



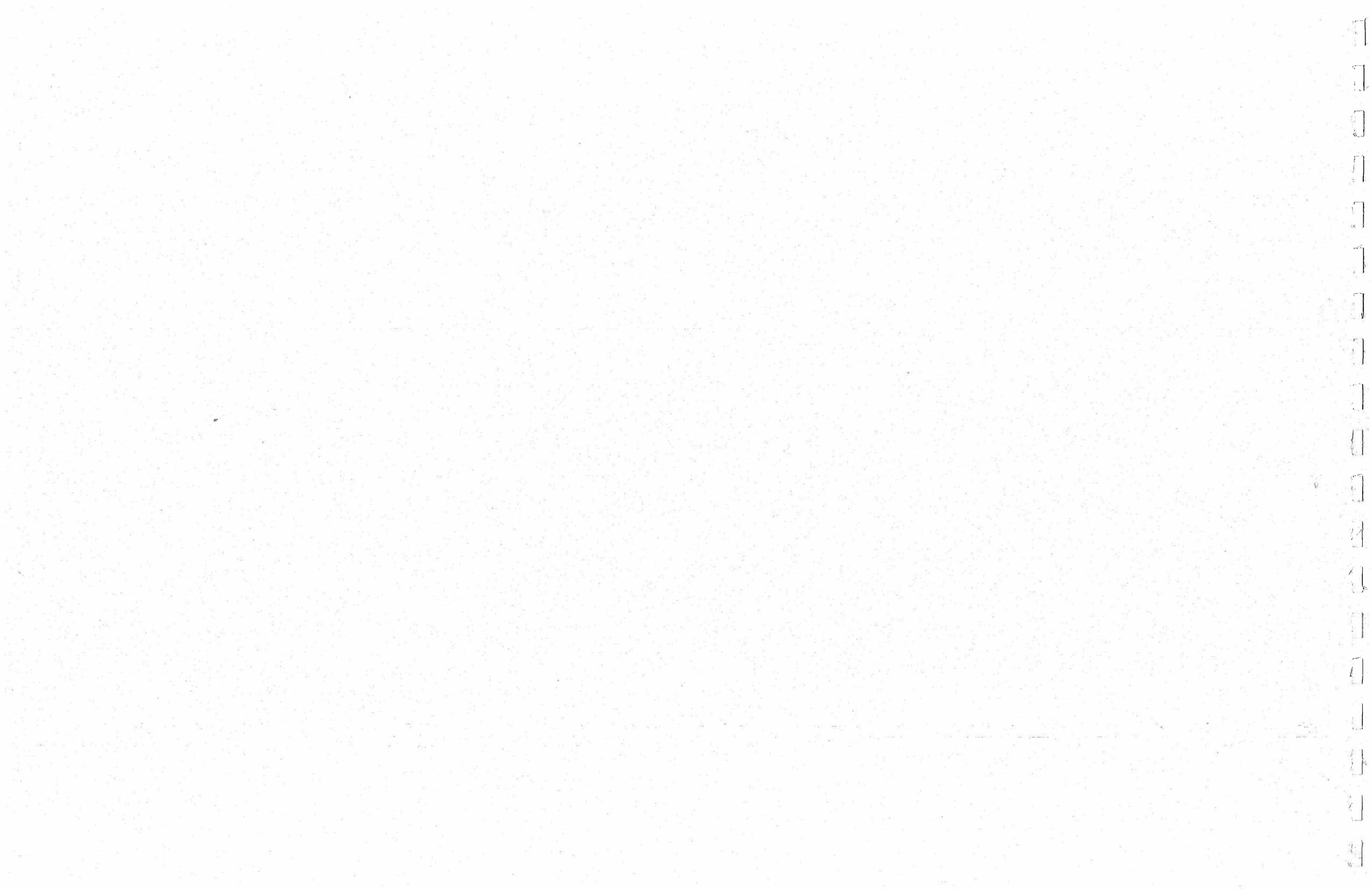
MOFFETT FIELD COMPREHENSIVE USE PLAN

Prepared by the Staff of
NASA Ames Research Center
Moffett Field, California 94035-1000

September 1994

*"From Lighter than Air,
to Faster than Sound,
to Outer Space"*

US Navy "Hail & Farewell", May 1993



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COMPREHENSIVE
USE PLAN

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Table of Contents

	<u>Page</u>		<u>Page</u>
<i>Preface</i>	II		
1.0. INTRODUCTION	1	4.0 POTENTIAL FOR FUTURE GROWTH	25
<i>1.1 Background</i>	2	<i>4.1 Site Opportunities</i>	26
<i>1.2 Context</i>	3	<i>4.2 Planning Areas and the Potential for Future Growth</i>	27
<i>1.3 A Brief History of Moffett Field</i>	6		
<i>1.4 Local Economy</i>	7	5.0 CONCEPTS OF THE FUTURE	38
		<i>5.1 Identification of Future Concepts</i>	39
2.0. THE SITE	8	<i>5.2 Future Concept 1</i>	40
<i>2.1 Site Characteristics</i>	9	<i>5.3 Future Concept 2</i>	43
<i>2.2 Site Facilities</i>	11	<i>5.4 Comparison of Concepts at the Planning Area Level</i>	45
<i>2.3 Site Constraints</i>	13		
		6.0 PREFERRED ALTERNATIVE	64
3.0 EXISTING ACTIVITIES	19	<i>6.1 Comparison Criteria</i>	65
<i>3.1 Description of Activities</i>	20	<i>6.2 Preferred Alternative</i>	67
<i>3.2 Traffic, Utilities and Services</i>	22	<i>6.3 Summary and Conclusion</i>	67
		REFERENCES	68

Preface

In October 1991, Congress and the President approved the recommendation of the Base Closure and Realignment Commission to disestablish the Naval Air Station at Moffett Field, California. The Commission recommended Moffett Field remain a Federal facility for use by NASA and other Federal entities. NASA, with strong support of the local communities and industries, agreed in December, 1992 to assume the role of custodian of Moffett Field upon disestablishment of the Naval Air Station in July, 1994.

The Air Force, through Onizuka Air Station, has assumed custodial responsibility for the military family housing at Moffett Field.

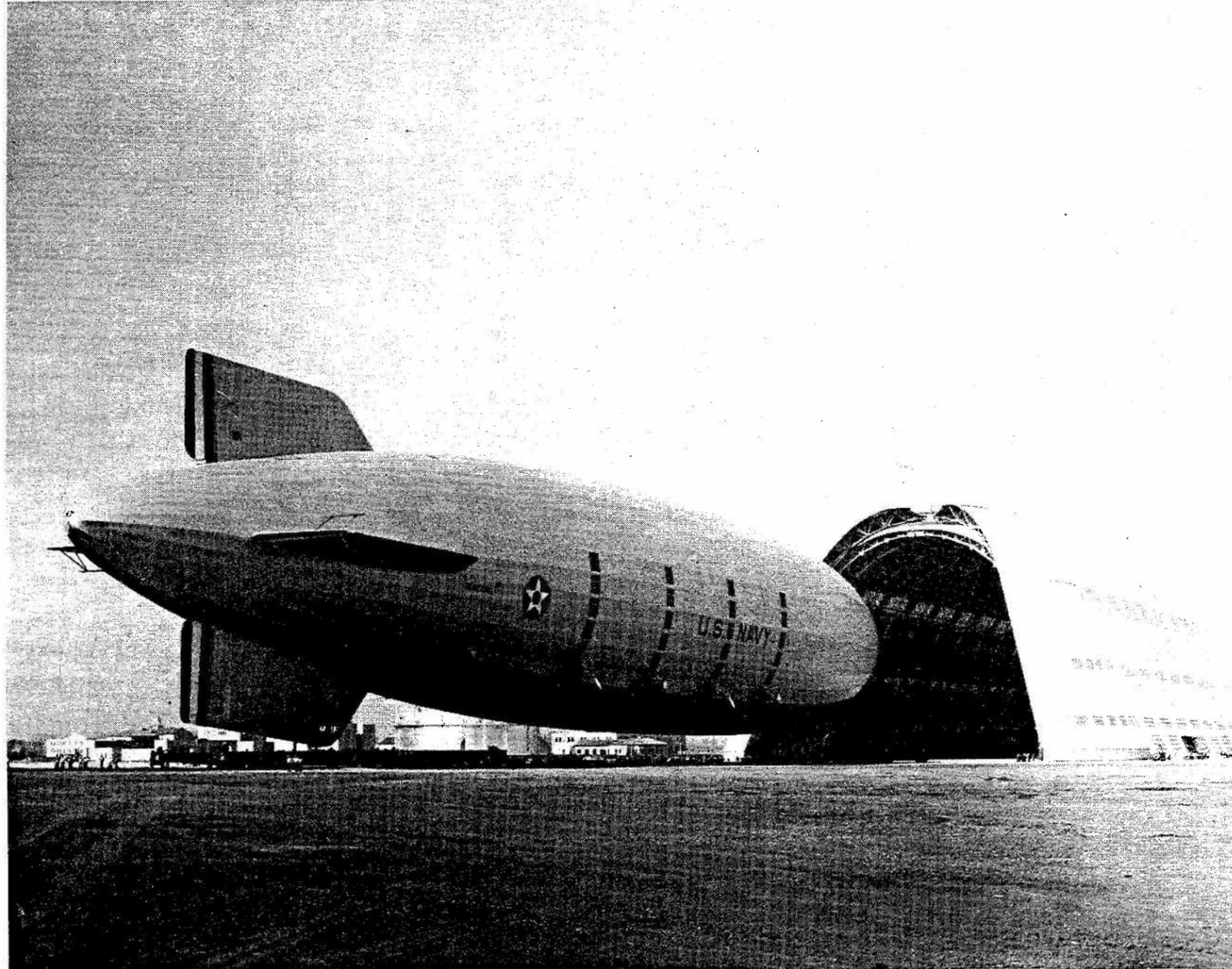
Acknowledgments

This Comprehensive Use Plan was produced by Ames Research Center with the cooperation and coordination of the Navy and other Federal entities now located at Moffett Field.

The Plan was prepared by the Moffett Transition Office under the direction of the NASA Ames Moffett Field Development Project Office. Moffett Transition Office managers, Charles Castellano and John Ferandin, were supported by: Brad Brewster and David Reel of Bentley Engineering Inc.; Assen Assenov of SRS Integral; and James Burke, Robert Conradt and Daniel Stephan of Burke Associates. Mr. Richard Brown, Chief of the Ames Facilities Planning Office, also directly participated in the plan preparation. Other staff and support service contractors of the Moffett Development Project Office made significant contributions as well.



Navy Aircraft in Hangar 1, Late 1930's



USS Macon, Late 1930's

1.1 Background

1.2 Context

1.3 A Brief History of Moffett Field

1.4 Local Economy

1.0 Introduction

1.0 Introduction

This chapter provides the background to the Comprehensive Use Plan and discusses its geographical context in terms of state, region, vicinity and the Moffett Field site. It also provides a brief history of the site and discusses the local economy.

1.1 Background

In October 1991, Congress and the President approved the recommendation of the Base Closure and Realignment Commission to disestablish the Naval Air Station at Moffett Field, California. The Commission further recommended Moffett Field remain a Federal facility for use by NASA and other Federal entities. NASA, with strong support of the local communities and industries, agreed in December 1992 to assume the role of custodian for Moffett Field upon disestablishment of the Naval Air Station in July 1994.

Moffett Field has been a Federal airfield used for research, development, training and operational activities for 60 years. There are no plans to change this use. Nor does ownership change; Moffett Field remains property of the US Government.

NASA Ames Research Center and other Federal entities, such as the California Air National Guard and the Navy Air Reserve will continue to serve at Moffett Field, as in the past. These Federal entities will be known as Resident Agencies.

The Department of Defense (DOD) will continue to utilize the military family housing at Moffett Field. In October 1993, the military housing was transferred to Onizuka Air Station. This area of DOD housing will not be part of this study.

As of this date, November 1993, Ames Research Center, the Naval Air Station and the military family housing, under the custody of Onizuka Air Station, occupy all of the government property located at Moffett Field, California and known as "Moffett Field."

Although there is no change in the use or ownership of Federal government property at Moffett Field, NASA Ames Research Center has undertaken a comprehensive planning process to consider possible future Federal activities and to provide information to those concerned with the management, planning and development of Moffett Field. This Comprehensive Use Plan reviews the existing conditions at Moffett Field, identifies two future concepts and recommends one of these concepts as indicative of the type of activity that could be found at Moffett Field in the year 2010.

Purpose of Comprehensive Use Plan

The purpose of the Comprehensive Use Plan is to provide a guide to NASA management, as custodian, for decisions that affect the future of Moffett Field and to provide a basis for additional assessments, if required.

The following pages describe Moffett Field and discuss its vicinity, characteristics, existing conditions, site constraints and planning areas. Finally, the preferred future concept is presented.

Organization

The Comprehensive Use Plan is organized into six chapters. This chapter provides an introduction to Moffett Field with information on background, context, history and local economy. Chapter 2 discusses current conditions, including site characteristics, existing facilities and possible constraints on future use and development. Chapter 3 discusses the activities at the site during the early 1990's, which provides a basis for comparison between concepts for future use. Chapter 4 provides detailed information about eleven planning areas identified for Moffett Field. Chapter 5 identifies two future concepts of Moffett Field and compares them at the planning area level. Chapter 6 contains an evaluation of two concepts and identifies a preferred concept for the future use of Moffett Field.



Moffett Field Runways

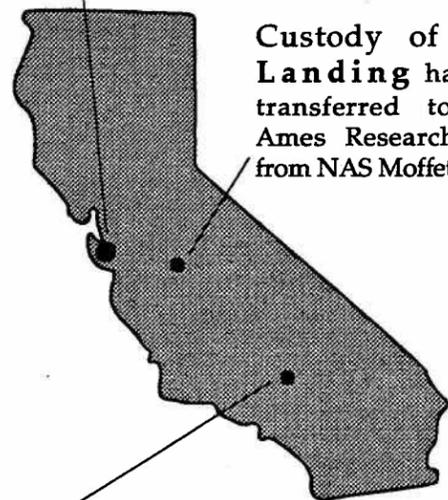
1.2 Context

State

NASA Ames Research Center operates three research facilities in California (Figure 1-1). The primary site is at Moffett Field, in the San Francisco Bay Area. A second site, Dryden Flight Research Facility at Edwards Air Force Base is in the Mojave desert. This site is used for testing high-performance aircraft and it is one of the two primary landing sites for the Space Shuttle Orbiter.

In 1993 Ames Research Center assumed custody of a third site, Crows Landing Auxiliary Flight Facility, in Stanislaus County. This site, formerly part of NAS Moffett Field, is used for low-speed flight research.

Ames Research Center: MOFFETT FIELD



Custody of Crows Landing has been transferred to NASA Ames Research Center from NAS Moffett Field.

Ames Dryden Flight Research Facility is part of Ames Research Center.

Figure 1-1: Ames Research Center California facilities

Region

Moffett Field is located at the southern end of the San Francisco Bay (Figure 1-2). It is ten miles north of San Jose and is within commute distance to San Francisco, Oakland and other cities in the southern part of the region.

Moffett Field falls within the Bay Area regional airport system, which includes three commercial international airports:

- San Francisco International Airport
- San Jose International Airport
- Oakland International Airport

Moffett Field is located in the heart of the Silicon Valley and has the potential to increase its influence as a technical research and development center for the benefit of the regional economy including high tech industries, research and educational institutions as well as the Federal government.

In addition to Silicon Valley, Moffett Field is in close proximity to other high tech centers, such as the emerging, marine-oriented, high-tech corridor between Santa Cruz and Monterey.

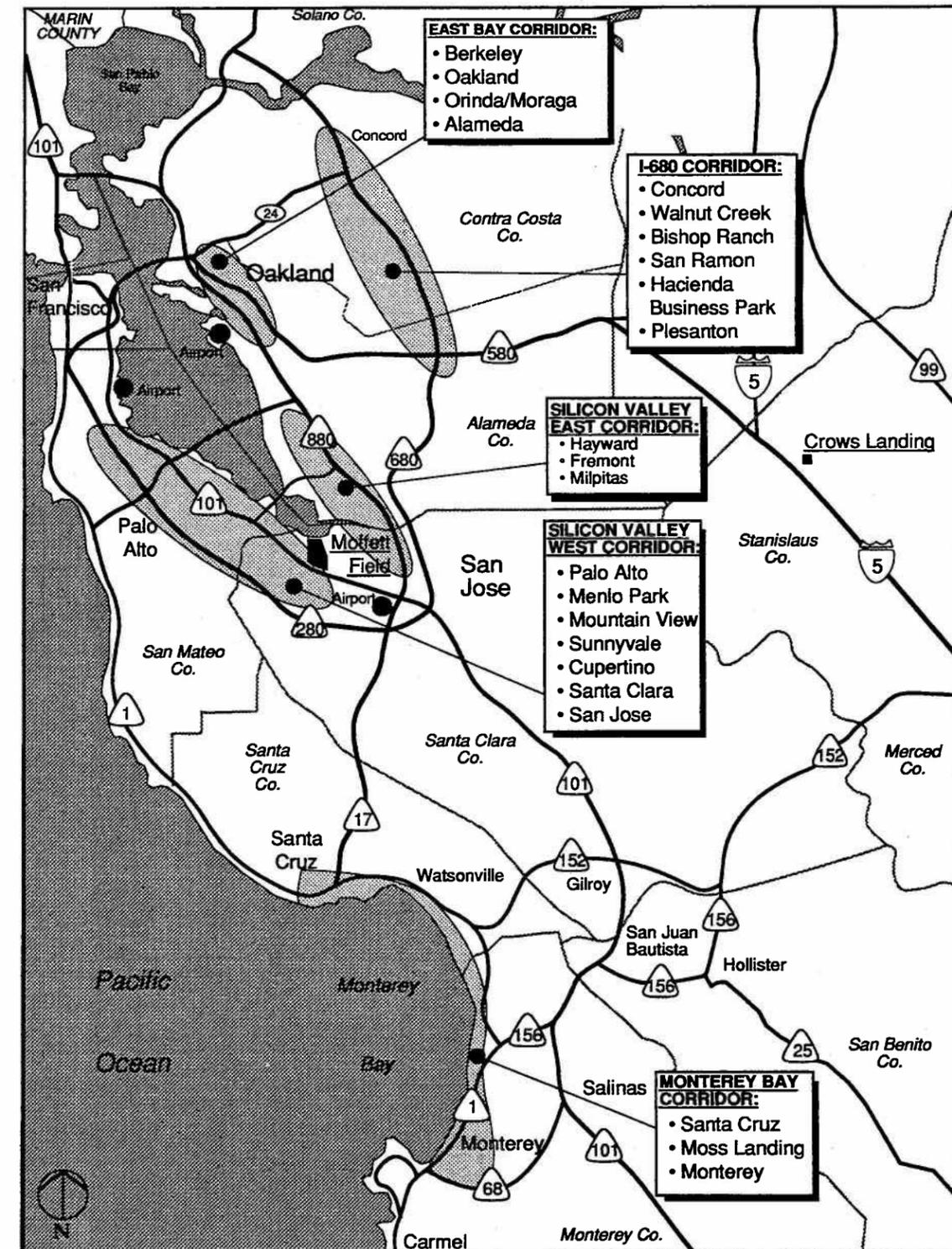


Figure 1-2: Bay Area Region and High-Tech Corridors

Vicinity

The vicinity of Moffett Field consists primarily of natural and industrial areas that are within the adjacent cities of Mountain View and Sunnyvale (Figure 1-3).

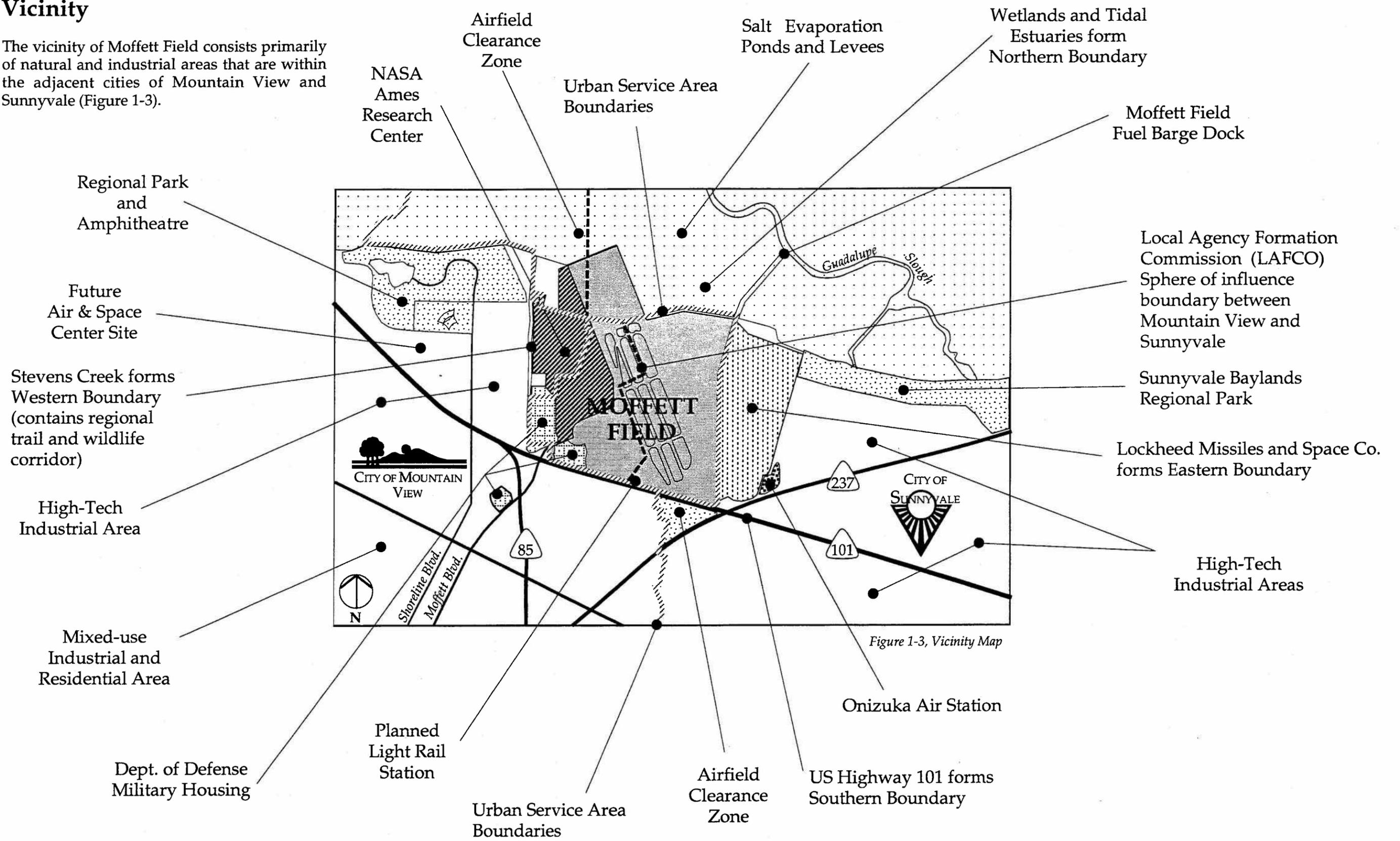


Figure 1-3, Vicinity Map

Moffett Field

Moffett Field is composed of an airfield, airfield support facilities and a technology center used by Ames Research Center and other Federal entities and their contractors. In the future the major components of Moffett Field will be Moffett Federal Airfield and Ames Research Center and the Department of Defense military housing (Figure 1-4). As in the past, the name of the entire facility will be Moffett Field.

In the past, Ames Research Center has utilized Moffett Field for:

- Aerospace research and technology (e.g. fluid and thermal physics, reentry systems and hypersonic vehicle flight research)
- Computational analysis of fluid flow, wind tunnel research, flight simulation and flight research
- Space and Life Sciences
- Research emphasizing high performance, powered lift and rotary wing aircraft
- Airborne Sciences (e.g. using aircraft as instrumentation platforms for earth and atmospheric observations)

In accordance with Federal law, use of the facility will continue to be restricted to Federal activities. The facility will continue to be shared with other Federal entities having goals compatible with those of NASA, other sharing entities and the local community.

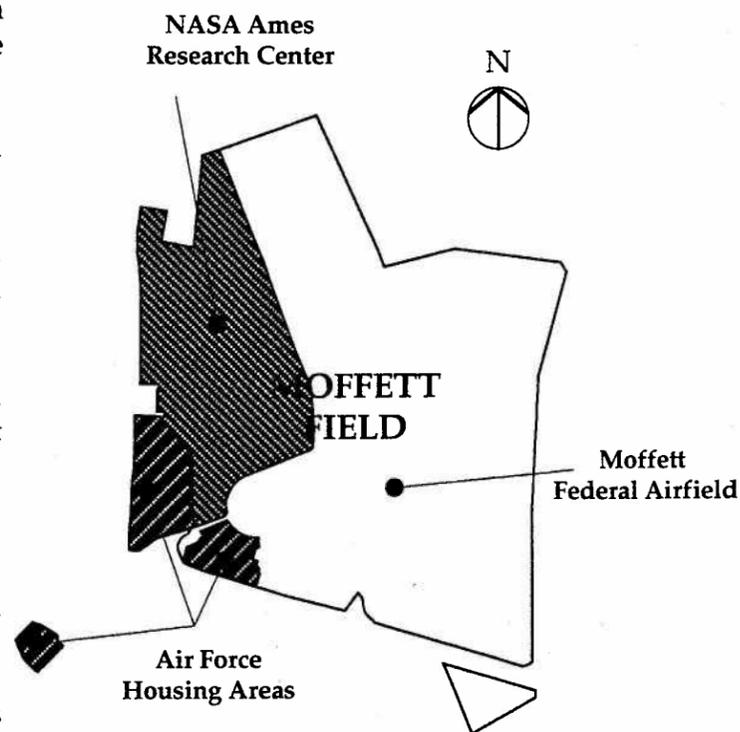


Figure 1-4, Moffett Field

These Federal users will be known as Resident Agencies. The use of the facility by the Federal entities will be cost-effective to each user and to the Federal government as a whole.

Major Resident Agencies identified for Moffett Field include:

- Army Reserve
- California Air National Guard
- Navy and Marine Air Reserves
- Onizuka Air Station

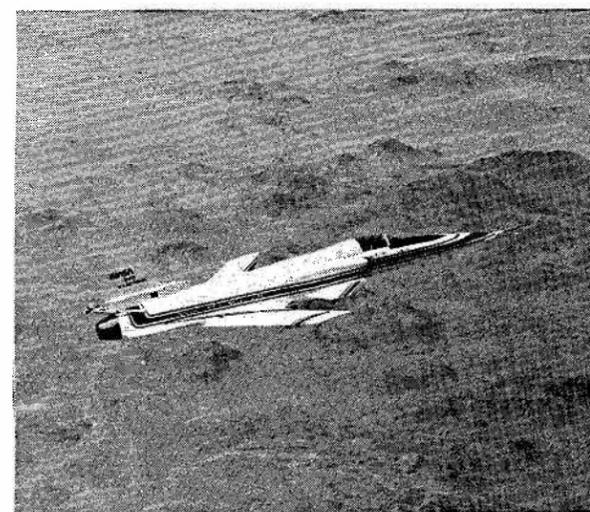
Access to Moffett Field will be controlled: it will be closed to the public. Moffett Field will be free of commercial activities, except those required for employee support.

Future activities at Moffett Field will be essentially the same as current activities:

- Activity levels will be similar to those prior to the transfer
- New activities will be compatible with existing uses



NASA Research Aircraft



NASA/Air Force Research Aircraft



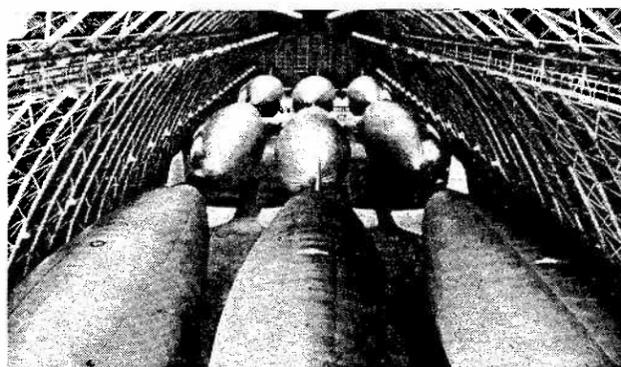
Navy F-18 Fighter Undergoing Testing at NASA

1.3 A Brief History Of Moffett Field

In 1930, a group of local citizens organized to raise funds to purchase land for a Naval Air facility. They purchased 1,000 acres for \$476,065.90 and turned the property over to the Federal government for \$1 on August 2, 1931. Construction of the original 40 buildings, including the landmark Hangar 1, was authorized in 1932, and the base was commissioned on April 12, 1933, as the Naval Air Station, Sunnyvale, California. Its original mission was to serve as home base for the Navy dirigible, U.S.S. Macon, which arrived on October 16, 1933.

After the Macon was lost at sea on February 12, 1935, the Navy continued to use the air station. On October 25, 1935, it was transferred to the Army Air Corps and used as a training base. The National Advisory Committee for Aeronautics (NACA) established the Ames Aeronautical Laboratory on an adjacent 62 acres in December 1939.

During World War II, on April 16, 1942, the base was returned to Navy control as Naval Air Station (NAS), Sunnyvale. Four days later it was renamed NAS Moffett Field, in honor of Rear Admiral William A. Moffett who was a strong air power advocate and who was lost with the Macon's sister ship, the U.S.S. Akron, when it went down off the East Coast on April 4, 1933. Shortly after the Navy's return, Hangars 2 and 3 were built to house the Navy blimps which were used during World War II for offshore surveillance.



Navy Blimp Storage, Hangar 2

In mid-1945, the first Naval Air Transport Service Squadron, VR-4, arrived. Navy transport aircraft and crews from Moffett Field played a significant role in the Berlin Air Lift in the 1950's. Jets first arrived in 1950 and included Navy fighters, F3Ds, F2Hs and F7Us. The fighters departed after concerns grew about crowded skies and community noise.

In 1958, the National Aeronautics and Space Administration (NASA) was created and it absorbed NACA; thus, Ames became the NASA Ames Research Center.

In November 1962, the mission for NAS Moffett Field changed to anti-submarine warfare. The Lockheed P-3 Orions used for that mission arrived in February 1963.

In 1983, NAS Moffett Field celebrated its 50th anniversary, and six years later Ames followed with its 50th anniversary. On April 15, 1991, the Base Closure and Realignment Commission recommended that the Navy cease active duty operations at NAS Moffett Field. By this time, the availability of the air field had become essential to Ames aerospace and aeronautic research. It was proposed and accepted, with enthusiastic support from the neighboring communities of Mountain View and Sunnyvale, that Moffett Field remain a Federal installation. NASA Ames Research Center has accepted responsibility for operating Moffett Field as a shared Federal facility after the active duty Navy leaves in 1994. See Figure 1-5, Historical Timeline.

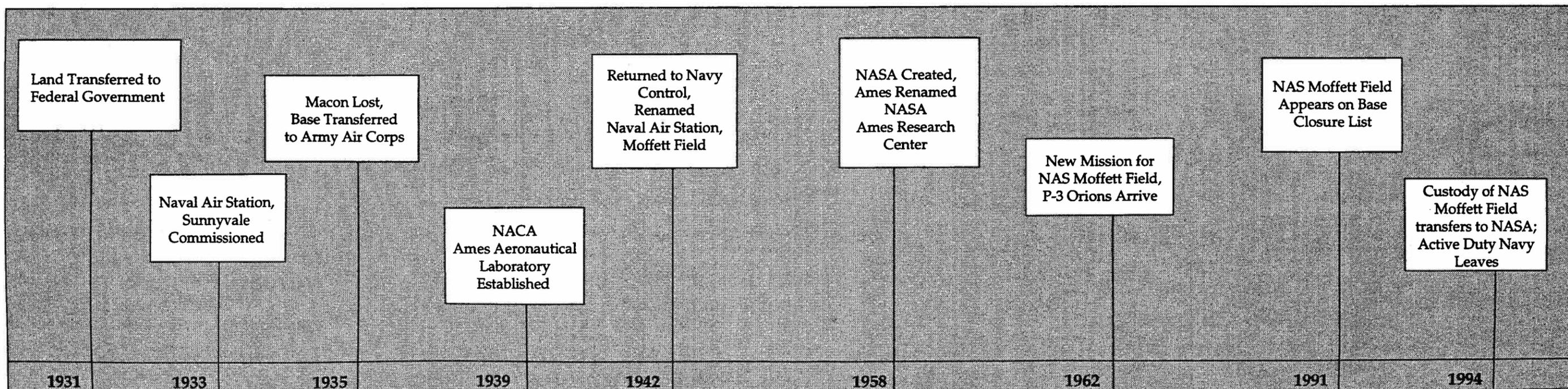


Figure 1-5: Historical Timeline.

1.4 Local Economy

The continued Federal use of Moffett Field will insure that jobs lost due to the Navy's departure will be largely replaced and that existing jobs will not be threatened.

This loss, without consideration of the continued use by NASA and other Federal entities, was estimated by the California Commission on State Finance to be 3,359 military and 633 civilian personnel by September 1994. It was also estimated that at least 2,800 jobs would be lost in supporting industries, largely in Santa Clara County.

As seen in following sections, this plan estimates that between 600 and 4,000 new jobs will be created at Moffett Field by the Federal government and its contractors. Federal activities have rapidly sought to increase their presence at Moffett Field. New activities at Moffett Field are expected for the Air Force, Army, Army Reserves, California Air National Guard, and Naval and Marine Air Reserves. This interest will, at least, balance the departing Navy civilian jobs and should cancel the predicted loss in supporting industry employment.

In addition, the continued Federal presence at Moffett Field will help retain existing jobs dependent on the facility. Ames Research Center has approximately 5,600 civil servants and support service contractors as well as some 575 full- and part-time academic researchers on site. The California Air National Guard, Naval Air Reserve, and the Air Force account for approximately 1500 direct military and civilian personnel. It is also estimated that local Federal contractors, employing as many as 20,000 people, will continue to benefit from use of Moffett Field support and will not be faced with the prospect of moving aerospace research and development activities outside of the region.

Finally, the presence of a Federal research and development facility in the midst of Silicon Valley presents opportunities for the future.

Economic Development Opportunities

The strong research and development capabilities of NASA Ames Research Center, the secure Federal facility and airfield, and the diverse operational capabilities of the Resident Agencies add to the potential for new programs and activities which could benefit the local communities, industries and educational institutions.

Specific areas of research and development where the assets of Moffett Field can provide the basis for new interfaces with the local community, local industry, Resident Agencies, and Ames Research Center may include:

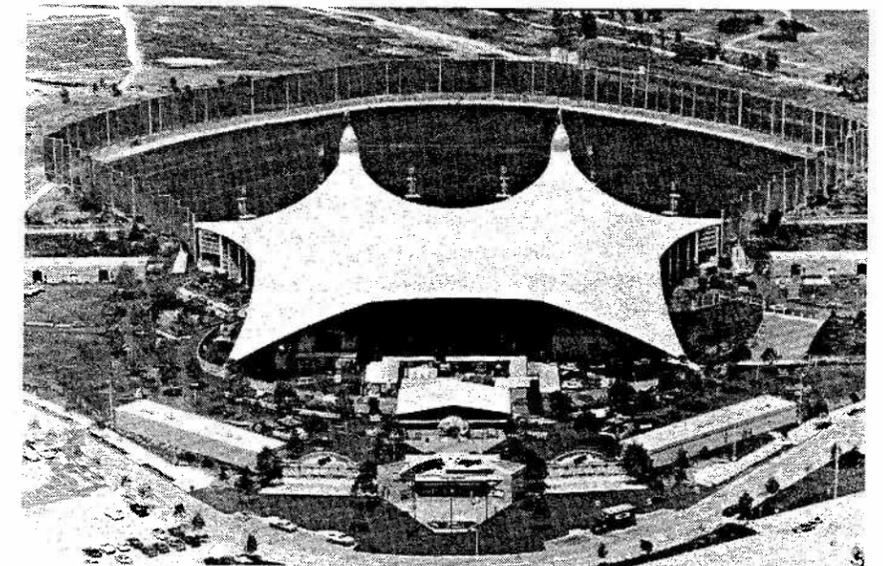
- Telecommunications and Navigation Systems
- Aerospace and Space Commerce
- Environmental Remediation Technology
- Information Systems and Software
- Biotechnology
- Industrial and Research Instrumentation

The above examples are representative of activities which have one or more of the following characteristics:

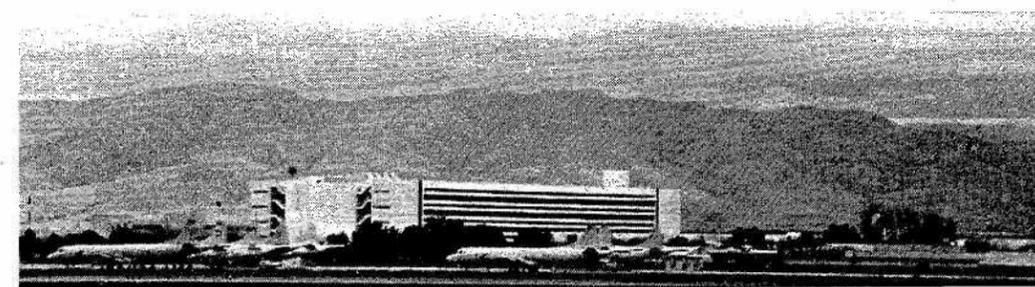
- Provide linkages with current or readily developed activities at Ames Research Center or Moffett Resident Agencies
- Have prospects for future product development in Silicon Valley
- Consistent with outlook for both short- and long- range international demand



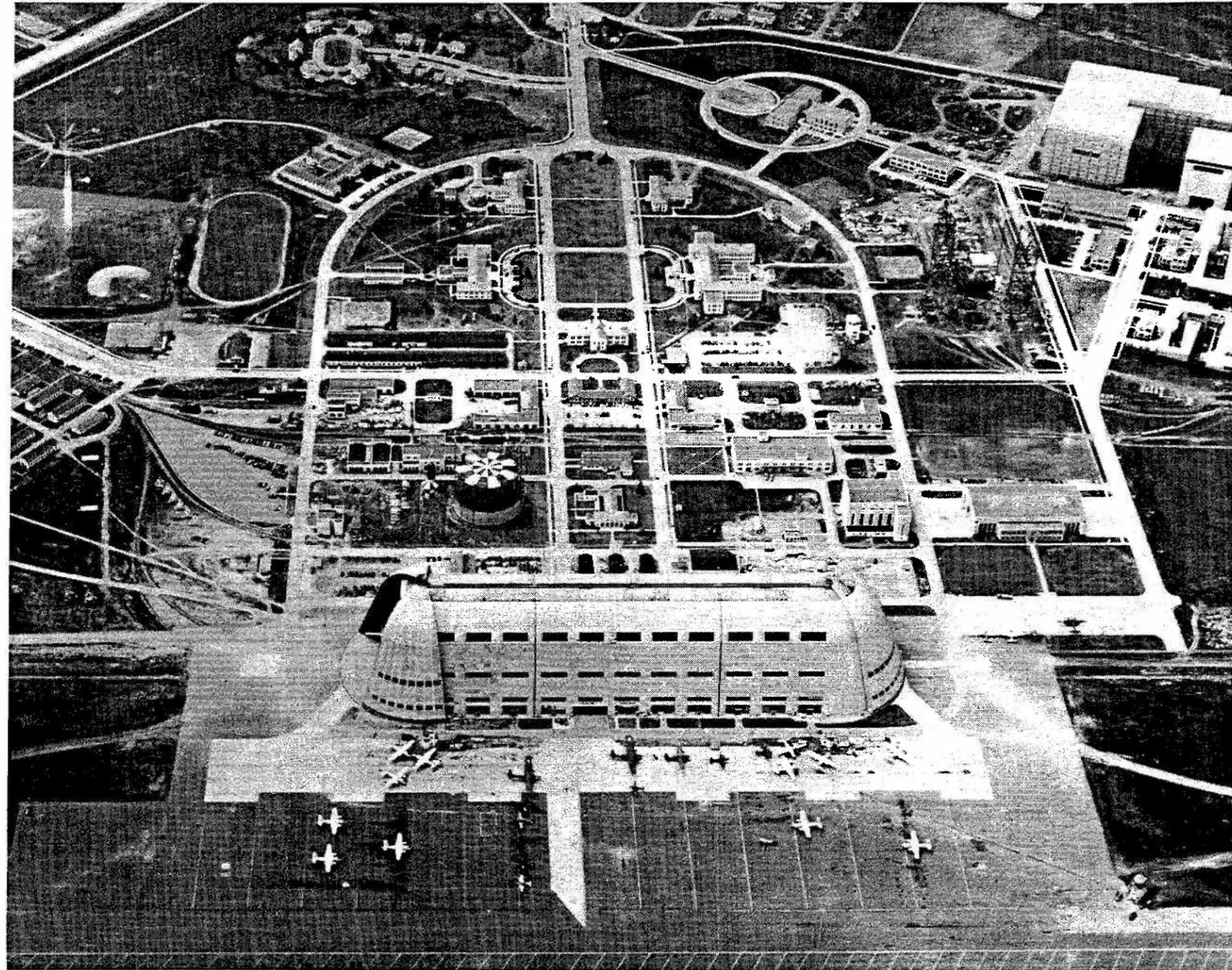
Stanford University, Palo Alto



Shoreline Amphitheatre, Mountain View



Federal -Related Industry Adjacent to Moffett Field



Moffett Field, Mid 1940's

2.1 Site Characteristics

2.2 Site Facilities

2.3 Site Constraints

2.0 The Site

2.0 The Site

This chapter provides information about the Moffett Field site. Section 2.1 discusses on-site and off-site characteristics and Section 2.2 describes the existing facilities. Section 2.3 reviews the site constraints that may affect future use and development.

2.1 Site Characteristics

The unique origin of Moffett Field, as a base for airships, coupled with the establishment of NASA Ames Research Center, has resulted in an overall image of the site based on large man-made features such as runways, hangars and wind tunnels. Significant site characteristics are shown in Figure 2-1. The airfield, with its two parallel runways, is located in the middle of the site and occupies approximately 450 acres. There are also over 70 structures related to airfield operations.

Hangars 2 and 3 lie directly across the airfield from Hangar 1 on the eastern portion of the site. Surrounding these structures are numerous auxiliary buildings needed for the daily operation of the airfield.

Coastal marshes

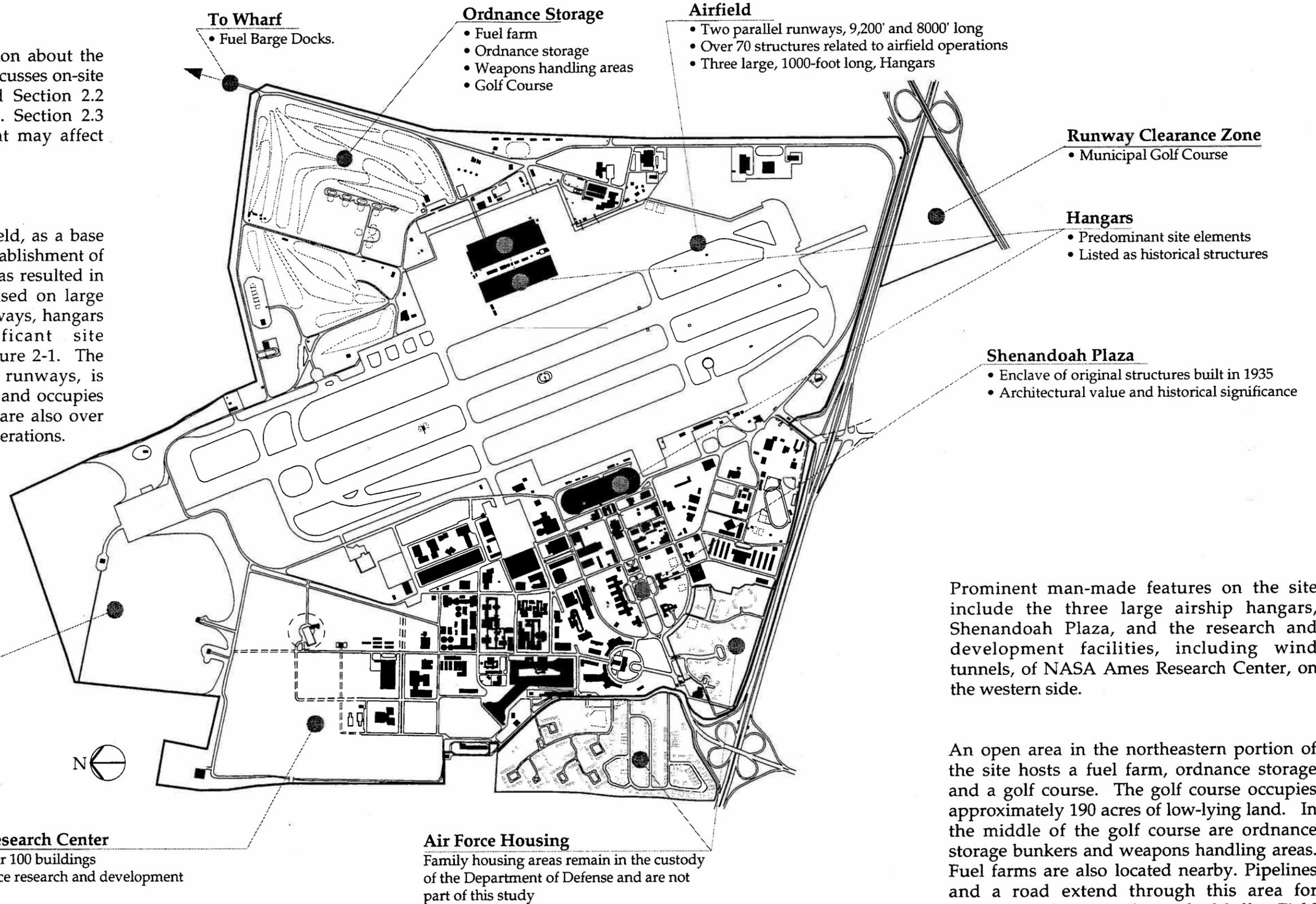
- Flood protection levees
- Airfield clearance zone
- Open Space and Wetlands

NASA Ames Research Center

- 430 acres and over 100 buildings
- National aerospace research and development

Air Force Housing

Family housing areas remain in the custody of the Department of Defense and are not part of this study



Prominent man-made features on the site include the three large airship hangars, Shenandoah Plaza, and the research and development facilities, including wind tunnels, of NASA Ames Research Center, on the western side.

An open area in the northeastern portion of the site hosts a fuel farm, ordnance storage and a golf course. The golf course occupies approximately 190 acres of low-lying land. In the middle of the golf course are ordnance storage bunkers and weapons handling areas. Fuel farms are also located nearby. Pipelines and a road extend through this area for approximately 0.75 miles to the Moffett Field wharf and fuel docks.

Figure 2-1: On-site characteristics

Existing Land Use

Land use has evolved in a somewhat disjointed pattern over the 60 year history of Moffett Field. The twelve land use types, shown in Figure 2-2, reveal some key land use features. The center of the site is dominated by the airfield which establishes a clear definition between the easterly and westerly portions of the site. Land use in the eastern portion is predominantly fuels and ordnance storage, operations and maintenance, and administration and training. The west side has clearly defined housing, services and recreation. Shenandoah Plaza, with its administration and billeting buildings, represent the architectural centerpiece of the site.

Following War World II unforeseen growth took place at Moffett Field in the areas adjacent to Shenandoah Plaza. Many semi-permanent structures and parking lots were built in a land use pattern that differs from the sense of scale and character found in the initial plan for Shenandoah Plaza.

Land use on the Ames Research Center site is characterized by clusters of large-scale aerospace research facilities interspersed with support areas. A small area of primarily administration uses is identifiable at the south end of the NASA Ames site (as shown on the map by shading number 13). An area of low density development and potential wetlands lies at the northern edge.

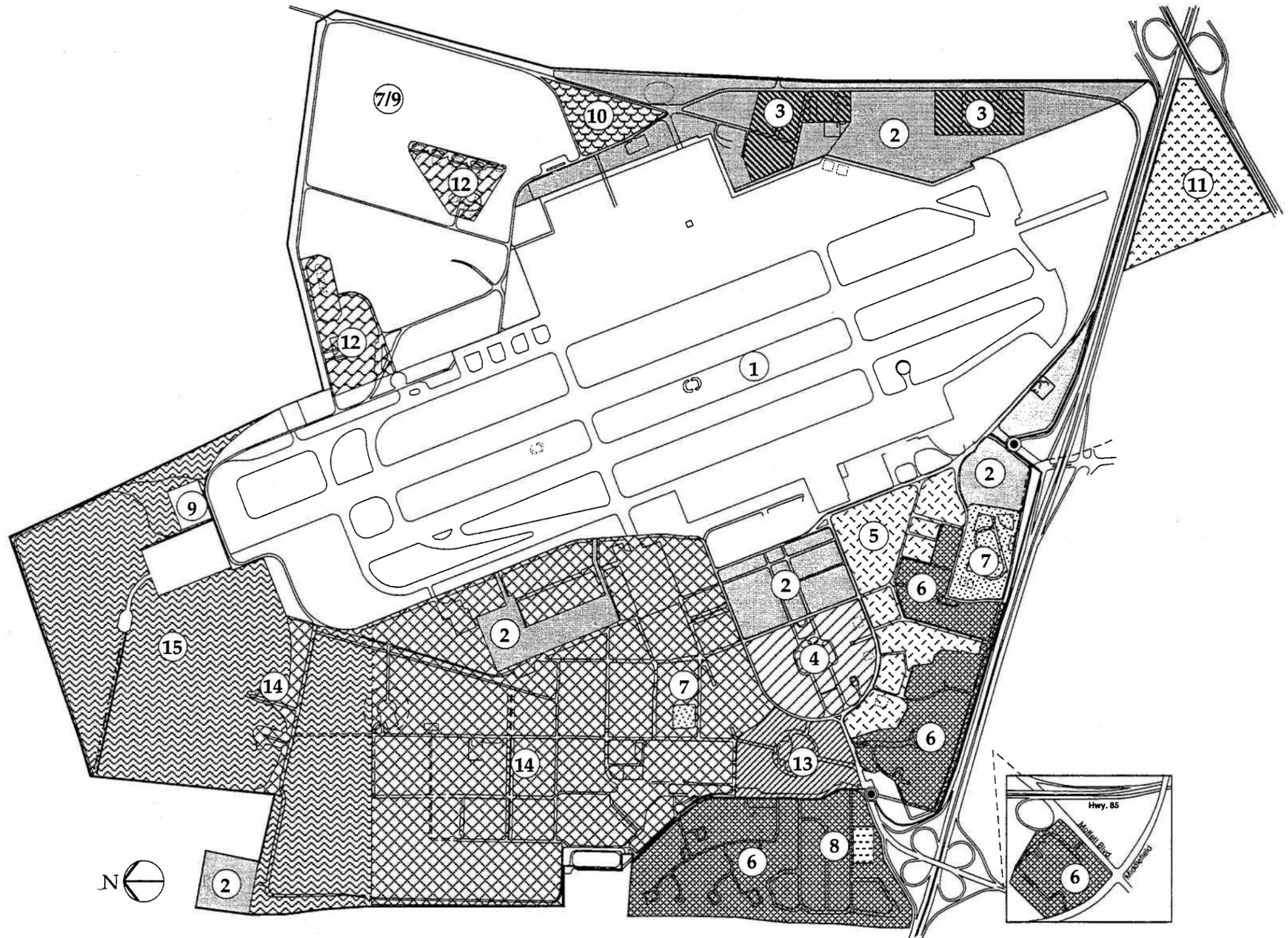


Figure 2-2: NAS Moffett Field Land Use

Moffett Field Primary Land Use

1. Airfield Operations	4. Administration/Billeting	7. Recreation	10. Fuel Operations	13. NASA Admin
2. Operations & Maintenance	5. Personnel Services	8. Medical Support	11. Airfield Clearance	14. NASA R&D
3. Administration/Training	6. Housing	9. Ordnance Safety Zone	12. Ordnance Storage	15. Wetlands

2.2 Existing Site Facilities

General Description of Moffett Field Facilities

The existing facilities of Moffett Field, as shown on Figure 2-3, are described here in three areas: Moffett Federal Airfield, Ames Research Center, and Onizuka Air Station Annex. Moffett Federal Airfield has over 300 facilities supporting a variety of functions ranging from flight operations to emergency and security services. Facilities are clustered on the east and west sides of the airfield, with the majority of facilities located on the west side between the Main Gate and the airfield. The three hangars are located on the periphery of the airfield center, with Hangar 1 located on the west side directly across the airfield runways from Hangars 2 and 3. The hangars and their two heating plants comprise approximately 1.2 million square feet of space, or approximately 41% of the total building area of NAS Moffett Field.

Ames Research Center contains over 100 facilities comprising approximately 2 Million square feet built between 1939-1992. Research support and administration facilities are dispersed throughout the site.

Onizuka Air Force Annex contains over 180 facilities totaling 1 million square feet of military family housing and personnel support functions. The Onizuka Air Station Annex is not part of this study.

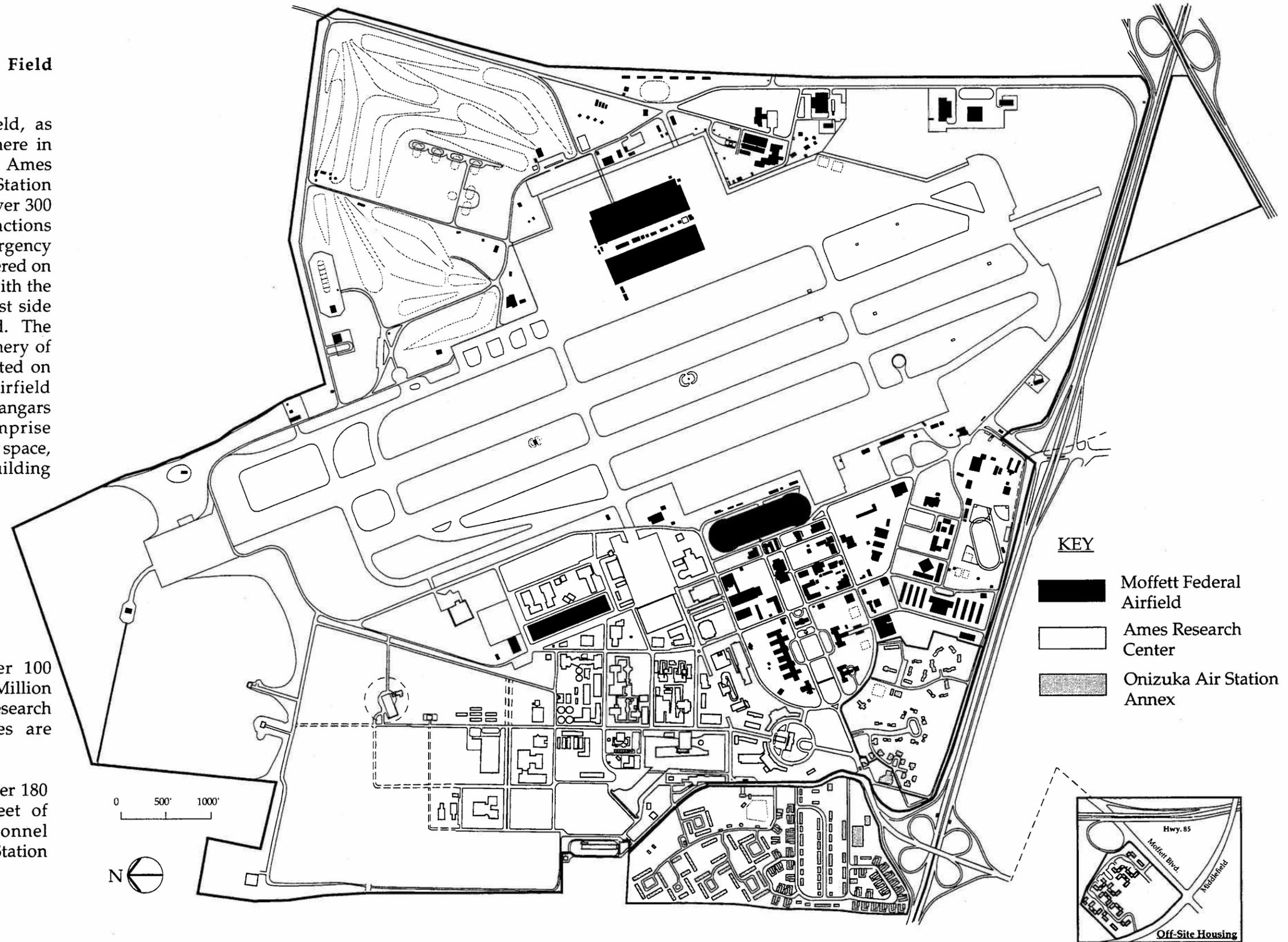


Figure 2-3: Moffett Field Facilities

Historical Buildings

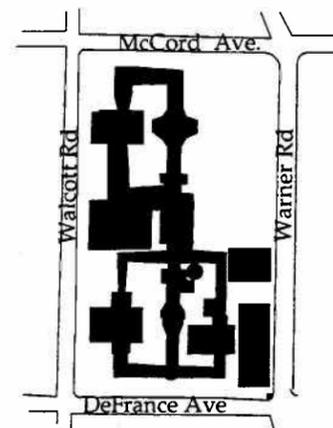
Probably the most recognizable group of buildings at Moffett Field are those within Shenandoah Plaza. These buildings, with their Mission Revival style architecture, were constructed between 1932 and 1935. The buildings on the western side of McCord Avenue have not had any major renovation, except for Building 19 which has had major additions (a new wing on each side); this has not detracted from the character of the original building.

The buildings east of McCord Avenue have been greatly altered over the years. However, due to their unique character and age, many of the buildings in Shenandoah Plaza, as well as Hangars 2 and 3 on the east side of the airfield,

have been included in the National Register for Historic Places as an "Historic District" in February 1994. Hangar 1 is also included.

According to a survey performed by the Navy in 1992, only 28 of the 78 buildings within the proposed Shenandoah Plaza historic district contribute towards its historic status. These buildings are shown in Figure 2-4.

The NASA Unitary Plan Wind Tunnel at Ames Research Center has also been formally designated as an historic structure and is listed on the National Register as a national landmark.



NASA Unitary Plan Wind Tunnel

NASA Unitary Plan Wind Tunnel

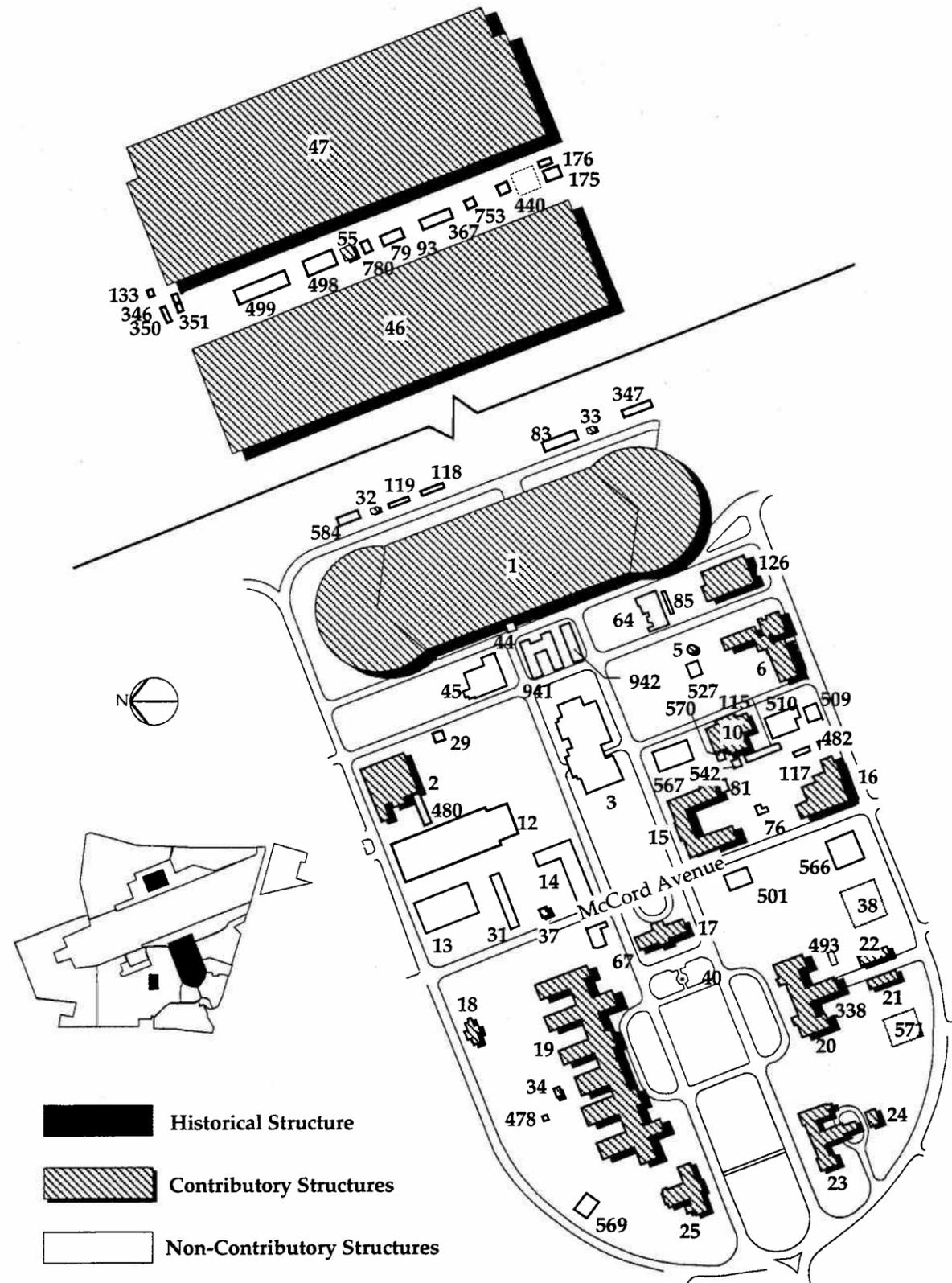


Figure 2-4 Contributory Historical Structures

2.3 Site Constraints

Constraints on use and development are posed by airfield operations, security, safety, noise, wetlands, wildlife, geology, cultural and historic resources and environmental clean-up requirements.

Airfield Constraints

As with any airfield, flight operations present a number of use constraints. Some of these constraints are relaxed under several airfield safety criteria waivers. For example, the three large hangars could not be as close to the runways with current safety regulations, but the airfield is allowed to operate because the hangars were built prior to the adoption of the regulations.

Facility development is also constrained by airfield clearance zones which occur at both ends of the airfield, as shown in Figure 2-5. No development is allowed in these zones which are located either south of Highway 101, or in wetland areas to the north.

The San Francisco Bay Conservation and Development Commission, under the authority of the Federal Coastal Zone Management Act, designates Moffett Field as an airport priority use area. The Commission recommends such activities at Moffett Field as aviation, related support, and ancillary services.

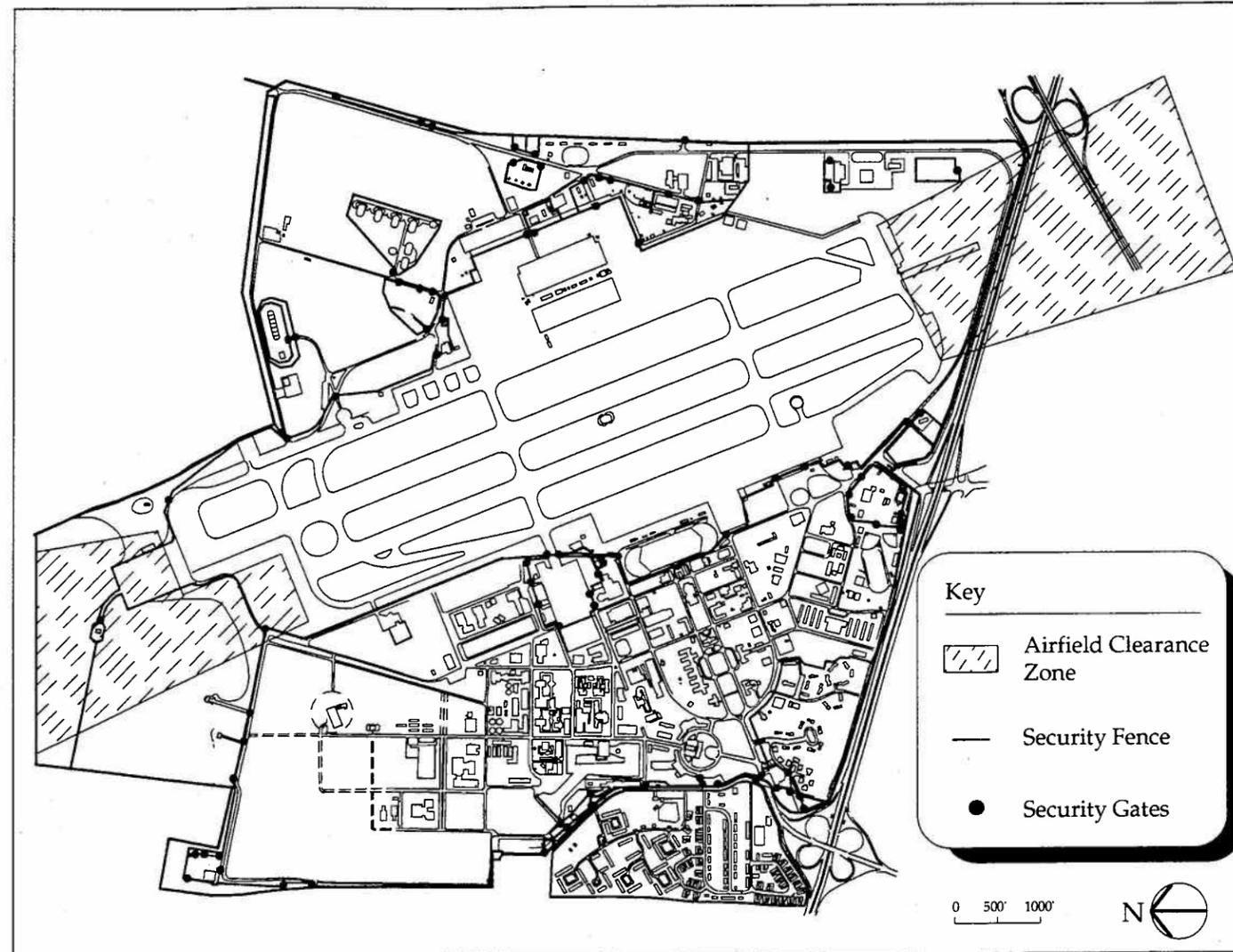
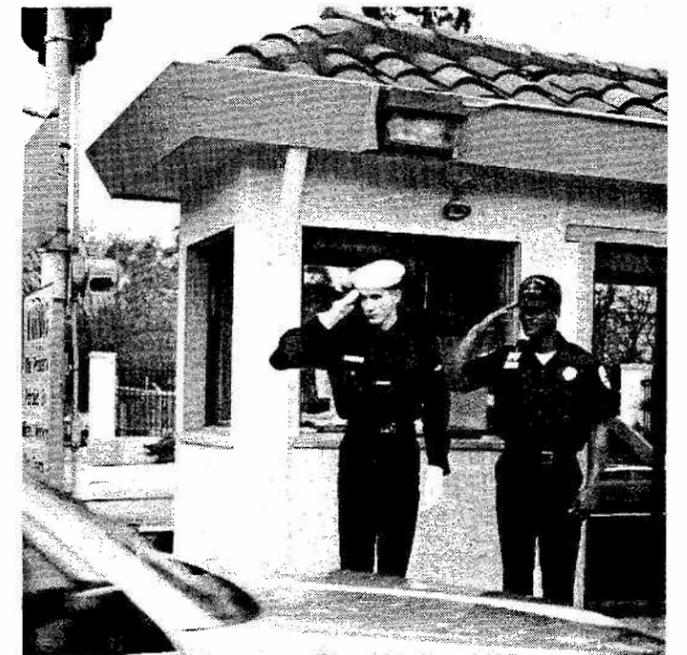


Figure 2-5 Airfield and Security Constraints Map

Security Constraints

Because Moffett Field is a closed Federal facility, security has a high priority. A security fence encloses the entire perimeter; three main gates allow ingress and egress of pedestrians and vehicles. These gates are located at Ellis Street (South Gate), on Moffett Boulevard (Main Gate) and King Road (Gate 18) which provides direct access to Ames Research Center. Two other gates have limited use. The security fences and gates are also shown in Figure 2-7.

A second fence encloses the airfield. There are gates along the airfield fence which are usually left open to allow traffic to reach the eastern side of the facility along Macon Road. These gates can be closed when necessary. The airfield perimeter fence is considered a necessary part of airfield operations and is not a major constraint to operations and development in the area.



Security Guards at the Main Gate

Safety and Noise Constraints

Safety Zones are required around ordnance storage facilities at Moffett Field, within which activities and land uses are constrained. Moffett Field has an agreement with the Cargill Company providing for production of salt on Cargill Company land which lies within the legally required separation distance from ordnance operations and storage areas. The Ordnance Safety Zone depicted in Figure 2-6 is based on the capacity of the facilities. The Ordnance Storage area will be operated in compliance with U.S. Air Force regulations.

Noise associated with wind tunnel operation, as shown in Figure 2-6, is also a development constraint at Moffett Field. All of the wind tunnels are located on the Ames Research Center site. The 80' X 120' wind tunnel produces high noise levels when operating. The 12-Foot pressurized wind tunnel will also produce high noise levels when it becomes operational in 1995. Due to potential noise impacts near these facilities, they are not considered prime locations for new development.

The 80' x 120' wind tunnel intake zone is also considered a constraint to development since any structures in this zone would disturb the flow of air into the wind tunnel.

Noise generated by aircraft may also constitute a constraint at Moffett Field. Noise contours surrounding the airfield are shown in Figure 2-6. Usually, new development should not occur in any area subjected to a noise level of 65 Community Noise Equivalent Level (CNEL) or higher without possible noise mitigation measures (CNEL refers to a State of California standard that describes airport noise environments).

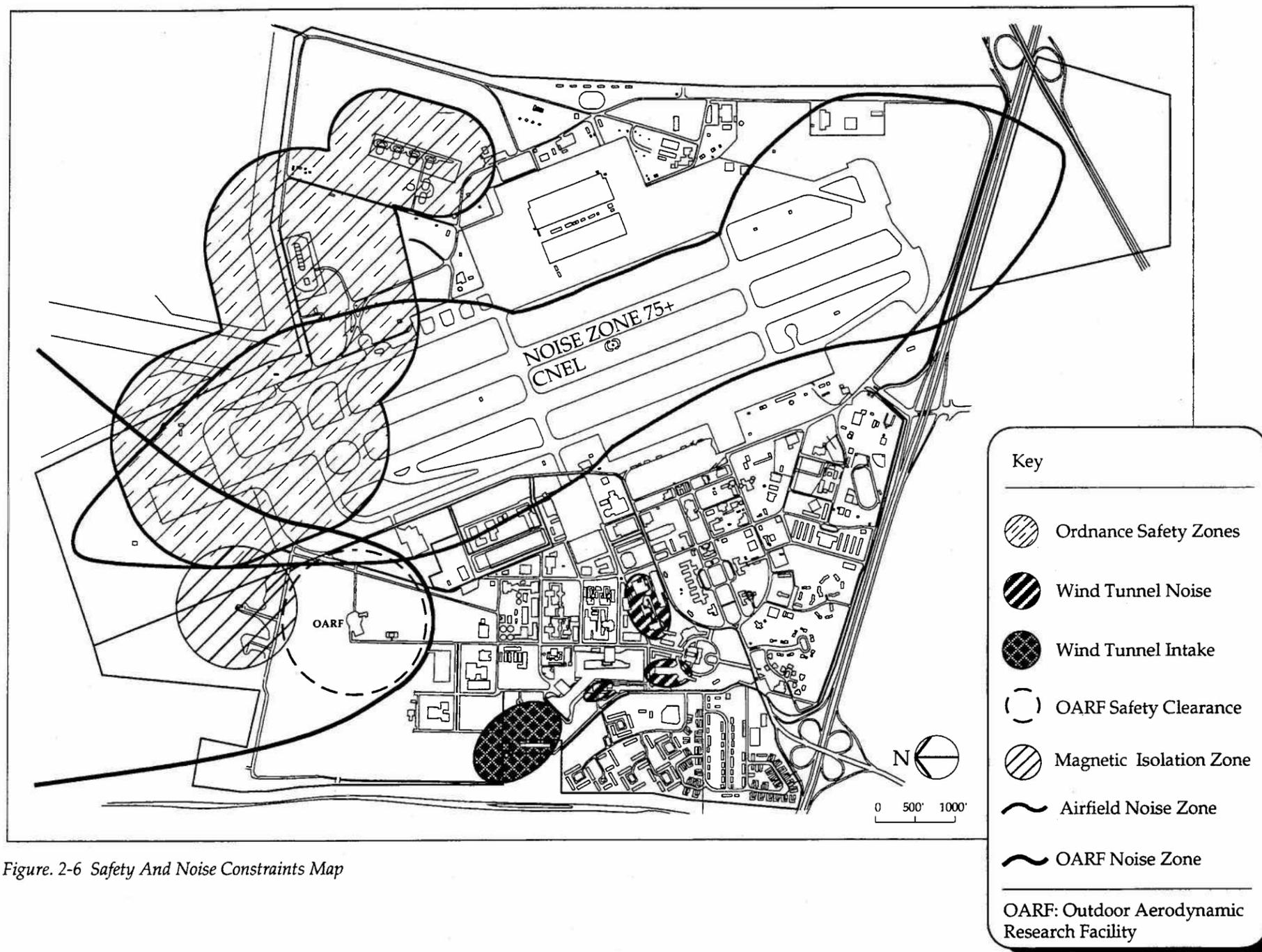


Figure. 2-6 Safety And Noise Constraints Map

The Outdoor Aerodynamic Research Facility (OARF), which is a test site for various flight related research activities, has a 1,500 feet diameter safety zone. New development should be located outside of this zone.

The Magnetic Test Facility is a test site for calibration and testing of scientific equipment. The facility requires a low ambient magnetic noise environment and has a 1,700' diameter isolation zone, within which no development is allowed.

Wetlands and Wildlife Constraints

Wetland areas at Moffett Field are located in the northern portion of the site where the land meets the lower reaches of the San Francisco Bay (Figure 2-7).

Wildlife presently existing in and around the wetlands in their natural habitat are protected by Federal and state laws. Some species of concern include: the burrowing owl, the salt marsh harvest mouse, the damselfly, the clapper rail and others.

One specie of concern is the western burrowing owl. According to a recent study approximately 50 western burrowing owls have been identified at 28 locations throughout Moffett Field, as shown in Figure 2-7. The burrowing owl is listed by the State of California as a species of special concern. Any development which occurs on or near a known burrowing owl habitat would require additional environmental review.

Another specie of concern is the San Francisco fork-tailed damselfly. This species inhabits the drainage ditches along Marriage and Patrol Roads as shown in Figure 2-7.

Focused environmental analyses will be conducted to evaluate the site-specific status of sensitive plant and animal species prior to any development at Moffett Field. Development plans shall ensure that there is not loss of wetland functions, values, or acreage.

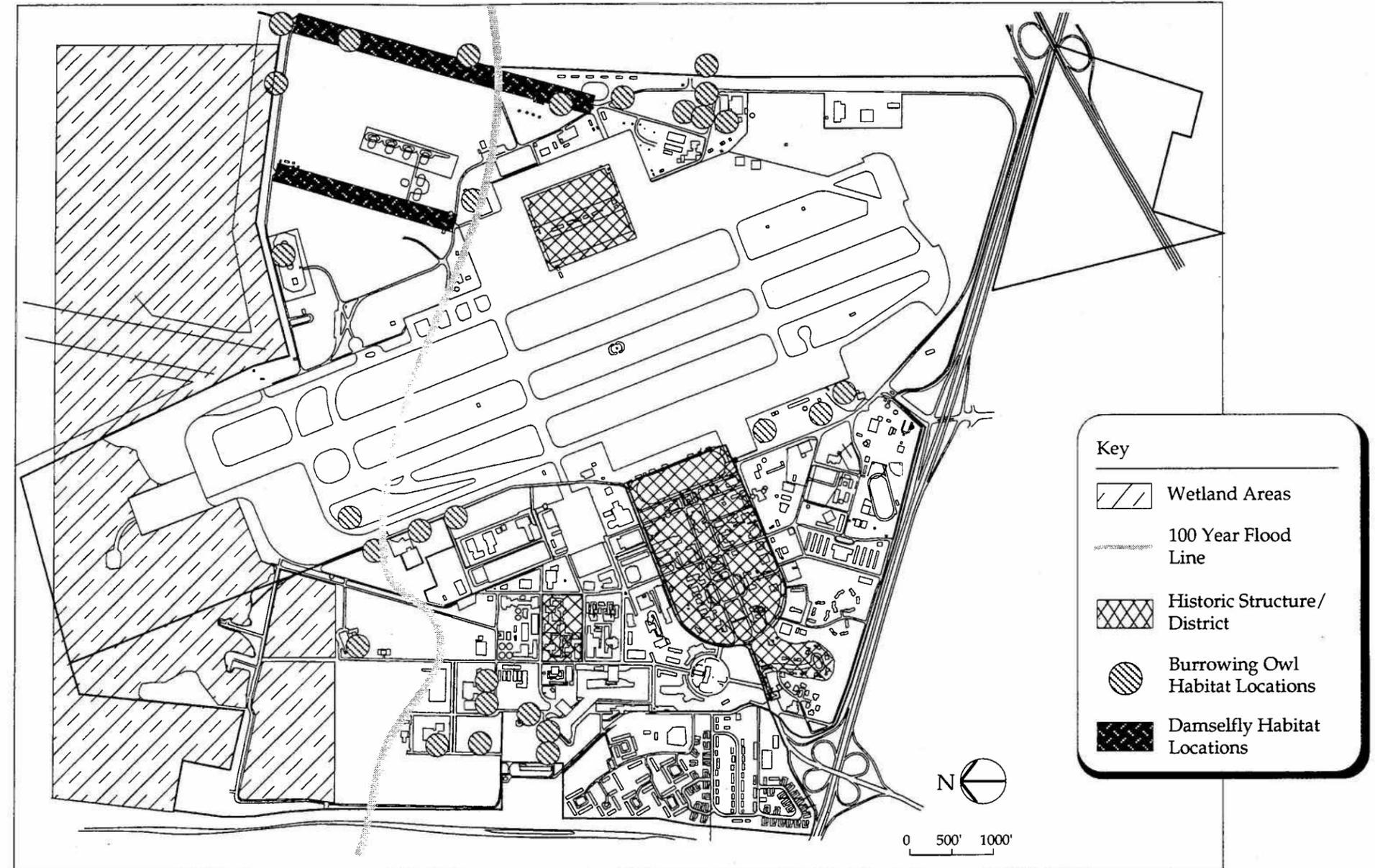


Figure 2-7: Natural And Cultural Constraints Map

Geological Constraints

Moffett Field's location and geological condition present several special considerations for the modification or construction of facilities. The site is located in Seismic Zone 4. Building codes for seismic safety, identified in Ames Research Center instructions, will be followed. Geotechnical investigations will be required on a project-by-project basis and appropriate

foundations will be designed prior to any development. Flood hazards exist from potential tidal flooding, storm water runoff and the overflow of Stevens Creek. Levee failure also presents a potential flooding problem at Moffett Field. The 100-year flood line, without levees, is shown in Figure 2-7. If construction is to occur in a flood zone, the placing of engineered fill and other appropriate measures will be taken to reduce flood hazards.

Cultural and Historical Constraints

Cultural resources at Moffett Field are state and federally protected. They include one wind tunnel and an historic district containing 28 structures, all of which have been recently added to the National Register of Historic Places. Any attempt to alter or develop these buildings or sites would require consultation with the State Historic Preservation Office through the Section 106 process.

The 1985 NAS Moffett Field Master Plan recommended archeological review of any new construction site prior to development. A May 1993 archaeology report found no known Native American resources at NASA Ames Research Center. However, as new development occurs at Moffett Field, archaeological sites may be found; they would be treated in accordance with applicable federal and state laws and regulations.

Environmental Clean-up Constraints

Nineteen clean-up sites have been identified by the Navy at NAS Moffett Field as potential hazardous waste disposal or spill locations and all are under investigation for remediation under the Navy's Installation Restoration Program (IRP). Remediation will remain the responsibility of the US Navy even after custody of Moffett Field has been transferred to NASA.

Three more sites have been informally identified by the Navy as areas on Moffett Field with potential environmental constraints. These sites are shown on the following page (Figure 2-8).

Another area, not on Moffett Field, located to the South of Highway 101 and bounded by Middlefield, Ellis and Whisman roads, (the MEW site), contains contaminated groundwater. This site has been identified as a Superfund site by the Environmental Protection Agency. The role, if any, of NASA and the Navy as potential responsible parties has not been determined.

The 19 clean up sites as identified by the Navy have been segregated into five "operable units" (OUs) to facilitate faster clean up at Moffett Field (see Figure 2-9).

This allows sites with similar contaminants and remediation measures to be studied and cleaned up at one time. The petroleum contaminated sites have been removed from the OUs and will be cleaned up in accordance with state regulations. The length of clean up time varies depending on the type of contaminants present and the remediation process involved.

On average, clean up of the various OU sites begins within one year of the signing of the Record of Decision (ROD), and may take up to 20 years to complete.

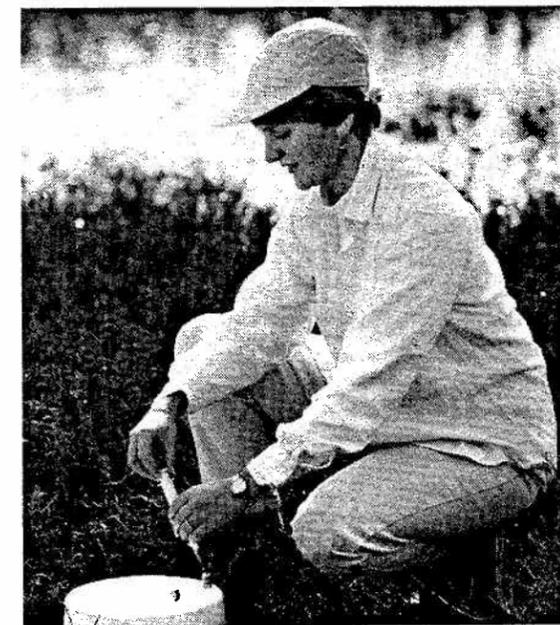
These clean up sites are considered a constraint to new development at Moffett Field. Where possible, an uncontaminated site, or the least contaminated site, will be chosen for new development. Prior to construction of individual projects, site-specific evaluation will occur to determine the extent of soil contamination and hazards related to the project. In the event that contaminated soil or ground water is encountered, as part of a new development, the Navy will perform environmental remediation.

In addition to the above mentioned sites, there are a number of storage tank sites which are considered environmental hazards. These tanks contain mostly solvents, fuels and oils. If contaminants are present in any of these remaining tanks, they must be cleaned up or removed in accordance with federal, state and local regulations. This remediation must occur prior to any development in the vicinity.

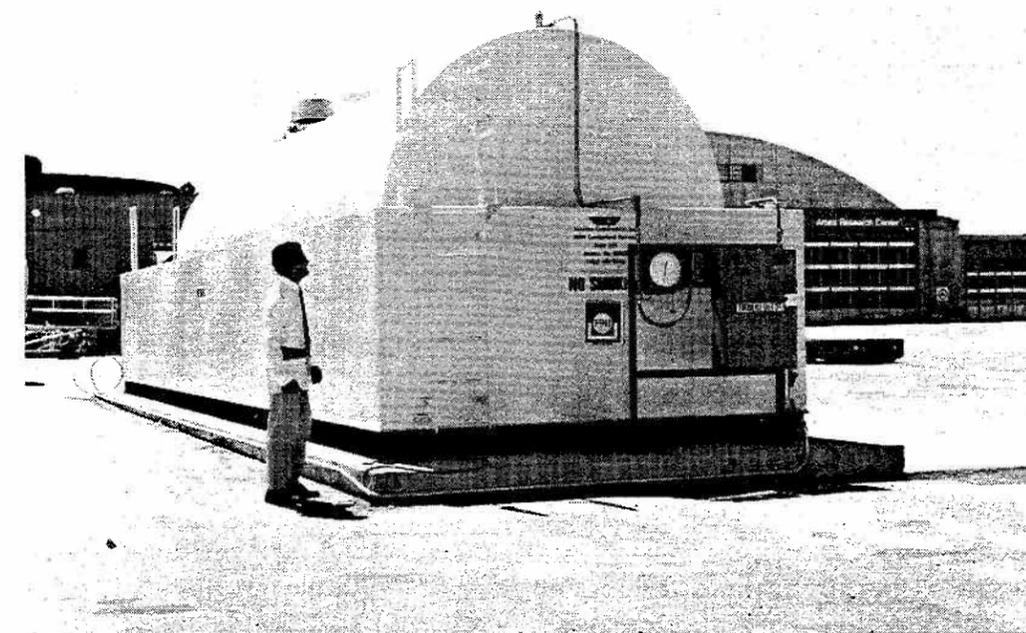
A monitoring program to detect fuel releases to the water and soil and spill prevention control and counter measure plan shall be established for potential impacts associated with aviation fuel received by barge through the Guadalupe Slough.

Electrical transformers and capacitors containing a PCB concentration of 500 parts per million (ppm) or higher are also considered an environmental hazard. Any future development which takes place in an area with a PCB transformer or capacitor having a concentration of 500 ppm or higher must be in accordance with Federal, state and local regulations.

Hazardous materials such as asbestos and PCBs are present in existing facilities. It is important that an on-going effort continue to eliminate these and other hazardous materials. NASA will coordinate required hazardous waste and hazardous materials permits needed for Resident Agency operations. As facility uses change and further development occurs, NASA will work with Resident Agencies to minimize waste, plan and prepare for waste storage and avoid emergency situations. Each building in which toxic or hazardous materials will be used will be required to have an Emergency Action Plan. In addition, the user will be required to comply with applicable federal and state Occupational Safety and Health Administration (OSHA) standards.



Soil Sampling at a Clean-Up Site



New Above-Ground Fuel Tank

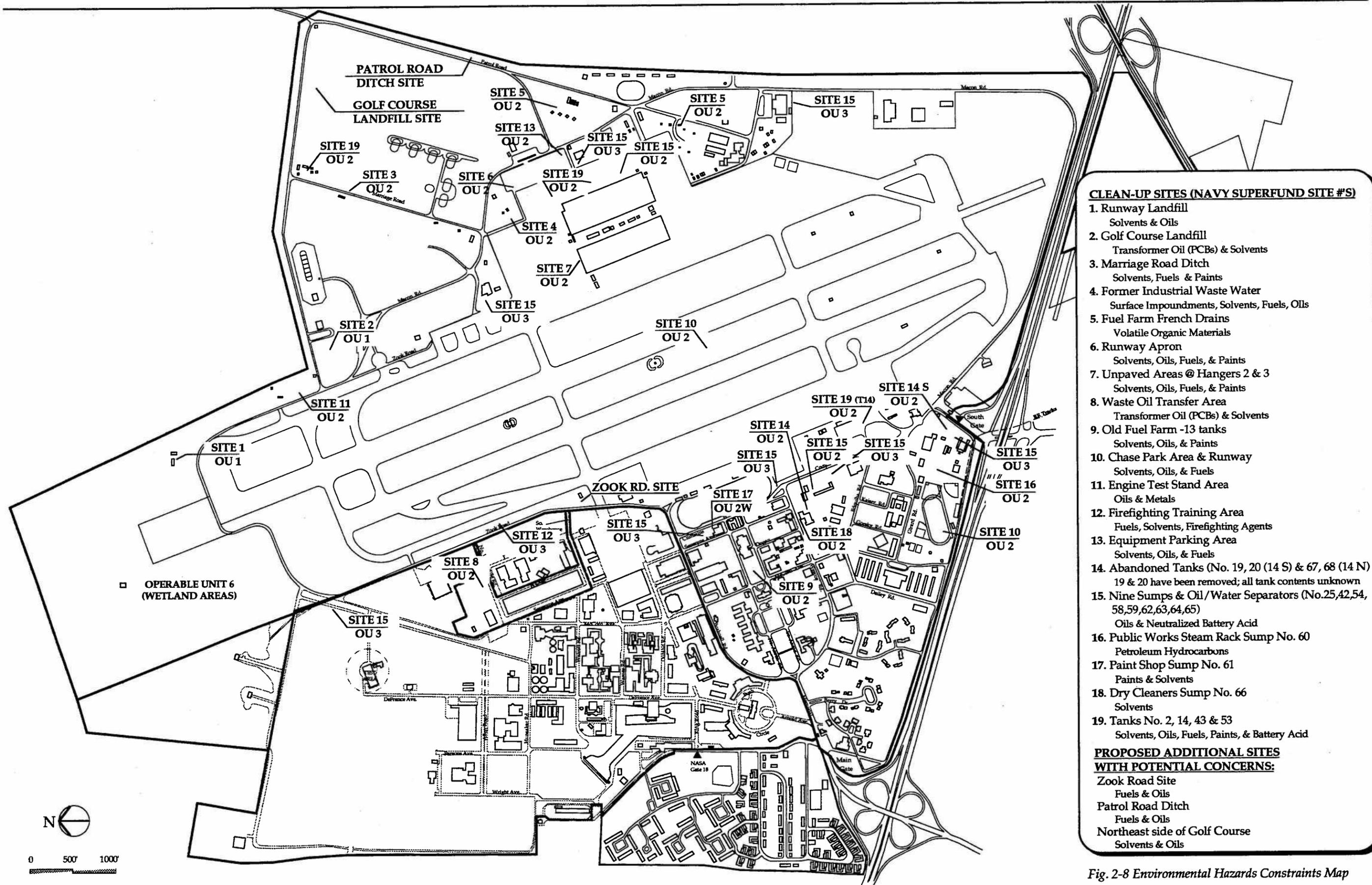
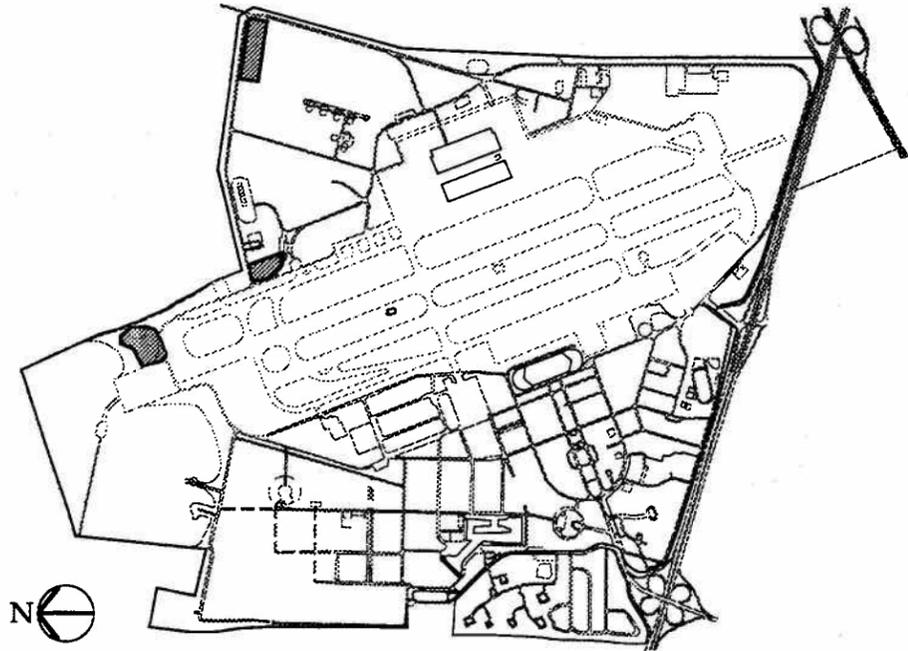
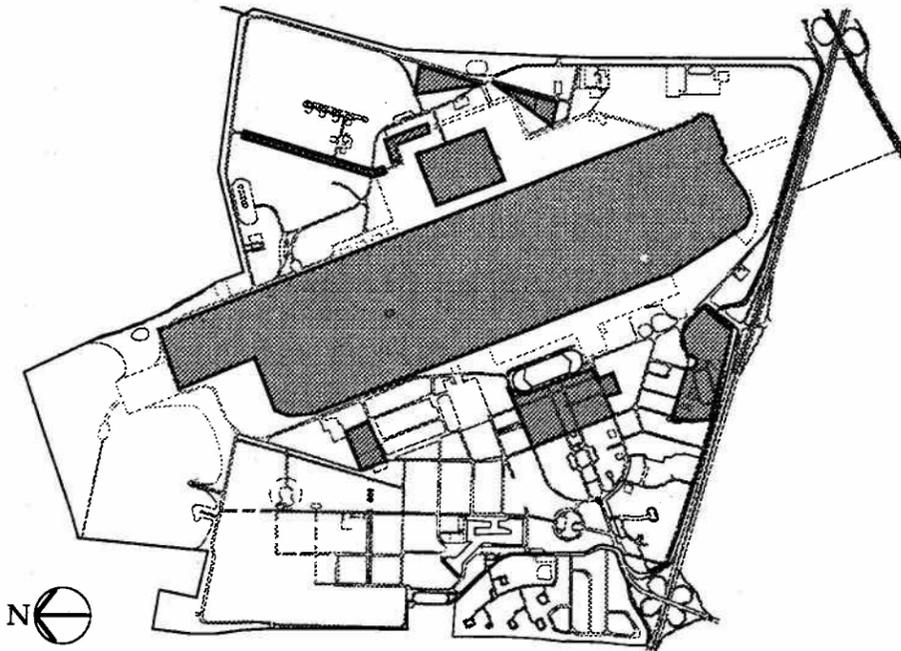


Fig. 2-8 Environmental Hazards Constraints Map

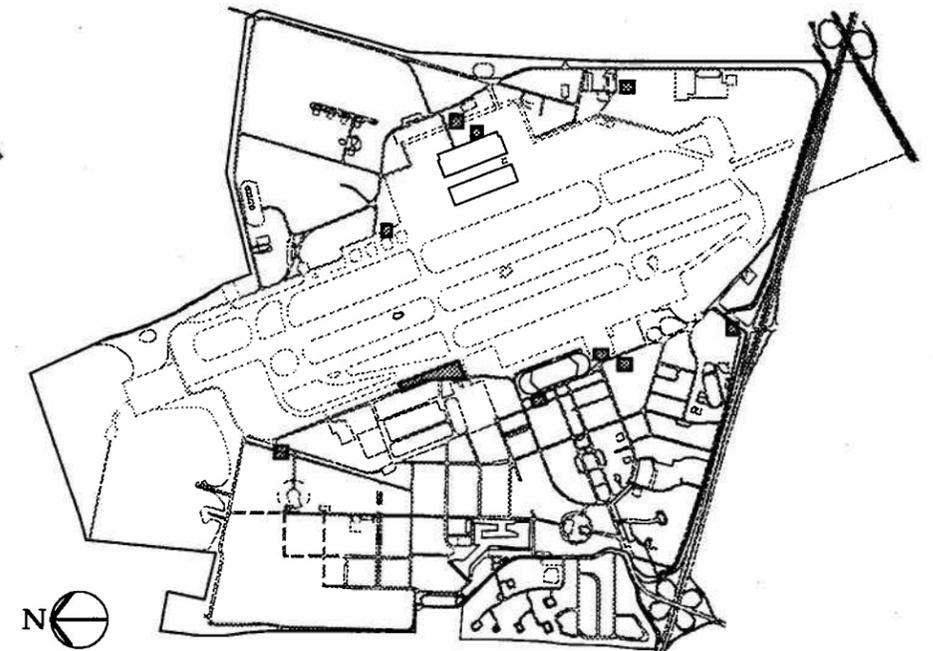
OPERABLE UNIT 1
Sites 1 and 2 Landfill Sites



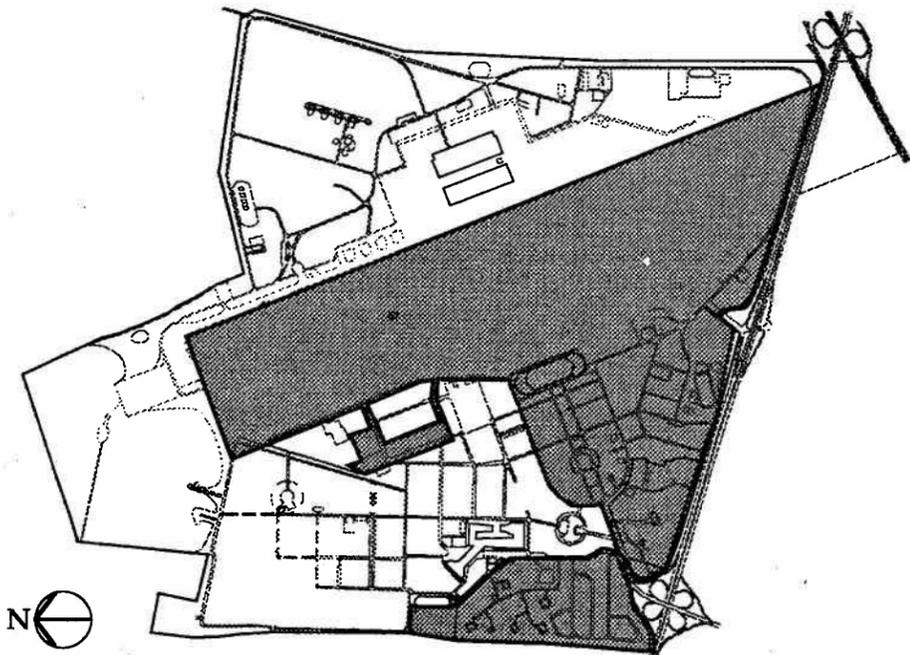
OPERABLE UNIT 2
Sites 3,4,5,6,7,8,9,10,11,13,14,16,17,18, and 19 Soils



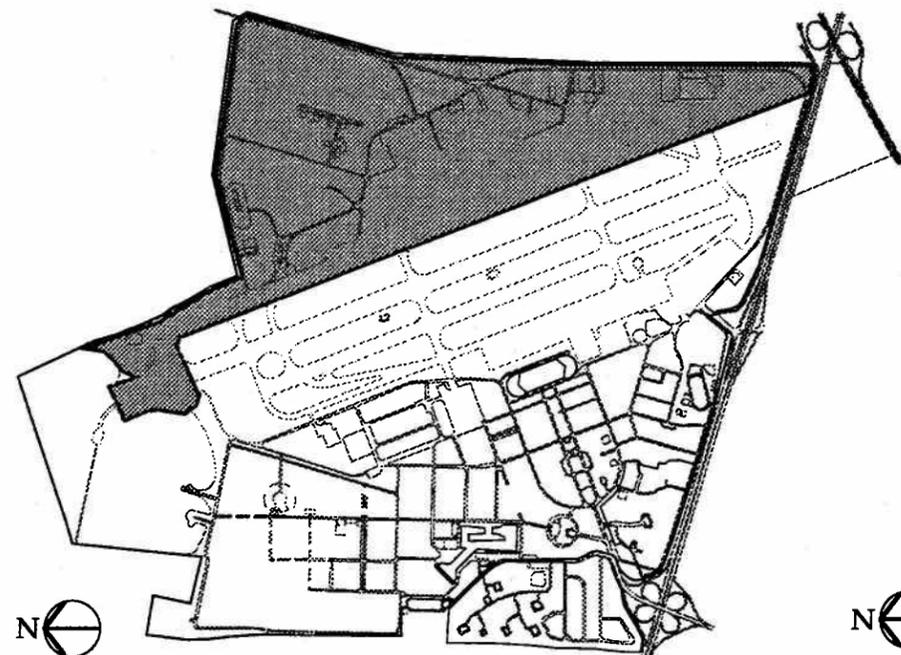
OPERABLE UNIT 3
Sites 12 and 15 Soils



OPERABLE UNIT 4
West-Side Aquifers



OPERABLE UNIT 5
East-Side Aquifers



OPERABLE UNIT 6
Wetland Areas

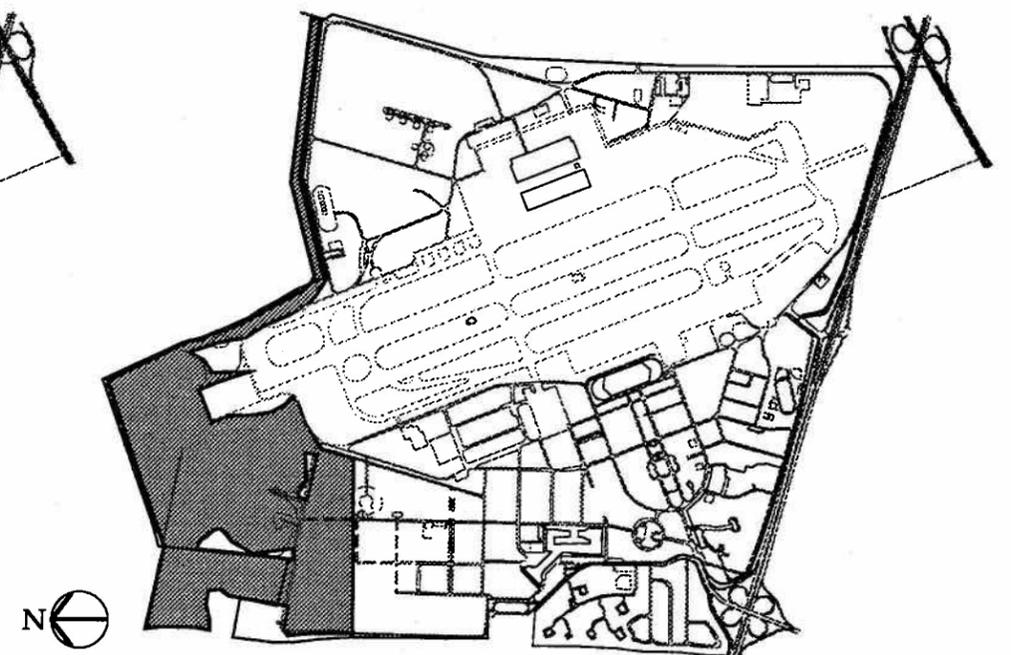
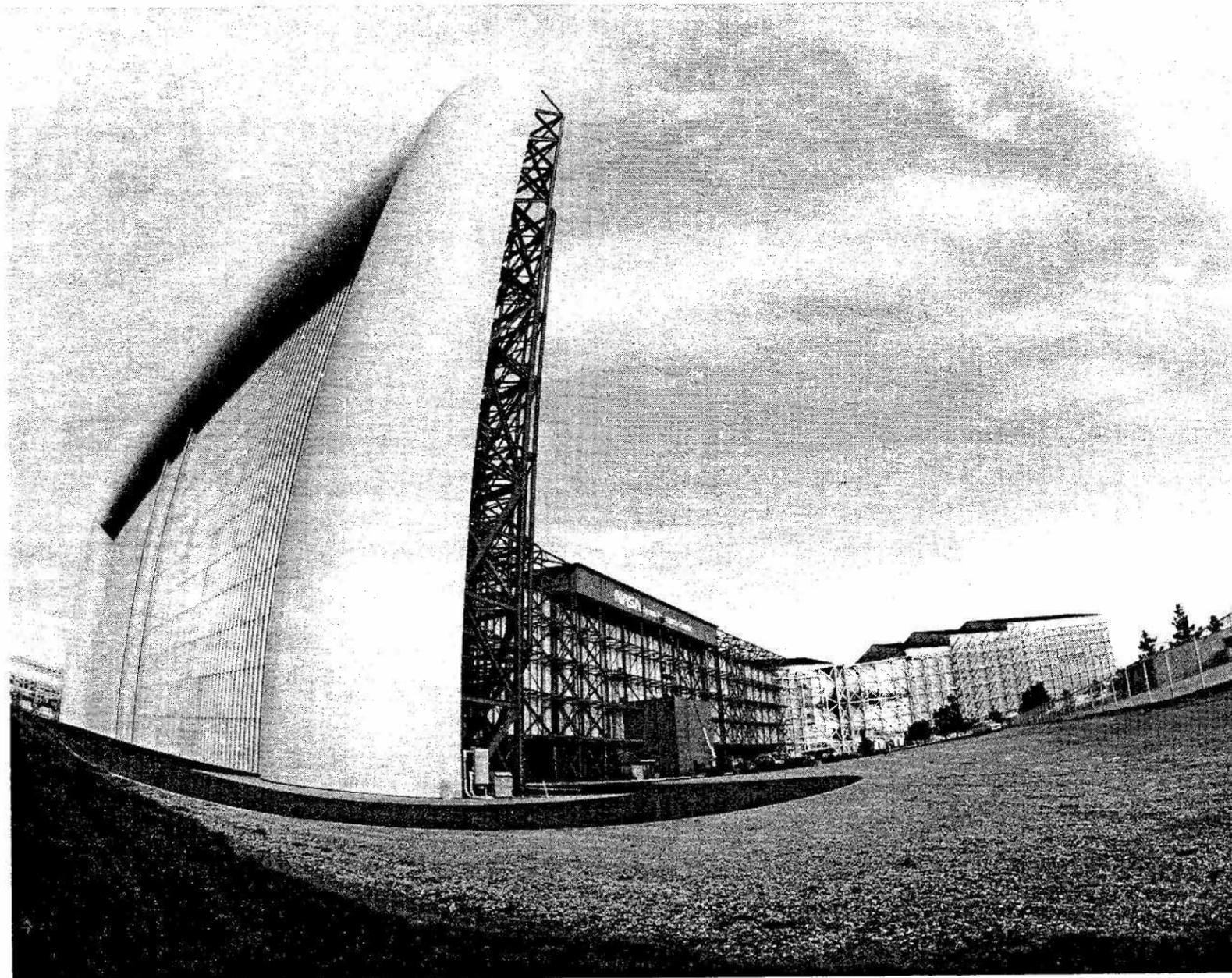


Figure 2-9 Operable Unit Designations



80' X 120' Windtunnel, NASA Ames Research Center

3.1 Description of Activities

3.2 Traffic, Utilities and Services

3.0 Existing Activities

3.0 Existing Activities

This chapter contains a description of activities at Moffett Field during the 1990s and the resulting impact on transportation systems, utilities and services. Section 3.1 describes five categories of activities and provides comparative information about the level of activities in 1991 and 1993. Section 3.2 provides information about how the activities have affected traffic, including comparative information for 1991 - 1993. This section also describes the utilities and services needed to support the types of activities discussed in Section 3.1

3.1 Description of Activities

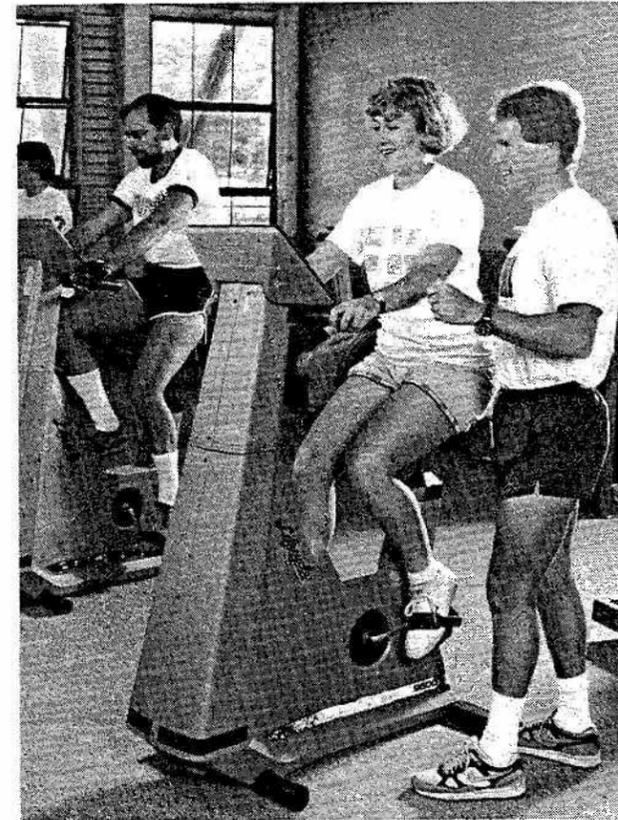
NASA activities at Moffett Field include: aeronautical flight research, airborne sciences flight operations, aerophysics and aerospace systems research, space and earth sciences research and other research & development activities. Military activities include: anti-submarine warfare, air rescue, medical evacuation and flight training operations; military ground training in a variety of disciplines; emergency service operations; explosive ordnance handling and storage and air transport of military cargo to and from defense contractors.

In addition, both NASA and the military organization require support activities such as administration, security, facility operations and maintenance, and other support services.

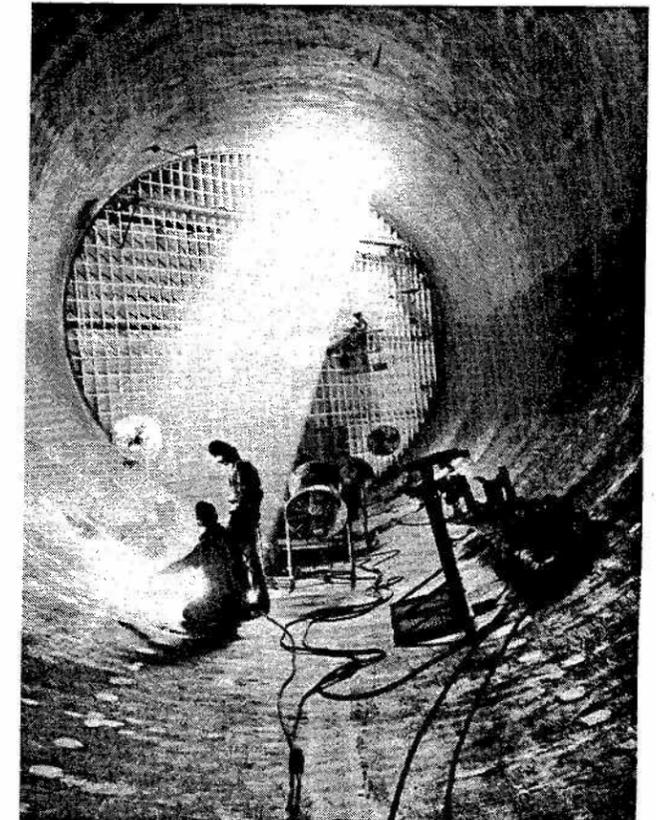
All Moffett Field activities may be categorized in a manner that allows an association with existing and future facilities:

- **Flight Operations:** All activities associated with the flight of aircraft, including support activities.
- **Research & Development:** All research and development activities found primarily at the Ames Research Center.
- **Administrative Support:** Administration activities including programs that involve the public.
- **Operational Support:** All other support activities for operations including security, facilities operations and maintenance and warehousing.
- **Personnel Support:** Quality of Life activities for employees at Moffett Field.

These five types of activities, together with their impact on transportation and utilities, provide the basis for creating the two future concepts which are described in Chapter 5.



Personnel Support



Operational Support - Wind Tunnel Maintenance



Flight Operations - Navy P-3 Orion Aircraft



Research and Development - Cray Super Computer



Administration Support - Ames Administrative Circle

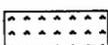
Planning information for activities in both 1991 and 1993 are shown on the adjacent tables and Figure 3-1. The disestablishment of NAS Moffett Field was announced in 1991; thus, data for this year are representative of full operations. Data for 1993 are also presented for use as a current baseline in any additional assessments that may be required.

There were two changes between 1991 and 1993 that are worthy of note. First, a number of Navy personnel, both active duty and civilian, have departed since the disestablishment was announced. Second, some of the vacated barracks are now used, at least temporarily, as administration support space.

1993 Activities

Activity	Developed Land (acres)	Buildings (sq.ft.)	Personnel
1	800	1,512,539	5,225
2	270	1,968,940	2,660
3	100	1,075,273	1,070
4	90	650,107	750
5	250	408,669	295
TOTAL	1,510	5,615,528	10,000

Activities:

-  1. Flight Operations
-  2. Research & Development
-  3. Administration Support
-  4. Operational Support
-  5. Personnel Support
-  6. Limited Activities

1991 Activities

Activity	Developed Land (acres)	Buildings (sq.ft.)	Personnel
1	800	1,512,539	7,300
2	270	1,968,940	2,900
3	85	812,870	1,210
4	90	650,107	1,050
5	265	671,072	540
TOTAL	1,510	5,615,528	13,000

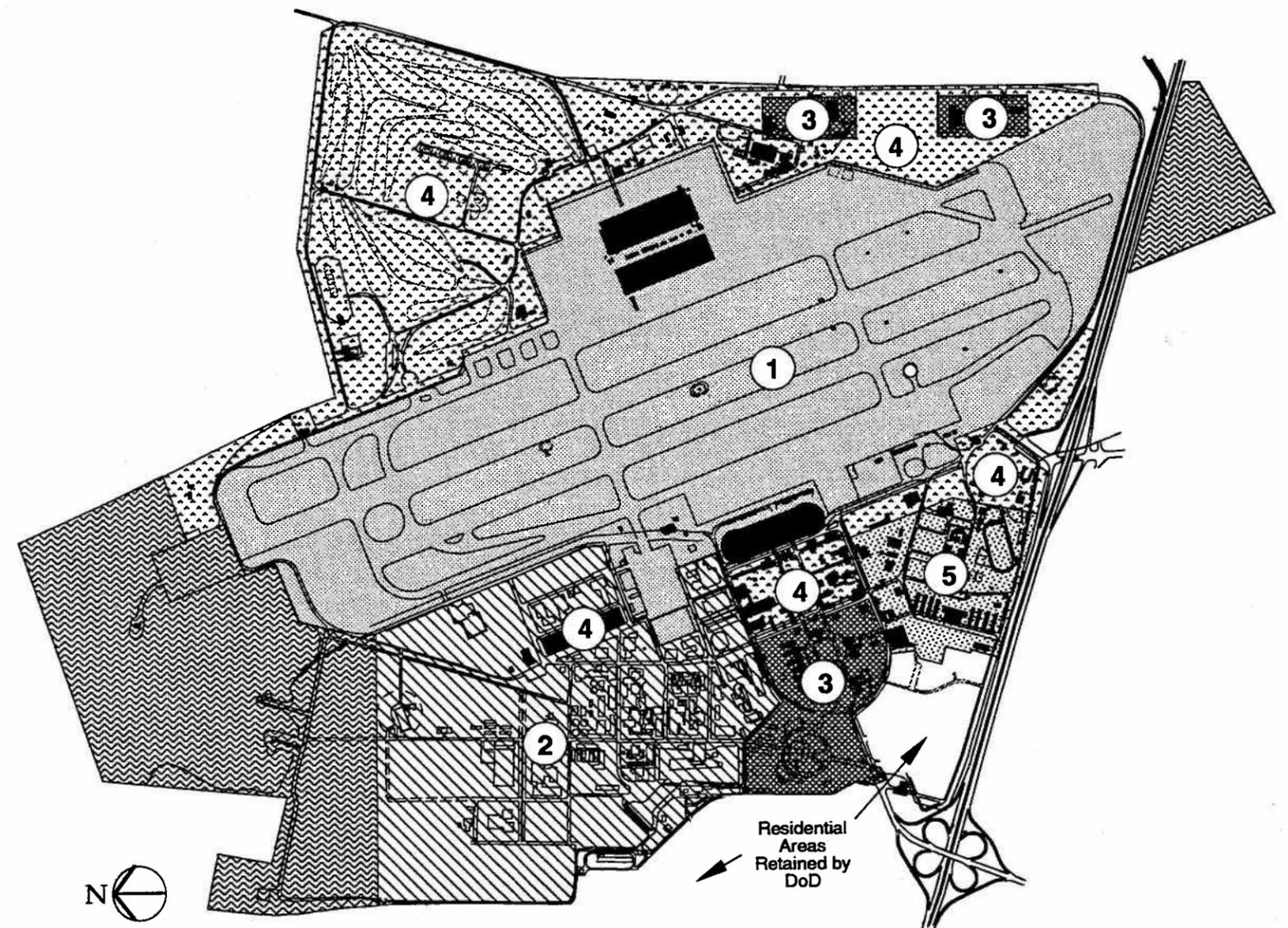


Figure 3-1: Activities at Moffett Field

3.2 Traffic, Utilities and Services

This section describes traffic, utility systems and other services required to operate Moffett Field.

Traffic

The traffic section covers site access, circulation, traffic characteristics, parking and alternative transportation modes. The analysis is based on available data, some of which are traffic counts from surveys conducted before 1990.

Site Access: Local roads that provide direct access to the site, are Moffett Boulevard and Ellis Street. Highway 101 runs parallel to the south side of the site. It connects to Moffett Boulevard through a full cloverleaf interchange and to Ellis Street through a diamond interchange. Moffett Boulevard also connects to Highway 85 south of Highway 101 (Figure 3-2).

The primary access point to Moffett Field is the Main Gate with additional access through the South Gate and Gate # 18. The Main Gate is the most direct access to the office complex at Shenandoah Plaza and also provides access to the western side of the airfield. The South Gate provides direct access to either side of the airfield and provides the most direct access to the flight line. Gate # 18 was built to provide direct access to Ames Research Center.

Circulation: Traffic circulation within the former NAS site is accommodated on the road system shown in Figure 3-3. The figure shows arterial roads, collector roads, and entrance gates. The roads were classified by function in the 1987 master plan for the Naval Air Station. In that plan, the arterial streets included Clark Memorial Boulevard (which extends into the site from Main Gate), Bushnell

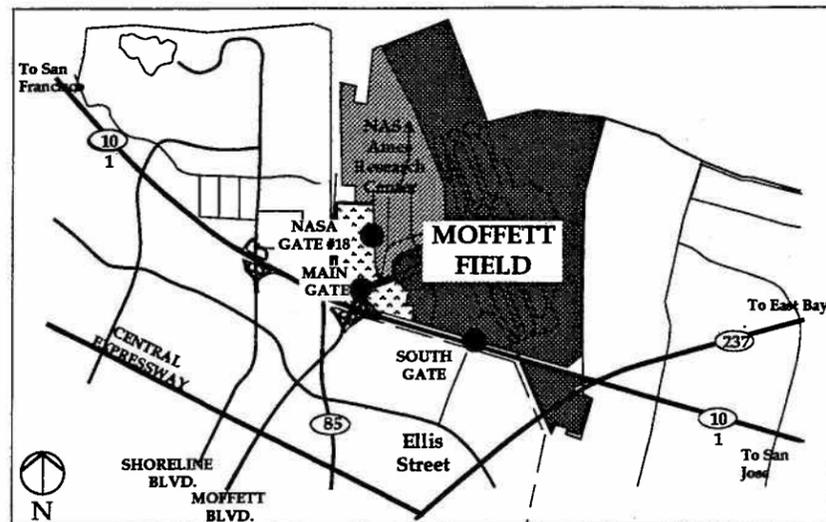


Figure 3-2 Local Road System

and Wescoat Roads, the segment of McCord Avenue between Bushnell and Wescoat, Edquiba Road, and a loop made up of Cody Road, Macon Road, Zook Road and Cummins Avenue that encircles the airfield.

Circulation at Ames Research Center is also shown in Figure 3-3. DeFrance Avenue runs from Bush Circle, surrounding the administration complex, through the site to the north. King Road provides access, from Parsons Avenue through Gate 18 to DeFrance Avenue. Access to the center may also be accomplished through the Main Gate to Bush Circle, or along McCord Avenue. McCord Avenue and DeFrance Avenues are major traffic collectors for Ames Research Center. McCord Avenue provides access around the airfield connecting to Zook Road to the north and Macon Road to the south.

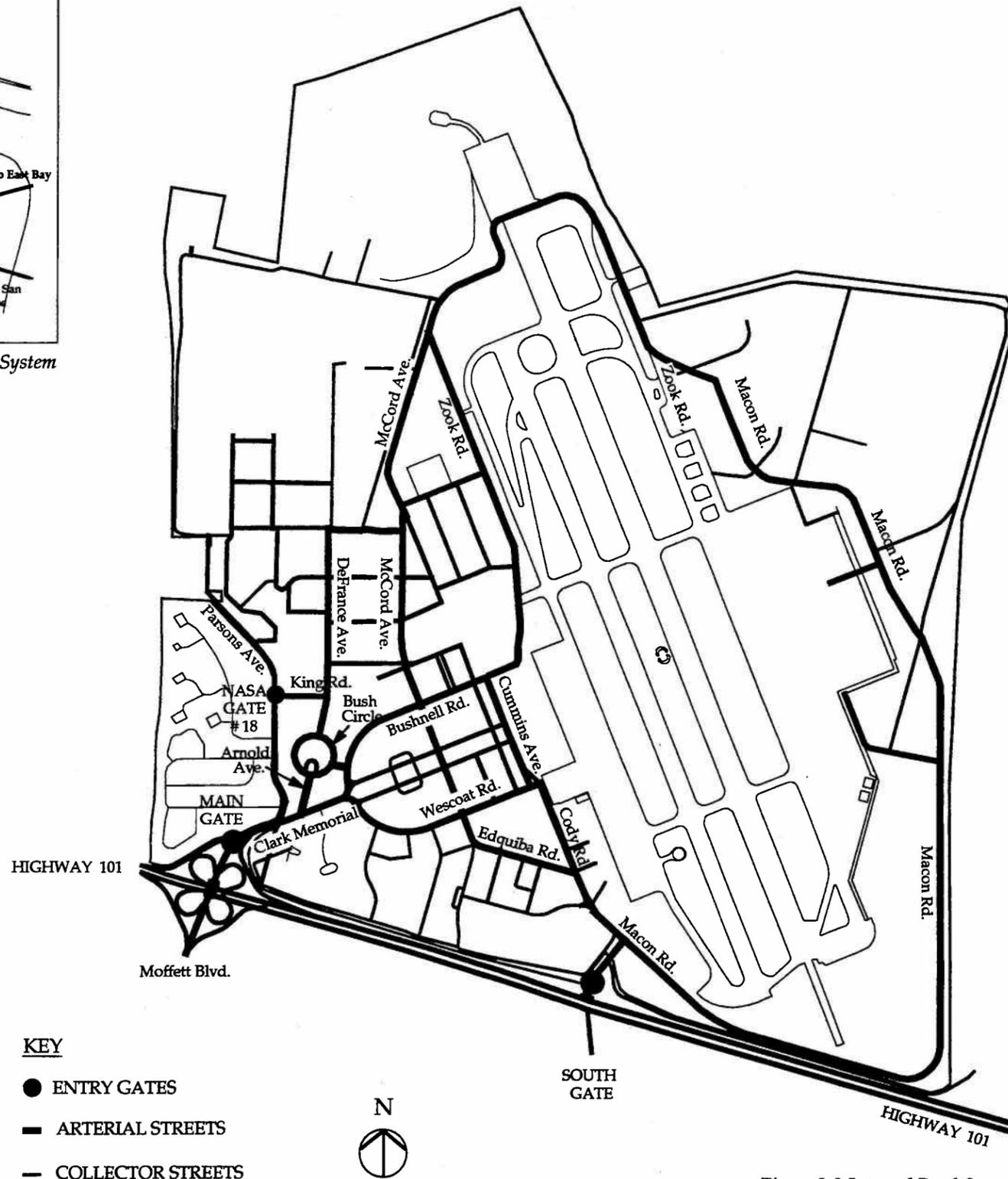


Figure 3-3 Internal Road System

Traffic Characteristics: Total daily and peak hour traffic volumes generated by Moffett Field, are shown for both 1991 and 1993 in the following table.

Peak hour traffic for Moffett Field passes through the three gates between 7:00 AM and 8:00 AM. The lower traffic values for 1993 reflect the reduced number of active duty Navy personnel at the base. However, a percentage of the personnel live on base and do not contribute to the daily and peak traffic on external roads

Occasionally traffic problems at Moffett Field have occurred at Main Gate during peak hours. There have been some less serious traffic problems within the site which can be relieved by intersection and roadway modifications. In general, traffic moves freely on the site.

Estimated Total Traffic Generated by Moffett Field		
Year	Traffic Volume (Daily)	Traffic Volume (Peak, 2-way)
1991	32,700	4,250
1993	27,800	2,390

Parking: There are approximately 9,100 parking spaces on the site, of which 3,500 are in the Ames Research Center area north of Bushnell Road and Clark Memorial Boulevard. Of the remaining 5,600 spaces on the former Moffett Federal Airfield portion of the site, 1,300 are in the northeast, and 3,550 are in the southwest area (south of Bushnell Road and Clark Memorial Boulevard), including 750 associated with the airfield and Hangar 1. Parking zones are shown in Fig. 3-4.

Most of the parking spaces are in off-street parking lots. There are a significant number of on-street spaces in the Ames Research Center area, but few in the Moffett Federal Airfield area.

Alternative Transportation Modes: Moffett Field is accessed by Santa Clara County Transit District (SCCT) buses through Gate 18.

A SCCT light rail project is planned for the Tasman Corridor and includes a right-of-way parallel to the southern boundary of the base to a station near the South Gate. When the light rail line is completed, it will provide rail access from the site to the Caltrain station in Mountain View, to the Guadalupe light rail corridor through central San Jose and eventually to a connection with BART services in the East Bay Area.

Trip Reduction Program: NASA Ames has an ongoing Trip Reduction Program which offers a variety of commute incentive programs. Programs have been established to provide carpool parking (there are currently 196 spaces), carpool ridematching, on-site ticket sales, transit subsidies, safe off-road bike access, shuttle service to and from the Mountain View Caltrain station and the Lockheed bus terminal. The purpose of this program is to reduce the number of single occupant vehicles entering Moffett Field.

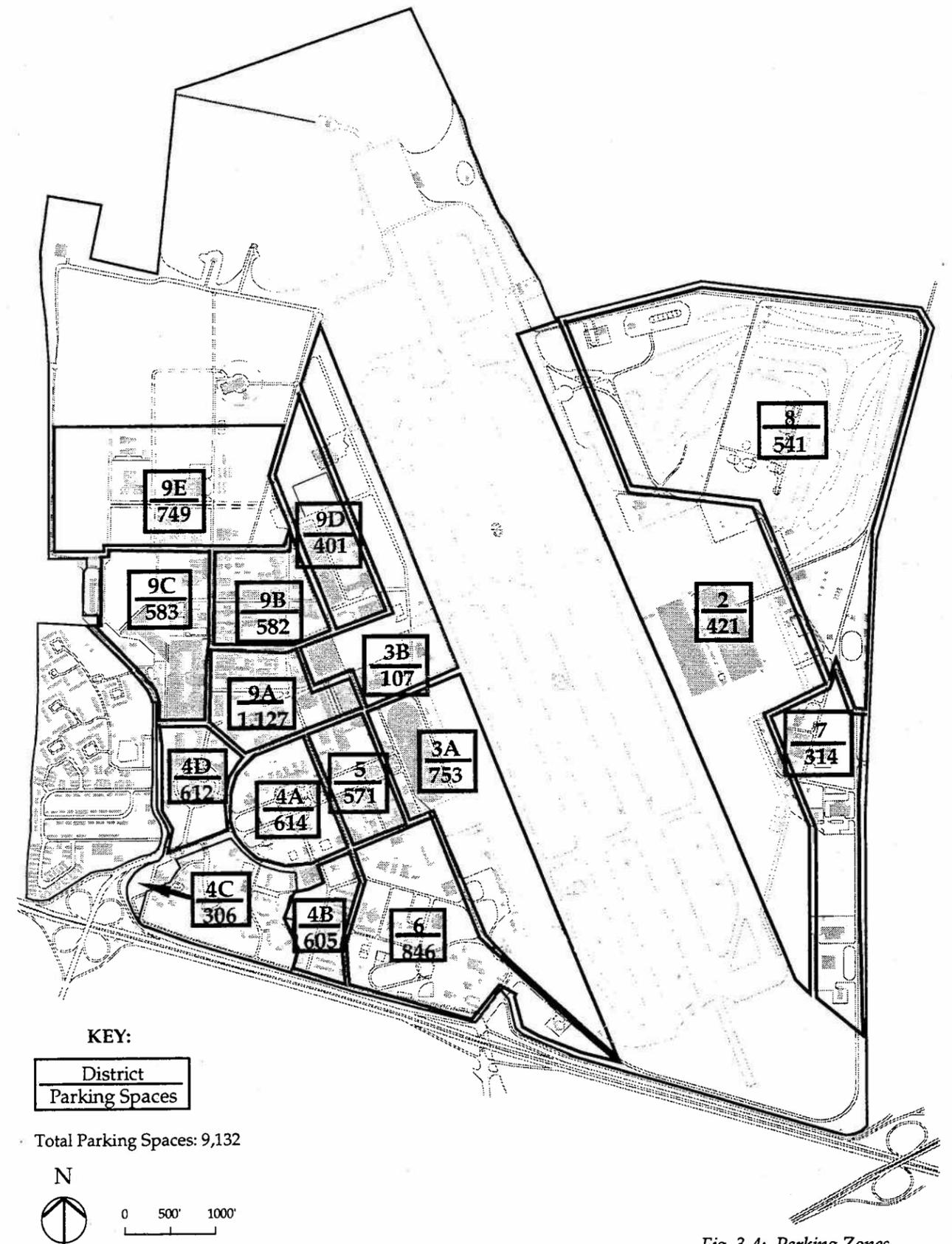


Fig. 3-4: Parking Zones

Utilities

Moffett Field utility systems include electricity, sanitary sewer, water supply, natural gas, fuel distribution, steam generation, telecommunications and storm sewer (Figure 3-5). Moffett Federal Airfield and Ames Research Center have separate electricity, gas, and water systems, whereas sanitary sewer, storm drainage and fuel distribution are interconnected. Services include security, fire and safety and waste collection.

Electricity: Electrical power is supplied from Pacific Gas & Electric (PG&E) to Moffett Field by a 115 KV feeder on the east side of the facility. This system feeds all facilities and is distributed underground at 2,400 volts and 12,000 volts, with one cross connection from Ames Research Center to be used in emergencies.

Water Supply System: The San Francisco Water Department provides two sources of freshwater from the Hetch Hetchy Aqueduct. Water storage at Moffett Field is provided in an elevated 200,000-gallon tank, located near Hangar 1. The tank supplements pressure and flow for fire fighting.

Sanitary Sewer: The sanitary sewage system was installed in the 1930's and includes approximately 91,000 linear feet of collection lines in two separate systems. The first connects with the Sunnyvale sewer system. One-third of the facilities at Ames Research Center discharge into the Sunnyvale sewer system. The second is for a specific number of off-site housing units and connects with Mountain View sewer system. Two-thirds of the facilities at Ames Research Center discharge into the Mountain View sewer system.

Storm Drainage The Moffett Field watershed consists of about 1,800 acres and is divided into two sub-basins: the area west of the airfield runways and the area east of and including the airfield runways.

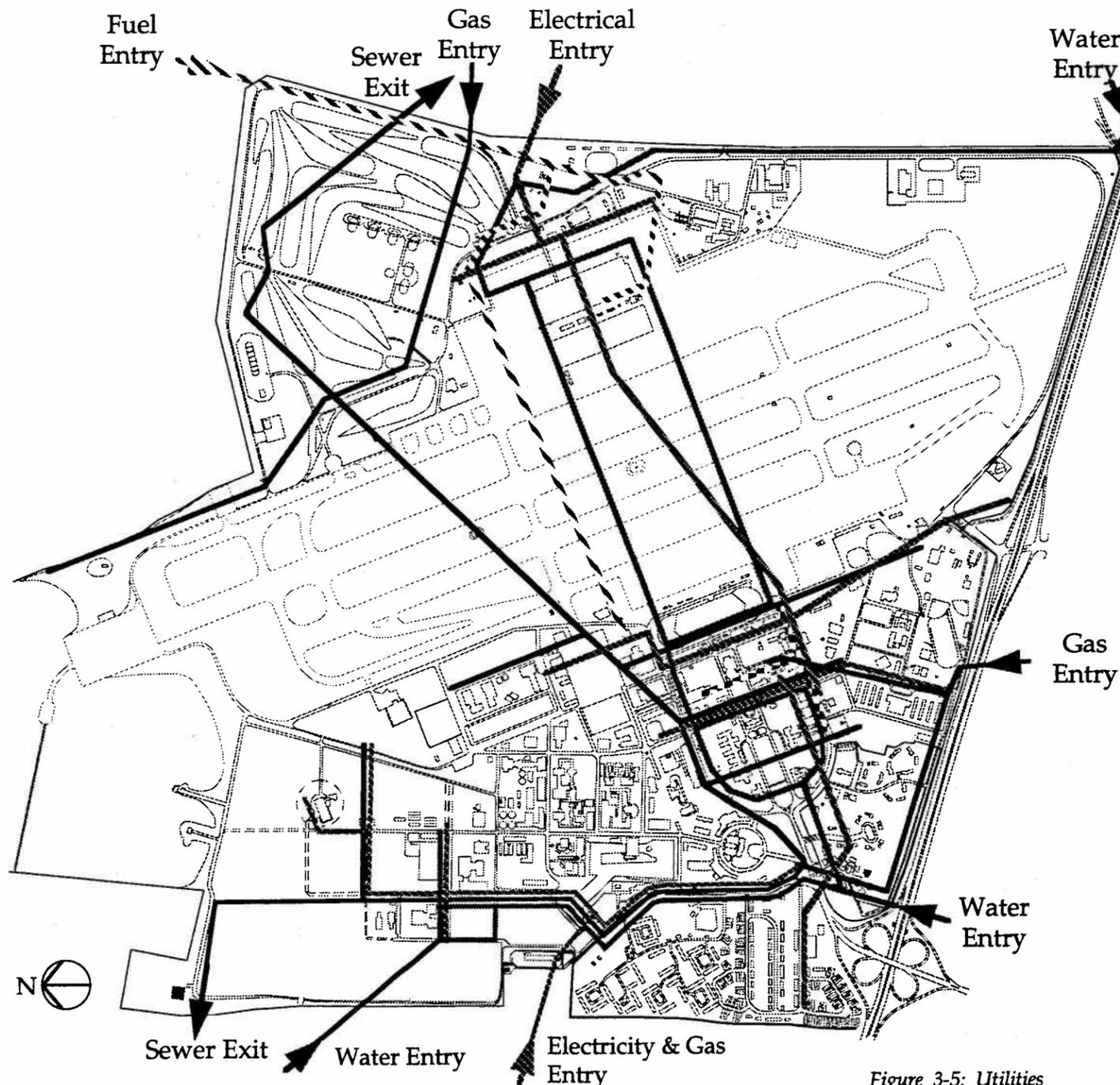


Figure 3-5: Utilities

Steam Generation System: Moffett Field contains two boiler plants which provide steam and hot water to 35 buildings on site. Steam generation for the west side of the station is from the main boiler plant, Facility 10. The east side plant, serving Hangars 2 and 3 and several small buildings, is located between the hangars. Ames Research Center uses a separate steam system to serve only a few facilities.

Fuel Distribution System: An extensive system of aviation fuel tanks exists on the east side of the airfield. Fuel is received by barge on Guadalupe Slough. A secondary or backup system of delivery by truck is also located on the east side. Fuel is stored in four single-wall concrete and steel tanks. A fuel line also passes under the airfield, providing fuel for NASA Ames flight operations.

Natural Gas: Natural gas is supplied via PG&E pipe mains to both sides of Moffett Field.

Telecommunications: Telephone cabling exists throughout NAS Moffett Field, and is tied into a AT&T/Pacific Bell Telephone switching system in the basement of Facility 17 on the west side, and in an AT & T facility between Hangars 2 and 3, on the east side. Ames Research Center has a separate switching system located in building N-263.

Services

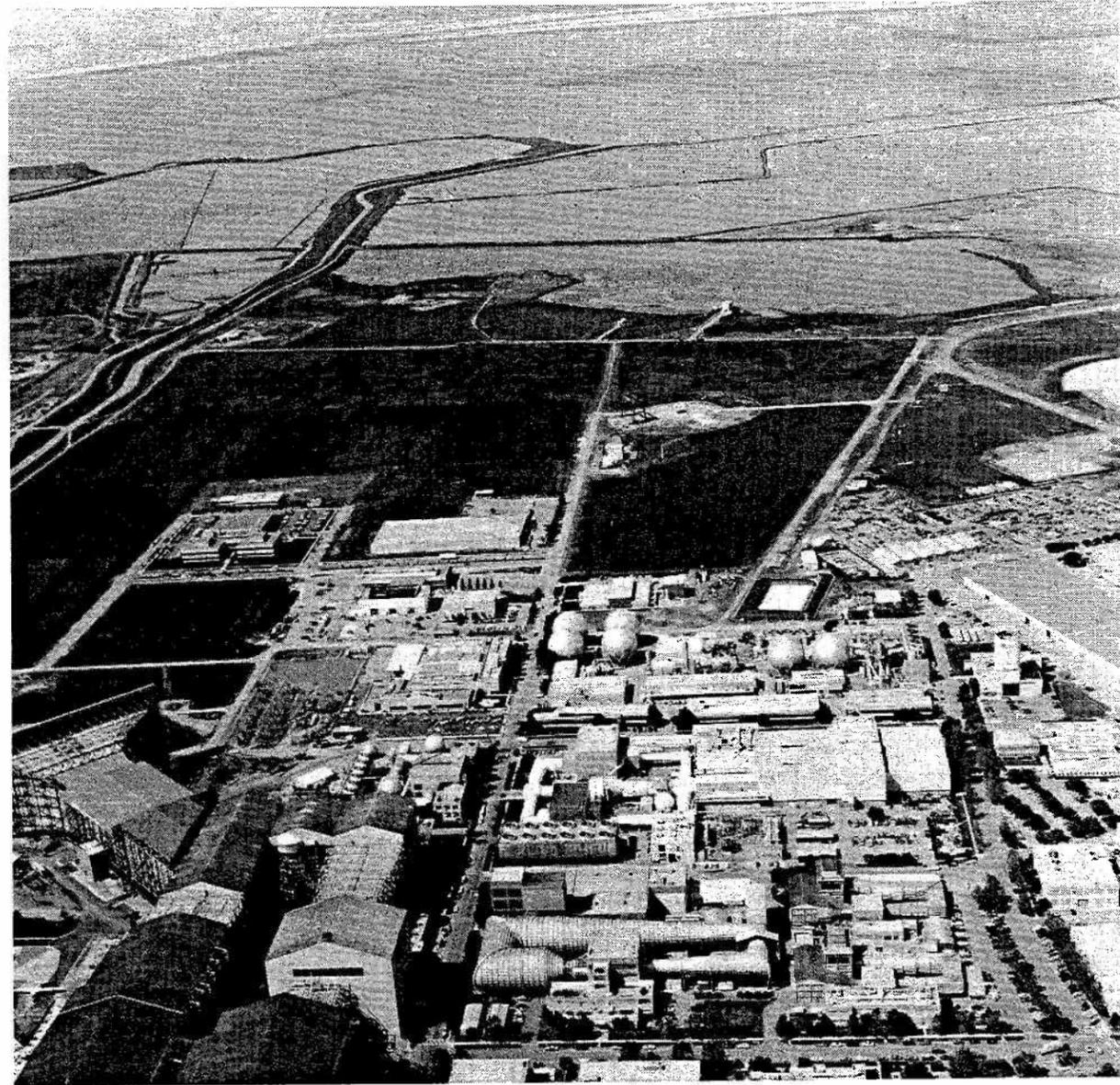
A number of services for both Navy personnel and NASA employees are provided at Moffett Field. They include, but are not limited to, security, fire and safety and waste collection services.

Security: Security measures such as controlled entrance gates, regular security patrols, surveillance, inspection, law enforcement and practice drills are a routine part of maintaining Moffett Field as a Federal facility closed to the general public.

Fire and Safety: The Moffett Field Fire Department provides structural fire suppression and airfield fire protection to the entire site. Other services provided by the Fire Department include hazardous material first response, emergency medical response, emergency preparedness planning, and fire inspections.

Waste Collection: Moffett Field has no active landfills. About 50,000 cubic yards of waste were generated in FY 1989. Garbage is hauled to the on-site recycling facility or off-site for disposal.

Other services include janitorial and building, grounds, utilities and roads maintenance, telephone and data services, engineering and construction, and numerous personnel services.



Opportunity Sites at NASA Ames Research Center

4.1 Site Opportunities

*4.2 Planning Areas and
the Potential for Future Growth*

***4.0 Potential for
Future Growth***

4.0 Potential for Future Growth

In this chapter the potential of the site for future growth is explored. Section 4.1, Site Opportunities, identifies areas on the site where future development may be possible. Section 4.2, Planning Areas and the Potential for Future Growth identifies 11 planning areas on the site where detailed analysis may be undertaken.

4.1 Site Opportunities

Identification of Site Opportunities

Four basic categories of development opportunities have been identified and are shown in Figure 4-1:

- **Open Developable Land:** Land parcels that are presently clear, that require minimal clean-up, that have few natural resource constraints and are large enough to accommodate a new facility.
- **Rehabilitation and Reuse:** Existing structures where modifications would accommodate an activity that is adaptable to that type of facility.
- **Integration and Expansion:** Small land areas adjacent to existing facilities that allow for an addition or expansion consistent with the surrounding area.
- **Future Removal:** Land that is currently unusable because of obsolete structures that need to be removed or because environmental clean up must be completed.

Evaluation of Site Opportunities

The following evaluation factors may be used to determine whether a particular project is appropriate for a particular site: utility services, circulation and design typology.

Utility Services Factor: Location near existing utilities that have unused capacity is an important consideration. This allows for integration of new development into the existing utility lines with minimal effort and expense.

Circulation Factor: Development sites with a close proximity to major arterials and adequate space for parking, as well as proximity to alternate transportation modes, are factors for choosing a site. Improved design of circulation corridors and other transportation features on the site will be an integral part of future land development.

Design Typology Factor: The function and architectural style of both a proposed building and of existing buildings in the surrounding area, play important roles in the determination of an appropriate location.

Site opportunities for Moffett Field are shown in Figure 4-1, and discussed, in general, in Section 4.2, Planning Areas and the Potential for Future Growth. The results of site opportunity analysis are shown in Section 5.4, Comparison of Future Concepts at the Planning Area Level.

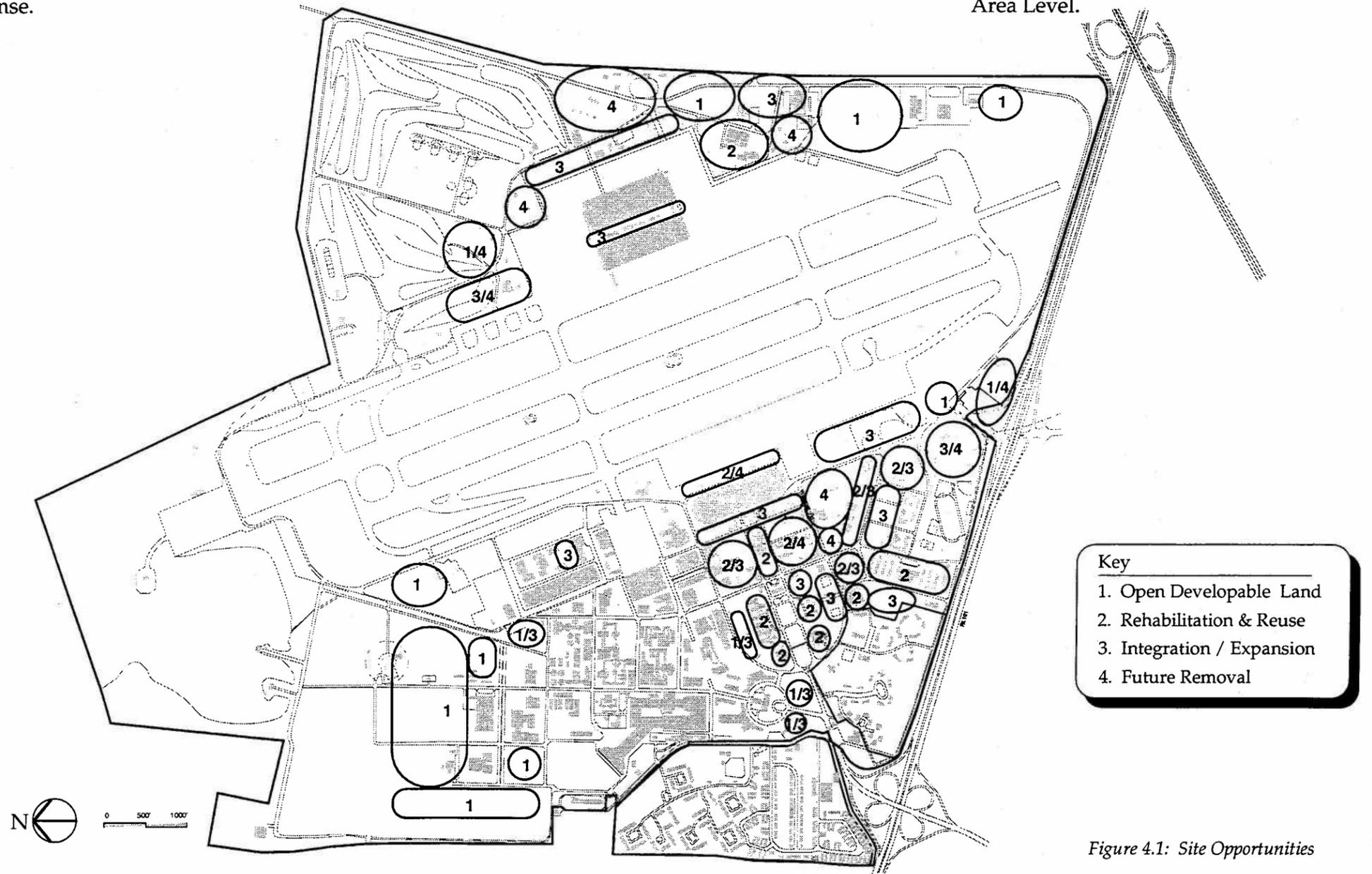


Figure 4.1: Site Opportunities

4.2 Planning Areas and the Potential for Future Growth

Eleven planning areas were established for Moffett Field: Airfield, Airfield Support East, Airfield Support West, Administration, Institutional Support, Personnel Services, Administration and Training, Limited Access Operations, Research and Development, Wetlands and Open Space, and Military Housing (not included in this study). The areas reflect existing land uses and possible future uses that are compatible with existing conditions.

The following pages focus on each planning area. By doing so, a better understanding of the site is possible when considering future development options. Each of the areas contain a brief description, as well as recommended actions for a primary use, several secondary uses, and possible future uses.

Possible future development in each planning area is given in Section 5.4, Comparisons of Concepts at the Planning Area Level.

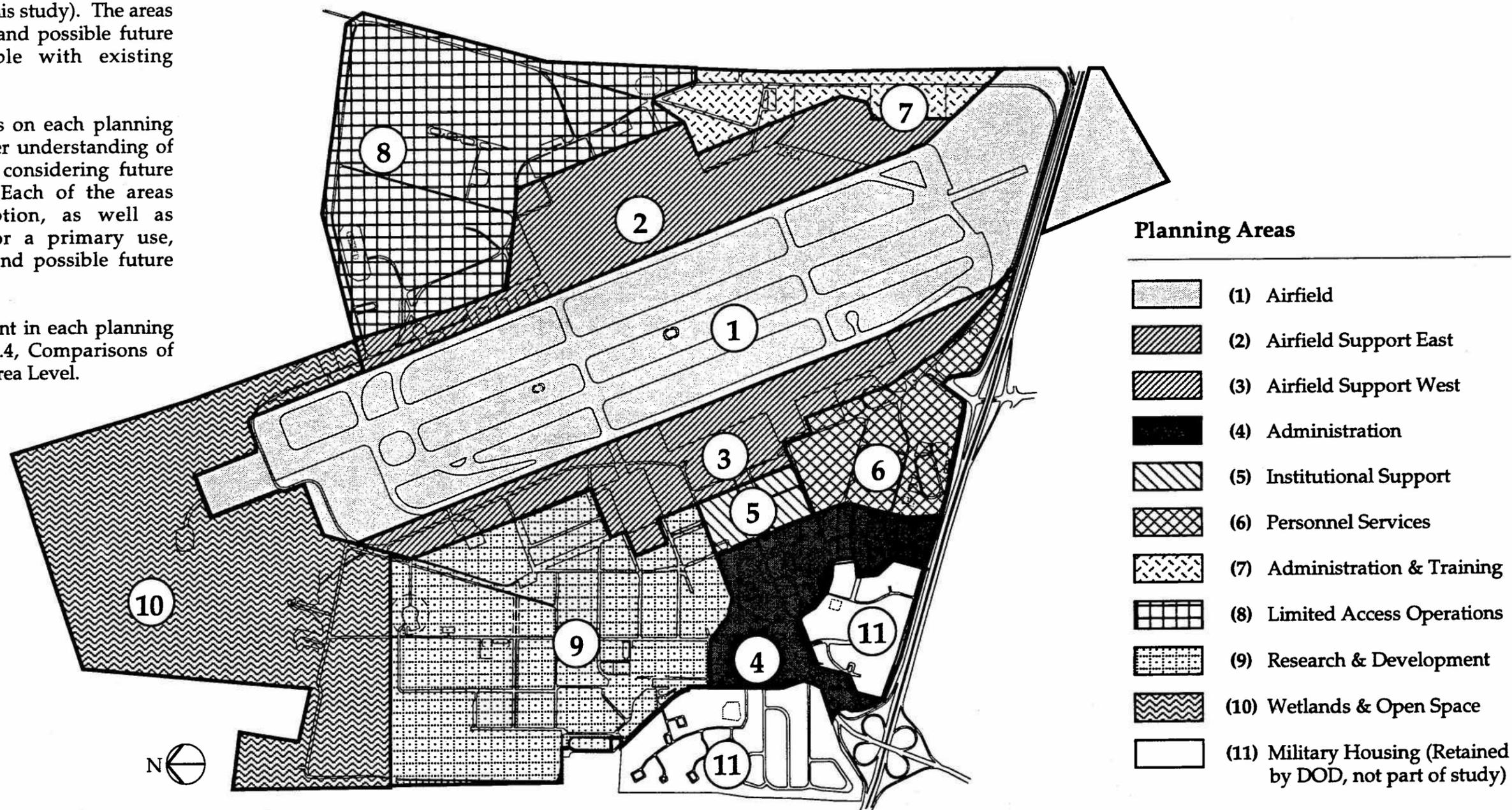


Figure 4-2: Planning Areas

OVERVIEW OF PLANNING AREAS

PLANNING AREA 1

Airfield

The airfield covers approximately 445 acres and consists of two parallel runways. There are 11 pieces of aircraft operation equipment on the airfield (250 gross square feet), located on or near the landing surface. The runways are oriented northwest and southeast based on wind and traffic requirements studies conducted by the Navy prior to construction. The runway on the east side (14L/32R) is 9200 feet long; the west runway (14R/32L) is 8150 feet long, due to safety clearances over Highway 101, length available to landing aircraft is reduced to 7480 ft. Total width of the landing area, including the grass strip between the runways, taxiways, and apron is 2000 feet.

The southern portion of land located on the other side of Highway 101 is included as part of Planning Area 1 and maintains the existing airfield clearance zone. It will continue to operate as the Sunnyvale Municipal Golf Course. Improvements, new developments or alterations to existing conditions adjacent to Moffett Field should comply with specific regulations governing air operations and safety.

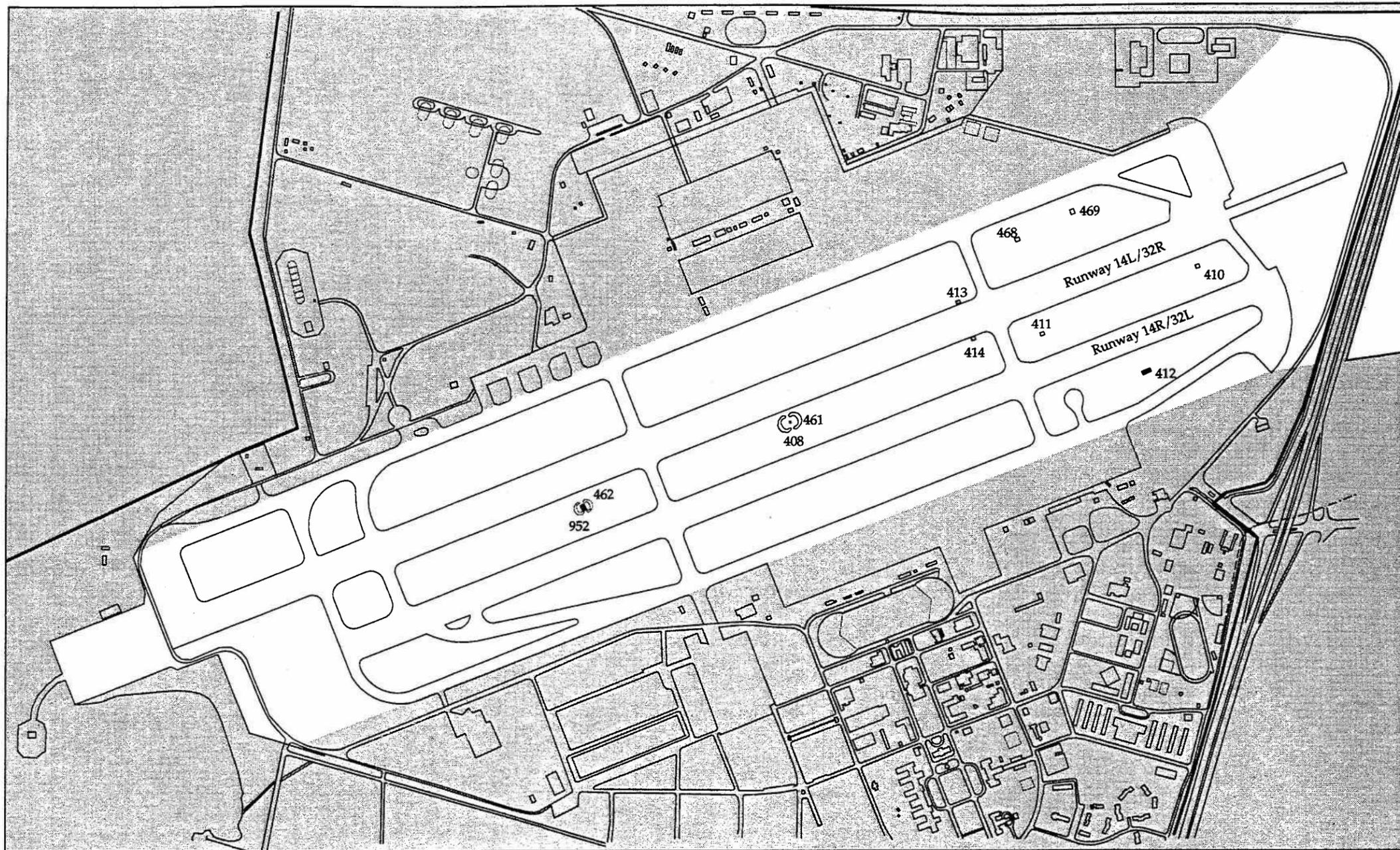
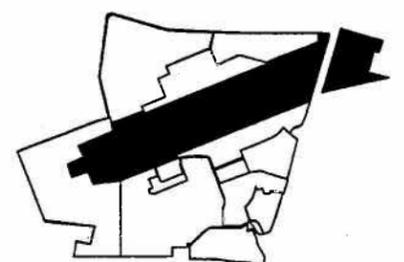


Figure 4-3: Planning Area 1



Primary Use: The airfield will continue to be used for aircraft operations by NASA and the Resident Agencies. The airfield is restricted to Federal use because of incompatibility with research flight operations and military flight operations. Civil and commercial aviation in direct support of Federal operations will be allowed.

Secondary Use: The airfield can be used for air transport of military cargo to and from defense contractors.

Future Use: The airfield will continue to be used as currently for operations by NASA and the Resident Agencies.

PLANNING AREA 2

Airfield Support East

Airfield Support East, located adjacent to the Airfield, contains approximately 174 acres. This includes buildings 46 and 47, known as Hangars 2 and 3, which were built in 1942; they are approximately 1000 feet long, 300 feet wide and 170 feet high. Hangar 3 has an addition consisting of workshop and office space on its east side, but in construction and size it is otherwise identical to Hangar 2.

This area contains 41 facilities with approximately 866,500 gross square feet. Almost 95% of this space is located in Hangars 2 and 3 and related aircraft operation facilities. The other facilities are used for operations, maintenance, support and ordnance handling.

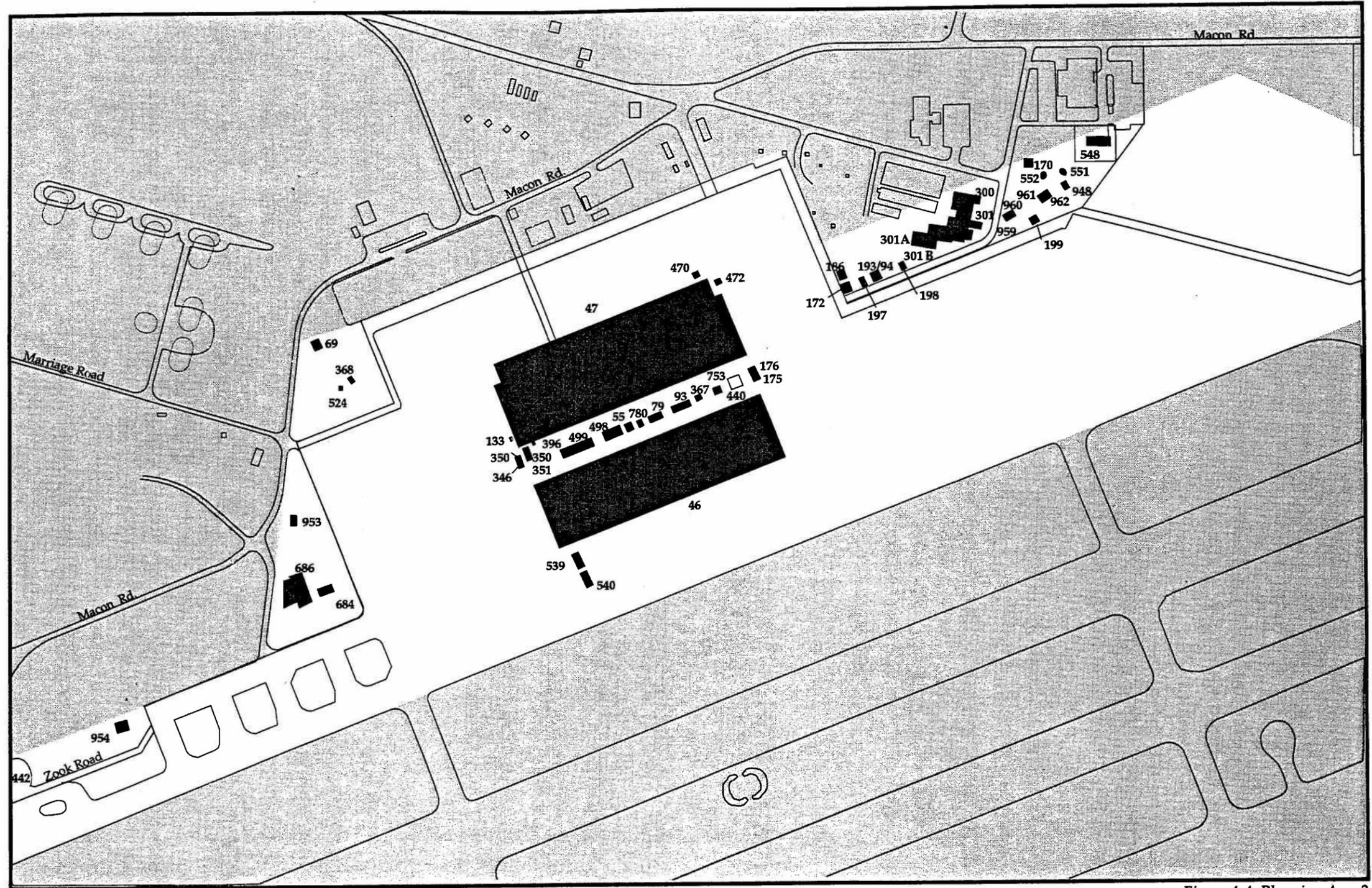
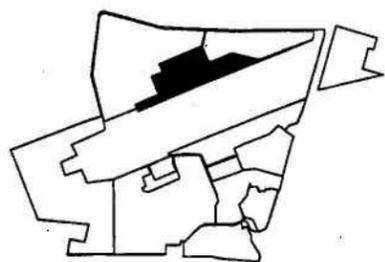


Figure 4-4: Planning Area 2



Primary Use: This area contains air operations support: hangars, air operations buildings and communications required to run the airfield.

Secondary Use: Air operations support contains many of the operations and maintenance facilities to support the airfield and other parts of the site including apron parking, fuel storage and ordnance storage.

Future Use: This area has a capacity to absorb future construction related to airfield support. Additional aircraft hangar and aircraft parking ramp space may be constructed here.

PLANNING AREA 3

Airfield Support West

Airfield Support West, which contains approximately 151 acres, is located between the Administrative area and the Airfield. Hangar 1 is its most prominent structure and has the greatest historical value. Also located here are NASA hangars N-211 and N-248.

Hangar 1 was built in 1933 and measures approximately 1000 feet long, 250 feet wide and 194 feet high. The exterior of the hangar still retains the original appearance, while the interior has been altered to allow for additional offices. Although approximately 804,500 gross square feet are located in the 30 facilities in this area, 385,000 gross square feet of this space is solely in Hangar 1.

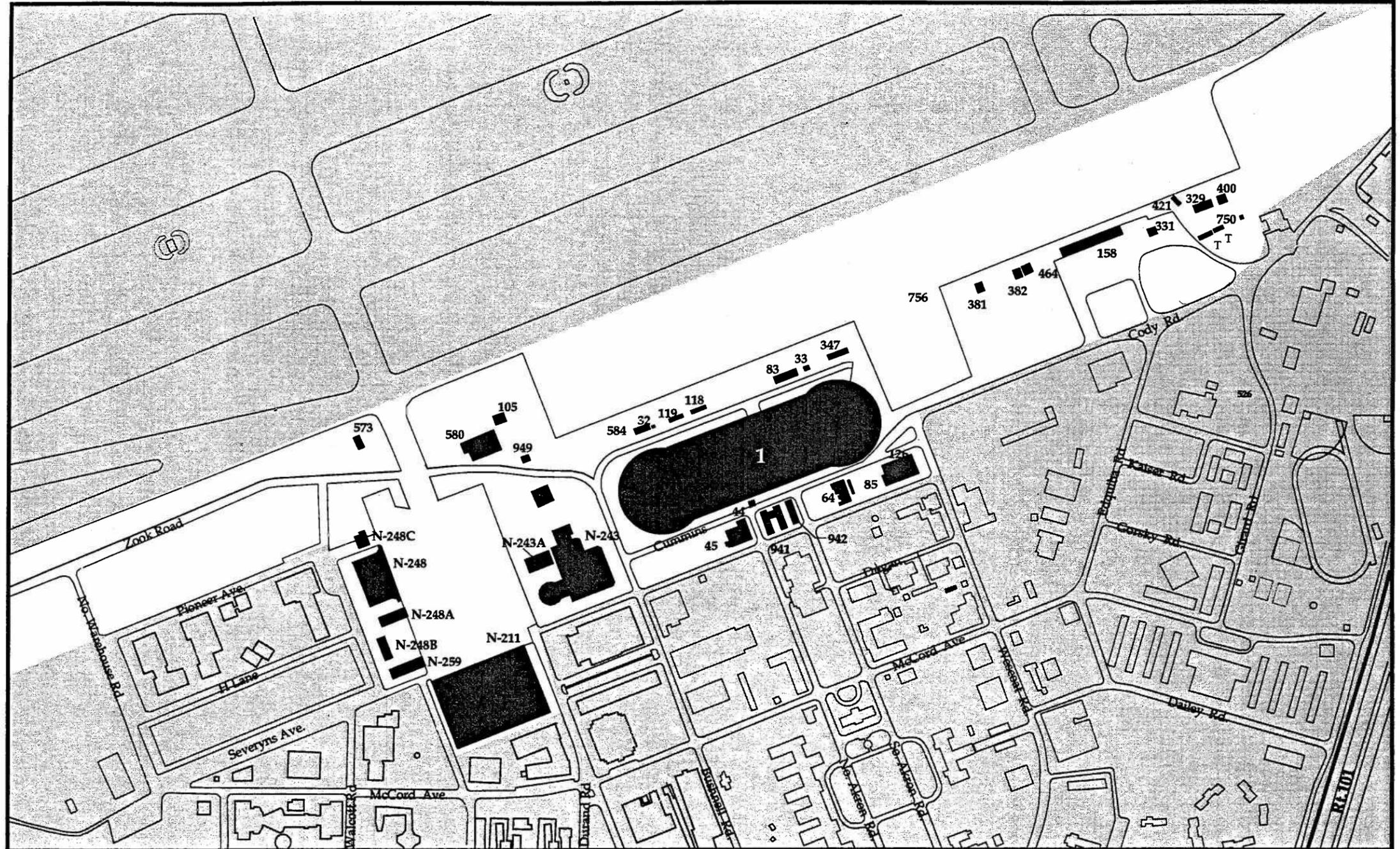
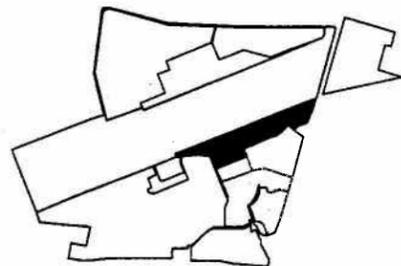


Figure 4-5: Planning Area 3

Primary Use: The primary use in this area is air operations support. Other primary uses include aircraft communications and fire safety.

Secondary Use: Other uses in this area include operations and maintenance, personnel support uses and a flight simulator.

Future Use: This area has potential for future expansion and consolidation of air operations. Land use in the area should be reserved for air operations and related activities. Some storage uses can be accommodated through adaptive reuse.



PLANNING AREA 4

Administration

This area of 82 acres is the main location for administration activities at Moffett Field. There are 41 facilities with approximately 775,000 gross square feet. The Administration area includes the historical structures along Shenandoah Plaza. Also included in this area are the Ames Research Center administrative buildings as well as the Navy barracks which have been converted to office space. NAS Moffett Field's Main Gate is an important part of this area.

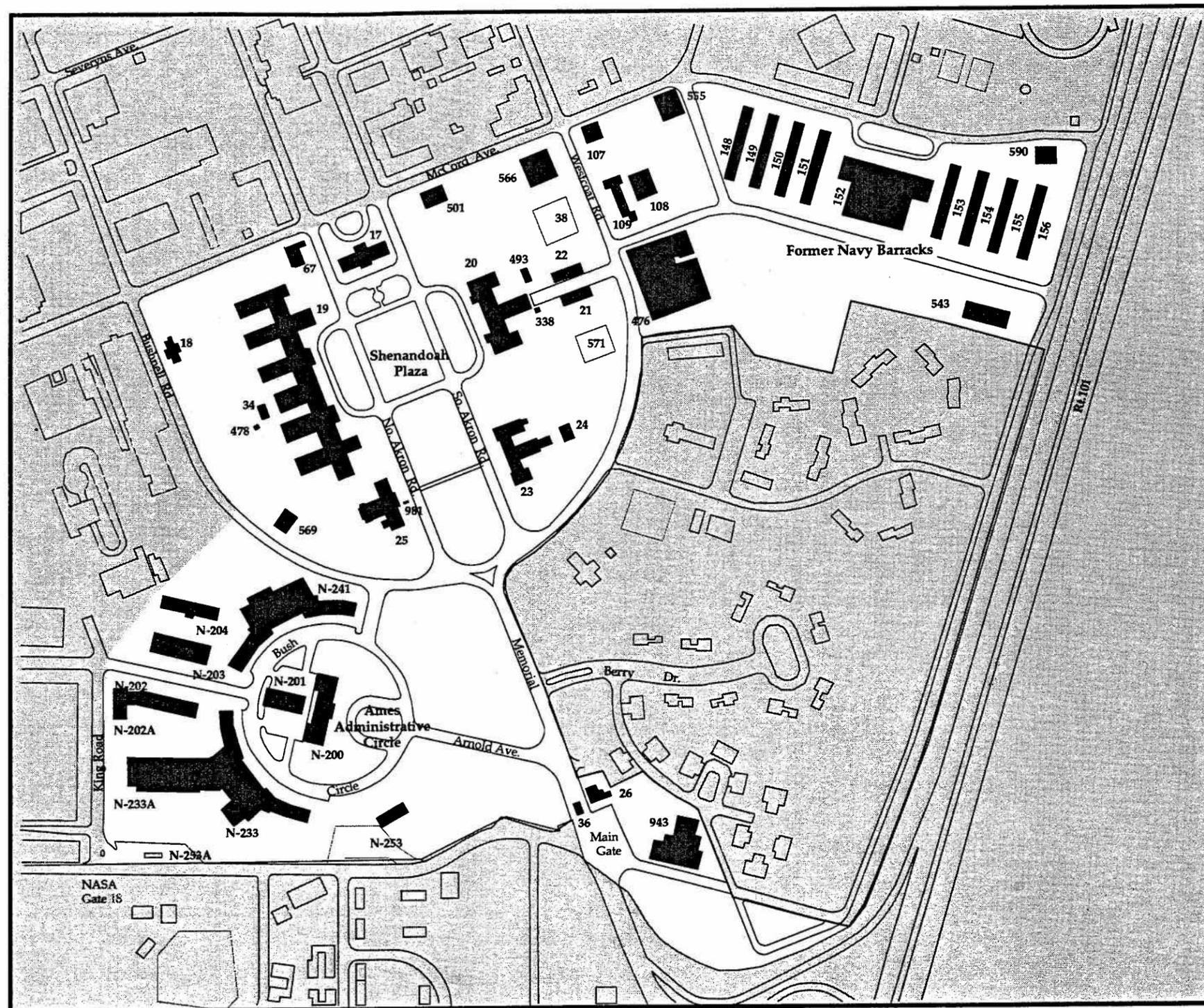
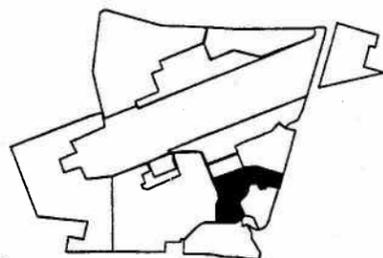
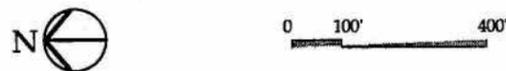


Figure 4-6: Planning Area 4

Primary Use: Administrative uses are the primary activity in this location. The planning area is broken up into three administrative districts; the Ames Administrative Circle, Shenandoah Plaza, and an area using converted barracks as offices.

Secondary Use: Besides administrative uses there are operations and maintenance and personnel support-related functions located here.

Future Use: This area will continue to be a strong administrative core for NASA and the Resident Agencies. Additions and upgrades to existing buildings as well as some degree of future development may occur. Historic integrity of the area will be maintained.



PLANNING AREA 5

Institutional Support

This area of 20 acres is located in the central transition area between Hangar 1 and Shenandoah Plaza. There are 26 facilities totaling 232,800 gross square feet. Some of the facilities were built between 1933-1935 and are considered historic, although many facilities have been heavily modified.

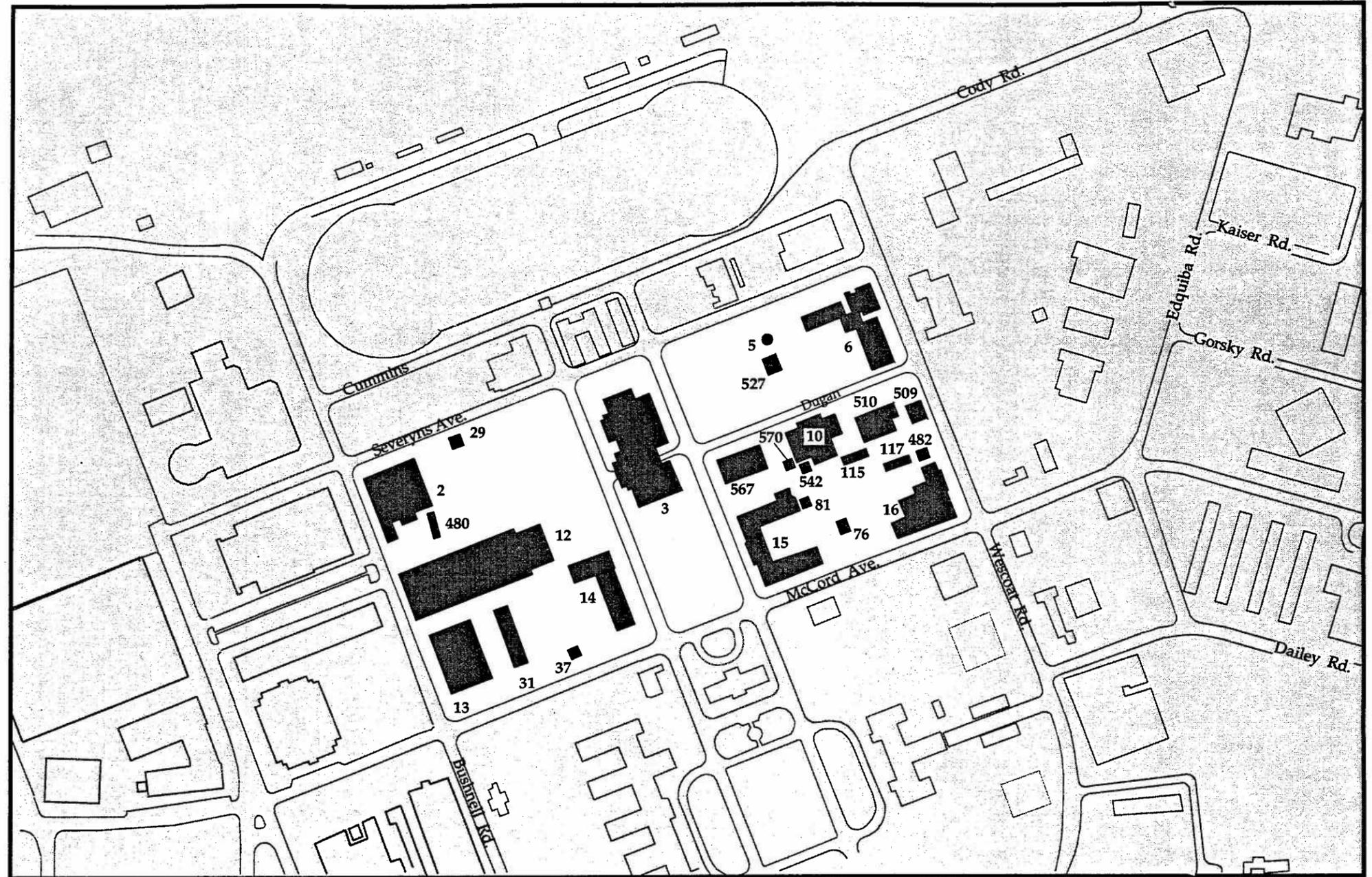
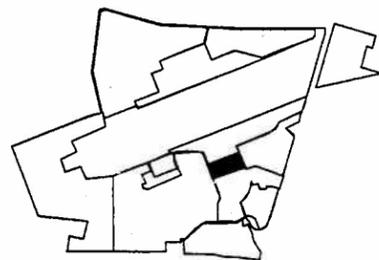


Figure 4-7: Planning Area 5

Primary Use: Operations and maintenance is the primary use in this area. Such operations and maintenance uses as public works, a boiler plant and security offices are located here. These uses provide the main infrastructure support to NAS Moffett Field.

Secondary Use: Storage and personnel support services are the secondary uses in this area. The personnel support uses include a center for dining and receptions, a military commissary, and an exercise gym.

Future Use: Infill and rehabilitation of this area, as well as new construction may be expected. Integrity of historic buildings will be maintained. Institutional support uses will be consolidated in the southern half of the area, whereas the northern half may be an extension of the research and development area that currently exists in Planning Area 9, Research and Development.



PLANNING AREA 7

Administration and Training

This area comprises 66 acres in the southeast corner of the airfield. It contains 31 facilities with approximately 157,900 gross square feet. Military-related administration and training occur in this area. A large number of other airfield support and operations and maintenance facilities, including fuel storage facilities, are also located here.

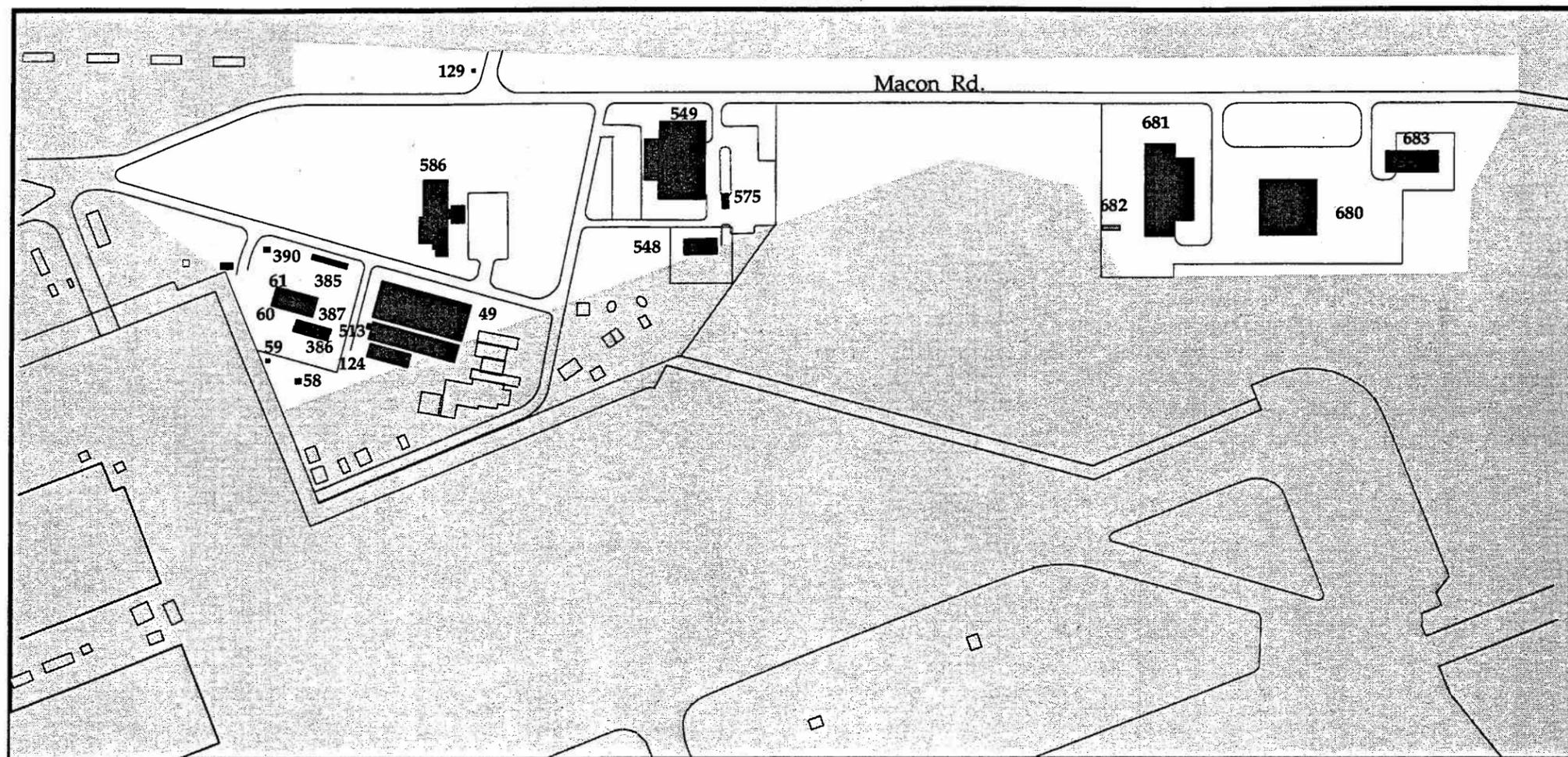
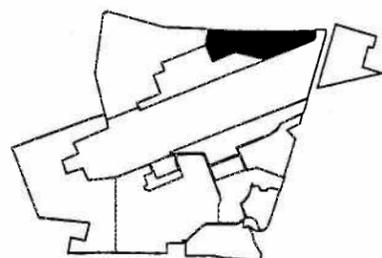
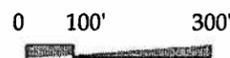


Figure 4-9: Planning Area 7



Primary Use: Administration and flight training, as well as operations and maintenance, are the primary activities in this planning area.

Secondary Use: Other airfield operations, including fueling and storage, are secondary uses in this area.

Future Use: There are several large vacant parcels which present an opportunity to expand maintenance, shop, testings, administration and training uses. Future expansion may necessitate access and circulation improvements.

PLANNING AREA 8

Limited Access Operations

This area of about 248 acres includes most of the ordnance storage facilities, most of the fuel storage areas, and the golf course. There are 52 facilities with approximately 60,700 gross square feet. Explosive safety arcs surrounding the ordnance storage severely limit development and access to this area. The area also contains operations and maintenance facilities used primarily for air operations support as well as for the golf course.

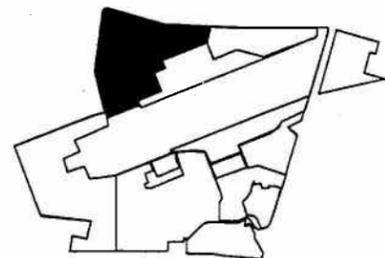
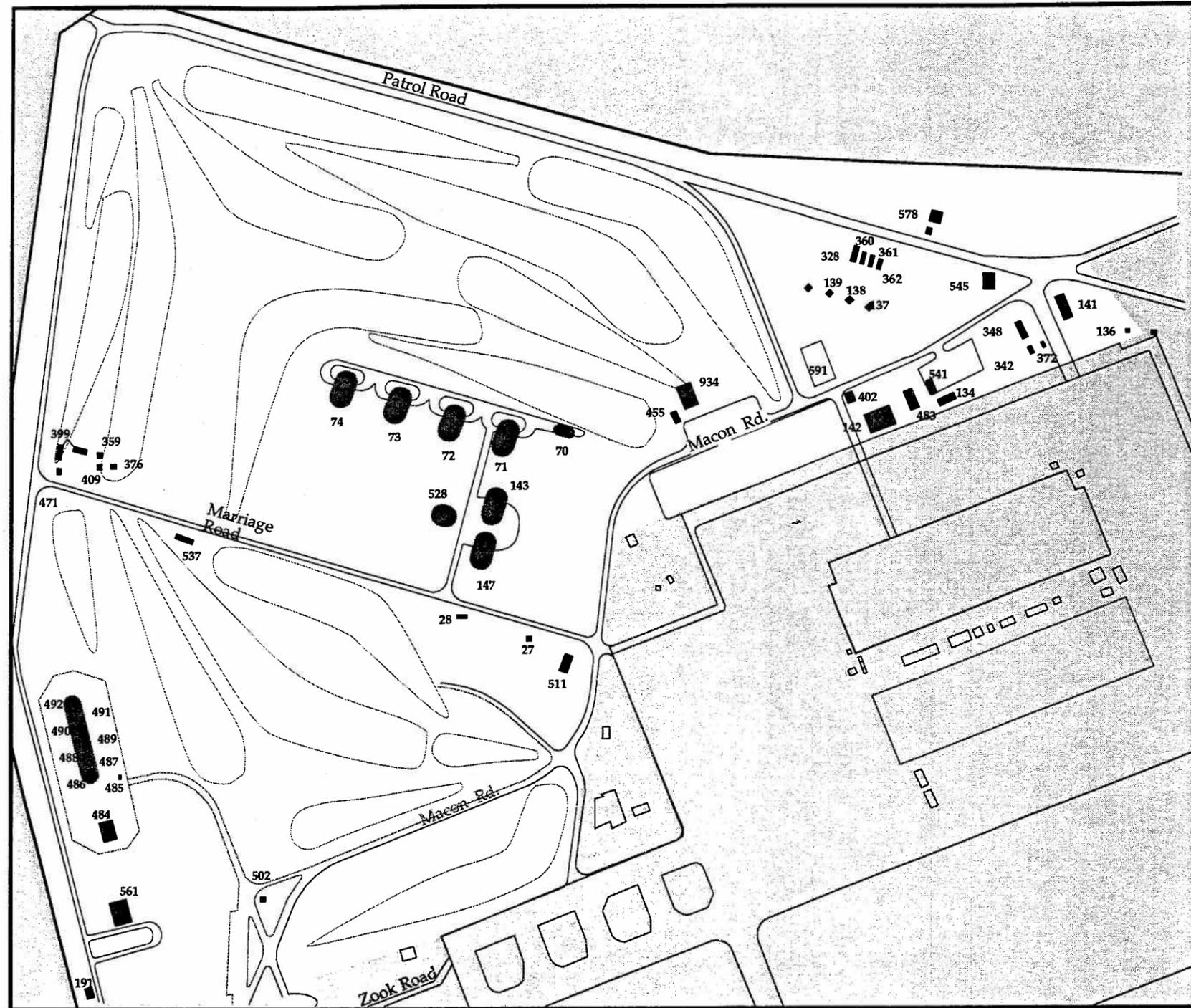


Figure 4-10: Planning Area 8

Primary Use: Ordnance storage and fuel storage are the primary activities in this area. Access to this area is limited.

Secondary Use: Operations and maintenance related to airfield support, as well as storage, and recreation are the secondary activities in this area. The golf course serves as a buffer zone, both internally and externally, for ordnance storage. A major electrical substation serving this side of the airfield is another secondary use.

Future Use: Ordnance storage will continue to prohibit development and limit access in this area. This area will continue to be utilized as a golf course, and for Nap-of-the-Earth (NOE) research flying. A new fuel storage facility may be located on the southern portion.

PLANNING AREA 9

Research and Development

This 224 acre area contains NASA facilities located generally within the current boundaries of Ames Research Center. There are approximately 85 facilities with 2,246,200 gross square feet. This area contains the majority of the research and development activities at Moffett Field. Some of the nation's most unique and important research facilities are located here, including wind tunnels, flight simulators, numerous test facilities, and advanced computer systems. Also included in this planning area are some former Navy warehouse buildings. Not included in this area, however, are the Ames Administrative Circle buildings, as well as various NASA hangars, related to flight operations. These buildings are located in Planning Areas 4 and 3, respectively.

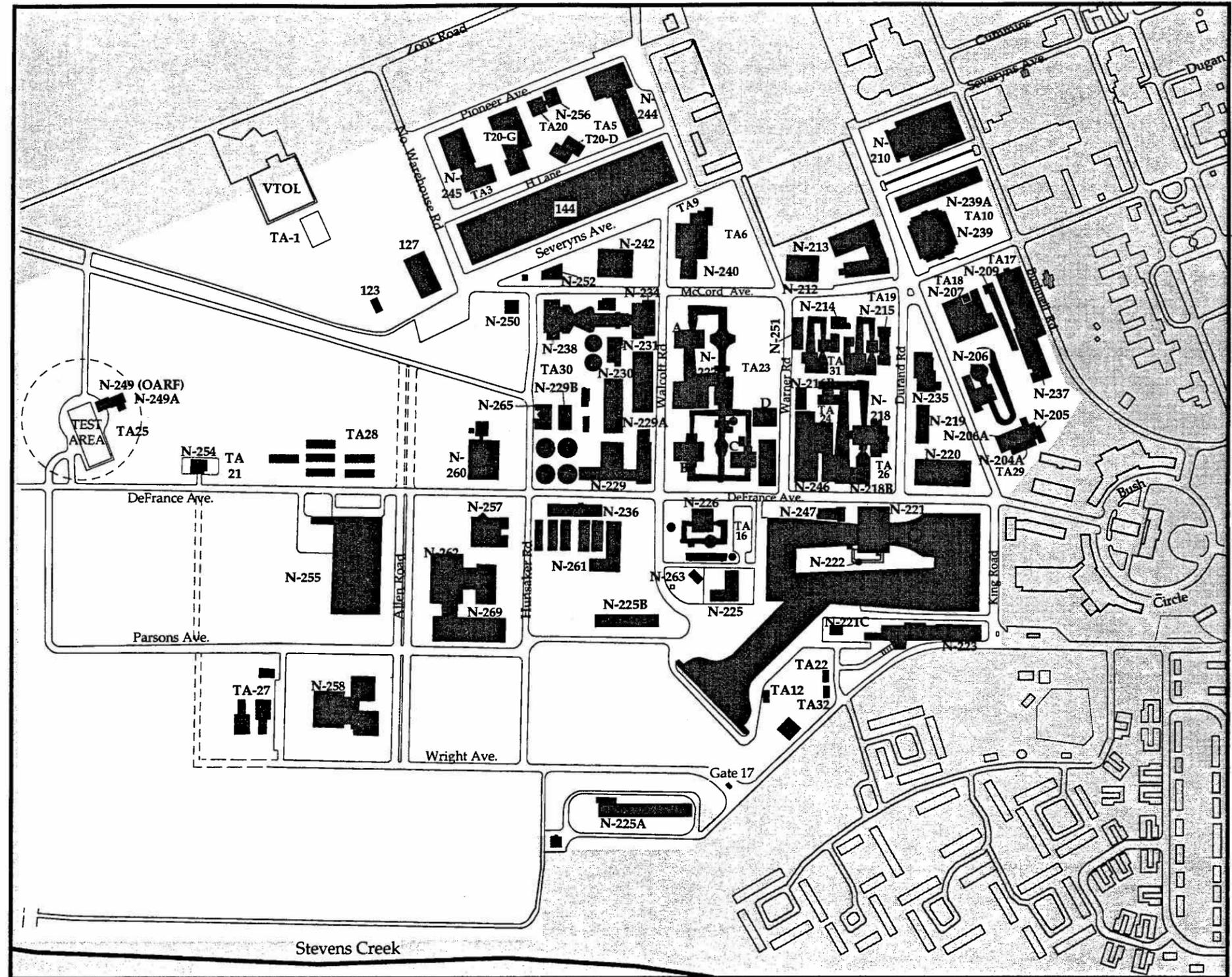


Figure 4-11: Planning Area 9

Primary Use: Light and heavy research, engineering and technical services, aerospace systems, aerophysics, life sciences, and space flight operations research, take place in this area.

Secondary Use: The research and ancillary facilities for support of technical offices and science laboratories are the secondary uses of this area.

Future Use: Ames Research Center may develop new facilities either through infill or on the undeveloped land to the north.

PLANNING AREA 10

Wetlands and Open Space

This area is located on the northern end of Moffett Field and includes approximately 276 acres of wetlands and open space areas. The wetlands areas are protected by state and Federal regulations. The non-wetland areas contain 8 facilities of roughly 3,500 gross square feet in area. These facilities include two magnetic test sites, flight navigation aids, maintenance shelters and a pistol range which currently is not in use. To the north and east of this planning area are sloughs, levees, and salt evaporation ponds, owned by The Cargill Company. Further to the north is the San Francisco Bay.

There are two major safety constraints that limit future development in this area. They include the flight path from the northern end of the runways, which covers a large portion of this area, and an explosive safety arc in the southeastern part of this area. See Section 2.3 for further details on these constraints.

Key

-  Wetland Areas
-  Non-Wetland Areas

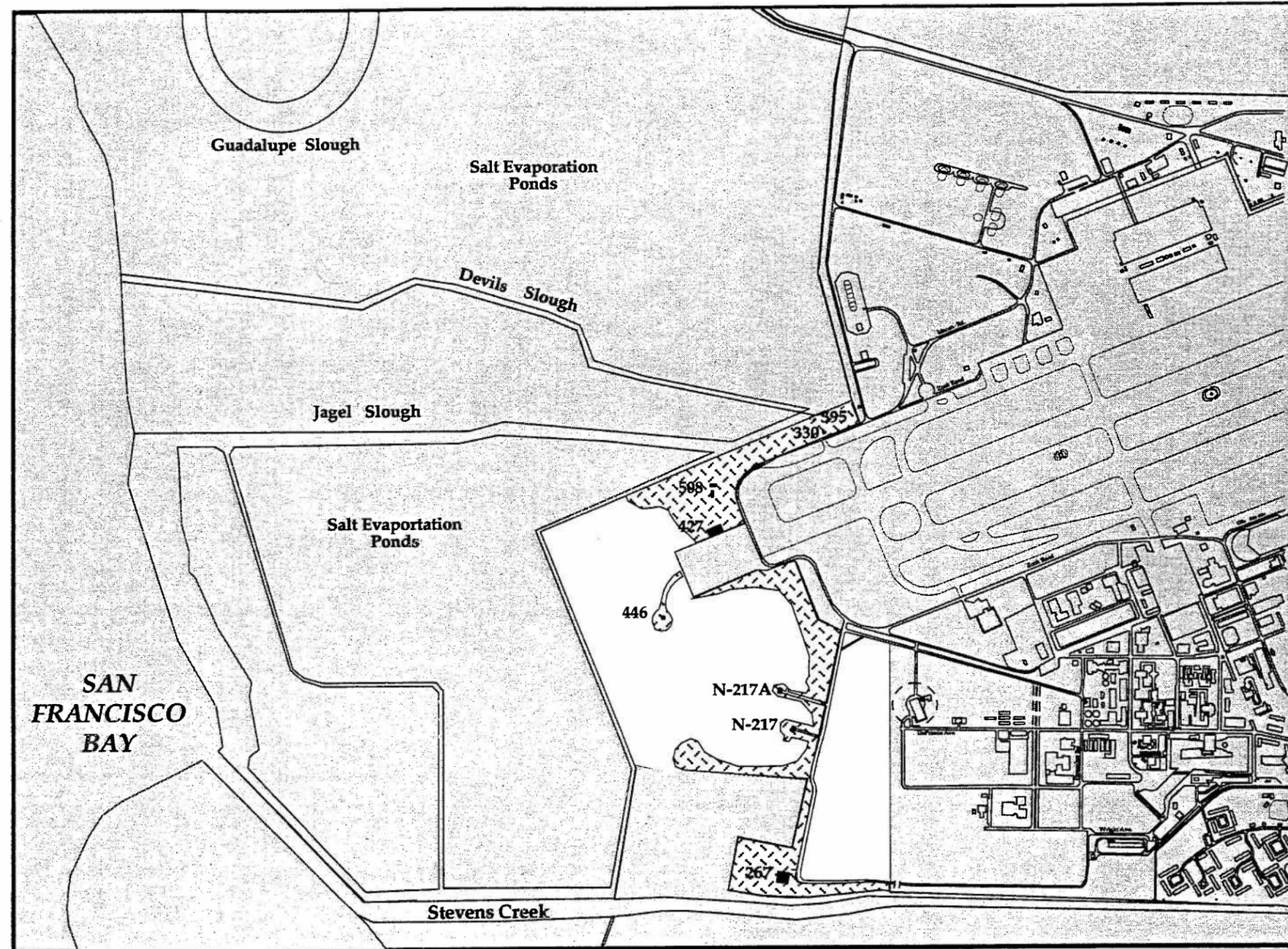
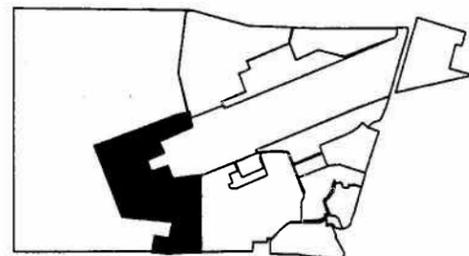
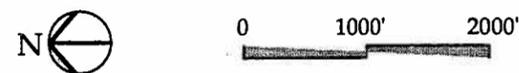
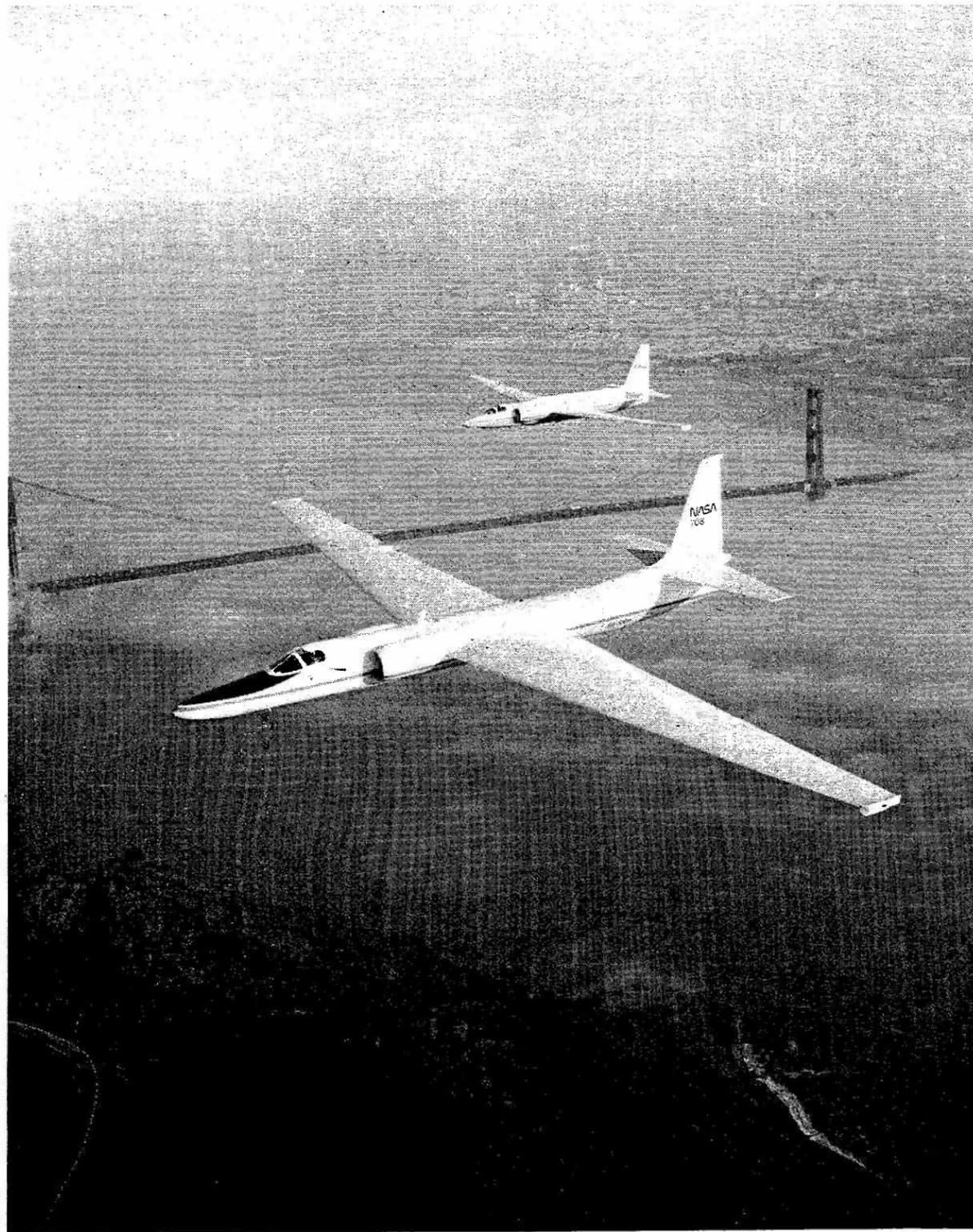


Figure 4-12: Planning Area 10

Primary Use: The primary use for this area is airfield clearance zone and open space. Due to the safety constraints in this area, it should have limited access and be preserved in its natural condition.

Secondary Use: Research activities, such as the magnetic test facilities and navigational aids, a pistol range, a security/rescue training facility and storage are secondary uses in this area.

Future Use: No development is planned in this area.



NASA ER-2 Research Aircraft

5.1 Identification of Future Concepts

5.2 Future Concept 1

5.3 Future Concept 2

*5.4 Comparison of Concepts at The
Planning Area Level*

5.0 Concepts of the Future

5.0 Concepts of the Future

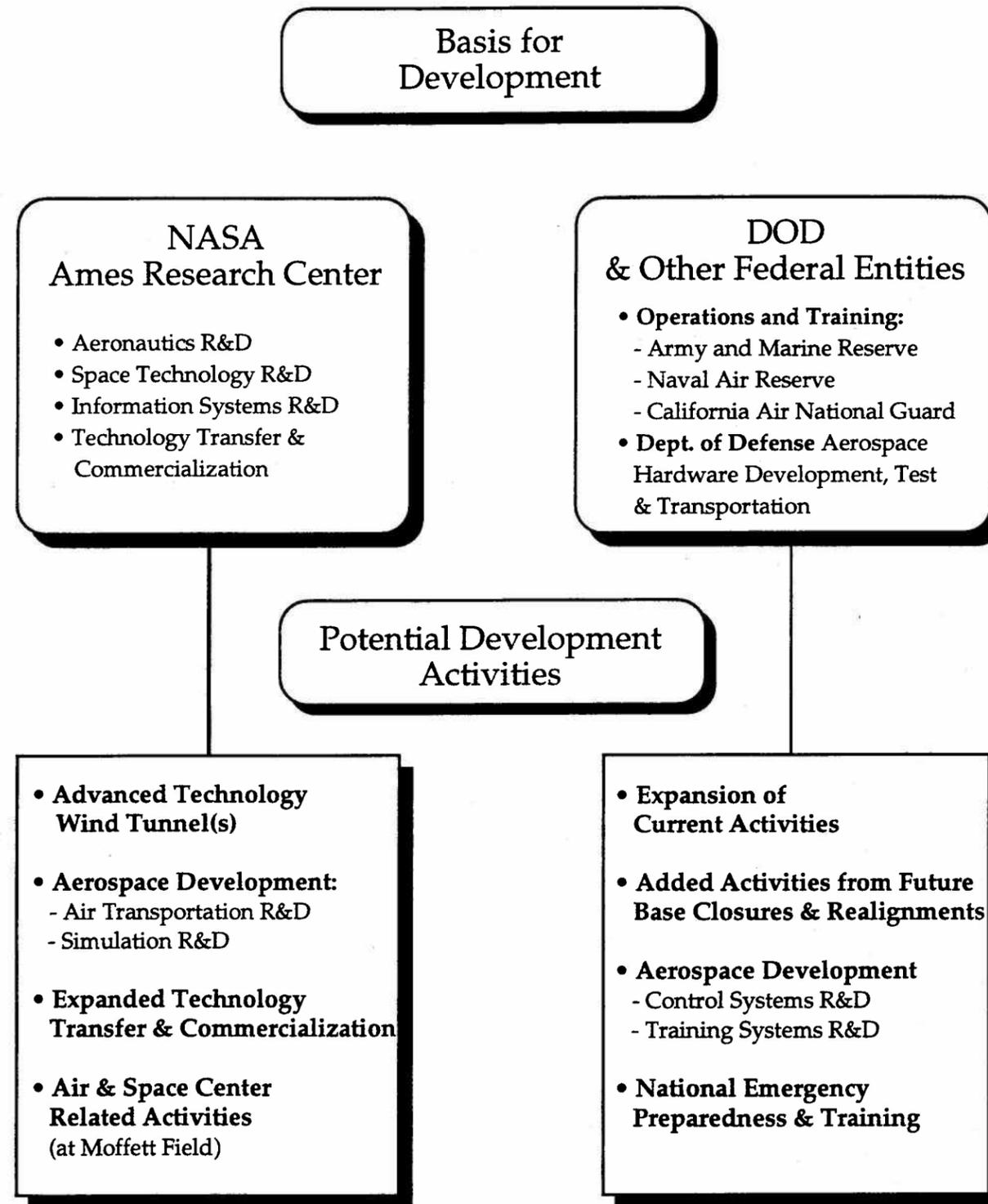
In this chapter two concepts for the future of Moffett Field are presented and analyzed. These concepts are based on possible levels of development and intensity of use, but they are not meant to be specific projections of the future of Moffett Field. They are general levels of development that allow a study of the site. In this chapter, Section 5.1 describes possible future activities. Sections 5.2 and 5.3 include site-wide descriptions and summaries of changes to site use under two future concepts. Section 5.4 expands the analysis to show the changes in each planning area.

5.1 Identification of Future Concepts

As previously stated, Moffett Field will continue to function as a closed Federal facility. In an assessment of possible future activities, it was assumed that Moffett Field would continue to be used in a manner consistent with its history.

Facilities will be required for activities such as research and development and military operations. Ideas for the future use of Moffett Field were based on:

- the vision for the future of Ames Research Center and the Resident Agencies
- on-going activities and available resources at Moffett Field
- suggestions by managers of the Federal entities at Moffett Field
- suggestions by officials and staff of Sunnyvale and Mountain View
- analysis of future Federal programs



Potential future activities, which form the basis for development of future concepts, can be divided into two broad categories (Figure 5-1):

- activities in support of the NASA mission
- activities in support of DOD and other Federal missions

Mix of Activities

Future Concept 1 and Future Concept 2 are conceived as a mix of activities and indicate the type and level of development that could occur at Moffett Field by the year 2010. As shown on the following pages the concepts differ primarily in the intensity of activities.

Sections 5.2 and 5.3 include a description and analysis of these concepts. The analysis and impact are evaluated using the framework described previously in Sections 3.1 and 3.2.

Figure 5-1: Potential Future Activities Programs

5.2 Future Concept 1

Future Concept 1 is a moderate mix of activities which represents a plausible development plan for Moffett Field over the next 15 years. It includes a balance of activities throughout the site and does not emphasize any particular type of development.

Planning Areas

- (1) Airfield
- (2) Airfield Support East
- (3) Airfield Support West
- (4) Administration
- (5) Institutional Support
- (6) Personnel Services
- (7) Administration & Training
- (8) Limited Access Operations
- (9) Research & Development
- (10) Wetlands & Open Space
- (11) Military Housing

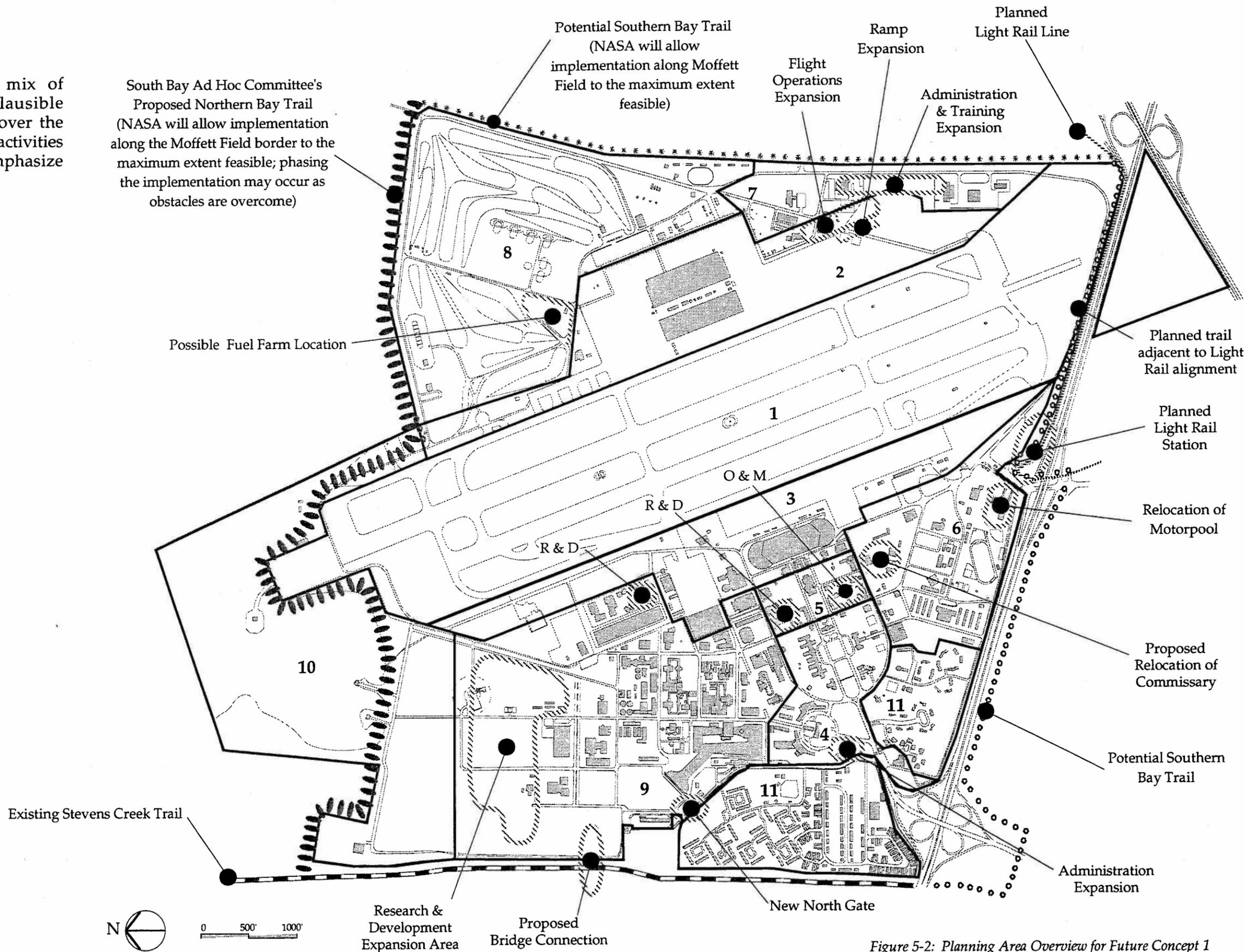


Figure 5-2: Planning Area Overview for Future Concept 1

Flight Operations

In Future Concept 1, the airfield will continue to be restricted to use by the Federal government. Air operations will support NASA's aviation activities such as aerospace research and development and platform research aircraft operations, as well as the routine operations and training of the Resident Agencies. Current ramp and hangars areas will continue to be used solely to support aircraft operations.

Flight operations at the airfield will increase slowly over the years to 80,000 operations per year in 2010; a return to the 1991 level. The number of operations is assumed to include many ground operations, which is not unusual for an aerospace research & development center. This estimate of Moffett Airfield annual operations includes:

- NASA: 10,000 operations
 - DOD: 40,000 operations
 - Defense Contractors: 7,000 operations
 - Fly-throughs and other Federal Programs: 23,000 operations
-
- Total: 80,000 operations

Aircraft operations are based on air traffic control tower traffic counts; a landing or a take-off is counted as one operation.

NASA research aircraft requirements, as well as Resident Agency requirements, may result in a need for new facilities at the airfield. These could include:

- Additional facility for a major fixed-wing aircraft program, such as airborne science platforms
- Expanded ramp, hangar, and related support facilities for Resident Agencies
- New instrument landing system

- New aircraft fueling system to replace current system

Research and Development

Aerospace research and development activity is assumed to increase with the addition of some major aeronautics research facilities. The activities expected to occur may require the construction of special research and development facilities. Some options for research and development facilities would include:

- Aeronautics, life sciences and space research laboratories
- New wind tunnel complex, including direct support facilities
- Other research and development facilities related to current Ames goals, such as additional testing capabilities for existing wind tunnels

Administration Support

Administrative activities will continue to be an important part of the daily operation of Moffett Field. Some specific options for administrative activities may include:

- Conversion of former Navy barracks from housing to administrative uses, for both NASA and Resident Agency use
- Some new construction of administrative buildings for both NASA and Resident Agency use
- Conversion of existing or the construction of new facilities outside the security perimeter to house activities emphasizing NASA's public and outreach programs in education, technology transfer and public affairs

Operational Support

This includes institutional activities which support the continued operation of the entire site. Specific examples are operations and maintenance and storage. Some specific improvements for support activities would include:

- Expanding and consolidating operations and maintenance facilities, such as public works and security in one centrally located site
- Consolidating motorpool activities for NASA and Resident Agencies
- Providing additional Ames Research Center and Resident Agency storage facilities, mostly through conversion from other uses

Personnel Support

Former Navy Morale, Welfare and Recreation (MWR) activities will remain and be managed by a single Resident Agency for DOD personnel and guests. This includes expansion and improvements in services and recreational activities and facilities:

- New commissary (for DOD personnel) and improved recreational activities for both NASA employees and Resident Agencies
- Continued operation of the golf course by a Resident Agency

Increases in land, buildings and personnel from 1993 to 2010 are shown, for Future Concept 1, in the following table.

<i>Activities</i>	<i>Developed Land (acres)</i>	<i>Buildings (sq.ft.)</i>	<i>Personnel</i>
Flight Operations	25	132,500	185
Research & Development	60	811,600	65 ¹
Administration Support	5	35,000	140
Operational Support	5	49,000	100
Personnel Support	5	61,700	120
TOTAL INCREASE	100	1,089,800	610

Increases from 1993 to 2010 for Future Concept 1

¹ Does not include additional personnel related to proposed National Wind Tunnel Project - see Planning Area 9, Future Concept 1

Description of Ground Transportation

Transportation activities, including gate control and security at Moffett Field, will change from Navy to NASA management. Various improvements to the internal circulation system may occur. Some transportation-related options would include:

- Intensified and expanded trip reduction program for NASA and the Resident Agencies. The Trip Reduction Program will reduce single-occupant auto trips through ridesharing, bicycles and transit, including use of an internal shuttle, and preferential parking for carpoolers. Bicycles are a suitable mode of travel for the site and their use can replace some internal auto trips. There are opportunities to further the use of bicycles for both internal trips and access to the site through additional paths and designations of street space for bicycles, as well as connections to public trails outside the site.

- A light rail station constructed just outside the South Gate to improve multi-modal passenger access for Moffett Field employees and further reduce auto trips. The convenience of rail service to the site could be further improved by a proposed internal shuttle bus serving the light rail station.

- The grid pattern of roads extended, with some existing roads widened and improved, mostly in the NASA Ames property

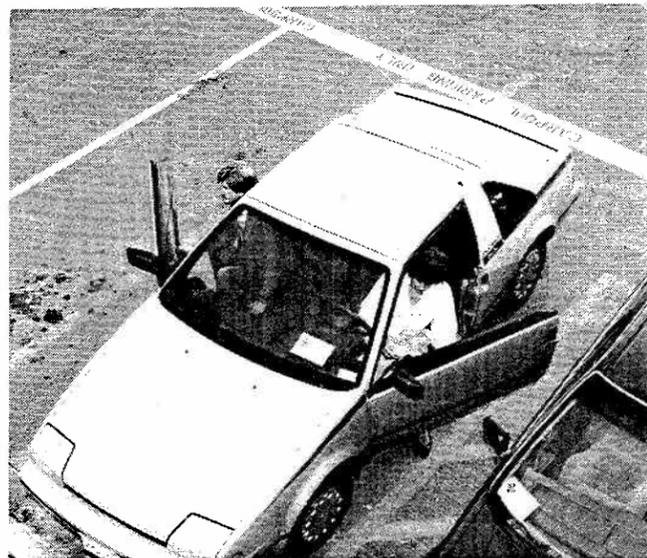
- Possible new bridge spanning Stevens Creek to connect with Charleston Avenue in Mountain View. This will necessitate a new gate, allowing for more ingress/egress options. A cooperative traffic analysis between NASA and Mountain View will be necessary prior to construction to determine the impact for re-routing Moffett Field traffic.

- Improved parking arrangements as well as additional parking related only to new construction/expansion

The combining of the Ames Research Center and former Moffett Federal Airfield areas provides an opportunity to reorganize the street system for a better connection between the two areas and provide additional parking for employees working at Ames Research Center. Although there are an adequate total number of parking spaces on the site, the spaces are not all located where they are needed most. The introduction of a shuttle bus service could support the allocation of parking areas that are further away than a comfortable walking distance.

Trip Generation

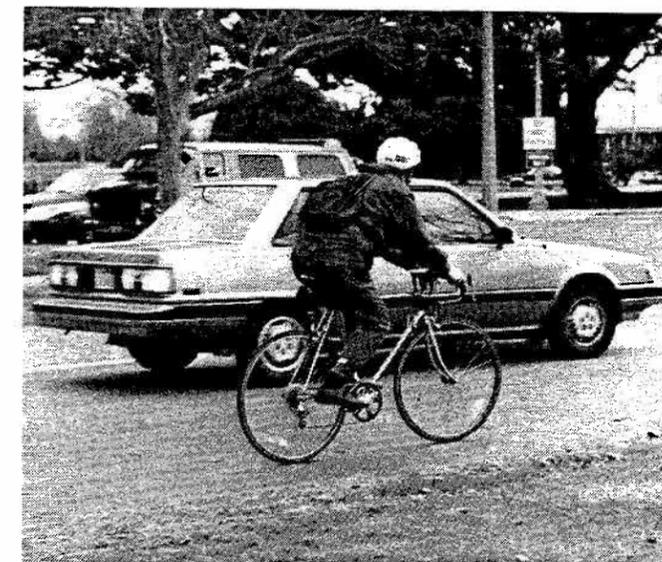
Based on the best available information, travel characteristics in Future Concept 1 show a slight increase in vehicle trips compared to existing conditions. The most that traffic could be expected to increase, based on existing commuting patterns and vehicle use, would be proportional to the level of employment growth, which would be approximately 6 percent.



Preferential Parking for Carpoolers



Shuttlebus Service



Alternative Transportation Mode

Utilities Improvements

To accommodate new development in Future Concept 1, it will be necessary to upgrade the infrastructure subject to the requirements of specific projects. In general, the infrastructure system at Moffett Field would be able to absorb new construction, with the exception of a new wind tunnel complex. Given the large energy requirements of such a complex, major improvements to the electrical system would be necessary if this project becomes a reality. Other improvements over time may include:

- New electrical substation and distribution system

- Minor additions to the natural gas distribution system

- Improvements to the water system including a new water main on the west side of the airfield

- Improvements to the sewer system

- Minor changes to storm drainage and flood control system

- Possible improvements to the communications system

- A distribution system for reclaimed water from the Palo Alto and/or Sunnyvale waste water treatment plants

Flight Operations

In Future Concept 2 the airfield will remain a restricted use Federal facility. Air operations will be in support of NASA's aviation activities such as aerospace research and development and platform research aircraft operations as well as operations and training of the Resident Agencies.

Just as in Future Concept 1, flight operations at the airfield will increase slowly over the years to 80,000 operations per year in 2010. This estimate of Moffett Airfield annual operations includes:

- NASA: 10,000 operations
- DOD: 40,000 operations
- Defense Contractors: 7,000 operations
- Fly-throughs and other Federal Programs: 23,000 operations

Total: 80,000 operations

The number of operations is assumed to include many ground operations which is not unusual for an aerospace research and development center.

It is envisioned that the ramp area and hangars will continue to be used solely to support aircraft operations with activities such as research and development, maintenance and training.

Some options for Flight Operation facilities would include:

- Facilities for several major aircraft programs
- Additional hangar and support facilities for Resident Agencies, in addition to those in Future Concept 1
- Larger airfield ramp expansion in addition to that in Future Concept 1

Research and Development

Aerospace research and development activity is assumed to increase with the addition of some major aeronautics research facilities. The activities expected to occur may require the construction of special research and development facilities. Some options for research and development facilities would include:

- Additional aeronautics, life sciences and space research laboratories and simulators in addition to those in Future Concept 1
- Construction of a wind tunnel complex, identical to that in Concept 1
- Construction of research and development laboratories and support facilities, on both sides of the airfield in addition to those in Future Concept 1

Administration Support

Administrative activities related to research and development, as well as for Resident Agency operations, will be concentrated and expanded where current administrative activities occur. Some specific options for administrative activities may include:

- Additional administrative buildings for both NASA and Resident Agency use, compared to Concept 1
- A visitor's center emphasizing high technology such as virtual reality
- Conversion of existing or construction of new facilities outside the security perimeter to house activities emphasizing NASA's public and outreach programs in education, technology transfer and public affairs

Operational Support

Support activities include operations and maintenance support and warehousing. Some options for support facilities would include:

- Operations and maintenance facilities expanded and consolidated on the East and West sides of the airfield
- Additional warehousing located on the East side of the airfield

Personnel Support

As in Future Concept 1 former Navy Morale, Welfare and Recreation (MWR) activities will remain and be managed by a single Resident Agency. This includes expansion and improvements in commercial services and recreational activities and facilities:

- New commissary (for DOD personnel) and improved recreational activities for both NASA employees and Resident Agencies
- Continued operation of the golf course by a Resident Agency

Increases in land, buildings and personnel from 1993 to 2010 are shown, for Future Concept 2, in the following table.

<i>Activities</i>	<i>Developed Land (acres)</i>	<i>Buildings (sq.ft.)</i>	<i>Personnel</i>
Flight Operations	70	647,900	965
Research & Development	75	1,299,600	1,045
Administration Support	20	226,000	905
Operational Support	20	287,700	645
Personnel Support	15	169,700	340
TOTAL INCREASE	200	2,629,900	3,900

Increases from 1993 to 2010 for Future Concept 2

Description of Ground Transportation

Transportation activities including ingress and egress at Moffett Field, will change under the management of NASA. Future Concept 2 will include all of the program items listed for Future Concept 1, plus the following:

- A boulevard connection through the Moffett Federal Airfield and NASA Ames areas
- Expansion of the shuttle bus system for employees of NASA, the Resident Agencies and several major employers in the vicinity of Moffett Field. The system will link buildings to parking lots and the planned Light Rail station at South Gate. The system will also interconnect with the shuttle bus tour of NASA facilities from the proposed Mountain View/NASA Air & Space Center.
- Improvement of additional streets to urban standards with curbs and landscaping
- Improvement of additional intersections
- Modification of parking system to provide additional incentive for ride sharing

Based on the best available information, traffic volumes generated by Moffett Field in Future Concept 2 will be comparable to existing conditions. There will be approximately 26,500 vehicles through the gates in both directions daily, and approximately 2,700 inbound in the morning peak hour.

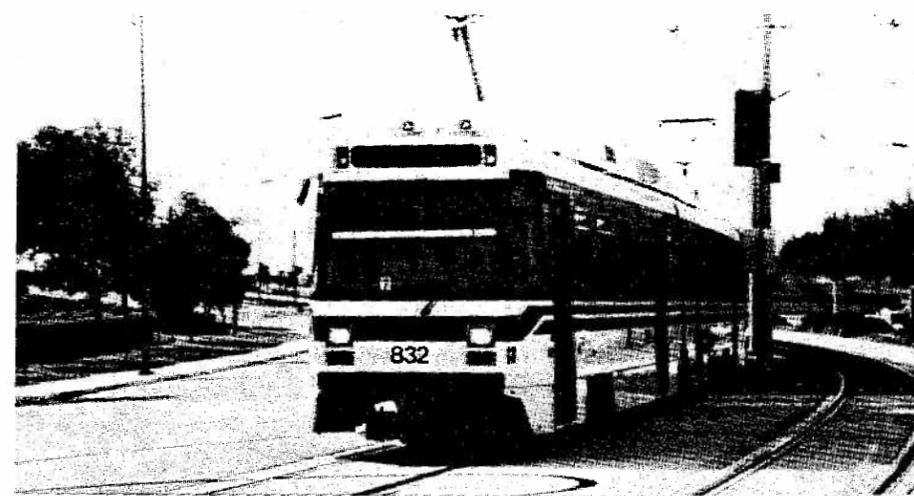
Utilities Improvements

In order to accommodate new development in the future, it may be necessary to upgrade the infrastructure subject to the study of the requirements of specific projects. In addition to the improvements for Future Concept 1, additional improvements may include:

- Improvements to the electrical distribution system, including the construction of a substation
- Additions to the natural gas and sewer systems
- Additions and enlargements to the water system depending on the future use of reclaimed water
- Expansion of the communications system

5.4 Comparison of the Concepts at the Planning Area Level

In this section Future Concepts 1 and 2 are compared for each planning area. In the following pages a planning area map shows the changes from the existing conditions for each concept. For Planning Areas 1 and 10 only one map is shown because little or no development occurs in the areas for either concept.



Example of Future Light Rail

**PLANNING AREA 1
AIRFIELD**

The airfield will continue to be restricted to use by NASA and other Federal Agencies. Aircraft operations will be approximately 80,000 per year. No significant changes to the airfield itself or related facilities are planned; however, any new construction or modifications will meet the requirements of Federal Air Regulations Part 77 and Part 139, except for facilities under existing waivers. The airfield will continue to operate with most current safety waivers in place. NASA will operate the airfield using FAA regulations, rather than Department of Defense regulations. Noise mitigation measures, such as modifying landing and take-off flight patterns, will be employed so as to minimize any substantial potential noise impacts.

Future Concepts

- A new instrument landing system (ILS) is planned for the airfield, replacing the existing Precision Approach Radar System (PARS). The ILS facilities are too small to be shown on the accompanying graphic
- The ILS will consist of a localizer antenna array and equipment shelters on either end of runway 14L/32R. A glide slope transmitter antenna and another equipment shelter will be situated next to runway 14R/32L on the southwest end

- Approximately 1,200 sq. ft. of new construction

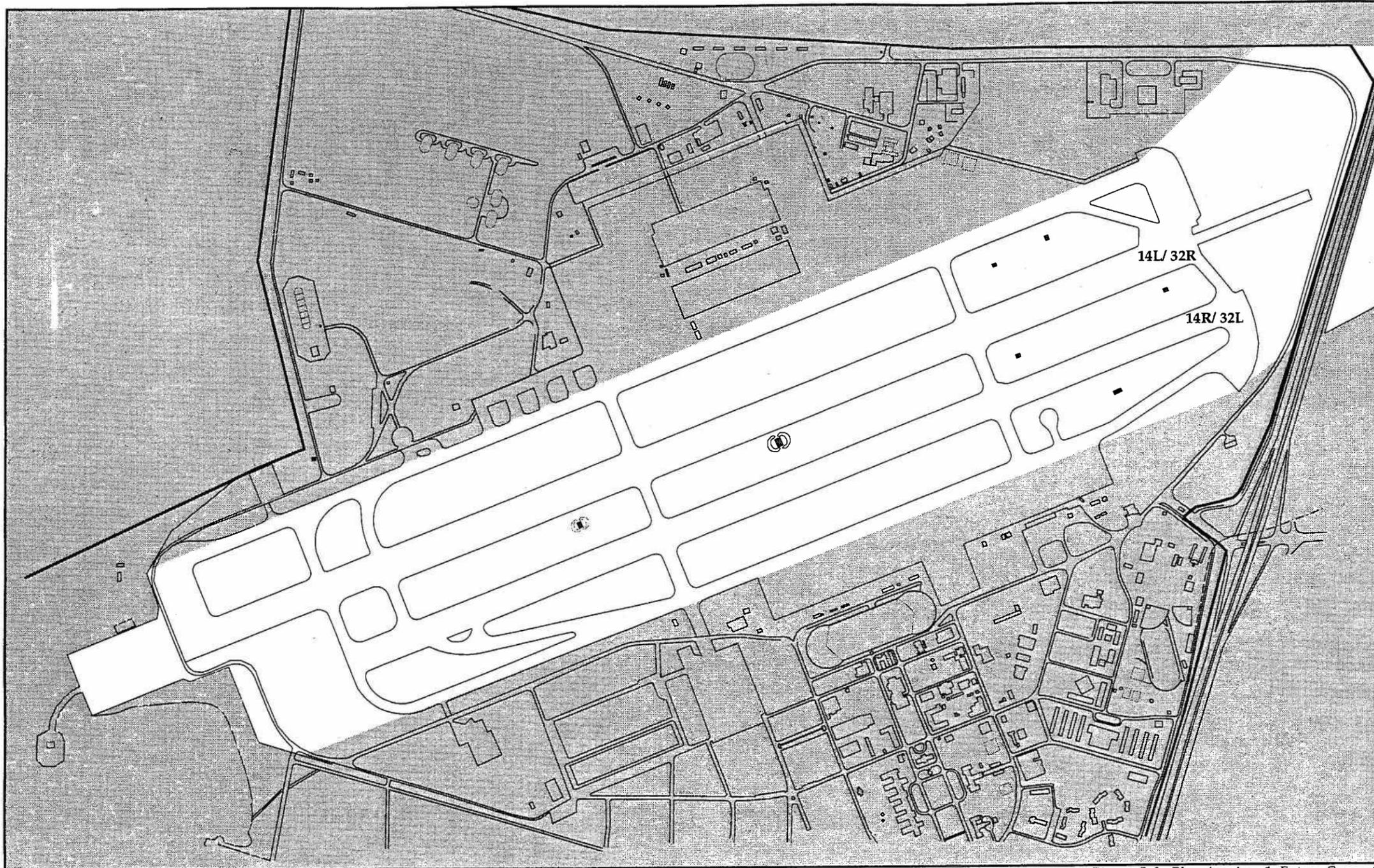


Figure 5-6: Planning Area 1, Future Concepts

	<p>445 Acres</p>	<p>KEY</p>	<p>SUMMARY</p>
	<p>0 100' 500' 1000'</p>		<p>EXISTING</p>
<ul style="list-style-type: none"> • Approximately 1,200 sq. ft. of total new construction • No additional personnel • 0% increase in floor area ratio 			

PLANNING AREA 2 AIRFIELD SUPPORT EAST

Planning Area 2 is the location of airfield support activities on the eastern side of the airfield. The major facilities include Hangars 2 and 3, maintenance, storage, apron parking (ramp) and other operational facilities which provide support for aircraft.

In the future, this area will continue to function as airfield support, with an expansion in hangar space. Many smaller, obsolete line maintenance shelters and ammunition storage facilities will be demolished.

Future Concept 1:

- One new hangar and a new aircraft maintenance facility totaling 104,000 sq. ft.
- New 4,500 sq. ft. aircraft ground support facility
- 1.5 acres of additional ramp space adjacent to the new hangars
- New 13,000 sq. ft. administrative building
- 6,600 sq. ft. of many small, WWII-era line maintenance shelters will be demolished due to new construction and obsolescence
- 121,500 sq. ft. of total new construction

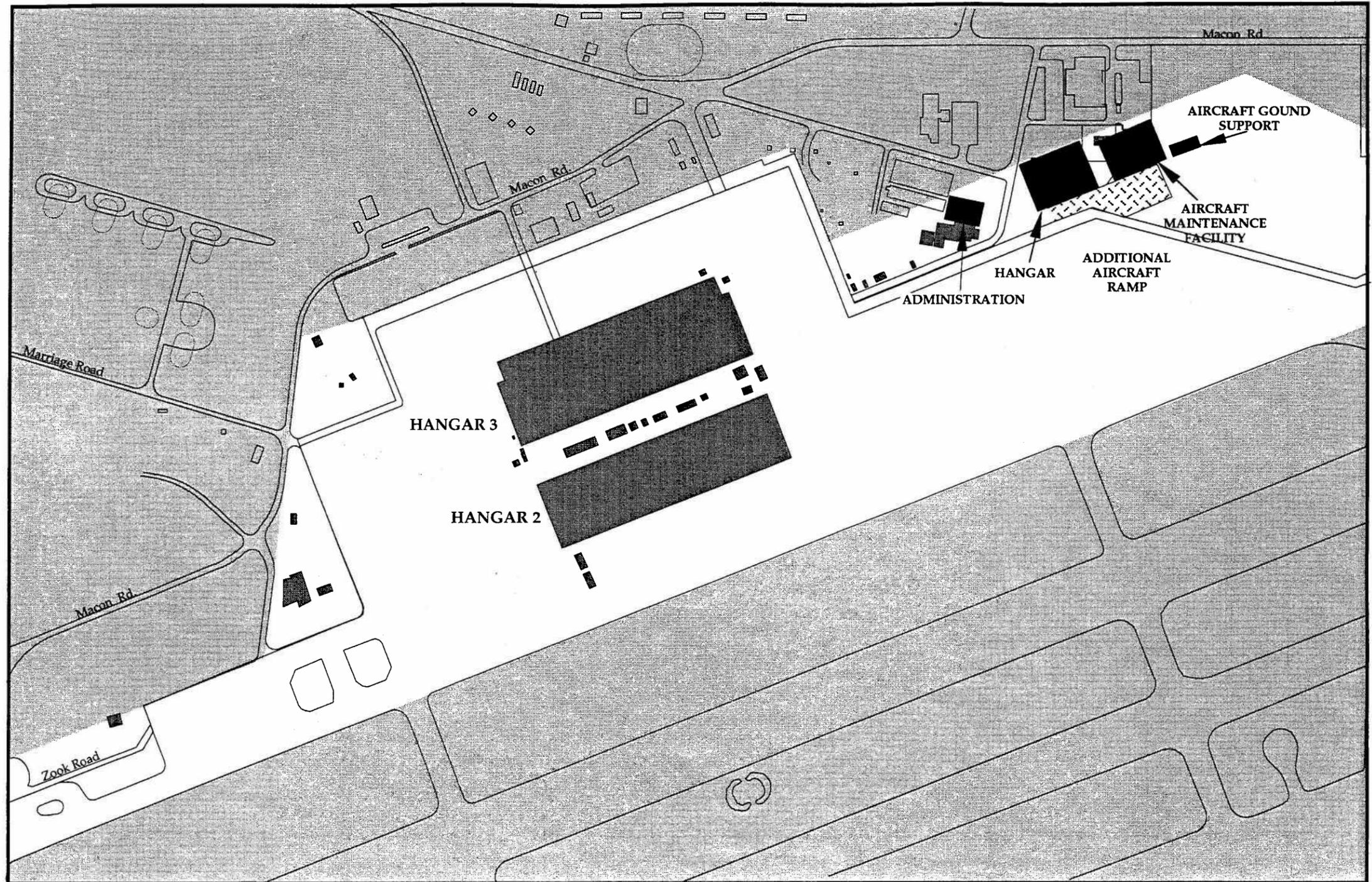
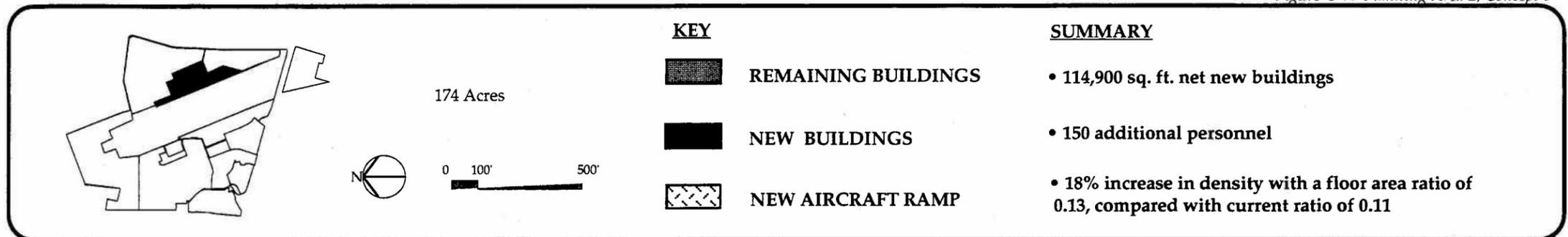
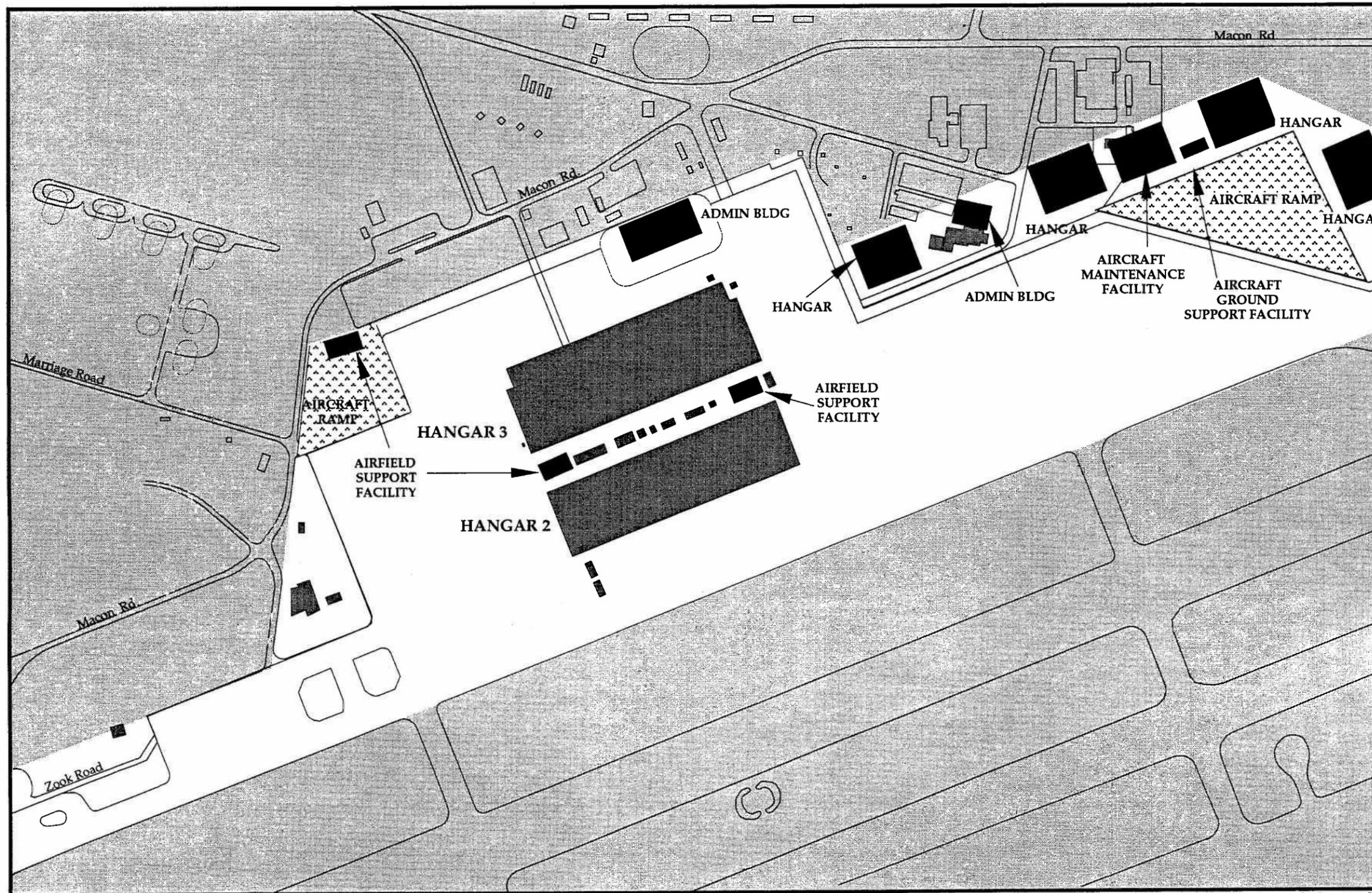


Figure 5-7: Planning Area 2, Concept 1



**PLANNING AREA 2
AIRFIELD SUPPORT EAST**



Future Concept 2:

- Three new 60,000 sq. ft. hangars, and one 44,000 sq. ft. aircraft maintenance facility, adjacent to 7.4 acres of expanded ramp
- New 47,500 sq. ft. hangar near Hangar 3
- New 100,000 sq. ft. , two-story administrative facility on current ramp area
- New 13,000 sq. ft. administrative building
- 6.4 acres of expanded ramp space northeast of Hangar 3
- New 16,000 sq. ft. of airfield support buildings related to flight operations
- Two new 4,500 sq. ft. airfield support buildings in between Hangars 2 and 3
- Demolish 10,000 sq. ft. of dilapidated, unnecessary structures, due to new construction and obsolescence
- 414,000 sq. ft. of total new construction

Concept Comparison Summary Table

		Building Sq. Ft.	Personnel ^A	Floor Area Ratio
Existing		866,500	1,155	0.11
Loss ^B	F.C. 1	6,000	10	
	F.C. 2	10,000	15	
Gain ^C	F.C. 1	121,500	160	
	F.C. 2	414,000	550	
Total	F.C. 1	981,400	1,305	0.13
	F.C. 2	1,270,500	1,690	0.17

Figure 5-8: Planning Area 2, Concept 2

174 Acres

KEY

- REMAINING
- NEW BUILDINGS
- NEW AIRCRAFT RAMP

SUMMARY

- 404,000 sq. ft. net new construction
- 540 additional personnel
- 55% increase in density with a floor area ratio of 0.17, compared with the current ratio of 0.11

F.C. = Future Concept

^A Personnel based on planning area capacity for type of building use

^B Loss = Demolition of substandard buildings/ reduction of personnel

^C Gain = New construction/added personnel

**PLANNING AREA 3
AIRFIELD SUPPORT WEST**

Planning Area 3 is the location of airfield support facilities on the western side of the airfield. Hangar 1 is the major facility, and NASA Hangars N211 and N248, the traffic control tower, apron parking and other flight operational support facilities are also located here.

This area will remain flight operations-related in the future. No demolition or new construction will take place, however some buildings to the west of Hangar 1 would be converted from office to storage uses.

Future Concept 1:

- Approximately 9,700 sq. ft. of existing substandard office space will be converted to storage for airfield support functions in the area west of Hangar 1
- Fuel tanks will be upgraded or replaced to maintain environmental compliance
- No major development or changes are planned in the foreseeable future

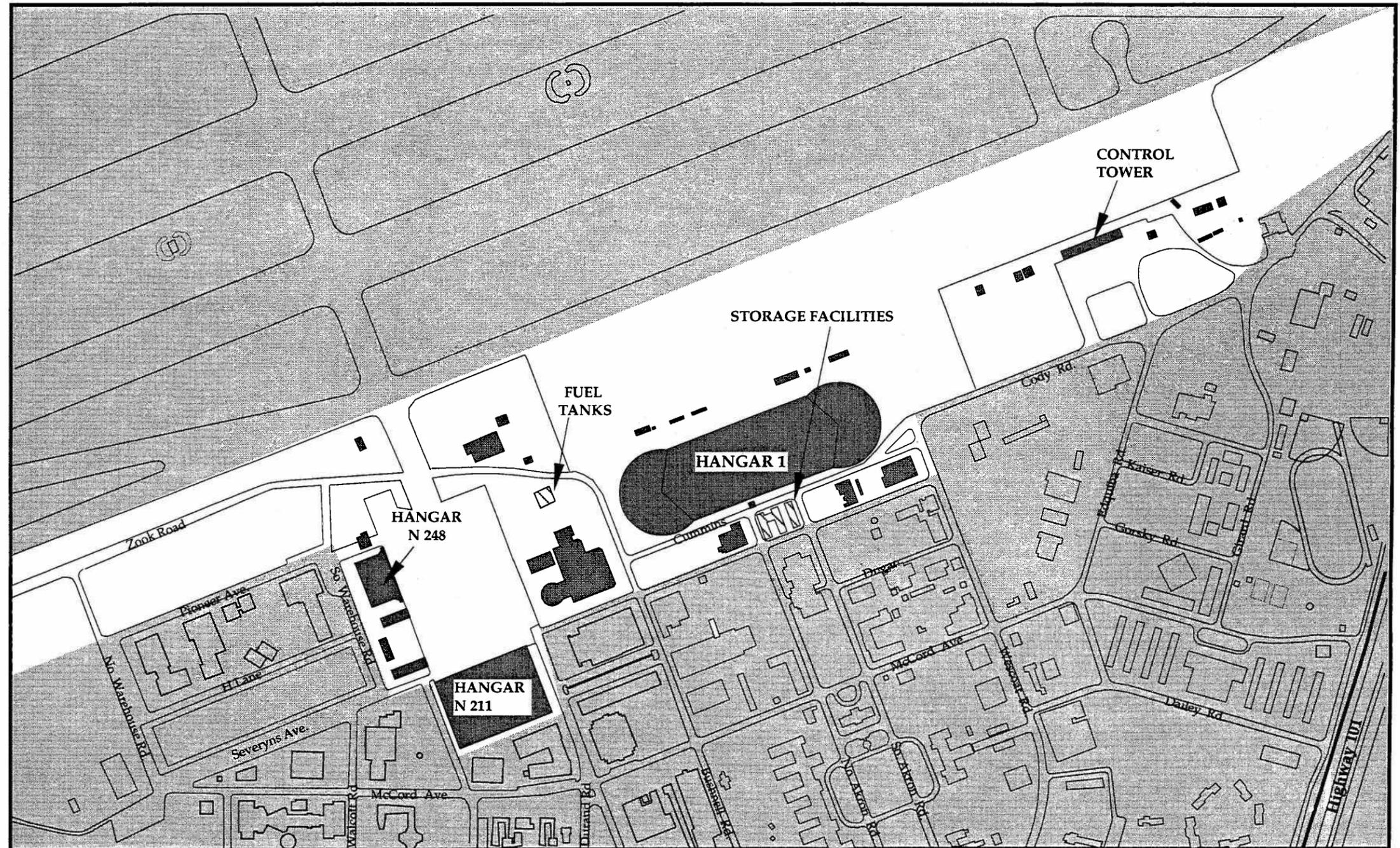
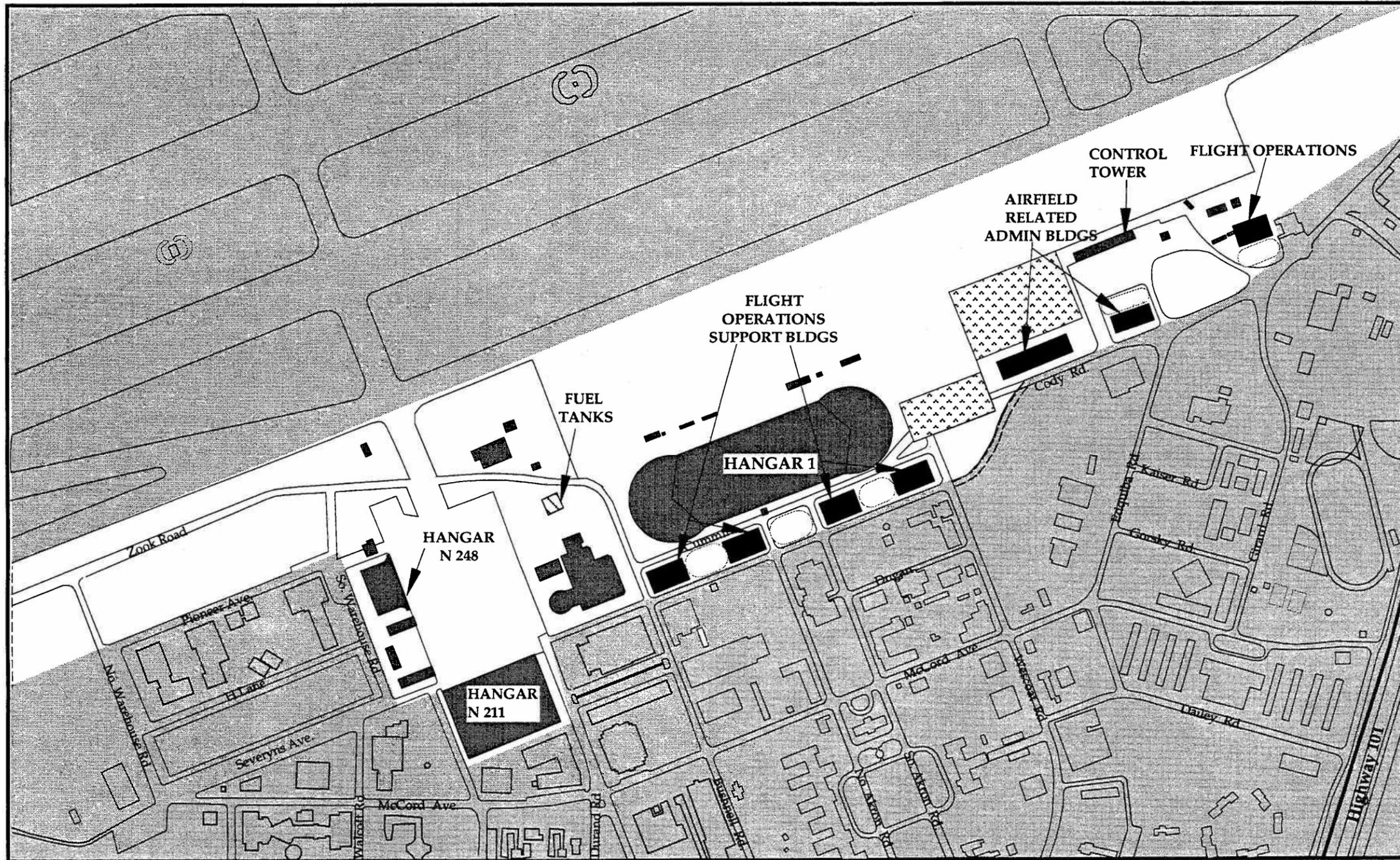


Figure 5-9: Planning Area 3, Concept 1

	<p>151 Acres</p>	<p>KEY</p>	<p>SUMMARY</p>
		<p> EXISTING BUILDINGS</p> <p> UPGRADE/CHANGED USE</p>	<ul style="list-style-type: none"> • No new construction • 15 fewer personnel • Floor area ratio maintained at 0.10

**PLANNING AREA 3
AIRFIELD SUPPORT WEST**



Future Concept 2:

- Four new 14,000 sq. ft. flight operations-support buildings plus associated parking
- Expanded ramp (5 acres) for apron parking and for large aircraft maneuvering into Hangar 1
- Three new buildings totaling 47,800 sq. ft. near traffic control tower, related to flight operations and airfield administration
- Demolition of 34,367 sq. ft. of non-contributory structures
- 105,600 total new construction

Concept Comparison Summary Table

	Building Sq. Ft.	Personnel ^A	Floor Area Ratio
Existing	804,500	1,070	0.12
Loss ^B	F.C. 1	0	-15
	F.C. 2	34,400	45
Gain ^C	F.C. 1	0	0
	F.C. 2	105,600	140
Total	F.C. 1	804,500	1,055
	F.C. 2	875,700	1,165

Figure 5-10: Planning Area 3, Concept 2

151 Acres

KEY

- REMAINING BUILDINGS
- NEW BUILDINGS
- NEW AIRCRAFT RAMP
- UPGRADE/CHANGED USE
- NEW PARKING AREAS

SUMMARY

- 70,900 sq. ft. net new buildings
- 95 additional personnel
- 8% increase in density with a floor area ratio of 0.13, compared to current ratio of 0.12

F.C. = Future Concept

^A Personnel based on planning area capacity for type of building use

^B Loss = Demolition of substandard buildings/reduction of personnel

^C Gain = New construction/added personnel

**PLANNING AREA 4
ADMINISTRATION**

Planning Area 4 is the location of the major administration facilities. Included in this area are the Shenandoah Plaza, the Ames Administrative Circle and the former Navy barracks. Most administrative uses will be concentrated here with an emphasis on the preservation of existing buildings and landscaping.

While no demolition of historic structures is planned for this area, any future modification or change to contributing elements shall be reviewed according to Section 106 of the National Historic Preservation Act. Demolition of any non-contributing buildings over 50 years in age shall also be reviewed, until a programmatic Agreement with the State Historic Preservation Office is in place.

Future Concept 1:

- New 18,600 sq. ft. building on southwest side of Ames Circle to accommodate increased administrative activities
- Keep the existing architectural style and massing in Shenandoah Plaza to preserve the historic integrity of the district
- No demolition

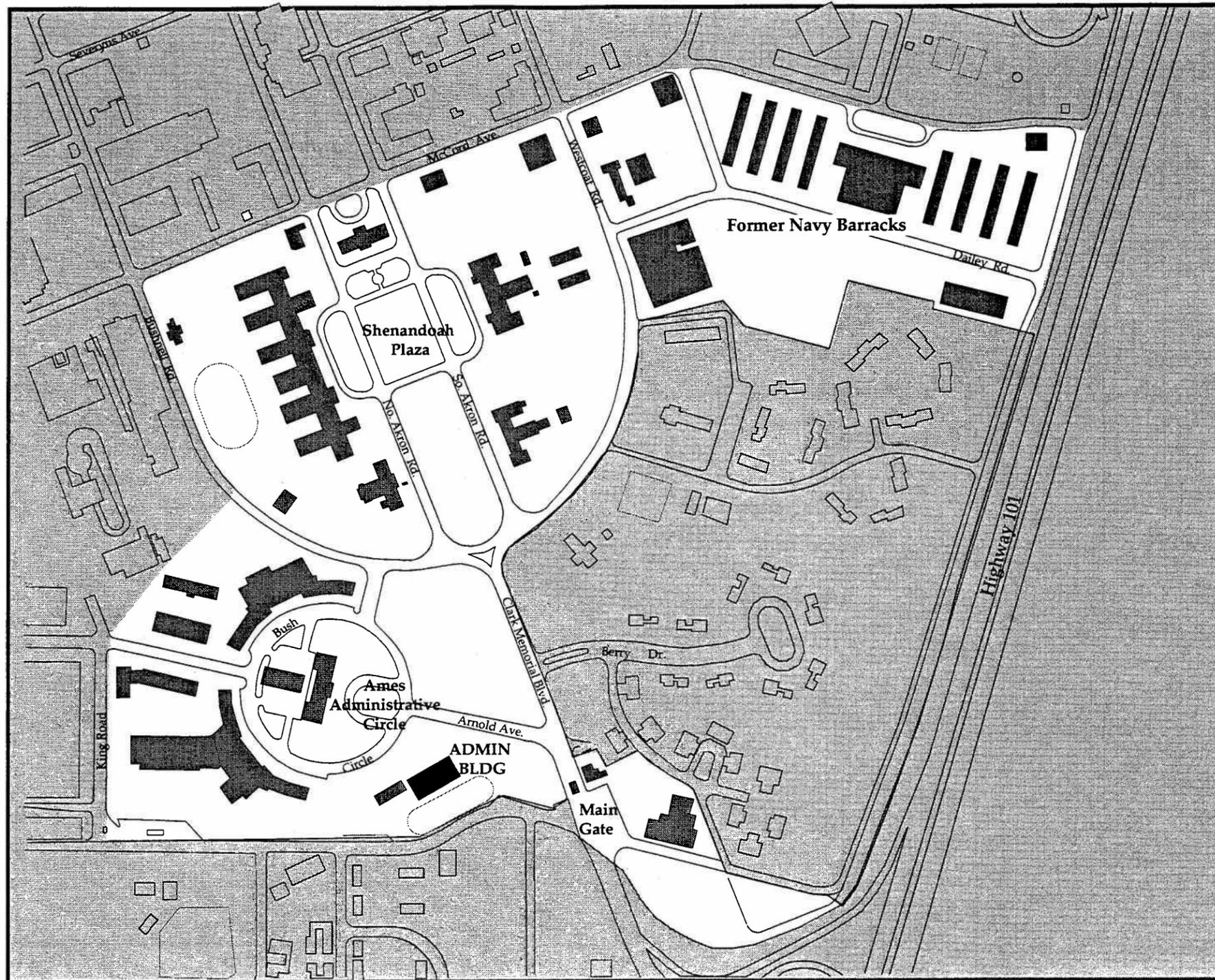


Figure 5-11: Planning Area 4, Concept 1

	<p>82 Acres</p>	<p>KEY</p>	<p>SUMMARY</p>
		<p>■ EXISTING BUILDINGS</p>	<ul style="list-style-type: none"> • 18,600 sq. ft. total new construction
		<p>■ NEW BUILDINGS</p> <p>○ NEW PARKING AREAS</p>	<ul style="list-style-type: none"> • 75 additional personnel • 5% increase in density with a floor area ratio of 0.22, compared with current ratio of 0.21

**PLANNING AREA 4
ADMINISTRATION**

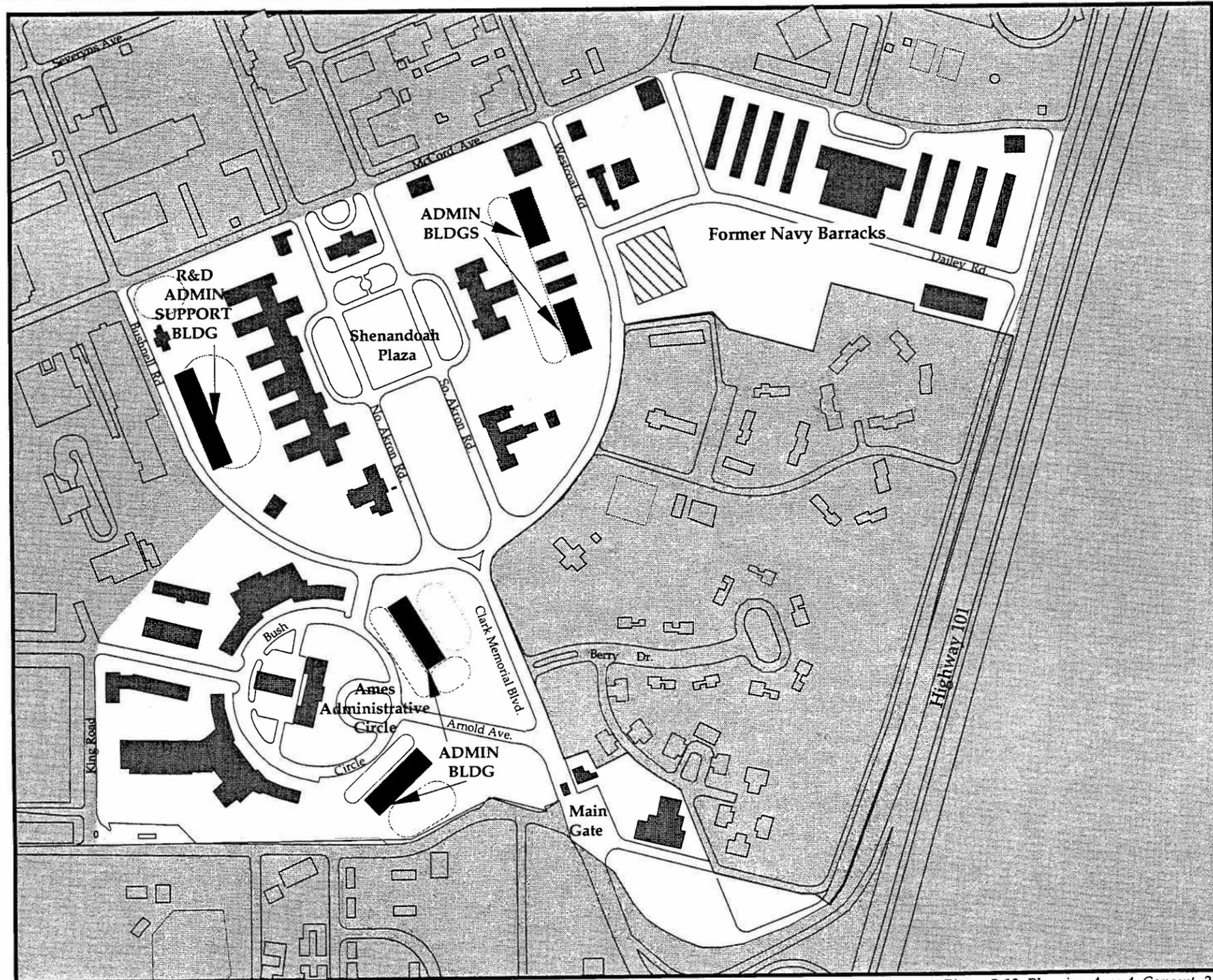


Figure 5-12 Planning Area 4, Concept 2

Future Concept 2:

- Increased density on periphery of Shenandoah Plaza, in keeping with existing architectural style and massing
- Two 21,400 sq. ft. buildings (2 story) along Westcoat Road plus additional parking to accommodate an increase in Resident Agencies administrative activities
- Existing Navy Exchange building would be remodeled and possibly expanded to accommodate additional Resident Agencies administrative activities. The Navy Exchange would be relocated to Planning Area 6, Concept 2
- One 34,000 sq. ft. building plus additional parking would be built along Bushnell Road to accommodate an increase in R&D-related administrative activities
- Two 27,200 sq. ft. buildings would be constructed along Ames Circle for R&D-related administrative activities. New construction would mirror existing buildings to preserve the character of the area and the landscaping along Clark Memorial Blvd. One of the buildings would incorporate the existing Badge and ID Office
- Demolition of approximately 560 sq. ft. of non-contributory structures
- 160,800 sq. ft. of total new construction

Concept Comparison Summary Table

		Building Sq. Ft.	Personnel ^A	Floor Area Ratio
Existing		775,000	3,100	0.21
Loss ^B	F.C. 1	0	0	
	F.C. 2	600	0	
Gain ^C	F.C. 1	18,600	75	
	F.C. 2	160,800	645	
Total	F.C. 1	793,600	3,175	0.22
	F.C. 2	935,200	3,745	0.26

82 Acres

KEY

- REMAINING BUILDINGS
- NEW BUILDINGS
- UPGRADE/CHANGED USE
- NEW PARKING AREAS

SUMMARY

- 160,200 sq. ft. net new construction
- 645 additional personnel
- 24% increase in density with a floor area ratio of 0.26, compared with current ratio of 0.21

**PLANNING AREA 5
INSTITUTIONAL SUPPORT**

Planning Area 5 is located next to the flight operations area of Hangar 1 and the administrative activities located in Shenandoah Plaza. Institutional support facilities will be retained and consolidated in the southern half of this planning area. New research and development-related activities will be expanded into the northern half of the site, adjacent to Ames Research Center.

Buildings considered dilapidated or of little value would be demolished to make way for new construction. While no demolition of historic structures is planned for this area, any future modification or change to contributing elements shall be reviewed according to Section 106 of the National Historic Preservation Act.

Future Concept 1:

- Reorganization of the site to improve it to full utilization, keeping the most useful and architecturally significant buildings
- 5,000 sq. ft. MEW ground water treatment plant
- Central steam boiler plant will be shut down and individual boilers installed throughout the Moffett site; the facility will be renovated for other institutional activities
- Admiral Moffett Banquet Center will be renovated for a NASA and Resident Agency training facility
- 31,600 sq. ft. of R&D Support Facility would replace dilapidated and architecturally insignificant structures
- Reuse/remodel of existing buildings for support functions
- Demolish 46,100 sq. ft. of non-contributory structures
- 36,600 sq. ft. of total new construction

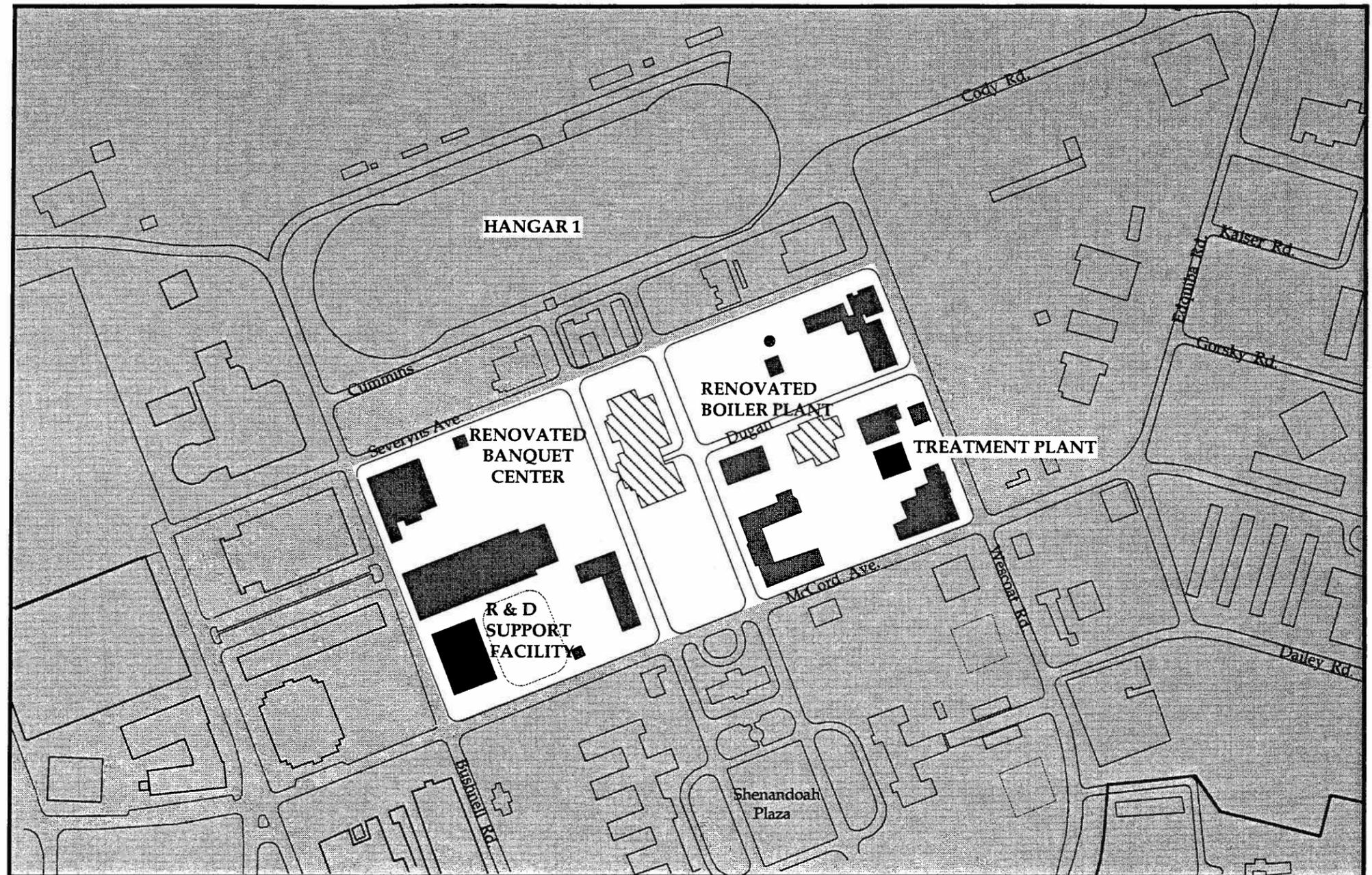


Figure 5-13: Planning Area 5, Concept 1

		KEY REMAINING BUILDINGS	SUMMARY <ul style="list-style-type: none"> • 9,500 sq. ft. fewer buildings • 20 fewer personnel • 4% decrease in density with a floor area ratio of 0.26, compared with current ratio of 0.27
		NEW BUILDINGS	
		UPGRADE/CHANGED USE	
		NEW PARKING AREAS	

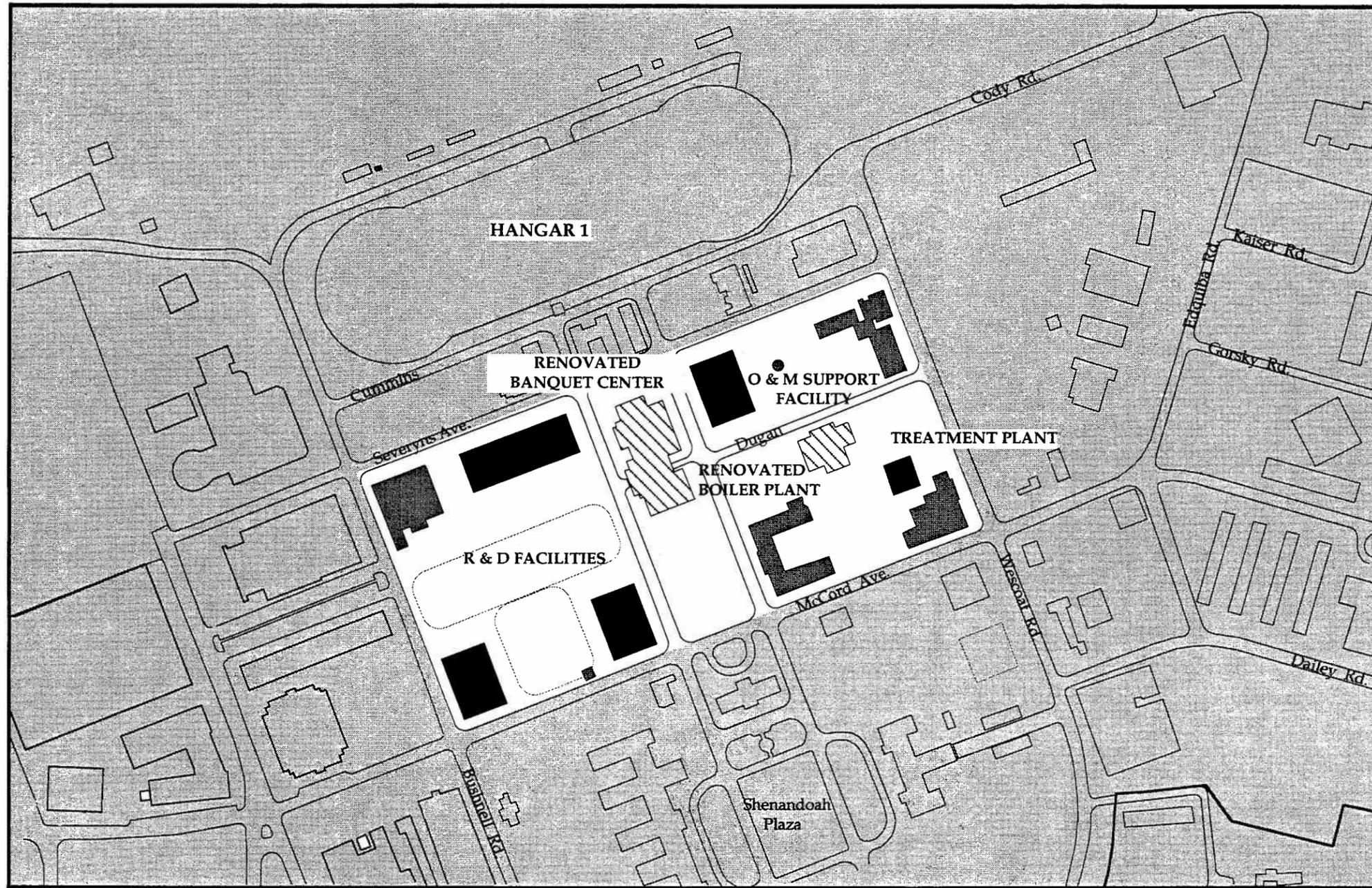


Figure 5-14: Planning Area 5, Concept 2

PLANNING AREA 5 INSTITUTIONAL SUPPORT

Future Concept 2

Same new construction as Future Concept 1, with the addition of the following:

- One new 15,800 sq. ft. operation and maintenance support facility
- Two new R&D facilities (both two story), totaling 81,000 sq. ft., would be constructed in the northern half of this planning area
- Demolition of 113,200 sq. ft. of non-contributory structures
- 134,000 sq. ft. of total new construction

Concept Comparison Summary Table

	Building Sq. Ft.	Personnel ^A	Floor Area Ratio
Existing	232,800	515	0.27
Loss^B	F.C. 1	46,100	100
	F.C. 2	113,200	250
Gain^C	F.C. 1	36,600	80
	F.C. 2	134,000	295
Total	F.C. 1	223,300	495
	F.C. 2	253,600	560
			0.26
			0.29

F.C. = Future Concept

^A Personnel based on planning area capacity for type of building use

^B Loss = Demolition of substandard buildings/reduction of personnel

^C Gain = New construction/added personnel

20 Acres

KEY

- REMAINING BUILDINGS
- NEW BUILDINGS
- UPGRADE/CHANGED USE
- NEW PARKING AREAS

SUMMARY

- 20,800 sq. ft. net new buildings
- 70 additional personnel
- 7% increase in density with a floor area ratio of 0.29, compared with current ratio of 0.27

**PLANNING AREA 6
PERSONNEL SERVICES**

Planning Area 6 contains a mix of uses, with military personnel-related services as the predominant use. Service and recreational facilities will be concentrated in this area through a reorganization of underutilized sites and new development. Motorpool activities will be consolidated in this planning area.

Future Concept 1:

- New construction and reorganization of Personnel Service facilities will be in the block bounded by Cody Road, Edquiba Road, McCord Avenue and Westcoat Road
- This Personnel Service core will include a new 60,000 sq. ft. Commissary and existing Military Exchange, Credit Union, and fast food restaurant. Bowling alley will be converted to other uses. Expanded and reorganized parking would also be constructed.
- 34,000 sq. ft. of consolidated motor pool with central parking.
- Proposed new light rail station adjacent to Planning Area 6
- Demolition of 28,700 sq. ft. of substandard buildings
- 95,700 sq. ft. of total new construction

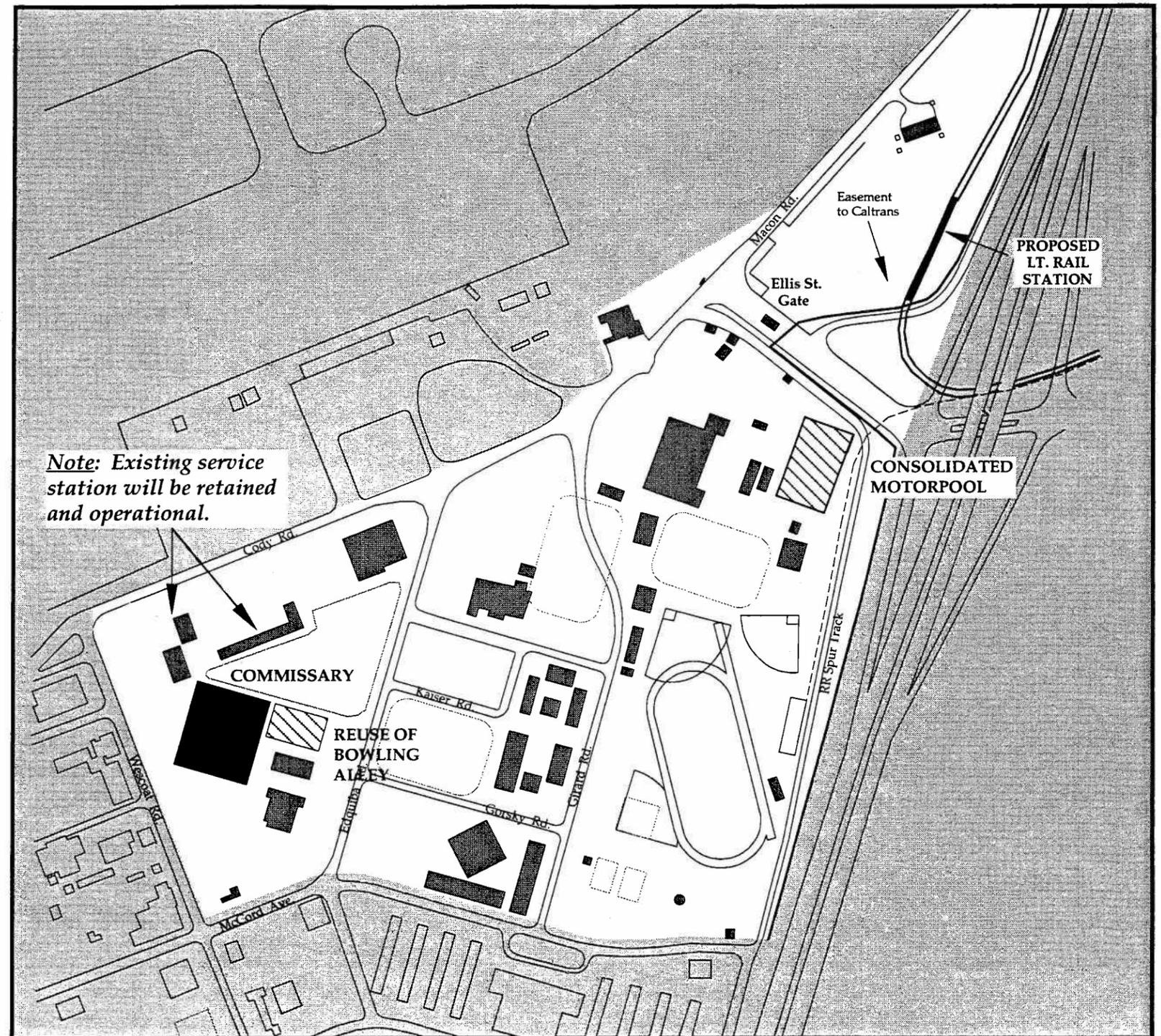
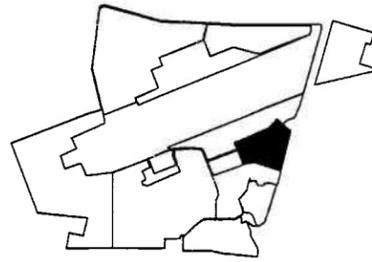
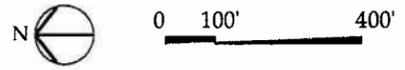


Figure 5-15: Planning Area 6, Concept 1

	<p>85 Acres</p> 	<p>KEY</p> <p> REMAINING BUILDINGS</p> <p> NEW BUILDINGS</p> <p> UPGRADE/CHANGED USE</p> <p> NEW PARKING AREAS</p>	<p>SUMMARY</p> <ul style="list-style-type: none"> • 64,900 sq. ft. net new buildings • 130 additional personnel • 22% increase in density with a floor area ratio of 0.11, compared to current ratio of 0.09
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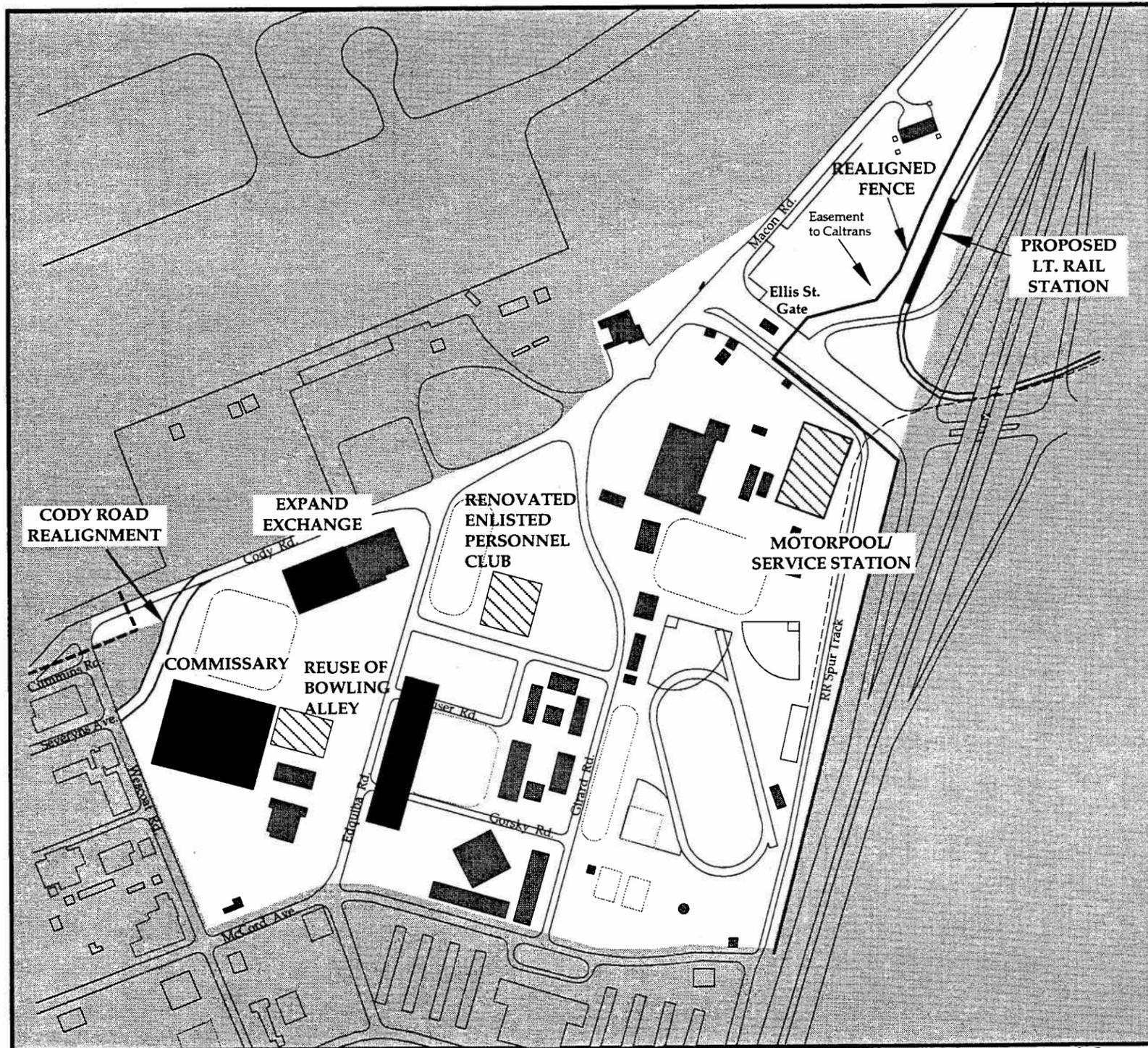


Figure 5-16: Planning Area 6, Concept 2

**PLANNING AREA 6
PERSONNEL SERVICES**

Future Concept 2:

Same new construction as Future Concept 1, with the following exceptions:

- 70,000 sq. ft. Commissary (expanded version) plus additional parking
- Cody Road realignment for better aircraft access to Hangar 1
- 31,000 sq. ft. Military Exchange to be removed from Planning Area 4 and added to the Exchange of this area
- 48,000 sq. ft. military-related Personnel Services complex along Edquiba Road (1 story)
- 32,000 sq. ft. renovation of existing Enlisted Personnel Club and restaurant
- Demolition of 43,300 sq. ft. of substandard buildings
- 205,000 sq. ft. total new construction

Concept Comparison Summary Table

		Building Sq. Ft.	Personnel ^A	Floor Area Ratio
Existing		345,200	690	0.09
Loss ^B	F.C. 1	30,800	60	
	F.C. 2	43,300	85	
Gain ^C	F.C. 1	95,700	190	
	F.C. 2	205,000	410	
Total	F.C. 1	410,100	820	0.11
	F.C. 2	506,900	1,015	0.14

F.C. = Future Concept

^A Personnel based on planning area capacity for type of building use

^B Loss = Demolition of substandard buildings/reduction of personnel

^C Gain = New construction/added personnel

85 Acres

KEY

- REMAINING BUILDINGS
- NEW BUILDINGS
- UPGRADE/CHANGED USE
- NEW PARKING AREAS

SUMMARY

- 161,700 sq. ft. net new buildings
- 325 additional personnel
- 55% increase in density with a floor area ratio of 0.14, compared with current ratio of 0.09

**PLANNING AREA 7
ADMINISTRATION
AND TRAINING**

Planning Area 7 contains administrative uses and training for the flight operations. It is located adjacent to the Airfield Support East planning area. In the future, these uses will expand in this area, as future development and expansion related to administration and training becomes necessary.

Future Concept 1:

- 16,400 sq. ft. single story, administration and training facility, with associated parking.
- Demolition of one 29,400 sq. ft. building to be replaced by an outdoor, landscaped personnel support area and parking lot
- 16,400 sq. ft. total new construction

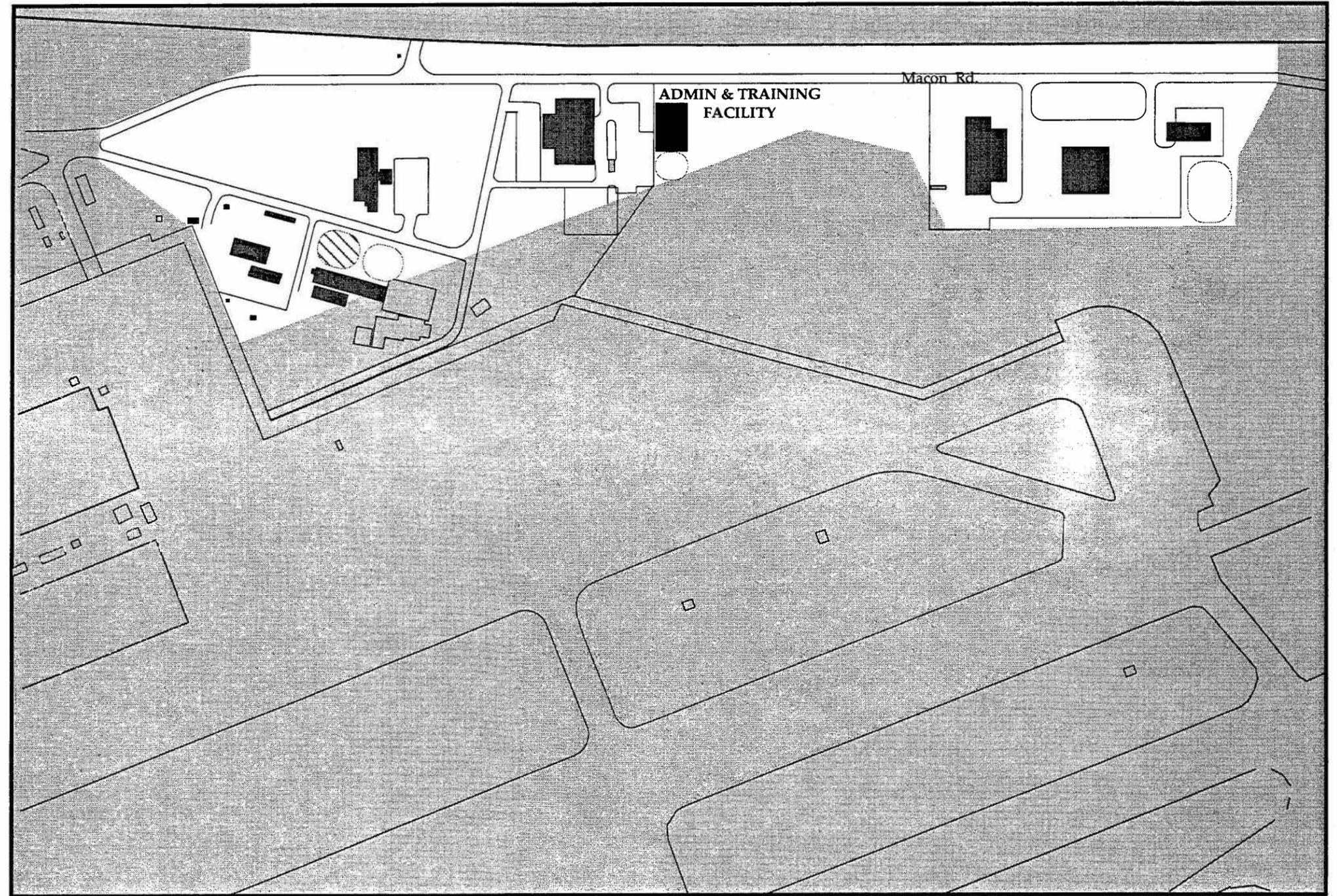
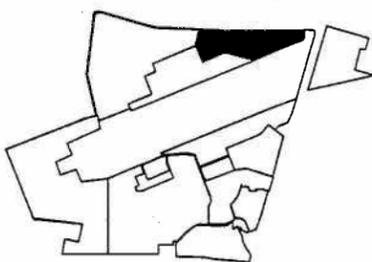
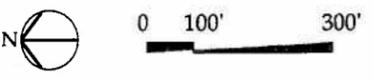


Figure 5-17: Planning Area 7, Concept 1

	<p>50 Acres</p> <p>0 100' 300'</p> 	<p>KEY</p>	<p>SUMMARY</p>
		<ul style="list-style-type: none">  REMAINING BUILDINGS  NEW BUILDINGS  UPGRADE/CHANGED USE  PARKING AREAS 	<ul style="list-style-type: none"> • 13,000 sq. ft. net reduction in buildings • 50 fewer personnel • 13% decrease in density with a floor area ratio of 0.06, compared to current ratio of 0.07

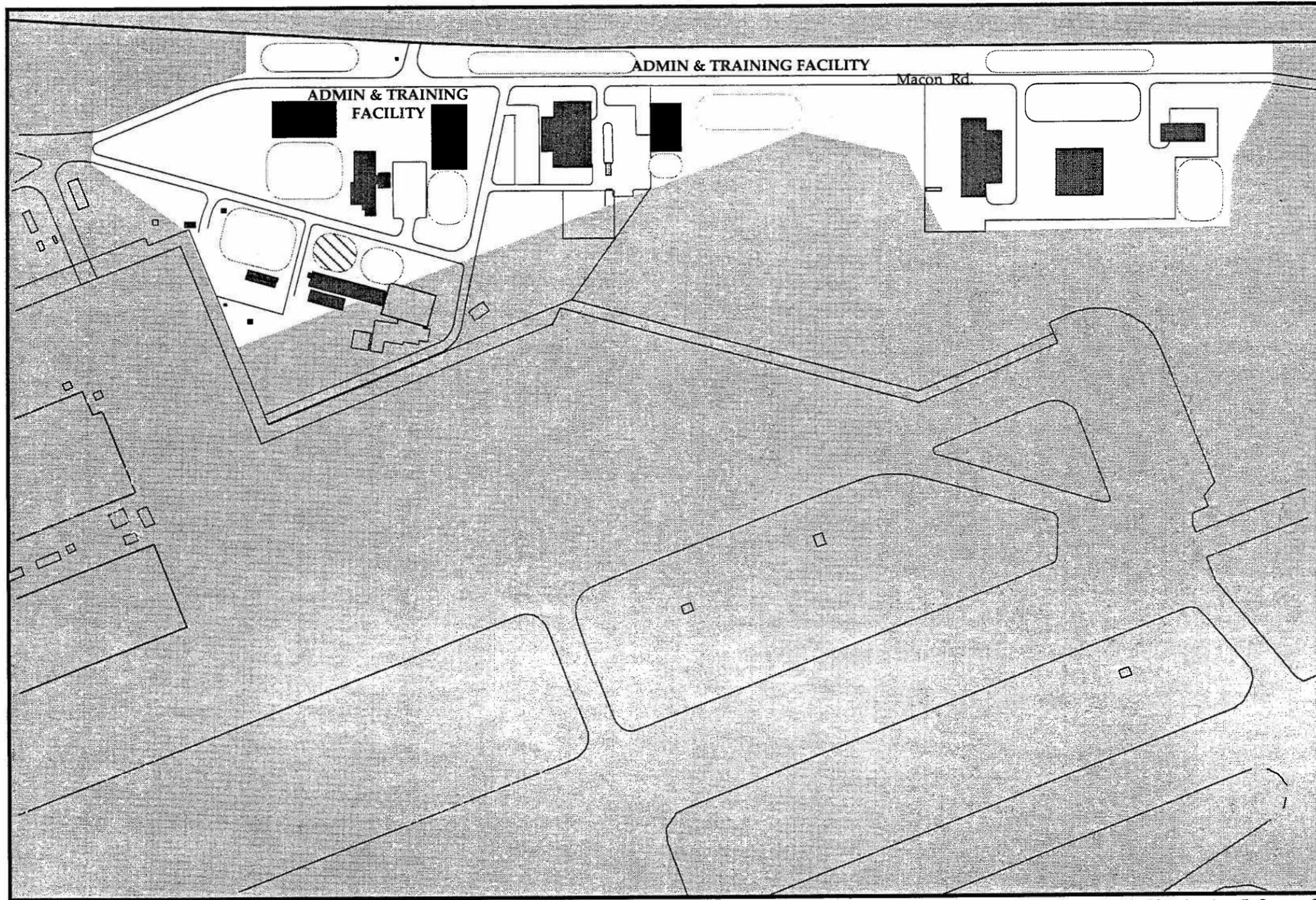


Figure 5-18: Planning Area 7, Concept 2

PLANNING AREA 7 ADMINISTRATION AND TRAINING

Future Concept 2:

- In addition to the development in Concept 1, two 24,400 sq. ft., double story, administration and training facilities will be constructed
- Construction of parking lots on east side of Macon Road
- Demolition of various structures related to fueling operations, such as aircraft ready fuel storage and tank truck unloading facilities, to make way for expanded parking
- Demolition of one 29,400 sq. ft. building to be replaced by an outdoor, landscaped personnel support area and parking lot
- 65,200 sq. ft. total new construction

Concept Comparison Summary Table

		Building Sq. Ft.	Personnel ^A	Floor Area Ratio
Existing		157,900	630	0.07
Loss^B	F.C. 1	29,400	115	
	F.C. 2	29,400	115	
Gain^C	F.C. 1	16,400	65	
	F.C. 2	65,200	260	
Total	F.C. 1	144,900	580	0.06
	F.C. 2	193,700	775	0.09

F.C. = Future Concept

^A Personnel based on planning area capacity Ffor type of building use

^B Loss = Demolition of substandard buildings/ reduction of personnel

^C Gain = New construction/added personnel

KEY

- REMAINING BUILDINGS
- NEW BUILDINGS
- UPGRADE/CHANGED USE
- NEW PARKING AREAS

SUMMARY

- 35,800 sq. ft. net new buildings
- 145 additional personnel
- 28% increase in density with a floor area ratio of 0.09, compared with current ratio of 0.07

50 Acres

0 100' 300'

**PLANNING AREA 8
RESTRICTED/
LIMITED DEVELOPMENT**

Planning Area 8 provides a buffer zone for ordnance storage and has an 18 hole golf course. Located the farthest from the entrance gates, this area is relatively inaccessible. Explosive safety arcs will limit development and restrict access.

Future Concept 1:

- Limited development will include expanded and consolidated operations and maintenance facilities, warehousing, fueling operations, and air operations-related facilities
- Approximately 13 acres of new fuel farm including fuel supply pipelines and an 11,000 sq. ft. office would be built. This development would be located outside of the explosive safety arcs. Development of the new fuel farms would require site-specific environmental analysis prior to construction, in conformance with California Underground Storage Tank regulations. If the new fuel farm is not constructed, the existing fuel farm will be retrofitted to comply with the above- mentioned regulations including additional environmental analysis under NEPA.
- Golf course would be retained in its current configuration
- Demolish approximately 8,300 sq. ft. of substandard buildings
- 11,000 sq. ft. total new construction

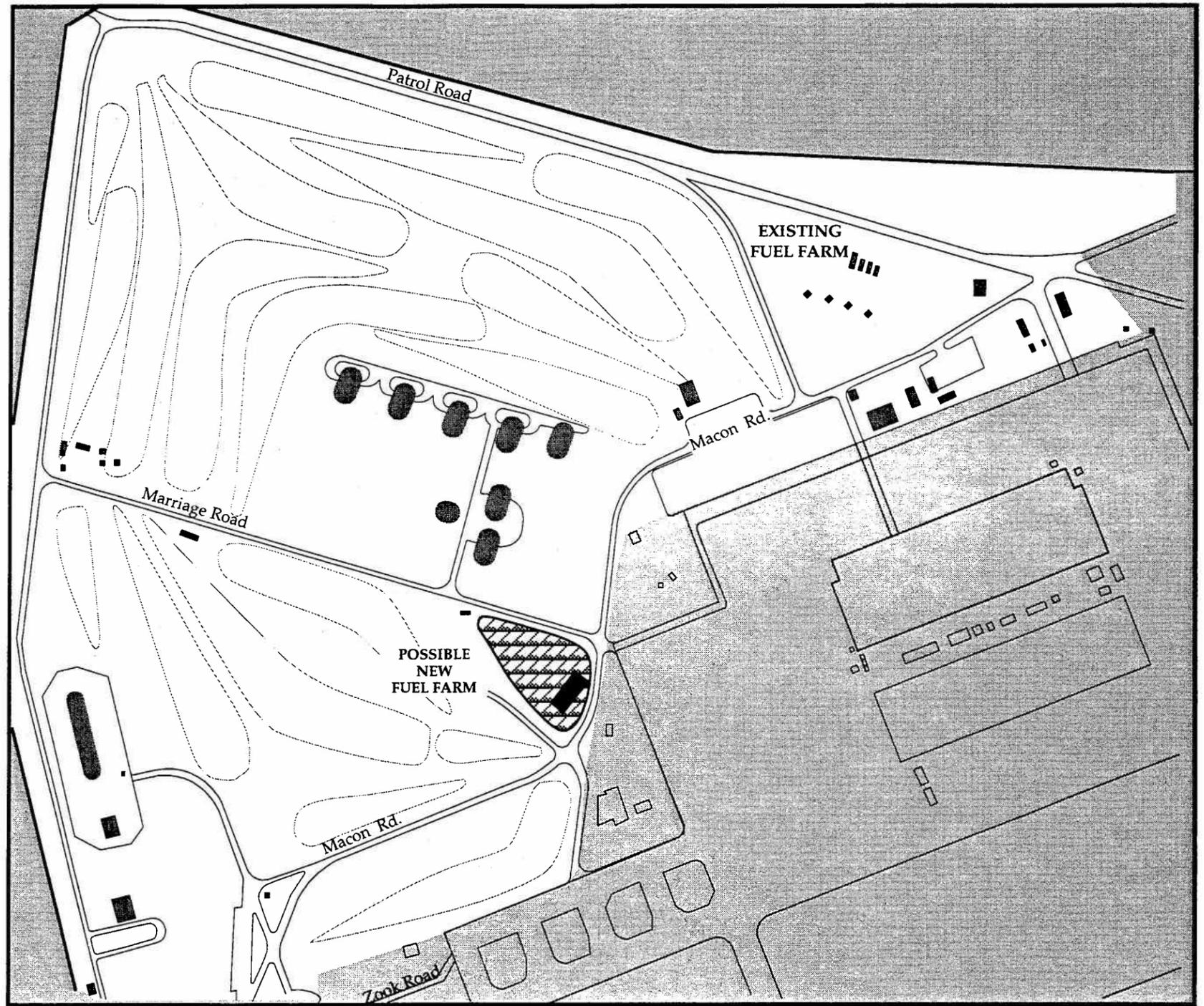


Figure 5-19: Planning Area 8, Concept 1

	<p>248 Acres</p>	<p>KEY</p>	<p>SUMMARY</p>
		<p> REMAINING BUILDINGS</p> <p> NEW BUILDINGS</p>	<ul style="list-style-type: none"> • 2,700 sq. ft. net new buildings • 5 additional personnel • Floor area ratio maintained at 0.01

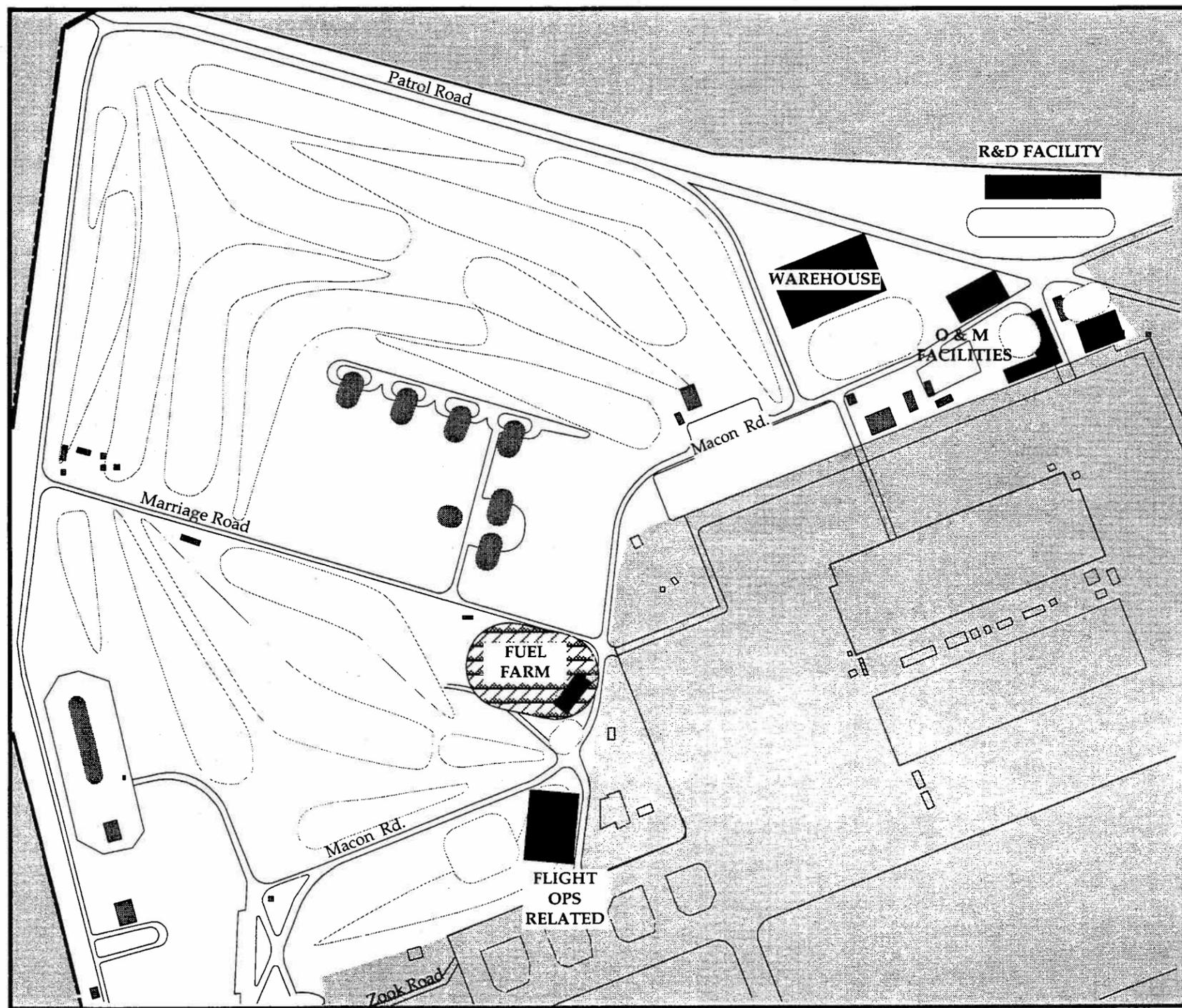


Figure 5-20: Planning Area 8, Concept 2

**PLANNING AREA 8
RESTRICTED/
LIMITED DEVELOPMENT**

Future Concept 2:

- Three institutional support (O&M) facilities totaling 75,700 sq. ft., and expanded parking.
- 87,000 sq. ft. research and development facility (2-story), containing office and lab space
- 150,000 sq. ft. warehouse (2-story) with associated parking
- New fuel farm and office to be built near corner of Macon Road and Marriage Road, outside of explosive safety arcs
- 57,300 sq. ft. flight operation-related building plus associated parking
- Demolish 10,700 sq. ft. total
- 355,300 sq. ft. total new construction

Concept Comparison Summary Table

		Building Sq. Ft.	Personnel ^A	Floor Area Ratio
	Existing	60,700	120	0.01
Loss ^B	F.C. 1	8,300	15	
	F.C. 2	10,700	20	
Gain ^C	F.C. 1	11,000	20	
	F.C. 2	355,300	710	
Total	F.C. 1	63,400	125	0.01
	F.C. 2	405,300	810	0.04

F.C. = Future Concept

^A Personnel based on planning area capacity for type of building use

^B Loss = Demolition of substandard buildings/ reduction of personnel

^C Gain = New construction/added personnel

248 Acres

KEY

- REMAINING BUILDINGS
- NEW BUILDINGS
- NEW PARKING AREAS

SUMMARY

- 344,600 sq. ft. net new buildings
- 690 additional personnel
- 300% increase in density with a floor area ratio of 0.04, when compared with current ratio of 0.01

**PLANNING AREA 9
RESEARCH & DEVELOPMENT**

Planning Area 9 includes unique research and development facilities of national importance in fields such as advanced flight simulation, development of short-haul aircraft technology, theoretical and experimental fluid mechanics, study of planetary atmospheres, airborne sciences and applications, human-factors technology for space vehicles and aircraft and life-sciences research.

Future Concept 1:

- A major new wind tunnel complex and supporting activities, approximately 700,000 sq. ft. in size and requiring 40 acres, may be developed in this area. Environmental analysis of any new wind tunnel facilities will be conducted prior to construction. If approved, 200 additional wind tunnel support personnel would be required.
- Additional 90,000 sq. ft. of R&D facilities, including:
 - New construction of support facilities related to wind tunnel preparation and pre-testing
 - New life science and support facilities
- Grid pattern of roads extended, with some existing roads widened and improved
- A new bridge over Stevens Creek to align with Charleston Road in Mountain View. The bridge would be designed to limit channel modification and erosion, siltation and pollutants in the vicinity of Stevens Creek.
- A new North Gate, to be used primarily by NASA Ames employees
- Demolition and relocation of the Outdoor Aeronautics Research Facility, a telecommunications facility, and trailers currently on the site
- No growth in personnel anticipated; new facilities to be staffed through realignment of current assignments
- 790,000 sq. ft. of total new construction

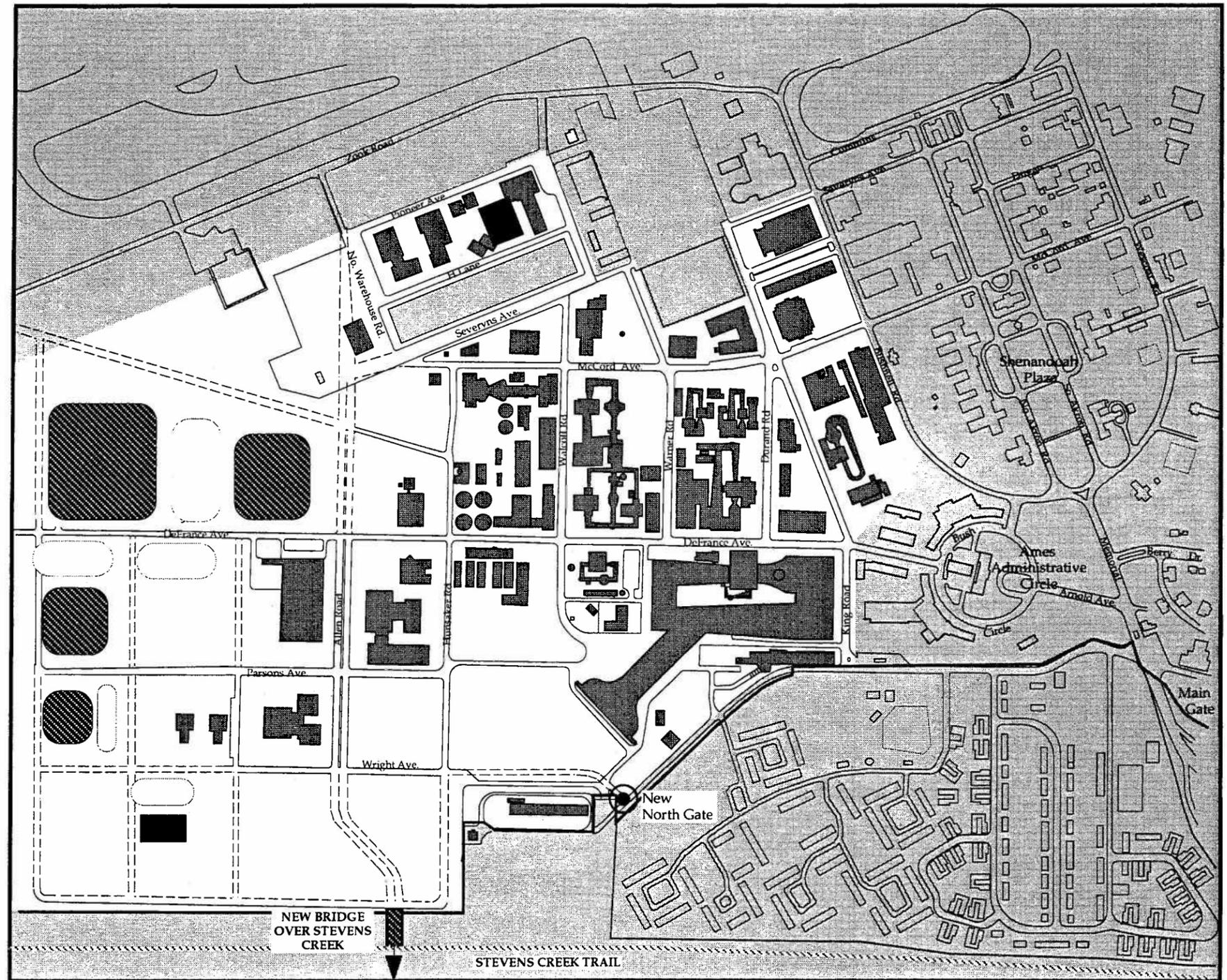


Figure 5-21: Planning Area 9, Concept 1

	<p>274 Acres</p> <p>N</p>	<p>KEY</p>	<p>SUMMARY</p>
		<ul style="list-style-type: none"> REMAINING BUILDINGS NEW BUILDINGS PROPOSED WIND TUNNEL FACILITIES NEW PARKING AREAS 	<ul style="list-style-type: none"> • 790,000 sq. ft. of total new construction • No additional personnel • 200 additional personnel for Wind Tunnel, if approved • 32% increase in density with a floor area ratio of 0.25, compared with current ratio of 0.19

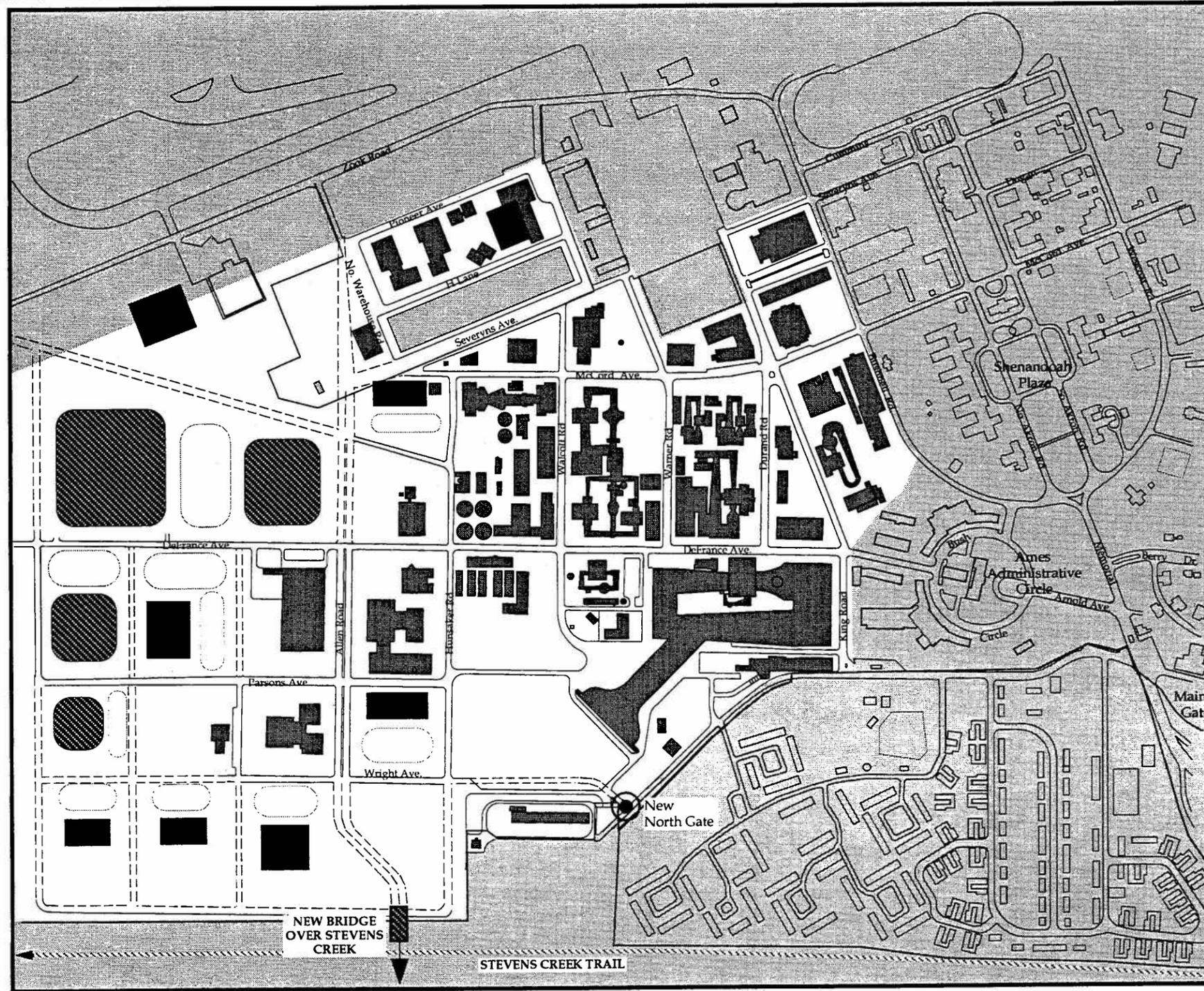


Figure 5-22: Planning Area 9 Concept 2

PLANNING AREA 9 RESEARCH & DEVELOPMENT

Future Concept 2:

- In addition to the development of Concept 1, approximately 410,000 sq. ft. of R&D and support facilities, including a model shop and storage area, airborne science support facilities, life science laboratories, and additional preparation and pre-test capability for existing wind tunnels would be constructed.
- The increased increment of development from Concept 1 would include additional personnel to support the expansion of R&D activities.
- Environmental analysis of any new or modified wind tunnel facility will be conducted prior to construction. All feasible noise attenuation will be implemented.
- Prior to construction of a Stevens Creek bridge, a traffic analysis would be done in cooperation with the City of Mountain View.

Concept Comparison Summary Table

		Building Sq. Ft.	Personnel ^A	Floor Area Ratio
	Existing	2,246,200	4,500	0.19
Loss ^B	F.C. 1	0	0	
	F.C. 2	0	0	
Gain ^C	F.C. 1	790,000	0	
	F.C. 2	1,190,000	820	
Total	F.C. 1	3,036,200	40,500	0.25
	F.C. 2	3,436,200	5,320	0.29

F.C. = Future Concept

^A Personnel based on planning area capacity per building use

^B Loss = Demolition of substandard buildings/ reduction of personnel

^C Gain = New construction/added personnel

274 Acres

KEY

- REMAINING BUILDINGS
- NEW BUILDINGS
- PROPOSED WIND TUNNEL FACILITIES
- NEW PARKING AREAS

SUMMARY

- 1,190,000 sq. ft. total new construction
- 820 additional personnel
- 200 additional personnel for Wind Tunnel, if approved
- 52% increase in density with a floor area ratio of 0.29, compared with current ratio of 0.19

**PLANNING AREA 10
WETLANDS & OPEN SPACE**

The northern edge of the site contains the airfield clearance zone, wetland and non-wetland areas, salt flats, numerous levees, and various safety easements. A pistol range, currently not in use, is also located here. It may be rebuilt by a Resident Agency in the future. There are no changes planned for the wetlands and open space area, with preservation as the main focus.

Future Concepts 1 and 2

Minimal development is planned by NASA in this area under either future concept. However, in cooperation with the South Bay Ad Hoc Committee of the San Francisco Bay Trail Project, NASA will allow implementation of a northern and/or southern alignment of the Bay Trail through Moffett Field to the maximum extent feasible. NASA will allow phasing of the Bay Trail improvements as the obstacles are removed.

A security/rescue training facility may be constructed near the pistol range location. Environmental review will occur prior to the development of these projects.

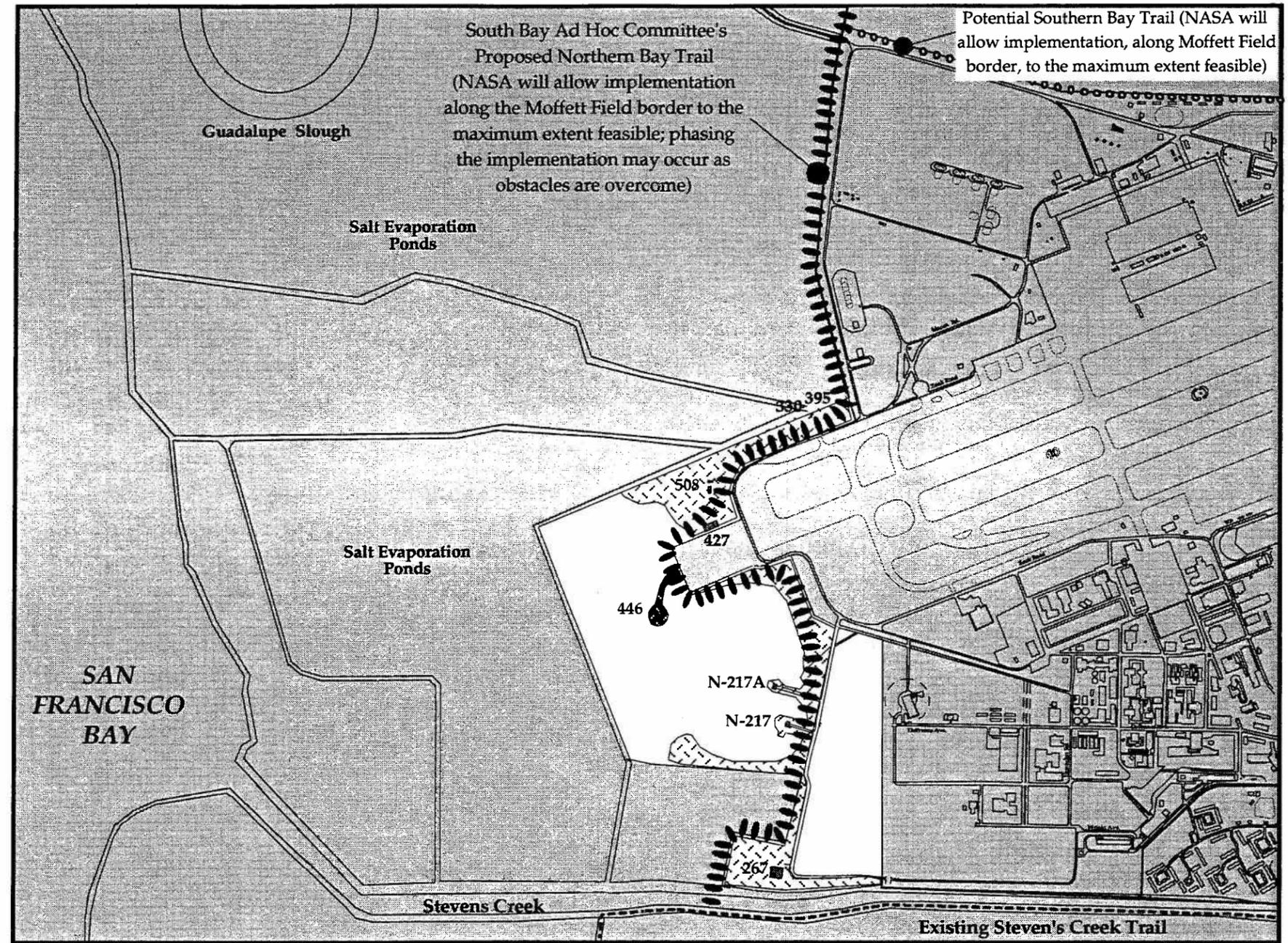
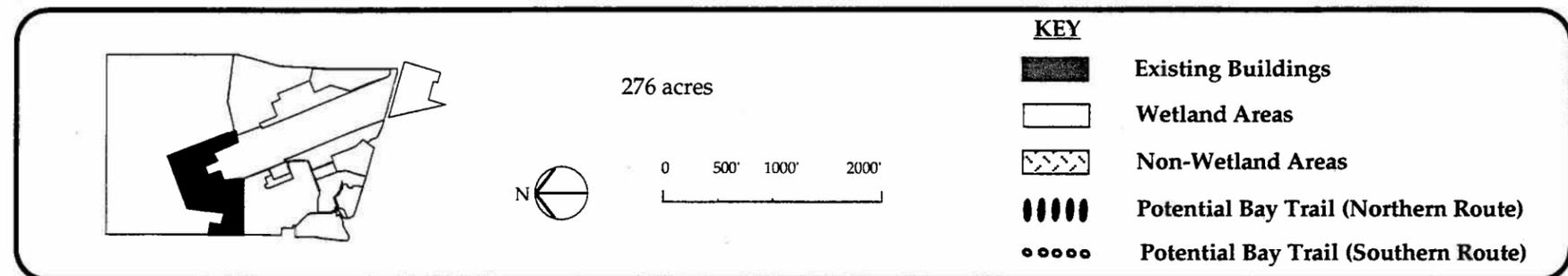


Figure 5-23: Planning Area 10, Future Concepts





Aerial View of Moffett Field and the Surrounding Area

- 6.1 Comparison Criteria*
- 6.2 Preferred Alternative*
- 6.3 Summary and Conclusion*

6.0 Preferred Alternative

6.0 Preferred Alternative

In this chapter, comparison criteria are identified and Future Concepts 1 and 2 are compared for selection as the preferred concept and as a no-action alternative.

6.1 Comparison Criteria

As noted in Chapter 5, Future Concept 1 represents a view of Moffett Field as it may exist in the year 2010. This concept assumes growth and expansion that are similar to growth occurring at Moffett Field for the past several decades. It incorporates both planned construction of facilities projects until the year 1998, as well as some additional development that can be reasonably expected to occur by the year 2010. Future Concept 2, however, represents a more rapid and extensive growth. It has been used to represent the highest probable future level of activity at Moffett Field. The no-action alternative would maintain the current level of activities.

Criteria were identified to compare Future Concepts 1 and 2 in order to select the concept to be used by Ames Research Center in environmental, facilities and airport planning studies. The criteria are building density, population density, aviation traffic, automobile traffic, economic considerations, security, air quality, noise, environmental hazards, biologic resources and utilities and services.

Building Density

The total building square footage under Future Concept 1 would be approximately 6,705,000 versus 8,246,000 square feet for Future Concept 2. This represents a 19 percent and a 46 percent increase, respectively, compared to the current building density.

Future Concept 1 represents a more likely amount of total building density by the year 2010, whereas Future Concept 2 approaches a full development of the site while maintaining its current design characteristics (e.g. type and density of buildings).

The existing floor area ratio (FAR) at Moffett Field is approximately 0.13. The FAR under Future Concept 1 would be approximately 0.14, as compared to 0.17 for Future Concept 2. The FAR measure does not, however, take into consideration the military family housing area, the wetland and open space areas, or the airfield. Because Future Concept 1 involves fewer buildings than Future Concept 2, the resulting impacts on utilities and services, water runoff, and other environmental considerations would be less under Future Concept 1.

The no-action alternative would result in no new construction. Development would proceed at Moffett Field on a project by project basis.

Population Density

In order to assess the approximate population at Moffett Field by the year 2010, a series of building type-to-personnel ratios were attributed to each planning area. Based on these ratios, Future Concept 1 would have an approximate population of 10,600 people working at Moffett Field, whereas Future Concept 2 would have about 13,900 people. This represents a 6 percent and a 40 percent increase respectively, when compared with the existing population of 10,000. As a result of the fewer people at Moffett Field, Future Concept 1 would have less overall impacts on utilities and services, traffic, air quality and other environmental considerations.

In the no-action alternative employment would be expected to decrease from 10,000 to 7,000 with the departure of the Navy's civilian and active duty personnel.

Aviation Traffic

Future Concepts 1 and 2 are projected to have 80,000 aircraft operations in the year 2010. Since the aviation traffic may be similar under both concepts, any potential impact related to aviation traffic will also be the same. Although the number of aircraft operating out of Moffett Field may be the same in the future as in the past, it is possible that different types of aircraft will operate out of the airfield. A detailed analysis of aircraft operations will be the subject of the Airfield Master Plan.

Automobile Traffic

Automobile traffic would be less under Concept 1 than under Concept 2, due largely to fewer people commuting to and from Moffett Field. Under Concept 1, employment levels are expected to only increase slightly, from approximately 10,000 today to 10,610 by 2010, thereby having minimal traffic impacts.

Daily traffic levels within both concepts will be elevated when compared to existing traffic levels. Future traffic levels may be only slightly higher under Future Concept 1 than current levels due to implementation of alternative modes of transportation, continued use of NASA's Trip Reduction Program, road improvements, expanded site-wide shuttle bus system, and the planned Santa Clara County Transit light rail extension to Moffett Field.

Economic Considerations

Both Future Concepts 1 and 2 would have direct and indirect benefits for the local economy, with the latter having the most relative benefits. However, Future Concept 2 would have increased costs but may allow NASA and other Federal entities to consolidate activities at Moffett Field and thus allow the Federal Government to achieve a higher efficiency of operations.

Security

Since Moffett Field is to remain a closed Federal facility in the year 2010, security issues are less important under Future Concept 1. Future Concept 2 involves a slightly higher degree of public access and would result in additional security requirements.

Air Quality

Air quality in Future Concept 1 would be better than Future Concept 2, given the lower number of automobile trips and the fewer possible air pollution point sources at Moffett Field. By the year 2010 most of the older buildings built by the Navy will have their own heating system, rather relying on the central boiler plant, a potential point source of air pollution.

Noise

The largest contributors to noise at NASA Moffett Field are aviation and wind tunnel activities. Since the number of aircraft operations would be approximately the same under both concepts, the amount of noise generated would be similar in each case. Furthermore, since both concepts show new wind tunnel facilities, the amount of noise generated from these activities would be the same as well.

Environmental Hazards

Most environmental hazards at NASA Moffett Field would remain relatively innocuous when left undisturbed. Since Future Concept 1 involves fewer ground-disturbing construction activities than Concept 2, environmental hazards would be lessened.

Biological Resources

Due to the decreased building density and land coverage under Future Concept 1, there could be fewer impacts on biological systems, when compared with Future Concept 2. Neither concept, however, would have much of an impact on biological systems when compared to the existing conditions, since wetlands and open space would be preserved, and that no buildings or airfield ramp space would be constructed in areas of known biological sensitivity with either concept.

Utilities and Services

Infrastructure requirements would be lower in Future Concept 1 than in Future Concept 2, due to the lower number of personnel and facilities requiring utilities and services. Utility upgrades and extensions would be necessary under both scenarios, however, given the increase in overall density by the year 2010. Due to the addition of new wind tunnel facilities under both concepts, electricity consumption, could become an issue. The central steam plant will be phased out by the year 2010, requiring individual buildings to have individual heating systems.

6.2 Preferred Alternative

Future Concept 1 is the preferred alternative; it represents a suitable level of activities at Moffett Field in the year 2010. This concept assumes a level of expansion by NASA and the Resident Agencies similar to growth occurring at Moffett Field for the past several decades. It incorporates both planned facilities construction projects, until the year 1998, and some additional development that can be reasonably expected to occur by the year 2010. Future Concept 2, however, represents more rapid and extensive growth.

Future Concepts 1 and 2 were compared using the criteria discussed in Section 6.1 and shown in the adjacent table, Relative Effect of Future Concepts. The criteria were evaluated for each concept as "preferred" (i.e. preferred to the other Future Concept), "less preferred" (less preferred to the other Future Concept) and "no difference" (no difference between Future Concepts) based on their potential impact on operations, the environment, the quality of life and other aspects of each criterion.

In the table, the two Future Concepts are compared and Future Concept 1 is seen to have eight criteria evaluated as "preferred", and three as "no difference". Future Concept 2, conversely, has eight criteria evaluated as "less preferred" and three criteria as "no difference". Future Concept 1, therefore, is preferred relative to Future Concept 2 based on the aggregate number of preferred criteria.

RELATIVE EFFECT OF FUTURE CONCEPTS		
Evaluation Criteria	Future Concept 1	Future Concept 2
Building Density	P	LP
Population Density	P	LP
Aviation Traffic	ND	ND
Automobile Traffic	P	LP
Economic Considerations	ND	ND
Security	P	LP
Air Quality	P	LP
Noise	ND	ND
Environmental Hazards	P	LP
Biologic Resources	P	LP
Utilities and Services	P	LP

"P" = Preferred "LP" = Less Preferred "ND" = No Difference

6.3 Summary and Conclusions

The Comprehensive Use Plan is a part of the process for NASA acceptance of custodial responsibility of Moffett Field. The facility will continue to be a closed Federal facility shared by Ames Research Center and many other Federal entities.

The primary purpose of the Comprehensive Use Plan is for use as a guide by Ames managers, as custodians, when considering the future of Moffett Field.

The Comprehensive Use Plan provides a context for the future of Moffett Field. Starting with the history, location and role of Moffett Field in Silicon Valley, the plan reviews the site and its activities.

The Comprehensive Use Plan takes into account a range of factors, including site constraints, that may affect the future of Moffett Field.

The plan develops two concepts as guides to the future development of Moffett Field. Future Concept 1 has been selected as the preferred concept in that it reflects the type and level of development suitable for Moffett Field in the future.

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