MLM-MU-91-72-0006

CONCEPTUAL DESIGN REPORT
FOR THE
FACILITIES CAPABILITY ASSURANCE PROGRAM
ROADS AND PARKING LOT REPLACEMENTS
FY 1994 LINE ITEM

JANUARY 6, 1992

EG&G MOUND APPLIED TECHNOLOGIES

P.O. BOX 3000 MIAMISBURG, OHIO 45343-3000 513-865-4020

operated for the UNITED STATES DEPARTMENT OF ENERGY
Contract No. DE-AC04-88-DP43495

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January 06, 1992

Mr. James A. Morley, Area Manager
U. S. Department of Energy
Dayton Area Office
P. O. Box 66
Miamisburg, Ohio 45343

Dear Mr. Morley:

FY 1994 Budget Submission
Conceptual Design Report
Facilities Capability Assurance Program (FCAP):
Roads and Parking Lot Replacements
EG&G Mound, Miamisburg, Ohio

Attached are eighteen (18) copies (fifteen required AL copies plus three DAO copies) of the subject Conceptual Design Report for your information and further action.

This line item was last submitted in November, 1989 as a FY 1992 Line Item. In a memorandum, dated November 27, 1990, from J. M. Barr, Rear Admiral, U. S. Navy, Deputy Assistant Secretary for Military Applications, Defense Programs on the subject of Capital Asset Management Process (CAMP)/Reconfiguration Projects, Mound was informed that this line item was not accommodated in the FY 1992/FY 1993 OMB Budget. Thus Mound is resubmitting this required project as a FY 1994 line item.

The TEC for this FCAP line item remains at $2,200,000 because the escalation factors decreased and thus off-set the two years delay in the line item.

Yours very truly,

Charles F. Draut,
Project Management and
Planning Manager

Approved: V. E. Castleberry
V. E. Castleberry
Director, Engineering

Attachment
CFD:nac

xc: J. A. Morley, DAO (2)

roadscpds_104b

OK to Release
per Mary Faricelli
7-18-96

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CONCEPTUAL DESIGN REPORT

FOR

FACILITIES CAPABILITY ASSURANCE PROGRAM (FCAP)

ROADS AND PARKING LOT REPLACEMENTS

FY 1994 LINE ITEM

MOUND

MIAMISBURG, OHIO

PREPARED FOR THE USDOE
BY EG&G MOUND APPLIED TECHNOLOGIES SAS/JANUARY, 1992

CONCEPTUAL DESIGN REPORT

FOR
FACILITIES CAPABILITY ASSURANCE PROGRAM
ROADS AND PARKING LOT REPLACEMENTS

MOUND

RECOMMENDED FOR APPROVAL

Jon D. Yonko — 10/24/89

J. D. Yonko, Manager
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EG&G Mound Applied Technologies

Date:

V. E. Castleberry — 10-23-89

V. E. Castleberry
Director, Engineering Dept.
EG&G Mound Applied Technologies

Date:

B. S. Claiborne — 10-24-89

B. S. Claiborne
Facilities Engineer
Dayton Area Office, DOE

Date:

D Eckman — 10-24-89

D. Eckman
Chief, Operations Branch
Dayton Area Office, DOE

Date:

D Eckman (for) — 10-24-89

J. A. Morley
Area Office Manager
Dayton Area Office, DOE

Date:

This line item was last submitted in November, 1989 as a FY 1992 new start. In a memorandum, dated November 27, 1990, from J. M. Barr, Rear Admiral, U. S. Navy, Deputy Assistant Secretary for Military Applications, Defense Programs on the subject of Capital Asset Management Process (CAMP)/Reconfiguration Projects, Mound was informed that this line item was not accommodated in the FY 1992/FY 1993 OMB Budget. Thus, Mound is resubmitting this required project as a FY 1994 line item. The TEC remains at $2,200,000 because the escalation factors decreased and thus off-set the two years delay in the line item. Because this is a resubmittal of a previously approved proposed line item, the approval page was not reissued for signatures.

CONCEPTUAL DESIGN REPORT

FOR

ROADS AND PARKING LOT REPLACEMENTS

(FCAP)

MOUND

MIAMISBURG, OHIO 45343-3000

PREPARED FOR THE USDOE

BY EG&G MOUND APPLIED TECHNOLOGIES SAS/JANUARY, 1992

CONTRIBUTORS:

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NO.	DATE	REVISION	REV. BY	DOE/DAO APPROVAL
1	01/92	Delayed Line Item from FY92 to 94		

FACILITIES CAPABILITY ASSURANCE PROGRAM
ROADS AND PARKING LOT REPLACEMENTS
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FACILITIES CAPABILITY ASSURANCE PROGRAM
ROADS AND PARKING LOT REPLACEMENTS

PART I - DESIGN CONCEPT

INTRODUCTION

Mound, located in Montgomery County, Miamisburg, Ohio, on the east bank of the Great Miami River, was established in 1948 by the Atomic Energy Commission to develop and manufacture explosive devices for the United States Government. Mound occupies 305 acres and at present the facility is operated by EG&G Mound Applied Technologies. It is devoted to research, development, testing and manufacturing of components for nuclear weapons systems under the auspices of the United States Department of Energy (DOE). The complex employs approximately 2,200 people generating an annual payroll in excess of $75 million.

Whereas Government sponsors have traditionally placed great emphasis on new technological concepts and manufacturing processes for weapons, unfortunately, such has not been the case in the maintenance of the roadway infrastructure. The roadway system which, for the most part is 40 years old, must be restored to a condition which will ensure smooth transportation of weapon component production, safe access for emergency and fire vehicles and safe ingress and egress for pedestrian personnel. This Facilities Capability Assurance Program (FCAP) project will provide this much needed restoration.

1. GENERAL DESCRIPTION OF PROJECT

The Mound site is generally divided into three portions; the Main Hill area, the upper area, and the lower area (See Figure I-1). The Main Hill area, the original Mound site, and the subject of this study is characterized by deteriorated roadways, parking lots and sidewalks. Many of the roads within the area have vertical profiles exceeding 10 percent with an absence of guardrail, proper roadway geometrics, drainage structures, signage or pavement markings.

The Main Hill area is highly congested as a result of ongoing construction along with vehicular traffic from contractors, vendors, and Mound employees. This traffic mix creates potential hazards and increases the likelihood of vehicle and pedestrian conflict throughout the area.

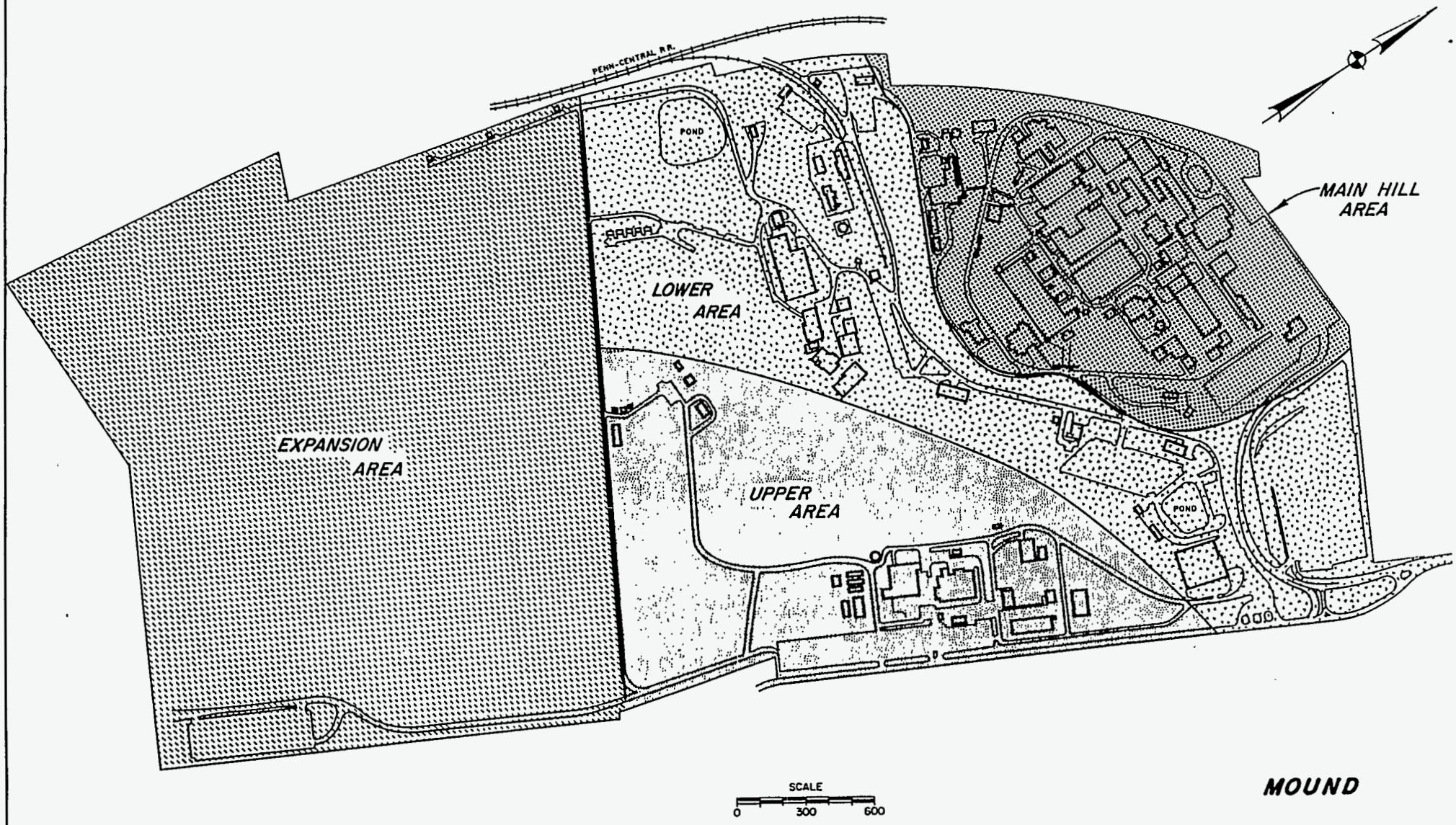

PENN-CENTRAL R.R.
POND
MAIN HILL AREA
LOWER AREA
EXPANSION AREA
UPPER AREA
POND
SCALE
0
300
600
MOUND

FIGURE I-1

The latest FCAP appraisal rates the existing roadway system as very poor to marginal. During their design life, the roadways have suffered from joint deterioration, sub-base failure and problems related to poor drainage. The sporadic maintenance repairs (due to funding deficiencies) and numerous expansions and installations of underground utilities have contributed to the failures. Record cold winters (deep freezing and thawing) and increased traffic have contributed to deterioration of these roads. At Mound, the roadways, parking lots, drainage and security routes all intertwine; which further complicates both the problem and its solution.

This conceptual design report will be an in-depth examination of the present Main Hill roads, parking and staging areas. The objective of the proposed project will be to restore the original areas to acceptable pavement and drainage standards to prevent detrimental impact to Mound production, vehicles, and personnel. The objective will be accomplished by examining the deficiencies, outlining the corrective measures, and producing cost data for engineering design and construction.

Specific components included in this project are as follows (See Sketch 1):

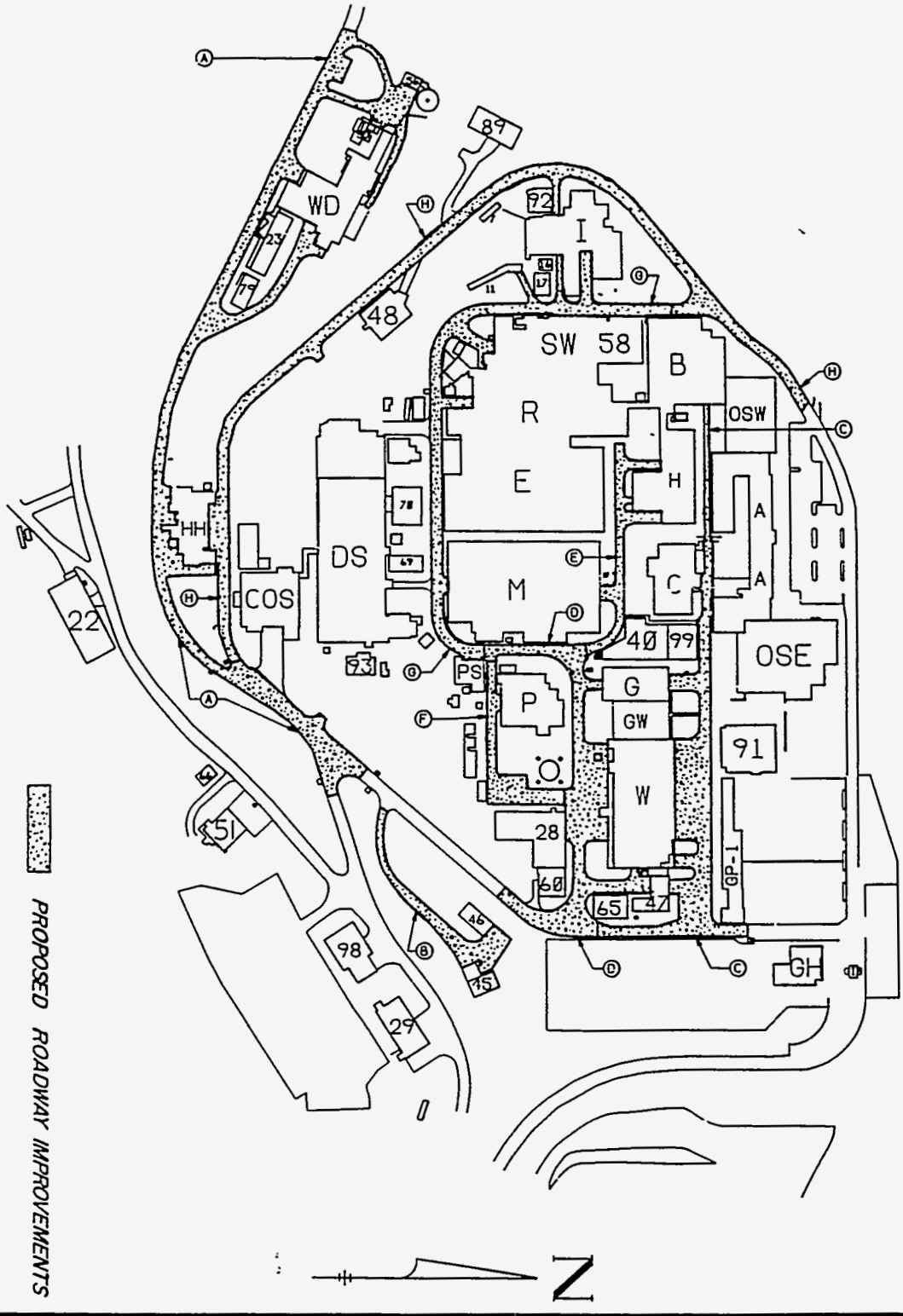
A. Replacement of the roadway from Guard Post #5 to the Waste Disposal (WD) Building. The new roadway will be asphalt over concrete and will include curb, sidewalks and provisions for drainage.

B. Replacement of the roadway serving Building #45 and Building #46 (Welding Development). The new road will incorporate a full depth asphalt pavement, new curb, reconstructed drainage structures, erosion protection and the replacement of an existing chain link fence.

C. Scarification and concrete joint repair of the roadway from Guard Post #1 to the Administration (A) Building. The roadway will receive an asphalt overlay, new sidewalks and the staging areas and drainage structures will be reconstructed.

D. Scarification, concrete joint repair, and an asphalt overlay for the roadway from the old warehouse (W Building) to the machine shop (M Building). Other items of work include new curb and reconstructed drainage structures.

E. Scarification, concrete joint repair, and an asphalt overlay for the roadway between the machine shop and the old cafeteria (C Building). Other items of work include new curb and reconstructed drainage structures.



PROPOSED ROADWAY IMPROVEMENTS

CONSTRUCTION PERIOD = 209 DAYS

N

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FACILITIES CAPABILITY ASSURANCE PROGRAM
ROADS AND PARKING LOTS
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SKETCH 1 OF 9

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DATE

F. Scarification, concrete joint repair and an asphalt overlay for the roadway between the water tower and the cooling tower. Other items of work include curb and reconstructed drainage structures.

G. Scarification, concrete joint repair and an asphalt overlay for the roadway south of the machine shop and west and north to the Operations Support West Building (OSW Building). Other items include reconstructed manholes, catch basins, staging areas and installation of curb.

H. Replacement of the roadway from Building OS West (OSW) to the new Central Operations Support (COS) Building. The new upgrade will include guardrail, curb, sidewalk and drainage facilities.

2. JUSTIFICATION

This project is justified on the basis of the need to reconstruct numerous segments of Mound's main hill road systems which are reaching the end of their design life and are deteriorating beyond reasonable repair. These segments are now requiring large layouts of expense dollars on a continuing basis to maintain a marginal condition of performance.

The drainage systems within many of these road segments have insufficient capacity to meet the current runoff demands. The poor performance of the existing drainage systems creates potential safety hazards due to ponding and freezing of surface water in many of the road segments. The inadequacy of the existing drainage system also causes the erosion of the plant landscaping which contributes to the sediment found in the plant's storm water run-off.

Many of the road segments provide insufficient capability to protect pedestrian traffic due to the lack of sidewalks, handicapped curbs, and traffic signs. In addition, many sections of sidewalk and curbing are severely deteriorated and have become a safety hazard to pedestrians.

At present, there are approximately 6.75 miles of roadway and 16.5 acres of paved parking at Mound. The roads and parking areas to be replaced by this project are used for transportation of finished goods, personnel, equipment, hot waste, other materials, as well as the parking of the vehicles and storage of various pieces of equipment. Over the past several years, there has been one documented incident in which the poor road conditions resulted in damage of approximately $50,000 to weapons components. In addition, vehicle maintenance costs related to front end alignments and deterioration of suspension systems have increased significantly over the past three years.

An independent engineering study, which was completed in 1982, identified the estimated costs to maintain these roads at about 13% of the current replacement costs. Figures I-2 thru I-8 illustrate the present condition of the roads.

FIGURE I-2

ALLIGATOR CRACKS RESULTING FROM
UNSTABLE SUBGRADE SUPPORT

FIGURE I-3

DETERIORATED CURB WHICH PROMOTES
INEFFECTIVE STORM WATER CHANNELIZATION

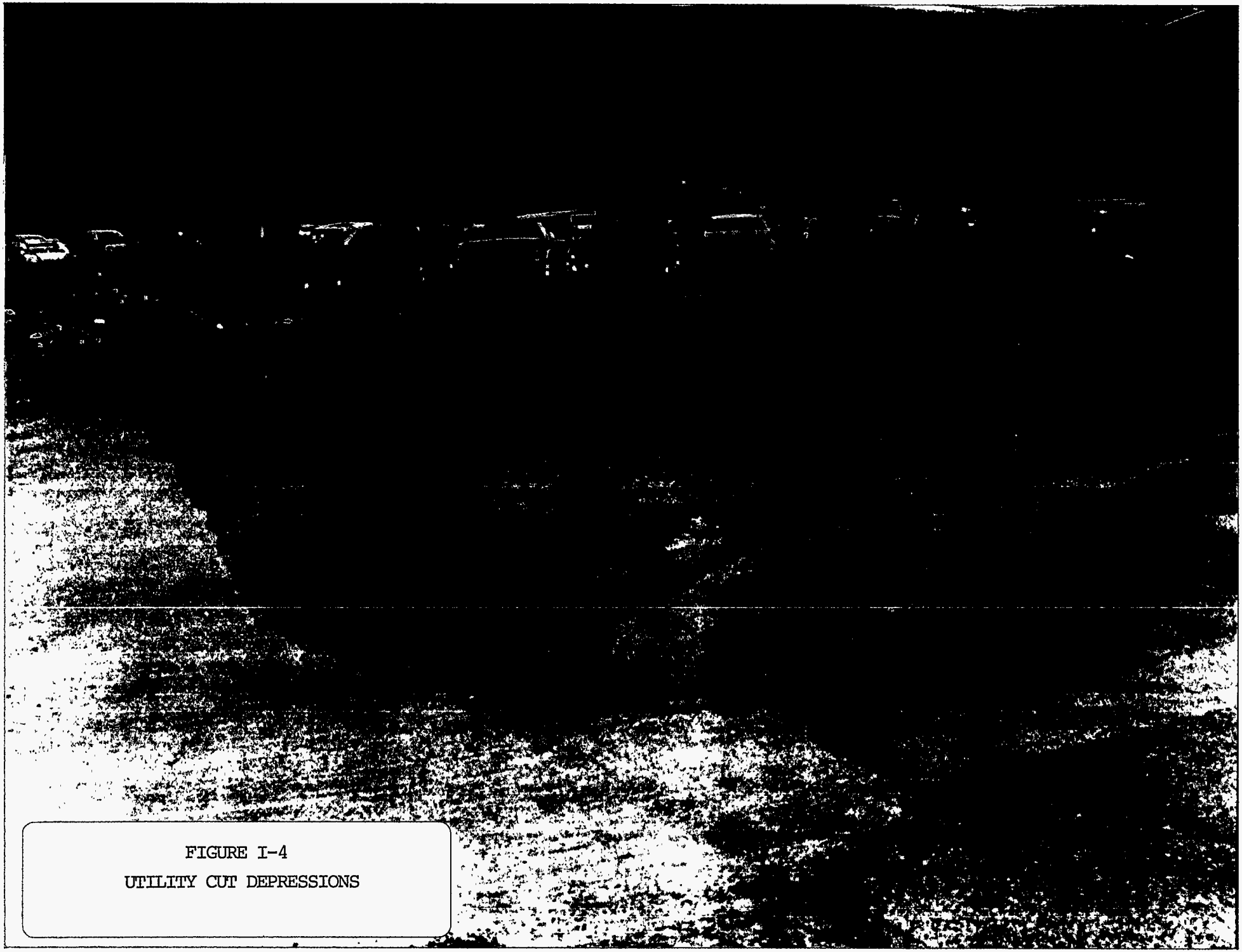


FIGURE I-4

UTILITY CUT DEPRESSIONS

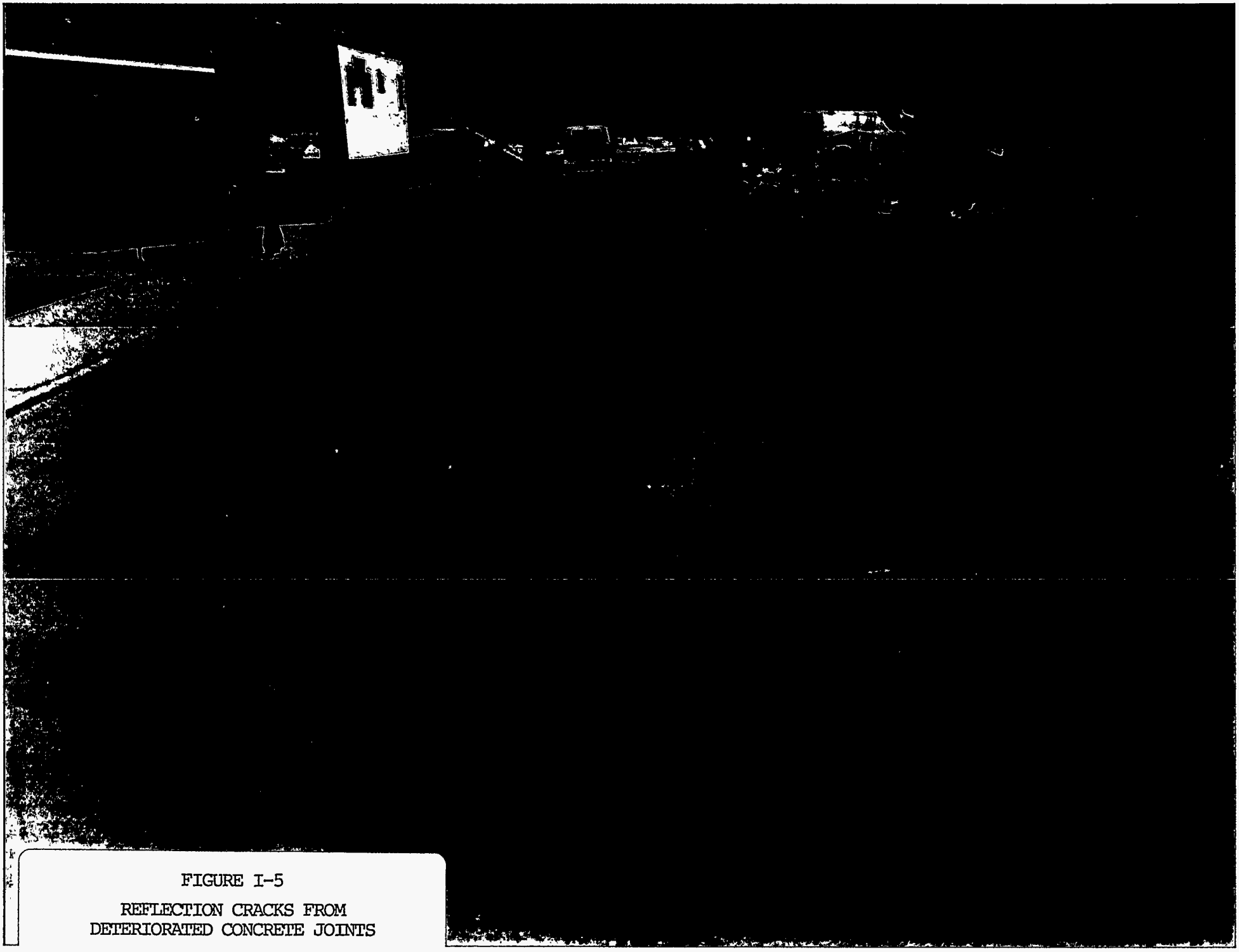


FIGURE I-5

REFLECTION CRACKS FROM
DETERIORATED CONCRETE JOINTS

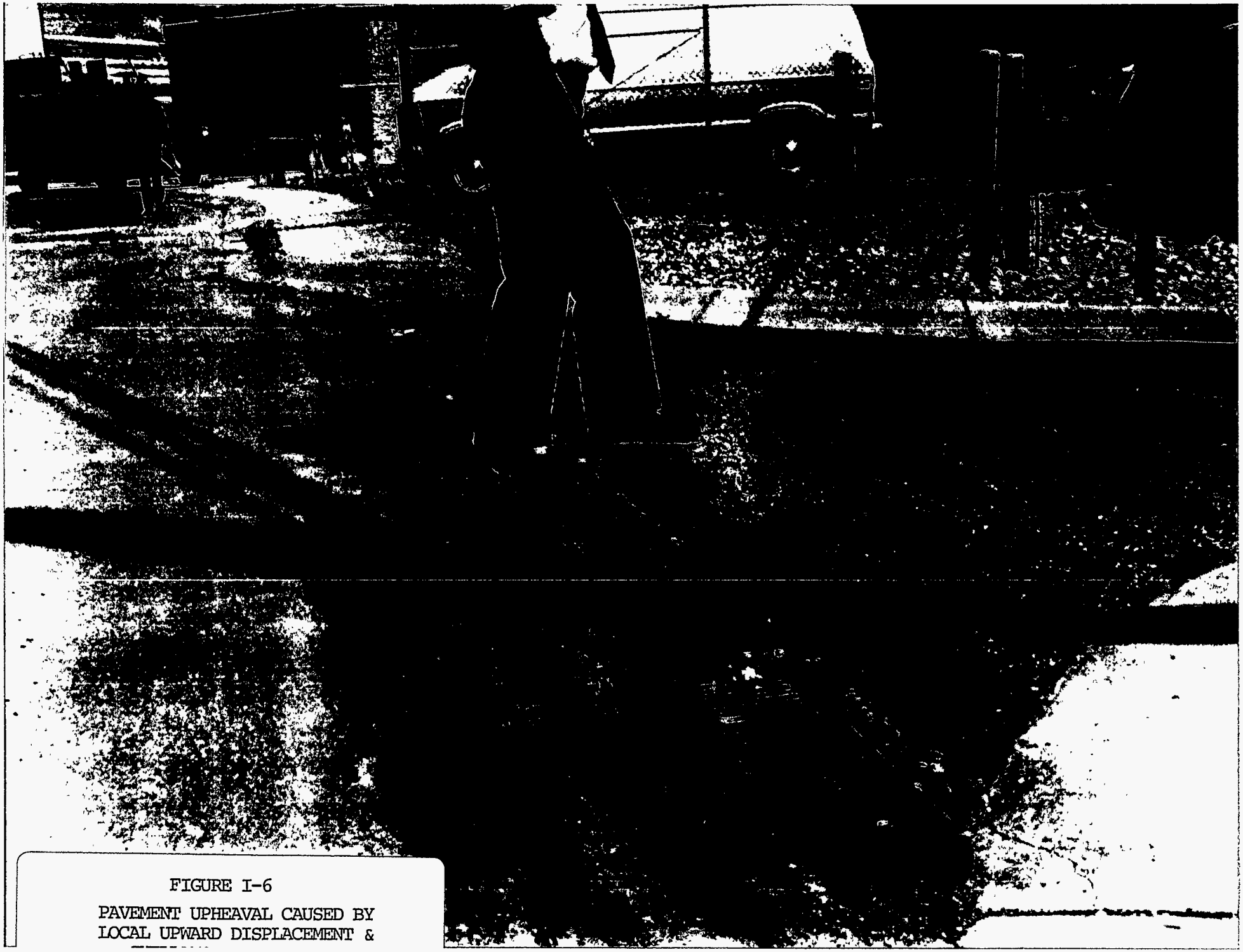


FIGURE I-6

PAVEMENT UPHEAVAL CAUSED BY
LOCAL UPWARD DISPLACEMENT &

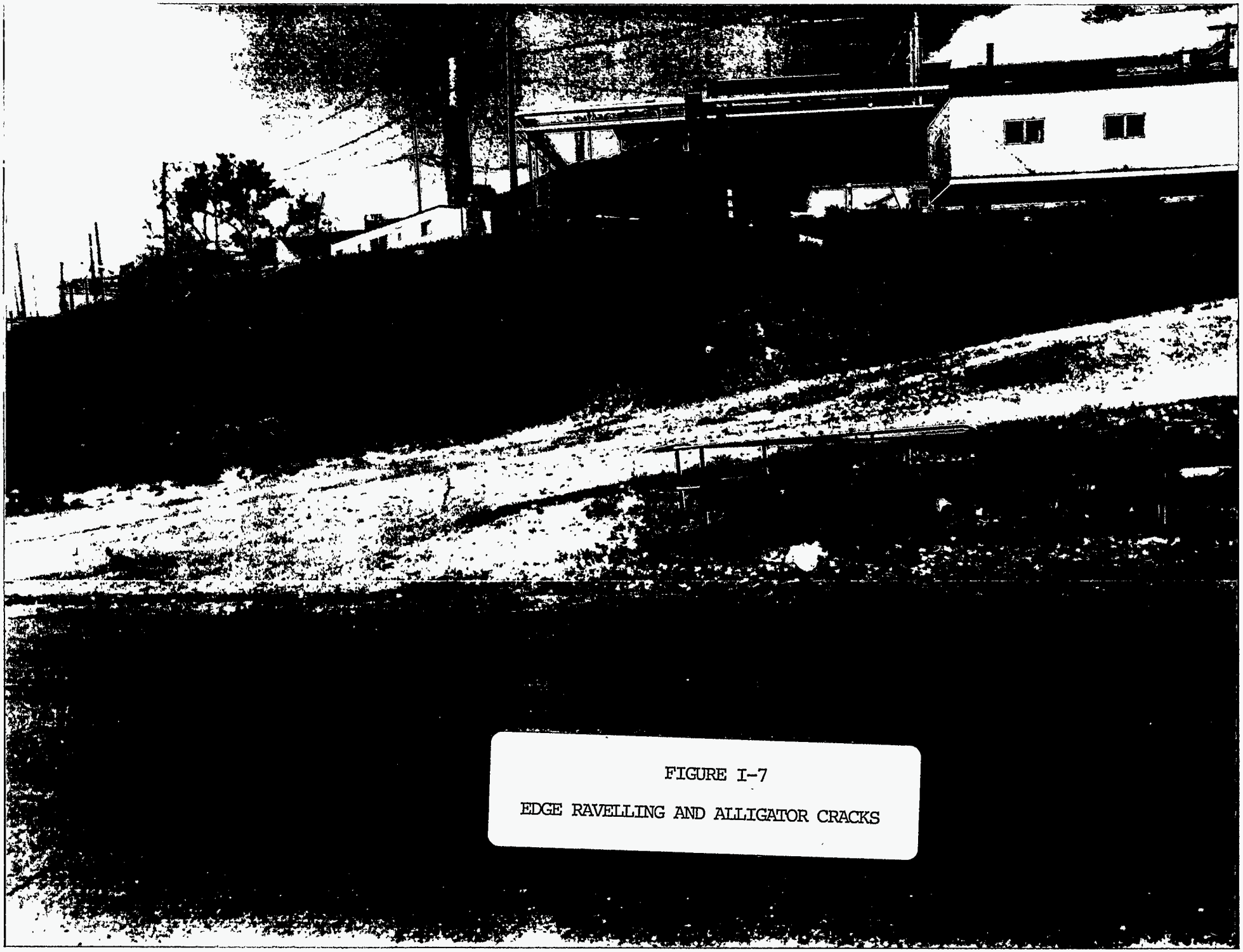


FIGURE I-7

EDGE RAVELLING AND ALLIGATOR CRACKS

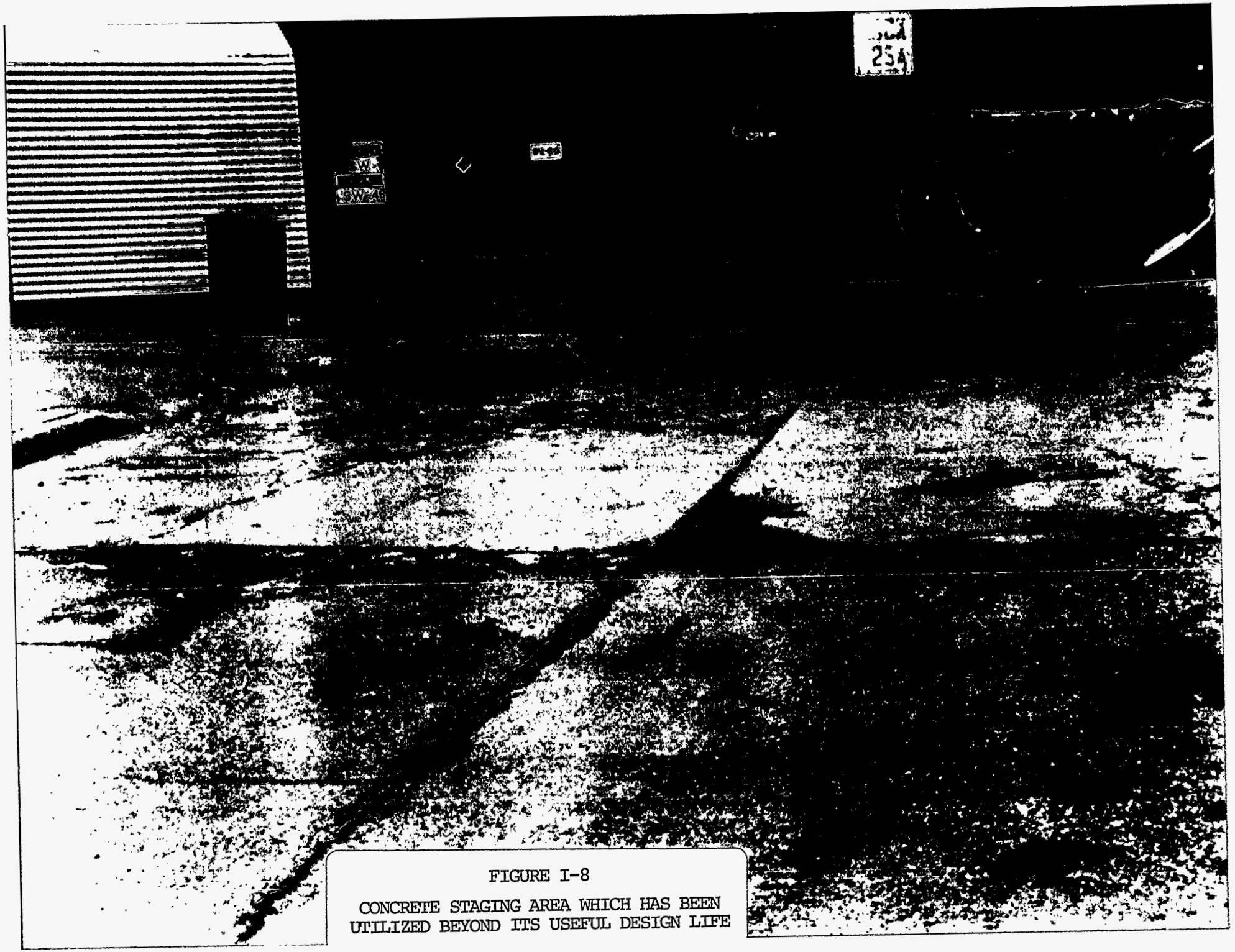


FIGURE I-8

CONCRETE STAGING AREA WHICH HAS BEEN UTILIZED BEYOND ITS USEFUL DESIGN LIFE

The following narrative describes each of the various road segments:

A. Roadway from Guard Post #5 to the Waste Disposal (WD) Building (see Sketch 2)

The north roadway section in the vicinity of guard post #5 is an asphalt wearing surface over concrete. The south roadway section is an asphalt wearing surface over gravel, stone and clay. The general condition of the roadway is considered to be fair to very poor. This roadway section originated as a well traveled dirt road that has been paved repeatedly over the years.

These sections were never fully engineered with respect to pavement design, sidewalks, curbs and gutters, storm sewers and access to the buildings. The result is a roadway with minimum standards, and insufficient drainage which contributes to pavement break-up. A cosmetic paving of the area was done in 1984, and for two years the pavement section had the appearance of being adequate, but has since continued to deteriorate. A review of photos taken in 1982 revealed a consistent problem related to poor subgrade conditions which are accelerating the pavement deterioration. This roadway section should be removed and replaced with a pavement section consisting of an asphalt overlay with a concrete and stone base adequate enough to accommodate the frequent truck traffic. It is also recommended that sidewalks, curb and gutter, erosion protection and storm sewers be included with the upgrade.

B. Roadway serving Building #45 and Building #46 (Welding Development) (see Sketch 3)

The deterioration of this roadway section is due primarily to the poor directional flow to the existing drainage system. Overland drainage flows across the area and continues in the direction of the parking lot near Building #29, causing severe erosion problems on the side slopes and exposing the supports of the existing chain link fence. The sideslopes should be seeded utilizing a Kentucky Bluegrass and fescue mixture, the fence should be replaced, inlets installed and the pavement section should be removed and replaced with a full depth asphalt pavement with underdrains.

C. Roadway from Guard Post #1 to the Administration (A) Building (see Sketch 4)

This roadway section is an asphalt wearing surface over concrete and it receives considerable truck traffic to and from the cafeteria and the old warehouse. The completion of buildings in the area has increased both pedestrian and vehicle traffic utilizing the road. Inlets along the roadway should be re-designed and set at an elevation which provides for sufficient drainage and eliminates ponding. The pavement section should be scarified, the concrete joints repaired and an asphalt overlay applied. The staging area at the mail room should be removed and replaced. The old track scales which are no longer operable will also be removed to provide vehicle parking space for the Security forces located in Building 47.

D. Roadway from the Old Warehouse (W Building) to the Machine Shop (M Building) (see Sketch 5)

This roadway section is characterized by an asphalt wearing surface over a concrete base and it serves as part of the internal employee bus transportation route. There are several items that are recommended to be corrected, and they are as follows:

- o Curb and gutter in front of the machine shop.
- o Re-design and set curb inlets and other drainage structures.
- o Scarify pavement, repair concrete joints and overlay with asphalt.

These repairs will insure that with proper maintenance thereafter, the roadway will reach its projected useful design life.

E. Roadway between the Machine Shop (M Building) and the Old Cafeteria (C Building) (see Sketch 6)

The roadway section consists of asphalt wearing surfaces over 9" of concrete and a 6" gravel base. The east section was recently rehabilitated, curbs were installed, inlets were replaced and set at proper elevations and the roads were resurfaced and will require only minor work. The west section (75% of total area) is an asphalt wearing surface over concrete and receives considerable truck traffic to the surrounding buildings. Inlets along the roadway should be redesigned and set at an elevation to promote drainage and eliminate ponding. The pavement section should be scarified, the concrete joints repaired and an asphalt overlay applied.

F. Roadway between Water Tower and Cooling Tower (see Sketch 7)

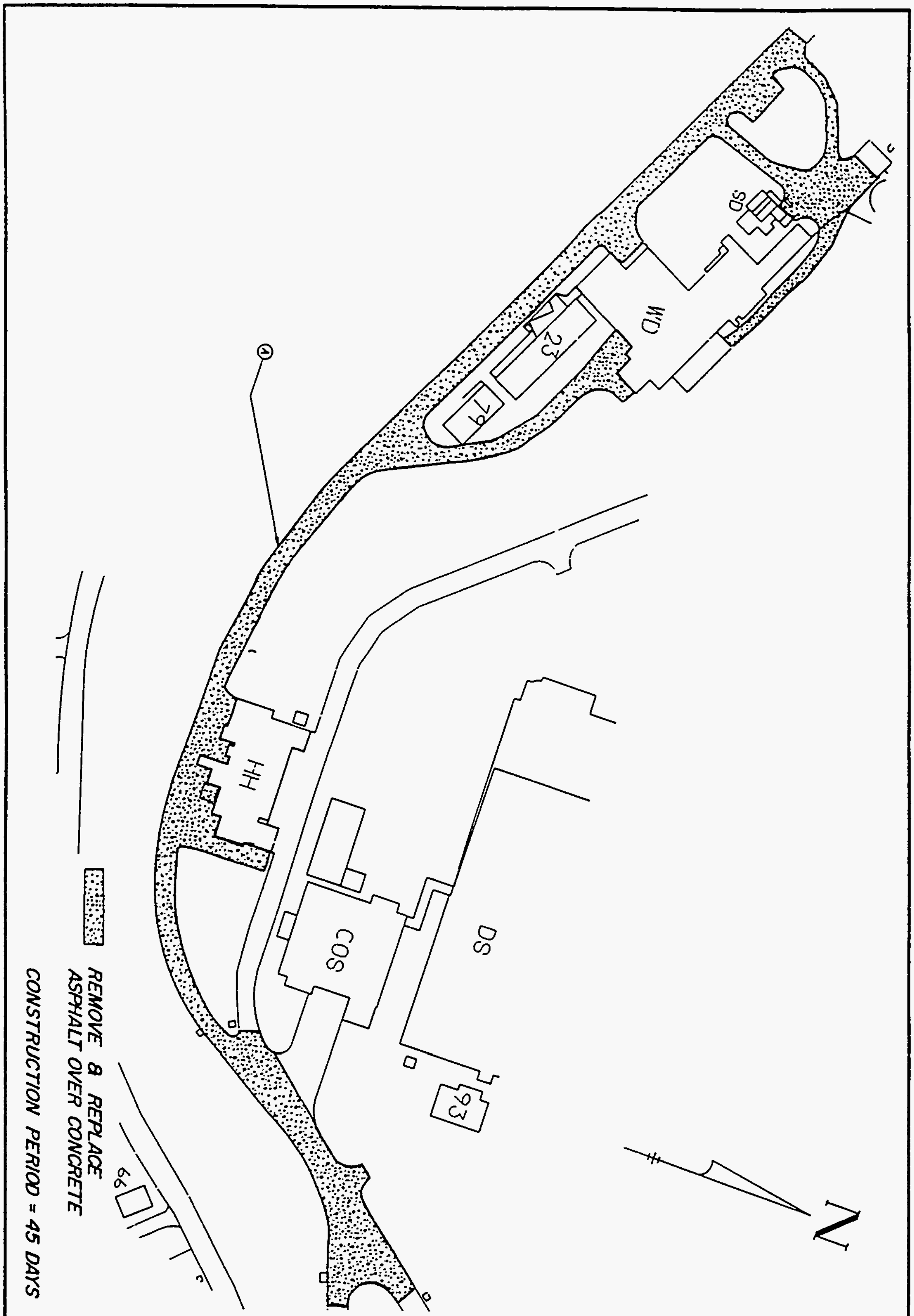
The west portion of this roadway is fifteen feet in width and much too narrow for the traffic mix which it must accommodate. Unfortunately, it is this west end which has functions adjacent to the roadway. Repairs are needed to the curbs and drainage structures. Erosion protection should be provided south of the cooling towers and south of the Ceramics Building (Building #28). The steep ravine south of Building #28 should be protected with guardrail to meet safety requirements. The pavement section is recommended to be scarified, the concrete joints repaired and an asphalt overlay applied.

G. Roadway south of the Machine Shop (M Building) and west and north to the Operations Support West Building (OSW Building) (see Sketch 8)

The problems that exist in this section are not unlike those within the central portion of the Main Hill area. It is recommended that the staging areas at Buildings #16, 17, SW, R and the Development and Standards Building (DS) (adjacent to Building 69) also have joint repairs with an asphalt wearing course applied. The pavement section should be scarified, the concrete joints repaired and an asphalt overlay applied. Other repairs that are needed include curb and gutter, manhole and catch basin structures.

H. Roadway from Operational Support West (OSW) Building to the Central Operations Support Building (COS) (see Sketch 9)

The soil borings for this roadway section indicate an adequate depth of concrete base material (9" to 9-1/2") but also some concrete decomposition. It is recommended that the roadway be redesigned and reconstructed. The guardrail should be removed and replaced according to safety standards, curb and gutter be installed and the drainage system rehabilitated. The staging areas at Building #48 and HH Building should also be removed and replaced.



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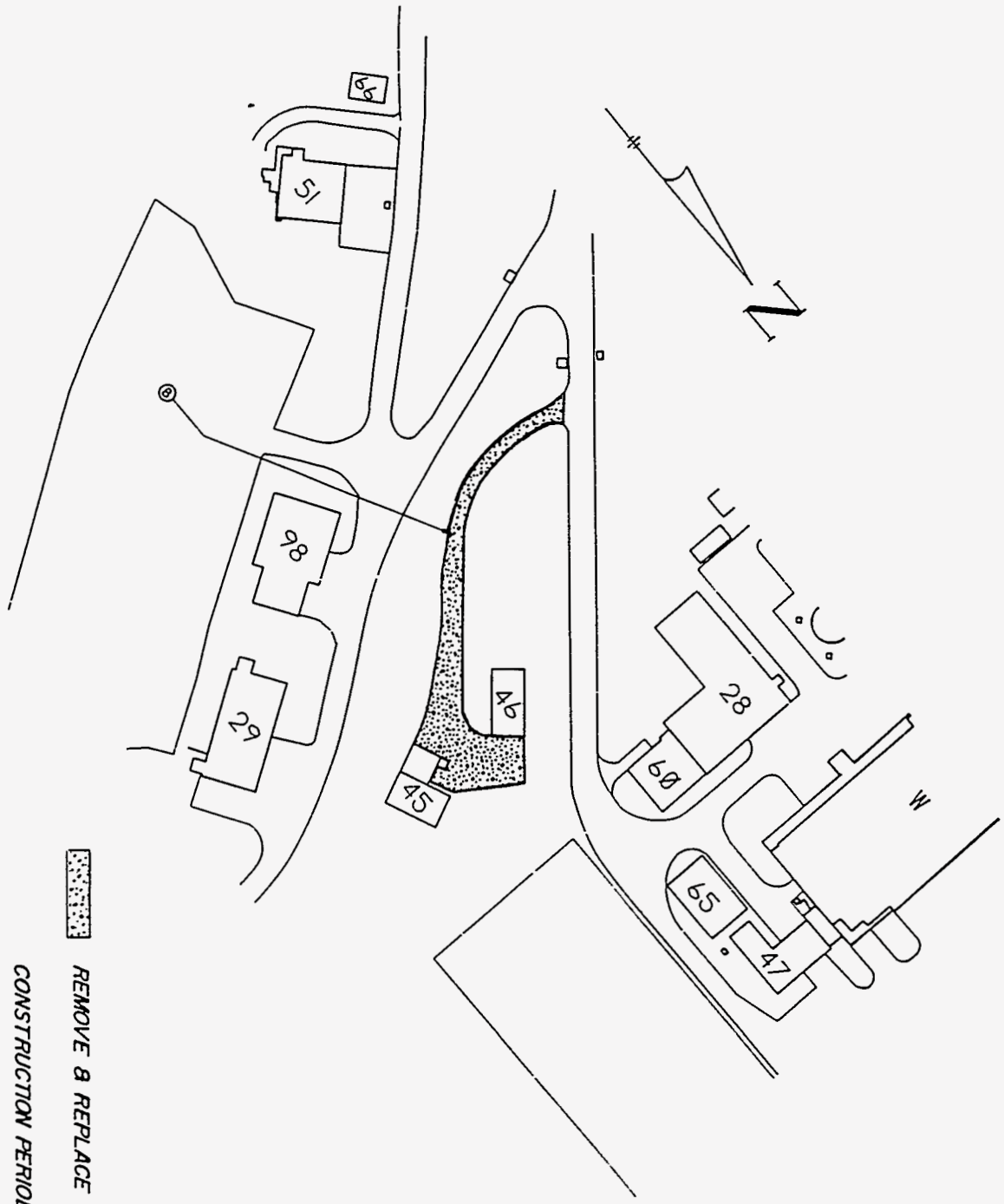
ROADS AND PARKING LOTS
CONSTRUCTION/DESIGN COST ESTIMATE

SKETCH 2 of 9

JOB NUMBER 406E2

DATE



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SKETCH 3 OF 9
JOB NUMBER 406E2
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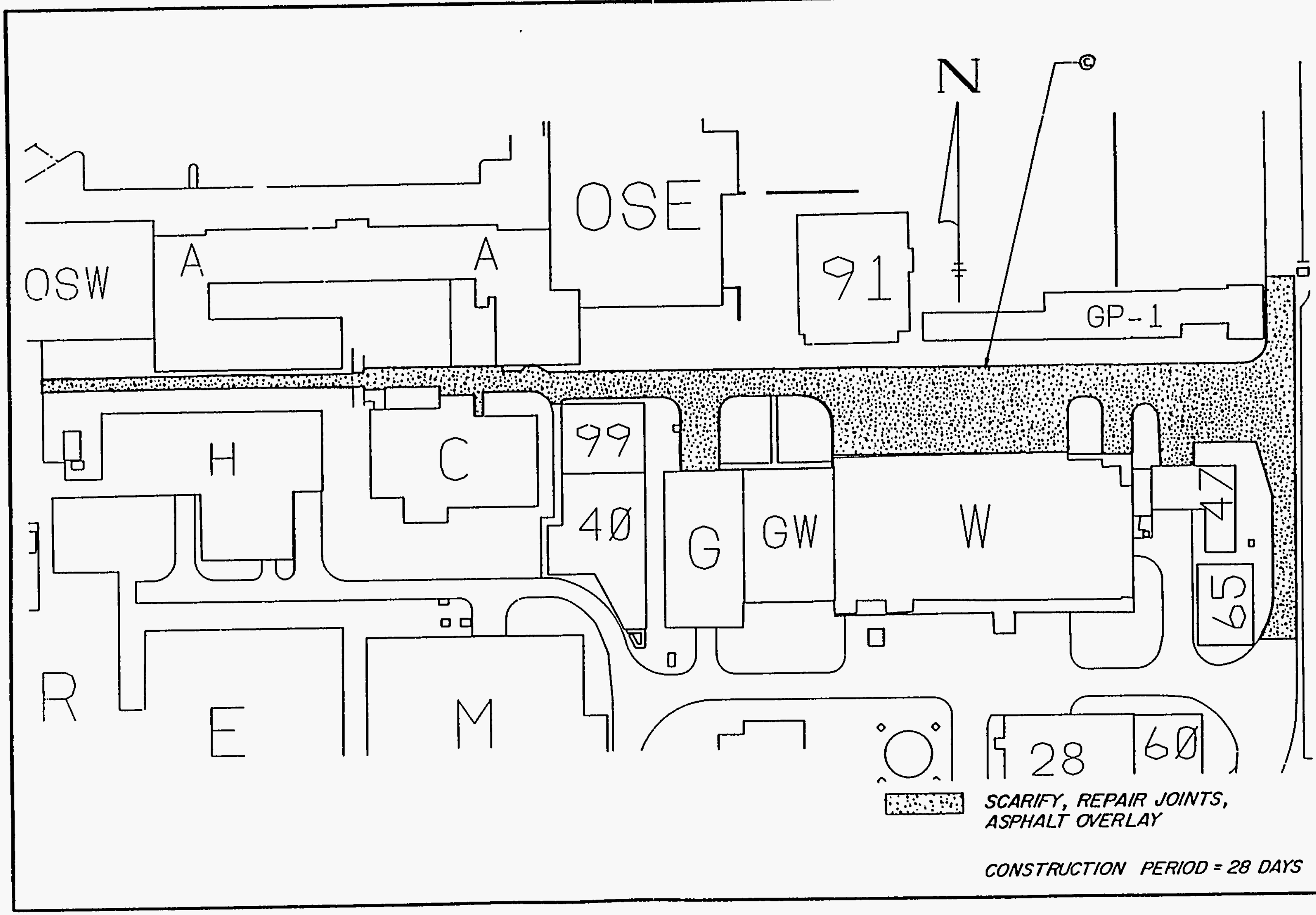

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SKETCH 4 of 9
JOB NUMBER 406E2
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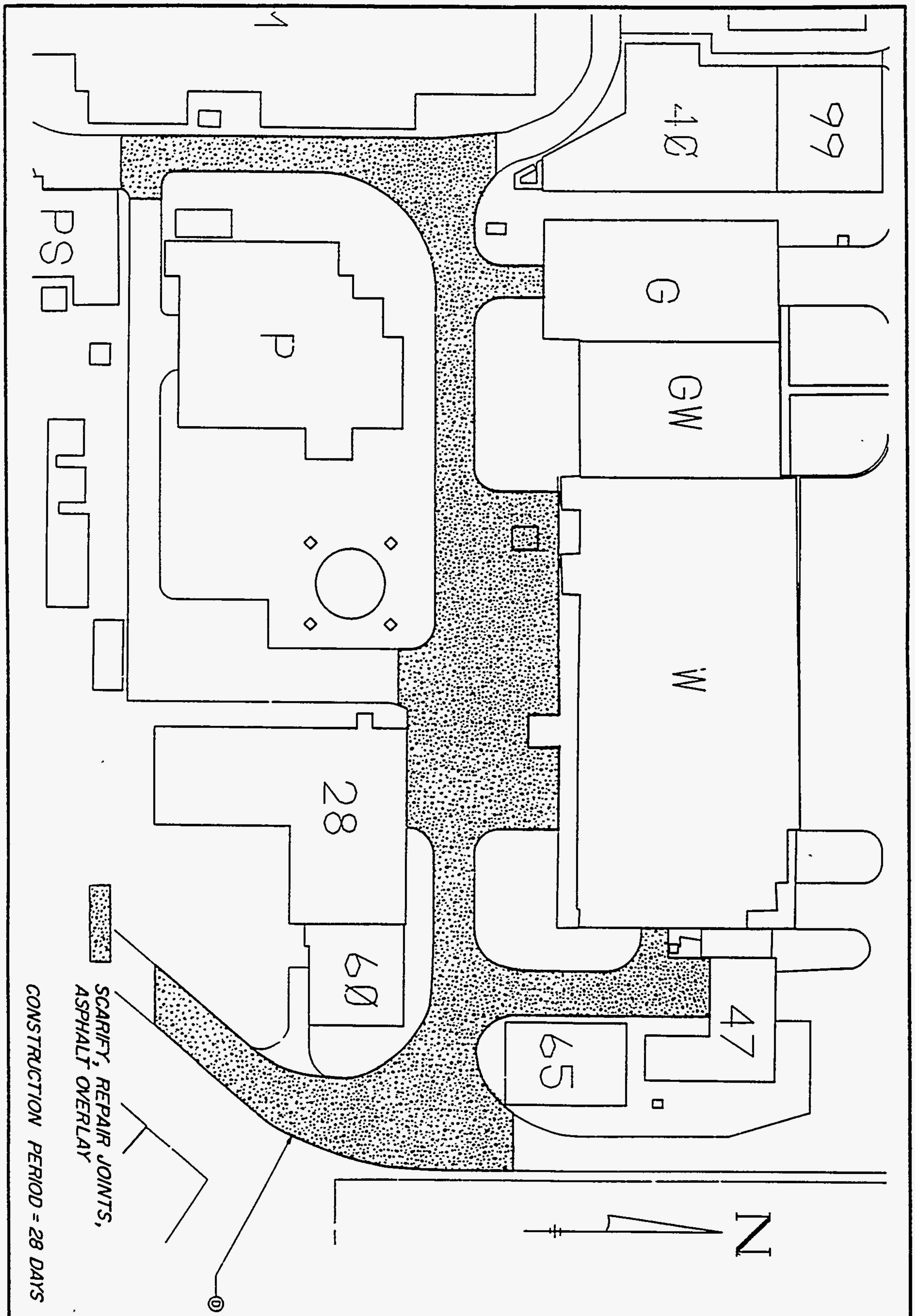

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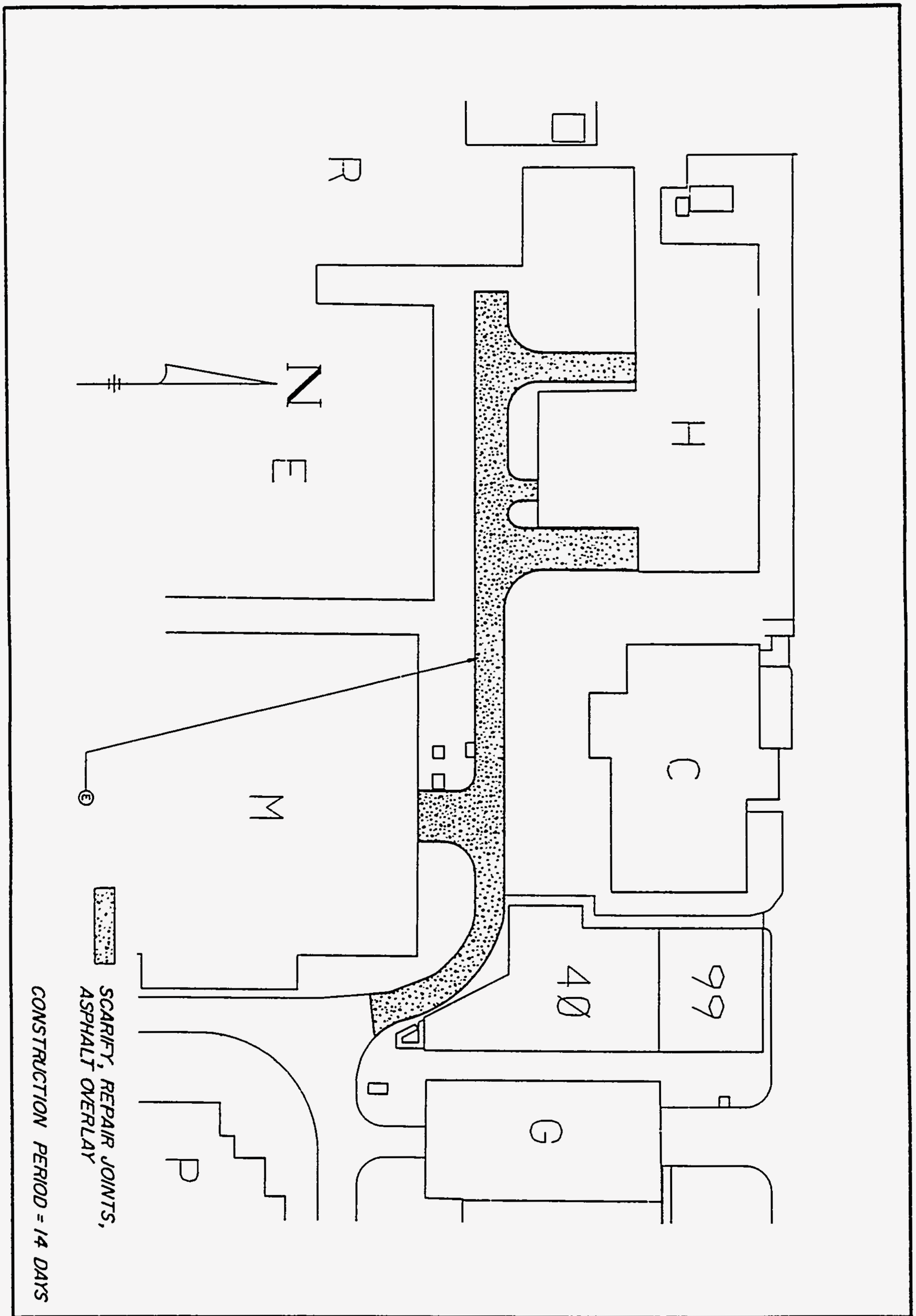

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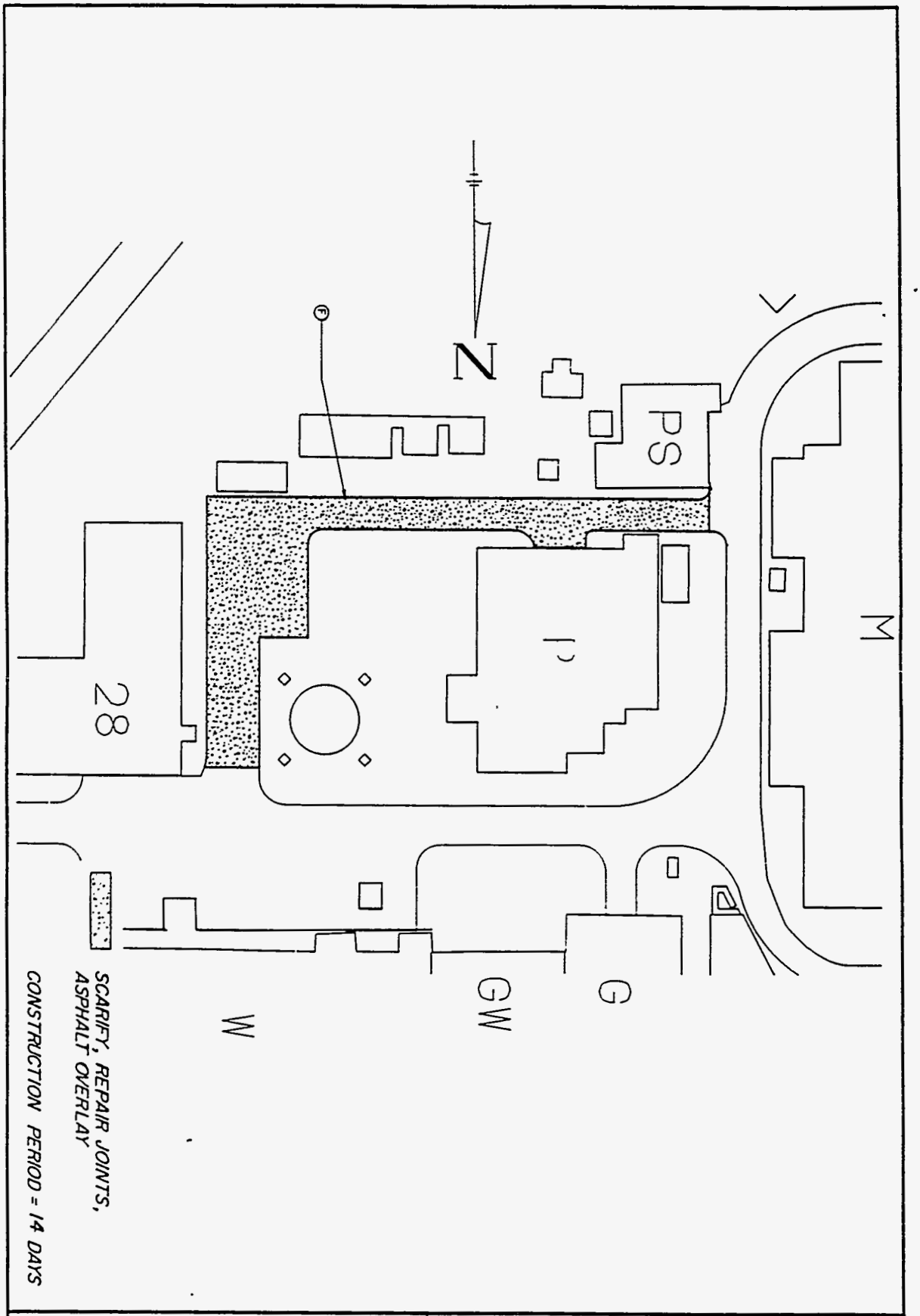

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ROADS AND PARKING LOTS
CONSTRUCTION/DESIGN COST ESTIMATE

SKETCH 7 OF 9
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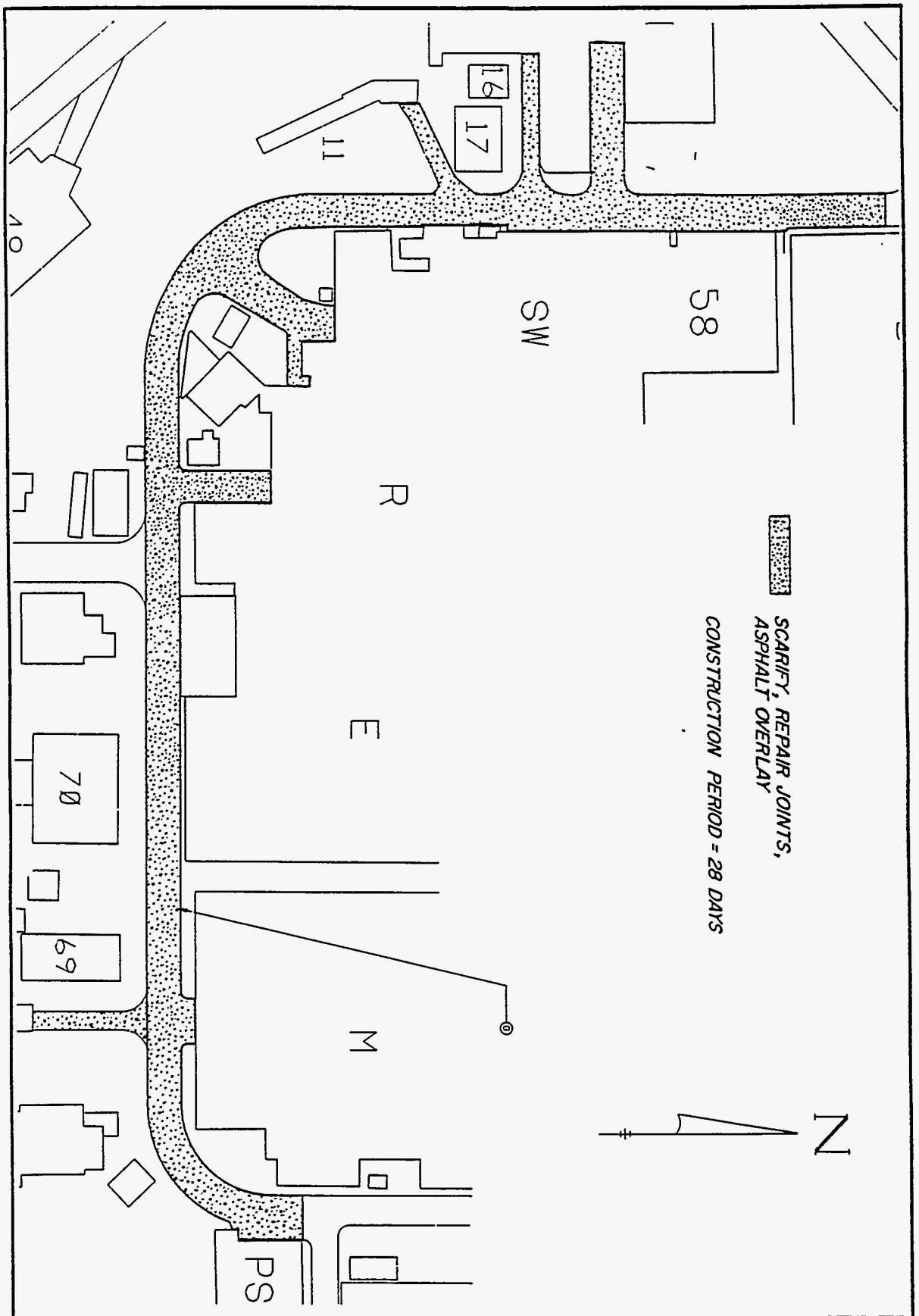

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FACILITIES CAPABILITY ASSURANCE PROGRAM
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SKETCH 8 OF 9
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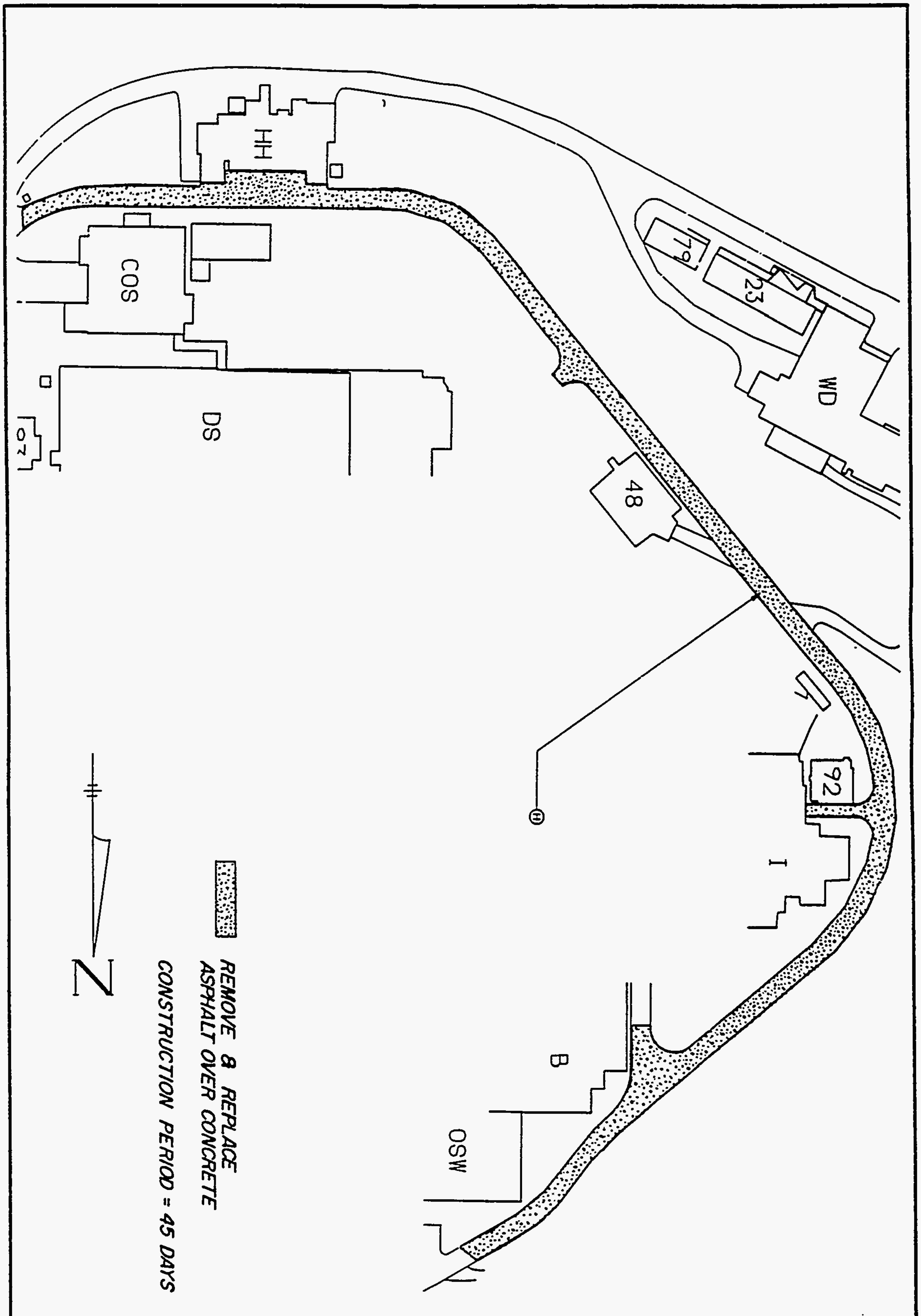

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3. RELATIONSHIP TO OTHER PROJECTS

The improvements proposed in this report do not relate to any other particular project. The upgrade of plant roadways, however, relates to the plant site as a whole and results in improved plant operations.

4. ALTERNATIVE EVALUATIONS

W. M. Gilleside, in his Manual of the Principles and Practices of Road Making stated that "a minimum of expense is, of course, highly desirable; but the road which is truly the cheapest is not the one which has cost the least money, but the one which makes the most profitable returns in proportion to the amount expended upon it." Because transportation competes with other opportunities for investment of public funds, demands for roadway improvements have always far exceeded the funds available to make them, and from this constraint there should always be an environment of cost consciousness. In the public arena, cost consciousness must be all conclusive and must weigh all the consequences to all who will be affected by the proposed improvement.

The Main Hill roadway system must answer two questions "Why do it at all?" and "Why do it this way?" There presently exist four alternatives to the Main Hill roadway system, the merits of each are as follows:

a. Do Nothing

This alternative is totally unacceptable because it would result in rapid and complete deterioration of plant roadways, ultimately impacting production, increasing safety hazards, and adversely affecting the environment because of uncontrolled water run-off.

b. Cosmetic Repairs

This alternative wastes scarce maintenance dollars while not correcting the root of the problem. Additional asphalt overlays actually contribute to failure of the drainage system by blocking drains and raising gutters (decreasing gutter capacity).

c. Complete Removal

The complete removal of the roadway system is not economically feasible nor does it make sense from an engineering standpoint. It has been shown that the majority of the roads are structurally adequate and are in need of mostly surface repairs. The complete removal of the roadway system would create a monumental construction staging problem that would severely cripple the transportation patterns.

d. Remove and Rehabilitate

The proper alternative is a combination approach. Some of the roadways should be removed but others need only to be scarified and asphalt overlays applied. The concrete sections should have joint repairs made and then overlaid with asphalt. Sidewalks, drainage structures and drainage systems should be re-engineered and pavement markings, handicap ramps and uniform signs should be incorporated into the design.

5. DESIGN CONCEPTS

a. Design Description

This project will be designed in accordance with the provisions of DOE Order 6430.1A, Divisions 1, 2 and 3, and the U.S. Department of Transportation "Handbook of Highway Safety Design and Operating Practices."

b. Energy Conservation Analysis

Not applicable for this project.

c. Environmental Considerations

- An Action Description Memorandum (ADM) on this project was submitted on February 1, 1989. DOE/AL issued a determination on October 13, 1989 which listed this project as a categorical exclusion listed in Section D of the DOE NEPA Guidelines (54 FR 12474); therefore, further NEPA documentation is not required.

- This project is not controversial; will be designed to minimize occupational, public health and safety hazards; will have no adverse affect on human health, safety, welfare or well-being; will not degrade water, air or land resources; will not affect the ecological systems; and will not destroy historical or cultural aspects of our national housing, transportation, schools and other social cultural amenities. Reasonable efforts will be made to control noise, dust and traffic during the site preparation and construction phases of the project.

- Airborne effluent will be treated in a manner consistent with existing facility practices at Mound to ensure compliance. Drainage will be controlled such that no erosion problems are encountered.

- The project is located in an area not subject to flooding, determined in accordance with Executive Order 11988 and DOE Regulation 10 CFR 1022.

- This project will comply with the policies, objectives and requirements of Executive Order 12088, National Environmental Policy Act, DOE 5440.1D, issued February 22, 1991.

d. Facility and Equipment Maintainability Considerations

The pavement and drainage systems, provided by this project, will be designed and installed with consideration for maintenance in the most economical and efficient manner.

e. Safety Considerations

- Fire

  All new construction will be in accordance with NFPA requirements.

- Wind and Earthquake

  Mound is required to design all new structures in accordance with ASCE7-88 (American Society of Civil Engineering Standards) wind and UBC (Uniform Building Code) seismic guidelines but are modified by UCRL-15910 "Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards."

- Miscellaneous

  No fallout shelters will be included in this project. In case of emergencies during construction, personnel will evacuate to T Building, which is the designated fallout shelter for this area of the plant site.

f. Security Considerations

The security considerations for this project incorporate normal contractor operating procedures and special considerations when area security islands are breached with service lines.

Security escorts will be used with any uncleared personnel employed in the construction of these projects when the work is within the main security island. Work in these areas will be subject to scheduling in order to assure adequate escort service by Mound Facility Security personnel.

g. Site Development Plan Coordination

These modifications and upgrades have been coordinated with The Mound Site Development Plan.

h. Roadway Analysis

In October 1982, Bowser Morner Testing Laboratories, Inc., completed a physical condition survey of the Mound Laboratory roads. The purpose of the study was to establish the length, width, classification, structure and condition of the roads and to establish a long range budget for upgrade and maintenance. During the Bowser Morner study, 78 borings of the pavement section were made and the borings revealed a number of different sections. Although the pavement condition of the roadway system in the Main Hill area has been given an overall rating of poor, close examinations show that most of the roads were "engineered" with respect to structural adequacy. Several soil borings which are "typical" of those found on the Main Hill area are depicted on the following page.

Upon comparing the "typical" sections, Figure I-9, with street design sections of the City of Dayton, Ohio, Figure I-10, it is clearly noted that the existing roads are structurally adequate. The deterioration is directly related to roadways being extended beyond their useful design life. It is also apparent from the typical sections that several "transportation links" evolved into roadways after being overlayed with concrete or asphalt.

When a pavement section exceeds its useful design life, or is improperly installed, there are several failure signs that generally occur. Many of these signs have occured in the Main Hill area. They are as follows:

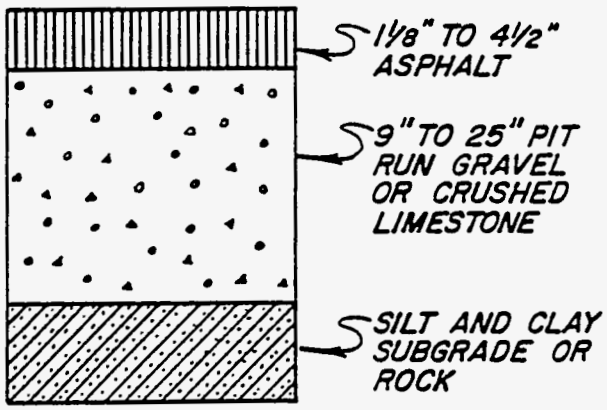
- Alligator Cracks (See Figure I-2)

  These are interconnected cracks forming a series of small blocks resembling an alligator's skin or chicken-wire. This condition occurs when a full depth asphalt section is used and excessive deflection results from unstable surfaces of support. The unstable support usually is the result of saturated granular subbases or subgrade.

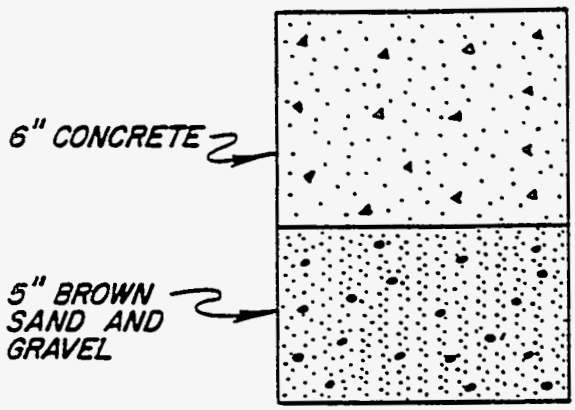
- Utility Cut Depressions (See Figure I-4)

  Depressions in the pavement that develop from a cut for utility installation or repair. These depressions are caused by lack of adequate compaction of backfill or utilization of improper backfill.

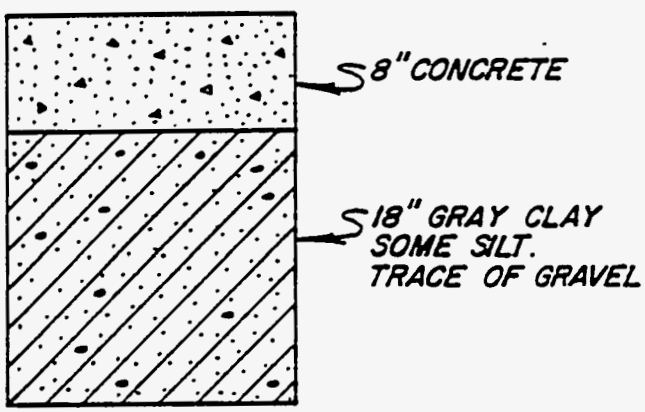
TYPICAL EXISTING PAVEMENT SECTIONS



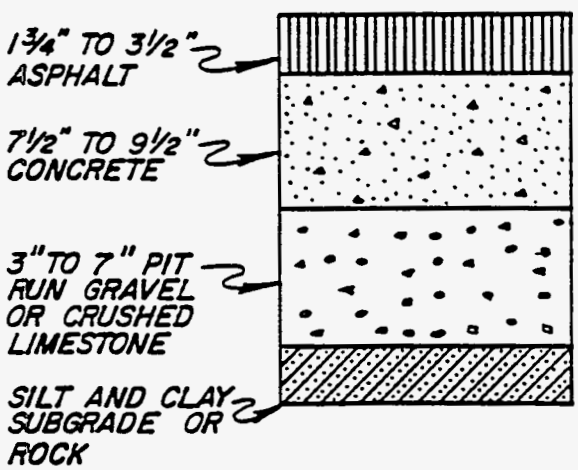
A



B



C

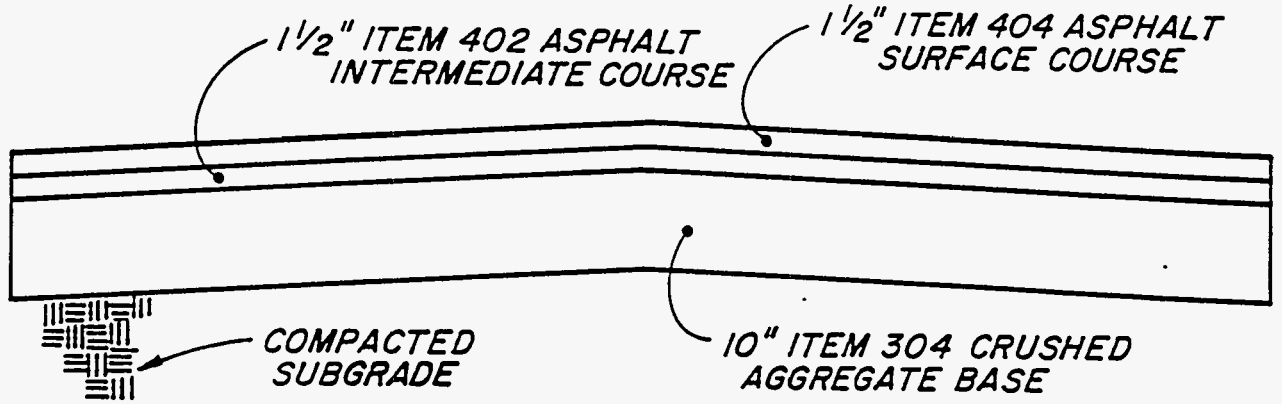


D

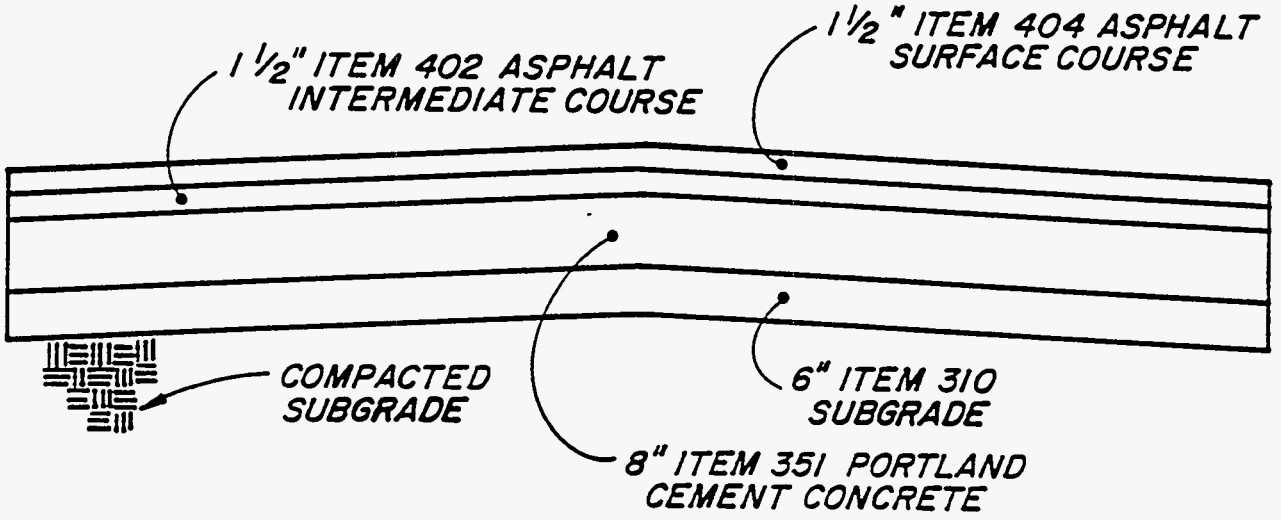
NOTE:

SECTIONS A AND D INDICATE ENGINEERED ROADWAYS AND SECTIONS B AND C INDICATE EVOLVED ROADWAYS OVER ORIGINAL SOIL PATHS.

FIGURE-9



RESIDENTIAL STREET



THOROUGHFARE STREET

CITY OF DAYTON, OHIO
STREET STANDARDS

FIGURE-10

- o Reflection Cracks (See Figure I-5)

  These are cracks in asphalt overlays which reflect the crack pattern in the pavement structure underneath. They occur most frequently in asphalt overlays on portland cement concrete or cement treated bases. They may also occur in asphalt overlays on asphalt pavements whenever cracks in the old pavement have not been properly repaired.

- o Upheaval (See Figure I-6)

  Upheaval is the localized upward displacement of a pavement due to swelling of the subgrade. This condition is most commonly caused by expansion of ice in the lower courses but it may also be caused by the swelling effect of moisture in expansive soils.

- o Ravelling (See Figure I-7)

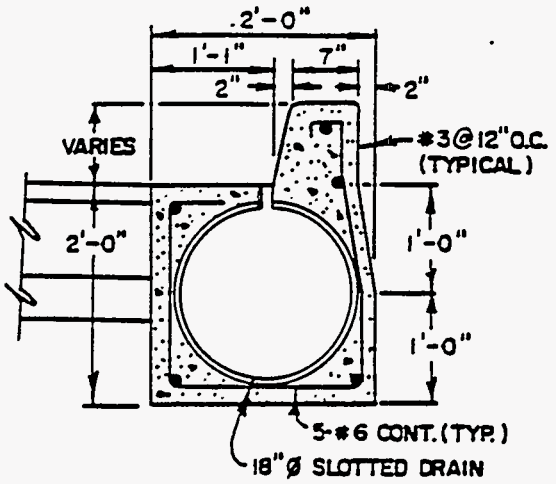
  This is the progressive separation of aggregate particles from the pavement surface. Raveling is caused by lack of compaction during construction, construction during wet or cold weather, dirty aggregate, too little asphalt in the plant mix or overheating of the asphalt mix.

i. Storm Sewer Analysis

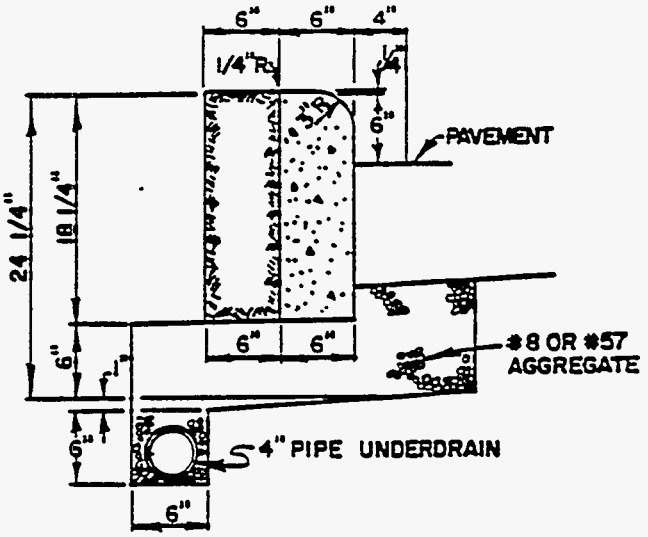
Hydraulic considerations for storm sewer systems prior to the 1950's were generally based on rule of thumb methods, many of them of doubtful validity. Since that time, engineers have devoted increasing attention to drainage problems and their effects on other roadway elements. Storm sewer designs should be implemented so that major storm waters are collected and the roadway drainage problem is reduced to caring for the water that falls on roadways and backslopes.

There are many sections of the Main Hill area whereby the drainage structures are inadequate in number or have failed from over-use. Also within the Main Hill area there exists several roadside ditches from which water is drawn by capillary action to the subbase and subgrade which contributes to pavement failure. Figure I-11 shows typical drainage structures and construction techniques which can be utilized to extend the useful design life of pavement surfaces.

Figures I-12 thru Figure I-14 show inadequate drainage structures that exist in the Main Hill area.

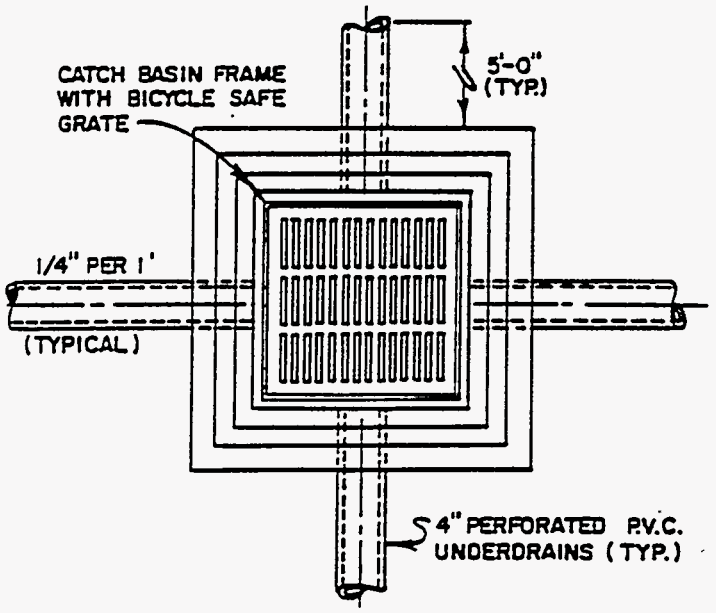


SLOTTED DRAIN CURB

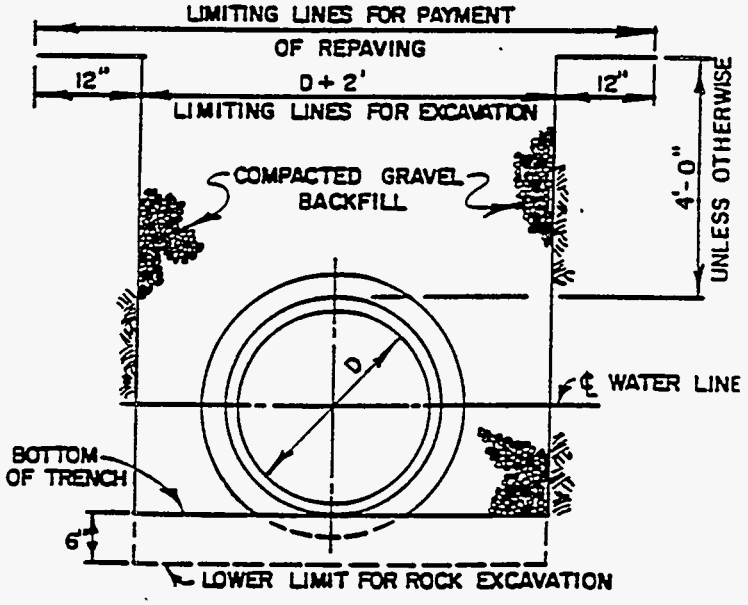


1) ALL EXPOSED SURFACES OF CONCRETE CURB TO BE FLOAT FINISHED.
2) VOLUME PER LINEAL FOOT OF CURB = 0.73 CU. FT.

STANDARD BARRIER CURB



CATCH BASIN INLET



TYPICAL TRENCH DETAIL

STANDARD DETAILS

FIGURE-11

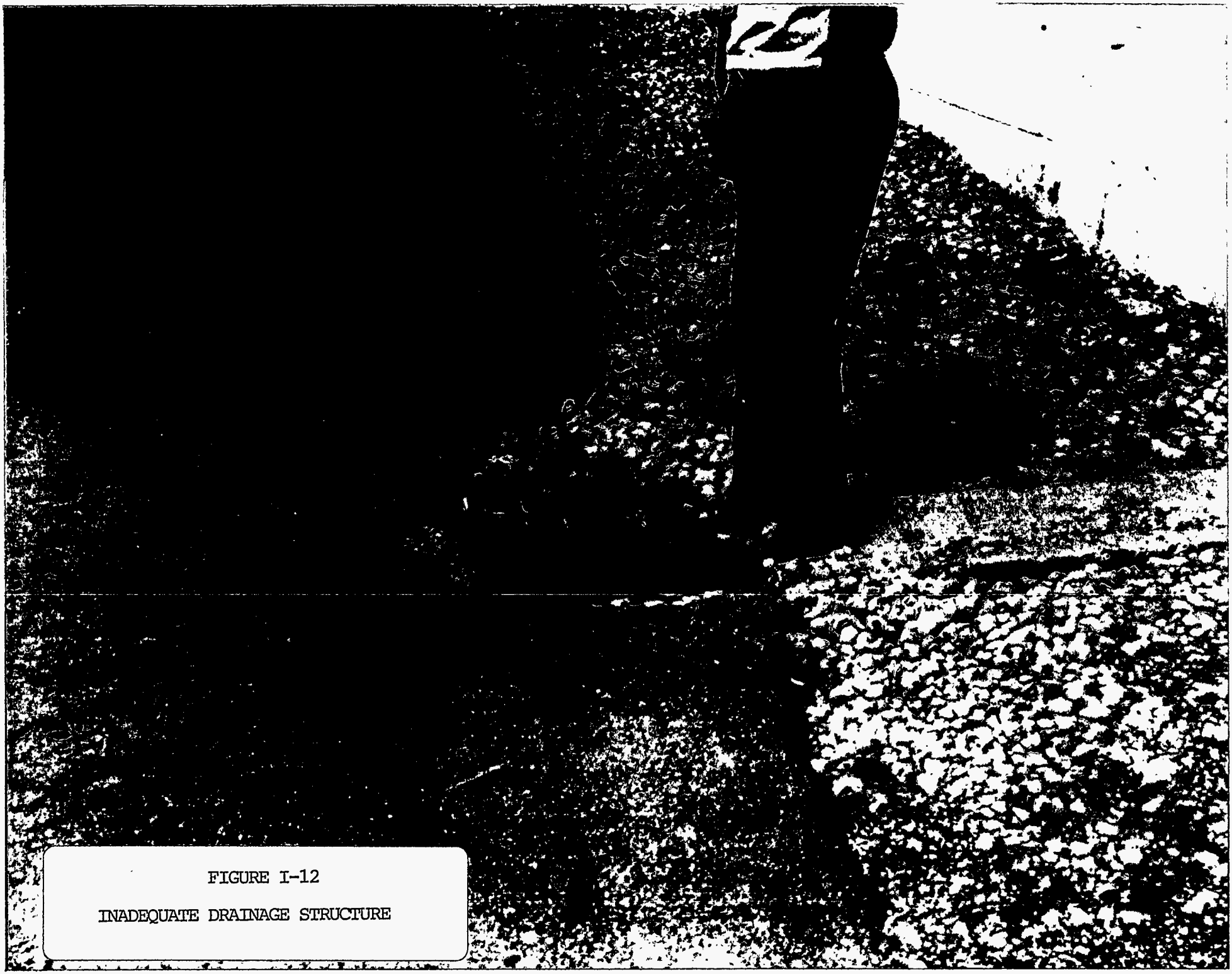


FIGURE I-12

INADEQUATE DRAINAGE STRUCTURE

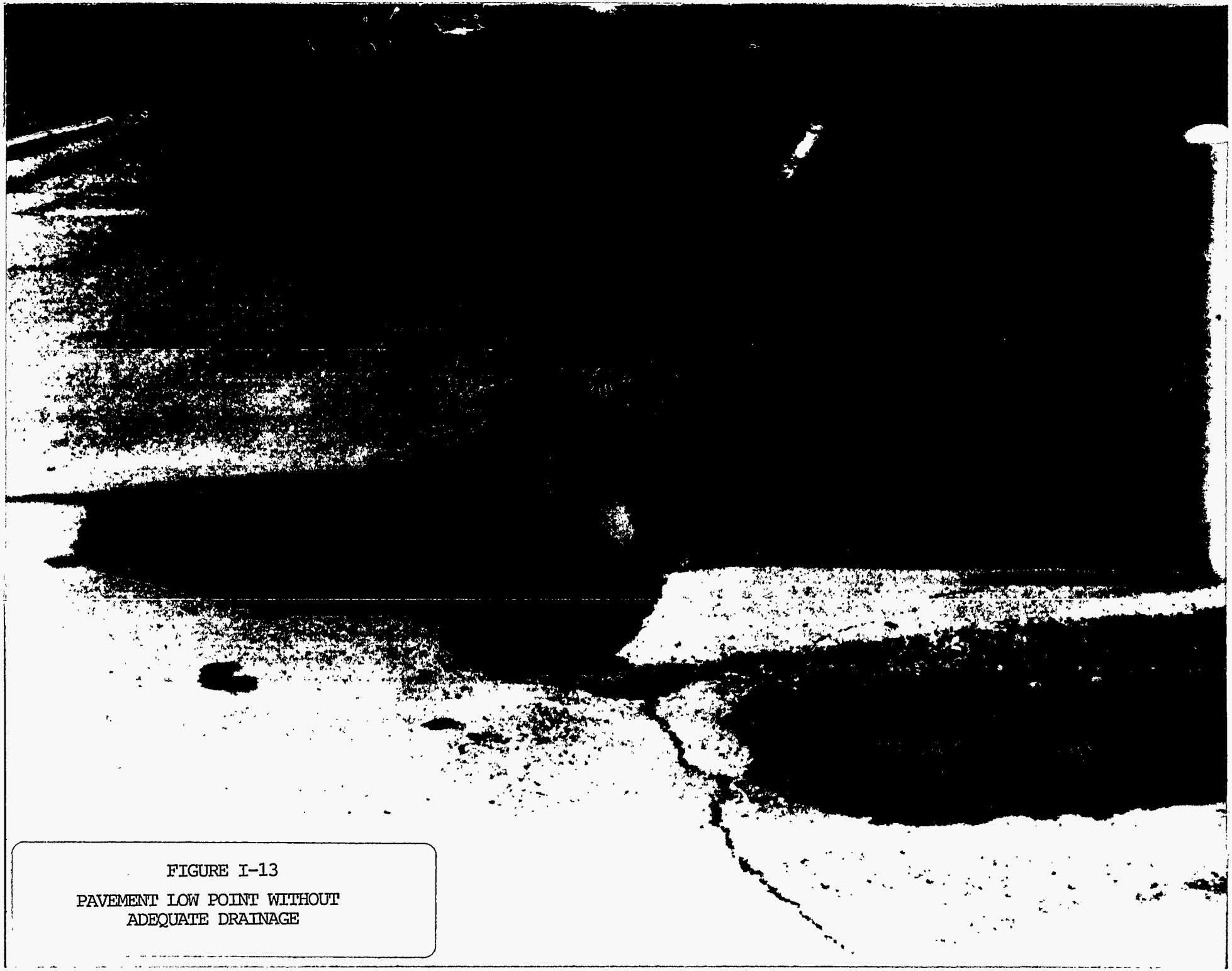


FIGURE I-13

PAVEMENT LOW POINT WITHOUT
ADEQUATE DRAINAGE

FIGURE I-14

SLOPE EROSION

Often during the initial layout of roadway systems, the roadway cuts intercept water that earlier had moved in sheet flows across the surfaces. As with the case in the Main Hill area the flows have been diverted perpendicular to side slopes causing erosion to the side slopes and pavement failures at the bottom of the slopes. Although expensive, curbs are used to channel storm water runoff to inlets and storm sewers and to limit the spread of water over the traveled lane. Positive pavement cross-slopes are used to direct the water to the curbs.

The investigations indicate that the drainage structures that were once adequate to handle storm water flows must be upgraded. Building and roadway systems have been expanded, increasing the impervious areas and the resulting storm water run-off.

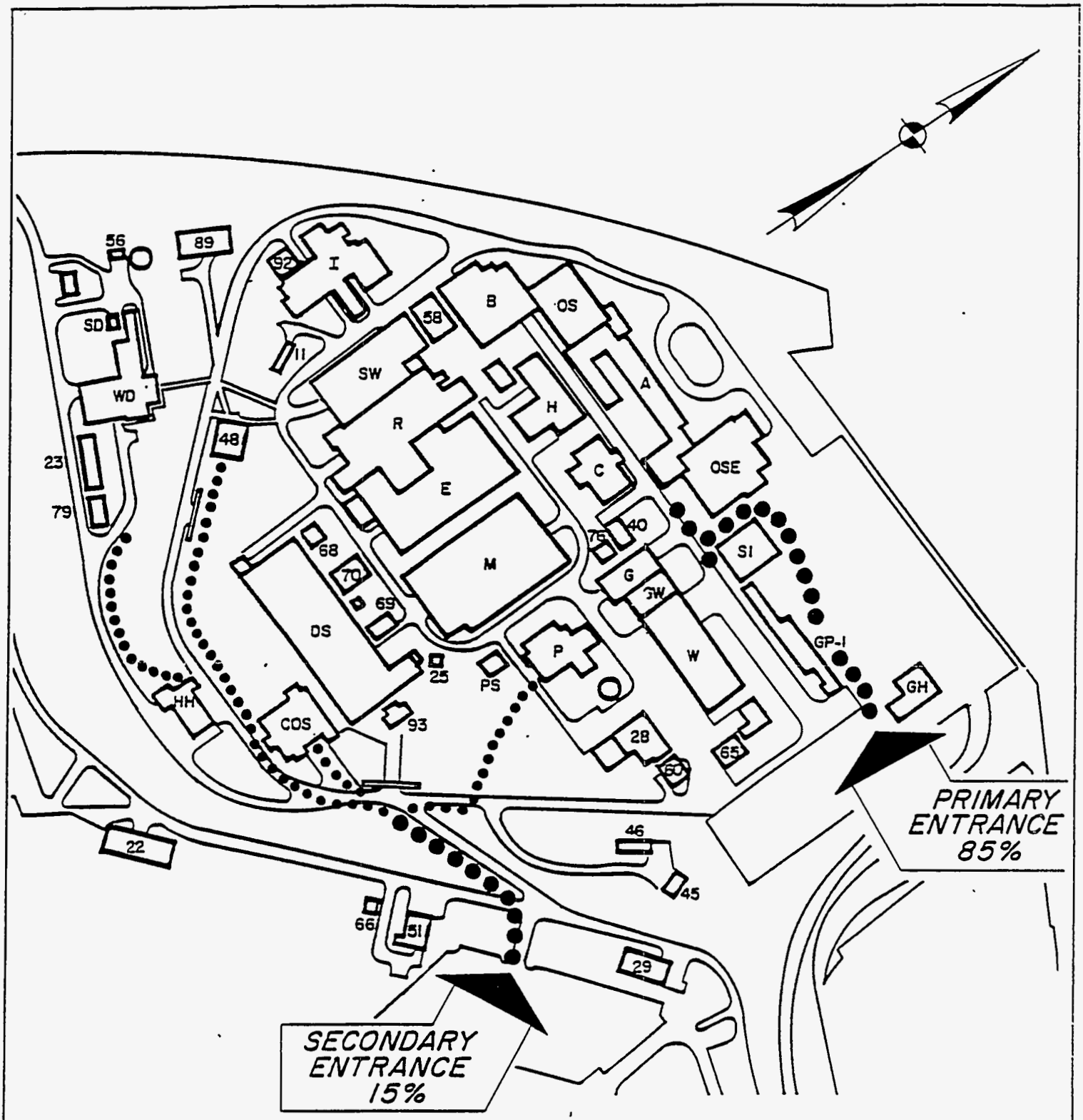
The cost of providing for proper drainage is neither incidental or minor on most roadway systems. After proper design of a drainage system, it is mandatory that an ongoing maintenance program be designed for the proposed improvements. Funds are required not only for capital improvements but also maintenance and operations.

j. Ancillary Concerns

Pedestrian safety considerations are elements which require considerable attention during any planned transportation system upgrade. The pedestrian presents an element of sharp conflict with vehicular traffic, especially when mixed with construction and employee traffic, as is the situation which exists in the Main Hill area. Pedestrian actions are less predictable than those of drivers, and therefore, pedestrian features such as sidewalks, crosswalks, signs and handicap curb ramps are essential and must be clearly visible in order to channel pedestrian flow. Figure I-15 thru Figure I-18 indicate the need for sidewalks and handicap ramps throughout the Main Hill area.

o Sidewalks (See Figure I-16)

Currently 85 percent of the employees entering the Main Hill area originate from Parking Lot A and the remaining 15 percent from Parking Lot 29. Although there are sufficient sidewalks in most of the travelled areas within the central portion of the Main Hill area, they are almost non-existent in the outlying areas. There are some sections of roadway whereby the profile grade approaches 10 percent, creating poor site distances to motorists; yet these road sections are void of sidewalks, curbs or guardrails.



PEDESTRIAN ROUTES
(STAGING AREAS)

FIGURE-15

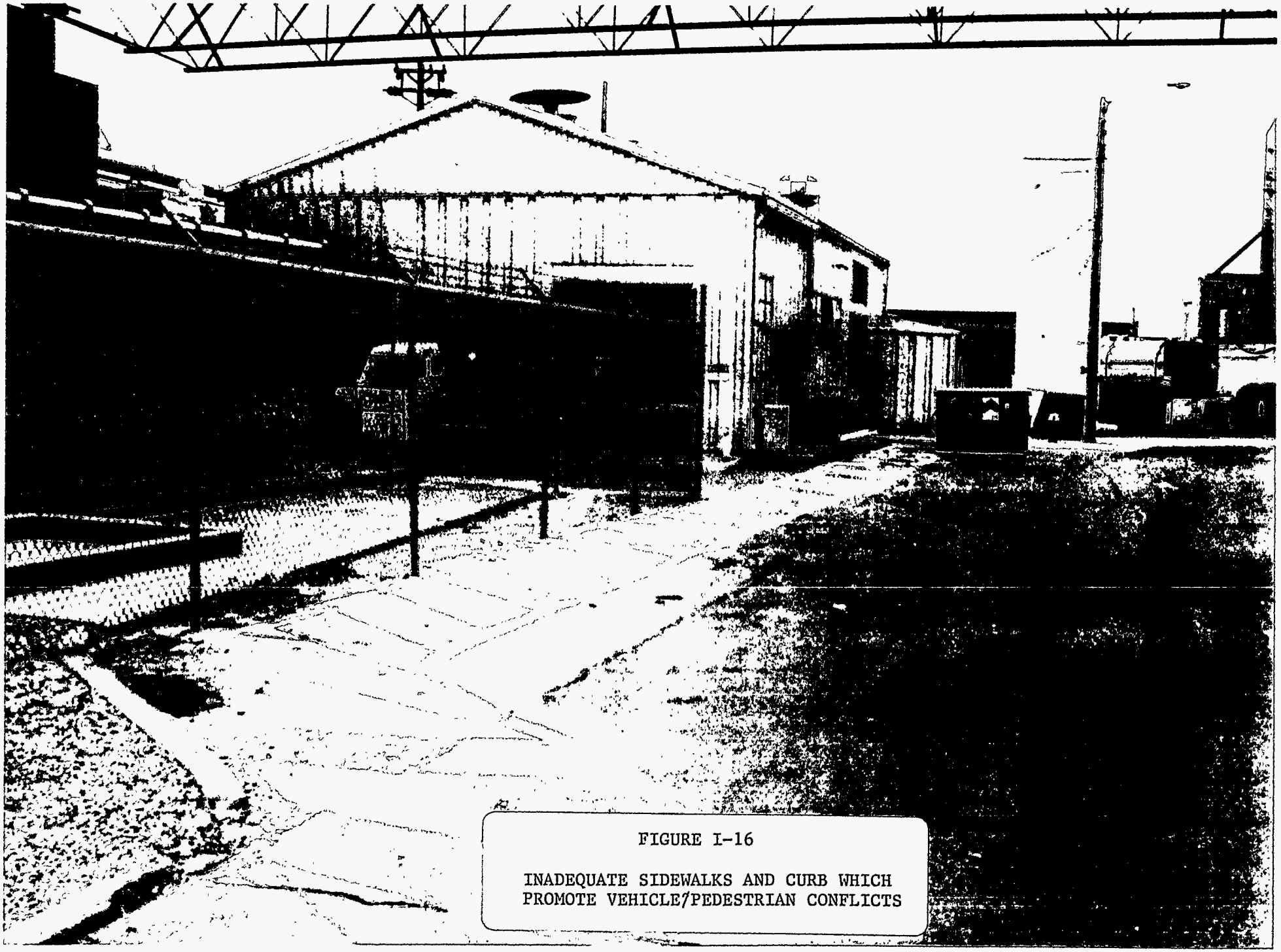


FIGURE I-16

INADEQUATE SIDEWALKS AND CURB WHICH PROMOTE VEHICLE/PEDESTRIAN CONFLICTS

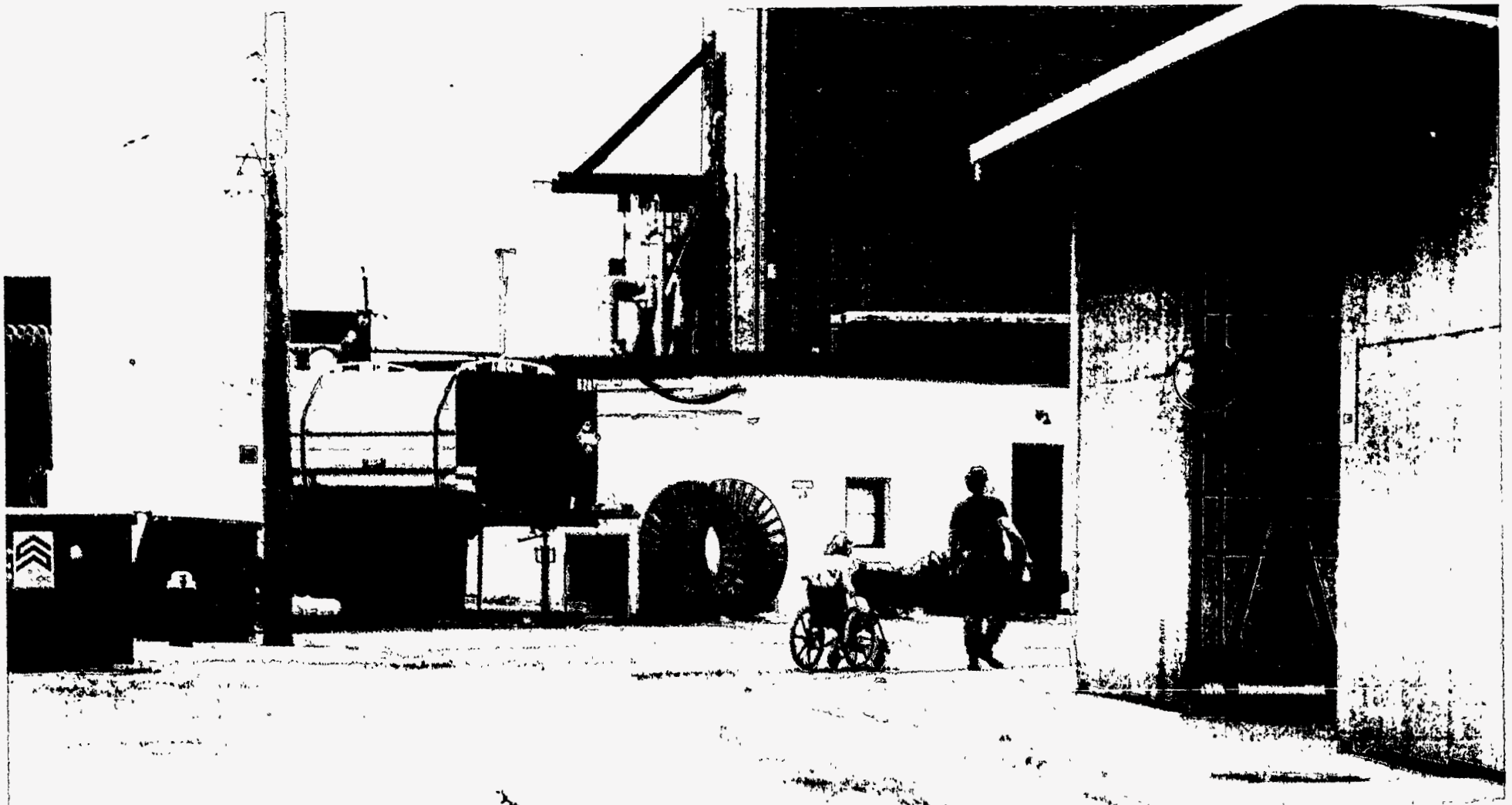


FIGURE I-17

INADEQUATE SIDEWALKS

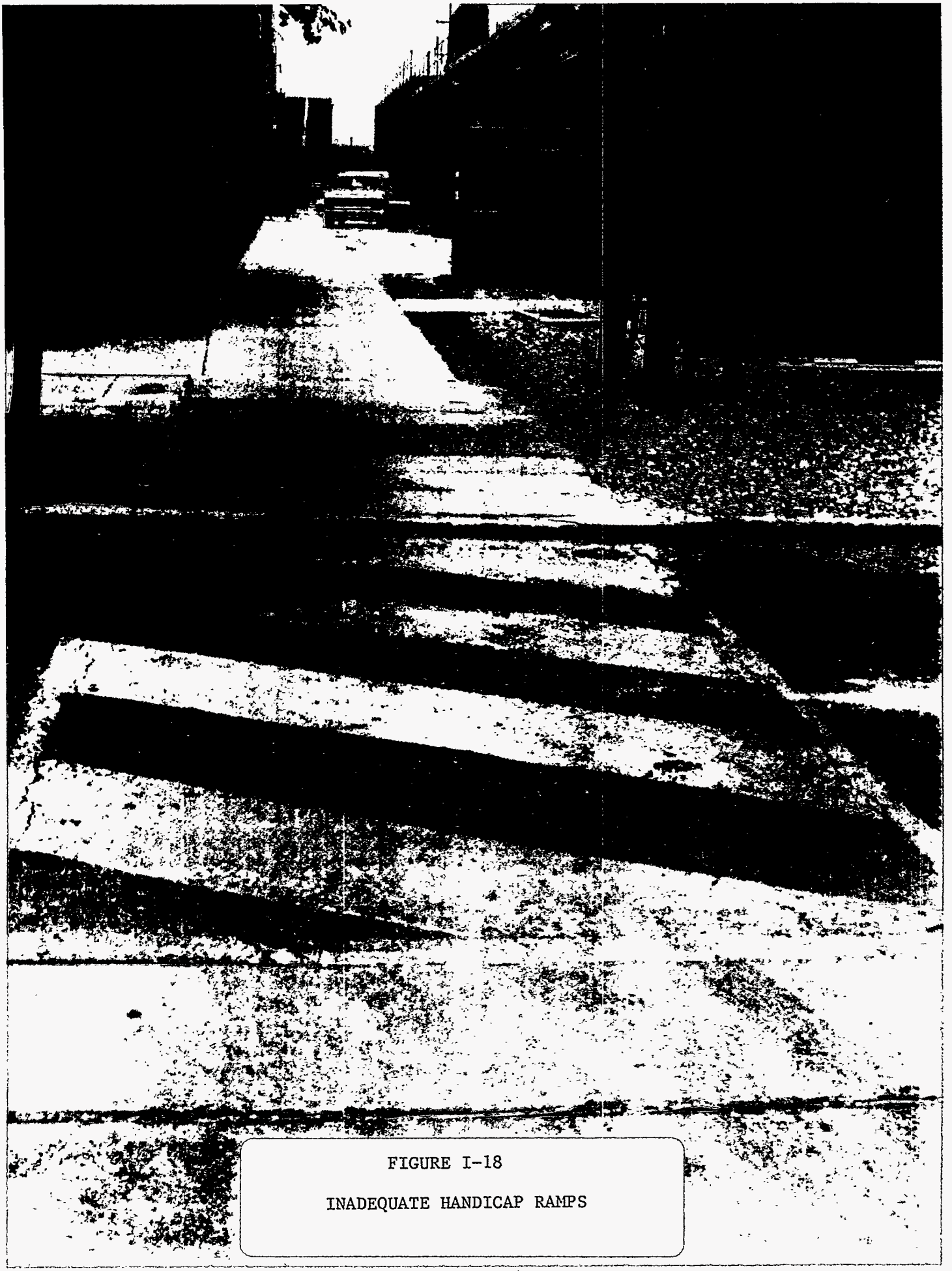


FIGURE I-18

INADEQUATE HANDICAP RAMPS

- Bus Zones/Transportation Routes

  There are currently two bus loops used at Mound, the special material loop and the test fire loop. Both loops leave the garage every eight to nine minutes. There are also, approximately 50 Cushman Utility Carts which provide a convenient means of transportation to personnel who travel frequently and/or travel to areas of the site not readily served by the bus system. During 1985, bus shelters were installed but there still exists a need to clearly differentiate bus zones and other transportation routes. Handicap ramps, crosswalks, pavement markings and standard regulatory signs are all key elements in eliminating the transportation confusion that exists.

k. Outline Specifications

DIVISION I

SECTION 01100 - SPECIAL CONTRACT REQUIREMENTS

01101 SCOPE OF WORK
01102 IDENTIFICATION OF ARCHITECT-ENGINEER
01103 CONTRACT DRAWINGS AND SPECIFICATIONS
01104 PRIORITIES, ALLOCATIONS AND ALLOTMENTS
01105 PERFORMANCE OF WORK BY CONTRACTOR

SECTION 01300 - SUBMITTALS

01301 GENERAL
01302 SPECIFIC REQUIREMENTS

SECTION 01500 - TEMPORARY FACILITIES, CONTROLS AND SPECIAL PROJECT REQUIREMENTS

01501 FIRE PROTECTION DURING CONSTRUCTION
01502 TEMPORARY FIELD OFFICE
01503 GOVERNMENT FURNISHED PROPERTY
01504 AVAILABILITY OF UTILITIES
01505 SALVAGE
01506 SECURITY MEASURES
01507 VEHICULAR ACCESS
01508 PAYMENT FOR MATERIALS STORED OFF-SITE

SECTION 01900 - GENERAL REQUIREMENTS

01994 SPECIAL PROJECT PROCEDURES
01995 COORDINATION
01996 REGULATORY REQUIREMENTS
01997 PROJECT MEETINGS
01998 QUALITY CONTROL
01999 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

DIVISION 2 - SITEWORK

02000 SUMMARY OF WORK
02072 SELECTIVE DEMOLITION
02110 sITE CLEARING
02211 ROUGH GRADING
02222 EXCAVATION
02223 BACKFILLING
02225 TRENCHING
02231 AGGREGATE BASE COURSE
02275 EROSION CONTROL
02513 ASPHALTIC CONCRETE PAVING
02514 PORTLAND CEMENT CONCRETE PAVING
02710 SUBDRAINAGE

02720 STORM SEWAGE SYSTEMS
02831 CHAIN-LINK FENCES AND GATES
02835 TEMPORARY SECURITY FENCING
02840 WALK, ROAD AND PARKING ACCESSORIES
02850 SIGNAGE
02921 LANDSCAPE GRADING
02936 SEEDING
02938 SODDING

DIVISION 3 - CONCRETE

03100 CONCRETE FORMWORK
03200 CONCRETE REINFORCEMENT
03300 CAST-IN-PLACE CONCRETE
03600 BONDING AND GROUTING

DIVISION 4 - MASONRY

04200 UNIT MASONRY
04210 BRICK MASONRY

DIVISION 5 - METALS

05120 STRUCTURAL STEEL
05320 METAL FLOOR DECK
05400 LIGHT GAGE FRAMING
05521 PIPE RAILINGS
05950 EXPANSION ANCHORS - CONCRETE AND MASONRY

DIVISION 6 - WOOD AND PLASTICS

Not applicable to this project.

DIVISION 7 - THERMAL AND MOISTURE PROTECTION

07200 THERMAL INSULATION

DIVISION 8 - DOORS AND WINDOWS

Not applicable to this project.

DIVISION 9 - FINISHES

Not applicable to this project.

DIVISION 10 - SPECIALTIES

Not applicable to this project.

DIVISION 11 - EQUIPMENT

Not applicable to this project.

DIVISION 12 - FURNISHINGS

Not applicable to this project.

DIVISION 13 - SPECIAL CONSTRUCTION

Not applicable to this project.

DIVISION 14 - CONVEYING SYSTEMS

Not applicable to this project.

DIVISION 15 - MECHANICAL

15000	GENERAL MECHANICAL PROVISIONS
15015	SLEEVES
15060	ELECTRICAL COORDINATION
15101	BUILDING SOIL, WASTE AND VENT SYSTEM
15110	DOMESTIC COLD WATER PIPING SYSTEM
15510	PIPING SPECIALTIES

DIVISION 16 - ELECTRICAL

16000	GENERAL ELECTRICAL PROVISIONS
16010	ELECTRICAL WORK
16111	CONDUIT AND FITTINGS
16120	WIRE AND CABLE
16131	PULL AND JUNCTION BOXES
16402	ELECTRICAL SERVICE
16412	UNDERGROUND DUCT INSTALLATION
16450	GROUNDING
16610	MINIMUM LIGHTING SYSTEM

6. QUALITY ASSURANCE PROGRAM

The DOE requirements for quality assurance for projects such as this one are set forth in AL Order 5700.6B, Revision 2, dated July 7, 1989. That AL Order directs contractors, such as EG&G Mound Applied Technologies, Inc., to develop non-weapons quality assurance programs through application of appropriate requirements of the consensus standard of the American National Standards Institute (ANSI) and the American Society of Mechanical Engineers (ASME) titled "Quality Assurance Program Requirements for Nuclear Facilities." That standard is designated as ANSI/ASME NQA-1 and is commonly called "NQA-1." The most recent issue is the 1986 edition with subsequent addenda.

The Engineering Department's portion of that program is set forth in Mound Technical Manual MD-10241, titled "5700.6B Quality Plans for Engineering Department."

The "Mound Project Management Manual 804" provides information on procedures within the Engineering Department. The "Plant Engineering Guide," issue of October 1, 1990, provides general guidelines for work within the Plant Engineering section.

Mound Technical Manual MD-10241 requires the use of "project Quality Assurance Review" form ML-8440 for initial assessment of consequence of failure and of the quality assurance needs for all new projects handled through the Authorization of Engineering Services (AES) system.

Mound QA Plans require the use of "Engineering Review Transmittal Sheet," Mound form ML-7588 (9-83) for documentation of design review and comment. If applicable, Mound QA Plans also require the use of a Deficiency Evaluation Corrective Action Report (DECAR).

A formal Project Quality Assurance Review has not yet been performed. The formal review will be performed during the preparation of the design criteria. It is anticipated that the project will be determined to be a Class III - Consequence of Failure and will require the use of "good engineering practices" which will require peer review of design, specifications, and tests with inspections and certifications where appropriate.

7. PROJECT EXECUTION

This project will be managed by a Mound Project Manager, who will have overall responsibility for scope, cost, and schedule, and by a Mound Construction Manager, who will handle day- to-day management of the design and construction

projects. In most cases, the design work will be performed by an Architect-Engineer firm working under a Mound negotiated, fixed price contract. Some subprojects may be designed by Mound Engineering personnel because of special expertise or other requirements. Construction will be performed under Mound controlled, competitively bid fixed price construction contracts. There may be some cases where Mound trades will have to perform minor facets of work because of security or health physics requirements.

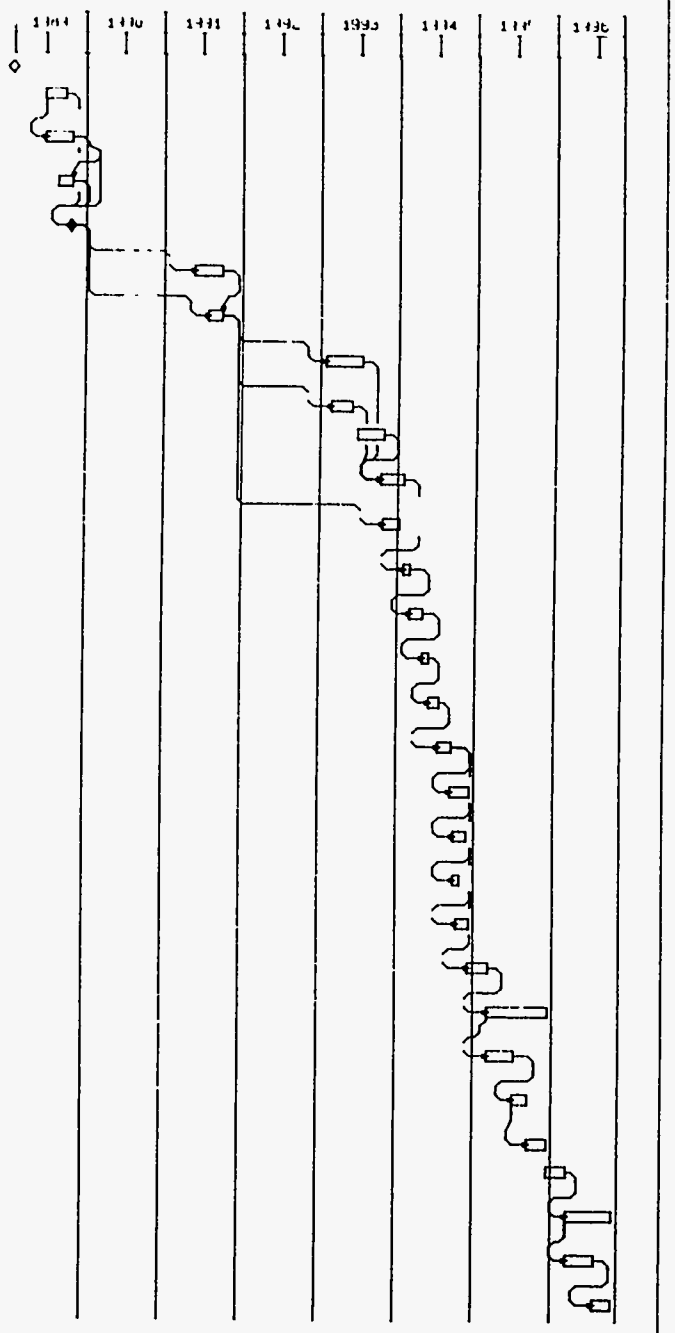
8. SCHEDULES

Architect-Engineer selection will be completed prior to or when the fiscal year 1994 funding becomes available. Design of this project will take approximately 9 months. Construction will begin during the fourth quarter of fiscal year 1994 and will require approximately 24 months to complete.

Figure III-1 shows the design and construction schedule for this project.

FCAP, ROADS AND PARKING LOTS

				EF	EF
010	SUBMITTED ADM	0	D	1Feb89	1Feb89
015	CONCEPTUAL DESIGN	63	D	3Jul89	29Sep89
020	CONCEPTUAL DESIGN REPORT (CDR)	85	D	3Jul89	31Oct89
030	PREPARE CPDS	43	D	31Aug89	31Oct89
031	SUBMIT CDR & CPDS	0	D	1Nov89	1Nov89
035	UPDATE CDR	86	D	30May91	30Sep91
040	UPDATE CPDS	42	D	1Aug91	30Sep91
045	DESIGN CRITERIA DEVELOPMENT	114	D	4Feb93	16Jul93
050	PROJECT MANAGEMENT PLAN	67	D	26Feb93	2Jun93
060	A/E SELECTION	85	D	2Jul93	1Nov93
065	TITLE I DESIGN	70	D	18Oct93	4Feb94
055	QA PLAN	45	D	1Nov93	14Jan94
070	TITLE I DESIGN REVIEW	20	D	7Feb94	4Mar94
075	TITLE II DESIGN	43	D	7Mar94	5May94
080	TITLE II DESIGN REVIEW	20	D	6May94	3Jun94
085	FINAL DESIGN REVISIONS	32	D	6Jun94	20Jul94
090	CONSTRUCTION BID & AWARD	43	D	21Jul94	20Sep94
100	CONSTRUCTION-PHASE I	60	D	21Sep94	15Dec94
101	ITEM D	40	D	5Oct94	1Dec94
102	ITEM E	20	D	5Oct94	1Nov94
103	ITEM F	39	D	20Oct94	15Dec94
110	WINTER SHUTDOWN	56	D	16Dec94	15Mar95
120	CONSTRUCTION-PHASE II	191	D	16Mar95	15Dec95
121	ITEM A	84	D	16Mar95	14Jul95
122	ITEM G	49	D	10Jul95	15Sep95
123	ITEM B	63	D	18Sep95	15Dec95
130	WINTER SHUTDOWN	57	D	18Dec95	15Mar96
140	CONSTRUCTION-PHASE III	143	D	18Mar96	80ct96
141	ITEM H	87	D	18Mar96	19Jul96
142	ITEM C	56	D	22Jul96	80ct96



Legend
Early CPM

Project: ROADS | ROAD | Date: 12Dec91 11:05
FCAP, ROADS AND PARKING LOTS
Page: 1 | EG&G Engineering Project Management Support

9. COST ESTIMATE SUMMARY

Costs for design and construction of the proposed projects were calculated based on recent plant experience and cost histories of completed projects by roadway contractors. Construction costs were based on a "concept level" estimate. All costs for construction are based on (1991) rates escalated to the midpoint of each phase of construction.

Engineering, design, inspection and testing costs were established at 11.9 percent of construction cost based on the size and complexity of the project, the extensive field work required, and the project management effort necessary to adequately control the overall project. This is consistent with costs for other work of this nature which has been recently completed.

Given the preliminary nature of this estimate and the complexity of the project, a contingency of 11.7 percent was added. A detailed cost estimate summary is presented in this report.

ESCALATION FACTORS UTILIZED
(Percent)

Year	Index
1991	1.000
1992	1.023
1993	1.061
1994	1.106
1995	1.157
1996	1.211
1997	1.267

The above table gives the escalation rates established by the Independent Cost Estimating (ICE) Group and issued in August 1991. A review by Mound of escalation factors established by other resources for the Dayton area indicated that the ICE rates were satisfactory for use on this project.

The cost estimate for this Conceptual Design Report uses The Summary of Contracts Awarded by the Ohio Department of Transportation, dated 1988, as a basis for establishing unit costs.

PROJECT SUMMARY DATE: DECEMBER 16, 1991

PROJECT NAME: ROADS & PARKINGS LOTS

PROJECT MANAGER: ALAN SPESARD TYPE OF ESTIMATE: CDR

NOTE:

A. ENG., DESIGN, & INSPECTION	TITLE I	TITLE II	TITLE III	
1. A/E		105,000	75,000	180,000
2. MOUND		15,000		15,000
B. CONSTRUCTION COST				1,444,000
1. ROADS	1,261,000			
2.CONST & PROJ MGMT	183,000			
C. ESCALATION				
A. ED&I	31,000	1.9%	10/95	
B. Construction	311,000	18.9%	5/96	
TOTAL ESCALATION	342,000	20.8%		342,000
D. SUBTOTAL OF ESTIMATED COST				$1,981,000
E. CONTINGENCY 12.20%				241,000
F. T.E.C.				$2,222,000
ROUNDED T.E.C.				$2,200,000

10. PROCUREMENT ACTIONS

Mound will secure all Architect-Engineer services and the subproject construction contracts.

Mound may secure additional contracts for design and construction support, monitoring and management assistance depending upon in-plant work loads.

Major equipment and items will be procured by the operating contractor.

11. COST AND FUNDING PLAN

Financial Schedule (in thousands)

FISCAL YEAR	AUTHORIZATION	OBLIGATION	COSTS
1994	$ 700	$ 700	$ 480
1995	1,500	1,500	920
1996	-0-	-0-	800
TOTALS	$2,200	$2,200	$2,200

Details of Obligation (in thousands)

FISCAL YEAR	ITEM		OBLIGATION
1994	Design - Titles I, II, III		$ 210K
	Construction - Phase I		280K
	Project Management		110K
	Contingency		100K
		TOTAL	$ 700K
1995	Construction - Phase II		$ 680K
	Construction - Phase III		580K
	Project Management		110K
	Contingency		130K
		TOTAL	$1,500K

PART II - PROJECT MANAGEMENT

This is a conceptual Project Management Plan. A more detailed plan will be prepared and submitted with the original Request For Project Authorization.

1. PROJECT MANAGEMENT ORGANIZATION

The basic roles of participants in this project will be consistent with DOE Order 4700.1. The project team will be composed of those individuals having a significant knowledge in the planning and execution of this project. The project team will consist of a variety of discipline engineers and service personnel as required.

A project team will be assembled for this project as shown on the organizational chart (Figure II-1).

2. MANPOWER REQUIREMENTS

The responsibility of the individual members of the project team are outlined below.

a. Dayton Area Office, Facility Engineer - carries principal DOE responsibility for day-to-day surveillance and administration (including planning, cost control, schedule control and communications with AL) for the project activities.

b. Operating Contractor's Engineering Project Manager - will have the responsibility for preparing the design criteria, preparing budget and authorization request type documents, interpreting design criteria with the Architect-Engineer if applicable, coordinating the design effort, scheduling activities, monitoring contractor's progress during construction and/or building modifications if any, and coordinating any Operating Contractor Trades work. He will act as overall project manager in controlling expenditures of funds allocated to the project and maintaining schedules throughout the life of the project.

c. Operating Contractor Program Manager - will have the responsibility to interpret the project requirements and specify the objectives that support the Mound program assignment.

d. Operating Contractor Loss Prevention Specialist - will coordinate all personnel safety, waste management, and environmental control activities during design, construction if any, equipment installation, startup and operation of the facilities and/or systems.

Organizational Chart
FCAP – ROADS AND PARKING LOT REPLACEMENT

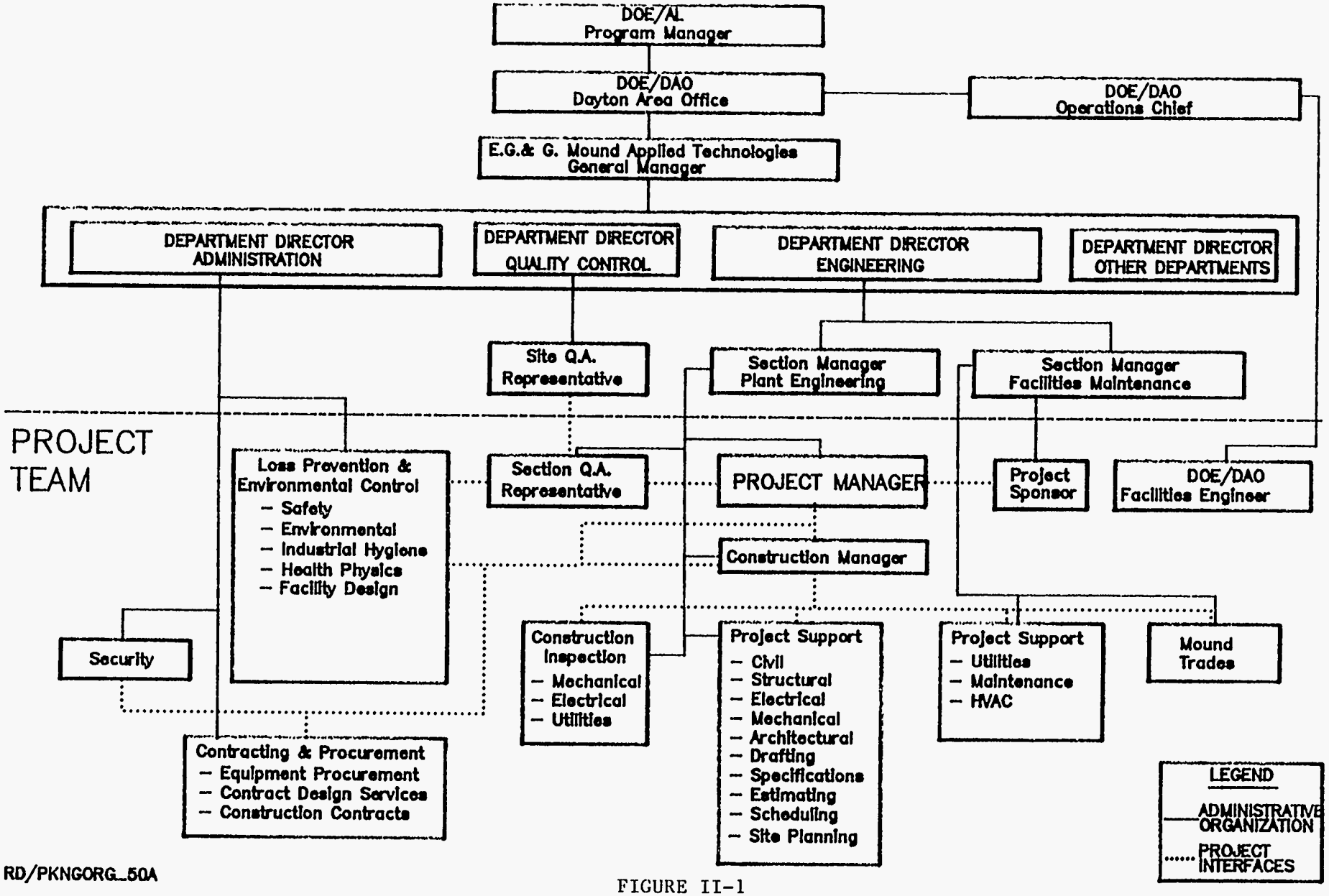


FIGURE II-1

e. Operating Contractor Security Representative - will have the responsibility of ensuring that this project institutes the latest security guidelines and requirements.

f. Operating Contractor Quality Assurance Specialist - will review, advise, monitor and audit those elements of the project that require quality assurance.

g. Project Engineers - shall provide day-to-day management of design and installation, reporting to the Operating Contractor Engineering Project Manager.

h. Operating Contractor Contracting and Procurement - will be, if appropriate, responsible to coordinate the A-E and construction contracting and the equipment procurement activities required for this project.

i. Operating Contractor Project Support - will be comprised of various discipline engineers (structural, architectural, civil, utilities, maintenance, mechanical and electrical) who will be responsible for detailed design reviews, and engineering advice throughout design, construction and/or building modifications if any, equipment installation and facility and systems startup.

j. Operating Contractor Construction Inspection Supervisor - will be responsible to assemble an inspection staff that will have the responsibility for daily inspection of construction and/or building modifications (if any) and equipment installation progress and the verification of compliance with any contracts.

k. The Operating Contractor Trades - This in-house craft staff will be responsible for installing equipment and facility modifications for this project as appropriate.

3. PROJECT CONTROL AND REPORTING SYSTEMS

a. Performance Control

The cost and schedule progress will be monitored by the Operating Contractor's Project Engineer and members of the Project Management Team against the design criteria and any contract documents. Progress payments less a retainage will be matched to performance if any contracts are awarded. The Operating Contractor will conduct weekly meetings with any contractors, if applicable, to assist in conformance to the contract.

All changes in project scope, cost and schedule will be controlled during design and installation using existing systems with modifications necessary to comply with project requirements.

A computerized system will be used in controlling cost of work being performed by the Operating Contractor. Each item of work or task equipment will be assigned a control number (MSR - Maintenance Service Request number). The various trades hours utilized for each MSR will be input to the computer daily, whereas engineering data will be input weekly. Output available from this system will include the following:

1. Detail status of the Task.
2. Labor hours charged to the Task.
3. Purchase Order material committed to the Task.
4. Purchase Order detail.
5. Stores (Warehouse) items issued for the Task.
6. Estimated cost detail for the Task.
7. Estimated hours detail for the Task.

These data will be monitored and charted by the Project Engineer(s) and members of the Project Management Team to provide up-to-date financial information to ensure adequate cost and project performance control.

b. Design and Planning

The planning phase of this project is the responsibility of the Operating Contractor Engineering Project Manager and the project team. The Project Manager will prepare all planning and budget documents, with input from the project team, in order to receive project approval. The design will be accomplished by the Operating Contractor Engineering staff or an A-E. The Operating Contractor Project Engineer will enlist the project support personnel for design reviews and input on design methods.

c. Construction Inspection and Acceptance

The construction, building modification and/or equipment installation inspection will be accomplished by the Operating Contractor Construction Inspection staff. There will be a staff of three inspectors that will perform the daily inspections (lead inspector, mechanical inspector, electrical inspector). The lead inspector will report all findings to the Project Engineer who will act on these

inspection reports. The construction submittals will be reviewed by an A-E, if applicable to the line item, and the Operating Contractor project support group. The construction inspection group is responsible for processing these submittals to and from the general contractor if applicable.

d. Technical Reviews

The following reviews will be conducted to assure all performance and safety parameters are met for all aspects of the project.

1. Conceptual Design Reviews will be conducted with both the Operating Contractor and DOE Management based upon the Conceptual Design Report.

2. The Conceptual Design Report, prepared by the Operating Contractor, will be reviewed and approved by DOE. Any discrepancies will be corrected.

3. Design Criteria will be reviewed by both the Operating Contractor and DOE management and technical staffs. Any discrepancies will be corrected.

4. Title I and II Design Reviews of the Operating Contractor or A-E prepared drawings and specifications will be conducted by the Operating Contractor Project Management Team, Management, Safety and similar DOE staffs.

e. Progress Reviews

This project will have three types of progress reviews. These are design, construction if applicable and management progress reviews.

The design progress review will be conducted monthly, with the A-E and/or the Operating Contractor Project Management team, throughout the Title I and II design. The progress will be measured against the schedule submitted in the Design Criteria.

The construction progress review, if applicable, will be conducted weekly throughout the duration of the construction. Participants will include the construction contractor, the appropriate Operating Contractor project management team members, and the A-E construction manager. The construction progress will be monitored against the schedule submitted by the construction contractor.

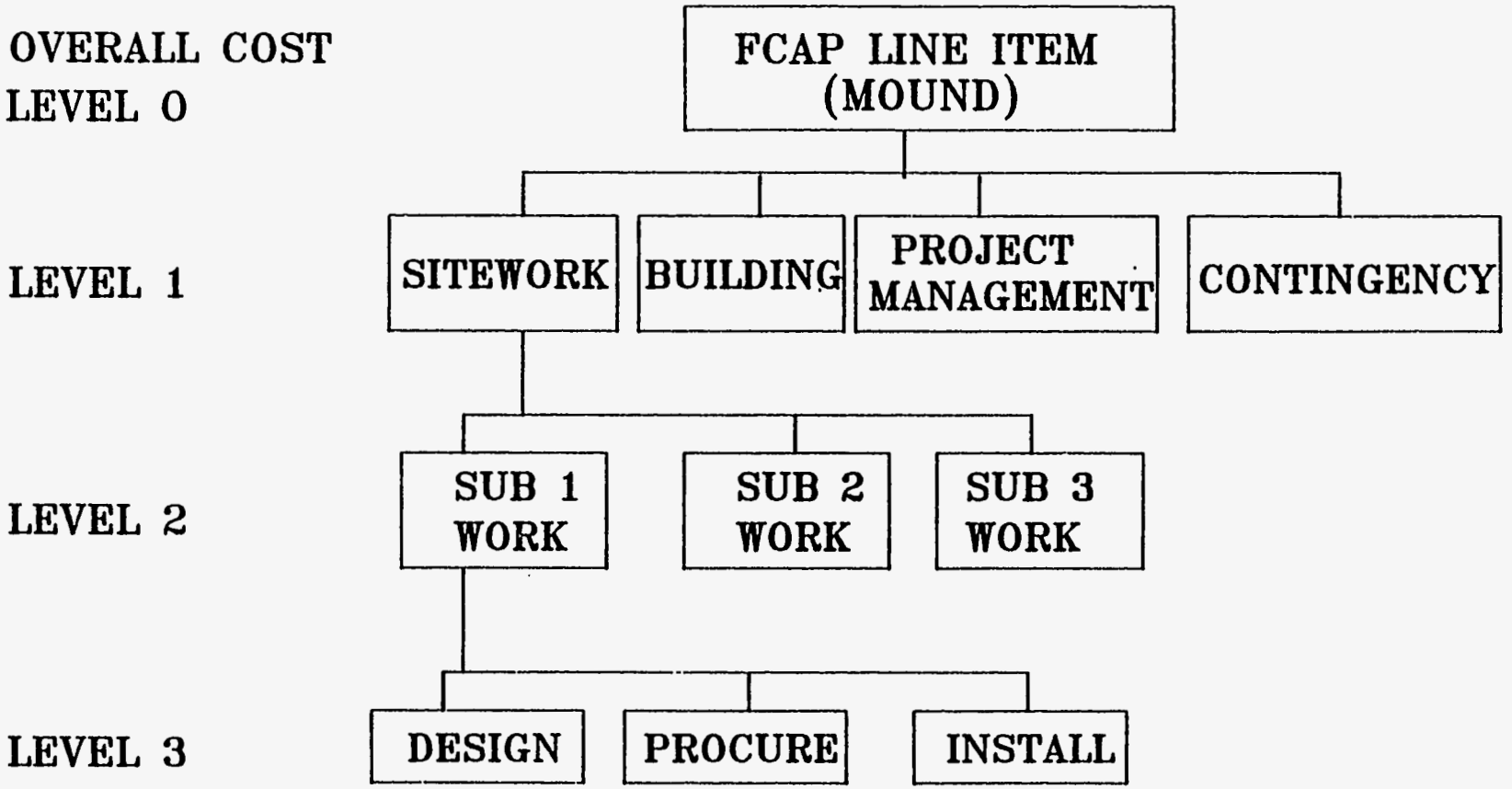
The management progress reviews will be conducted quarterly throughout the life of the project. These meetings will be conducted by the Operating Contractor Project Management group for Mound management, DOE-DAO and DOE-AL. These reviews will include data concerning end of fiscal year unobligated balance and the 50% and 80% contingency analysis reports.

f. Financial Control

Cost control will be maintained by breaking the project into cost elements associated with the various work elements. Cost accounts will be established and costs accrued as work progresses per the following diagram. These cost accounts will be further defined in the project management plan.

The Operating Contractor Engineering Project Manager will have prime responsibility to monitor and authorize expenditures within the Project Authorization issued by the Government. Any changes to the project's scope, cost, and technical baselines will be handled according to Mound's change/configuration control system, which is in compliance with DOE Order 4700.1. Contingency analysis will be done in accordance with DOE Order 4700.1.

WORK BREAKDOWN STRUCTURE



g. Construction Contractor Control

The construction subcontractors report to and are responsible to the general construction contractor. It is therefore the general contractor's responsibility to control the subcontractor so as to keep their performance at an acceptable level to the Operating Contractor Project Management team.

The Mound Project Management Team (Project Manager, Construction Manager, Inspectors and Construction Contracting) has the responsibility of keeping the general construction contractor in control and performing in an acceptable manner.

h. Documentation

All project documentation will be filed and stored in accordance with Mound Engineering procedures. These procedures are as follows:

The Engineer and/or Engineering Project Manager assigned to a project will obtain a new project file from the Engineering Systems and Design Group. This file will be maintained through the life of the project.

During the life of the project, the Project Engineer and/or Project Manager will file all project related documents in the appropriate folder and retain possession in their office.

If the project has been managed as a QA project, the engineer will notify the QA Representative, upon project completion, that the file is ready for auditing. In case of discrepancies, the QA Representative will resolve differences with the engineer and turn the file over to the Engineering Systems and Design Group clerk.

Upon completion of the project, the Project Engineer will assure that all necessary documentation, per the list from DOE 4700.1 is included and that the "contents of file" list on ML-5757, is properly sequenced in the file. The engineer should then sign on the "job closed by" line and date on Form ML-5757. The engineer's supervisor will initial after the engineer's signature and the engineer will submit the file to the Engineering Systems and Design Group clerk.

The Engineering Systems and Design Group clerk will prepare a Job File Indexing Form, and the project will be filed in Drawing Control. An index system for the project files is maintained by the Engineering Systems and Design Group clerk, and access to the files may be obtained by contacting this clerk.

i. Reporting Requirements

In accordance with the requirements of Chapter IV, Part B, DOE Order 4700.1, the project's status relative to the established cost, schedule and technical base will be periodically reported. The following reports are required and will be provided.

1. Operating Contractor Monthly Report

This report is a detailed summary of the project status. It includes a financial summary, along with detailed financial information and a Schedule/Highlights/Concerns summary with a bar chart schedule showing project progress against that schedule. Subprojects are broken out for individual reporting. It is used by the Operating Contractor Construction Manager/Project Manager and DOE to monitor project progress. The 50% and 80% project contingency analysis targets are also indicated in this report.

2. A-E Progress Report

This report summarizes the progress an Architect-Engineer (if A-E used) has accomplished on a design. It is submitted by the A-E to the Operating Contractor's Construction Manager. This report consists of the following six sections: 1) summary of Work Accomplished/Percent Complete during the period, 2) information on summary of trips, meetings and progress reviews; 3) existing or anticipated changes of key design team member, 4) progress planned for next monthly reporting period, 5) problems and areas of concern, and 6) adequacy of schedule, reimbursable funding, or other contract/design criteria provision.

3. AL Construction Quarterly Report

This report will be prepared by the Operating Contractor and provided to DAO and AL each quarter. The information included in this report will be as described in Attachment IV-1 Page IV-11, of DOE Order 4700.1.