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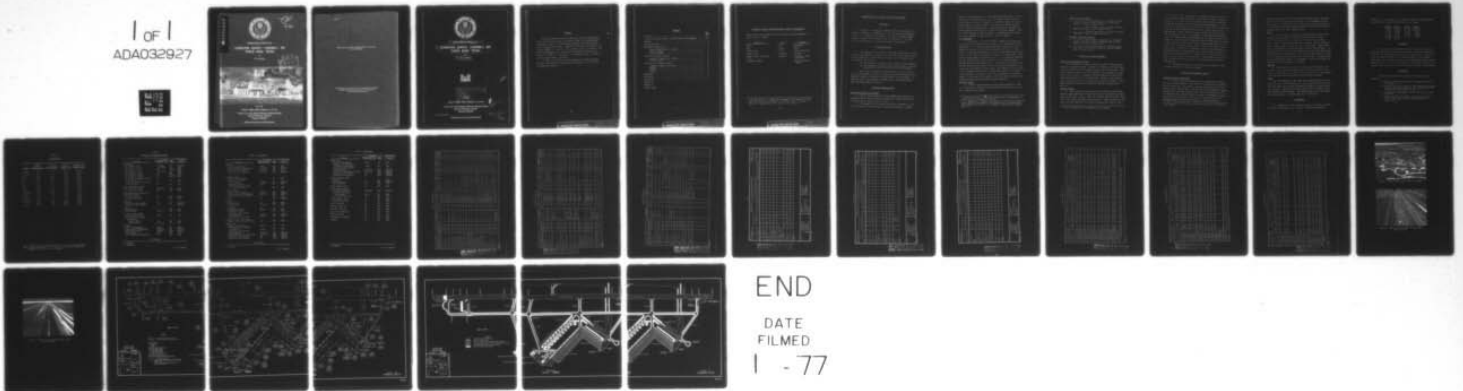
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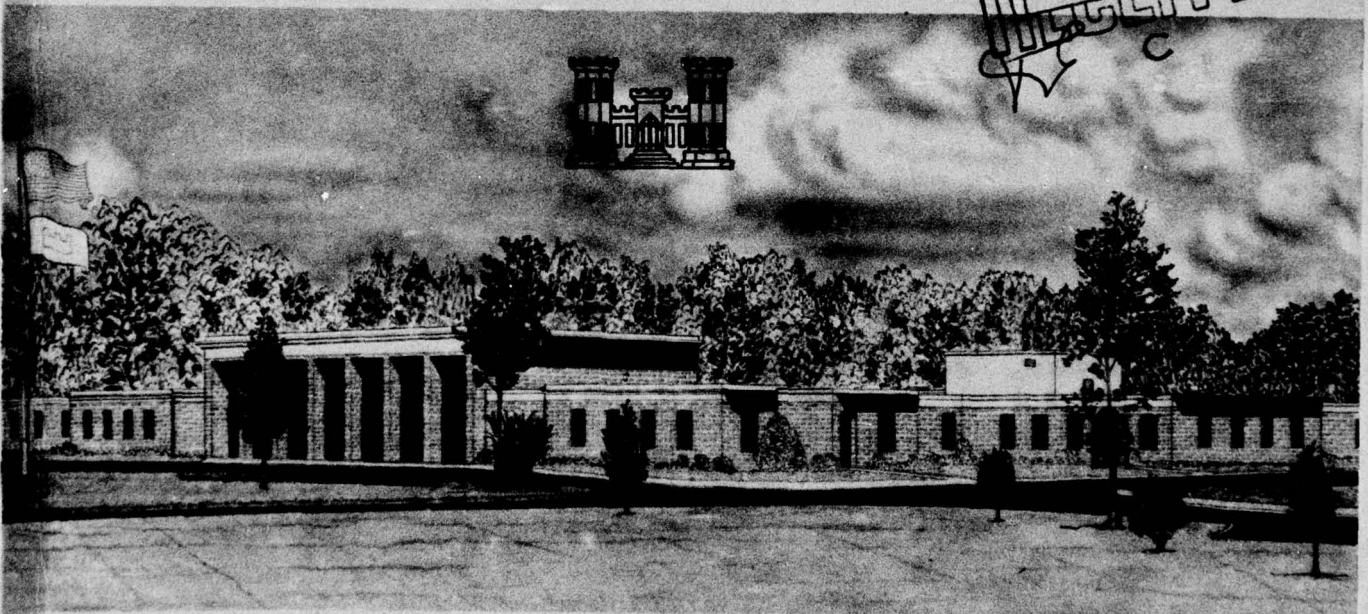
MISCELLANEOUS PAPER S-73-39

CONDITION SURVEY, CARSWELL AIR FORCE BASE, TEXAS

by

R. D. Jackson

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Conducted by U. S. Army Engineer Waterways Experiment Station
Soils and Pavements Laboratory
Vicksburg, Mississippi

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Foreword

The study reported herein was conducted under the general supervision of the Engineering Design Criteria Branch, Soils and Pavements Laboratory, of the U. S. Army Engineer Waterways Experiment Station (WES), Vicksburg, Mississippi. Personnel involved in the condition survey were Messrs. R. D. Jackson, K. A. O'Connor, and S. R. Rowland. This report was prepared by Mr. Jackson under the general supervision of Messrs. J. P. Sale, R. G. Ahlvin, R. L. Hutchinson, and P. J. Vedros of the Soils and Pavements Laboratory.

COL Ernest D. Peixotto, CE, was Director of the WES during the conduct of the study and preparation of the report. Mr. F. R. Brown was Technical Director.

Contents

	<u>Page</u>
Foreword	iii
Conversion Factors, British to Metric Units of Measurement	vii
Authority	1
Purpose and Scope	1
Pertinent Background Data	1
General description of airfield	1
Site conditions	2
Previous reports	2
History of Airfield Pavements	3
Design and construction history	3
Traffic history	3
Conditions of Pavement Surfaces	4
Pavement inspection procedure	4
Runway	5
Taxiways	5
Aprons	5
Maintenance	5
Evaluation	6
Conclusions	6
Tables 1-5	
Photos 1-3	
Plates 1 and 2	

Conversion Factors, British to Metric Units of Measurement

British units of measurement used in this report can be converted to metric units as follows:

<u>Multiply</u>	<u>By</u>	<u>To Obtain</u>
inches	2.54	centimeters
feet	0.3048	meters
square inches	6.4516	square centimeters
pounds (mass)	0.45359237	kilograms
pounds (force) per square inch	0.6894757	newtons per square centimeter
Fahrenheit degrees	*	Celsius or Kelvin degrees

* To obtain Celsius (C) temperature readings from Fahrenheit (F) readings, use the following formula: $C = (5/9)(F - 32)$. To obtain Kelvin (K) readings, use: $K = (5/9)(F - 32) + 273.15$.

CONDITION SURVEY, CARSWELL AIR FORCE BASE, TEXAS

Authority

1. Authority for conducting condition surveys at selected airfields is contained in amendment to FY 1972 RDTE Funding Authorization (MPS-MC-5, 16 February 1972), subject: "Air Force Airfield Pavement Research Program," from the Office, Chief of Engineers, U. S. Army, Directorate of Military Construction, dated 18 February 1972.

Purpose and Scope

2. The purpose of this report is to present the results of a condition survey performed at Carswell Air Force Base (CAFB), Texas, during 16-19 December 1972. The following two major areas of interest were considered in this survey:

- a. The structural condition of the primary airfield pavements.
- b. The condition of pavement repairs and the types of maintenance materials that have been used at this airfield.

3. This report is limited to a presentation of visual observations of the pavement conditions, discussion of these observations, and pertinent remarks with regard to the performance of the pavements. No physical tests of the pavements, foundations, or patching materials were performed during this survey.

Pertinent Background Data

General description of airfield

4. CAFB is located adjacent to Texas Highway 183, between U. S. Interstate 20 and Texas Highway 199, northwest of downtown Fort Worth. A vicinity map is shown in plates 1 and 2.

5. In December 1972, the airfield facilities consisted of a N-S (17-35) runway, a parallel taxiway, 9 connecting taxiways, 3 ladder

taxiways, 5 parking aprons (i.e., the north and south aprons, the transient apron, and alert aprons A and B), 18 parking stubs, a warm-up apron, a power check pad, a washrack, a calibration hardstand, and two hangar aprons and access taxiways. The runway was 300 ft* wide and 12,000 ft long; the aprons were of various dimensions (see plate 1); and the taxiways were 50 and 75 ft wide and of various lengths. A layout of the airfield is shown in plate 1. A pavement plan indicating the type of pavement on each facility is shown in plate 2.

Site conditions

6. The climate in the area of CAFB is normally of a clear and sunny nature and of relatively low humidity. The average yearly mean temperature is 66 F, with recorded yearly mean extremes of 76 and 55 F. Temperature and precipitation data are presented in table 1. The amounts of departure from normal for the 1971 temperatures and precipitation are for periods of record of 76 and 84 yr, respectively. Annual precipitation averages approximately 41.2 in. The topography surrounding the airfield affords natural facilities for excellent surface drainage and rapid storm water runoff. An adequate storm sewer system provides the necessary facility for the collection and disposal of all storm water into natural drainage areas. The subgrade soil at the airfield is composed generally of a reddish-brown sandy clay and clay of CL classification.** The water table is not encountered at depths near enough to the bottom of the pavement to have any adverse effect on the foundation materials and consequent pavement behavior.

Previous reports

7. Previous reports concerning the airfield pavements at CAFB are listed below. Pertinent data were extracted from them for use in this condition survey report.

* A table of factors for converting British units of measurement to metric units is presented on page vii.

** U. S. Department of Defense, "Unified Soil Classification System for Roads, Airfields, Embankments, and Foundations," Military Standard MIL-STD-619B, June 1968, U. S. Government Printing Office, Washington, D. C.

8. Condition survey reports:

- a. Ohio River Division Laboratories, CE, "Report of Rigid Pavement Condition Survey, Carswell Air Force Base, Texas," June 1947, Mariemont, Ohio.
- b. _____, "Condition Survey Report, Carswell Air Force Base, Texas," April 1951, Mariemont, Ohio.
- c. _____, "Condition Survey Report, Carswell Air Force Base, Texas," May 1956, Mariemont, Ohio.

9. Pavement evaluation reports:

- a. U. S. Army Engineer District, Dennison, CE, "Airfield Pavement Evaluation Report, Fort Worth Army Airfield, Texas," June 1944, Dennison, Texas.
- b. Ohio River Division Laboratories, CE, "Pavement Evaluation Report, Carswell Air Force Base, Texas," November 1959, Cincinnati, Ohio.

History of Airfield Pavements

Design and construction history

10. The pavements constructed during the period 1941-1943 were designed to support World War II bombers. Pavements constructed during the period 1944-1946 were designed to support the B-36 aircraft. Pavements constructed during the period 1947-1955 were designed for either B-36 or B-47 aircraft. Pavements constructed during the period 1956-1965 were designed for B-52 aircraft loads. Details of the construction history of the airfield pavements are presented in table 2. Pavement thicknesses, descriptions, and other details are presented in table 3.

Traffic history

11. A detailed traffic record was not available for this study; however, some approximation of the traffic can be made from the records that are available. Prior to 1951, the airfield was used by B-36, B-25, C-47, C-45, C-119, and other smaller aircraft. Traffic records for the years 1951-1957 show that 1200 cycles* per month were flown at CAFB.

* A cycle of operation is one takeoff and one landing.

Of this total traffic, approximately 65 percent consisted of B-36 aircraft operations, and approximately 35 percent consisted of miscellaneous B-25, C-47, C-45, C-119, and other similar aircraft operations. Records for the years 1957-1960 indicate that approximately 37 cycles per month of B-47, 80-90 cycles of B-52, 149 cycles of KC-135 and KC-97, 37 cycles of cargo aircraft, and 1227 cycles of all other aircraft were applied. Traffic records were not available for the years 1960-1964 and 1968-1971, but it is reasonable to assume that the amounts of traffic for these periods were approximately the same as those for the period July 1964-June 1967. During this period, 80-90 cycles per month of B-52; 73 cycles of KC-135; 63 cycles of heavy cargo aircraft (i.e., C-135, C-124, C-141, and C-133); and 667 cycles of all other aircraft were applied. Traffic records indicate that the following amounts of traffic were applied during November 1971-October 1972: 1000 cycles per month of light aircraft; 1125 cycles of T-37, T-38, and T-39 aircraft; and 3375 cycles of heavy aircraft. Approximately 100 cycles of B-52 aircraft traffic were applied, since this airfield is a pilot training base.

12. More than 50 percent of the takeoffs and landings at CAFB are from the south (35) end of the runway.

Conditions of Pavement Surfaces

Pavement inspection procedure

13. The following procedure was used in conducting the inspection of the rigid pavements. Representative features were selected for detailed inspection. The features were then inspected slab* by slab, and the defects were recorded. The locations of the individual pavement features, the inspection starting points, and the directions in which the pavements were inspected (shown by arrows) are indicated in plate 1. The results of the pavement survey for those features that were inspected in detail are presented in table 4. This table shows a

* A slab is the smallest unit, containing no joints, of a given pavement feature.

quantitative breakdown of the various types of defects and a condition rating for each feature inspected in detail. The procedures used for determining the condition rating of a pavement are given in Appendix III, of Department of the Army Technical Manual TM 5-827-3, "Rigid Airfield Pavement Evaluation," dated September 1965.

Runway

14. All the 15-, 16-, and 18-in. portland cement concrete (PCC) pavements, features R1A, R2B, R5C, R6C, R7C, R8B, R9A, and R10D, were in excellent structural condition, with only 18 major defects noted. Photo 1 shows epoxy patches used to correct surface irregularities in several slabs near the south end of the runway. These irregularities resulted from an aircraft having burned at this location. Features R4C and R3C, which had been overlaid with asphaltic-concrete (AC) pavement, were in good condition. At the time of the overlay, a french drain was installed along the west side of the runway. The drain seems to have cured the problem of slab settlement. Photos 2 and 3 show the condition of the AC pavement on the runway.

Taxiways

15. The conditions of the PCC taxiways ranged from good to excellent. The AC portion of taxiway D was in fair condition, but this taxiway is used only as an access to the power check pad. Four pumping joints were noted near the south end of the parallel taxiway.

Aprons

16. The conditions of the apron areas ranged from very good to excellent based on the percentages of slabs containing no major defects. The apron areas have required considerable patching to correct mostly minor defects. Some areas have been overlaid with AC pavement rather than patching the PCC pavement. The apron taxiway on the south apron was overlaid because of defects that were load related.

Maintenance

17. Maintenance of the airfield pavements at CAFB has generally consisted of mudjacking, joint sealing, overlaying, replacing AC

pavements with PCC pavements, and slurry sealing AC shoulder pavements. Maintenance expenditures at CAFB have been as follows:

<u>Period</u>	<u>Amount</u>	<u>Period</u>	<u>Amount</u>
1958-60	\$181,861	FY 1967	\$395,709
FY 1962	46,488	FY 1968	86,795
FY 1963	451,980	FY 1969	23,175
FY 1964	10,450	FY 1970	175,139
FY 1965	93,904	FY 1971	61,130
FY 1966	132,299		

Evaluation

18. A summary of the pavement evaluation is presented in table 5. Previously published pavement evaluations were updated to eliminate aircraft that are no longer in the Air Force inventory and to include aircraft that have been added to the inventory since the last pavement evaluation. The evaluation is based on the pavement thickness, flexural strength (PCC), base and subbase thickness and strength, strength of the subgrade (CBR or k value), and the structural condition of the pavement.

Conclusions

19. ^k The following statements summarize the findings of this inspection: (1)

- a. The PCC pavements were in good to excellent structural condition; (2)
- b. The problem that had existed on the runway of slab settlement was apparently solved with the installation of the french drain along the western edge; (3)
- c. The portion of the runway overlaid with AC was in good condition; and (4)
- d. Epoxy patches on the aprons were performing satisfactorily, even though some were beginning to show deterioration.

A

Table 1

Climatic Data

Month	<u>1971</u> Average Temperature, F	Departure from Normal, F	<u>1971</u> Precipi- tation, in.	Departure from Normal, in.
January	46.7	1.2	0.19	-1.85
February	49.2	0.0	1.32	-0.92
March	55.6	-0.3	0.34	-2.17
April	64.0	-0.8	2.76	-0.84
May	70.5	-2.2	1.88	-2.71
June	82.9	1.4	0.83	-2.15
July	84.4	-1.0	3.60	1.85
August	79.5	-5.9	5.70	4.02
September	77.1	-1.3	3.24	0.70
October	70.1	2.2	7.64	5.05
November	57.0	2.2	1.77	-0.69
December	52.2	4.5	6.77	4.64
Annual	65.8	0.0	36.04	4.93

Note: Highest temperature in 1971 was 103 F on July 19; lowest temperature in 1971 was 12 F on February 8.

Table 2
Airfield Construction History

Feature	Pavement		Construction Period
	Thickness, in.	Type	
N-S runway			
Sta 0+00 to 81+75	27-18-27	PCC	1945-46
Sta 20+75 to 81+75	2 to 5-1/2	AC*	1963
Sta 81+75 to 105+00	16	PCC**	1953
Sta 81+75 to 87+50	2 to 5-1/2	AC*	1963
Sta 105+00 to 115+00	18	PCC	1953
Sta 115+00 to 120+00	15	PCC**	1956
Sta 120+00 to 125+00	16	PCC**	1957
Sta 125+00 to 130+00 (225-ft- wide section)	18	PCC	1957
Sta 125+00 to 130+00 (75-ft- wide section)	16	PCC	1957
South connecting taxiway			
Sta 115+00 to 126+25	16-18-16	PCC	1956
Sta 126+25 to 139+35	18	PCC	1956
North connecting taxiway and parallel taxiway			
Sta 0+00 to 80+50	27	PCC	1959
Sta 80+50 to 115+00	27	PCC	1959
Taxiway D			
375-ft-long west portion	18	PCC	1953-54
675-ft-long east portion	4	AC	1953-54
Taxiway C			
Center portion	21	PCC	1957
Outside lanes	19 to 17	PCC	1957
SAC alert apron taxiway			
Original NE-SW runway	8-6-8	PCC	1942
3600-ft-long NE portion reconstructed			
Center portion	19	PCC	1957
Outside lanes	19 to 17	PCC	1957
Taxiway H			
Original construction	8-6-8	PCC	1943
E and W ends reconstructed	15-10-15	PCC	1945-46
1000-ft-long center	12-8-12	PCC*	1945-46
Entire taxiway	5-1/2	AC*	1950
Entire taxiway reconstructed	23	PCC	1962

(Continued)

- * Overlay.
** Extension.

Table 2 (Continued)

Feature	Pavement		Construction Period
	Thickness, in.	Type	
Taxiway I			
Original construction	9-6-9	PCC	1942
Entire taxiway reconstructed	15-10-15	PCC	1945-46
50-ft-wide west portion	5 to 1/2	AC*	1950
50-ft-wide east portion	10 to 14	PCC*	1953-54
Taxiways E and F			
Original construction	2	AC	1942
Overlay of original construction	15-10-15	PCC	1945-46
Overlay of overlay	5-1/2	AC	1950
56-ft-wide center of taxi- way F reconstructed	23	PCC	1965
NW-SE taxiway			
Original NW-SE runway	8-6-8	PCC	1941
Entire taxiway reconstructed	15-10-15	PCC	1945-46
Entire taxiway reconstructed	17	PCC	1954
Taxiway G	28	PCC	1958-59
Taxiway B			
Center portion	19	PCC	1958
Outside lanes	19 to 17	PCC	1958
E-W taxiway			
Original E-W runway	8-6-8	PCC	1941
50-ft-wide center	4	AC*	1957
250-ft-wide west portion reconstructed	15-10-15	PCC	1945-46
250-ft-wide west portion	5-1/2	AC*	1957
Taxiways J and K and hangar aprons E and W (hangar access)			
	18	PCC	1958
North apron			
Original construction	8-6-8	PCC	1942
1st extension to original construction	9-6-9	PCC	1943
250-ft-wide west portion reconstructed	15-10-15	PCC	1943-46
125-ft-wide transition section	10 to 15	PCC*	1943-46
250-ft-wide west portion	10	PCC*	1953-54
350-ft-wide east portion	15	PCC*	1953-54

(Continued)

* Overlay.

(2 of 3 sheets)

Table 2 (Concluded)

Feature	Pavement		Construction Period
	Thickness, in.	Type	
South apron			
Original construction	8-6-8	PCC	1942
Extension and widening of original construction	9-6-9	PCC	1943
625-ft-wide west portion reconstructed	15-10-15	PCC	1943-46
100-ft-wide transition section	10 to 15	PCC*	1943-46
525-ft-wide west portion	10	PCC*	1953-54
75-ft-wide east portion	15	PCC*	1953-54
Taxiway through apron			
Overlay	2	AC	1967
West extension	14	PCC	1953-54
East extension	14	PCC	1957
South warm-up apron	16	PCC	1957
North warm-up apron			
Original construction	15-10-15	PCC	1945-46
Overlay of original construction	5-1/2	AC	1950
Section reconstructed	17	PCC	1957
Alert aprons A and B	13	PCC	1953
Overlay of apron B	4	AC	1970
Power check pad	18	PCC	1953
Original stubs (9)	17	PCC	1954
Original stubs (9)	17	PCC	1957
Nose dock aprons (4)	18	PCC	1954
Transient apron	14	PCC	1953
Calibration hardstand	15	PCC	1953
Washrack	14	PCC	1954

* Overlay.

(3 of 3 sheets)

Table 3
SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY				OVERLAY PAVEMENT			PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA OR CONSIDERED
OVERWELL AFB, Texas	FACILITY NUMBER AND IDENTIFICATION	LENGTH FT	WIDTH FT	THICK. IN.	DESCRIPTION	FLEX. STR. PSI	THICK. IN.	DESCRIPTION	FLEX. STR. PSI	THICK. IN.	CLASSIFICATION	CBR OR K	CLASSIFICATION	CBR OR K	
B1A	R-6 runway; lat 500 ft, 17 end	500	300				18	Portland cement concrete 27-18-27-in. reinforced 3/0-6-in.	690				Clay (CL)	75	Excellent
B2B	R-3 runway, 17 end Sta 15+00 to 20+75	575	300				18	Portland cement concrete 27-18-27-in. reinforced 3/0-6-in.	690				Clay (CL)	75	Excellent
B3C	R-3 runway interior Sta 20+75 to 21+75	6100	300	5.5 to 2	Asphaltic concrete $E = 19,479$		18	Portland cement concrete 27-18-27-in. reinforced 3/0-6-in.	690				Clay (CL)	75	Good
B4C	R-3 runway interior Sta 21+75 to 27+50	575	300	5.5 to 2	Asphaltic concrete $E = 17,664$		16	Portland cement concrete	690				Clay (CL)	75	Good
B5C	R-3 runway interior Sta 27+50 to 105+00	1750	300				16	Portland cement concrete	690				Clay (CL)	75	Excellent
B6C	R-3 runway interior Sta 105+00 to 115+00	1000	300				18	Portland cement concrete	690				Clay (CL)	75	Excellent
B7C	R-3 runway interior Sta 115+00 to 120+00	500	300				15	Portland cement concrete	790	6	Select material	200	Clay (CL)	75	Excellent
B8B	R-3 runway; 2nd 500 ft, 35 end	500	300				16	Portland cement concrete	790	6	Select material	200	Clay (CL)	75	Excellent
B9A	R-2 runway; lat 500 ft, 35 end (25-ft-wide east portion)	500	225				18	Portland cement concrete	790	6	Select material	200	Clay (CL)	75	Excellent
B10D	R-5 runway; lat 500 ft, 35 end (75-ft-wide west portion)	500	75				16	Portland cement concrete	790	6	Select material	200	Clay (CL)	75	Excellent
T1A	North connecting taxiway and parallel taxiway Sta 0+00 to 80+50	8050	50				27	Portland cement concrete	700		1-in. stabilized subgrade	100	Sandy clay (CL)	75	Excellent
T2A	Parallel taxiway Sta 80+50 to 115+00	3450	50				27	Portland cement concrete	700			75	Sandy clay (CL)	75	Excellent
T3A	Parallel taxiway Sta 115+00 to 126+65	1125	75				18	Portland cement concrete 16-18-16-in.	700	6	Select material	100	Sandy clay (CL)	75	Excellent
T4A	South connecting taxiway Sta 126+65 to 139+35	1310	75				18	Portland cement concrete	700	6	Select material	100	Sandy clay (CL)	75	Excellent
T5C	Taxiway B	1050	75				19	Portland cement concrete 17-19-17-in.	700				Sandy clay (CL)	75	Good
T6C	Taxiway C	1075	75				21	Portland cement concrete 19-21-19-in.	700	6	Select material	100	Clay (CL)	75	Excellent
T7C	Taxiway D	375	150				18	Portland cement concrete	690				Clay (CL)	75	Very good
T8C	Taxiway D	675	150				4	Asphaltic concrete		6 25	Crushed stone gravel	80 40	Clay (CL)	7	Fair
T9A	Taxiway E	2800	Variable	3	Asphaltic concrete $E = 5,5$ center 0.5 inches 12-in and 12.9 in. (B-52)		10	Portland cement concrete 15-15-15-in.	600	2	Asphaltic concrete	175	Sandy clay (CL)		Good

(1 of 3 sheets)

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Table 3 (Continued)
SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY				OVERLAY PAVEMENT			PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA OR CONSIDERED	
FACILITY NUMBER AND IDENTIFICATION	LENGTH FT	WIDTH FT	THICK. IN.	DESCRIPTION	FILEX STR PSI	THICK. IN.	DESCRIPTION	FILEX STR PSI	THICK. IN.	CLASSIFICATION	CBR OR K	CLASSIFICATION	CBR OR K			
Correll AFB, Texas																
T10A Taxiway F	1155	56				23	Portland cement concrete	710						Sandy clay (CL)	75	Excellent
T11B Taxiway F	1155	22 each	3	Asphaltic concrete 5.5 center 0.5 edges		10	Portland cement concrete	680	8	Asphaltic concrete Stabilized gravel	175			Sandy clay (CL)	75	Good
T12A W-SE taxiway	5550	75				17	Portland cement concrete	650	6	Select material	100			Sandy clay (CL)	75	Good
T13A Taxiway through south apron	1740	75	2 10	Asphaltic concrete Portland cement concrete $h_c = 16.7$ and 17.07 in. ($h=52$)	650	10	Portland cement concrete	610	6	Sand (SF)	100			Sandy clay (CL)	75	Good
T14A Taxiway G	756	75				28	Portland cement concrete	800	6	Select material	100			Sandy clay (CL)	75	Excellent
T15A SAC alert apron taxiway	2867	75				19	Portland cement concrete 17-19-17-19 in.	700	6	Select material	100			Sandy clay (CL)	75	Excellent
T16A Taxiway H	2232	50				23	Portland cement concrete	710						Sandy clay (CL)	75	Excellent
T17A Taxiway H end portion	325	50	3	Asphaltic concrete $h_c = 5.5$ center 0.5 edges 11.7 and 11.9 in. ($h=52$)		10	Portland cement concrete 15-10-15 in.	680						Sandy clay (CL)	75	Fair
T18A Taxiway I east portion	325	50	10	Portland cement concrete (10-14 in.) $h_c = 11.9$	650	10	Portland cement concrete 15-10-15 in.	610	6	Sand (SF)	100			Sandy clay (CL)	75	Good
T19A Taxiway I west portion	450	Varies	3	Asphaltic concrete $h_c = 5.5$ center 0.5 edges 11.9 and 12.2 in. ($h=52$)		10	Portland cement concrete	680	10	Sand (SF)	100			Sandy clay (CL)	75	Good
T20B Taxiway J and regular access apron E stubs	Varies	Varies				18	Portland cement concrete	700						Sandy clay (CL)	75	Excellent
T21B Taxiway K and Hanger access apron W stubs 1 and 2	Varies	Varies														
A1B South warm-up apron	Varies	Varies				16	Portland cement concrete	700	6	Select material	100			Sandy clay (CL)	75	Excellent
A2B Power check pad	700	300				18	Portland cement concrete	650						Clay (CL)	75	Excellent
A3B North warm-up apron (abandoned)	Varies	Varies	3	Asphaltic concrete $h_c = 5.5$ center 0.5 edges 11.9 and 12.2 in. ($h=52$)		10	Portland cement concrete	680						Sandy clay (CL)	75	Poor
A4B North apron (west portion)	1800	125				10	Portland cement concrete	610	6	Sand (SF)	100			Sandy clay (CL)	75	Excellent
A5B South apron (west portion)	3150	Varies												Sandy clay (CL)	75	Very good

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Table 3 (Continued)
SUMMARY OF PHYSICAL PROPERTY DATA

FACILITY		OVERLAY PAVEMENT		PAVEMENT		BASE		SUBGRADE		GENERAL CONDITION OF AREA OR CONSIDERED	
FACILITY NUMBER AND IDENTIFICATION	LENGTH FT	WIDTH FT	THICK IN.	DESCRIPTION	FLEX STR PSI	THICK IN.	DESCRIPTION	CLASSIFICATION	CBR OR K		
Carroll AFB, Texas											
A6B North apron	Varies	125	15 to 10	Portland cement concrete $h_c = 14.2$ in.	650	10	Portland cement concrete	Sand (SF)	100	75	Excellent very good
A7B South apron											
A8B North apron (east portion)	1400	350	15	Portland cement concrete $h_c = 17.9$ in.	650	6	Portland cement concrete 8'-6"-8'-in.	Sand (SF)	100	75	Excellent very good
A9B South apron (east portion)	1400	75									
A10B North apron extension	350	200									
A11B Transient apron	Varies	Varies	14	Portland cement concrete	650	4	Asphaltic concrete (k = 400)	Gravel	300	75	Excellent very good
A12B South apron extension (west)											
A13B South apron extension (east)	Varies	Varies	14	Portland cement concrete	650	14	Portland cement concrete	Compacted flexible base compacted to 95% mod AASHTO	300	75	Very good
A14B Alert apron A and 29-ft strip of apron B	1150	200	200	Asphaltic concrete $h_c = 17.59$ in.	650	13	Portland cement concrete	Stabilized gravel	200	75	Very good
A15B Alert apron B	1700	225	4	Asphaltic concrete $h_c = 17.59$ in.	650	13	Portland cement concrete	Stabilized gravel	200	75	6004
A16B Operational apron	1485	445	4	Asphaltic concrete $h_c = 8.14$ in.	650	6	Portland cement concrete 8'-6"-8'-in.	Gravel	100	75	Fair
A17B Misc original stubs 3W-5E taxiway	Varies	Varies									
A18B Misc new parking stubs	Varies	Varies	17	Portland cement concrete	650	6	Portland cement concrete	Select material	100	75	Fair
A19B Wehtrak	Varies	Varies	17	Portland cement concrete	710	6	Portland cement concrete	Select material	100	75	Fair
A20B Calibration hardstand and taxiway	Varies	Varies	14	Portland cement concrete	700	6	Portland cement concrete	Select material	100	75	Excellent
R11X H-3 runway overrun north end	1000	300	15	Portland cement concrete	650	15	Portland cement concrete	Sandy clay (CL)	100	75	Fair
R12X H-3 runway blast pad south end	250	300	18	Portland cement concrete 27'-18"-27'-in. reinforced 3/8"-6'-in.	650	6	Asphaltic concrete	CLAY (CL)	75	75	Excellent
R13X H-3 runway overrun south end	850	300	2	Double bituminous surface treatment		6	Crushed limestone				Good

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

Table 4

ARFIELD,
DALLAS, TEXAS

SUMMARY OF DATA - RIGID PAVEMENT CONDITION SURVEY

DATE: December 1972

NO.	FEATURE DESIGNATION	SLAB SIZE FT	APPROX NO OF SLABS	PAVE. THICK. IN.	NO. OF SLABS CONTAINING INDICATED DEFECTS													% OF SLABS DEFECTS	% OF SLABS NO DEFECTS	CONDITION					
					I	-	\	Δ	*	K	~	S	J	J	J	J	⊕				M	P	O	C	D
R1A	N-S runway; 1st 500 ft, 17 end	25 by 25	240	18				4							1								97.5	98.5	Excel- lent
R2B	N-S runway Sta 15+00 to 20+75	25 by 25	276	18			4								4								96.7	98.5	Excel- lent
R3C	N-S runway interior	25 by 25	1584	16	3	1		5							3								97.6	99.4	Excel- lent
R7C				15																					
R8B	N-S runway; 2nd 500 ft, 35 end	25 by 25	240	16				1															98.7	99.5	Excel- lent
R9A	N-S runway; 1st 500 ft, 35 end	25 by 25	240	18																			99.5	100.0	Excel- lent
R10D				16																					
T1A	North connecting taxiway, parallel	25 by 25	1231	27				2	1						11	1	3						96.5	98.4	Excel- lent
T2A	taxiway, parallel	Var		18																					
T3A	taxiway, and south connecting																								
T4A	taxiway																								
T5C	Taxiway B	25 by 25	174	19	15	3	4	6	2						10								83.5	85.6	Good
T6C	Taxiway C	25 by 25	183	21	1			1															98.9	98.9	Excel- lent
T10A	Taxiway F	25 by 25	110	23													1						98.1	100.0	Excel- lent

REMARKS:

- LEGEND:
- I LONGITUDINAL CRACK
 - TRANSVERSE CRACK
 - \ DIAGONAL CRACK
 - Δ CORNER BREAK
 - * SHATTERED SLAB
 - K KEYED JOINT FAILURE
 - ~ SHRINKAGE CRACK
 - S SCALING
 - J SPALL ON TRANSVERSE JOINT
 - J SPALL ON LONGITUDINAL JOINT
 - J CORNER SPALL
 - ⊕ SETTLEMENT
 - M MAP CRACKING
 - P PUMPING JOINT
 - O POP-OUT
 - UNCONTROLLED EXPANSION CRACK
 - C CRACKING
 - D 'D' CRACKING

COPY AVAILABLE TO DDC DOES NOT
PERMIT FULLY LEGIBLE PRODUCTION

Table 4 (Continued)

DATE: December 1972		SUMMARY OF DATA - RIGID PAVEMENT CONDITION SURVEY												AIRFIELD: Carswell AFB, Texas											
NO.	FEATURE DESIGNATION	SLAB SIZE FT	APPROX NO. OF SLABS	PAVE. THICK IN.	NO. OF SLABS CONTAINING INDICATED DEFECTS													% OF SLABS NO MAJOR DEFECTS	CONDITION						
					I	-	\	Δ	*	K	w	S	J	↓	J	⬢	M			P	O	C	D		
T14A	Taxiway G	25 by 25	70	28																			100.0	Excel- lent	
T15A	SAC apron taxiway	25 by 25	193	19			4			1		6	2	2									91.7	Excel- lent	
T16A	Taxiway H	25 by 25	177	23										1									99.4	Excel- lent	
T20B A21B	Taxiway J and Hangar access apron E stubs 3 and 4	25 by 25	467	18		3		2						3									97.8	Excel- lent	
T21B A22B	Taxiway K and han- gar access apron H	25 by 25	342	18								1	1	4									97.9	Excel- lent	
A1B	South warm-up apron	25 by 25	256	16				2													2		98.4	Excel- lent	
A2B	Power check pad	25 by 25	423	18		1	1	2					1	1							1		99.0	Excel- lent	
A4B A6B A8B	North apron	12-1/2 by 20 13-1/2 by 15	4293	10/10 15 to 10/10 15/6		31	2	4	20			33	1	5	7	13					1	5	30	96.7	Excel- lent

REMARKS:

- LEGEND:
- I LONGITUDINAL CRACK
 - TRANSVERSE CRACK
 - \ DIAGONAL CRACK
 - Δ CORNER BREAK
 - * SHATTERED SLAB
 - K KEYED JOINT FAILURE
 - SHRINKAGE CRACK
 - SCALING
 - S SPALL ON TRANSVERSE JOINT
 - J SPALL ON LONGITUDINAL JOINT
 - ↓ CORNER SPALL
 - ⬢ SETTLEMENT
 - M MAP CRACKING
 - P PUMPING JOINT
 - O POP-OUT
 - C UNCONTROLLED CONTRACTION CRACK
 - D "D" CRACKING

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

Table 4. (Continued)

DATE: December 1972		SUMMARY OF DATA - RIGID PAVEMENT CONDITION SURVEY													ARFIELD COUNTY, AFD, TEXAS										
NO.	FEATURE DESIGNATION	SLAB SIZE FT	APPROX NO. OF SLABS	PAVE. THICK. IN.	NO. OF SLABS CONTAINING INDICATED DEFECTS													% OF SLABS NO DEFECTS	CONDITION						
					I	-	\	Δ	*	K	~	S	J	↓	J	⬢	M			P	O	C	D		
A5B	South apron and extension	12-1/2 by 15	7694	15 to 10/20	42	23	56	110	1			39			68	27	68	9	1	19	11	94.3	97.2	Very good	
A7B		25 by 25		15/6																					
A9B		25 by 25		14																					
A12B																									
A13B																									
A10B	North apron extension	25 by 25	396	15			1					1			1	3	3					97.7	99.7	Excellent	
A11B	Transient apron	25 by 25	483	14			1	2			4				1	6	1		1			96.8	99.3	Excellent	
A14B	Alert apron B	25 by 25	502	13	2	1	8	11			12				3	1	1					93.0	96.0	Very good	
A19B	Washrack	25 by 25	170	14				1														99.1	99.1	Excellent	
R11X	N-S runway over-run north end	25 by 25	480	18			8				4						1			1	2	96.6	98.3	Excellent	

REMARKS:

- LEGEND:
- I LONGITUDINAL CRACK
 - TRANSVERSE CRACK
 - \ DIAGONAL CRACK
 - Δ CORNER BREAK
 - * SHATTERED SLAB
 - K KEVED JOINT FAILURE
 - ~ SHRINKAGE CRACK
 - S SCALING
 - J SPALL ON TRANSVERSE JOINT
 - ↓ SPALL ON LONGITUDINAL JOINT
 - J CORNER SPALL
 - ⬢ SETTLEMENT
 - M MAP CRACKING
 - P PUMPING JOINT
 - O POP-OUT
 - C UNCOMPENSATED JOINT CRACK
 - D "D" CRACKING

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION

Table 5

SUMMARY OF PAVEMENT EVALUATION

NAME OF AIRFIELD: Carswell AFB		DATE OF EVALUATION		LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										REMARKS				
MONTH: Dec		YEAR: 1972		TRICYCLE ARRANGEMENT										BICYCLE	REMARKS			
NO.	FEATURE	PAVEMENT OPERATIONAL USE	TRICYCLE ARRANGEMENT										BICYCLE	REMARKS				
			1	2	3	4	5	6	7	8	9	10						
	DESIGNATION		SINGLE 100-PSI TIRE PRESSURE	SINGLE 100-SQ-IN. CONTACT AREA	SINGLE 241-SQ-IN. CONTACT AREA	TW 28-IN. C-C 226-SQ-IN. CONTACT AREA EACH TIRE	TW 37-IN. C-C 287-SQ-IN. CONTACT AREA EACH TIRE	SINGLE TANDEM 60-IN. SPACING 400-SQ-IN. CONTACT AREA	TW 37-IN. C-C 287-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 426-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 426-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 426-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 426-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 426-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 426-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 426-SQ-IN. CONTACT AREA EACH TIRE	TW 44-IN. C-C 426-SQ-IN. CONTACT AREA EACH TIRE	
RIA	N-S runway; 1st 500 ft, 17 end	Capacity	155,000+	85,000+	155,000+	210,000	210,000	200,000+	195,000	245,000	320,000	320,000	320,000	320,000	320,000	320,000	320,000	280,000
R2B	N-S runway, sta 15+00 to 20+75	Capacity	155,000+	85,000+	155,000+	210,000	210,000	200,000+	235,000	285,000	370,000	370,000	370,000	370,000	370,000	370,000	370,000	300,000
A2B	Power check pad																	
R3C	N-S runway, sta 20+75 to 31+75	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	330,000+	330,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	460,000
R4C	N-S runway, sta 31+75 to 87+50	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	300,000	330,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	390,000
R5C	N-S runway, sta 87+50 to 109+00	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	295,000	320,000	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	330,000
R6C	N-S runway, sta 109+00 to 115+00	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	310,000	330,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	400,000
T7C	Taxiway D																	
R7C	N-S runway, sta 115+00 to 120+00	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	330,000+	330,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	470,000
R8B	N-S runway; 2nd 500 ft, 35 end	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	285,000	330,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	390,000
F9A	N-S runway; 1st 500 ft, 35 end	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	285,000	330,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	430,000
T1A	North connecting taxiway and parallel taxiway	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	330,000+	330,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	580,000
TEA	Parallel taxiway	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	330,000+	330,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	380,000+	560,000
T3A	Parallel taxiway	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	220,000	280,000	370,000	370,000	370,000	370,000	370,000	370,000	370,000	320,000
T4A	South connecting taxiway	Capacity	155,000+	85,000+	155,000+	220,000+	220,000+	200,000+	220,000	280,000	370,000	370,000	370,000	370,000	370,000	370,000	370,000	320,000

Note: + sign denotes allowable gross loading greater than maximum gross weight of any existing aircraft having indicated gear configuration.
 (a) denotes allowable gross loading less than minimum gross weight of any existing aircraft having indicated gear configuration.

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE REPRODUCTION

Table 5 (continued)
SUMMARY OF PAVEMENT EVALUATION

NAME OF AIRFIELD: Carswell AFB		DATE OF EVALUATION		LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										REMARKS
MONTH: Dec		YR: 1972		TRICYCLE ARRANGEMENT										
NO.	DESIGNATION	PAVEMENT OPERATIONAL USE	SINGLE TIRE PRESSURE 100-PSI	SINGLE 100-50-IN CONTACT AREA	SINGLE 24-SQ-IN CONTACT AREA	1W 20-IN, C-C 28-SQ-IN CONTACT AREA EACH TIRE	SINGLE TANDEM 60-IN SPACING 40-SQ-IN CONTACT AREA	1W 44-IN, C-C 28-SQ-IN CONTACT AREA EACH TIRE	1W 44-IN, C-C 28-SQ-IN CONTACT AREA EACH TIRE	TWIN TANDEM 33-IN X 40-IN 28-SQ-IN CONTACT AREA EACH TIRE	C-SA GEAR CONFIGURATION	TWIN TWIN SPCG 87-42-37 28-SQ-IN CONTACT AREA EACH TIRE		
													1	2
A4B	North apron (west portion)	Capacity	115,000	85,000+	155,000	165,000	200,000+	185,000	230,000	310,000	800,000+	240,000		
A5B	South apron (west portion)	Capacity	110,000	85,000+	145,000	155,000	200,000+	175,000	250,000	295,000	800,000+	235,000		
A6B	North apron	Capacity	155,000+	85,000+	155,000+	210,000	200,000+	230,000	285,000	380,000+	800,000+	300,000		
A7B	South apron	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	260,000	330,000+	380,000+	800,000+	370,000		
A8B	North apron (east portion)	Capacity	130,000	85,000+	155,000+	195,000	200,000+	220,000	290,000	380,000+	800,000+	310,000		
A9B	South apron (east portion)	Capacity	115,000	85,000+	155,000+	170,000	200,000+	195,000	250,000	360,000	800,000+	270,000		
A10E	North apron extension	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	270,000	330,000+	380,000+	800,000+	360,000		
A11B	Transient apron	Capacity	50,000	35,000	70,000	70,000	110,000	80,000	(a)	155,000	440,000	(a)		
A12B	South apron extension (west)	Capacity	145,000	85,000+	155,000+	200,000	200,000+	225,000	280,000	370,000	800,000+	295,000		
A13E	South apron extension (east)	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	245,000	310,000	380,000+	800,000+	320,000		
A14B	Alert apron A and 25 ft strip of apron B	Capacity	115,000	85,000+	155,000+	160,000	200,000+	180,000	225,000	310,000	800,000+	240,000		
A15B	Alert apron B	Capacity	155,000+	85,000+	155,000+	160,000	200,000+	175,000	220,000	290,000	800,000+	240,000		
A16B	Operational apron	Capacity	115,000	85,000+	155,000+	160,000	200,000+	175,000	220,000	290,000	800,000+	240,000		
A17E	Nine original stubs	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	245,000	310,000	380,000+	800,000+	320,000		
A18B	Nine new parking stubs	Capacity	115,000	85,000+	150,000	160,000	200,000+	180,000	225,000	310,000	800,000+	240,000		
A19B	Washrack	Capacity	115,000	85,000+	145,000	160,000	200,000+	175,000	220,000	290,000	800,000+	240,000		
A20B	Calibration hardstand and taxiway	Capacity	115,000	85,000+	145,000	160,000	200,000+	175,000	220,000	290,000	800,000+	240,000		

(3 of 3 sheets)

WES FORM NO. 969
JUNE 1972
EDITION OF AUG 1960 IS OBSOLETE.

COPY AVAILABLE TO DDC DOES NOT PERMIT FULLY LEGIBLE PRODUCTION



Photo 1. Epoxy patches near south end of runway



Photo 2. General view of runway looking south
from sta 60+00

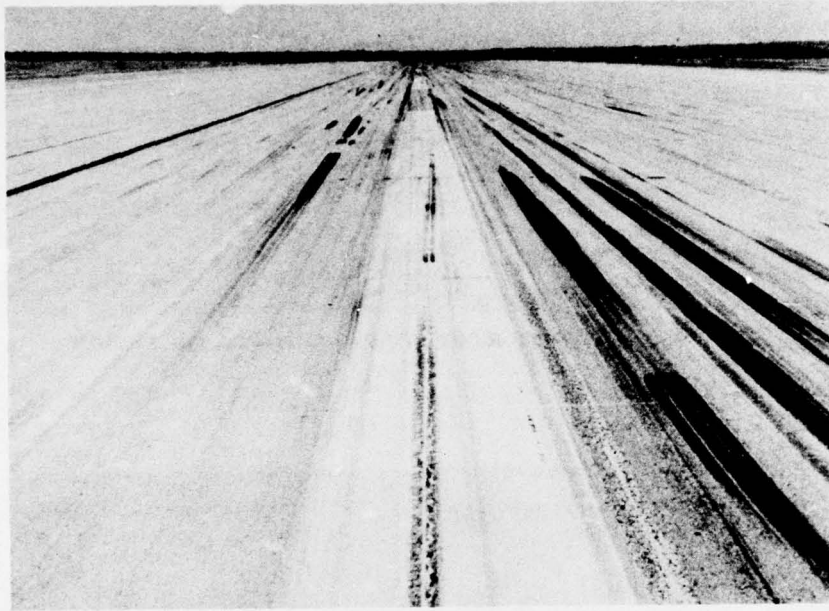
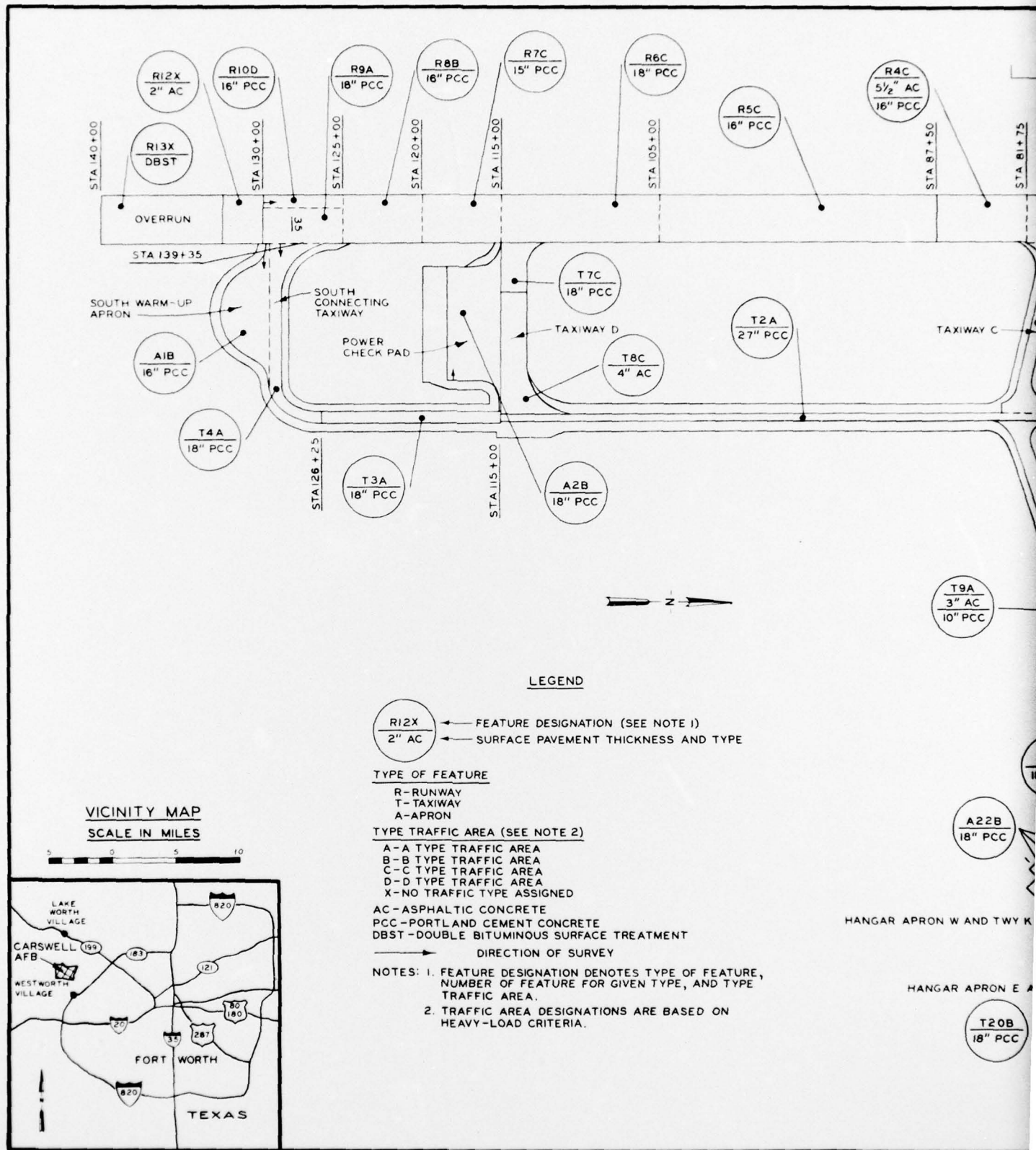
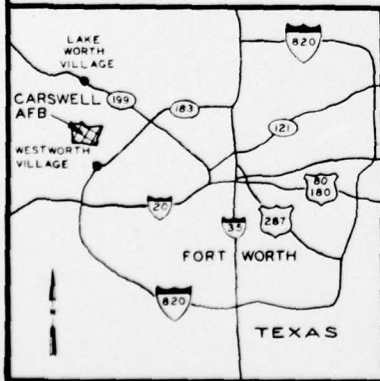


Photo 3. General view of runway looking north
from sta 60+00



VICINITY MAP
SCALE IN MILES



LEGEND



TYPE OF FEATURE

- R-RUNWAY
- T-TAXIWAY
- A-APRON

TYPE TRAFFIC AREA (SEE NOTE 2)

- A-A TYPE TRAFFIC AREA
- B-B TYPE TRAFFIC AREA
- C-C TYPE TRAFFIC AREA
- D-D TYPE TRAFFIC AREA
- X-NO TRAFFIC TYPE ASSIGNED

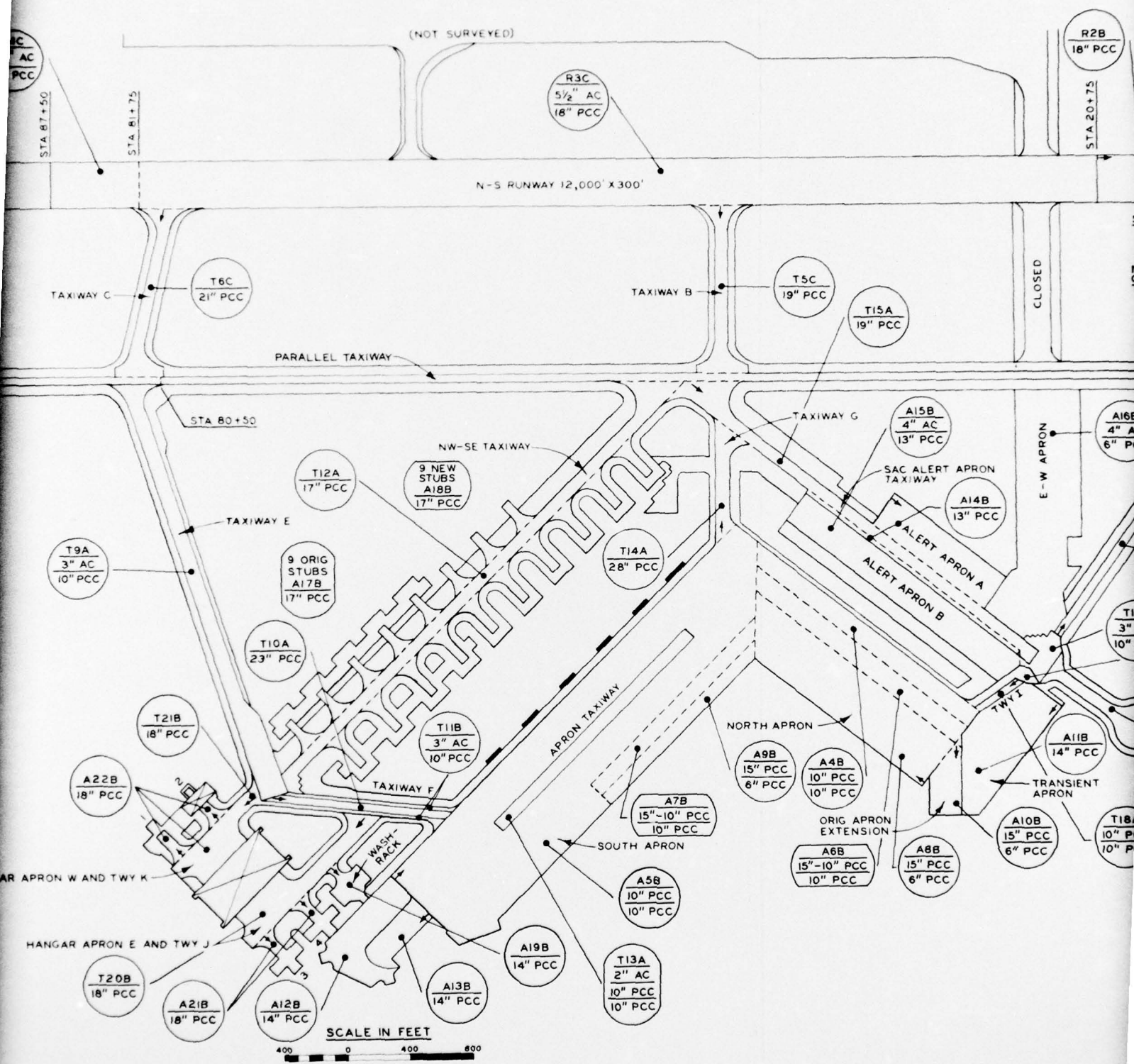
- AC-ASPHALTIC CONCRETE
- PCC-PORTLAND CEMENT CONCRETE
- DBST-DOUBLE BITUMINOUS SURFACE TREATMENT

→ DIRECTION OF SURVEY

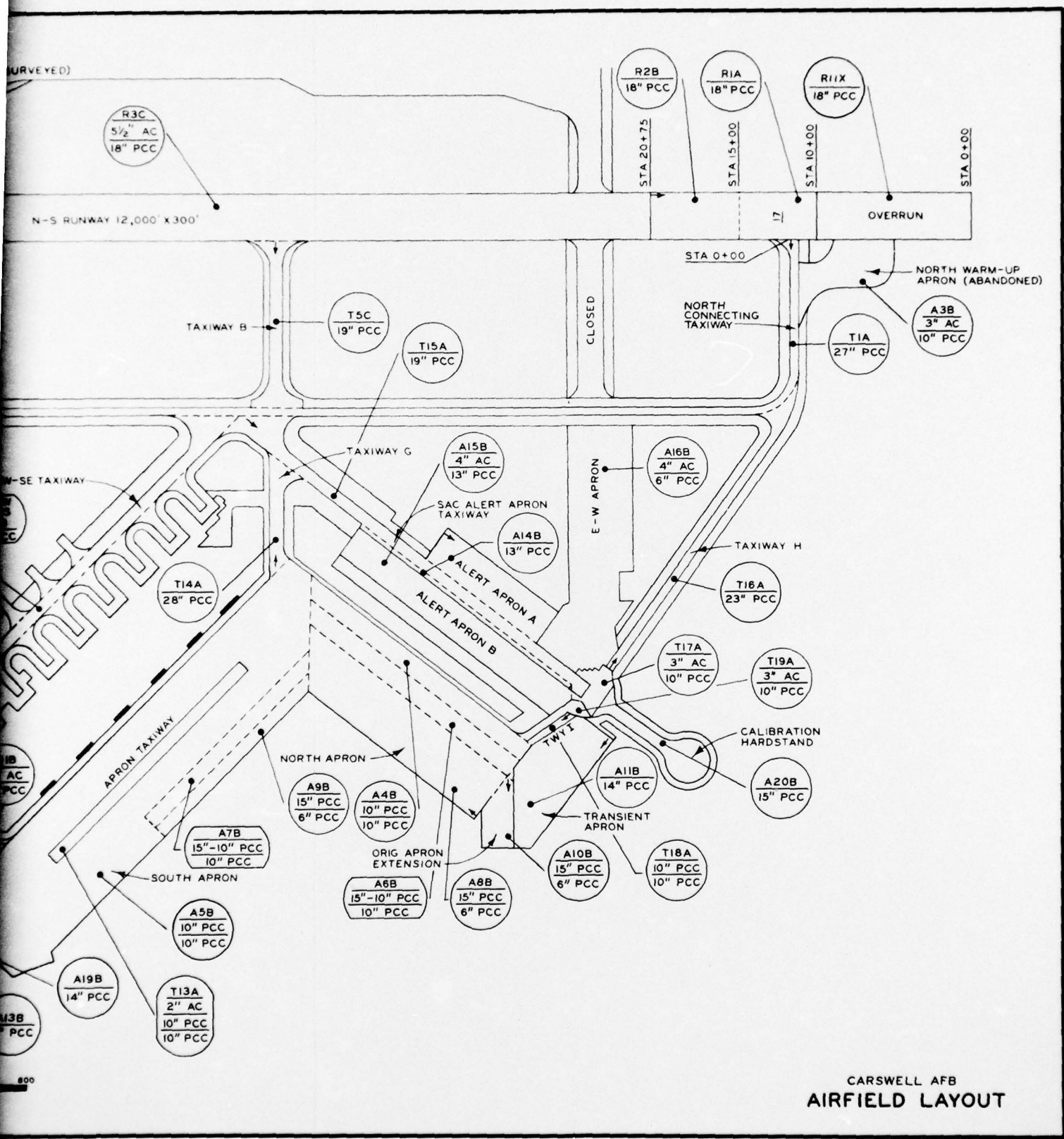
- NOTES: 1. FEATURE DESIGNATION DENOTES TYPE OF FEATURE, NUMBER OF FEATURE FOR GIVEN TYPE, AND TYPE TRAFFIC AREA.
2. TRAFFIC AREA DESIGNATIONS ARE BASED ON HEAVY-LOAD CRITERIA.

HANGAR APRON W AND TWY K

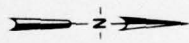
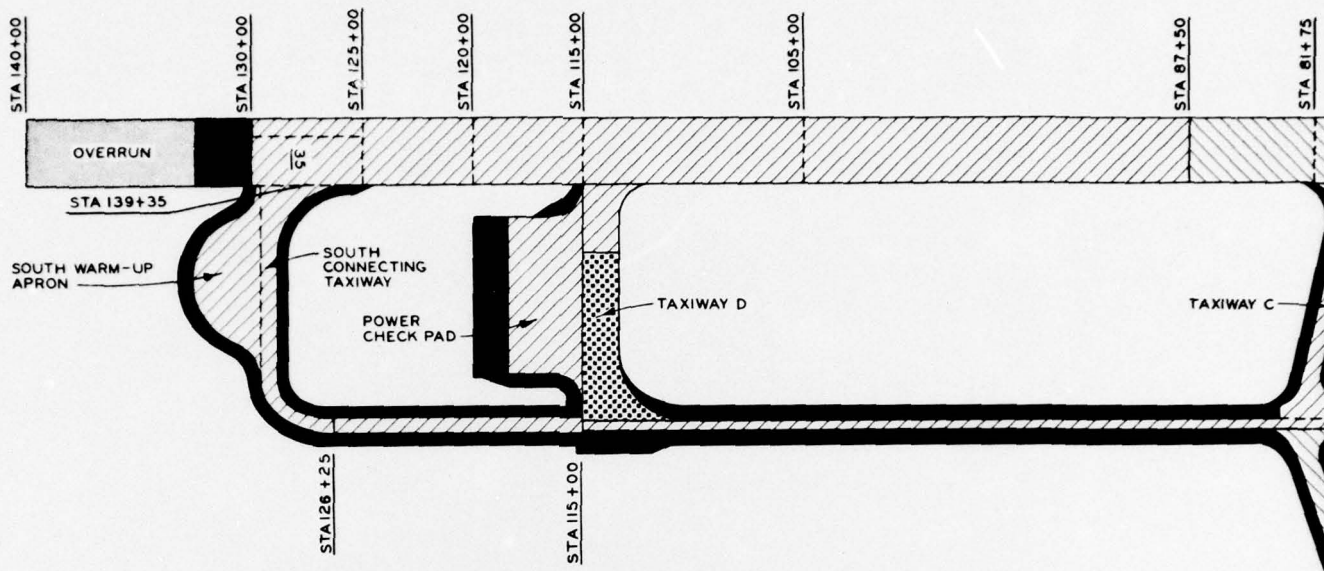
HANGAR APRON E A









2



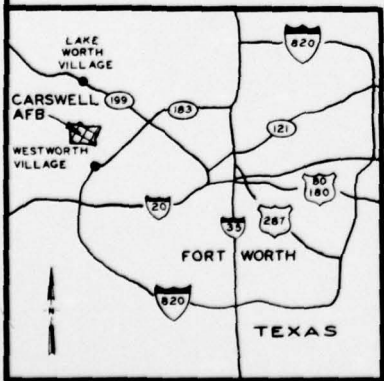
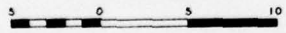
CARSWELL AFB
AIRFIELD LAYOUT



LEGEND

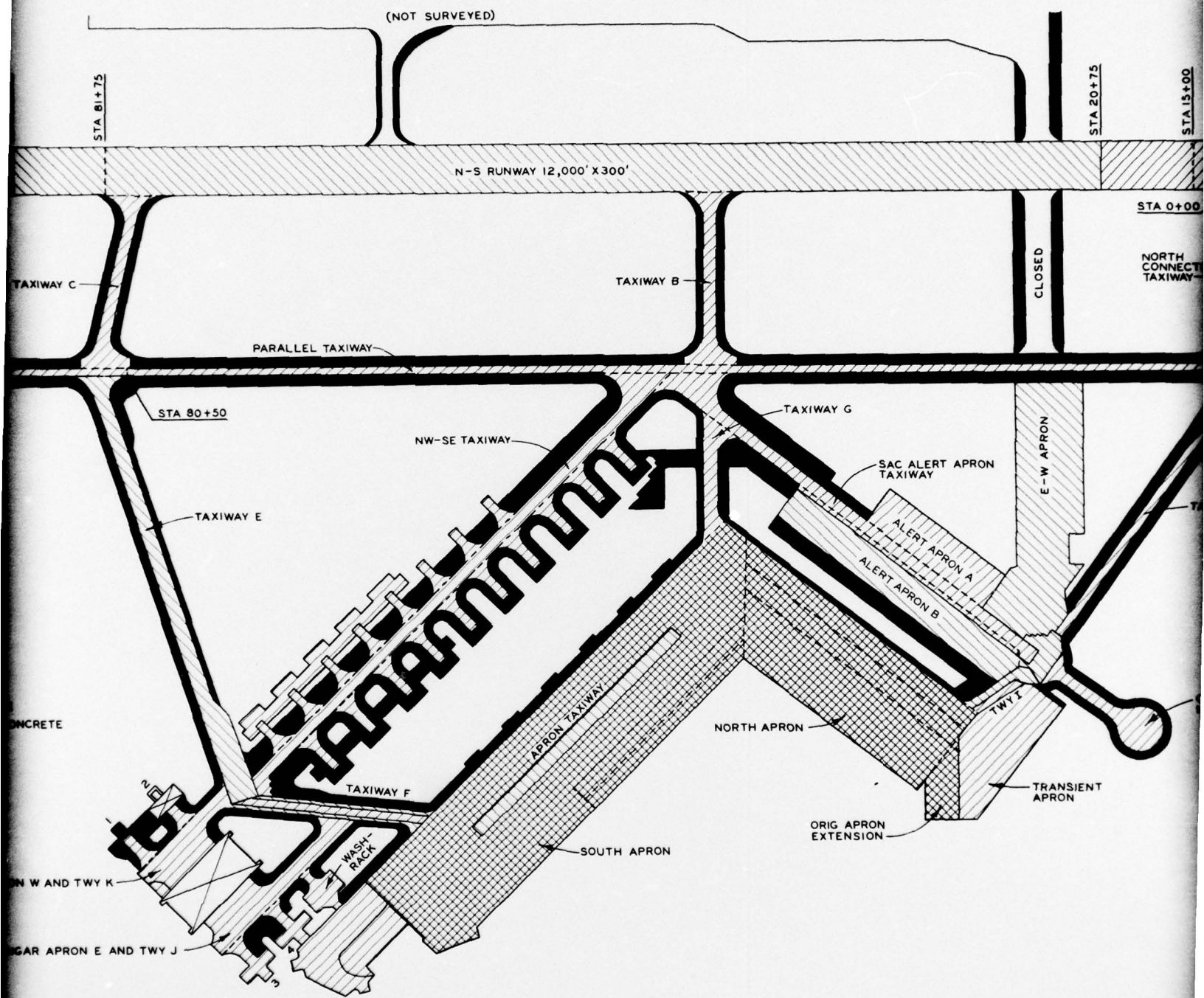
-  PORTLAND CEMENT CONCRETE (PCC)
-  ASPHALTIC CONCRETE (AC)
-  ASPHALTIC CONCRETE OVER PORTLAND CEMENT CONCRETE
-  PORTLAND CEMENT CONCRETE OVER PORTLAND CEMENT CONCRETE
-  DOUBLE BITUMINOUS SURFACE TREATMENT (DBST)
-  BLAST PAVEMENT (AC NON-TRAFFIC)

**VICINITY MAP
SCALE IN MILES**

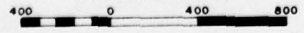


HANGAR APRON W AND TWY K

HANGAR APRON E AND TWY J



SCALE IN FEET



2

SURVEYED)

N-S RUNWAY 12,000' x 300'

STA 20+75

STA 15+00

STA 10+00

STA 0+00

OVERRUN

TAXIWAY B

CLOSED

STA 0+00

NORTH CONNECTING TAXIWAY

NORTH WARM-UP APRON (ABANDONED)

NW-SE TAXIWAY

TAXIWAY G

SAC ALERT APRON TAXIWAY

E-W APRON

TAXIWAY H

ALERT APRON A

ALERT APRON B

CALIBRATION HARDSTAND

NORTH APRON

TWY 1

TRANSIENT APRON

ORIG APRON EXTENSION

SOUTH APRON

APRON TAXIWAY

CARSWELL AFB
PAVEMENT PLAN

3