal of Draft with Enclosure 2
(page 1 of 8)**

WDAD-K

SUBJECT: Transmittal of Draft Final Report of the Airfield Construction Feasibility Study

4. The sites identified as feasible in this report are listed as such primarily on the basis of engineering construction feasibility. Sites were selected attempting to minimize interferences with existing installation operations. With the limited information available to us, we have described direct impacts where problems exist. Identifying a site as feasible does not mean that the direct or indirect impacts of these layouts are acceptable to the installation. This level of coordination was beyond the scope of this study, but is essential if a site is to be proposed for further study in the final rocket disposal environmental impact statement.

5. In verifying the construction criteria for the airfield, we requested the advice of Headquarters Military Airlift Command (HQ MAC). Their response to us contained information on the costs of airfield operations which you will need in developing operating cost estimates. Information on airfield operating personnel and crash rescue equipment requirements is in the HQ MAC letter provided as Inclosure 2.

6. We presently have not scheduled a date to issue the final report. The final report will be published from 15 to 30 working days after receipt of your review comments. Point of contact for this action is Major W. C. King, AUTOVON 742-5370.

FOR THE COMMANDER:



WILLIAM A. MILLER
COL, CE
Deputy Commanding

2 Incl
as



DEPARTMENT OF THE AIR FORCE

HEADQUARTERS MILITARY AIRLIFT COMMAND

SCOTT AIR FORCE BASE, ILLINOIS 62228

24 DEC 1984

REPLY TO
ATTN OF

DOVF

SUBJECT

**Requested Support for Army Environmental Impact Statement Study
(Your Ltr, 19 Nov 84)**

TO

HNDDED-PM

1. The information in the following paragraphs is provided in response to your 19 Nov 84 letter and is an estimate of the minimum facility requirements under which MAC could supply the support requested.

2. The basic assumptions we have applied are these:

a. The operation at a site will require at least 12 months. Therefore, the site will be exposed to the full range of weather from the four seasons. Personnel and equipment must be sheltered accordingly.

b. The maximum number of aircraft on the ground at any one time will be limited. This number affects the requirements for ramp space, loading crews and for crash, fire and rescue (CFR) equipment and personnel.

c. Performance calculations for runway length determination are based on a fully loaded aircraft with fuel to fly from Lexington to the west coast on a 90°F day. Cooler temperatures would improve takeoff performance and enhance capability.

3. Runway dimensions are as provided previously by telephone to HNDDED-PM/Maj King. Runway length should be no less than 7500 feet and width 150 feet. Pavement strength should be sufficient to support a C-141 at maximum gross weight of 325,000 pounds.

4. MAC Regulation 55-23 and the attachments thereto identify the crash fire rescue (CFR) requirements (Atch 1). These requirements are dependent on the frequency of operation and the number of aircraft on the ground at any one time. For example, with one or two C-141B aircraft on the ground MAC requires one P-4 vehicle and one P-13(A). If the number of aircraft increases to three, then an additional P-4 is required. It may be possible to adjust the support requirements as the aircraft flow rate changes at different times in the overall operation. In any case there must be shelter provided for all vehicles and personnel for the annual range of weather extremes. Note that substitute vehicles are acceptable as long as the agent carrying and pumping capabilities are equivalent to those listed in MACR 55-23, Attachment 2. Also, recognize that we are not aware of any peculiar requirements in the CFR area imposed by the type of

Attachment 10. Transmittal of Draft with Enclosure 2

(page 3 of 8)

materials being transported. We would expect your organization to identify any special requirements in this area and equip accordingly, including identification of any incompatibilities which might be introduced involving our fire suppressing agents.

5. We do not have a requirement for installation of a permanent airfield lighting system, since the airfield is not intended to operate at night or in periods of inclement weather (no all-weather capability) and will be effectively a day-VFR operation.

6. We can arrange for our aircraft to arrive at the onload site with enough fuel to reach their ultimate CONUS destination. This will eliminate any requirement for refueling at the onload sites, although you may desire to establish a minimum capability for contingencies.

7. We do not require a tower or an aircraft hangar facility. We do require a maintenance/support structure of sufficient size to house a limited logistics capability such as spare tires and some small high-use aircraft components, to provide space for material handling equipment and to provide space and facilities for support personnel.

8. Our estimate of personnel and equipment necessary to operate and support this type of facility is included as Attachment 2. This is a rough estimate and is based on having one aircraft on the ground at a time and daylight operations only. Airlift control element (ALCE) personnel are required to provide overall control and supervision on site and will be provided by MAC. Since their availability is limited by the number of qualified personnel and other duties, ALCE support to more than one site at a time would be questionable. Any increase in support personnel requirements beyond the one aircraft at a time would require additional personnel. Personnel other than ALCE would have to be provided by the Army, although ALCE could assist in their training to some degree.

9. These estimates are the best we can provide based on the guidance furnished. Support requirements in terms of personnel equipment and facilities are direct dependent on the frequency of the missions, which in turn is dependent on the availability of aircraft. If it is desired or intended that more than one aircraft will be on the ground at a time and simultaneous loading operations will be necessary, the support requirements must be adjusted upward.

10. HQ MAC point of contact is HQ MAC/DOVF, Mr. Dixon, AUTOVON
638-4508.

Herbert I. Noonan

HERBERT I NOONAN, Col, USAF
Dep Dir, Aircrew Stan/Eval
DCS/Operations

2 Atch
1. Crash Fire Rescue
Requirements
2. Personnel and Equipment

24 June 1983

CRASH FIRE RESCUE REQUIREMENTS

CFR vehicle requirements at other than USAF active airfields will be based on the maximum number of MAC aircraft on the ground at one time which require simultaneous support. When aircraft types are mixed, CFR vehicle requirements may be based on the largest requirement for a single type of aircraft. Example: C-141 MOG of 6 and C-130 MCG of 5 require three P-4 and one P-13A.

a. C-130, UC-123, or similar aircraft.

MAXIMUM AIRCRAFT ON GROUND AT ONE TIME

MOG	1-4	5-8	Over 9
P-4	1	1	2
P-13(A)		1	1

b. C-141, DC-8, B-707, or similar aircraft.

MOG	1-2	3-5	Over 5
P-4	1	2	3
P-13(A)	1	1	1

c. C-5, DC-10, B-747, or similar aircraft.

MOG	1	2	Over 2
P-4	2	3	4
P-13(A)	1	1	2

d. CT-39, C-12, or similar aircraft.

One lightweight vehicle with at least 500 pounds of dry chemical extinguishing agent or 450 pounds of dry chemical and 50 gallons of water for aqueous film forming foam (AFFF) production (extracted from Federal Air Regulation (FAR) 139.49, February 1977). When operating into locations with other MAC aircraft, the greater CFR requirements apply.

USAF CFR VEHICLE CAPACITIES/CAPABILITIES

The suitability of a non-USAF vehicle as a substitute for USAF CFR vehicle can be determined by comparing the agent carrying and pumping capabilities with those listed below. For the purpose of this directive, a CFR vehicle is defined as a motorized vehicle which carries a quantity of water and fire extinguishing foam in affixed tanks. It must be equipped with a fire pump capable of discharging metered water and foam through one or more turrets, monitor nozzle, or deluge gun while the vehicle is in motion. These discharge devices may be electrically, hydraulically, or manually controlled. Fire protection manpower assigned to non-USAF CFR vehicles should be commensurate with the size and specific mission of the vehicle.

VEHICLE				HALON	DRY	AIR TRANS-
TYPE	PUMP	WATER	FOAM	1211	CHEM	PORTABLE
A/S 32	1400	2300	200	0	0	C-5
P-2	GPM	GALS	GALS			Only
A/S 32	1200	1500	180	0	0	C-130
<u>P-4</u>	GPM	GALS	GALS			
A/S 32	NA	0	0	507	350	C-123
<u>P-13A</u>				LBS		

NOTE: Two 530-C pumpers and one twin agent combination vehicle (dry chemical/1350 lbs and AFFF/200 gallons premixed) plus a minimum of two qualified firelighters on each vehicle may be used to provide a suitable substitute for one P-4 with three firelighters.

**Personnel and Equipment
(per on-load site)**

Personnel:

- 1 ALCE Operations Officer
- 1 ALCE Operations NCO
- 1 ALCE Loadmaster
- 3 Maintenance (Marshalling, Maintenance etc)
- 4 Transportation MHE Operators
- 4 Load team operators
- 6 Load Team (pre-load pallet build up)

Equipment:

- 2 Sedans
- 1 Pickup truck
- 2 10K Standard forklifts (pre-load prep)
- 2 10K Forklifts (aircraft load)
- 2 25K loaders (TAC loader can substitute)
- 2 Power units A/M32A-86 (Diesel) Primary MD-3 (Secondary)
- 2 Light Carts (NF-2 Floodlight)