Work Plan
Environmental Impact Analysis Process (EIAP)
Dysart Drain Improvement Project
Luke Air Force Base, Arizona

Prepared for

Department of the Air Force
Headquarters Air Education and Training Command
Directorate of Civil Engineering
Randolph Air Force Base, Texas
and
Armstrong Laboratory
Occupational and Environmental Health Directorate
Brooks Air Force Base, Texas

May 1994

Contract No. F33615-89-D-4003/Delivery Order 0144

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ES ENGINEERING-SCIENCE

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Prepared by

Engineering-Science, Inc.
Austin, Texas

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CONTENTS

FIGURES

TABLES

SECTION 1

PROJECT SCOPE AND BACKGROUND

1.1 SCOPE

Engineering-Science, Inc. (ES) has been retained to support Headquarters Air Education and Training Command (HQ AETC) in execution of the environmental impact analysis process (EIAP) and development of related studies and documentation to identify impacts of activities associated with the improvements to the Dysart Drain Flood Channel at Luke Air Force Base (Luke AFB), Arizona. This effort will consist of preparation of an environmental assessment (EA) and identification of all required environmental permits at Luke AFB. This EA will consider the cumulative impacts of the proposed action; however, no similar actions have been identified for Luke AFB during the same period. In addition, an air emissions impact analysis will be conducted to determine if the proposed project conforms with the State of Arizona's Implementation Plan (SIP), as required under Section 176 of the Clean Air Act (CAA) and codified at 42 USC 7506(c), as amended by the 1990 amendments. A general conformity applicability analysis and conformity determination (if required) will be published as a companion document to the EA.

ES will collect all applicable program and environmental data necessary to analyze and document the environmental consequences of this proposed action. The environmental analysis process will provide the necessary data for HQ AETC to determine if the proposed action qualifies for a finding of no significant impact (FONSI) or if an environmental impact statement (EIS) will be required. If, upon review of the EA, the Air Force determines that it supports a FONSI, ES will prepare the FONSI. Preparation of the EIS, if required, is not a part of this project.

1.2 BACKGROUND

Luke AFB is located in Maricopa County, in the central part of the State of Arizona, as shown in Figure 1. Luke AFB is located just west of the city limits of Phoenix. The existing Dysart Drain Flood Channel is located along the northerly limit of Luke AFB. The Dysart Drain flows in an easterly direction from about one half mile west of Luke AFB to the Agua Fria River. The relative location of the Dysart Drain to Luke AFB is shown in Figure 2.

The Dysart Drain was constructed by the US Army Corps of Engineers in 1958 to collect off-site stormwater runoff and to protect Luke AFB property from

FIGURE 1
GENERAL LOCATION MAP
LUKE AFB

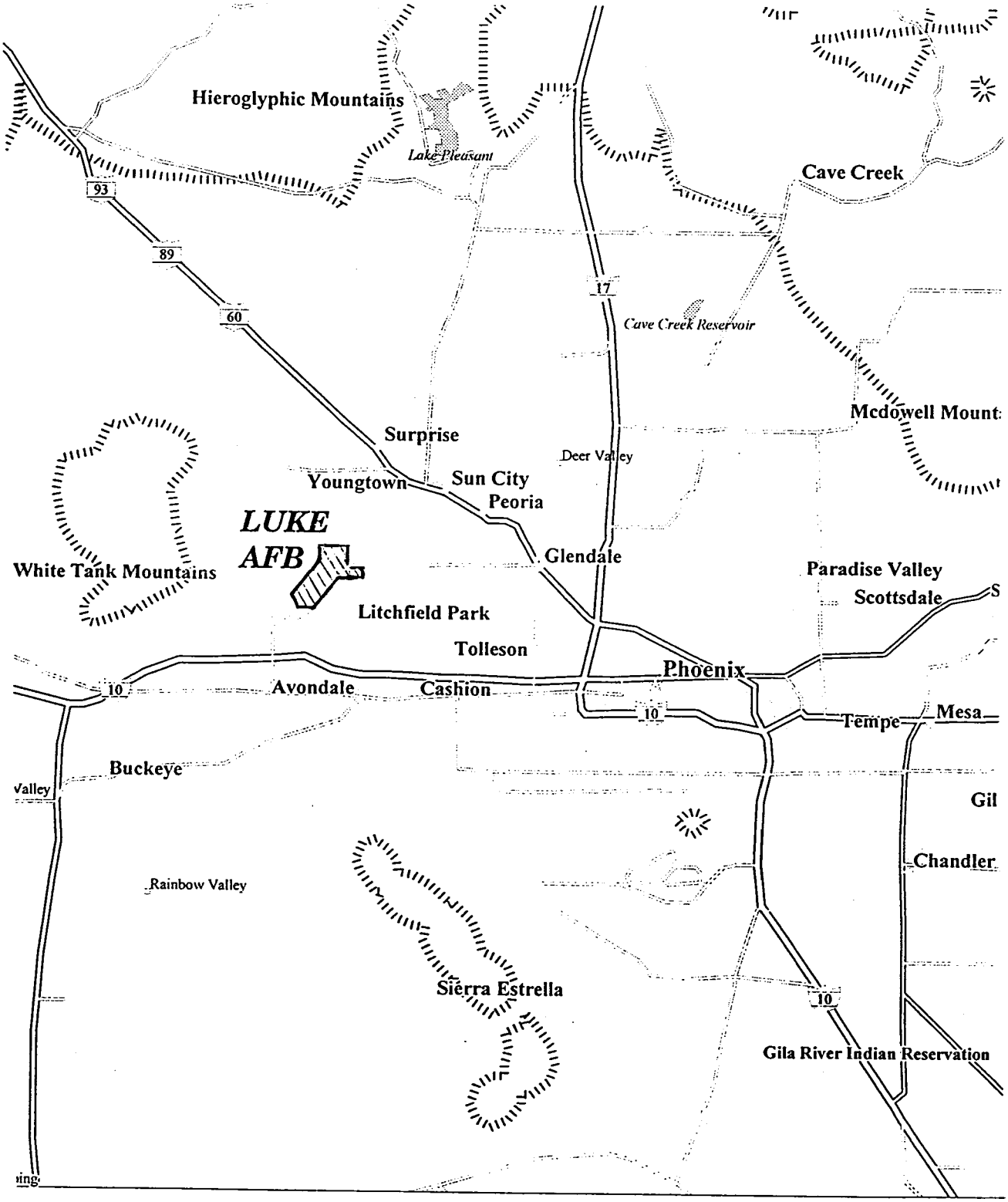
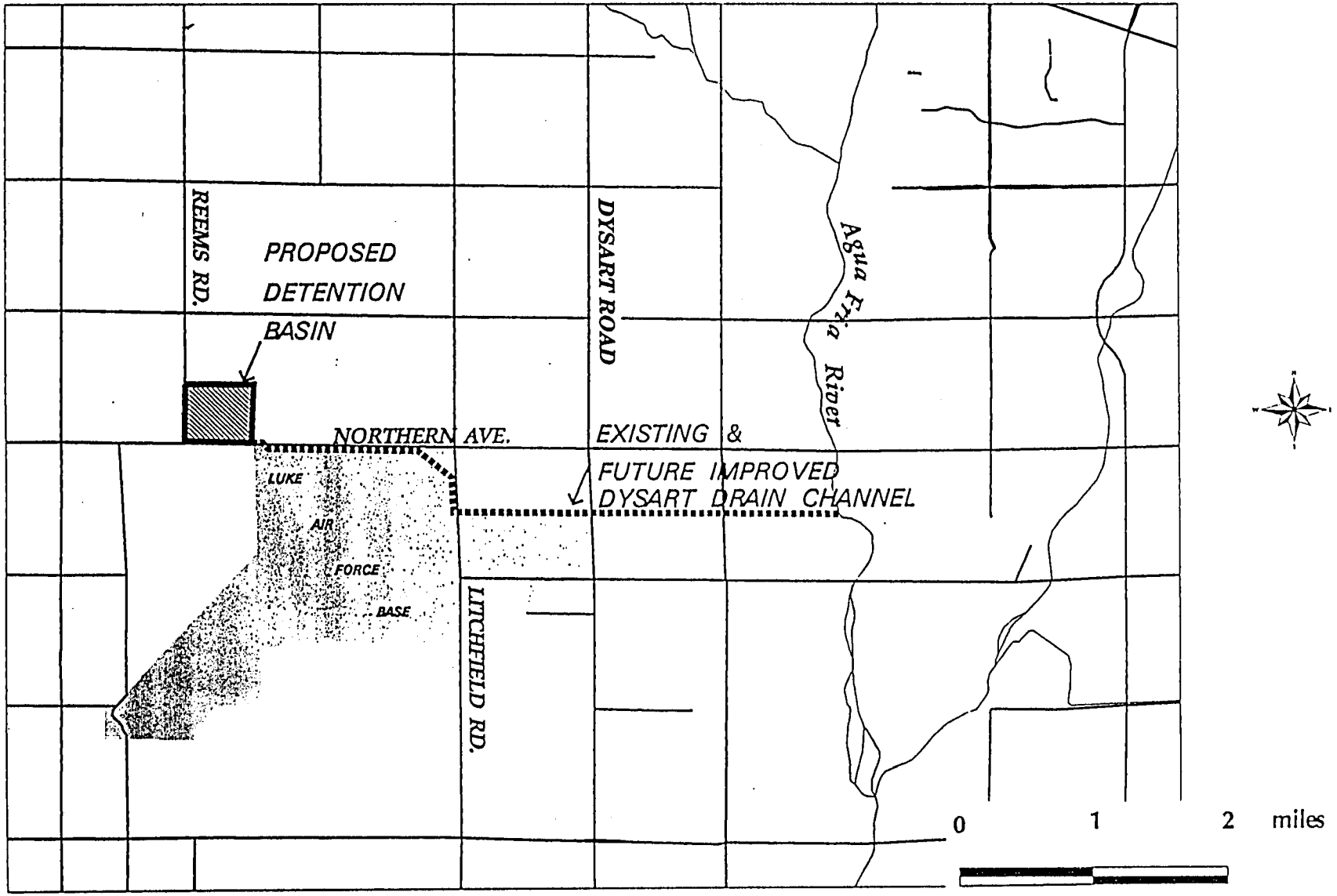


FIGURE 2
DYSART DRAIN IMPROVEMENT PROJECT



flooding. The entire Dysart Drain lies within property owned by the government. The Dysart Drain was built in conjunction with McMicken Dam, which is located upstream of Luke AFB. McMicken Dam retains flow from a 320-square-mile drainage area that would otherwise flood Luke AFB. The floodwaters impounded by the dam are discharged to the Agua Fria River.

The purpose of the Dysart Drain is to collect and convey runoff from the contributing drainage area downstream of McMicken Dam (approximately 50 square miles). The drainage area is composed predominantly of agricultural land. Stormwater runoff travels overland via sheet flow, roadways, or farm ditches. The flow generally follows a mild slope (0.005 ft/ft) in a southeasterly direction. Almost no stormwater runoff from Luke AFB enters the Dysart Drain, since the base lies down slope from the channel.

Both McMicken Dam and the Dysart Drain were built in response to a large flood that occurred in August of 1951. A subtropical storm system dropped a large amount of rain in the upstream watershed which resulted in heavy flooding. Luke AFB suffered extensive damage, as did surrounding agricultural fields.

Land subsidence in the area around Luke AFB has occurred for a number of years. This phenomenon is believed to be primarily the result of groundwater pumping. The problem for the Dysart Drain has been differential land subsidence. Almost no subsidence has occurred at the Luke salt body located east of Dysart Road. Approximately 12 feet of subsidence has occurred at Litchfield Road and about 14 feet has occurred at the upstream end of the drain at Reems Road. The differential subsidence has resulted in the loss of Dysart Drain conveyance capacity. A 5-year frequency rain event now exceeds the conveyance capacity of the channel and floods the base. The conveyance capacity has been decreased from an original design of 1,100 cubic feet per second (cfs) to the current capacity of approximately 300 cfs.

In addition to the land subsidence problems, three separate areas exist where stormwater flows are no longer contained within the conveyance channel. When the capacity of the channel is exceeded, water overflows to the south onto Luke AFB property. The breakout flows deposit sediment on runways, impair operations, and flood base housing at Luke AFB.

The Arizona Department of Water Resources (ADWR) regulates the Arizona Groundwater Management Code, a law that was established to actively manage groundwater withdrawal and replenishment. Active Management Areas (AMAs) were set up in regions where severe overdrafts occurred. The Dysart Drain watershed lies within the Phoenix AMA. The primary management goal of the AMAs is to reach a point where there will be no net withdrawal of groundwater, such that the amount of artificial and natural recharge equals the groundwater withdrawals. Therefore, this program may alleviate future land subsidence problems.

The Flood Control District of Maricopa County (FCDMC) maintains various rain gages in the west valley area, near Luke AFB. Based on data from the gages and other local rainfall information, the September 1992 storm event is estimated to be equivalent to a 75-year storm.

In the fall of 1992, Luke AFB and the FCDMC agreed to develop a joint project to resolve the chronic flooding problems caused by the inadequate and non-functional Dysart Drain Flood Channel. From the agreement between Luke AFB and the FCDMC, an evaluation of the base's flooding problems was accomplished in late 1992.

As evidenced in 1992 and again in 1993, significant stormwater runoff is generated from the watershed north of Luke AFB. At the inception of the project and until very recently, no portion of Luke AFB was located within a Federal Emergency Management Agency (FEMA) delineated 100-year floodplain. However, FEMA as recently as April 1994, made revisions to the FEMA flood insurance rate maps which include delineated 100-year floodplains across portions of Luke AFB.

1.3 PURPOSE OF AND NEED FOR ACTION

Chronic flooding occurred in 1951, 1955, 1979, 1992, and 1993, causing extensive damage at Luke AFB as well as disruption to base operations. Flooding in September 1992 and January 1993 produced an estimated $3,500,000 in damages at Luke AFB.

If the Dysart Drain Improvements Project is not implemented, and the existing Dysart Drain Flood Channel remains unimproved, the potential for future flooding may increase, causing further damage at Luke AFB and disruption to the base's mission.

1.4 WORK PLAN OVERVIEW

This work plan gives the description of proposed action and alternatives (DOPAA), tasks and deliverable schedule, project milestones, staff assignments, and project strategy.

SECTION 2

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES (DOPAA)

The DOPAA contained in this work plan is proposed as a refinement of several technical reports provided by HQ AETC and FCDMC.

2.1 PROPOSED ACTION

The proposed action is to reconstruct and improve the conveyance capacity of the Dysart Drain Flood Channel. The Dysart Drain will be improved so that it will effectively intercept and convey to the Agua Fria River the 100-year storm event runoff from the watershed north of Luke AFB. To minimize the size of the reconstructed channel and to reduce the right-of-way and utility impacts and associated costs, a detention basin and spoil area will be constructed at the upstream end of the improved channel.

2.2 PROJECT DESCRIPTION

The location of the project features with respect to Luke AFB is shown on Figure 2 (Section 1). Based on the conceptual design, this project for construction and right-of-way will cost $9,017,228. This information is based on correspondence provided by FCDMC, dated April 1994 to Luke AFB and supersedes preliminary design information provided in the appendix.

2.2.1 Channel Reconstruction

The 4-mile-long Dysart Drain is located on US Government and Air Force-owned property. The channel will be reconstructed on the existing alignment to minimize construction costs and the need for additional property acquisition along the channel.

The channel will be deepened and widened to provide adequate capacity to convey the design 100-year storm flows estimated at 4,000 cfs at the Agua Fria River outlet. At this location, the Agua Fria River is within a FEMA delineated 100-year floodplain. The channel invert profile and the cross-section will be designed to accommodate future anticipated subsidence. Only a minimum amount of reconstruction of the existing channel outlet into the Agua Fria River will be required. This will minimize any construction activities which may occur adjacent to or within the waters of the United States, as delineated by the US Army Corps of Engineers at the outlet.

The channel depth to the top of the bank will vary from about 8 feet to about 28 feet, as a function of the topography along the alignment and the channel bottom slope. The typical channel cross section will be a concrete-lined trapezoidal section with 1.5:1 side slopes. The bottom width varies from approximately 15 feet to about 25 feet, and the channel top width varies from about 50 feet to about 100 feet. The invert will have a varying slope, with an average slope of about 0.08 percent. The elevation at the top of the spillway to the Agua Fria River will remain at approximately Elevation 1,050 feet.

Other features associated with the channel improvements will be the reconstruction of two existing Maricopa County bridges (at El Mirage and Dysart Roads), one bridge at the Morton International Salt Facility, and one culvert on Luke AFB.

2.2.2 Detention Basin and Spoil Area

To reduce the magnitude of storm flows entering at the upstream end of the Dysart Drain, and thereby reducing the size of the reconstructed channel, a detention basin will be constructed. The basin will also significantly reduce the stormwater flows along the west side of Luke AFB, which also cause flooding along the southern end of the runway. The basin and associated spoil area will be located northwest and across from Luke AFB, on the northeast corner of Reems Road and Northern Avenue (Figure 2). The basin will be placed on existing agricultural land which is privately owned and must be acquired. This land is presently used to grow vegetable crops and rose bushes. The basin and spoil area property will occupy an estimated 155 acres. This basin will also be used for future recreational improvements by Luke AFB.

The basin will have an average depth of about 10 feet, with 6:1 side slopes. The spoil areas will have an average height of fill of about 11 feet, with 6:1 side slopes. The basin will discharge flows into the reconstructed Dysart Drain via a culvert undercrossing of Northern Avenue.

The basin and associated collector channels will be designed to intercept the 100-year design storm flows, to detain the flows, and to control the discharge at a maximum of 550 cfs into the Dysart Drain. The total storage volume of the detention basin is estimated to be 550 acre-feet. The basin will be designed to convey the more frequent, less intense storm flows via a low flow channel through the basin and directly to the outlet culvert. This will significantly reduce the need for operation and maintenance activities, curtail the growth of unwanted vegetation, and reduce the occurrence of storm flows interrupting the recreational uses of the basin area.

Associated with the construction of the basin and spoil area, reconstruction will be required for both a portion of Reems Road, along the west side of the basin and spoil area, and a portion of Northern Avenue, along the south side of the basin and spoil area. This reconstruction is necessary to ensure that stormwater runoff is effectively captured by the basin.

2.3 ALTERNATIVES TO THE PROPOSED ACTION

2.3.1 Channel Reconstruction Alternative

In this alternative, the Dysart Drain will be reconstructed to convey the design 100-year storm flows on the existing alignment. This alternative does not require detention basin and minimizes the need for additional property. The estimated cost for construction and right-of-way for this alternative, based on conceptual design, was $9,845,529.

The channel invert profile and the cross-section will be designed to accommodate future anticipated subsidence. Only a minimum amount of reconstruction of the existing channel outlet into the Agua Fria River will be required. This will minimize any construction activities which may occur adjacent to or within the waters of the United States, as delineated by the US Army Corps of Engineers at the outlet.

As measured from existing grade through the varying topography along the channel alignment, channel depth will vary from about 8 feet to about 28 feet. The typical channel cross section will be a concrete-lined trapezoidal section with 2:1 side slopes. The bottom width varies from about 15 feet to about 25 feet, and the channel top width varies from about 50 feet to about 135 feet. The invert will have a varying slope, with an average slope of about 0.18 percent. The elevation at the top of the spillway to the Agua Fria River will remain at approximately Elevation 1,051 feet.

Other features associated with the channel improvements will be the reconstruction of three existing Maricopa County bridges (at El Mirage, Dysart, and Litchfield Roads), one bridge at the Morton International Salt Facility, one bridge at Luke AFB, and one spillway at the head of the Dysart Drain (at Reems Road).

2.3.2 No-action Alternative

As future subsidence occurs, the Dysart Drain will continue to lose conveyance capacity. If the proposed action is not implemented, stormwater runoff from the watershed north of Luke AFB will continue to exceed the capacity of the channel and cause flooding problems on the base. This flooding will impact the mission of Luke AFB, and it will continue to cause disruption and impact to the lives of Luke AFB personnel, especially those living in base housing. In addition, costly repair and clean-up efforts will continue to be required on the runway and adjacent areas following flood events.

2.3.3 Alternatives Eliminated from Further Consideration

After the agreement between Luke AFB and FCDMC in the fall of 1992, several alternatives were developed to alleviate the flooding on the base. These alternatives were examined and discarded from further consideration for the reasons explained in the paragraphs below. (FCDMC 1994)

A. Improvements to existing channel, continued split flow at Luke AFB, no detention basin.

Under this alternative, split flow at Reems Road and Northern Avenue would remain. Under current conditions, the Dysart Drain has insufficient capacity at Reems Road, which is the upstream end of the channel. The result is a split flow with approximately 800 cfs flowing east in Dysart Drain and 1,500 cfs flowing south over Northern Avenue and along the west and south sides of Luke AFB.

Although this alternative was the lowest estimated cost ($6,265,338), this alternative does not eliminate the split flows which impact the west and south sides of Luke AFB. The elimination of split flows was one of the fundamental criteria for the base's planning objectives.

B. Improvements to existing channel, flows to Bullard Wash and Agua Fria River, and no detention basin.

This alternative consists of collecting the runoff at Reems Road and Northern Avenue and conveying it south, under Northern Avenue, and around the west side of the Base to Bullard Wash. The remainder of the flows are collected in Dysart Drain and conveyed east to the Agua Fria River. The effect of constructing the channel on the west side of the Base is a significantly reduced flow in the Dysart Drain.

This alternative includes significant channel reconstruction from Luke AFB west along the frontage of Northern Avenue to Reems Road and along the west side of Luke AFB to the south of the base. Although this alternative eliminated the split flows at Reems Road, it was the highest cost ($12,367,356).

C. Improvements to existing channel, and construction of a 290-acre detention basin along the frontage of Northern Avenue.

The 290-acre basin will extend approximately 1.5 miles from the northeast corner of Reems Road and Northern Avenue to the Atchison, Topeka, and Santa Fe (AT&SF) railroad. The basin detains all of the runoff from the 100-year flood that currently reaches the Dysart Drain between Reems Road and the AT&SF track. The outflow of the detention basin is conveyed to the Agua Fria River in the Dysart Drain.

This alternative had significant impacts to private property and roadway frontage, and was estimated to cost $10,010,439.

D. Improvements to existing channel and construction of two large detention basins along the frontage of Northern Avenue. In this alternative, a 125-acre basin would be located at Reems Road and Northern Avenue, and a 116-acre basin would be located at Northern Avenue and the AT&SF railroad track.

The 125-acre basin detains runoff from the 100-year flood and discharges at a reduced flow into a proposed channel to Bullard Wash. This would require significant new channel construction along the west side of Luke AFB to the southern end of runway.

The 116-acre basin was designed to reduce the 100-year peak discharge in the Dysart Drain down to the capacity of the existing culverts under the AT&SF railroad tracks. The reduced outflow would be metered into the Dysart Drain and conveyed east to the Agua Fria River.

This alternative was not the least cost option ($10,680,589) which eliminates the split flows at Reems Road. This alternative has significant impacts to private property and roadway frontage.

SECTION 3

PROJECT PLANNING AND STRATEGY

ES will follow the established work plan and specific contract deliverables schedule in performing project elements.

3.1 PROJECT MILESTONES

Table 1 is the project milestone chart, outlining major project activities and deliverables as presented in the scope of work. These key milestones are critical to timely and complete project execution.

3.2 PROJECT ACTIVITY SEQUENCE AND IMPLEMENTATION

The project activity sequence for the EA is discussed on a task-by-bask basis. The following task narratives present detailed task activities, strategies, and proposed methodologies. These activities have been incorporated into a project schedule, shown in Figure 3.

Task 1: Other direct cost (ODC) allocation. ODCs are charged to a discrete task to maintain strict control of project expenditures.

Task 2: Kick-off Meeting and Project work plan. The draft and final project work plans are produced under this task. ES will gather information on project descriptions, including activities, size, nature, schedule, etc., of the project. ES will meet with project representatives from Luke AFB and FCDMC to obtain key documents such as previous environmental surveys, detailed project scope, design evaluations, etc. An additional objective of this task is to develop and finalize a DOPAA for the project.

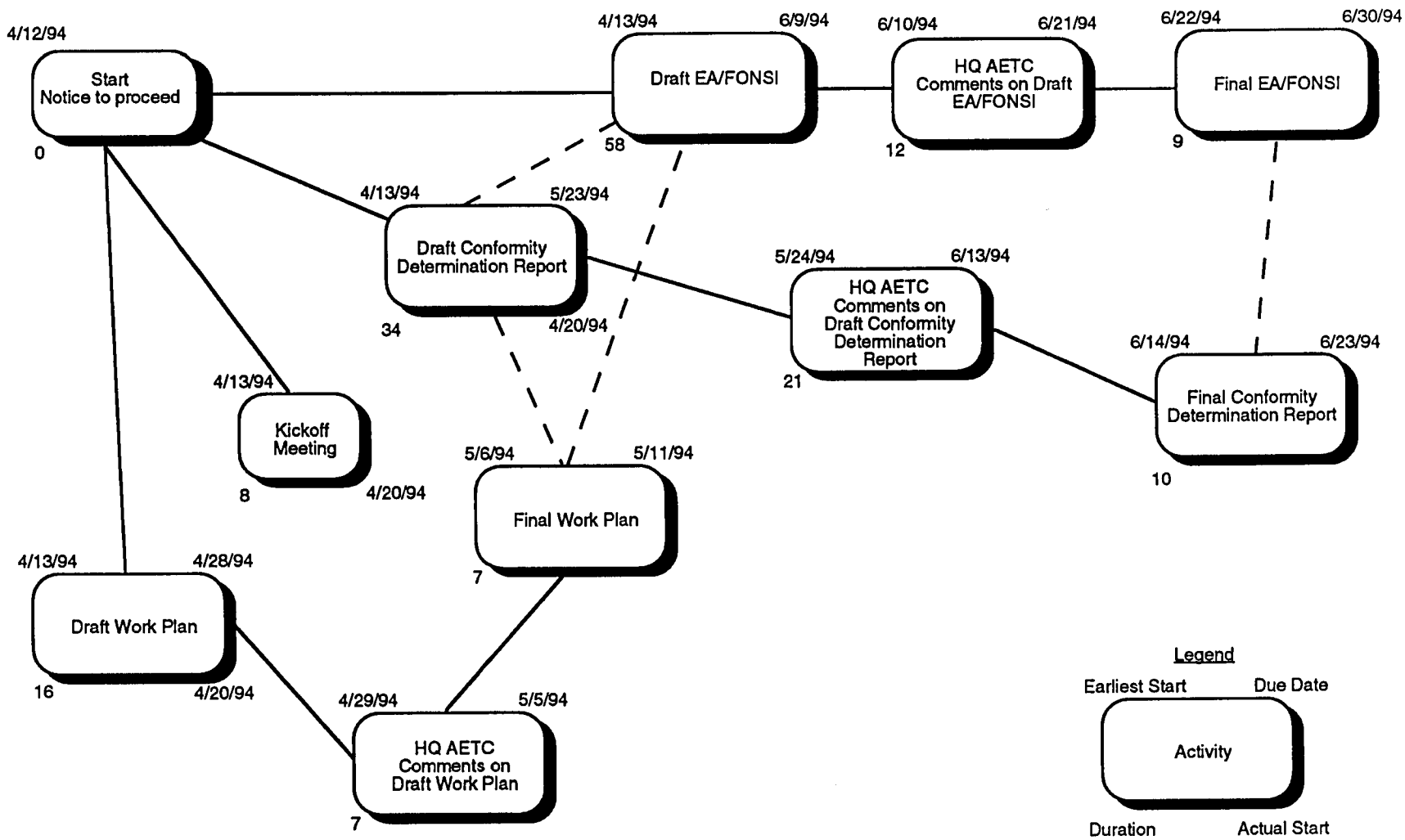
Task 3: Conformity report. This task involves the preparation of an air emissions analysis to determine if the proposed improvement to the Dysart Drain conforms with the Arizona's SIP. The conformity report will be submitted as a stand-alone, companion document to the EA. The structure of the report will contain the following:

I. Executive Summary
II. Introduction
III. Discussion
IV. Results
V. Recommendations and Appendices.

Table 1. Project Milestones
Dysart Drain Improvement Project

Task	Milestone	Date
Kickoff Meeting	Establish contacts, collect baseline data	04/20/94
Draft work plan/ DOPAA	Draft to HQ AETC/CEVC and AL/OEB Comments due from HQ AETC/CEVC	04/28/94 05/05/94
Final Work plan/ DOPAA	Final to HQ AETC/CEVC and AL/OEB	05/11/94
Draft Conformity Report	Draft to HQ AETC/CEVC and AL/OEB Comments due from HQ AETC/CEVC	05/23/94 06/13/94
Draft EA/FONSI	Draft to HQ AETC/CEVC and AL/OEB Comments due from HQ AETC/CEVC	06/09/94 06/21/94
Final Conformity Report	Final to HQ AETC/CEVC and AL/OEB	06/23/94
Final EA/FONSI	Final to HQ AETC/CEVC and AL/OEB	06/30/94

Figure 3
Project Schedule
Dysart Drain Improvement Project
Environmental Assessment



Task 4: Baseline data collection and review. This task involves collection and review of baseline data, applicable regulations, and local environmental studies in the areas of:

- Land use
- Water quality
- Noise
- Air quality
- Cultural resources
- Socioeconomics
- Transportation
- Toxic and hazardous materials and wastes
- Regulatory compliance
- Mitigation and waste minimization measures
- Biology
- Alternatives.

As part of this task, site-specific review and study will be conducted and new data requirements identified as appropriate. A list of impact analysis tasks and the methodology for major issues is presented in Table 2.

Task 4 also involves the physical production of deliverables. The deliverables schedule is detailed in Table 1 and Figure 3. An outline of the draft EA is presented in Table 3.

Task 5: Project management. This task provides for control of project budget, maintenance of project files, supervision of project schedule, and administrative contact with client. In addition, this task incorporates the quality assurance functions.

Engineering-Science is committed to performing quality work and meeting conformance requirements for our clients. ES's quality assurance policy manual defines the company's commitment and policy for quality assurance and sets forth the organization and procedures to effect the policy. The ES policy manual will serve as the primary guidance document for establishing and implementing the quality assurance program for this project.

Engineering-Science's quality assurance program, as presented in the program management plan, will be implemented to assure that this work meets the HQ AETC conformance requirements in carrying out the EIAP, and that the EA and supporting deliverables are of the highest quality. This program is designed to meet acceptable performance standards established by the project manager, technical director, and HQ AETC.

Table 2. Impact Analysis Tasks and Methodology for Major Issues

Impact Analysis Task	Approach and Methodology
Land use	• Identify land use in vicinity of Dysart Drain project • Evaluate proposed actions with regard to affect on land use
Biological resources	• Review reference documents describing endangered and threatened species at or near the project • Identify biological communities and endangered and threatened species in the Dysart Drain project area which may be affected • Determine if proposed actions will have biotic impacts in the vicinity of the project
Water resources	• Identify ground and surface water issues which may be affected by the proposed action • Determine stormwater quality in the Agua Fria River and Dysart Drain • Determine if proposed actions will have any impact on receiving stormwater quantity and quality • Evaluate hydraulic analysis to compare conveyance capacity to the anticipated runoff entering the channel • Identify permit requirements per federal, state, and local jurisdictional entities
Cultural resources	• Review reference documents on historical significance of the area proposed for use in the Dysart Drain project and determination of findings

Table 2, continued

Impact Analysis Task	Approach and Methodology
Noise	• Estimate noise levels from construction activities (heavy equipment) for the proposed action
Community setting	• Determine local economic impact of construction to the area • Determine the availability of construction companies and work in the area to conduct the project
Air quality	• Review federal, and state of Arizona air quality regulations • Determine existing meteorological conditions and local/regional air quality • Estimate air emissions for construction activities related to the proposed project including personal vehicles • Determine if emissions generated during construction phases of the proposed action will impact local and regional air quality • Prepare project conformity applicability analysis and a conformity determination (if required)
Environmental management	• Review disposal options for excavated materials and waste minimization measures • Determine if proposed actions will have any impact on waste management or IRP sites at Luke AFB which are in close proximity to the project • Determine additional permit requirements, if any

Table 3. Proposed Outline
Dysart Drain Improvement Project
Environmental Assessment

Finding of No Significant Impact (FONSI)

Acronyms and Abbreviations

Section 1: Purpose and Need for Action
- 1.1 Introduction
- 1.2 Purpose and Need for Action
- 1.3 Decision to be Made
- 1.4 Location of Proposed Action
- 1.5 Summary of Environmental Study Requirements
- 1.6 Scope of the Environmental Analysis and the Environmental Assessment
- 1.7 Relevant Federal, State, and Local Statutes, Regulations, and Guidelines

Section 2: Description of Proposed Action and Alternatives
- 2.1 Proposed Action
- 2.2 Project Description
- 2.3 Alternatives to the Proposed Action
- 2.4 Alternatives Eliminated from Further Consideration
- 2.5 Summary of Environmental Impacts

Section 3: Affected Environment
- 3.1 Proposed Action
  - 3.1.1 Mission
  - 3.1.2 Land Use
  - 3.1.3 Transportation
  - 3.1.4 Biological Resources
    - 3.1.4.1 Ecology
    - 3.1.4.2 Endangered, Threatened, and Special-status Species
  - 3.1.5 Water Resources
    - 3.1.5.1 Surface Water
    - 3.1.5.2 Groundwater

Table 3, continued

- 3.1.6 Community setting
- 3.1.7 Cultural Resources
  - 3.1.7.1 Archaeological Resources
  - 3.1.7.2 Historical Resources
- 3.1.8 Noise
  - 3.1.8.1 Effects of Noise Exposure
  - 3.1.8.2 Noise Criteria and Regulations
  - 3.1.8.3 Baseline Noise Levels
- 3.1.9 Air Quality
  - 3.1.9.1 Air Pollutants and Regulations
  - 3.1.9.2 Regional Air Quality
  - 3.1.9.3 Baseline Emissions
- 3.1.10 Environmental Management
  - 3.1.10.1 Toxic and Hazardous Materials and Wastes
  - 3.1.10.2 Mitigation and Waste Minimization Measures
  - 3.1.10.3 Regulatory Compliance
- 3.2 Alternative Action

Section 4: Environmental Consequences

- 4.1 Proposed Action
  - 4.1.1 Mission
  - 4.1.2 Land Use
  - 4.1.3 Transportation
  - 4.1.4 Biological Resources
  - 4.1.5 Water Resources
  - 4.1.6 Community setting
  - 4.1.7 Cultural Resources
  - 4.1.8 Noise
  - 4.1.9 Air Quality
  - 4.1.10 Environmental Management
- 4.2 Alternative Action
  - 4.2.1 Mission
  - 4.2.2 Land Use
  - 4.2.3 Transportation
  - 4.2.4 Biological Resources
  - 4.2.5 Water Resources
  - 4.2.6 Community setting

Table 3, continued

Quality assurance for the project will be directed through the technical director and quality assurance officer. The technical director will provide consultation on technical matters throughout the duration of the project. He will also be responsible for quality review of all deliverables prior to submission. The quality assurance officer is responsible for conducting audits to ensure compliance with the management plan and for reviewing all deliverables prior to submission.

3.3 MEETINGS

ES will attend meetings and/or conferences as requested by the Air Force.

SECTION 4

PROJECT ORGANIZATION

The following sections describe the organization of the project team and the responsibilities and qualifications of team members. The addresses and telephone numbers of key team members are provided, as is a discussion of lines of communication for the project.

4.1 ORGANIZATIONAL STRUCTURE AND RESPONSIBILITIES

The staffing for the ES team has been carefully selected to meet and exceed technical and management experience requirements. The staff will be able to perform the task activities efficiently and will provide a quality product to the Air Force, on time and within budget. The organizational chart shows the ES project management staff, discipline managers, and other key personnel who will be actively involved in the EIAP. These people will be assisted by various junior professionals, technicians, and support staff.

The project manager will manage the day-to-day administration of the EIAP. He will monitor and report on the budget schedule and the progress toward milestones and deliverables. He will provide direction to the project team and coordinate and monitor the activities of the discipline managers. He will provide information to the technical director. He will be assisted by the deputy project manager.

4.2 KEY PROJECT PARTICIPANTS

The names, affiliations, addresses, and phone/fax numbers of key project participants are presented in Table 4. A list of assignments is presented below:

Assignment	ES Staff
Technical director	R.C. Wooten
Quality assurance officer	D. Latimer
Project manager	R. Palachek
Deputy project manager	J. Wallin
Air quality evaluation	J. Garrison
Hydrology and Hydraulics	K. Ganze
Socioeconomics and Land Use	T. Anderson

Table 4. Key Project Participants

Name	Organization	Address/phone/fax
Robert Sheahan	Randolph AFB (HQ AETC/CEVC)	HQ AETC/CEVC 266 F. Street West, Bldg. 901 Randolph AFB, TX 78150-4321 Phone: 210/652-3240 Fax: 210/652-3597
Lt Col James Montgomery	Armstrong Laboratory (AL/OEB)	AL/OEB Building 175W Brooks AFB, TX 78235-5000 Phone: 210/536-3305 Fax: 210/536-3945
R.C. Wooten Randy Palachek John Wallin	Engineering-Science, Inc.	8000 Centre Park Drive Suite 200 Austin, TX 78754 Phone: 512/719-6000 Fax: 512/719-6099
Bert Cruzan	HQ AETC/CECF	HQ AETC/CECF Randolph AFB, TX 78150 Phone: 210/652-2143 Fax: 210/652-
Capt Mike Ray	58 CES/CEV	58 CES/CEVN 14002 West Marander Luke AFB, AZ 85309-1125 Phone: 602/856-3621 Fax: 602/856-3817
Catesby W. Moore Don Rerick	Flood Control District of Maricopa County	2801 West Durango Phoenix, AZ 85009 Phone: 602/506-1501 Fax: 602/506-4601

4.3 QUALIFICATIONS OF KEY PERSONNEL

A summary of the qualifications of key personnel for the EIAP follows:

R.C. Wooten, Ph.D., Technical Director

- 27 years of experience in Air Force and DOD, NEPA, RCRA, and CERCLA programs
- ES technical director for recently completed EAs for the Air Force: Small Launch Vehicle Program, runway repair and extension for Kirtland AFB, and development and operation of the Delta Centralized Facility and Centaur facilities at Cape Canaveral AFS, EIS for base closures, Myrtle Beach AFB and MacDill AFB
- Project manager for environmental characterization and EIS preparation for the Connecticut low-level radioactive waste facility
- Prepared multiple EISs and directed the NEPA and EIAP as Air Force Space Shuttle Environmental Program manager
- Involved in the preparation of numerous EAs and EISs involving Air Force systems and base closures and realignment

Randy Palachek, Project Manager

- Over 11 years experience in NEPA, water quality, and DOD projects
- Project manager for installation-wide EA at Camp Stanley Storage Facility, Texas and Camp Bullis, Texas, evaluating all aspects of regulatory and DOD compliance issues
- Project manager for property assessments conducted at US Army Reserve Centers in Conroe, Texas and Harlingen, Texas
- Project manager for stream studies conducted at a major petroleum refinery in southeast Texas, including sediment, water quality, toxicity, fisheries, and benthic invertebrate assessments
- Project manager or substantial involvement in ecological and human health risk assessments conducted at McConnel AFB, Tinker AFB, Keesler AFB, Dobbins AFB, Wright-Patterson AFB, and Chanute AFB.

John Wallin, Deputy Project Manager

- Project manager for preparing the EA for the merger of ATC and AU into the AETC and the EA for the move of four USAF training programs to Maxwell AFB
- Project manager for preparing the EA for the installation and operation of two transportable satellite test facilities for the USAF's Space and Missile Systems Center
- Deputy project manager for preparing the EAs for the Interim Vehicle Maintenance Training Facility at Kelly AFB and the relocation of the Inter-American Air Forces Academy to Lackland AFB

- Airspace/air traffic discipline manager for EIS prepared for closure of MacDill and Myrtle Beach Air Force Bases as well as EIS for joint use of Air Force Plant 42
- Assisted with EAs for U.S. Army facilities at Fort Sam Houston and Conroe, Texas
- Retired Air Force command pilot with over 3,200 total flying hours
- Designed and managed activities associated with unit mission changes to include manpower, facilities, and airspace utilization

Jim Garrison, Air Quality

- 15 years of professional experience in air quality engineering
- Performed dispersion modeling studies to determine ambient concentrations of pollutants using the EPA SCREEN model, and Industrial Source Complex Short-Term and Long-Term (ISCST and ISCLT) models
- Used Fugitive Dust Model (FDM), LAND 7, and PAVE models to characterize and quantify fugitive emissions from construction projects, contaminated soils, and fugitive emissions from sites
- Prepared air quality assessments for recently-completed Air Force EAs: runway repair and extension of Kirtland AFB, New Mexico; construction and operation of Centaur and Delta facilities at Cape Canaveral AFS
- Provided technical review, guidance, and assistance in making Emission Dispersion Modeling System (EDMS) available to AFB operations
- Conducted numerous source testing projects using EPA methods on commercial an Air Force facilities
- Prepared construction and operation permit applications for various state and local regulatory agencies

Keith Ganze, Hydrology and Hydraulics

- Over 7 years experience in hydrological evaluations
- Discipline manager for hydrology for an EIS in support of the 1996 Olympic Whitewater Slalom Venue to be held on the Ocoee River, Tennessee
- Conducted several RCRA and CERCLA projects for DOD and DOE facilities
- Conducted hydraulic modelling and dye studies in support of a discharge permit application for a large petrochemical plant in southeast Texas
- Prepared numerous discharge permit applications for refineries, petrochemical plants, and specialty chemical plants located on the Gulf Coast.

Teresa Anderson, Socioeconomics and Land Use

- Performed socioeconomic analyses for relocation of Officer Training Squadron (OTS) and Interim Vehicle Maintenance Facility (IVMF), and the Inter-American Air Force Academy (IAAFA)
- Participated in risk assessments for McConnell AFB and Keesler AFB
- Prepared land use evaluation in Camp Stanley EA
- Analyzed socioeconomic impacts associated with AETC Merger and the move of four training programs to Maxwell AFB
- Developed closure plans for two sites at Fort Sam Houston, Texas

SECTION 5

ADMINISTRATION PROCEDURES

5.1 CORRESPONDENCE

Routine project correspondence from ES to the Air Force will be sent to Mr Robert Sheahan at HQ AETC/CEVC and Lt Col James Montgomery at AL/OEB. All correspondence will reference Basic Contract F33615-89-D-4003 and Delivery Order 0144.

Any correspondence and conversation directed to others (i.e., regulatory agency, etc.) will be approved in advance by the Air Force, and copies to the Air Force will reference the contract and delivery order numbers.

The ES contract with the Air Force is very specific regarding communication with news organizations or release of information such as professional papers, presentations, news releases, etc. No such releases will be made without prior Air Force approval from applicable Office of Public Affairs. Three copies must be submitted for security and clearance review 60 days prior to release.

Correspondence from the Air Force to ES in general will be sent to Randy Palachek in Austin.

5.2 DOCUMENT DISTRIBUTION MATRIX

The distribution for various project documents is listed below:

	HQ AETC/CEVC Robert Sheahan	AL/OEB Lt Col James Montgomery	Luke AFB Capt Mike Ray	FCDMC Catesby Moore	ES Copies*
Letter reports/ meeting minutes	1	1			3
Work Plan/DOPAA	2	1	1	1	3
Draft EA/FONSI	10	1	5	10	3
Draft Conformity Report	10	1	5	1	3
Final EA/FONSI	10	1	5	10	5
Final Conformity Report	10	1	5	1	5

* ES copies include Project Manager, Technical Director, and File Copies.

5.3 FILING SYSTEM

All active job files will be maintained in the ES Austin office. Contracts, financial billings, and monthly R&D reports will be maintained in Austin and forwarded to the Air Force per contract requirements. Rachel Tilley will be responsible for maintaining the ES job files in Austin. Sherri Tilghman will maintain contract files in Austin.

The project files will, at a minimum, include:

- Correspondence;
- Memos, meeting minutes, etc.;
- Data collection;
- Work plan;
- Draft conformity report;
- Final conformity report;
- Draft EA;
- Final EA;
- Letter reports; and
- DOPAA.

A library of key technical documents and reports relevant to this project, (including previous EAs, maps, etc.) will be maintained by Randy Palachek in the ES Austin office.

5.4 DOCUMENTATION

All site visits, meetings, and conversations between ES and the Air Force that entail significant findings, decisions, or commitments will be documented by ES and distributed to the appropriate individuals. The form on Figure 3 will be used for this purpose, or another appropriate format (letters, trip reports, meeting minutes, memorandum of record, etc.) will be used.

Letter reports will be numbered sequentially beginning at LR001.

5.5 SITE VISITS

ES will advise both Mr Robert Sheahan at HQ AETC/CEVC and Lt Col James Montgomery at AL/OEB at least 7 days prior to any visits to governmental agencies (federal, state, county, city), or to the sites.

Figure 4

ES ENGINEERING-SCIENCE, INC.

MEMORANDUM TO FILE

JOB NUMBER _____

FILE DESIGNATION _____

DATE _____ TIME _____

PHONE CALL FROM _____ PHONE NUMBER _____

PHONE CALL TO _____ PHONE NUMBER _____

CONFERENCE WITH _____

PLACE _____

SUBJECT _____

SIGNED _____

E1/ADMIN/FORMS/TELMEMO.FRM

Appendix

Correspondence from FCDMC

DYSART DRAIN IMPROVEMENTS PROJECT
LUKE AIR FORCE BASE, ARIZONA
"ENVIRONMENTAL ASSESSMENT"

1.0 PURPOSE OF AND NEED FOR PROPOSED ACTION

The United States Air Force in conjunction with the Flood Control District of Maricopa County (FCDMC) proposes to reconstruct and improve the existing Dysart Drain Flood Channel on Luke Air Force Base (LAFB), Arizona. The existing channel was constructed by the U.S. Army Corps of Engineers in the late 1950's to intercept and convey storm runoff to the Agua Fria River. Over the past 35 years the capacity of the channel has been significantly reduced due to local ground subsidence caused primarily by intensive ground water pumping. The present channel invert has a negative slope away from the Agua Fria River, flowing back toward LAFB. Storm runoff from north of LAFB exceeds the capacity of the channel, over tops the channel, and contributes to the flooding problem on LAFB.

Flooding, causing extensive damage and disruption to LAFB operations, is a chronic problem, having occurred in 1955, 1979, 1992, and 1993. Damage from flooding in September 1992 and January 1993 caused an estimated $3,500,000 in damages. In the fall of 1992 LAFB and FCDMC entered into discussions to develop a joint project to resolve the chronic flooding problems caused by the inadequate and non-functional Dysart Drain Flood Channel. In the fall of 1992 The WLB Group, the FCDMC consultant for the White Tanks - Agua Fria River Area Drainage Master Study (ADMS), was asked to evaluate the flooding problems at LAFB. An alternatives study was completed by The WLB Group and submitted to the FCDMC and LAFB.

As evidenced in 1992 and again in 1993, significant storm runoff is generated from the watershed north of LAFB which impacts base operations, base housing, and other on base support services. At this time no portion of LAFB is located within a FEMA delineated 100-year floodplain. However, future revisions to the FEMA Flood Insurance Rate Maps may include delineated 100-year floodplains across portions of LAFB. The FCDMC maintains various rain gauges in the west valley area around LAFB. Based on data from these gauges and other local rainfall information, the September 1992 storm event is estimated to have been equivalent to about a 100-year storm. The kind of storm events as experienced in 1992 and 1993, cause damages and disruption with associated high repair costs, completely closes down the training mission of LAFB, and causes significant disruption and impact to the lives of LAFB personnel, especially those living on base. The proposed action to improve the Dysart Drain Flood Channel will prevent this type of flooding on LAFB.

If the Dysart Drain Improvements Project is not implemented, and the existing Dysart Drain Flood Channel remains unimproved, the potential for future flooding as was experienced in 1992 and again in 1993 will continue to exist, causing further disruption to the mission of LAFB.

1.1 LOCATION OF THE PROPOSED ACTION

Luke Air Force Base is located in Maricopa County in the central part of the State of Arizona, as shown in Figure 1.1-1. LAFB is located just west of the westerly city limits of Phoenix, Arizona. The existing Dysart Drain Flood Channel is located along the northerly limit of LAFB, and flows in an easterly direction from the northwest corner of LAFB to the Agua Fria River, about one and one quarter mile east of LAFB. The channel begins as a road side ditch about one half mile west of LAFB. Figure 1.1-2 shows the relative location of the existing channel and LAFB.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The proposed action is to reconstruct and improve of the approximately four mile long Dysart Drain Flood Channel in its present location so that it will effectively intercept and convey the 100-year storm event runoff from the watershed north of LAFB, and discharge those flows into the Agua Fria River, thereby preventing the runoff from overtopping the channel and flooding LAFB. To minimize the size of the reconstructed channel, and reduce right-of-way and utility impacts and associated costs, a detention basin and spoil area will be constructed at the upstream end of the improved channel. See Figure 2.1-1 for the location of the project features with respect to LAFB.

2.1.1 Channel Reconstruction

The existing, approximately four mile long non-functioning Dysart Drain Flood Channel is located on U.S. Government and Air Force owned property. The channel will be reconstructed on the existing alignment to minimize construction costs and the need for additional new real property for the channel.

The channel will be deepened and widened to provide adequate capacity to convey the design 100-year storm flows estimated at about 4,000 cubic feet per second at the outlet into the Agua Fria River. The Agua Fria River at this location is within a FEMA delineated 100-year floodplain. The channel invert profile and the cross section will be designed to accommodate future anticipated subsidence. Only a minimum amount of reconstruction of the existing channel outlet into the Agua Fria River will be required. This will help to minimize any disruption within the "waters of the U.S." as delineated by the U.S. Army Corps of Engineers.

As measured from existing grade through the varying topography along the channel alignment, the channel depth will vary from about 8 feet to about 28 feet. The typical channel cross section will be a concrete lined trapezoidal section with 1.5:1 side slopes. The bottom width varies from about 15 feet to about 25 feet, and the channel top width will vary from about 50 feet to about 100 feet. The invert will have a varying slope, with an average slope of about 0.08 percent. The elevation at the outfall of the reconstructed channel will be approximately El. 1045 (NGVD 1929 datum).

Other features associated with the channel improvements will be the reconstruction of two existing Maricopa County bridges, one bridge at the Morton International Salt Facility, and one culvert on LAFB.

2.1.2 Detention Basin and Spoil Area

To reduce the magnitude of storm flows entering at the upstream end of the channel, and thereby reducing the size of the reconstructed channel a detention basin will be constructed. The basin will also significantly reduce the storm flows along the west side of LAFB which also cause flooding along the west side of LAFB and at the southern portion of the runways. The basin and associated spoil area for the placement of basin excavation material will be located northwest of and across from LAFB on existing agricultural land. This land is presently being used to grow vegetable crops and rose bushes. The basin and spoil area property of an estimated 155 acres will be used for future recreational improvements by LAFB.

The basin will have an average depth of about 10 feet with 6:1 side slopes. The spoil areas will have an average height of fill of about 11 feet with 6:1 side slopes. The basin will discharge flows into the reconstructed Dysart Drain Flood Channel via a culvert undercrossing of Northern Avenue, Northern Avenue being located along the north boundary of LAFB.

The basin and associated collector channels will be designed to intercept and convey the 100-year design storm flows, detain the flows, and outlet a maximum of about 550 cubic feet per second into the channel. The total storage volume of the basin is estimated to be about 550 acre-feet. The basin will be designed to convey the more frequent less intense storm flows (nuisance flows) via a low flow channel through the basin and directly to the outlet culvert. This will significantly reduce the need for operation and maintenance activities, curtail the growth of unwanted vegetation, and reduce the occurrence of storm flows interrupting the recreational uses of the basin area.

Associated with the basin and spoil area construction will be the reconstruction of a portion of Reems Road along the west side of the basin and spoil area property and Northern Avenue along the south side of the basin and spoil area property. This is necessary to ensure that storm runoff is captured by the basin.

2.2 ALTERNATIVES

2.2.1 Channelization and Basin Alternatives

Five project alternative concepts (see attached Exhibit No. 1) were evaluated by the District's ADMS consultant, The WLB Group. These were submitted to the District and LAFB for review and a final alternative concept selection. As described above, the proposed action (the selected alternative concept) consists of the reconstruction of the existing Dysart Drain Flood Channel and the construction of a detention basin and spoil area. The proposed action actually consists of elements from two of the five alternative concepts.

The five alternative concepts included various combinations of channel reconstruction and/or detention basin construction. The extent of channel reconstruction varies from total reconstruction to partial reconstruction. Some of the alternatives do not include any detention basin, while others include multiple basins. The storm flows along the west side of LAFB are eliminated in some alternatives and not eliminated in others.

Channel alignments other than the present alignment were not considered because other alignments would require the acquisition of new property for the channel. The present channel right-of-way should be fully utilized for the reconstruction of the channel in order to minimize right-of-way costs and disruption to other property owners.

Cost was also a consideration in the selection of the proposed action alternative. The estimated cost of the proposed action is approximately $600,000 less than the average of the five project alternative concepts that were evaluated.

2.2.2 No Action Alternative

If the proposed action is not implemented, the Dysart Drain Flood Channel will continue to be non-functional. Storm runoff from north of LAFB will continue to exceed the capacity of the channel, over top the channel, and continue to cause flooding problems on LAFB. This flooding will impact the mission of LAFB, and will continue to cause disruption and impact to the lives of LAFB personnel, especially those living on base.

EXHIBIT NO. 1

DYSART DRAIN IMPROVEMENTS PROJECT
DETENTION BASIN OPTION
APRIL 21, 1994

I. **The five alternatives and "Selected Alternative" -**

Alter. 1 - Improvements to existing channel, no basin. Lowest cost, however, does not eliminate split flows at Reems Road.

WHY NOT SELECTED - This alternative does not eliminate the split flows which impact the west and south side of LAFB.

Alter. 2 - Significant improvements to existing channel, plus new channel construction from LAFB west along the frontage of Northern Avenue to Reems Road and north. No basin. Second lowest cost and eliminates split flows at Reems Road.

WHY NOT SELECTED - This alternative is not the least cost option which eliminates the split flows.

Alter. 3 - Improvements to existing channel, no basin. Significant new channel construction from LAFB west along the frontage of Northern Avenue to Reems Road and north, and along the west side of LAFB to south of LAFB. Highest cost and eliminates split flows at Reems Road.

WHY NOT SELECTED - This alternative is not the least cost option which eliminates the split flows, and it creates additional channel length of more than three miles.

Alter. 4 - Improvements to existing channel and construction of a very large one and one-half mile long basin along the frontage of Northern Avenue from the northeast corner of Reems Road and Northern Avenue to the AT&SF railroad. Significant right-of-way impacts. Middle cost and eliminates split flows at Reems Road.

WHY NOT SELECTED - This alternative is not the least cost option which eliminates the split flows, and it has the greatest impact to private property and roadway frontage.

Alter. 5 - Improvements to existing channel and construction of two large basins along the frontage of Northern Avenue from the northeast corner of Reems Road and Northern Avenue to the AT&SF railroad. Significant new channel construction along the west side of LAFB to south of LAFB. Significant right-of-way impacts. Second highest cost and eliminates split flows at Reems Road.

WHY NOT SELECTED - This alternative is not the least cost option which eliminates the split flows, and it has significant impact to private property and roadway frontage.

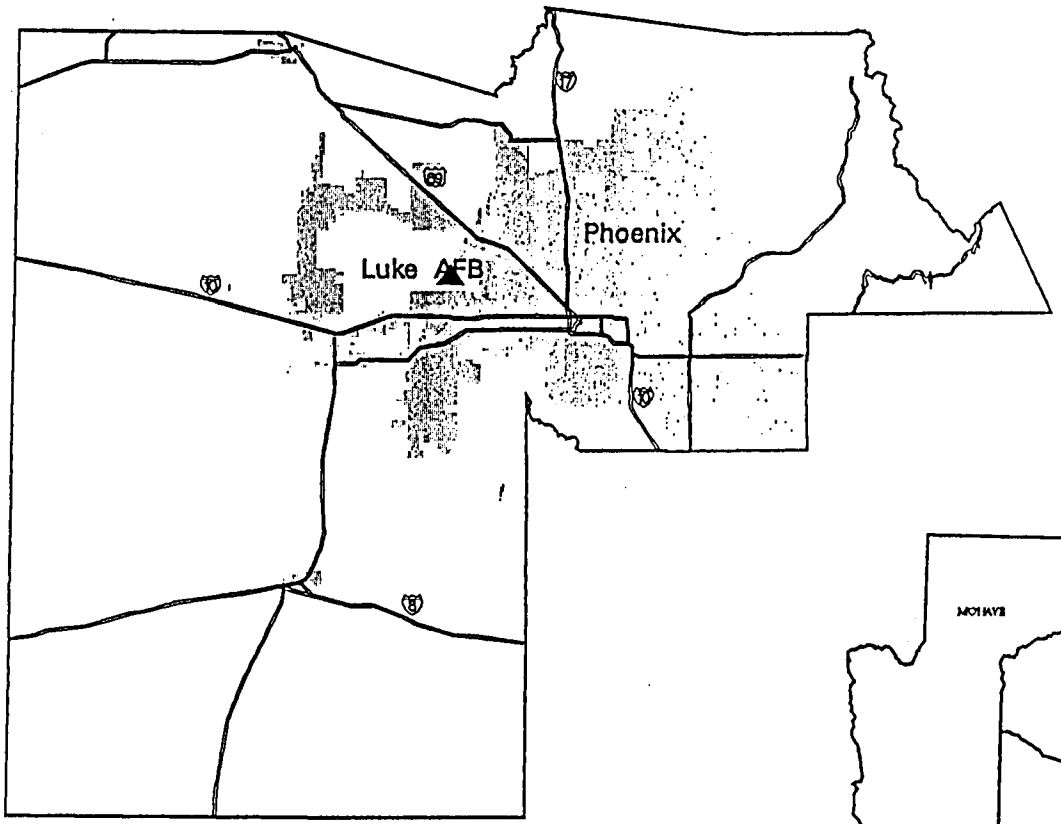
"Selected Alter." - Improvements to existing channel and construction of a smaller basin along the frontage of Northern Avenue at the northeast corner of Reems Road and Northern Avenue. Less right-of-way impacts than alternatives 4 and 5. Lowest cost of all the alternatives which eliminate the split flows at Reems Road.

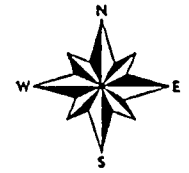
WHY SELECTED - This is the least cost alternative which eliminates the split flows, utilizing the channel improvement concept from Alternative 1 and the west basin concept from Alternative 5, and has the least impact to private property of the basin alternatives.

II. **Costs of alternatives -**

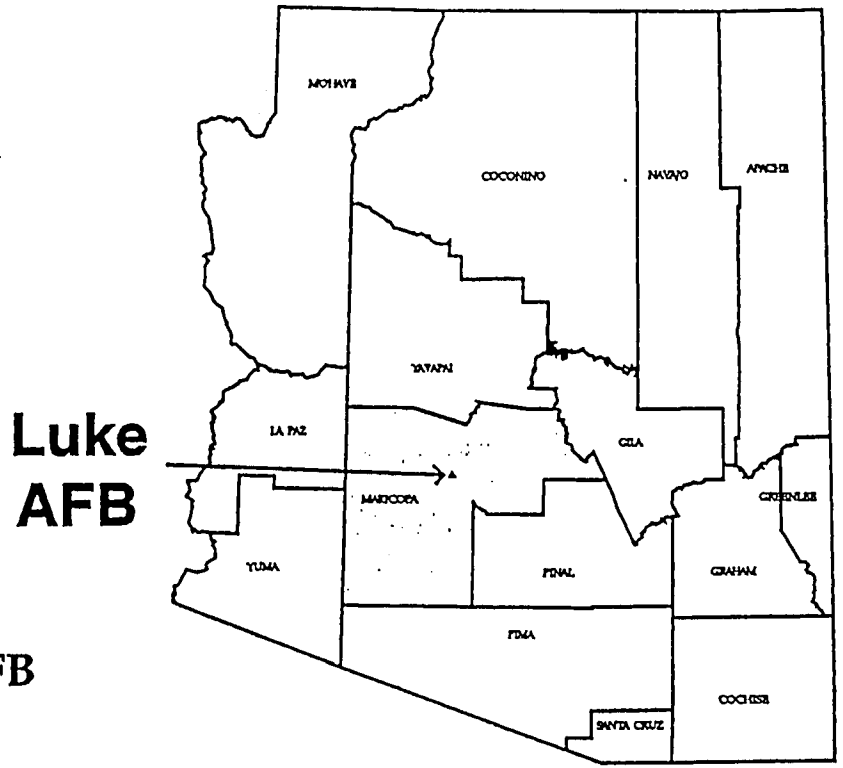
Using the Concept Design Study Report dated June 2, 1993 and the Selected Alternative Report dated August 4, 1993, the various alternatives construction costs including a 20% contingency, plus right-of-way at $2,500/acre are as follows:

Alter. 1 -	$6,253,200 + $12,138	=	$6,265,338
Alter. 2 -	$9,822,900 + $22,629	=	$9,845,529
Alter. 3 -	$12,256,700 + $110,656	=	$12,367,356
Alter. 4 -	$9,277,100 + $733,339	=	$10,010,439
Alter. 5 -	$10,071,000 + $609,589	=	$10,680,589
"Selected Alter." -	$8,694,600 + $322,628	=	$9,017,228
30% Engr's. Est. -	$8,637,600 + $415,000	=	$9,052,600





NOT TO SCALE



Luke AFB

Regional Location of Luke AFB

Figure 1.1-1

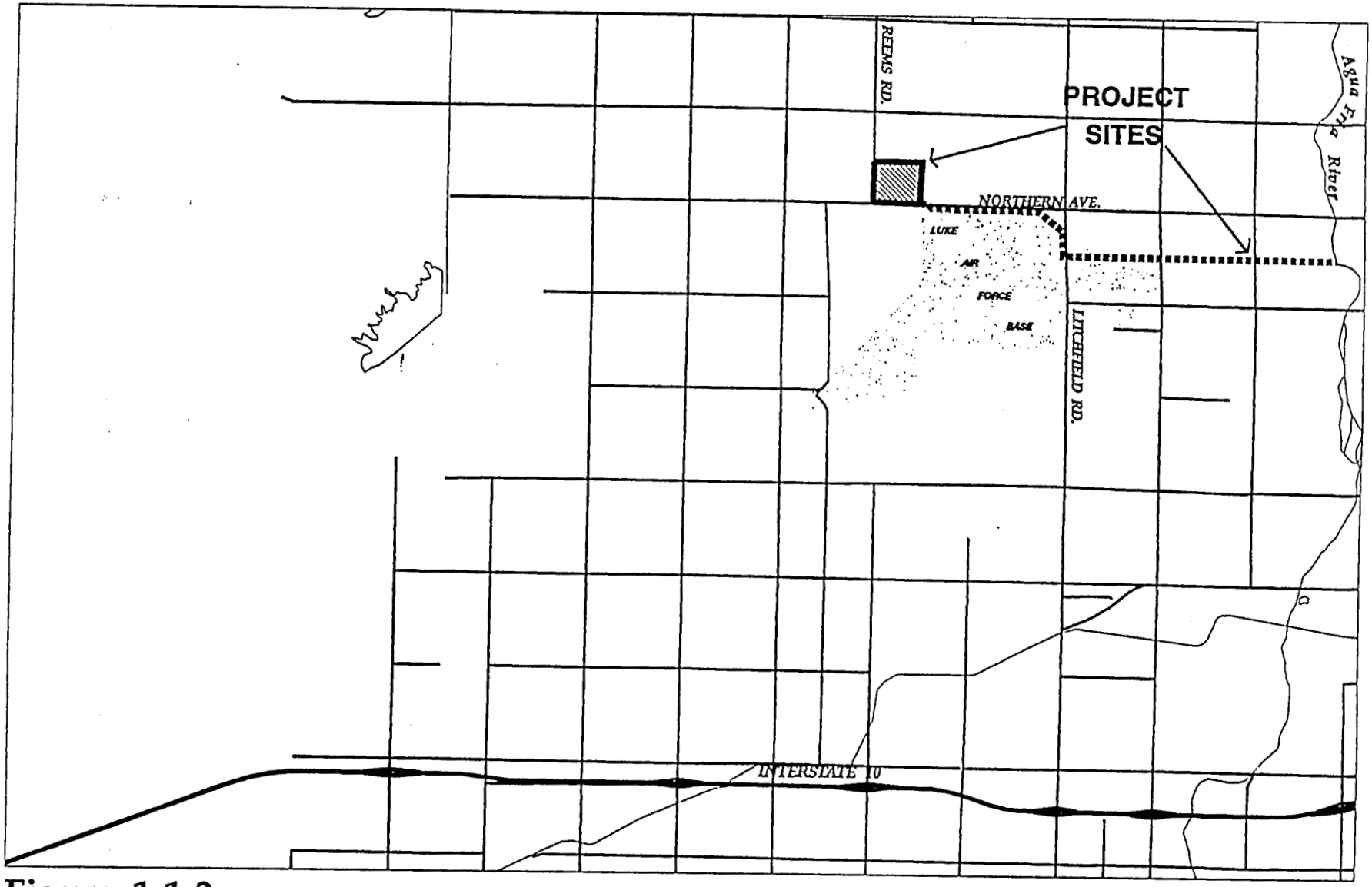


Figure 1.1-2

General Location of Project Site

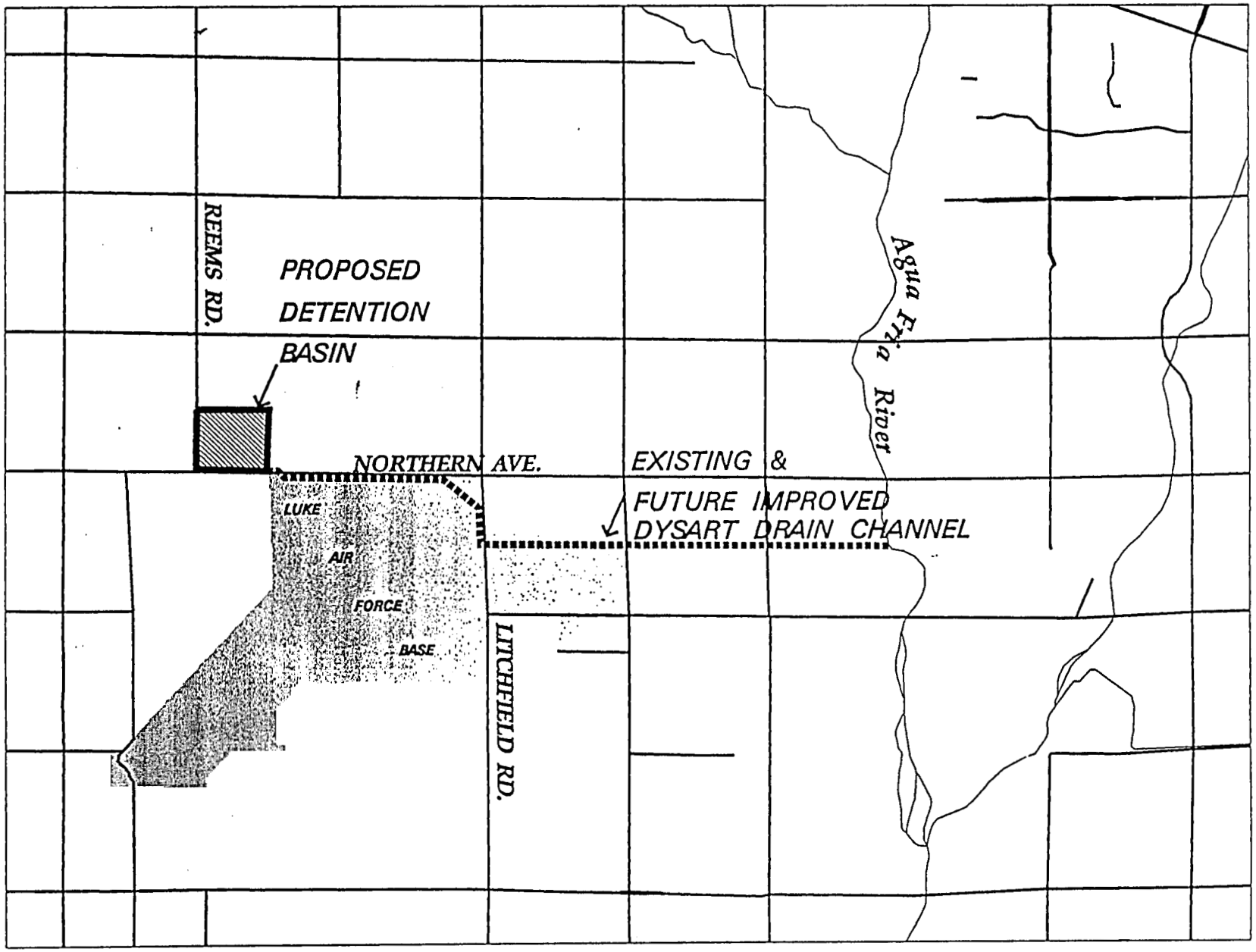


Figure 2.1-1

Dysart Drain Improvement Project

DATE: February 1, 1994

MEMO TO: Dale Olson, LAFB

MEMO FROM: Don Rerick, FCDMC

SUBJECT: Dysart Drain Project -
"EA" and "813" Report Narrative on Project History and Alternatives

Attached is an original and copy of the five page subject narrative.

This was requested by Robert Sheahan for his use in preparing the "EA", and by Mike Ray for his use in preparing the "Form 813".

Please provide copies of this to both Sheahan and Ray as soon as possible so as not to delay their activities in this regard.

If you, Mike, or Robert have any questions, or would like this document in Word Perfect diskette form, please call me at 506-1501.

Thanks.