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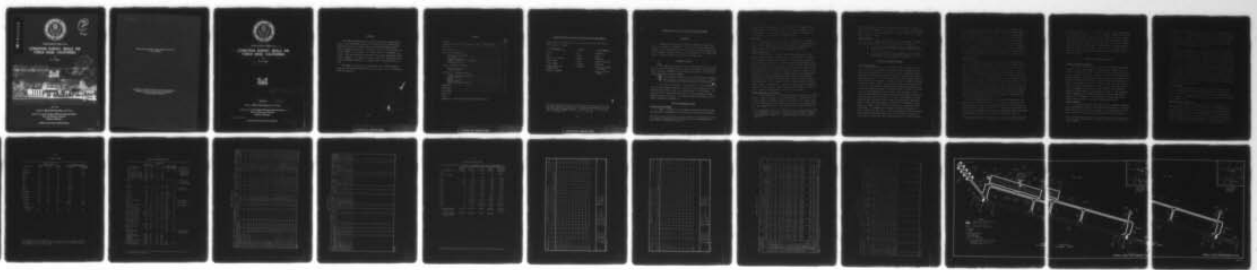
ARMY ENGINEER WATERWAYS EXPERIMENT STATION VICKSBURG MISS F/G 1/5
CONDITION SURVEY, BEALE AIR FORCE BASE, CALIFORNIA.(U)
APR 73 P J VEDROS

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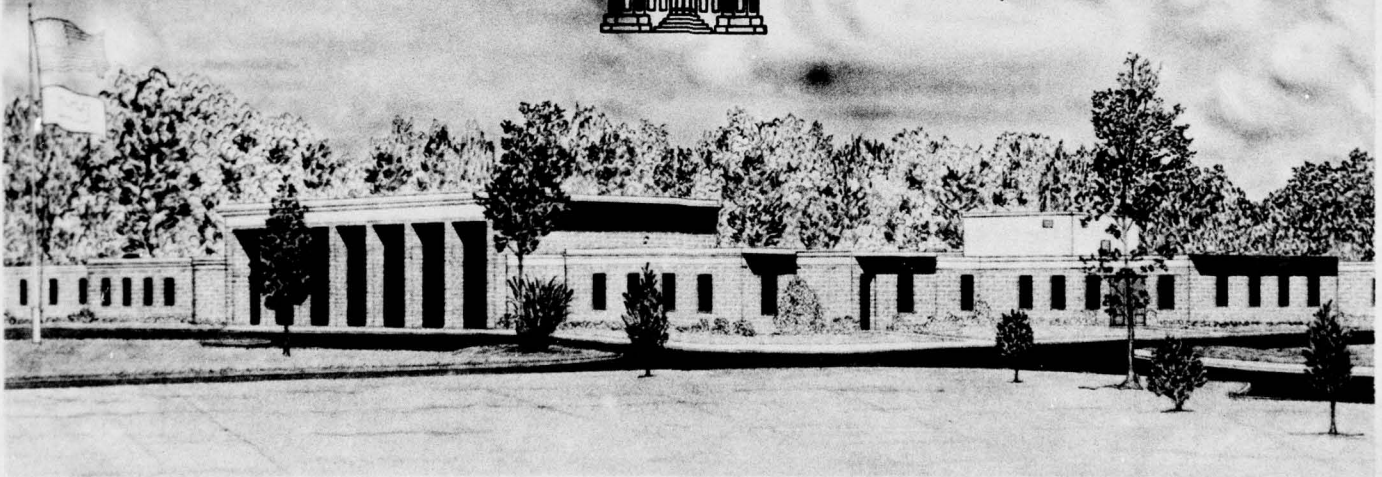
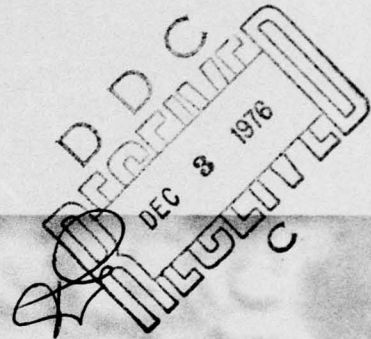
MISCELLANEOUS PAPER S-73-18

CONDITION SURVEY, BEALE AIR FORCE BASE, CALIFORNIA

by

P. J. Vedros

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April 1973

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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. P. J. Vedros, S. J. Alford, and P. S. McCaffrey, Jr., of WES. This report was prepared by Mr. Vedros under the general supervision of Messrs. J. P. Sale, R. G. Ahlvin, and R. L. Hutchinson of the Soils and Pavements Laboratory. Appendix A was obtained from the Air Force.

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.

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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
miles (U. S. statute)	1.609344	kilometers
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, BEALE AIR FORCE BASE, CALIFORNIA

Authority

1. Authority for conducting condition surveys at selected airfields is contained in amendment to FY 1972 RDTE Funding Authorization (MFS-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 Beale Air Force Base (BAFB), California, during 4-7 November 1972. The following two major areas of interest were considered in this condition survey.

- (1) The structural condition of the primary airfield pavements.
- (2) 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 pavements, foundations, or patching materials were performed during this survey. The annual pavement maintenance plan for BAFB is presented in Appendix A.

Pertinent Background Data

Location and topography

4. BAFB is located in Yuba and Nevada Counties, between the Bear and Yuba Rivers, approximately 10 miles* east of Marysville, California.

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

The western portion of the base is on a relatively flat plain of the eastern edge of the Sacramento Valley, with elevations ranging from 20 to 200 ft above mean sea level. This terrain develops eastwardly into the rapidly rising foothills of the Sierra Nevada.

Soil types

5. The subgrade soil is generally a clay having a low plasticity of the CL classification (according to the Unified Soil Classification System*), with varying amounts of sand and gravel. Some amounts of sandy silt (ML) and agglomerate are also found in the area.

Climatic conditions

6. The area has a semiarid climate characterized by hot, dry summers and mild winters. Climatic data (extracted from U. S. Weather Bureau records for Marysville, California) for a period of record of about 45 years indicate that the average daily mean temperatures range from 47 F in January to 79 F in July. Rainfall generally occurs during the winter months. An 81-year period of record indicates that the average annual rainfall is about 20 in., ranging from only a trace in July and August to 3.8 in. in December. Temperature and precipitation data for the past 5 years of record were also obtained from the weather squadron at BAFFB. These records show that average daily mean temperatures range from 45 F in January to 81 F in July and that the average annual rainfall is about 21 in. Frost occurs infrequently and does not penetrate to any noticeable depth below the ground surface. Complete climatic data for the Marysville area are shown in table 1.

General description of airfield

7. In November 1972, the airfield facilities consisted of a NE-SW runway, a parallel taxiway, an operational apron, a transient and base (T and B) apron, two warm-up aprons, an alert facility, a hangar access apron with maintenance docks, connecting taxiways to the aprons and runway, and a power check pad. The runway was 300 ft wide and 12,000 ft

* 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.

long; the operational apron with extension was 600 ft wide and 4625 ft long; the T and B apron was 300 ft wide and 750 ft long; and the taxiways were 75 ft wide, with 75-ft shoulders. A layout of the airfield pavements is shown in plate 1.

Previous reports

8. Previous reports concerning BAFB are listed below. Pertinent data were extracted from them for use in this condition survey.

- a. Ohio River Division Laboratories, CE, "Condition Survey Report, Beale Air Force Base, California," May 1963, Cincinnati, Ohio.
- b. U. S. Army Engineer District, Sacramento, CE, "Airfield Pavement Evaluation No. 1, Beale Air Force Base, California," November 1958, Sacramento, California

History of Airfield Pavements

Construction history

9. The construction of the airfield pavements at BAFB was initiated in April 1957 and completed in January 1959. The pavements were designed in accordance with the Corps of Engineers Engineering Manual for Military Construction, Part XII, Chapter 3, dated May 1956 (now designated TM 5-824-3). All of the rigid pavements except the maintenance docks were designed to support a landing gear load of 240,000 lb carried on twin-twin wheels abreast, with each wheel having a tire contact area of 267 sq in. The center to center spacing between the twin wheels is 37 in. and between the centers of the inside wheels of each set of twins is 62 in. The maintenance docks, taxiway 7, and the hangar access aprons were designed using the same criteria and landing gear configurations for a gear load of 160,000 lb. In 1964, alert aprons 7-10 were added, and the same design criteria used for the previous aprons were used. In 1966, the power check pad, taxiway 9, the operational apron extension, taxiway 8, the extension to taxiway 10, and taxiway 11 were constructed. The pavement on the power check pad was designed as a type C traffic area (see plate 1), and the operational apron and taxiway pavements were designed as type A and C traffic areas for a gear load of 265,000 lb and the same landing gear configuration as that used for

the 1957 construction. In 1971, the large aircraft maintenance dock (1243) and taxiway were constructed, and the pavements were designed to support a landing gear load of 160,000 lb carried on twin-twin wheels abreast and the same wheel spacing and tire contact area as indicated previously for this loading. Details of the design and construction history of the airfield pavements (extracted from the reports referenced in paragraph 8) are presented in table 2. Pavement thicknesses, descriptions, and other details are presented in table 3. The physical property data indicated for the pavements constructed after 1958 are those values which were assigned for use in the design analysis for the various facilities.

Traffic history

10. A detailed traffic record was available for the period from July 1960 to December 1971. Traffic at the airfield at the present time consists of about 75 to 90 cycles* per month by B-52 aircraft and about 200 cycles per month by KC-135 aircraft. There are about 4 cycles per month of SR-71 aircraft traffic and a considerable number of touch-and-go operations by aircraft from other bases. It was reported that approximately 20-25 cycles per month are applied on the pavements by towed or taxied alert aircraft. The breakdown by percentage of use by various types aircraft is estimated as follows: KC-135, 25 percent; B-52, 20 percent; C-141, 10 percent; T-38, 13 percent; SR-71, 12 percent; and others, 20 percent. These percentages are only for use of the runway, since the C-141 aircraft is not stationed at BAFB and uses the runway only for touch-and-go operations. Eighty percent of the takeoffs are from the northeast end of the runway.

11. An estimated traffic record for the period July 1960 to December 1971 is presented in table 4. As is shown in this table, the reported number of cycles of operation for the B-52 and KC-135 has increased rapidly since the 1966 report. The touch-and-go operations are believed to be included in the figures presented after 1966, even though these operations do not meet the criteria for a normal cycle of

* A cycle of traffic is a combination of one takeoff and one landing.

operation. For touch-and-go operations, the aircraft only touches down on the runway and then takes off again. However, assuming that the number of cycles in table 4 presented for B-52 operations for the period 1960-1966 is essentially correct and selecting a normal monthly figure of from 75 to 90 cycles for the 1967-1971 period, then it is estimated that there have been approximately 12,000-14,000 cycles applied on the pavements at BAFB. These figures do not take into account the alert movements, which would account for approximately 3,000-4,000 cycles of additional traffic.

Conditions of Pavement Surfaces

Pavement inspection procedure

12. The following procedure was used in conducting the pavement 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 rigid pavement survey for those features inspected in detail are presented in table 5. This table shows a quantitative breakdown of the various types of defects and a condition rating for each pavement 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.

General condition

13. All rigid pavements were found to be in excellent condition. Some surface defects were noted that were more predominant in the runway and taxiway 6 than in the other pavements. The surface defects in the runway consisted of light map cracking in most of the slabs, light

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

shrinkage cracking, and small pop-outs or spalls of the grooves in the pavement surfaces. Some patching of small pop-outs and spalls (reportedly caused by decaying wood fragments or disintegrating foreign matter) had been accomplished in the past and reported on in the 1962 survey. The minor defects observed on taxiway 6 were usually spalls on the transverse joints that were relatively small.

Runway

14. The central 5 lanes (150 ft) and the length of the runway (excluding 625 ft at each end) contained longitudinal grooves on approximately 3/4-in. spacings. This grooving was accomplished during the period October 1967 to March 1968. During this survey, it was observed that a number of the grooved slabs contained a small area of spall (from 1-1/2 in. to 3 in. in diameter) where the groove had broken off. This did not appear to present an operational problem, since the loose chips had been removed by sweeping. The rubber deposits had recently been removed from the northeast end of the runway, and the surface was in excellent condition. The shrinkage cracking reported in the 1962 report was observed to occur in lanes 5 and 7 about 5000-6000 ft from the runway ends. However, it was very difficult to detect this fine shrinkage cracking in the grooved surface.

Taxiway system

15. The taxiway system was found to be in excellent condition, with the predominant defect being the minor spalling on transverse joints of taxiways 1 and 6. A poor drainage condition existed on taxiway 3 (adjacent to the runway), where water was standing on the pavement and shoulder area.

Aprons and alert facilities

16. Blast fences are installed at the east and west edges of the operational apron to form 17 parking slots. At the time of this survey, all but three of the parking positions were being occupied by B-52 and KC-135 aircraft. Parking positions 4, 7, and 15 were thoroughly inspected, and the only major defect recorded was transverse cracking. Four slabs in parking position 4, two slabs in 7, and three slabs in 14 contained a transverse crack. Some slight pitting or

erosion of the surface of the concrete was noted, usually behind the in-board engine of the B-52 aircraft. Three aircraft were parked along the north edge of the north warm-up apron, and two aircraft were parked along the south edge of the south warm-up apron. No surface defects were noted in these areas; however, these two aprons could not be inspected in detail.

17. The T and B apron and taxiway 10 (adjacent to this apron) were in excellent condition, with no defects observed in the taxiway and only two transverse spalls noted in the apron. The addition to the T and B apron, which included taxiway 11, was in excellent condition, with no defects observed. This area is used by taxiing SR-71 aircraft that are parked in shelters adjacent to the west edge of the apron addition.

18. Alert stubs 1-5, which are used for parking KC-135 aircraft, were occupied at the time of this survey; stubs 7-10, which are used for B-52 aircraft, were vacant. The only defects observed in these vacant areas were one or two spalls in each parking stub.

19. The power check pad and taxiway were inspected, and no defects of any type were observed in the pavement surfaces.

Maintenance

20. Maintenance of the rigid pavements has consisted of spall repairs, joint resealing, spot joint repairs, and rubber deposit removal. The annual pavements maintenance plan for BAFB was obtained from the Air Force and is presented as Appendix A. This maintenance plan indicates the type and amount of maintenance that has been performed through November 1972. The in-house maintenance costs for FY 1971 and 1972 were as follows:

	<u>FY 1971</u>	<u>FY 1972</u>
Labor	\$19,728	\$13,581
Materials	28,239	16,662
Other	--	9,336
Total	<u>\$47,967</u>	<u>\$39,579</u>

21. As stated previously, patching of small pop-outs and spalls and some spot resealing of joints have been required. Epoxy mortar and a latex patching material have been used for these repairs. These types of patches on the runway were inspected during this survey, and they appeared to be performing satisfactorily.

Evaluation

22. The latest evaluation report for BAFB was prepared in 1958 (see paragraph 8b). Because some changes in gear configurations and methods of evaluation have been made since that time, a new evaluation table (table 6) has been prepared. The physical properties of the materials as determined in previous evaluations and from design analyses reports for pavements constructed after 1958 were used for determination of the load-carrying capabilities of the pavements.

Conclusions

23. The following remarks summarize the findings of the 1972 inspection:

- a. All portland cement concrete pavements are in excellent condition.
- b. Pavements with grooves are spalling slightly in these grooves; however, this development does not present an operational hazard, since the pavements are being swept to pick up loose debris.
- c. No maintenance of these spalled grooved areas appears to be necessary at present.
- d. Water ponds at a few locations on the airfield after a rain, particularly on taxiway 3.

Table 1
Climatic Data*

<u>Month</u>	<u>Average Daily Temperature, F</u>			<u>Precipitation, in.</u>	
	<u>Max</u>	<u>Min</u>	<u>Mean</u>	<u>Rainfall</u>	<u>Snowfall</u>
January	54	37	47	3.6	0.1
February	60	41	51	3.4	Trace
March	66	44	56	2.8	0.1
April	72	47	61	1.4	--
May	80	52	67	0.8	--
June	89	57	74	0.3	--
July	96	60	79	Trace	--
August	95	59	77	Trace	--
September	89	55	73	0.5	--
October	78	49	64	1.1	--
November	66	41	55	2.3	--
December	55	38	48	3.8	--
Annual	75	48	63	20.0	0.2
Number of years of record	43	44	79	81	21

* Extracted from U. S. Weather Bureau records for Marysville, California, about 10 miles west of BAFB.

Table 2

Airfield Construction History

Designation	Dimensions		Pavement		Construction		Remarks
	Length ft	Width ft	Thick- ness in.	Type	Year	Agency	
Primary runway	12,000	300			1957	CE*	See plate 1 for pavement configuration at runway ends
Sta 140+00 to 145+00	5,000	200	25	PCC			
Sta 255+00 to 260+00	500	200	25	PCC			
Sta 140+00 to 150+00	1,000	Varies	22	PCC			
Sta 250+00 to 260+00	1,000	Varies	22	PCC			
Sta 150+00 to 250+00	10,000	300	20	PCC			
Taxiway 6	12,000	75	22-25	PCC	1957-58	CE	Referred to as east taxiway in 1963 report
Taxiway 1	3,560	75	22	PCC	1958	CE	
Taxiway 2	2,100	75	22-25	PCC	1958	CE	East end was taxiway 6
Taxiway 3	1,250	75	22	PCC	1958	CE	
Taxiway 4	1,250	75	22	PCC	1957-58	CE	
Taxiway 5	1,250	75	22-25	PCC	1957-58	CE	
Taxiway 7	950	75	22-25	PCC	1958	CE	
Taxiway 7 (east end)	850	75	17	PCC	1958	CE	Was taxiway 10
Taxiway 10	2,575	75	20-25	PCC	1958	CE	Was taxiway 8
Taxiway 10 (south end)	875	75	18-22	PCC	1958	CE	Was taxiway 9
Operational apron	2,575	600	20	PCC	1958	CE	
T and B flight apron	750	300	18	PCC	1958	CE	
North warm-up apron	Varies	225	22	PCC	1957-58	CE	
South warm-up apron	Varies	225	22	PCC	1957-58	CE	
Alert aprons (1-5)	Varies	Varies	22	PCC	1958	CE	
Hangar access apron	515	350	17	PCC	1958	CE	
Maintenance docks (1073-1076)	200	95	11-17	PCC	1958	CE	
Alert aprons (7-10)	Varies	Varies	20	PCC	1964	CE	
Power check pad	400	100	18	PCC	1966	CE	
Taxiway 9	875±	50	18	PCC	1966	CE	
Operational apron extension					1966	CE	See plate 1 for apron layout
Southeast end	1,100	300	18	PCC			
West side addition	1,950	225	18	PCC			
Taxiway 8	650	75	22	PCC			
Taxiway 11	2,000	75	22	PCC			
Taxiway 10 addition	1,175	75	22	PCC			
Maintenance dock (1243) and taxiway	200	125	9-15	PCC	1971	CE	
	Varies	75	15	PCC	1971	CE	

* CE denotes Corps of Engineers.

Table 3
SUMMARY OF PHYSICAL PROPERTY DATA

Sheets AFB	FACILITY				OVERLAY PAVEMENT		PAVEMENT			BASE			SUBGRADE		GENERAL CONDITION OF AREA CONSIDERED
	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	
R1A R5A	Primary runway, 1st 500 ft each end; sta 140+00 to 145+00 and sta 255+00 to 260+00	500	100 to 200	25			25	Portland cement concrete	665	6	Sandy gravel		Sandy clayey gravel to sandy clay	150	Excellent
R2B R4B	Primary runway, 2nd 500 ft each end; sta 145+00 to 150+00 and sta 250+00 to 255+00	500	300	22			22	Portland cement concrete	665	6	Sandy gravel		Sandy clayey gravel to sandy clay	150	Excellent
R3C	Primary runway interior, sta 150+00 to 255+00	10,000	300	20			20	Portland cement concrete	665	6	Sandy gravel		Silty sandy gravel to sandy clay	150	Excellent
T2A T7A	Taxiway 2	3,100	75	25			25	Portland cement concrete	620	6	Sandy gravel		Sandy gravel to sandy silt	200	Excellent
T3A	Taxiway 5	11,975	75	22-25-28			22-25-28	Portland cement concrete	665	6	Sandy gravel		Appropriate to sandy clay	200	Excellent
T4A	Taxiway 5	1,250	75	25			25	Portland cement concrete	640	6	Sandy gravel		Sandy clay to sandy silt	150	Excellent
T5A	Taxiway 7	850	75	22-25-28			22-25-28	Portland cement concrete	610	6	Sandy gravel		Sandy clay to sandy gravel	350	Excellent
T6A	Taxiway 10	2,375	75	20-25-20			20-25-20	Portland cement concrete	610	6	Sandy gravel		Sandy clay to sandy gravel	350	Excellent
T10A	Taxiway 10	960	75	18-22-18			18-22-18	Portland cement concrete	830	6	Sandy gravel		Sandy clayey gravel to sandy silt	225	Excellent
T12A T13A T14A	Taxiway 10 Taxiway 8 Taxiway 11	1,175 625 2,000	75 75 75	18-22-18			18-22-18	Portland cement concrete	680	6	Stabilized aggregate		Sandy clayey gravel to sandy silt	200	Excellent
T1B	Taxiway 1	3,560	75	22			22	Portland cement concrete	680	6	Sandy gravel		Sandy clay	350	Excellent
T11B T12B	Taxiway 7	890	75	17			17	Portland cement concrete	670	6	Sandy gravel		Clayey gravelly	225	Excellent
A1B	Operational apron	2,500	600	20			20	Portland cement concrete	610	6	Sandy gravel		Sandy clay to sandy gravel	350	Excellent
A2B	Operational apron extension	varies	varies	18			18	Portland cement concrete	680	6	Stabilized aggregate		Sandy clayey gravel to sandy silt	200	Excellent
A2B	T and B apron	750	300	18			18	Portland cement concrete	830	6	Sandy gravel		Sandy clayey gravel to sandy silt	225	Excellent
A7B	Alert stubs 1-5	200	100	22			22	Portland cement concrete	700	6	Sandy gravel		Sandy gravel to sandy clay	350	Excellent
A8B	Alert stubs 7-10	200	75	20			20	Portland cement concrete	680	6	Sandy gravel		Sandy gravel to sandy clay	350	Excellent
A2B	South warm-up apron	1,200	300	22			22	Portland cement concrete	620	6	Sandy gravel		Sandy gravel to sandy silt	200	Excellent
A6B	North warm-up apron	1,200	300	22			22	Portland cement concrete	640	6	Sandy gravel		Sandy clay to sandy silt	150	Excellent

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(1 of 2 sheets)

Table 3 (Continued)
SUMMARY OF PHYSICAL PROPERTY DATA

Scale AFB	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	FLEX. STR. PSI	THICK. IN.	CLASSIFICATION	CBR OR K	CLASSIFICATION	CBR OR K	
A3B	hangar access apron	515	425				17	Portland cement concrete	570	6	Sandy gravel		Clayey gravelly sand to sandy clay	225	Excellent
A1B	Maintenance docks 1073, 1074, 1075, and 1076	200	95				17 center 11 sides	Portland cement concrete	670	6	Sandy gravel		Clayey gravelly sand to sandy clay	265	Excellent
A1DB	Maintenance dock	500	75				15	Portland cement concrete	680	6	Stabilized aggregate		Sandy clay to sandy gravel	200	Excellent
T1C T2C	Taxiways 3 and 4	1,250	75				22	Portland cement concrete	585	6	Sandy gravel		Argillaceous to sandy clay	200	Excellent
T15C	Taxiway 9	700	75				18	Portland cement concrete	680	6	Stabilized aggregate		Sandy clay to sandy silt	200	Excellent
A11C	Lower check pad	550	150				18 and 6	Portland cement concrete	680	6	Stabilized aggregate		Sandy clay to sandy silt	200	Excellent

Table 4

Aircraft Traffic Data

Year	Cycles of Operation per Type of Aircraft				
	Medium Bomber	Heavy Bomber	Tanker	Heavy Cargo	All Other Aircraft
1960 (Jul to Dec)	34	708	1,810	564	17,052
1961	60	1,155	1,617	359	6,357
1962	390	1,018	1,250	375	5,280
1963	616	1,008	910	384	160
1964	385	1,063	1,300	297	2,106
1965	4	1,296	1,624	80	1,954
1966	2	1,150	1,425	85	2,120
1967	0	6,682	26,736	1,676	7,218
1968	0	7,510	30,036	1,876	12,436
1969	0	17,979	16,275	1,972	12,362
1970	0	8,466	10,584	4,230	22,876
1971	0	8,568	10,708	4,284	24,838
Average takeoff weight (lb)	190,000	450,000	260,000	200,000	7,000 to 71,000
Average landing weight (lb)	175,000	230,000	180,000	120,000	--

Table 5

DATE: November 1972		SUMMARY OF DATA - RIGID PAVEMENT CONDITION SURVEY												AIRFIELD: Beale AFB															
FEATURE	NO.	DESIGNATION	SLAB SIZE FT	APPROX SLABS	FARE, INCHES	NO. OF SLABS CONTAINING INDICATED DEFECTS													% OF SLABS NO MAJOR DEFECTS	CONDITION									
						I	-	\	Δ	*	K	w	S	J	J	J	⊕	M			P	O	C	D					
RLA		Primary runway, 1st 500 ft, NE end	25 by 25	144	25															9						99	100	Excellent	
RLB		Primary runway, 2nd 500 ft, NE end	25 by 25	336	22																						97	100	Excellent
R3C		Primary runway Interior	25 by 25	4800	20																						99	99	Excellent
R4B		Primary runway, 2nd 500 ft, SW end	25 by 25	336	22																						99	100	Excellent
R5A		Primary runway, 1st 500 ft, SW end	25 by 25	144	25																						100	100	Excellent
T2A		Taxiway 2	25 by 25	270	25																						99	100	Excellent
T3A		Taxiway 6	25 by 25	1466	22 and 25																						99	100	Excellent
T6A		Taxiway 5	25 by 25	227	25																						99	100	Excellent
T7A		Taxiway 2 apron	25 by 25	63	25																						100	100	Excellent
T9A		Taxiway 10	25 by 25	412	20 and 25																						99	100	Excellent
REMARKS:																													

LEGEND:

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

W.S. FORM NO. 2004
JUN 1972

(1 of 2 sheets)

Table 6
SUMMARY OF PAVEMENT EVALUATION

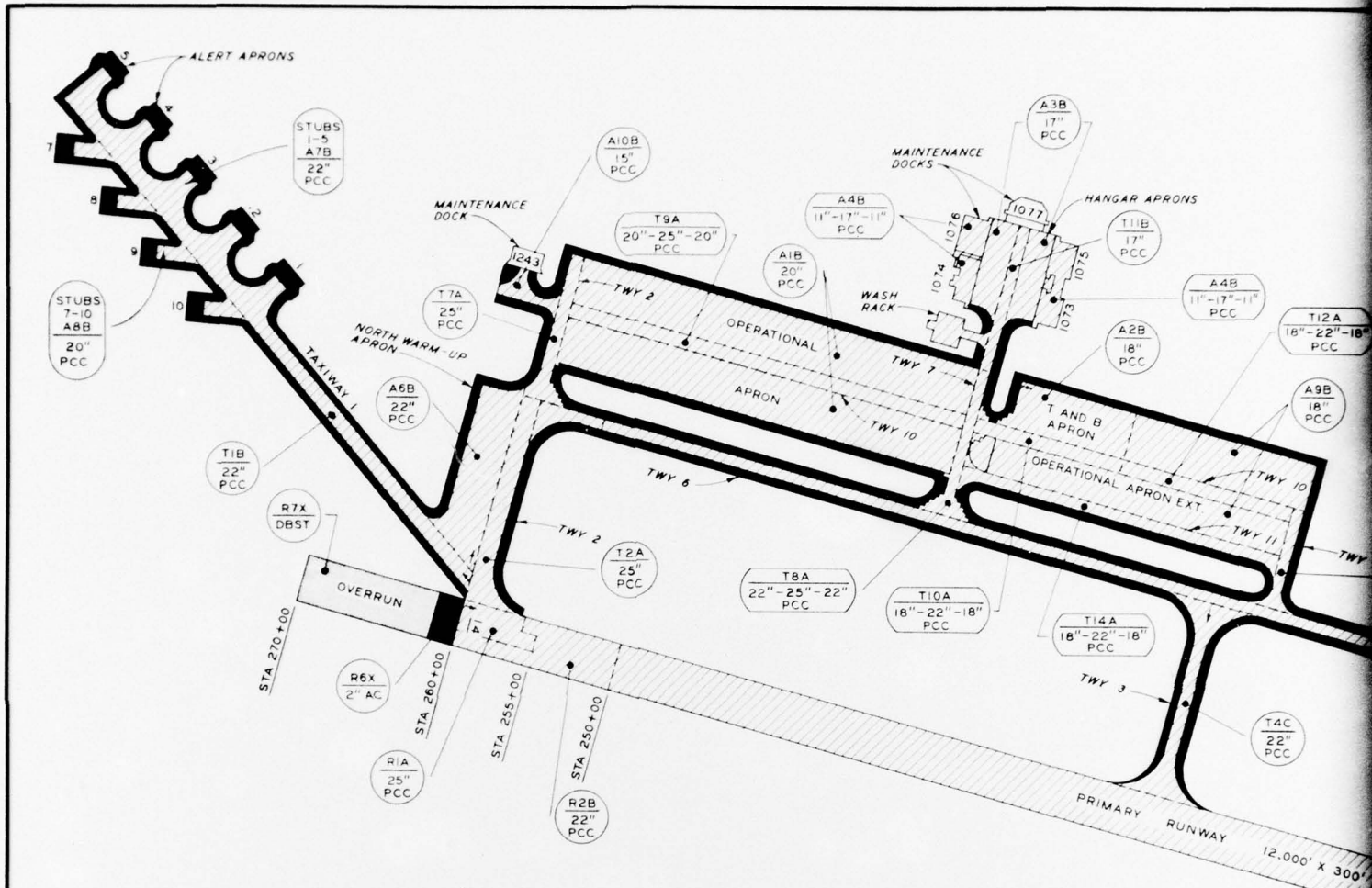
NAME OF AIRFIELD: Beale AFB		LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS										REMARKS		
DATE OF EVALUATION MONTH-November YR: 1972		TRICYCLE ARRANGEMENT												
NO.	FEATURE DESIGNATION	PAVEMENT OPERATIONAL USE	TRICYCLE ARRANGEMENT											
			1	2	3	4	5	6	7	8	9	10		
R1A R1B	Primary runway, 1st 500 ft, each end	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	530,000	
R2B R4B	Primary runway, 2nd 500 ft, each end	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	470,000	
R3C	Primary runway interior	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	550,000	
T2A T7A	Taxiway 2	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	530,000	
T3A	Taxiway 6	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	570,000	
T6A	Taxiway 5	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	510,000	
T6A T9A	Taxiway 7 Taxiway 10	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	600,000+	
T10A	Taxiway 10	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	600,000+	
T12A T13A T14A	Taxiway 10 Taxiway 8 Taxiway 11	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	490,000	
T11B A3B	Taxiway 1 Hangar access apron	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	600,000+	
A4B	Maintenance docks 1073, 1074, 1075, and 1076	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	275,000	330,000+	380,000+	800,000+	370,000	
A1B	Operational apron	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	330,000+	330,000+	380,000+	800,000+	520,000	
A3B	Operational apron extension	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	200,000+	295,000	330,000+	380,000+	800,000+	390,000	

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




Table 6 (Continued)

SUMMARY OF PAVEMENT EVALUATION

NAME OF AIRFIELD: Beale AFB		LOAD-CARRYING CAPACITY IN LB OF GROSS PLANE LOAD FOR INDICATED LANDING GEAR TYPES AND CONFIGURATIONS											
DATE OF EVALUATION: MONTH November YR 1972		TRICYCLE ARRANGEMENT											
NO.	FEATURE DESIGNATION	PAVEMENT OPERATIONAL USE	SINGLE 100-PSI TIRE PRESSURE	SINGLE 100-SQ-IN. CONTACT AREA	SINGLE 241-SQ-IN. CONTACT AREA	TR 20-IN. C-C 200-SQ-IN. CONTACT AREA EACH TIRE	SINGLE TANDEN 80-IN. SPACING 400-SQ-IN. CONTACT AREA	TR 37-IN. C-C 267-SQ-IN. CONTACT AREA EACH TIRE	TR 48-IN. C-C 630-SQ-IN. CONTACT AREA EACH TIRE	TRIN TANDEN 37-IN. x 41-IN. 208-SQ-IN. CONTACT AREA EACH TIRE	C.A.M. GEAR CONFIGURATION	BICYCLE TRIN TANDEN SPEC. REAR TIRE 28 1/2-SQ-IN. CONTACT AREA EACH TIRE	REMARKS
A2B	T and B apron	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	220,000+	330,000+	330,000+	800,000+	500,000	
A7B	Alert stubs 1-5	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	220,000+	330,000+	330,000+	800,000+	600,000+	
A8B	Alert stubs 7-10	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	220,000+	330,000+	330,000+	800,000+	585,000	
A9B	South warm-up apron	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	220,000+	330,000+	330,000+	800,000+	470,000	
A10B	North warm-up apron	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	220,000+	330,000+	330,000+	800,000+	460,000	
A10B	Maintenance dock	Capacity	140,000	85,000+	155,000+	200,000	200,000+	225,000	285,000	380,000+	800,000+	300,000	
T14C T5C T5C	Taxiways 3 and 4	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	220,000+	330,000+	330,000+	800,000+	590,000	
T15C A11C	Taxiway 9 Power check pad	Capacity	155,000+	85,000+	155,000+	220,000+	200,000+	220,000+	330,000+	330,000+	800,000+	520,000	



LEGEND

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

-

TYPE OF FEATURE

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

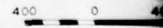
TYPE TRAFFIC AREA (SEE NOTE 2)

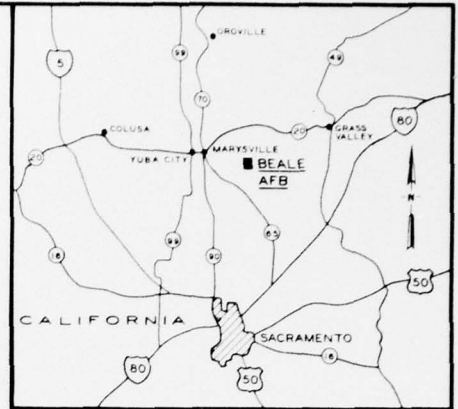
- A-A TYPE TRAFFIC AREA
- B-B TYPE TRAFFIC AREA
- C-C TYPE TRAFFIC AREA
- X-NO TRAFFIC TYPE ASSIGNED

→ 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.

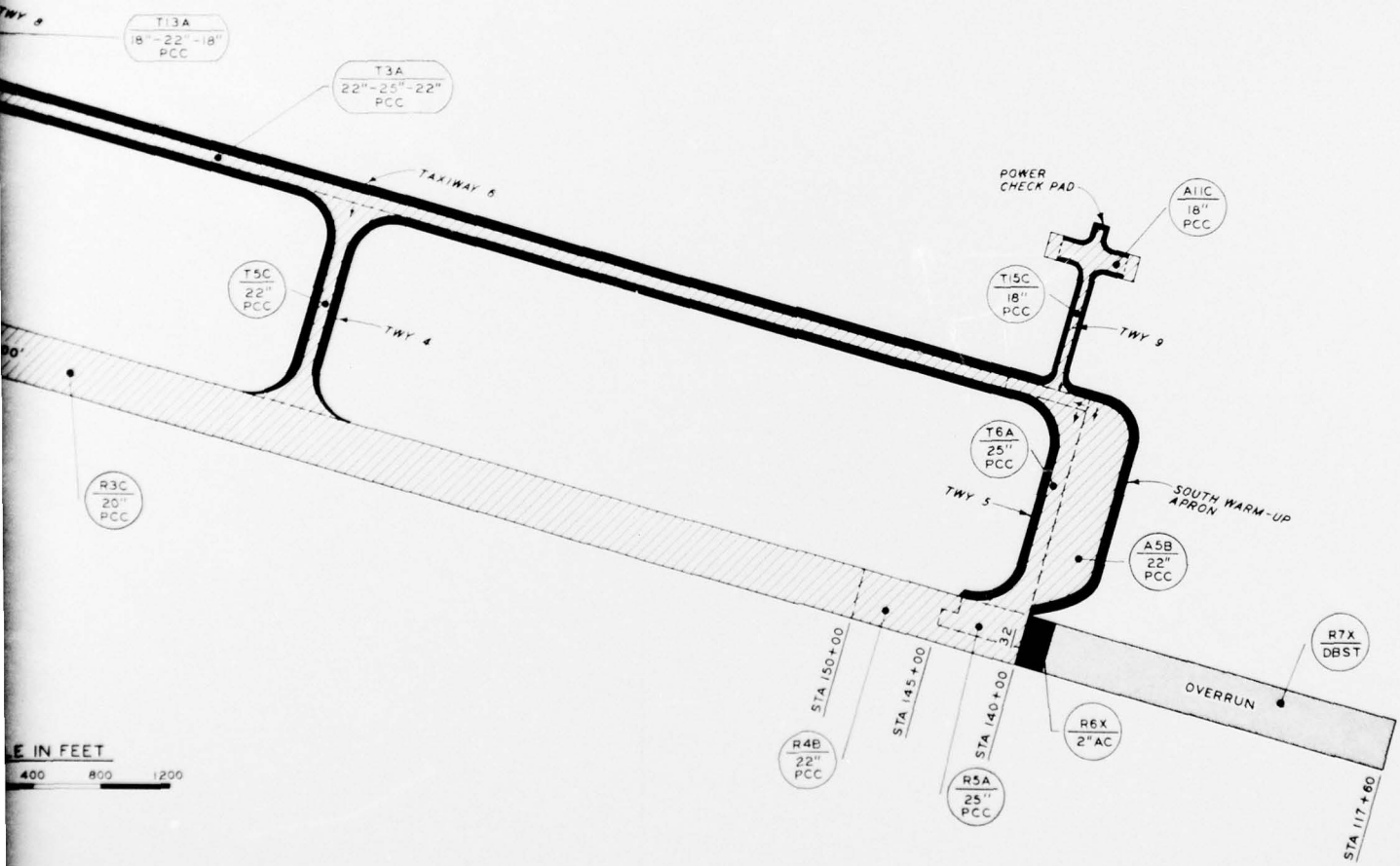
SCALE





VICINITY MAP

SCALE IN MILES



BEALE AFB
AIRFIELD LAYOUT AND PAVEMENT PLAN

3

Appendix A: BAFB Annual Pavement Maintenance Plan

No.	Facility	Pavement Description	Type	Year Constructed	Existing Condition	Inspected	Priority	Maintenance and Repair History
1	8205	Runway, primary, 12,000 by 300 ft, 20- to 25-in. PCC, 6-in. base, 24-in. select fill	Rigid heavy	1957	S	D-PG SA-EC	I-A	Spalled joints repaired, 1966
2	8210	Taxiway 1, 3856 by 75 ft, 22-in. PCC, 6-in. base, 24-in. select fill, 50-ft shoulder, 2-in. AC	Rigid heavy	1957	S	Q-PG Q-EC	I-B	Joints sealed, 1965
3	8210	Taxiway 2, 2000 by 75 ft, 22-in. PCC, 6-in. base, 24-in. select fill, 50-ft shoulder, 2-in. AC	Rigid heavy	1958	S	SA-PG SA-EC	I-B	
4	8210	Taxiway 3, 1250 by 75 ft, 22-in. PCC, 6-in. base, 24-in. select fill, 50-ft shoulder, 2-in. AC	Rigid heavy	1958	S	SA-PG SA-EC	I-B	
5	8210	Taxiway 4, 1250 by 75 ft, 22-in. PCC, 6-in. base, 24-in. select fill, 50-ft shoulder, 2-in. AC	Rigid heavy	1957 1958	S	SA-PG SA-EC	I-B	Joints sealed, 1965
6	8210	Taxiway 5, 1370 by 75 ft, 22-in. PCC, 6-in. base, 24-in. select fill, 50-ft shoulder, 2-in. AC	Rigid heavy	1957 1958	S	SA-PG SA-EC	I-B	Joints sealed, 1965
7	8210	Taxiway 6, 11,200 by 75 ft, 22- to 25-in. PCC, 6-in. base, 24-in. select fill, 50-ft shoulder, 2-in. AC	Rigid heavy	1957 1958	S	SA-PG SA-EC	I-A	Joints sealed, 1965
8	8210	Taxiway 7, 1900 by 75 ft, 25-in. PCC, 6-in. base, 24-in. select fill	Rigid heavy	1958	S	SA-PG SA-PG	I-B	Joints sealed, 1965
9	8210	Taxiway 8, 650 by 75 ft, 25-in. PCC, 6-in. base, 24-in. select fill, 50-ft shoulder, 2-in. AC	Rigid heavy	1958	S	SA-PG SA-EC	I-B	Joints sealed, 1965
10	8210	Taxiway 9, 950 by 75 ft, 18-in. PCC, 6-in. base, 25-ft shoulder, 2-in. AC	Rigid medium	1958	S	SA-PG SA-EC	I-B	Joints sealed, 1965
11	8210	Taxiway 10, 3000 by 75 ft, 22- to 25-in. PCC, 6-in. base, 24-in. select fill, 50-ft shoulder, 2-in. AC	Rigid heavy	1958	S	SA-PG SA-EC	I-B	Joints sealed, 1965
12	8265	Alert aprons, east, five 120 by 200 ft each of 20-in. PCC, 6-in. base, 50-ft shoulder, 2-in. AC	Rigid heavy	1958	S	SA-PG SA-EC	I-B	Joints sealed, 1965
13	8265	Alert aprons, west, four 100 by 200 ft each of 22-in. PCC, 6-in. base, 50-ft shoulder, 2-in. AC	Rigid heavy	1964 1965	S	SA-PG SA-EC	I-B	
14	8285	Apron, south warm-up, 1100 by 300 ft, 22-in. PCC, 6-in. base, 24-in. select fill, 50-ft shoulder, 2-in. AC	Rigid heavy	1957 1958	S	SA-PG SA-EC	I-B	Joints sealed, 1965
15	8280	Overrun blast pad, south, 150 by 300 ft, 2-in. AC, 6-in. base, 24-in. select fill	Rigid heavy	1957 1958	S	Q-PG Q-EC	I-B	
16	8280	Runway, south overrun, 2100 by 300 ft, 6-in. base, 15-in. subbase, 24-in. select fill	Flexible double bituminous treatment, heavy-load design	1965	S	A-PG A-EC	I-B	
17	8285	Apron, north warm-up, 1000 by 250 ft, 22-in. PCC, 6-in. base, 24-in. select fill, 50-ft shoulder, 2-in. AC	Rigid heavy	1957 1958	S	SA-PG SA-EC	I-B	Joints sealed, 1962
18	8280	Overrun blast pad, north, 150 by 300 ft, 2-in. AC, 6-in. base, 24-in. select fill	Rigid heavy	1957 1958	S	Q-PG Q-EC	I-B	
19	8280	Runway, north overrun, 850 by 300 ft, 6-in. base, 15-in. subbase, 24-in. select fill	Flexible double bituminous treatment, heavy-load design	1958	S	A-PG A-EC	I-B	
20	8280	Apron, north operational, 2550 by 300 ft, 2600 by 300 ft, 18-in. PCC, 6-in. base, 50-ft shoulder, 2-in. AC	Rigid heavy	1958	S	SA-PG SA-EC	I-B	Joints sealed, 1965*
21	8280	Apron, transit, 750 by 300 ft, 22-in. PCC, 6-in. base, 50-ft shoulder, 2-in. AC	Rigid heavy	1958	S	SA-PG SA-EC	I-B	Joints sealed, 1965
22	8265	Apron, dock access, 400 by 550 ft, 17-in. PCC, 6-in. base, 24-in. select fill	Rigid heavy	1958	S	Q-PG Q-EC	I-B	Joints sealed, 1965
23	8265	Washrack, 200 by 200 ft, 14-in. PCC, 6-in. base, 6-in. subbase	Rigid heavy	1961	S	SA-PG SA-EC	I-C	
24	8265	Apron, south operational, 800 by 300 ft, 900 by 675 ft, 22-in. PCC, 6-in. base, 50-ft shoulder, 2-in. AC	Rigid heavy	1965	S	SA-PG SA-EC	I-B	Spalled joints repaired, 1968
25	8282	Power check pad, 18-in. PCC, 6-in. base, 25-ft shoulder, 2-in. AC	Rigid medium	1965	S	Q-PG Q-EC	I-A	

Note: S - Satisfactory.

* Maintenance and repair proposed: Reseal joints, pits 15, 16, and 17, FY 1974.