社会開発調査部報告書

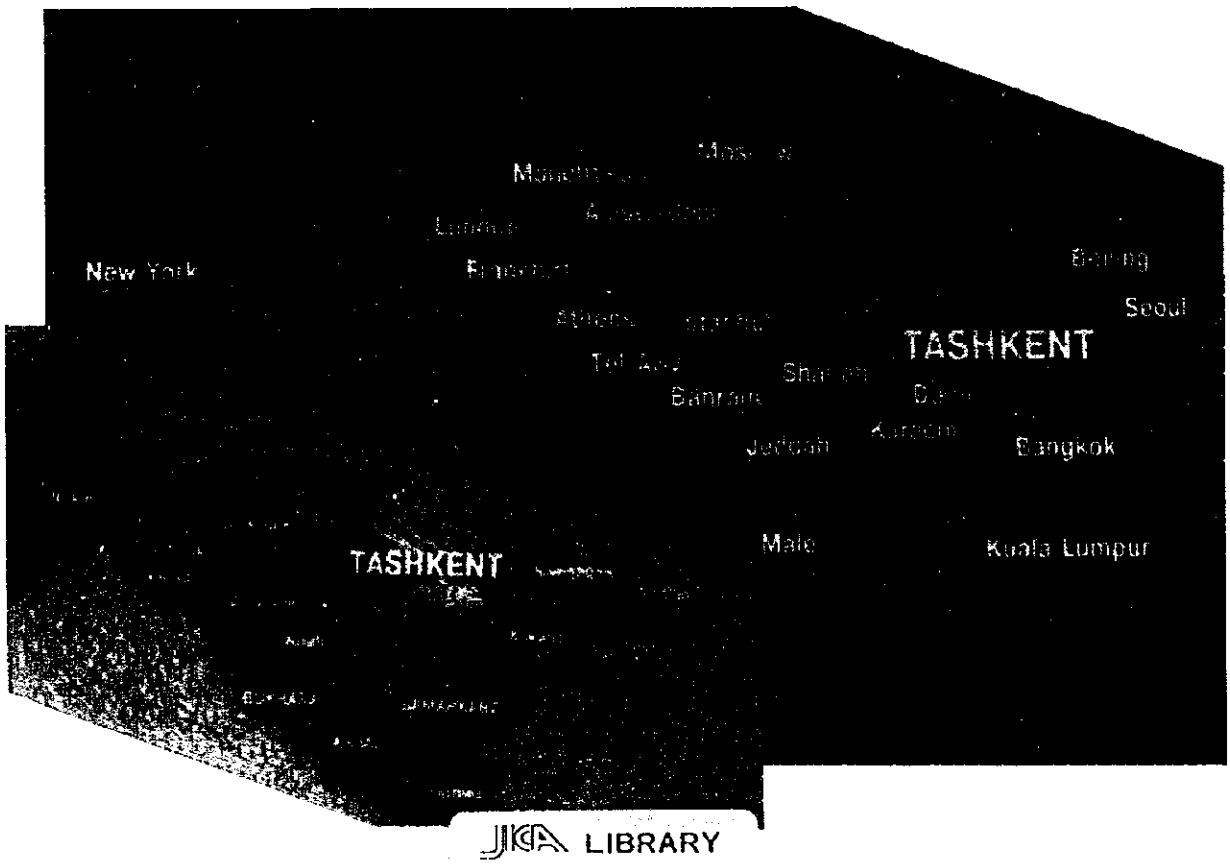
No. 032

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NATIONAL AIR COMPANY
"UZBEKISTAN HAVO YULLARI"
THE REPUBLIC OF UZBEKISTAN

THE STUDY FOR THE AIR TRANSPORTATION DEVELOPMENT IN THE REPUBLIC OF UZBEKISTAN

FINAL REPORT *APPENDICES*



AUGUST 1998

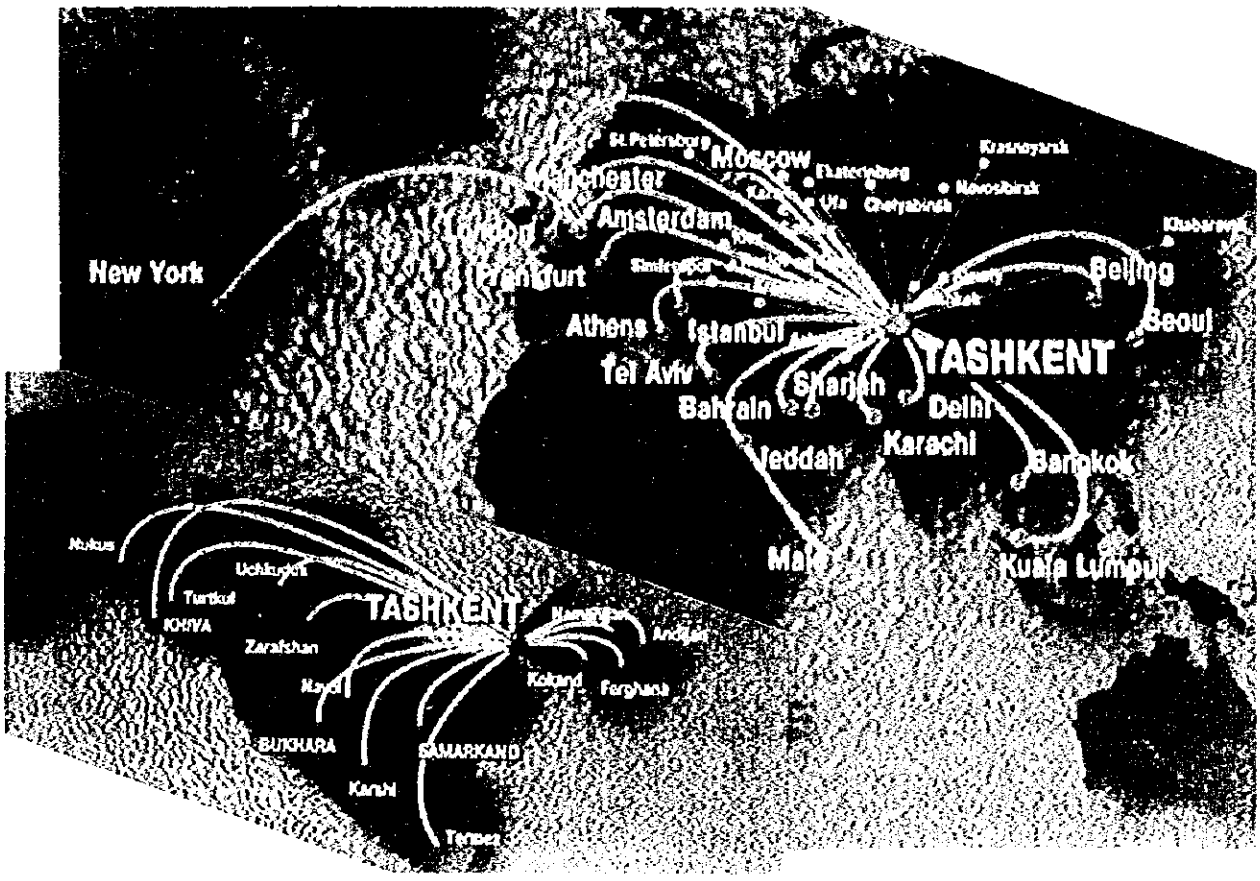
JAPAN AIRPORT CONSULTANTS, INC.

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NATIONAL AIR COMPANY
"UZBEKISTAN HAVO YULLARI"
THE REPUBLIC OF UZBEKISTAN

THE STUDY FOR THE AIR TRANSPORTATION DEVELOPMENT IN THE REPUBLIC OF UZBEKISTAN

FINAL REPORT *APPENDICES*



AUGUST 1998

JAPAN AIRPORT CONSULTANTS, INC.

Exchange Rate of Currency
US$ 1.00 = ¥ 120
US$ 1.00 = Sum 100
Application Date : As of July 1997

THE STUDY FOR
THE AIR TRANSPORTATION DEVELOPMENT
IN THE REPUBLIC OF UZBEKISTAN

FINAL REPORT

CONTENTS OF APPENDICES

APPENDIX 1

SUPPLEMENTARY STUDY OF FEASIBILITY OF THE INTERNATIOANL FREIGHTER TRANSIT BASE IN THE NEW TASHKENT AIRPORT DEVELOPMENT

Appendix 1

Supplementary Study of Feasibility of the International Freighter Transit Base in the New Tashkent Airport Development

Present study was made supplementarily as a case study to review the feasibility of the New Tashkent Airport Development, taking into account prospective demand of international freights via Tashkent. The study was based on the information obtained during the third field survey in Uzbekistan in May 1998.

1. General

Korean Airlines and Asiana have operated their freighter flights between Seoul and Europe via Tashkent airport since March 1998. There are 20 weekly freighter flights with B747 via Tashkent airport as shown in Table-1.

Air France has a plan to change its freighter flights to Japan via Tashkent from September 1998 instead of via Anchorage. Lufthansa had studied the possibility of using of Termez airport as a transit airport for freighters to Southeast Asia.

Taking into account the situation of Tashkent airport, feasibility on freighter transit airport of the New Tashkent Airport was reviewed including economic and financial analyses.

Table-1 Timetable of Freighters at Tashkent Airport

(May 1998)

Flight No.	Route	Day	Arv.	Dep.
513	SEL/TAS/BRU	Mon.	0105	0305
505	SEL/TAS/FRA		0135	0305
507	SEL/TAS/LHR		1045	1145
506	FRA/TAS/SEL		2115	2215
511	SEL/TAS/AMS		2310	0010+1
514	BRU/BSL/TAS/SEL	Tue.	0110	0210
508	LHR/TAS/SEL		0835	0935
512	CPH/TAS/SEL		2015	2115
-		Wed.	-	-
511	SEL/TAS/MAS/CPH	Thu.	0035	0135
505	SEL/TAS/FRA		0035	0205
501	SEL/TAS/CDG		1650	1825
506	FRA/TAS/SEL		2115	2215
512	CPH/TAS/SEL		2140	2240
517	SEL/TAS/BSL	Fri.	0135	0335
502	CDG/TAS/SEL		1120	1220
518	BSL/TAS/SEL		1955	2055
505	SEL/TAS/FRA	Sat.	0905	1035
515	SEL/TAS/MXP	Sun.	0125	0325
506	FRA/TAS/SEL		0245	0345
516	MXP/TAS/SEL		1935	2035

TAS: Tashkent/Uzbekistan
SEL: Seoul/Korea
AMS: Amsterdom/Netherland
BRU: Brussel/Belgium
BSL: Basel/Switzland
CDG: Paris/France
CPH: Copenhagen/Denmark
FRA: Frankfurt/Germany
LHR: London/UK
MXP: Milan/Italy

2. Possibility for Transit Airport of Freighter Flights

(1) Geographical Advantage of Tashkent

Uzbekistan is located centrally between West Europe and Northeast/Southeast Asia, having approximately 5,000-6,000 km in direct distance to both areas as shown in Figure-1.

Route distance from major cities in Asia to Europe is shown in Table-2 and Figure-2. Flight route distance via Tashkent between major cities in Northeast Asia and Europe is shorter than the route via Anchorage, and Uzbekistan has the geographical advantage of Tashkent been located in the middle, between West Europe and Northeast/Southeast Asia.

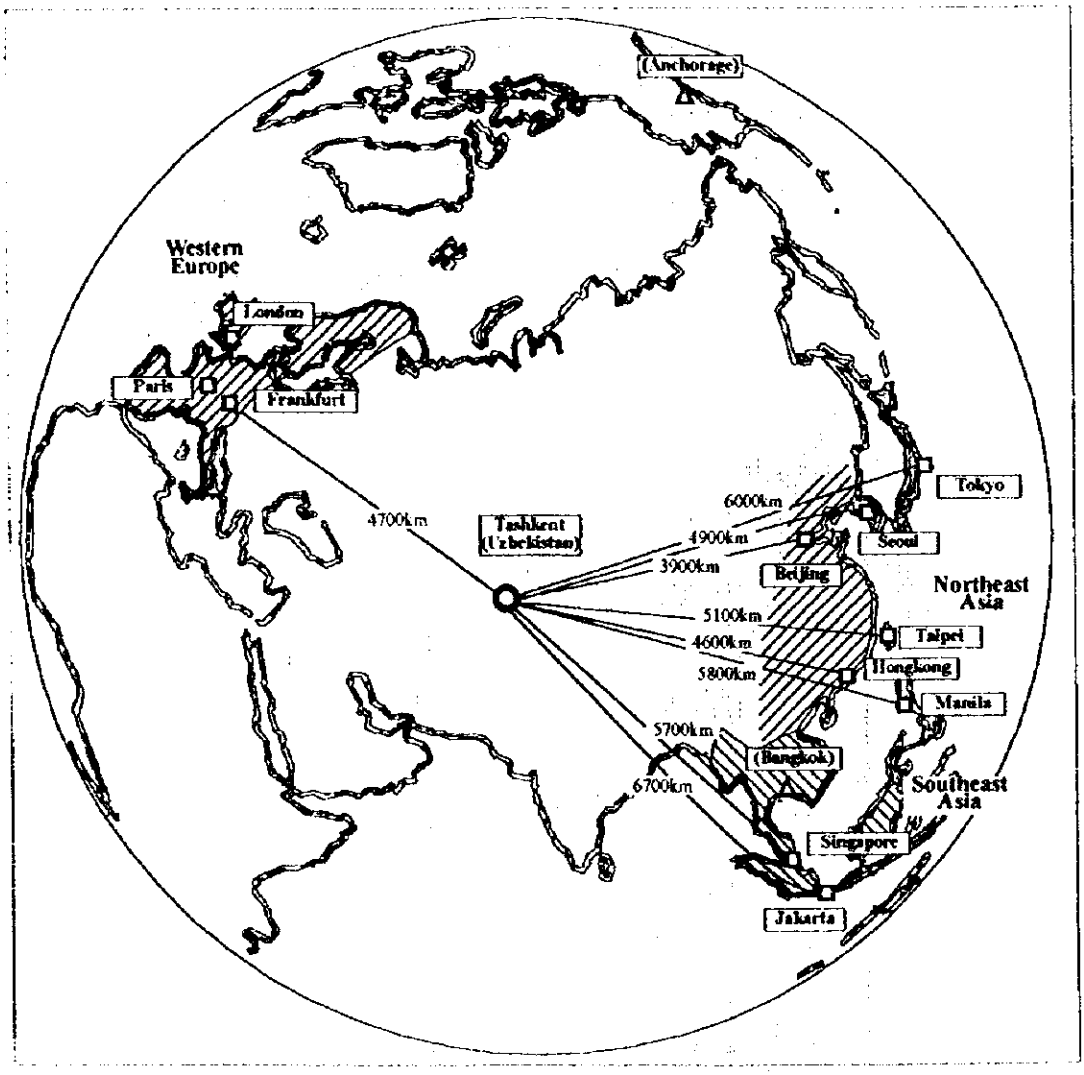


Fig.-1 Geographical Location of Tashkent (Uzbekistan)

Table-2 Distance from Asia to Europe by Route

(Km)

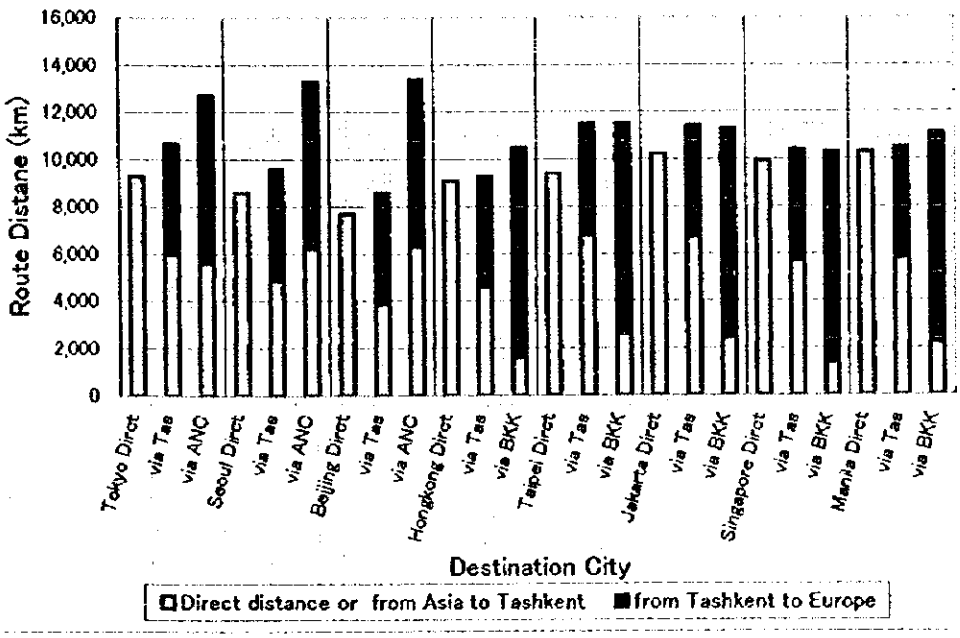
City	Direct	via Tashkent		via ANC(or BKK)	
		to Tashkent	from Tashkent to Europe	to BKK	from ANC (or BKK) to Europe
Tokyo	9,300	6,000	4,700	5,600	7,100
		10,700		12,700	
Seoul	8,600	4,900	4,700	6,200	7,100
		9,600		13,300	
Beijing	7,700	3,900	4,700	6,300	7,100
		8,600		13,400	
Hongkong	9,100	4,600	4,700	(1,600)	(8,900)
		9,300		(10,500)	
Taipei	9,400	6,800	4,700	(2,600)	(8,900)
		11,500		(11,500)	
Jakarta	10,200	6,700	4,700	(2,400)	(8,900)
		11,400		(11,300)	
Singapore	9,900	5,700	4,700	(1,400)	(8,900)
		10,400		(10,300)	
Manila	10,300	5,800	4,700	(2,200)	(8,900)
		10,500		(11,100)	

Note: 1.Minimum distance measured by map

2.Destination City in Europe : Frankfurt

3.BKK : Bangkok , ANC : Anchorage

Fig-2 Route Distance between West Europe and Northeast/Southeast Asia



(2) Possibility for Transit Airport of Freighters

In general, selection of routes for freighter flight is made taking into consideration such factors as the specification of aircraft to be operated and economic aspects of operational costs as well as meteorological conditions of air routes, overflying charges, capacity of cargo handling at airports, facility charges, fuel prices, service level of airport and cargo agents.

Location of Uzbekistan is geographically advantageous due to the shortcutting of air route distance . It is considered that if the invitation promotion to foreign airlines can be taken actively by offering attractive sales conditions, increasing the possibility for usage as a transit airport for foreign freighters will be expected. The fact that Korean Airlines have operated their freighters via Tashkent shows obviously the possibility of Tashkent as a freighter transit airport.

3. Demand Forecast of International Air Freight

(1) Current Situation of International Air Freight between Asian and Europe

Air freight traffic volume in 1996 between Northeast/Southeast Asia and West Europe is shown in Table-3. Air freight volume in 1996 between Northeast and West Europe was 950,000 tons, and 480,000 tons between Southeast Asia and West Europe. In particular, air freight volume from/to Korea and Japan, which may receive high merit by using Tashkent airport as a transit airport was 440,000 tons.

Table-3 Freight Traffic Volume to/from Western Europe and NE/SE Asia

Region	Country	Annual Traffic Volume(000 t) 1996		
		Inbound	Outbound	Total
Northeast Asia	Region	521	433	954
	Japan	185	110	295
	Korea	81	67	148
	Subtotal(1)	266	177	443
	China	58	40	98
	Hongkong	159	150	309
	Taiwan	37	65	102
	Subtotal(2)	254	255	509
	Total(1+2)	520	432	952
	Others	1	1	2
Southeast Asia	Region	246	233	479
	Indonesia	11	10	21
	Philippines	18	18	36
	Singapore	111	89	200
	Total	140	117	257
	Others	106	116	222
Grand Total		767	666	1,433

Western Europe: Finland,Norway,Sweden,Denmark,Germany,Netherland,Belgium France,UK,Switzerland,Spain,Portugal,Italy etc.

Source:Aviation Information & Research -Freight Forecast 1997-2001(IATA)

Others=Total volume of region - Total of countries

(2) Estimate of Freight Volume Demand via Tashkent Airport

1) Methodology

Estimate of freight volume demand through Uzbekistan and number of freighters via Tashkent airport were made in accordance with the flow diagram shown in Figure-3.

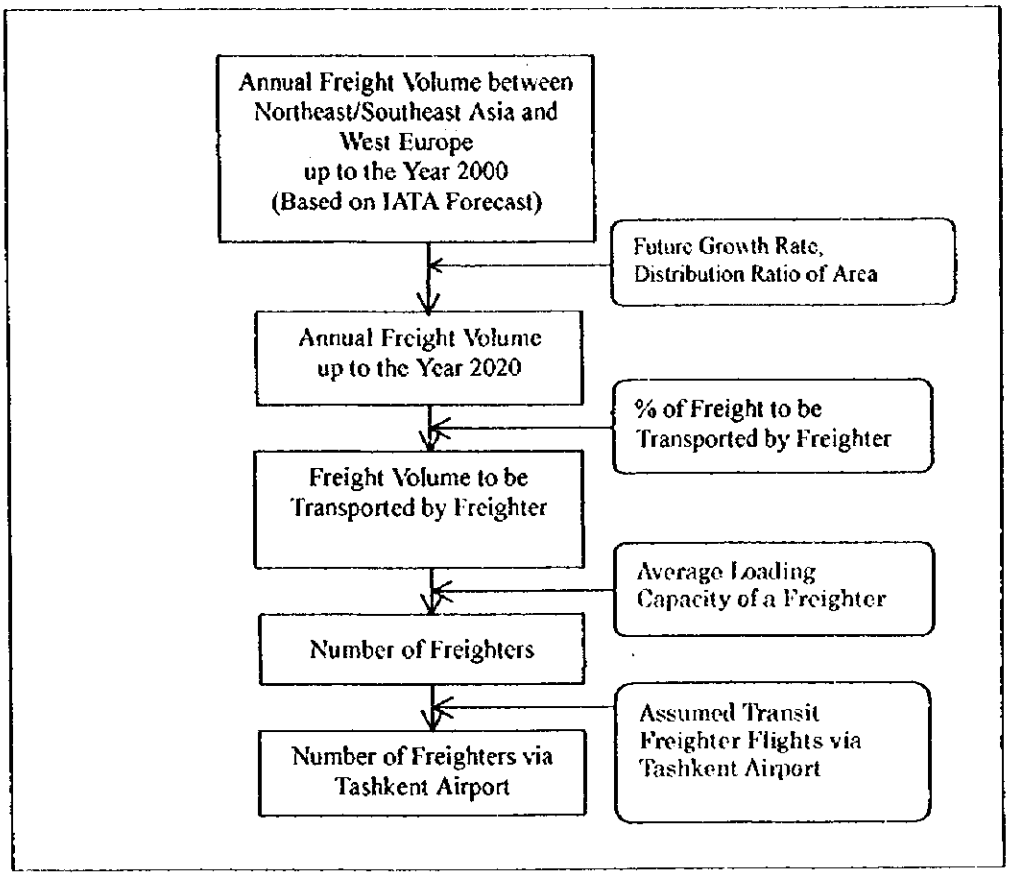


Figure-3 Estimate of Freight Volume through Tashkent Airport

2) Annual Freight Volume Demand

Annual freight volume demand up to the year 2020 between Northeast/Southeast and West Europe was estimated as shown in Table-4.

Freight volume demand in 2000 adopted the forecast of IATA, and freight volume demand between 2000 and 2020 was estimated applying decrease ratio of growth rate of the World's GDP.

Table-4 Freight Forecast between Northeast/Southeast Asia and Western Europe

Region	Country	Forecast Annual Traffic Volume (000 t)					Share (%)
		2000	2005	2010	2015	2020	
Northeast Asia	Region	1,249	1,626	2,003	2,380	2,757	100.00
	Japan	350	456	561	667	773	28.02
	Korea	205	267	329	391	452	16.41
	Subtotal(1)	555	723	890	1,058	1,225	44.43
	China	126	164	202	240	278	10.09
	Hongkong	372	484	596	709	821	29.78
	Taiwan	194	253	311	370	428	15.53
	Subtotal(2)	692	901	1,109	1,319	1,527	55.40
	Total(1+2)	1,247	1,624	1,999	2,377	2,752	99.83
	Others	2	2	4	3	5	0.17
Southeast Asia	Region	659	884	1,109	1,334	1,559	100.00
	Indonesia	33	44	56	67	78	5.01
	Philippines	53	71	89	107	125	8.04
	Singapore	278	373	468	563	658	42.19
	Total	364	488	613	737	861	55.24
	Others	295	396	496	597	698	44.76
Grand Total		1,908	2,510	3,112	3,714	4,316	

Western Europe: Finland,Norway,Sweden,Denmark,Germany,Netherlands,Belgium,France UK,Switzerland,Spain,Portugal,Italy etc
Others=Total volume of region - Total of countries

3) Number of Freighters

Number of freighters was estimated based on the following formula, and the result is shown in Table-5.

Number of Freighters = (Freight Volume) × (% of Freight to be transported by freighter = 40%) / (Average loading capacity=50 tons)

Table-5 Freighter Movement between Western Europe and Northeast/Southeast Asia

Region	Country	Weekly Freighter Traffic (Inbound and Outbound)				
		2000	2005	2010	2015	2020
Northeast Asia	Region	192	250	308	366	424
	Japan	54	70	86	103	119
	Korea	32	41	51	60	70
	Subtotal(1)	85	111	137	163	188
	China	19	25	31	37	43
	Hongkong	57	74	92	109	126
	Taiwan	30	39	48	57	66
	Subtotal(2)	106	139	171	203	235
	Total(1+2)	192	250	308	366	423
	Others	-	-	-	-	-
Southeast Asia	Region	101	136	171	205	240
	Indonesia	5	7	9	10	12
	Philippines	8	11	14	16	19
	Singapore	43	57	72	87	101
	Total	56	75	94	113	132
	Others	45	61	77	92	108
Grand Total		293	386	479	571	664

Note : Others=Total volume of region - Total of countries

4) Number of Transit Freighters via Tashkent Airport

Number of transit freighters via Tashkent Airport between Asian and Europe was estimated for the following three demand cases. The result is shown in Table-6 and Figure-4.

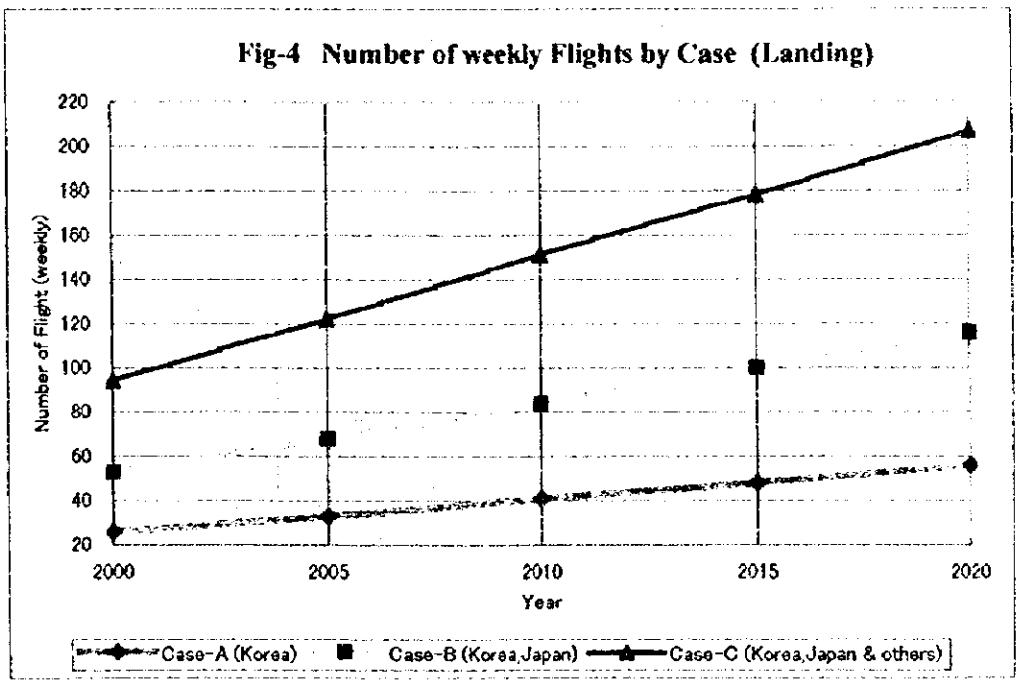
Case A (Low Demand) :80% of freight demand form/to Korea are to be transported by freighter flights via Tashkent.

Case B (Medium Demand) :In addition to the demand in Case A, 50% of freight demand from/to Japan are to be transported by freighter flights via Tashkent.

Case C (High Demand) : In addition to the demand in Case C, 50% of freight demand from/to China (including Hong Kong) and Indonesia are to be transported by freighter flights via Tashkent.

Table-6 Number of weekly Flights by Case

Case/Region	Weekly Freighter Traffic (Landing)				
	2000	2005	2010	2015	2020
Case-A/Korea	26	33	41	48	56
Case-B/Korea+Japan	53	68	84	100	116
Case-C/Korea,Japan, China(Hongkong),Indonesia	94	122	151	178	207



4. Required Apron Area and Capacity of the Existing Apron at Tashkent Airport

(1) Required Parking Stands for Freighters

Number of required parking stands for freighter was calculated by the following formula, applying the same concept for calculation in regards to passenger flights.

Required Parking Stands for Freighters

=(Peak-Hour Landings)×(Weighted arrival ratio) x (Stand occupancy time/ 60) +(Reserve parking stands)

Where: **Peak-hour Coefficient**=0.15／Daily Freighters+0.178

(obtained from analysis of the flight schedule of Tashkent Airport)

Daily Freighters= 2 ×Weekly Landings) x 0.25

Weighted Arrival Ratio = 0.6

Stands Occupancy Time = 90

Reserve Parking Stands = 1 stand for every 10 stands required

Required parking stands and apron area is shown in Table-7.

Table-7 Apron Area Requirements by Case

Item	District	Aircraft Type	2000		2005		2010		2015		2020	
			Num. of Spots	Area (ha)	Num. of Spots	Area (ha)	Num. of Spots	Area (ha)	Num. of Spots	Area (ha)	Num. of Spots	Area (ha)
Passenger & Cargo etc.	Dom	Large	-	-	-	-	-	-	-	-	-	-
		Medium	-	-	1	0.42	1	0.42	4	1.67	6	2.49
		Small/Mini	13	3.32	12	3.07	13	3.32	10	2.56	10	2.56
		subtotal	13	3.32	13	3.49	14	3.74	14	4.23	16	5.05
	Int/CIS	Large	-	-	-	-	7	6.23	7	6.23	9	8.00
		Medium	15	9.68	19	12.26	16	10.33	21	13.55	24	15.48
		Small/Mini	3	1.02	3	1.02	3	1.02	3	1.02	3	1.02
		subtotal	18	10.70	22	13.28	26	17.58	31	20.80	36	24.50
	VIP			2.20		2.20		2.20		2.20		2.20
	Maintenance etc.			11.00		11.00		11.00		11.00		11.00
	Cargo		2	1.16	2	1.16	3	1.75	4	2.33	4	2.33
	Total		33	28.38	37	31.13	43	36.27	49	40.56	56	45.08
Freighter (Large)	Case-A	Large	3	2.67	3	2.67	3	2.67	4	3.56	4	3.56
	Case-B		4	3.56	5	4.45	5	4.45	6	5.33	7	6.22
	Case-C		6	5.33	7	6.22	8	7.11	10	8.89	11	9.78

Dimension and Area of Stands

Item	District	Aircraft Type	Planned Aircraft		Spot Area		
			Width (m)	Length (m)	Width (m)	Depth (m)	Area (m2)
Passenger & Cargo etc.	Domestic	Medium	40	48	50	83	4,150
		Small/Mini	30	29	40	64	2,560
	Int./CIS	Large	65	71	75	118.5	8,890
		Medium	50	60	60	107.5	6,450
		Small/Mini	30	38	40	85.5	3,420
	Cargo	medium	55	47	65	89.5	5,820
Freighter		Large	65	71	75	118.5	8,890

(2) Capacity of the Existing Apron at Tashkent Airport

Area available as stands for freighters at the existing Tashkent airport is 13.6 ha of VIP and international passenger aprons (VIP apron =2.2 ha, international passenger apron = 11.4 ha)

At present, improvement project with EBRD finance for the international and CIS passenger building and apron is ongoing in order to serve large aircraft.

Capacity of the existing apron is analyzed as follows;

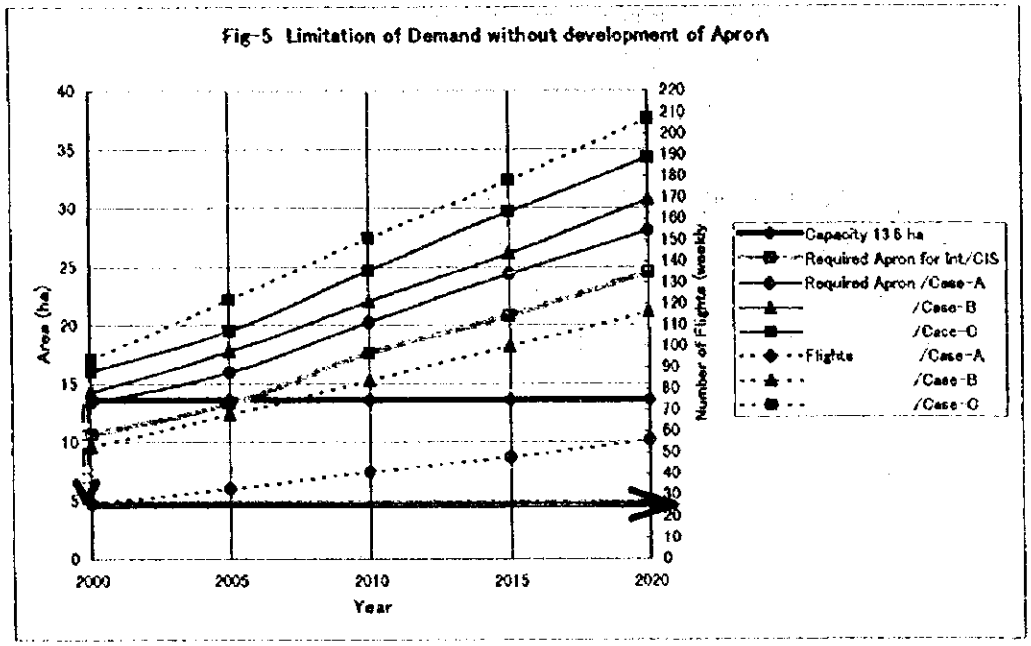
1) Capacity where parking stands for freighters are to be arranged within the area of the exiting international and VIP aprons without expansion works of apron area;
   = 13.6 ha
2) Capacity where parking stands for freighters are to be arranged in the above area and the domestic and maintenance aprons with improvement works of apron pavement;
   = 36.2 ha
3) Capacity where parking stands for freighters are to be arranged in the above area and the domestic and maintenance aprons with expansion works of apron area in front of the maintenance hangars;
   = 45 ha

Required area and capacity of the existing apron is shown in Figure-5 (without any improvement works of the existing aprons).

Based on the above analyses, capacity of the existing apron for freighters is assumed as 30 weekly flights (landing and departure) as a base case for the purpose of economic analysis of the New Tashkent Airport Development Project.

<Note: Capacity of the Existing Apron>

VIP Apron	2.2 ha
International and CIS Passenger Apron	11.4 ha
Domestic Passenger Apron	11.6 ha
Maintenance Apron	11.0 ha
Total	36.2 ha
Area available for expansion	9 ha



5. Benefits and Costs of Development for Freighter Flights

(1) Cases of Analyses

Economic and financial analyses were made for the following three cases;

Case A (Low Demand)

80% of freight demand form/to Korea are to be transported by freighter flights via Tashkent.

Case B (Medium Demand)

In addition to the demand in Case A, 50% of freight demand from/to Japan are to be transported by freighter flights via Tashkent.

Case C (High Demand)

In addition to the demand in Case C, 50% of freight demand from/to China (including Hong Kong) and Indonesia are to be transported by freighter flights via Tashkent.

(2) Additional Project Costs

1) Base Case

Any additional improvement for freighter apron is not to be made at the existing Tashkent airport. Parking stands are to be handled within the existing apron area. Therefore, there is no additional project cost.

2) New Tashkent Airport

Improvement or expansion of apron and additional fuel storage facility will be required due to the increase of freighter flights at the New Tashkent Airport. Additional costs due to the freighter operation at the New Tashkent Airport are calculated as shown in

Table-8. It was assumed that the target year of development was 2015, construction period would be from the year 2008 to 2009, and inauguration of the new airport would be the year 2010.

Table-8 Cost of New Airport Additional Prject Case

(ha)

Demand Case	Year	2000	2005	2010	2015	2020
A	Required Freighter Apron(ha)	2.67	2.67	2.67	3.56	3.56
	Development Plan(ha)			3.56		
	Cost (000 US$)			5,197.6		
B	Required Freighter Apron(ha)	3.56	4.45	4.45	5.33	6.22
	Development Plan(ha)			5.33		
	Cost (000 US$)			7,781.8		
C	Required Freighter Apron(ha)	5.33	6.22	7.11	8.89	9.78
	Development Plan(ha)			8.89		
	Cost (000 US$)			12,979.4		

Note 146USD/m^2

Completion year of Project :2010

Target year of facility requirement :2015

(3) Benefit

1) Landing Charges

Pricing method of landing charge is the same as stated in Chapter 6.7. The parking charge is not considered due to less than three hours parking.

2) Fueling Charge

Based on the date provided, fueling charge is US$280.

Annual Fuel Consumption by Freighter

= 52 x (Number of Weekly Departures) x (Fuel Consumption by Type of Aircraft)

Fuel Consumption of B747 = 0.013 x 6,200 km +4.8 = 85 kl = 65.45 tons

(note) Average flight distance between Tashkent and Europe/Asia is assumed to be 6,200 km.

6. Supplementary Economic and Financial Analyses

The results of supplementary economic and financial analyses on the additional development for freighter flights at the New Tashkent Airport is shown in Table-9, which were made based on the Case 2 of the New Tashkent Airport Development as stated in Chapters 6.7 and 6.8.

Conclusions based on the analyses are as follows;

1) EIRR of Case A, of which demand is between only Korea and Europe is 8.63%, showing lower EIIR than the Social Discount Rate (12%). This means that the economic

feasibility of the New Tashkent Airport Development is not improved by the freighter demand only between Korea and Europe.

Therefore, it is essential that the demands from/to the countries in the Northeast/Southeast Asia in addition to the demand from/to Korea be increased.

2) EIRR of Case B shows 13.13%, which is higher than the Social Discount Rate (12%). This means that the development of the new airport will be feasible from both economic and financial aspects.
3) In order to increase the demand of freighter flights of foreign airlines, it is recommended to offer attractive conditions relating to airport charges and fuel prices as well as to improve service quality level of airport facilities and staff.

Table –9 EIRR and FIRR in Sensitive Analysis for Additional Cases

Case	EIRR (%)	FIRR (%)	Remarks
A (Low Demand)	8.63	6.55	Korea
B (Medium Demand)	13.13	12.22	Korea, Japan
C (High Demand)	18.50	18.35	Korea, Japan, China (Hong Kong), Indonesia

Note : EIRR of Alternative 2 without Freighters : 7.01% , FIRR: 4.07%

APPENDIX 3.5-1

INTERVIEW SURVEY OF PASSENGER AT TASHKENT AIRPORT

INTERVIEW SURVEY OF PASSENGER AT TASHKENT AIRPORT

1. Objectives

The Interview Survey was made with purpose of obtaining basic data and information to facilitate facility planning of existing Tashkent airport and New Tashkent International Airport.

2. Method of Interview Survey

The Survey was made with direct interview to international and CIS departure passengers at international and CIS check-in area and VIP check-in area.

3. Interview Items (Attached Sheet)

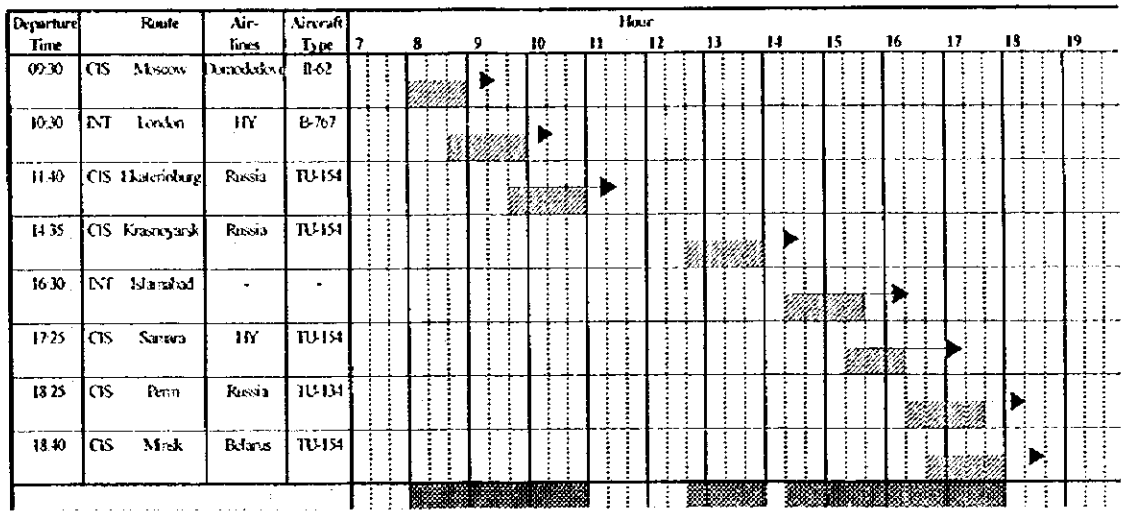
Interview items as follows;

a) Nationality
b) Purpose of trip
c) Origin and destination of trip
d) Transportation and time to airport
e) Number of well-wisher
f) Opinions on airport facility and service quality
g) Annual number of trip and transportation mode
h) Other

4. Date and Time of Interview (Table 1)

Interview Survey was made on Saturday, May 31, 1997 from 8:00 to 18:00. Flight schedule of the said day was as follows.

Table 1 Flight Schedule and Interview Time



5. Provisional Summary of Interview

5.1. Number of Interview Samples(Table 2)

Number of interview made to departure passengers was 114 person in total, of which 33% (37 persons) were international departure passengers, 63% (72 persons) for CIS departure passengers. Rest were foreigners for domestic flight.

Table 2 Number of Passengers Interviewed

Route	Number of persons	Share (%)
International		
London	27	23.7
Islamabad	10	8.8
subtotal	37	32.5
CIS		
Moscow	7	6.1
Ekaterinburg	17	14.9
Krasnoyarsk	24	21.1
Samara	12	10.5
Perm	1	0.9
Minsk	10	8.8
Ufa	1	0.9
subtotal	72	63.2
Others, N.A	5	4.4
Total	114	100.1

5.2. Nationality (Tables 3)

Nationality of passengers interviewed was 42% of Uzbeks, 33% of CIS nationalities, 11% of Asian and European respectively

Table 3 Nationality of Passengers Interviewed

Nationality	Number of persons	Share (%)	Nationality	Number of persons	Share (%)
Uzbekistan	**48**	**42.1**	**Europe**		
CIS			England	6	5.3
Russia	33	28.9	Finland	1	0.9
Kyrgyz	2	1.8	France	3	2.6
Tadjic	1	0.9	Germany	1	0.9
Belarus	2	1.8	Italian	1	0.9
subtotal	**38**	**33.3**	Switzerland	1	0.9
Asia			subtotal	**13**	**11.4**
Afgan	1	0.9	**USA**	**2**	**1.8**
Pakistan	8	7.0			
Malaysia	1	0.9			
Japan	1	0.9			
Korea	2	1.8			
subtotal	**13**	**11.4**			
			Total	114	100

5.3. Purpose of Trip (Table 4)

Purpose of trip of passengers interviewed was 36% for business, 10% for vacation, 7% for sightseeing, 4% for study.

Table 4 Purpose of Trip

Purpose of Trip	Number of persons	Share (%)
Business	41	36.0
Sightseeing	8	7.0
Vacation	11	9.6
Study	4	3.5
Immigration	2	1.8
personal	48	42.1
Total	**114**	**100**

5.4. Origin and Destination of Trip (Tables 5 and 6)

Origin city of passengers interviewed was 63% in Tashkent, 5% of Kazakhstan, Kyrgyzstan and Tadjikistan receptively. Destination of the same was 63% for CIS countires, 22% for Europe, and 11% for Asia.

Table 5 Origin City for Trip

Province	Number of persons	Share (%)	Remark
Uzbekistan			
Tashkent	72	63.2	
Except Tashkent			
Andijan	8	7.0	
Fergana	11	9.6	
Djizak	2	1.8	
Samarkand	4	3.5	
Kashkadarya	3	2.6	
Navoi	4	3.5	
Bukhara	2	1.8	
Khorezm	1	0.9	
Sukhandaria	1	0.9	
subtotal	36	31.6	
Other country			
Kazakhstan	4	3.5	Sariagach
Kyrgyzstan	1	0.9	Bishkek
Tadjikistan	1	0.9	Leninabad
subtotal	6	5.3	
Total	**114**	**100**	

Table 6 Destination of Trip

Destination		Number of persons	Share (%)
City	Country		
Asia			
Islamabad	Pakistan	8	7.0
Karachi	Pakistan	1	0.9
Kuala Lumpur	Malaysia	1	0.9
New Delhi	India	2	1.8
Istanbul	Turkey	1	0.9
subtotal		13	11.4
Europe			
Frankfurt	Germany	2	1.8
London	England	21	18.4
Helsinki	Finland	1	0.9
Rome	Italy	1	0.9
subtotal		25	21.9
CIS			
Moscow	Russia	9	7.9
Ekaterinburg	Russia	17	14.9
Krasnoyarsk	Russia	10	8.8
Perm	Russia	1	0.9
Samara	Russia	23	20.2
Petersburg	Russia	2	1.8
Volgograd	Russia	1	0.9
Minsk	Belarussia	9	7.9
subtotal		72	63.2
Others		4	3.5
Total		114	100

5.5. Transportation to Airport and Time Spent (Table 7and 8)

Transportation to the airport mostly used by passengers was car, of which share was 45%, followed by 20 % by bus and taxis respectively.

32% of passengers spent a time to the airport for 10-20 minutes. Passengers who spent more than one (1) hour was 25%.

Table 7 Transportation to the Airport

Transportation	Number of persons	Share (%)
Bus	22	19.5
Taxi	22	19.5
Car	51	45.1
Train	3	2.7
Airplane	15	13.3
N.A	1	-
Total	**114**	**100**

Table 8 Access Time to Airport

Access Time to Airport (minutes)	Number of persons	Share (%)
Less than10	10	9.1
10 - 20	35	31.8
20 - 30	16	14.5
30 - 40	6	5.5
40 - 50	10	9.1
50 - 60	6	5.5
60 - 120	9	8.2
120 - 240	6	5.5
240 - 300	5	4.5
more than	7	6.4
N.A	4	-
Total	114	100

5.6. Number of Well-wishers and Fellow Persons (Tables 9 and 10)

75% passengers were sent off by one (1) or (2) well-wisher at the airport. Number of well-wishers per passenger was 2.2 persons on average. Number of fellow persons coming to the airport by one (1) car was 2.3 persons.

Table 9 Number of Well-wishers

Number of well-wishers	Number of Passengers	Share (%)	Average per Passenger
1	26	35.1	
2	29	39.2	
3	6	8.1	
4	7	9.5	
5	2	2.7	2.22
6	0	0.0	
7	1	1.4	
8	1	1.4	
9	1	1.4	
10-	1	1.4	
N.A	40	-	
Total	114	100	

Table 10 Number of Fellow Persons in Car

Number of Fellow Persons	Number of passengers	Share (%)	Average per Passenger
1	29	54.7	
2	3	5.7	
3	10	18.9	2.26
4	3	5.7	
5	5	9.4	
6	3	5.7	
N.A	61	-	
Total	114	100	

5.7. Evaluation on Airport Facility and Quality of Service (Table 11)

Evaluation on airport facility and quality of airline services was asked based on the following five (5) categories.

Table 11 Opinions on Facility and Services

Opinion	Quality of Facility		Quality of Service	
	Number of persons	Share (%)	Number of persons	Share (%)
Excellent	1	0.9	1	0.9
Good	32	28.1	26	22.8
Normal	12	10.5	21	18.4
Bad	55	48.2	52	45.6
Very Bad	8	7.0	8	7.0
Others	6	5.3	2	1.8
N.A	-	0.0	4	3.5
Total	**114**	**100**	**114**	**100**

5.8. Number of Foreign Trip per Year (Tables 12)

Passengers going abroad more than one (1) time per year were 70% of total passengers interviewed.

Table 12 Number of Foreign Trip per Year

Times	Number of persons	Share (%)
1	31	30.7
2	17	16.8
3	31	30.7
4	4	4.0
5	0	0.0
6- 10	4	4.0
10 - 20	1	1.0
1/5 year	7	6.9
1/10 year	2	2.0
N.A	13	3.9
Total	**114**	**100**

5.9. Number of Foreign Trip other than Air (Table 13)

Passengers going abroad other than air were as follows;

Table 13 Number of Foreign Trip other than Air

Times	Number of persons	Share (%)
1	11	33.3
2	5	15.2
3	2	6.1
4	4	12.1
5	0	0.0
6- 10	4	12.1
10 - 20	3	9.1
- 1 year	2	6.1
1/4 year	1	3.0
1/5 year	1	3.0
Total	33	100

5.10. Number of Staying Days (Table 14)

Staying days in Uzbekistan were as follows;

Table 14 Staying Days and Expenses

Stay Days	Number of persons	Share (%)
1	2	7.4
2	1	3.7
3	1	3.7
4	0	0.0
5	5	18.5
6-10	5	18.5
11-20	4	14.8
21-30	3	11.1
-6months	2	7.4
- 1year	2	7.4
-10years	2	7.4
Total	27	100

5.11. Opinions of Passengers

During the Interview Survey, there were several following opinions about airport facility, airlines' services from passengers interviewed. Major opinions were as follows;

(1) Airport Facilities

- No good seats in the hall, when having to wait for 2-3 hours
- No amusement facilities such as TV and music as well as clean toilet
- No good air-conditioning, particularly, this was true of gateway lounge, where 300 passengers were being waited.
- Many of passengers did smoke, but there was no possibility to open windows for women and children
- There was no services in the airport, no washroom, no sitting places. It does not

looks like an international airport.

- There is absolutely no facilities such as food and sitting place
- There is no cart.

(2) **Services of Airlines and Others**

- Check-in is too much slow, not efficient and attentive.
- Attendant at check-in counter is not polite.
- Flight schedule is not good, a lot of passengers for different flights must queue at a time in narrow space for check-in.
- Staffs are generally impolite, they should be trained abroad.
- I can't buy ticket right here at the airport.
- We have to wait for long time to pass the customs control and immigration because of only one officer.

APPENDIX 3.5-2

SUMMARY OF AIRPORT FACILITIES FOR 12 AIRPORTS

Summary of Airport Facilities (1)

Name of Airport : Tashkent

General			
Location	6 Km south from Tashkent city center (10 min. by car)		
Elevation	431m	Area	4,520,000 m^2
Operation Hour	24 hours	Opening Year	-
Airfield Facilities			
Runway	08L/26R 4000m x 60m concrete pavement 08R/26L 3900m x 45m asphalt-concrete pavement		
Taxiway	10 exit taxiway (1 not available) and parallel taxiway		
Apron	362,000m^2 asphalt-concrete		
Airfield Lighting	08R / 08L/ 26R ALS ,PAPI ,SFL ,RWL ,RCL,TWL Apron flood Light		
Radio Navigation	08L ILS Cat2,08R/26R ILSCat1,PAR ,VOR/DME,6xNDB		
Met. Equipment	RVR(Board), Ceilometer, Anemometer, Thermometer, Barometer Weather Rader		
Rainwater Drainage	Open ditch and pipe culvert		
Terminal Facilities			
Passenger Terminal	International :RC 3F 39,500m^2 (1976) Domestic :Brick 2F 2918.5 m^2 (1997)		
Cargo Terminal	Brick 450 m^2, Storage for vegetable 1186 m^2(1979) Transit cargo storage 864 m^2(1980) Arrival cargo storage module 1800 m^2(1986)		
Control Tower/Operations	N.A		
Fire/Rescue Station	Fire:Brick 396 m^2 (1983) Rescue 630 m^2 (1986)		
Administration	Brick 2364 m^2 (1956)		
Electric Power Supply	Brick 697 m^2 (1974)		
Fuel Supply	N.A.		
Hangers	N.A.		
Car Parking	N.A.		
Access Road	N.A.		
Utilities			
Power Supply	Cable lines from city 35KV		
Water Supply	N.A.		
Hot Water Supply	N.A.		
Gas Supply	N.A.		
Sewage Disposal	N.A.		
Telephone	N.A.		
Equipment			
Fire Fighting Vehicles	N.A.		
Ground Support	N.A.		
Snow and ice removal	N.A.		
ATC,Nav-com	ASR ,SSR ,ARSR ,ATC Consoles , VHF-HF-com.		
Met. Equipment	CRUMS-2. ,Teletype ,HF transmitter		

Summary of Airport Facilities (2)

Name of Airport : Tashkent

FACILITY		DESCRIPTION
Runway	Dimensions	08L/26R 4000mx60m 08R/26L 3900mx45m
	Surface	08L/26R Concrete 08R/26L Asphalt-concrete
	Strength	08L/26R 84/F/B/X/T 08R/26L 60/F/B/X/T
	Slope	Longitudinal 0.4% Transversal 1.25%
Taxiway	Dimensions	TW-1~6,12~15 width 22.5m TW-8,11 width 21m
	Surface	TW-1~6 Concrete TW-11~15 Asphalt-concrete
	Strength	TW-1,5,6 PCN61/R/B/X/T TW-2,3,4 PCN70/R/B/X/T TW-11~15 PCN 50/F/C/Y/T
Apron	Dimensions	Area VIP 22,000m^2 , Int./CIS 114,000m^2, Domestic 116000m^2 , Others 110,000m^2
	Aircraft stand	Aircraft IL-86 13 stands IL-76 12 stands IL-62 8 stands TU-154 19 stands TU-134 5 stands AN-24 17 stands YAK-40 19 stands B-747 1 stands B-767 2 stands B-757 2 stands note: some spots are parked by different type of aircraft.
	Surface	Concrete and asphalt-concrete
	Strength	Spot-1 PCN55/R/B/W/T Spot-T-2 PCN42/R/B/X/T Spot-8,9,10 PCN55/R/B/X/T Spot-11,12 PCN55/R/B/W/T Spot-16,17 PCN70/R/B/X/T
Drainage		Open ditch and pipe culvert
Perimeter Road		Asphalt-concrete
Security Fence		Reinforced concrete and iron wires

Summary of Airport Facilities (1)

Name of Airport : Namangan

General			
Location	8 Km from Namangan city center		
Elevation	519m	Area	1,985,200 m^2
Operation Hour	24 hours	Opening Year	1984
Airfield Facilities			
Runway	11/29 3270m x 50m 190t asphalt-concrete pavement		
Taxiway	3 exit taxiway and parallel taxiway		
Apron	58,612 m^2 asphalt-concrete		
Airfield Lighting	29 ALS ,RWL ,TWL ,Apron flood Light		
Radio Navigation	ILS Cat1 ,PAR ,2xNDB		
Met. Equipment	FI-1A,AIU ,IVO ,RVO-2M, MV-1-2 ,FAK ,INEI ,T-63		
Rainwater Drainage	Open type		
Terminal Facilities			
Passenger Terminal	RC 4,219 m^2 (1978)		
Cargo Terminal	94.2 m^2 (1974)		
Control Tower/Operations	RC 46 m^2 ,Roof height 25m		
Fire/Rescue Station	Brick 450 m^2		
Administration	Brick 216 m^2 (1993)		
Electric Power Supply	Brick 530 m^2 (1980)		
Fuel Supply	Tank storage capacity 4000 cub.m , Area 20,000 m^2		
Hangers	450(18x25) m^2 (1975)		
Car Parking	1100 m^2 ,80 lots		
Access Road	Width 22m		
Utilities			
Power Supply	Cable lines from city, 4Mains ,10transformer x0.4KV		
Water Supply	Centralized town network, capcity 2 atm 177 cub.m/day		
Hot Water Supply	820 Gcal/year		
Gas Supply	Average pressure for 50 mm diameter		
Sewage Disposal	town network		
Telephone	N.A.		
Equipment			
Fire Fighting Vehicles	N.A.		
Ground Support	N.A.		
Snow and ice removal	N.A.		
ATC,Nav-com	RSP ,ILS ,DPRM ,DRL ,electric communication		
Met. Equipment	IVO ,FI-1 ,AIU ,RVO ,MV-1-2 ,FAK ,INEI ,T-63		

Summary of Airport Facilities (2)

Name of Airport : Namangan

FACILITY		DESCRIPTION
Runway	Dimensions	11/29 3270mx50m
	Surface	Asphalt-concrete
	Strength	33/F/C/X/T(190t)
	Slope	Longitudinal 1.58% Transversal 1.6%
Taxiway	Dimensions	TW-1 160mx20m TW-2 150mx20m TW-3 under repair
	Surface	Asphalt-concrete
	Strength	TW-1 PCN34/F/C/X/T TW-2 PCN37/F/C/X/T TW-3 under repair
Apron	Dimensions	Area 58,612m ^{2}
	Aircraft stand	Aircraft Tu-154 1stand Tu-134 1 stand IL-86 1stand IL-76 2stands An-24 2stands An-2 5stands
	Surface	Spot-1~7 Asphalt-concrete Spot-8~12 gravel-sand mix
	Strength	Spot-1~4 PCN37/F/C/X/T Spot-4~7 PCN40/F/C/X/T
Drainage		Open type
Perimeter Road		Asphalt-concrete width 3m
Security Fence		Reinforced concrete

Summary of Airport Facilities (1)

Name of Airport : Andizhan

General			
Location	7 Km from Andizhan city center		
Elevation	475m	Area	N.A.
Operation Hour	N.A.	Opening Year	1980
Airfield Facilities			
Runway	04/22 2900m x 45m 100t Concrete pavement		
Taxiway	7 exit taxiway and parallel taxiway		
Apron	Asphalt-concrete		
Airfield Lighting	ALS ,RWL ,TWL(Military) ,Apron flood Light(Civil)		
Radio Navigation	04 ILS Cat1 etc.(LLZ,GP-Civil / LMM,LOM-Military))		
Met. Equipment	RVR(Board), Ceilometer, Anemometer, Thermometer, Barometer		
Rainwater Drainage	Pumping-up and piping sysytem is adopted		
Terminal Facilities			
Passenger Terminal	RC 2F 300 passengers/hr (1979)		
Cargo Terminal	N.A.		
Control Tower/Operations	N.A.		
Fire/Rescue Station	N.A.		
Administration	N.A.		
Electric Power Supply	N.A.		
Fuel Supply	N.A.		
Hangers	N.A.		
Car Parking	N.A.		
Access Road	N.A.		
Utilities			
Power Supply	N.A.		
Water Supply	N.A.		
Hot Water Supply	N.A.		
Gas Supply	N.A.		
Sewage Disposal	N.A.		
Telephone	N.A.		
Equipment			
Fire Fighting Vehicles	N.A.		
Ground Support	N.A.		
Snow and ice removal	N.A.		
ATC,Nav-com	ASR, SSR, VHF-COM		
Met. Equipment	Teletype, HF-COM		

Summary of Airport Facilities (2)

Name of Airport : Andizhan

FACILITY		DESCRIPTION
Runway	Dimensions	04/22 2900mx45m
	Surface	Asphalt-concrete
	Strength	14/R/A/W/T(100t)
	Slope	Longitudinal 0.17% Transversal N.A.
Taxiway	Dimensions	TW-1,4,5 26m TW-8 23m TW-7 20m TW-2 18m TW-3 15m TW-6 10m
	Surface	TW-1,5 Concrete Others Asphalt-concrete
	Strength	TW-1,5 PCN14/R/A/W/T TW-3,4 PCN62/F/C/X/T TW-7 PCN20/F/C/X/T TW-38 PCN38/F/C/X/T
Apron	Dimensions	N.A.
	Aircraft stand	Aircraft Yak-40 2 stands Tu-154,134 2 stands An-24 1stand (for Civil Apron)
	Surface	Asphalt-concrete
	Strength	PCN24/F/C/X/T
Drainage		Pumping-up and underground piping system
Perimeter Road		N.A.
Security Fence		N.A.

Summary of Airport Facilities (1)

Name of Airport : Fergana

General			
Location	5 Km southwest from Fergana city (15 min. by car)		
Elevation	625m	Area	- m^2
Operation Hour	3:00-13:30	Opening Year	-
Airfield Facilities			
Runway	18/36 2860m x 50m 170t Asphalt-concrete Pavement		
Taxiway	4 exit and parallel taxiway		
Apron	11 stands Asphalt-concrete Pavement		
Airfield Lighting	ALS,RWL,TWL (owned by military),Apron flood Light		
Radio Navigation	ILS etc.(owned by military)		
Met. Equipment	IVO,RVO,M-63 2sets Barometer 2sets		
Rainwater Drainage	Open ditch and pipe culvert		
Terminal Facilities			
Passenger Terminal	Main Terminal RC2F 200 passengers per peak hour		
Cargo Terminal	N.A.		
Control Tower/Operations	N.A.		
Fire Station	N.A.		
Administration	N.A.		
Others	N.A.		
Car Parking	N.A.		
Access Road	N.A.		
Utilities			
Power Supply	N.A.		
Water Supply	N.A.		
Hot Water Supply	N.A.		
Gas Supply	N.A.		
Sewage Disposal	N.A.		
Telephone	N.A.		
Equipment			
Fire Fighting Vehcles	N.A.		
Ground Support	N.A.		
ATC,Nav-com.EQ	"Polet" system tranceivers-2sets,APR-80		
Met.Equipment	Teletypewriter ,Indicator		

Summary of Airport Facilities (2)

Name of Airport : Fergana

FACILITY		DESCRIPTION
Runway	Dimensions	18/36 2,860mx50m
	Surface	Asphalt-concrete
	Strength	PCN50/F/B/W/T(170t)
	Slope	Longitudinal 1.4% Transversal -
Taxiway	Dimensions	TW-1~4 Width 18m TW-5 Width 20m TW-6 Width 24m
	Surface	Asphalt-concrete
	Strength	TW-1, 6 PCN29/F/B/W/T TW-2, 3 PCN28/F/B/X/T TW-4 PCN22/F/B/X/T TW-5 PCN33/F/B/X/T
Apron	Dimensions	N.A.
	Aircraft stand	TU-154, AN12 5 stands IL-76 1 stands Yak-40 1 stands AN-24 2 stands AN-2 2 stands
	Surface	Asphalt-concrete
	Strength	Loading PCN 24/F/B/X/T (1991)
Drainage		N.A.
Perimeter Road		N.A.
Security Fence		concrete slabs ,metal wires

Summary of Airport Facilities (1)

Name of Airport : Kokand

General			
Location	11Km from Kokand city (10 min. by car)		
Elevation	500 m	Area	1,826,000m^2
Operation Hour	08:00 -17:00	Opening Year	1977
Airfield Facilities			
Runway	25/07 1600m x 40m 25t Asphalt-concrete Pavement		
Taxiway	3 exit, 3 connection and parallel taxiway		
Apron	21,065m^2 Asphalt-concrete Pavement		
Airfield Lighting	01 ALS,19 SALS,RWL,TWL ,Apron flood Light		
Radio Navigation	ILS Cat1,4xNDB		
Met. Equipment	RVR(Board), Ceilometer ,Anemometer , Thermometer		
Rainwater Drainage	Open ditch		
Terminal Facilities			
Passenger Terminal	RC 2F 321m^2 (1980)		
Cargo Terminal	RC 1F 60m^2 (1978)		
Control Tower/Operations	RC 941m^2,Roof height 16.1m (1977)		
Fire Station	Fire station 324m^2, Rescue 324m^2(1988)		
Administration	Concrete Brick 288m^2(1976)		
Electric power supply	Concrete brick 288m^2 (1976)		
Fuel supply	Tank strage capacity 3200 kl Area 236m^2 (1976)		
Others	Hangers 1455m^2 (1977)		
Car Parking	521m^2.50 lots		
Access Road	1 lane 6m width		
Utilities			
Power Supply	2 Stations 400kVa Main : 2transformers 10KV 160 kVa		
Water Supply	2 water tanks of 130 kl Supply capacity 197.89 per day		
Hot Water Supply	0.247 Gcal/hr pipe,uses natural gas		
Gas Supply	Pipe line from AGRS and GRP		
Sewage Disposal	Flushing to "Rustam" enterprise network		
Telephone	20 lines		
Equipment			
Fire Fighting Vehcles	Ural-375 and MAZ-7313 trucks		
Ground Support	Fuel trucks 3 , Oil trucks 1		
ATC,Nav-com.EQ	DRL-7CM ,ARP-80K ,PAR-10 ,APR-7 ,Communication by Polet-2		
Met.Equipment	DV-1		

Summary of Airport Facilities (2)

Name of Airport : Kokand

FACILITY		DESCRIPTION
Runway	Dimensions	25/07 1,600mx40m
	Surface	Asphalt-concrete
	Strength	PCN 12/F/A/X/T(25t) (1977)
	Slope	Longitudinal 0.15% Transversal 0.5%
Taxiway	Dimensions	TW-1 550mx14m TW-2 175mx16m TW-3 775mx14m
	Surface	Asphalt-concrete
	Strength	TW-1 PCN11/F/A/X/T TW-2 PCN 7/F/A/X/T TW-3 PCN11/F/A/X/T
Apron	Dimensions	Area 21,065m^2
	Aircraft stand	AN-24 1 stand YAK-40 1 stand AN-26 1 stand KA-26 32 stands AN-2 7 stands
	Surface	Asphalt-concrete
	Strength	PCN 7/F/A/X/T for AN-24 and YAK-40 ,N.A. for others
Drainage		Natural
Perimeter Road		Width 3m with asphalt-concrete paved
Security Fence		Net fencing

Summary of Airport Facilities (1)

Name of Airport : Samarkand

General			
Location	8Km northeast from Samarkand city		
Elevation	678m	Area	m^2
Operation Hour	-	Opening Year	1966
Airfield Facilities			
Runway	09/27 3100m x 49m 100t Concrete Pavement		
Taxiway	4 exit and parallel taxiway		
Apron	120,600 m^2 Concrete Pavement		
Airfield Lighting	09 ALS, 27 SALS,RWL,TWL ,Apron flood Light		
Radio Navigation	ILS Cat1,2xNDB		
Met. Equipment	RVR(Board), Ceilometer ,Anemometer , Thermometer Hydrometer ,Barometer		
Rainwater Drainage	Open ditch and pipe culvert		
Terminal Facilities			
Passenger Terminal	Main Terminal RC 2F 5340m^2		
Cargo Terminal	Brick 1F 510 m^2		
Control Tower/Operations	RC 1/2/4F 1590m^2,Roof height approx.15m		
Fire Station	Main RC 1F 360m^2(3 bays) , Sub RC 1F 250m^2(2 bays)		
Administration	4 buildings of 1040m^2 in total ,brick 1F		
Others	Hangers ,Fuel Supply,VIP building ,Workshops ,Storages ,etc.		
Car Parking	Approx.50 lots		
Access Road	2lanes in each direction ,16m width		
Utilities			
Power Supply	3 cable lines from the city 6KV 16 substations ,main one has 2x320KVA transformers 23 diesel generators of 715KW in total		
Water Supply	6 wells,5 pump stations and 4 water tanks of 150 cub.m pump capacity 1600 cub.m per day		
Hot Water Supply	4 Boilers and 2 speed boilers of approx. 8 Gcal/h		
Gas Supply	Not available		
Sewage Disposal	2 filter ponds 2aeration watercourses and slurry pit temporary oxidation ponds		
Telephone	Exchange is located in the operations bldg. 300 lines(assumption)		
Equipment			
Fire Fighting Vehcles	Three MJV of 12 Kl water tank and one RIV of 1 Kl water tank		
Ground Support	Refuelers ,towing tructers ,power supply ,water supply lavatory ,catering ,cargo/baggage handling step car , etc.		
ATC,Nav-com.EQ	ASR ,SSR , ATC Consoles		
Met.Equipment	Teletypewriter ,Indicator		

Summary of Airport Facilities (2)

Name of Airport : Samarkand

FACILITY		DESCRIPTION
Runway	Dimensions	09/27 3,100mx49m
	Surface	Cement concrete except for both end which is asphalt-concrete paved
	Strength	PCN29/R/C/X/T(100t)
	Slope	Longitudinal 0.42% Transversal 1.0%
Taxiway	Dimensions	TW-1 148.5mx21m TW-2 148.5mx21m TW-3 148.5mx18m TW-4 2530mx21m
	Surface	Concrete
	Strength	TW-1 PCN23/R/B/X/T TW-2 PCN25/R/B/X/U TW-3 PCN18/R/B/X/T TW-4 PCN25/R/B/X/U
Apron	Dimensions	Loading 10753mx95.5m General Aviation 300mx60m
	Aircraft stand	TU-154,IL-18 4 stands TU-134 3 stands AN-24,Yak-49 15 stands AN-2 26 stands
	Surface	Loading Cement concrete General Aviation Asphalt-concrete
	Strength	Loading PCN 25/R/B/X/U
Drainage		Pipe culvert system (diameter 370 mm - 140 mm)
Perimeter Road		Unpaved
Security Fence		Barbed wire fence and concrete fencing

Summary of Airport Facilities (1)

Name of Airport : Termez

General			
Location	9Km from Termez city (15 min. by car)		
Elevation	313m	Area	2,288,000m ^{2}
Operation Hour	06:00-21:00	Opening Year	1952
Airfield Facilities			
Runway	25/07 3000m x 42m 190t reinforced concrete pavement		
Taxiway	1 exit taxiway		
Apron	35,050m ^{2} asphalt-concrete and concrete pavement		
Airfield Lighting	25ALS,RWL,TWL,Apron flood Light		
Radio Navigation	ILS Cat1,VOR/DME ,2xNDB		
Met. Equipment	RVR(Board), Ceilometer, Anemometer, Thermometer, Barometer		
Rainwater Drainage	No drainage system		
Terminal Facilities			
Passenger Terminal	RC 2F 2,200m ^{2} (1979)		
Cargo Terminal	None		
Control Tower/Operations	Brick 96 m ^{2} ,Roof height 6.2m (1989)		
Fire/Rescue Station	Fire :Brick 216 m ^{2} (1979) Rescue: Brick 360 m ^{2} (1993)		
Administration	Brick 420 m ^{2} (1955)		
Electric Power Supply	RC 672 m ^{2} (1965)		
Fuel Supply	Storage capacity 1600Kl ,Area 1500 m ^{2}		
Hangers	Metal 20m x 30m 1dock (1981)		
Car Parking	1200 m ^{2} 80 lots		
Access Road	2lanes width 15m		
Utilities			
Power Supply	2 lines from city 36/6KV 1station 2transformers 8x400KV		
Water Supply	3tanks x 25Kl Supply capacity 28.5Kl/day		
Hot Water Supply	N.A		
Gas Supply	N.A		
Sewage Disposal	chemical cleaning capacity 36 cub.m/h		
Telephone	12 lines		
Equipment			
Fire Fighting Vehcles	AA-60-7310 ,AA-60 -7313 ,Atz-40-375		
Ground Support	TTz-22,APA-4G,APA-50, AS-161,MZ-66,TZ-7,5,APK-10,towing vehicle		
Snow and ice removal	KPM ,auto-grader		
ATC,Nav-com	UshW Tranceiver ,ShW Tranceiver ,ASR ,SSR		
Met. Equipment	FAP-1nei , radioreceivers ,teletypes ,loudspeaker comm.		

Summary of Airport Facilities (2)

Name of Airport : Termez

FACILITY		DESCRIPTION
Runway	Dimensions	25/07 3000mx42m (1990)
	Surface	Reinforced concrete(PAK14)
	Strength	19/R/A/X/U(190t)
	Slope	Longitudinal 0.12% Transversal 1.2%
Taxiway	Dimensions	TW-1 740mx20m TW-2 420mx20m TW-3 100mx20m TW-4 180mx20m TW-5 200mx 8m
	Surface	Asphalt-concrete
	Strength	TW-1,2 PCN62/F/C/Y/T (190t) TW-3 PCN30/R/A/X/T(190t) TW-4 PCN24/F/C/Y/T (25t) TW-5 PCN12/F/C/Y/T (10t) Parallel PCN19/R/A/X/T
Apron	Dimensions	Area 3,505 m^2
	Aircraft stand	Aircraft Tu-154 2stands An-24, Yak-40 5stands An-2 30stands
	Surface	Spot 1,2 Asphalt-concrete Spot 3-7 Concrete
	Strength	Spot 1,2 PCN62/F/C/Y/T Spot 3-7 -
Drainage		natural ,surface
Perimeter Road		Asphalt-concrete width 4m ,clearence from aircraft 75m
Security Fence		Reinforced concrete and iron wires

Summary of Airport Facilities (1)

Name of Airport : Karshi

General			
Location	12 km from Karshi city		
Elevation	372	Area	364 ha
Operation Hour	06:00-19:30	Opening Year	1953
Airfield Facilities			
Runway	16/34 2900m x 42m 100t asphalt-concrete pavement		
Taxiway	4 exit taxiway and a parallel taxiway asphalt-concrete pavement		
Apron	22,124m ^{2} asphalt-concrete		
Airfield Lighting	16ALS,RWL,TWL,Apron flood Light		
Radio Navigation	ILS Cat1,4xNDB		
Met. Equipment	RVR(Board), Ceilometer, Anemometer, Thermometer, Barometer		
Rainwater Drainage	locked drainage system(outside of airport)		
Terminal Facilities			
Passenger Terminal	RC 2F 2,400m ^{2}, 200 passenger per hour(1990)		
Cargo Terminal	N.A.		
Control Tower/Operations	N.A.		
Fire/Rescue Station	N.A.		
Administration	N.A.		
Electric Power Supply	N.A.		
Fuel Supply	N.A.		
Hangers	N.A.		
Car Parking	N.A.		
Access Road	N.A.		
Utilities			
Power Supply	3 lines from city 6KV ,2station 7transformers (1980)		
Water Supply	N.A.		
Hot Water Supply	4 Gcal/hr , natural gas		
Gas Supply	N.A.		
Sewage Disposal	N.A.		
Telephone	N.A.		
Equipment			
Fire Fighting Vehcles	N.A.		
Ground Support	N.A.		
Snow and ice removal	2BPM, 3PM130 aerodrome service vehicles		
ATC,Nav-com	DRL-7CM, ARP-75, SP-80M,PAR-8C, PAR-10C, Baklan RN , Polet-1, Polet-2, Chinara, Kedr, IKM-30, P-439, P-330		
Met. Equipment	Teletype ,Indicater		

Summary of Airport Facilities (2)

Name of Airport : Karshi

FACILITY		DESCRIPTION
Runway	Dimensions	16/34 2900mx42m
	Surface	Asphalt-concrete
	Strength	17/F/B/X/T (1986)
	Slope	Longitudinal 0.08% Transversal 0.01%
Taxiway	Dimensions	TW-1 320mx22m TW-2 140mx22m TW-3 260mx21m TW-4 420mx21m
	Surface	Asphalt-concrete
	Strength	TW-1,2 PCN7/F/B/X/T(1983)
Apron	Dimensions	Area 22,124 m^2
	Aircraft stand	Aircraft Tu-154 3stands Tu-134 1stands Yak-40 7stands
	Surface	Asphalt-concrete
	Strength	PCN6/F/B/X/T
Drainage		Locked dranage
Perimeter Road		Asphalt-concrete width 4m ,clearence from aircraft 60m
Security Fence		Reinforced concrete

Summary of Airport Facilities (1)

Name of Airport : Bukhara

General			
Location	7Km northeast from Bukhara city		
Elevation	229 m	Area	m^2
Operation Hour	-	Opening Year	1980
Airfield Facilities			
Runway	01/19 3000m x 45m 110t Concrete Pavement		
Taxiway	5 exit, 3 connection and parallel taxiway		
Apron	115,000 m^2 Concrete Pavement , 40,000 m^2 for AN-2		
Airfield Lighting	01 ALS,19 SALS,RWL,TWL ,Apron flood Light		
Radio Navigation	ILS Cat1, 4xNDB		
Met. Equipment	RVR(Board), Ceilometer ,Anemometer , Thermometer, Barometer		
Rainwater Drainage	Open ditch		
Terminal Facilities			
Passenger Terminal	Existing Terminal Brick 1F 1100m^2 New Terminal under construction RC 8,420m^2		
Cargo Terminal	Brick 1F 250 m^2,steel storage ,wooden storage		
Control Tower/Operations	Brick 96 m^2 , Roof height approx.11m		
Fire Station	RC 1/6F(watch tower),1070 m^2(3 bays)		
Administration	Brick 2F 790 m^2		
Others	Hangers ,Fuel Supply,VIP building ,Workshops ,Storages ,etc.		
Car Parking	Existing approx. 20 lots, New approx.30 lots		
Access Road	2lanes in each direction ,13m width		
Utilities			
Power Supply	2 lines from the city 10KV to 380/220V 16 substations ,main one has 2x630KVA transformers Main one has diesel generators of 100KW in total		
Water Supply	300mm diameter water main from the city		
Hot Water Supply	2 Boilers of approx.1.6 Gcal/h in total		
Gas Supply	Not available		
Sewage Disposal	Sewage is treated by the city, sewage main is of 219 mm diameter		
Telephone	Exchange will be located in the new operations bldg. 200 lines(currently 100 internal and 50 lines out)		
Equipment			
Fire Fighting Vehcles	One MJV of 12 KI water tank and one RIV of 1 KI		
Ground Support	Refuelers ,towing tructers ,power supply ,water supply lavatory ,catering ,cargo/baggage handling step car , etc.		
ATC,Nav-com.EQ	ASR ,SSR , ATC Consoles ,Indicator		
Met.Equipment	Teletypewriter ,Indicator		

Summary of Airport Facilities (2)

Name of Airport : Bukhara

FACILITY		DESCRIPTION
Runway	Dimensions	01/19 3,000mx45m
	Surface	Cement concrete
	Strength	PCN17/R/A/X/T(110t)
	Slope	Longitudinal 0.17% Transversal 1.2%
Taxiway	Dimensions	TW-1 513mx22m TW-2 241.5mx22m TW-3 500mx22m TW-4 2100mx18-30m TW-5 115mx10m TW-6 200mx11m TW-7 100mx18m
	Surface	Asphalt-concrete
	Strength	PCN31/F/C/Y/T
Apron	Dimensions	Spot-1 258mx133m Spot-2 430mx95.5m Spot-3 400mx100m
	Aircraft stand	TU-154 4stands AN-24,Yak-49 5stands AN-2 37stands
	Surface	Spot-1 Cement concrete Spot-2 Asphalt-concrete Spot-3 Grass & cement concrete
	Strength	Spot-1 PCN 25/R/A/X/T Spot-2 PCN 21/F/A/X/T
Drainage		Open Channel System
Perimeter Road		Asphalt-concrete
Security Fence		Barbed wire fence

Summary of Airport Facilities (1)

Name of Airport : Navoi

General			
Location	13Km southwest from Navoi city (25 min. by car)		
Elevation	346.9m	Area	N.A
Operation Hour	daytime	Opening Year	1986(Runway ,Terminal)
Airfield Facilities			
Runway	07/25 1400m x 45m 25t asphalt concrete pavement		
Taxiway	1 exit taxiway		
Apron	12,953m ^{2} (165mx78.5m) asphalt-concrete		
Airfield Lighting	none		
Radio Navigation	3xNDB		
Met. Equipment	IVO-1m 2sets,Barometer 2sets,M63 console 2sets Thermometer 2sets		
Rainwater Drainage	N.A		
Terminal Facilities			
Passenger Terminal	N.A		
Cargo Terminal	N.A		
Control Tower/Operations	N.A		
Fire/Rescue Station	N.A		
Administration	N.A		
Electric Power Supply	N.A		
Fuel Supply	N.A		
Hangers	N.A		
Car Parking	N.A		
Access Road	N.A		
Utilities			
Power Supply	2 lines from city 10KV main: 2transformersx10KV		
Water Supply	2tanks x 500KI		
Hot Water Supply	N.A		
Gas Supply	N.A		
Sewage Disposal	Central treating		
Telephone	25 pairs		
Equipment			
Fire Fighting Vehcles	2 vehicles		
Ground Support	N.A		
Snow and ice removal	according demand		
ATC,Nav-com	APR-2 2sets, PAR-100 1sets ,APR-80 ,ARP-7C Baklan Tranceiver ,Polet-1		
Met. Equipment	IVO-1M,Barometer console ,M-63 ,thermometer		

Summary of Airport Facilities (2)

Name of Airport : Navoi

FACILITY		DESCRIPTION
Runway	Dimensions	25/07 3000mx42m (1990)
	Surface	Reinforced concrete(PAK14)
	Strength	19/R/A/X/U(190t)
	Slope	Longitudinal 0.12% Transversal 1.2%
Taxiway	Dimensions	TW-1 740mx20m TW-2 420mx20m TW-3 100mx20m TW-4 180mx20m TW-5 200mx 8m
	Surface	Asphalt-concrete
	Strength	TW-1,2 PCN62/F/C/Y/T (190t) TW-3 PCN30/R/A/X/T(190t) TW-4 PCN24/F/C/Y/T (25t) TW-5 PCN12/F/C/Y/T (10t) Parallel PCN19/R/A/X/T
Apron	Dimensions	Area 3,505 m^2
	Aircraft stand	Aircraft Tu-154 2stands An-24, Yak-40 5stands An-2 30stands
	Surface	Spot 1,2 Asphalt-concrete Spot 3-7 Concrete
	Strength	Spot 1,2 PCN62/F/C/Y/T Spot 3-7 -
Drainage		natural ,surface
Perimeter Road		Asphalt-concrete width 4m ,clearence from aircraft 75m
Security Fence		Reinforced concrete and iron wires

Summary of Airport Facilities (1)

Name of Airport : Urgench

General			
Location	5Km east of Urgench city and 33Km northeast of Khiva		
Elevation	97 m	Area	- m^2
Operation Hour	-	Opening Year	1967
Airfield Facilities			
Runway	13/31 3000m x 44m 191t Concrete Pavement		
Taxiway	3 exit and parallel taxiway		
Apron	64,000 m^2 Concrete Pavement , 85,000 m^2 for AN-2		
Airfield Lighting	13 ALS,31 SALS,RWL,TWL ,Apron flood Light		
Radio Navigation	ILS Cat1,VOR/DME,4xNDB		
Met. Equipment	RVR(Board), Ceilometer ,Anemometer , Thermometer Hydrometer ,Barometer		
Rainwater Drainage	Open ditch and pipe culvert		
Terminal Facilities			
Passenger Terminal	RC 2F 3420m^2		
Cargo Terminal	Brick 1F 250 m^2		
Control Tower/Operations	RC 1/3F 570 m^2,Roof height approx.11m		
Fire Station	Brick 1F 410 m^2 (3 bays) under expansion		
Administration	2 buildings of 265m^2 in total		
Others	Hangers ,Fuel Supply,VIP building ,Workshops ,Storages ,etc.		
Car Parking	Approx.80 lots		
Access Road	2 lanes in each direction ,26m width		
Utilities			
Power Supply	2 cable lines from the city 10KV to 380/220V 12 substations ,main one has 2x400KVA transformers Main one has diesel generators of 100KW in total		
Water Supply	150mm diameter dual water main from the city		
Hot Water Supply	Supplied by the city		
Gas Supply	150 mm diameter gas main from the city		
Sewage Disposal	Sewage is treated by the city, sewage main is of 150 mm diameter		
Telephone	Exchange will be located in the passenger terminal bldg.		
Equipment			
Fire Fighting Vehcles	Two MJV of 12 Kl water tank and one RIV of 1 Kl water tank		
Ground Support	Refuelers ,towing tructers ,power supply ,water supply lavatory ,catering ,cargo/baggage handling step car , etc.		
ATC,Nav-com.EQ	ASR ,SSR , ATC Consoles ,Indicator		
Met.Equipment	Teletypewriter ,Indicator ,Recorder		

Summary of Airport Facilities (2)

Name of Airport : Urgench

FACILITY		DESCRIPTION
Runway	Dimensions	13/31 3,000mx44m
	Surface	Asphalt-concrete
	Strength	PCN57-38/F/B/W/T(191t)
	Slope	Longitudinal 0% Transversal 1.0%
Taxiway	Dimensions	TW-1 260mx21m TW-2 180mx21m TW-3 240mx21m TW-4 145mx21m TW-5 680mx21m
	Surface	TW-1~4 Asphalt-concrete TW-5 Gravel
	Strength	TW-1~3 PCN38/F/B/W/T
Apron	Dimensions	Spot-1 546mx118m Spot-2 530mx170~150m
	Aircraft stand	TU-154 3stands AN-24,Yak-40 2stands AN-2 23stands MI-2 19Stands
	Surface	Asphalt-concrete
	Strength	PCN 38/R/B/W/T
Drainage		Open Channel System
Perimeter Road		Asphalt-concrete
Security Fence		Steel fence

Summary of Airport Facilities (1)

Name of Airport : Nukus

General			
Location	7 Km from Nukus city (20 min. by car)		
Elevation	76m	Area	450 hectares
Operation Hour	24 hours	Opening Year	1980
Airfield Facilities			
Runway	15/33 3000m x 48m 165t reinforced concrete pavement		
Taxiway	3 exit taxiway and parallel taxiway		
Apron	83,844m ^{2} asphalt-concrete		
Airfield Lighting	15 ALS / 33 SALS ,RWL,TWL		
Radio Navigation	ILS Cat1 ,4xNDB		
Met. Equipment	Fully equipped with meteorological aids to norms		
Rainwater Drainage	N.A		
Terminal Facilities			
Passenger Terminal	RC 2,200m ^{2} (1970)		
Cargo Terminal	550 m ^{2} (1976)		
Control Tower/Operations	85 m ^{2} ,Roof height 6.2m (1967)		
Fire/Rescue Station	Fire station:445 m ^{2} (1976)		
Administration	515 m ^{2} (1952)		
Electric Power Supply	126 m ^{2} (1973)		
Fuel Supply	N.A.		
Hangers	800 m ^{2} (1985)		
Car Parking	2000 m ^{2}		
Access Road	2lanes width 3.5m		
Utilities			
Power Supply	6KV line from city, transformer 250KV		
Water Supply	N.A.		
Hot Water Supply	by boiler of 1.7 Gcal/h in total		
Gas Supply	by pipeline from the city		
Sewage Disposal	without processing and city network		
Telephone	local town network		
Equipment			
Fire Fighting Vehcles	N.A.		
Ground Support	N.A.		
Snow and ice removal	N.A.		
ATC,Nav-com	ASR ,SSR ,ATC Consoles		
Met. Equipment	Teletype ,Indicater		

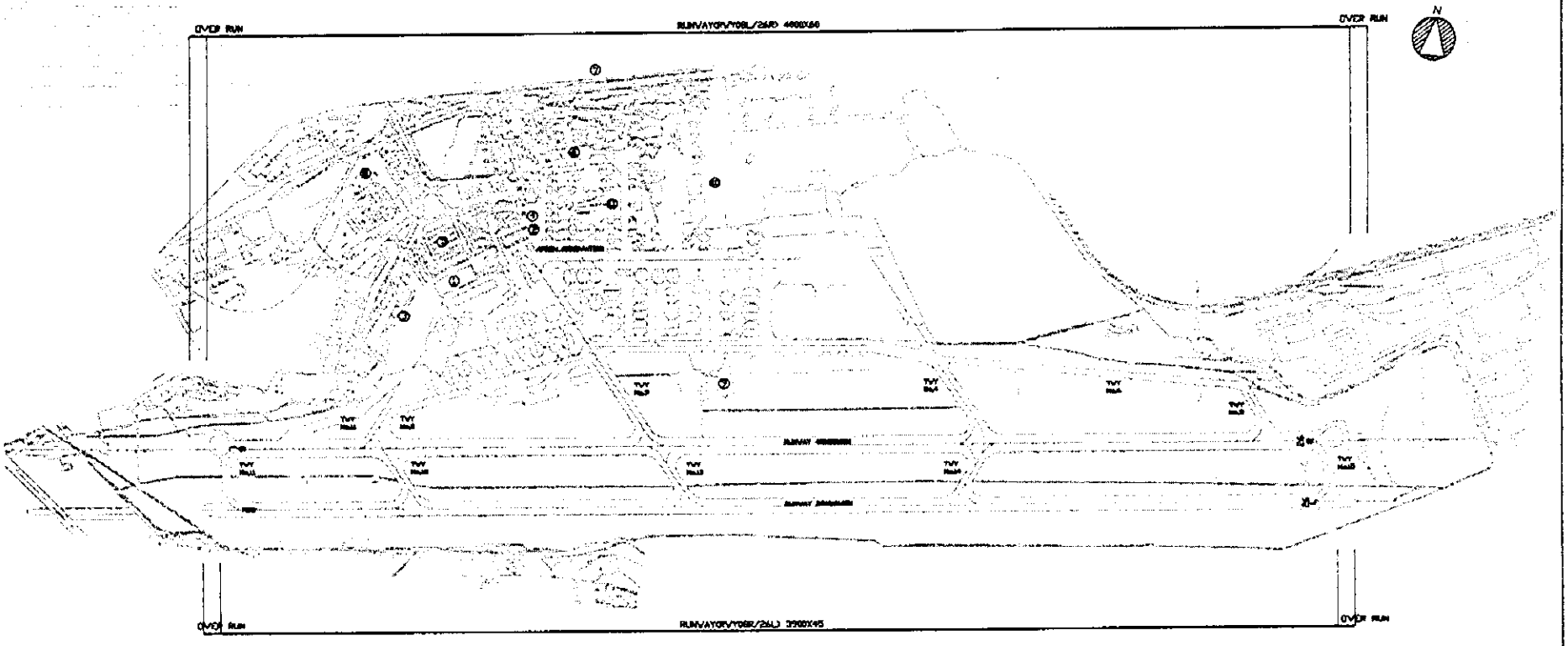
Summary of Airport Facilities (2)

Name of Airport : Nukus

FACILITY		DESCRIPTION
Runway	Dimensions	15/33 3000mx48m
	Surface	Reinforced concrete
	Strength	20/R/A/X/T(165t)
	Slope	Longitudinal 0.1% Transversal 1.5%
Taxiway	Dimensions	TW-1 1968mx36m TW-2 162mx33m TW-3 182mx22m TW-4 182mx22m TW-5 226mx31m
	Surface	Asphalt-concrete
	Strength	TW-1 PCN42/F/B/X/T (t) TW-2 PCN28/F/B/X/T(t) TW-3 PCN42/F/B/Y/T (t) TW-4 PCN36/F/B/Y/T (t) TW-5 PCN26/F/B/X/T
Apron	Dimensions	Area 83,844m ^{2}
	Aircraft stand	Aircraft Tu-154 2stands IL-62 1stands Yak-40 4stands An-24 1stands
	Surface	Asphalt-concrete
	Strength	PCN35/F/B/X/T
Drainage		N.A.
Perimeter Road		Asphalt-concrete width 3m
Security Fence		Reinforced concrete

APPENDIX 3.5-3

GENERAL LAYOUT OF THE EXITING AIRPORTS

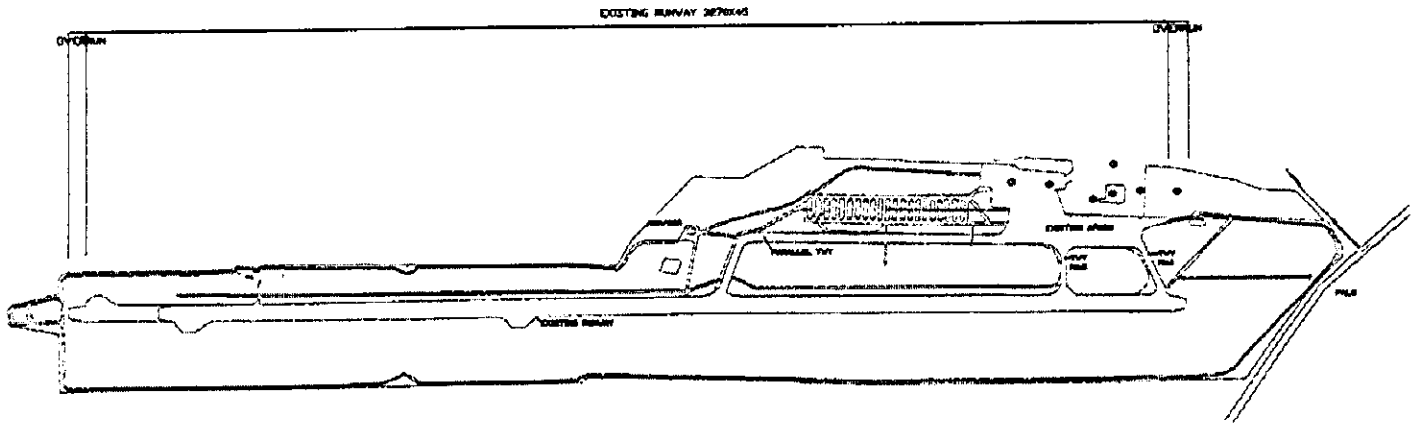


TERMINAL AREA			
1	Int'l Passenger Terminal Building	8	Fuel Tank Farm
2	Dom. Passenger Terminal Building	9	Fire Station
3	VIP Building	10	Aircraft Maintenance Area
4	Control Tower and Operation	11	Aircraft Maintenance Office
5	Car Park		
6	Cargo Handling Area		
7	Administration Area		

AIRPORT DATA			
Airport Name	Tashkent	Elevation	431m
Class	I	Reference Temperature	29°C
Province	Tashkent	Runway	4000mx60m
Main City	Tashkent		3900mx45m
Distance from city	6km south	Direction (True north)	N 82° E
Reference Point	N 41° 15' 24"	Instrument Runway	08L/08R/26R
Coordinates	E069° 16' 24"	II S Category	CAT-II

The Republic of Uzbekistan National Air Company "Uzbekistan Havo Yullari"	
The Study for The Air Transportation Development in The Republic of Uzbekistan	
Airport	Tashkent Airport
Drawing Tittle	Existing Airport Layout Plan
Date	Scale

A3.5-3-2

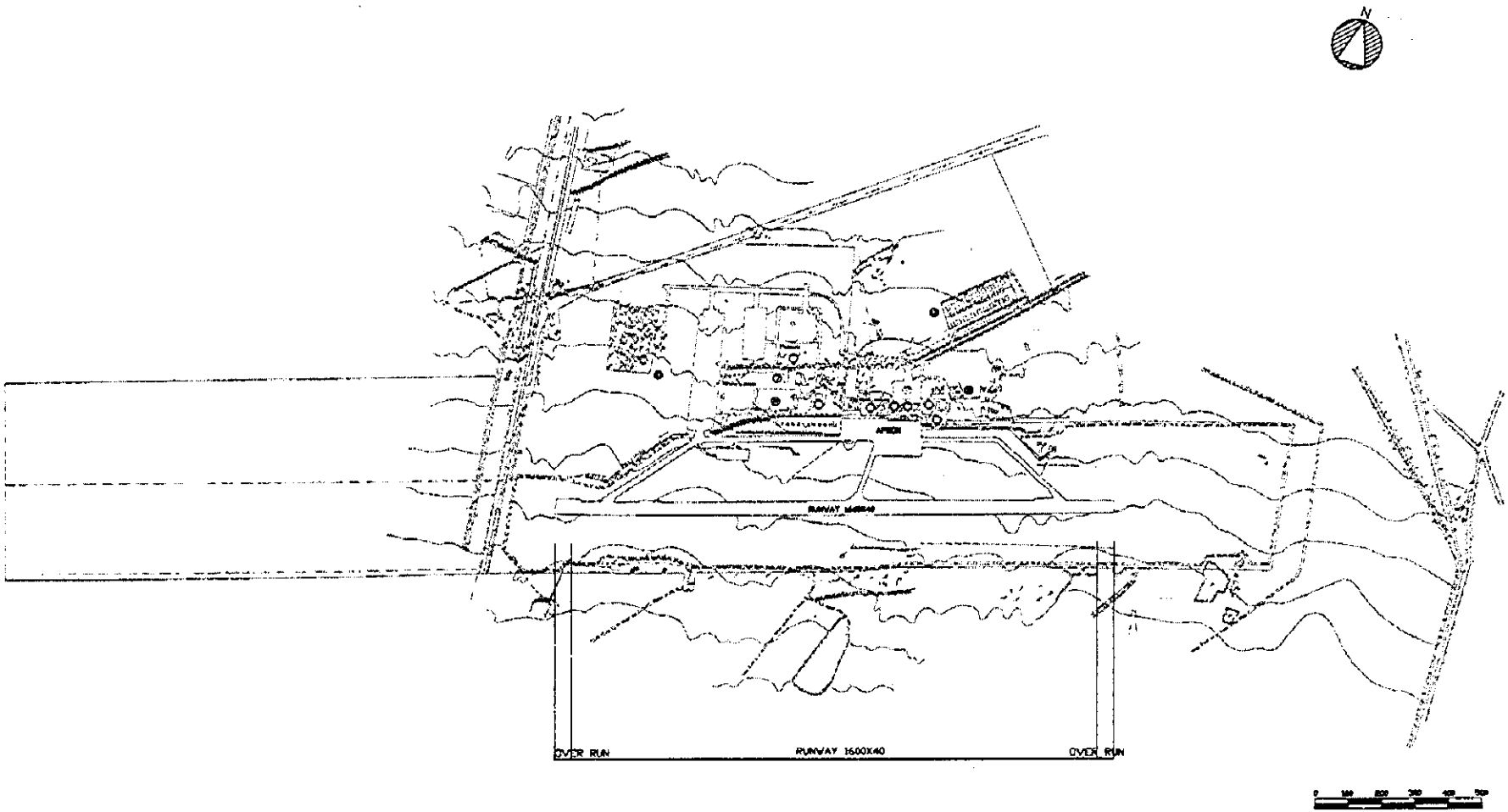


TERMINAL AREA			
1	Passenger Terminal Building	8	Car Park
2	VIP building		
3	Cargo Storage(under construction)		
4	Control Tower		
5	Administration Building		
6	Storage and Garage Area		
7	Fuel Farm		

AIRPORT DATA			
Airport Name	Namangan	Elevation	515m
Class	II	Reference Temperature	35°C
Province	Namangan	Runway	3270mx50m
Main City	Namangan		
Distance from city	8km southwest	Direction (True north)	N 112 33' E
Reference Point	N 40 59' 05"	Instrument Runway	29
Coordinates	E071 33' 27"	ILS Category	CAT-I

The Republic of Uzbekistan National Air Company "Uzbekistan Havo Yullari"	
The Study for The Air Transportation Development in The Republic of Uzbekistan	
Airport	Namangan Airport
Drawing Tittle	Existing Airport Layout Plan
Date	Scale

A3.5-3-3

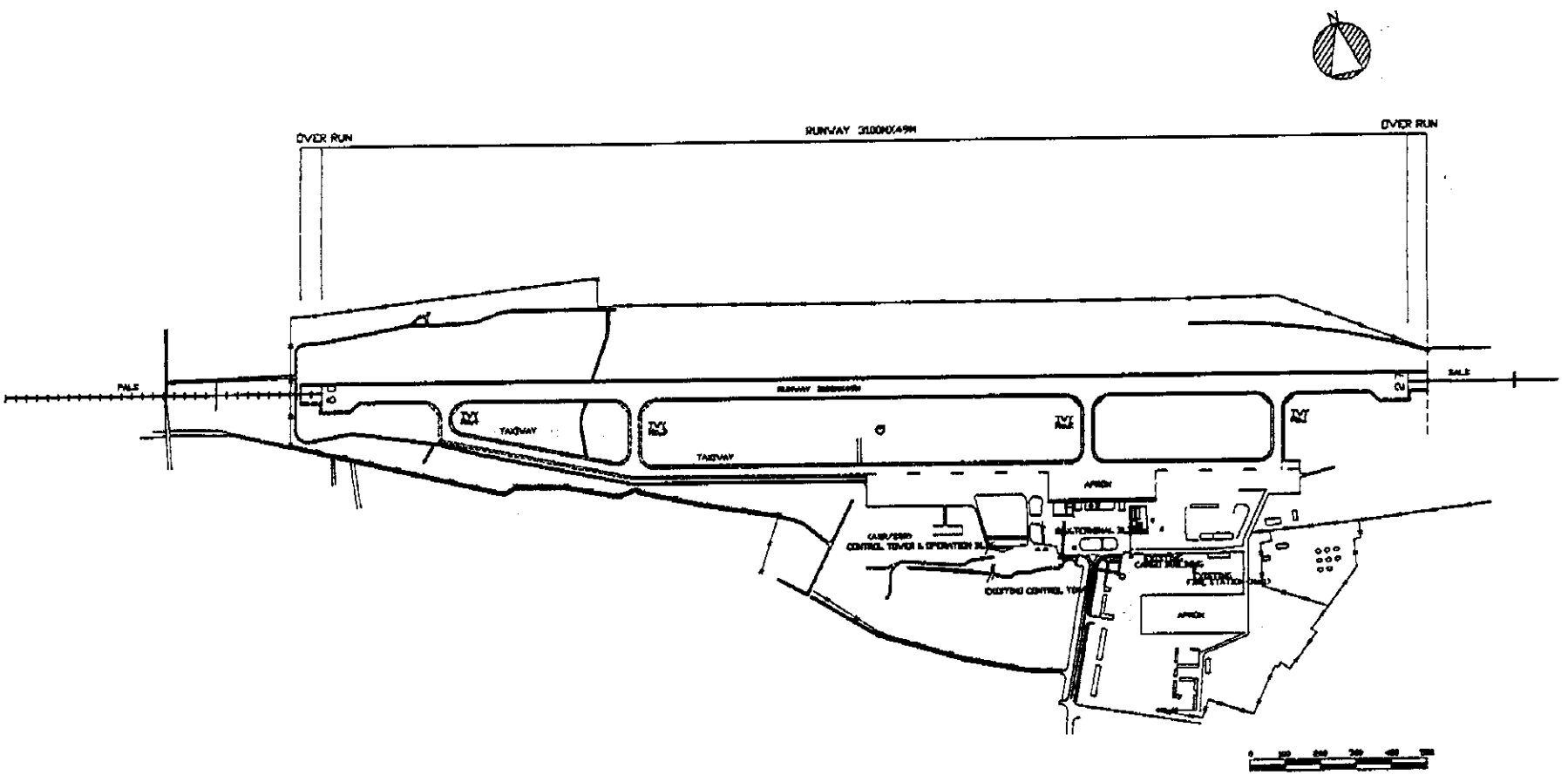


TERMINAL AREA			
1	Passenger Terminal Building	8	Boiler Building
2	VIP Building	9	Club House
3	Cargo Storage	10	Hanger
4	Administration Building	11	Fuel Farm
5	Fire Station	12	Dormitory
6	Garage		
7	Storage		

AIRPORT DATA			
Airport Name	Kokand	Elevation	500m
Class	III	Reference Temperature	34 C
Province	Fergana	Runway	1600mx40m
Main City	Kokand		
Distance from city	4km south	Direction (True north)	N 73 E
Reference Point Coordinates	N 40 26' E070 59'	Main Runway	25
		ILS Category	-

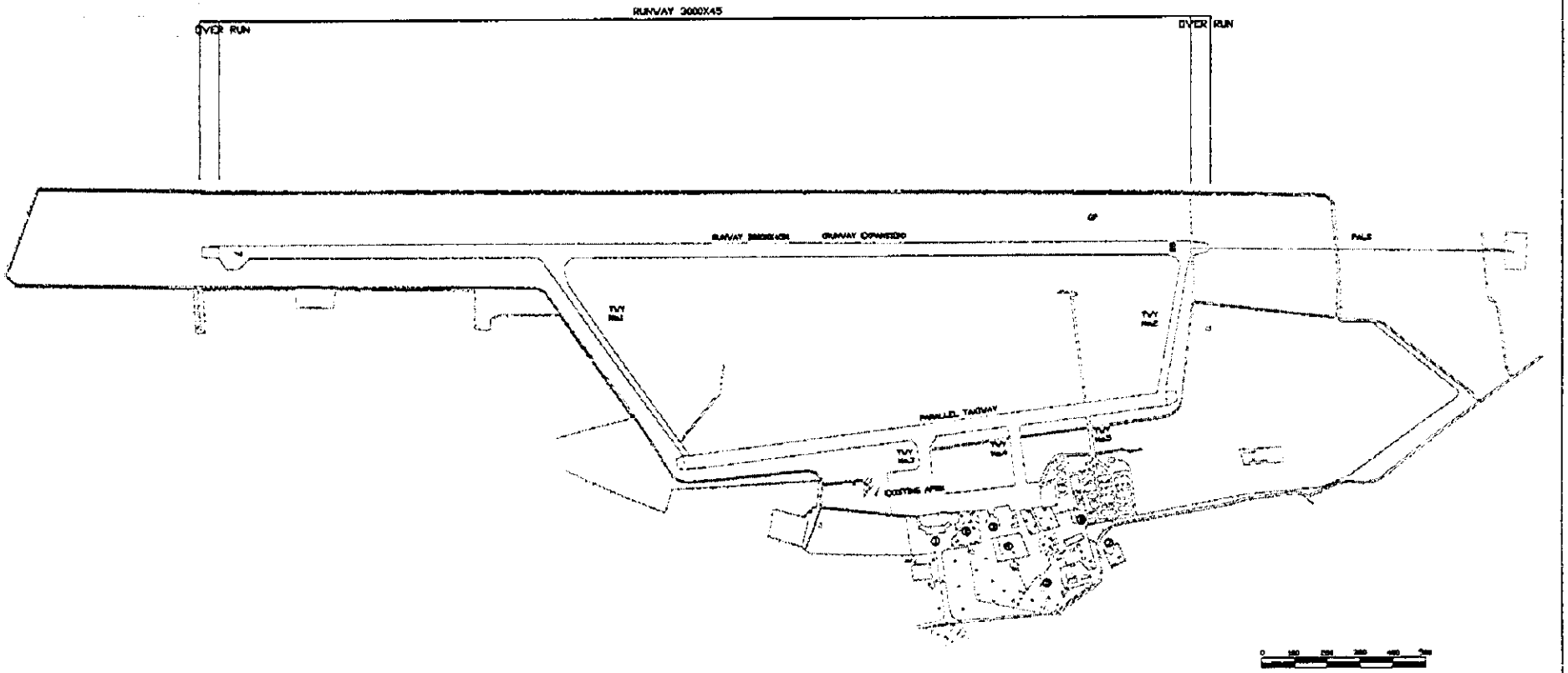
The Republic of Uzbekistan National Air Company "Uzbekistan Havo Yullari"	
The Study for The Air Transportation Development in The Republic of Uzbekistan	
Airport	Kokand Airport
Drawing Tittle	Existing Airport Layout Plan
Date	Scale

A3.5-3-4



AIRPORT DATA			
Airport Name	Samarkand	Elevation	678m
Class	II	Reference Temperature	36 C
Province	Samarkand	Runway	3100mx49m
Main City	Samarkand		
Distance from city	8km north	Direction (True north)	N 99 44' E
Reference Point Coordinates	N 39 42' 06" E066 59' 06"	Instrument Runway	09
		ILS Category	CAT-I

The Republic of Uzbekistan National Air Company "Uzbekistan Havo Yullari"	
The Study for The Air Transportation Development in The Republic of Uzbekistan	
Airport	Samarkand Airport
Drawing Tittle	Existing Airport Layout Plan
Date	Scale



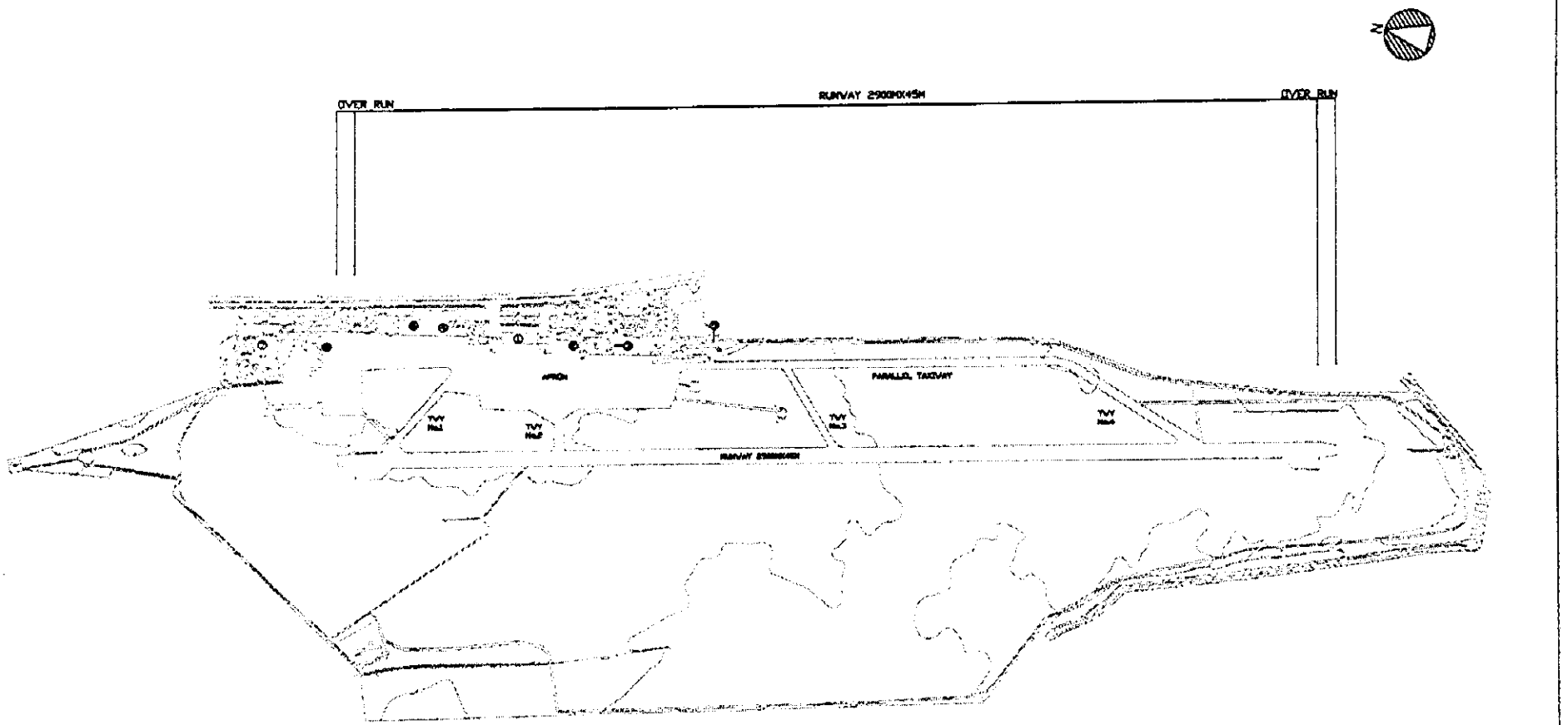
TERMINAL AREA			
1	Passenger Terminal Building	7	Canteen
	Controll Tower		
2	VIP Building		
3	Fire Station		
4	Garage		
5	Sotrage		
6	Hanger		

AIRPORT DATA			
Airport Name	Termez	Elevation	313m
Class	II	Reference Temperature	38°C
Province	Sukhandaria	Runway	3000mx42m
Main City	Termez		
Distance from city	9km	Direction (True north)	N 74 09' E
Reference Point Coordinates	N 37 17' 11" E067 18' 33"	Instrument Runway	25
		ILS Category	CAT-I

The Republic of Uzbekistan National Air Company "Uzbekistan Havo Yullari"	
The Study for The Air Transportation Development in The Republic of Uzbekistan	
Airport	Termez Airport
Drawing Tittle	Existing Airport Layout Plan
Date	Scale

A3.5-3-5

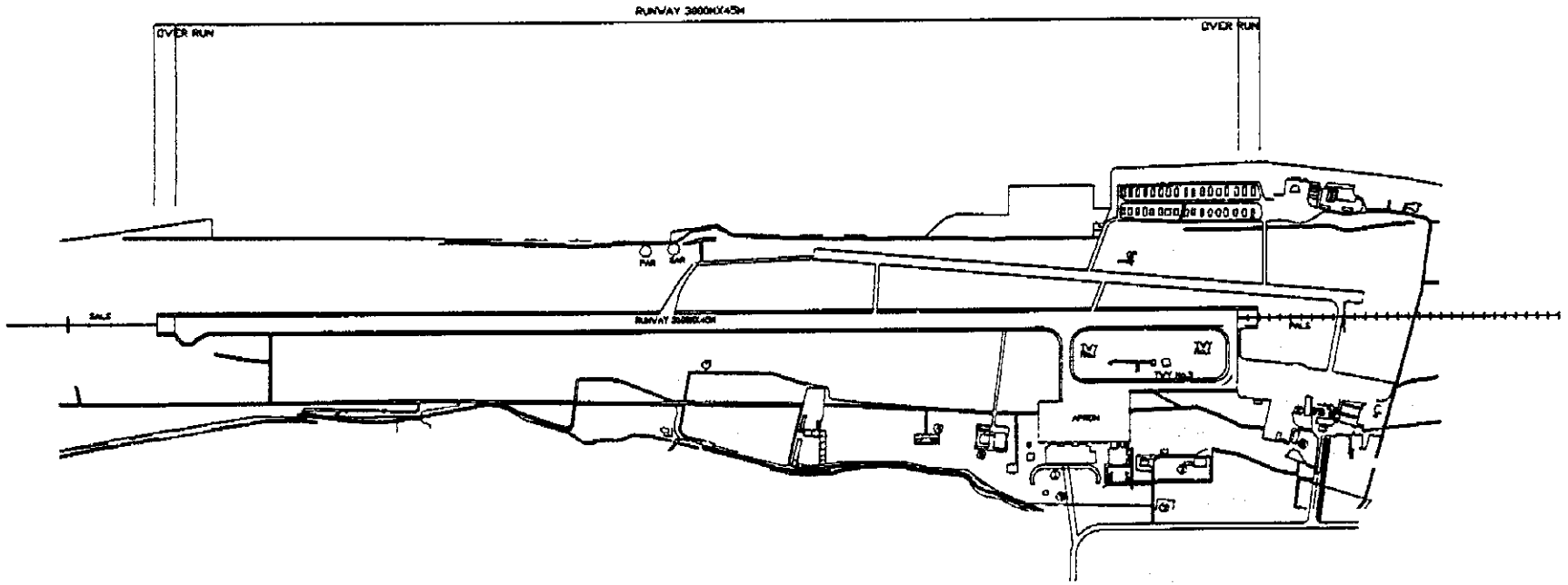
A3.5-3-8



TERMINAL AREA			
1	Passenger Terminal Building	7	Fuel Farm
2	VIP Building	8	Hanger
3	Operation,Administration Building and Control Tower		
4	Sotrage		
5	Fire Station		
6	Garage		

AIRPORT DATA			
Airport Name	Karshi	Elevation	374m
Class	III	Reference Temperature	-
Province	Kashikadarya	Runway	2900mx42m
Main City	Karshi		
Distance from city	5km north	Direction (True north)	N 167° 47' E
Reference Point Coordinates	N 38° 48' E065° 46'	Main Runway	16
		ILS Category	-

The Republic of Uzbekistan National Air Company "Uzbekistan Havo Yullari"	
The Study for The Air Transportation Development in The Republic of Uzbekistan	
Airport	Karshi Airport
Drawing Tittle	Existing Airport Layout Plan
Date	Scale

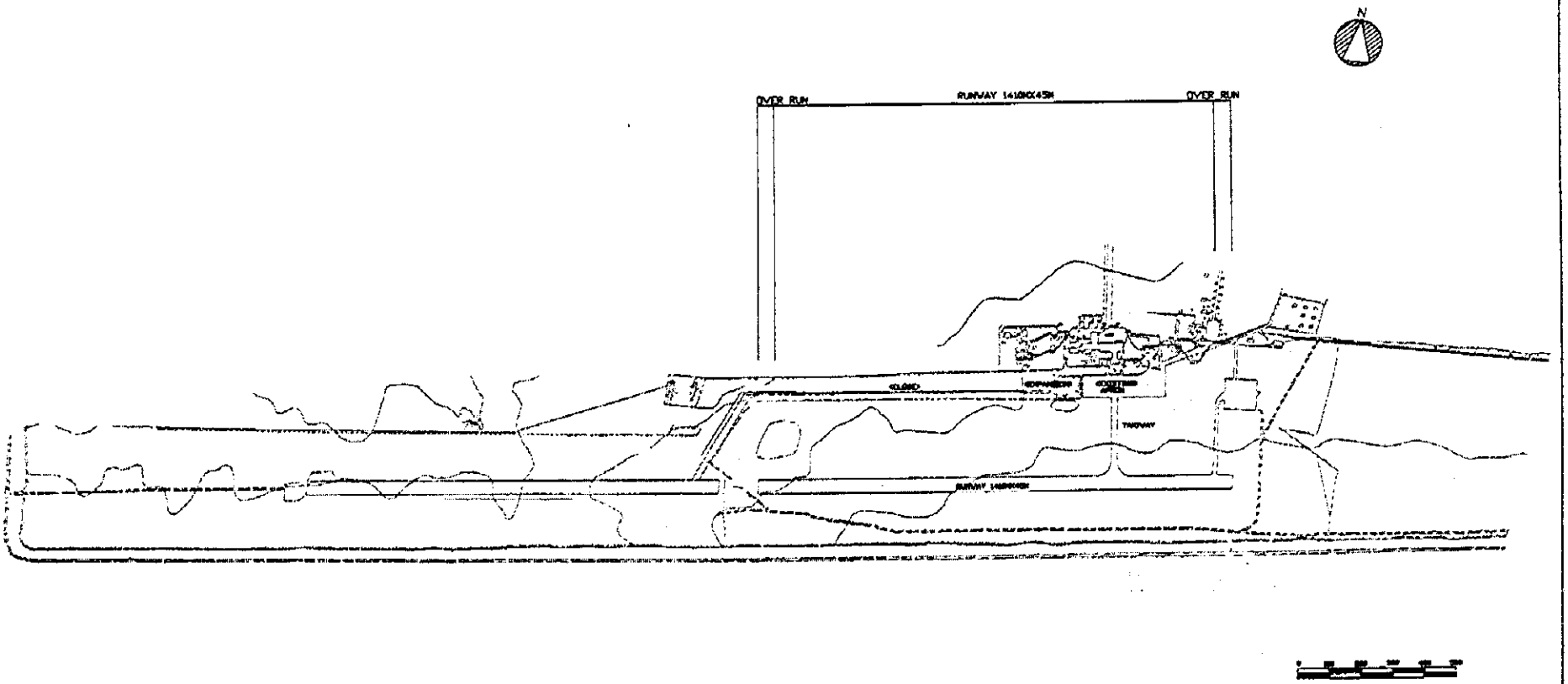


TERMINAL AREA			
1	Passenger Terminal Bldg.	8	Administration Building
2	Existing Passenger Terminal Bldg.	9	Car Park
3	Cargo Bldg.		
4	Control Tower and Operation		
5	Existing Control Tower and Operation		
6	Fire Station		
7	Boiling Station		

AIRPORT DATA			
Airport Name	Bukhara	Elevation	229m
Class	II	Reference Temperature	35° C
Province	Bukhara	Runway	3000mx45m
Main City	Bukhara		
Distance from city	7km	Direction (True north)	N 15° E
Reference Point Coordinates	N 39° 46' 30" E064° 28' 48"	Instrument Runway	01
		ILS Category	CAT-I

The Republic of Uzbekistan National Air Company "Uzbekistan Havo Yullari"	
The Study for The Air Transportation Development in The Republic of Uzbekistan	
Airport	Bukhara Airport
Drawing Tittle	Existing Airport Layout Plan
Date	Scale

A3.5-3-7

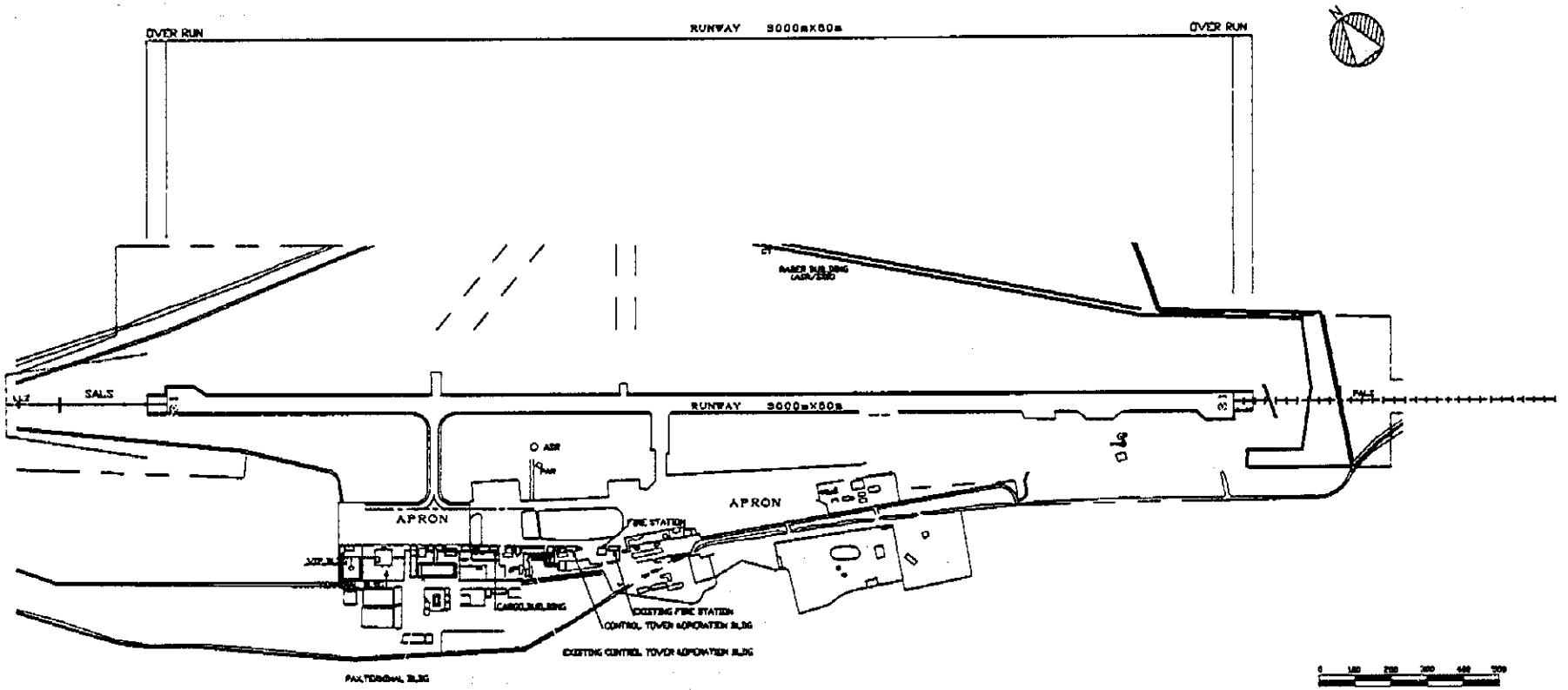


TERMINAL AREA			
1	Passenger Terminal Building	8	Car Park
2	Operation and Control Tower		
3	Administration Building		
4	Fire Station		
5	Storage		
6	Fuel Farm		
7	Utilities Farm		

AIRPORT DATA			
Airport Name	Navoi	Elevation	347m
Class	III	Reference Temperature	-
Province	Navoi	Runway	1410mx45m
Main City	Navoi		
Distance from city	25km south-west	Direction (True north)	N 82□ 25' E
Reference Point	N 40° 07'	Main Runway	25
Coordinates	E065° 12'	ILS Category	-

The Republic of Uzbekistan National Air Company "Uzbekistan Havo Yullari"	
The Study for The Air Transportation Development in The Republic of Uzbekistan	
Airport	Navoi Airport
Drawing Tittle	Existing Airport Layout Plan
Date	Scale

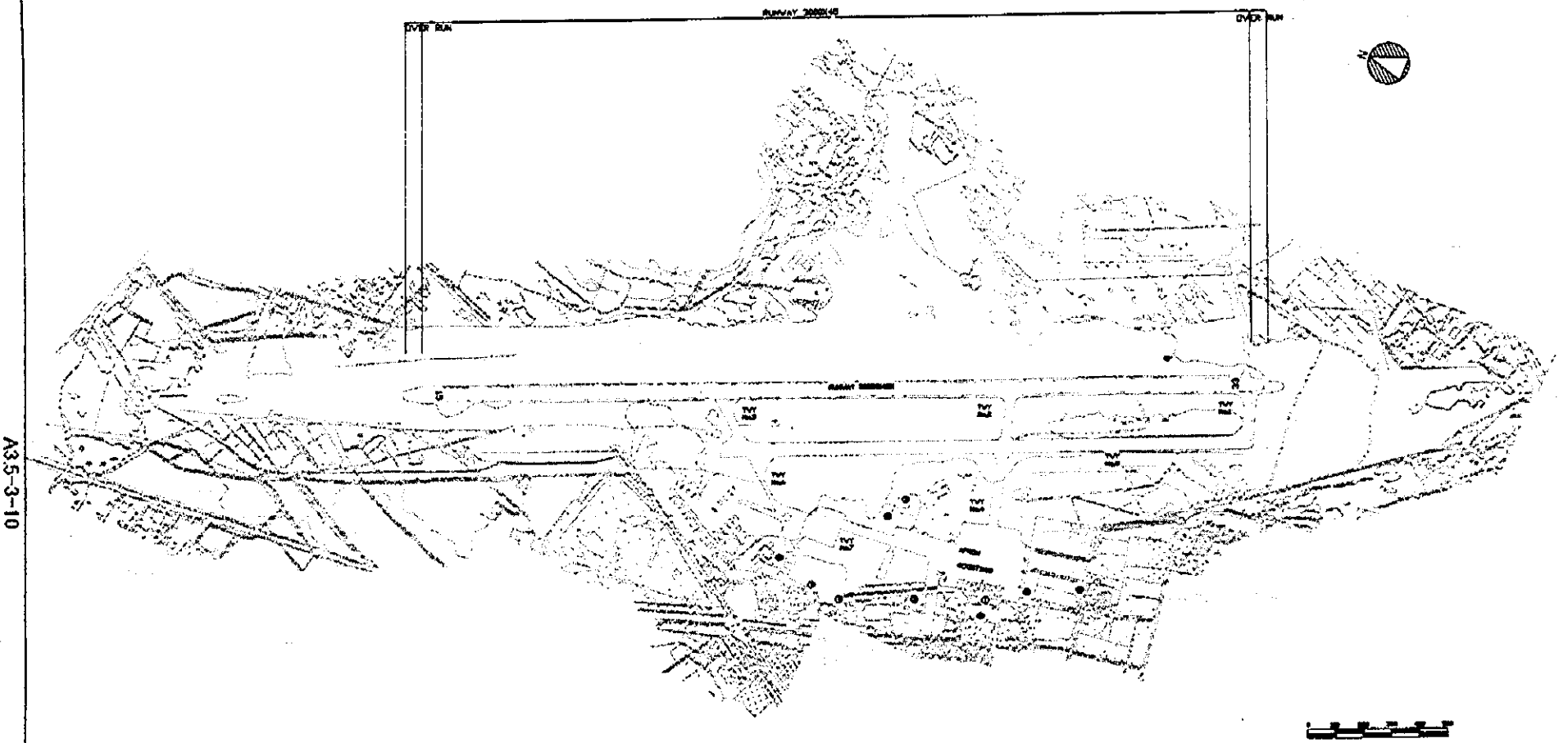
A3.5-3-8



AIRPORT DATA			
Airport Name	Urgench	Elevation	97m
Class	II	Reference Temperature	-
Province	Khorezm	Runway	3000mx44m
Main City	Urgench		
Distance from city	5km east	Direction (True north)	N 143° 29' E
Reference Point Coordinates	N 41° 34' 30" E060° 38' 30"	Instrument Runway	31
		ILS Category	CAT-I

The Republic of Uzbekistan National Air Company "Uzbekistan Havo Yullari"	
The Study for The Air Transportation Development in The Republic of Uzbekistan	
Airport	Urgench Airport
Drawing Tittle	Existing Airport Layout Plan
Date	Scale

A3.5-3-9



TERMINAL AREA			
1	Passenger Terminal Building	8	Fuel Tank Farm
2	VIP Building	9	Aircraft Maintenance
3	Cargo Storage	10	Car Park
4	Administration Building		
5	Control Tower		
6	Fire Station		
7	Garage Storage		

AIRPORT DATA			
Airport Name	Nukus	Elevation	76m
Class	II	Reference Temperature	36°C
Province	Karakalpakstan	Runway	3000mx48m
Main City	Nukus		
Distance from city	7km northwest	Direction (True north)	N 159 31' E
Reference Point	N 42 29' 18"	Instrument Runway	33
Coordinates	E059 37' 24"	ILS Category	CAT-I

The Republic of Uzbekistan National Air Company "Uzbekistan Havo Yullari"	
The Study for The Air Transportation Development in The Republic of Uzbekistan	
Airport	Nukus Airport
Drawing Tittle	Existing Airport Layout Plan
Date	Scale

A3.5-3-10

APPENDIX 6.2-1

REQUIRED RUNWAY LENGTH OF HIGH PRIORITY AIRPORTS

Appendix Required Runway Length

Airport:Tashkent

A. Aircraft Type	B747-400
B. Take-off weight	395 ton
C. Runway length required foe take-off at sea level in ISA+15° C conditions	3322 m
D. Aerodrome elevation	431 m
E. Aerodrome reference temperature	29° C
F. Temperature in the standard atmosphere for 431m	12.2° C
G. Runway slope	0.39%
H. Runway take-off length corrected for elevation {C x 0.07 x D/300}+C	3656m
I. Runway take-off length crrected for elevation & temperature {H x (E-F) x 0.01}+H	4270m
J. Runway take-off length corrected for elevation, temperature and slope {I x G x 0.1}+I	4437m→**4400m**

Airport: New Tashkent

A. Aircraft Type	B747-400
B. Calculated take-off weight	395 ton
C. Runway length required foe take-off at sea level in ISA+15° C conditions	3322 m
D. Aerodrome elevation	350 m
E. Aerodrome reference temperature	29° C
F. Temperature in the standard atmosphere for 431m	12.7° C
G. Runway slope	0.2%
H. Runway take-off length corrected for elevation {C x 0.07 x D/300}+C	3593m
I. Runway take-off length crrected for elevation & temperature {H x (E-F) x 0.01}+H	4179m
J. Runway take-off length corrected for elevation, temperature and slope {I x G x 0.1}+I	4263m→**4300m**

Airport:Namangan

Design Aircraft	:B767-300
Aerodrome Reference Temperature	:35degree
Aerodrome Elevation	:519m
Effective Runway Slope	:1.58%

Case 1 5 degree Flaps

Minimum Allowable Take-off Weight

=175.5t-10.65x19/500

=175.6t

Reference Factor "R"

=66.2+8.5x19/500

=66.5

Basic Runway Length

=2925.7m+538.5mx6.5/10

=3275.7m

Effective Runway Length

=3275.7mx1.158

=3793m

Case-2 15 degree Flaps

Minimum Allowable Take-off Weight

=167.8t+10.25tx19/500

=167.4t

Reference Factor "R"

=61.7+7.65x19/500

=62.0

Basic Runway Length

=2635.6m+487.3mx6.2.0/10

=2733.1m

Effective Runway Length

=2733.1mx1.158

=3165m

Case-3 10 degree Flaps

Effective Runway Length

=(3793m+3165m)/2

=3479m → **3500m**

Airport:Termez

Design Aircraft	:B767-300
Aerodrome Reference Temperature	:38degree
Aerodrome Elevation	:313m
Effective Runway Slope	:0.14%

Case 1 5 degree Flaps

Minimum Allowable Take-off Weight

=182.3t-10.4x313/500

=175.8t

Reference Factor "R"

=60.6+7.9x313/500

=65.5

Basic Runway Length

=2936.9m+540.8mx5.5/10

=3234.3m

Effective Runway Length

=3234.3mx1.014

=3280m

Case-2 15 degree Flaps

Minimum Allowable Take-off Weight

=174.3t-10.4tx313/500

=167.8t

Reference Factor "R"

=56.9+7.0x313/500

=61.3

Basic Runway Length

=2649.2m+490.2mx1.3/10

=2712.9m

Effective Runway Length

=2712.9mx1.014

=2751m

Case-3 10 degree Flaps

Effective Runway Length

=(3280m+2751m)/2

=3016m → **3000m**

Airport:Nukus

Design Aircraft	:B767-300
Aerodrome Reference Temperature	:36° C
Aerodrome Elevation	:76m
Effective Runway Slope	:0.03%

Case 1 5 degree Flaps

Minimum Allowable Take-off Weight

=185.1t-10.5x76/500

=183.5t

Reference Factor "R"

=59.4+7.5x76/500

=60.5

Basic Runway Length

=3236.1m+602.7mx0.5/10

=3266.2m

Effective Runway Length

=3266.2mx1.003

=3276m

Case-2 15 degree Flaps

Minimum Allowable Take-off Weight

=177.0t-10.5tx76/500

=175.4t

Reference Factor "R"

=55.7+7.0x76/500

=56.7

Basic Runway Length

=2376.6m+541.4mx6.7/10

=2739.3m

Effective Runway Length

=2739.3mx1.003

=2748m

Case-3 10 degree Flaps

Effective Runway Length

=(3276m+2748m)/2

=3012m → **3000m**

APPENDIX 6.2-2

REQUIRED FLOOR AREA OF PASSENGER TERMINAL BUILDINGS

Appendix (1/5) **Required Area Formula for Domestic Passenger TerminalBuilding**

1. Check-in lobby

Formula $P \times (1.0+\alpha) \times t/60 \times A$

P : number of departure passengers
α : fraction of visitors/passenger (0.2)
t : passenger staying time (25 minutes)
A : area per passenger ($2.5m^2$/person)

2. Check-in counter

Formula $\{(X_1 \times C_1)+C_2\} \times F$ = length
Formula length $\times$ 3m = area

X_1 : number of check-in positions for each flight (1P)
C_1 : length of check-in counter (2m/P)
C_2 : length of other counters (2m)
F : number of departure flights at peak hour

3. Departure lobby

Formula $P \times (1.0+\alpha) \times t/60 \times A$

P : number of departure passengers
α : fraction of visitors/passenger (0.2)
t : passenger staying time (25 minutes)
A : area per passenger ($2.5m^2$/person)

4. Security & passport check

Formula $P \times t/60$ = number of security unit
Formula number of unit $\times$ 60 m^2 =area

P : number of departure passengers
t : passenger processing time (0.5 minutes)

5. Departure lounge

Formula $P \times (A_1 \times a+A_2 \times b) \times t/60 \times C$

P : number of departure passengers
A_1 : seating space per person ($1.5m^2$/person)
a : seat capacity rate (0.75)
A_2 : space for standing person ($1.0m^2$/person)
b : (1-a) (0.25)
t : passenger staying time (50 min)
C : rate of associated space (1.3)
(wicket and queue space, passways, etc.)

Appendix (2/5) Required Area Formula for Domestic Passenger Terminal Building

6. Baggage claim area Formula $F \times t/60$ = number of claim conveyors unit
Formula number of claim conveyors unit $\times 300m^2$ = area
(middle jet and small jet)
F : number of arrival flight at peak hour
t : flight processing time (25minutes)

7. Arrival lobby Formula $P \times (1.0 \times t_1 + \alpha \times t_2)/60 \times A$
P : number of Arrival passengers
t_1 : passenger staying time (10minutes)
α : fraction of visitors/passenger (0.2)
t_2 : visitor staying time (30minutes)
A : area per passenger (2.5 m^2 /person)

8. Baggage make-up area (Departure baggage)
Same as baggage break-down area

9. Baggage break-down area (Arrival baggage)
Formula $B \times 180\ m^2$
B : number of claim conveyors unit

Total passenger-related facilities (56% of grand total area)

10. Airlines office VIP room (8 % of grand total area)
11. Concession (19% of grand total area)
12. Others (17% of grand total area)

Domestic Passenger Terminal Building grand total (100%)

Appendix(3/5) **Required Area Formula for International Passenger Terminal Building**

1. Check-in lobby

Formula $P \times (1.0+\alpha) \times t/60 \times A$

P : number of departure passengers

α : fraction of visitors/passenger (0.2)

t : passenger staying time (25 minutes)

A : area per passenger ($2.5m^2$/person)

2.Departure customs inspection area

Formula $P \times t/60$ = number of customs inspection unit

Formula number of unit $\times 15\ m^2$

P : number of departure passengers

t : passenger processing time (0.5 minutes)

3. Check-in counter

Formula $\{(X_1 \times C_1)+C_2\} \times F$ = length

Formula length $\times$ 3m = area

X_1 : number of check-in positions for each flight (3P)

C_1 : length of check-in counter (2m/P)

C_2 : length of other counters (2m)

F : number of departure flights at peak hour

4. Departure lobby

Formula $P \times (1.0+\alpha) \times t/60 \times A$

P : number of departure passengers

α : fraction of visitors/passenger (0.2)

t : passenger staying time (25 minutes)

A : area per passenger ($2.5m^2$/person)

5. Departure immigration control area

Formula $P \times t/60$ = number of unit (2unit/booth)

P : number of departure passengers

t : passenger processing time (1.0 min/person)

Calculated from width and depth

width depth

Formula $\{(C_1+C_2) \times X_1+C_3\} \times (D+L)$ = area

C_1 : departure inspection booth width (3.0m/booth)

C_2 : passenger width 0.7m on booth sides (1.4m/booth)

X_1 : number of inspection booths

C_3 : wheel chair and crew passage width (0.9m)

D : inspection booth depth (2.5m)

L : queue space (11m)

6. Security check

Formula $P \times B \times 1/a$ = number of unit

Formula number of unit $\times 30\ m^2$ = area

P : number of departure passengers

B : baggage per person (1.25 PCS/person)

a : security check processing capacity (600 PCS)

Appendix (4/5) Required Area Formula for International Passenger Terminal Building

7. Departure gate lounge

Formula $\{S \times (A_1 \times a + A_2 \times b) \times C\} \times F_1$

8. Departure bus lounge

Formula $\{S \times (A_1 \times a + A_2 \times b) \times C\} \times F_2$

S	:	number of seats for large jet	(350seats×70%)
A_1	:	seating space per person	($1.5m^2$/person)
a	:	seat capacity rate	(0.75)
A_2	:	space for standing person	($1.0m^2$/person)
b	:	(1-a)	(0.25)
C	:	rate of associated space (wicket and queue space, passways, etc.)	(1.3)
F_1	:	number of departure flights at peak hour	
F_2	:	number of departure flights at peak hour×1/2	

9. Arrival immigration control area

Formula $P \times t/60$ = number of unit (2unit/booth)

P	:	number of arrival passengers	
t	:	passenger processing time	(1.2min/person)

Calculated form width and depth

width depth

Formula $\{(C_1+C_2) \times X_1 + C_3\} \times (D+L)$ = area

C_1	:	arrival inspection booth width	(3.0m/booth)
C_2	:	passage width 0.7m on booth sides	(1.4m/booth)
X_1	:	number of inspection booths	
C_3	:	wheel chair and crew passage width	(0.9m)
D	:	inspection booth depth	(2.5m)
L	:	queue space	(10m)

10. Baggage claim & customs inspection area

Formula $F \times t_1/60$ = number of claim conveyors unit

F	:	number of arrival flights at peak hour	
t_1	:	flights processing time	(25minutes)

Formula $P \times \beta \times t_2/60$ = number of customs inspection unit

P	:	number of arrival passengers	
β	:	rate of declarating passengers	(0.3)
t_2	:	passenger process time	(2 min/person)

Formula number of claim conveyors unit×$650m^2$ = area (large jet)

Appendix (5/5) Required Area Formula for International Passenger Terminal Building

11. Arrival lobby Formula $P \times (1.0 \times t_1 + \alpha \times t_2)/60 \times A$

t_1 : passenger staying time (10 minutes)

t_2 : visitor staying time (30 minutes)

A : area per passenger ($2.5m^2$/person)

12. Baggage make-up area (Departure baggage)

Same as baggage break-down area

13. Baggage break-down area (Arrival baggage)

Formula $B \times 180m^2$

B : number of claim conveyors unit

Total passenger-related facilities (51% of grand total area)

14. Uzbekistan Airways office, VIP room (6 % of grand total area)
15. Other airlines office (8 % of grand total area)
16. Customs & Immigration office (3 % of grand total area)
17. Concession (15%of grand total area)
18. Others (17%of grand total area)

International Passenger Terminal Building grand total (100%)

APPENDIX 6.2-3

THICKNESS OF PAVEMENT STRUCTURE

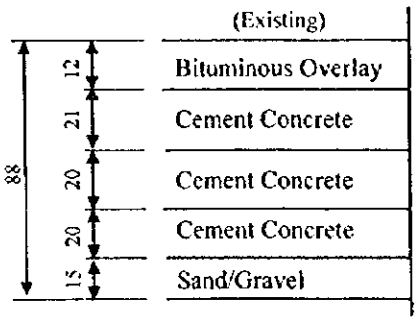
- Tashkent Airport Pavement Structure Design -

1. New Pavement Construction (Flexible)

Design Aircraft	:	B 767-300
Equivalent Annual Departure	:	3000
Assumed CBR of Subgrade	:	6 %
Required Thickness	:	105 cm (Flexible)
• Bituminous Surface	:	10 cm
• Crusher-run Base	:	35 cm
• Sand/Gravel Sub-base	:	60 cm

2. Existing Runway 08L/26R Overlay

Design Aircraft	:	B 767-300
Equivalent Annual Departure	:	3000
Assumed K-value of Subgrade	:	80 MN/m^3
Required Thickness	:	35 cm (Rigid)



Equivalent Existing Single Thickness

$= \sqrt{0.75 \times (21^2 + 20^2 + 20^2)}$

$\fallingdotseq$ 30cm

Overlay Thickness

$= 2.5 (F \cdot h - Cb \cdot he) - 12$

F = 0.81

H = 35 cm

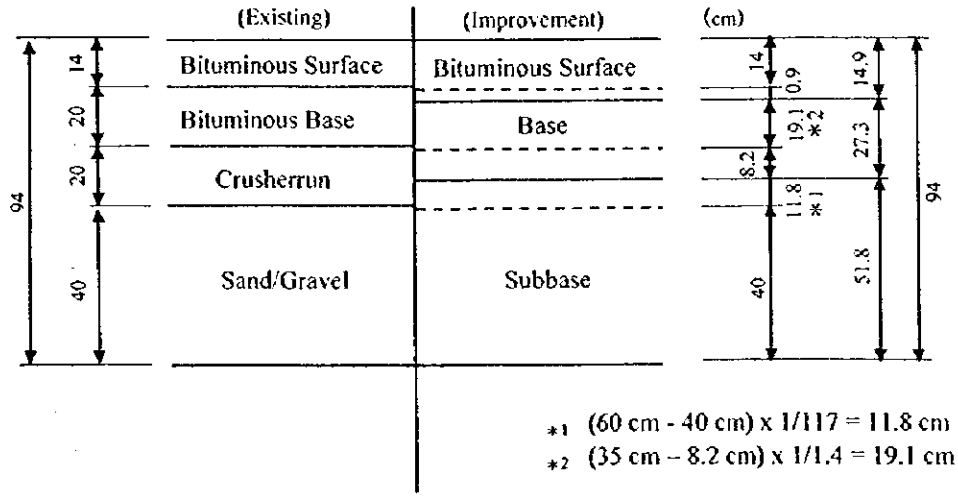
Cb=1

he =30cm

$= 2.5 (0.81 \times 35 - 1 \times 30) - 12$

$\fallingdotseq 0$ cm → 8 cm (Minimum Requirement)

3. Existing Runway 08R/26L Overlay



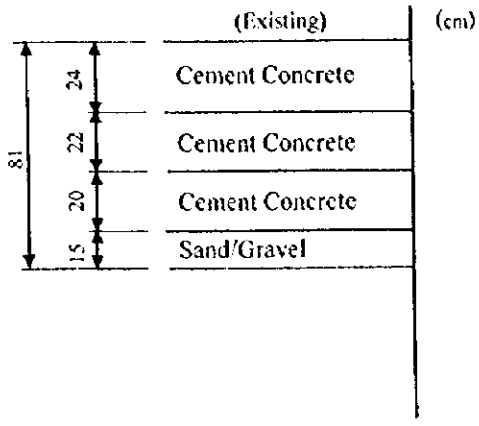
*1 (60 cm - 40 cm) x 1/117 = 11.8 cm

*2 (35 cm – 8.2 cm) x 1/1.4 = 19.1 cm

Overlay Thickness = 94 cm - 94 cm

= 0 cm

4. Existing Taxiway No. 1 ~ No. 5 Overlay

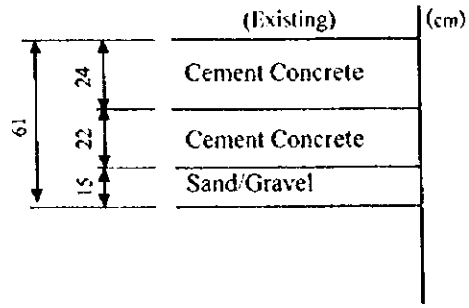


Required Single Thickness = 35 cm
Equivalent Existing Single Thickness

$= \sqrt{0.75 \times (24^2 + 22^2 + 20^2)}$
$\fallingdotseq$ 33 cm

Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.81
h = 35 cm
Cb = 1
he = 33 cm
= 2.5 (0.81 x 35 - 1 x 33)
$\fallingdotseq$ 0 cm → 20 cm (Minimum Requirement)

5. Existing Taxiway No. 6 Overlay

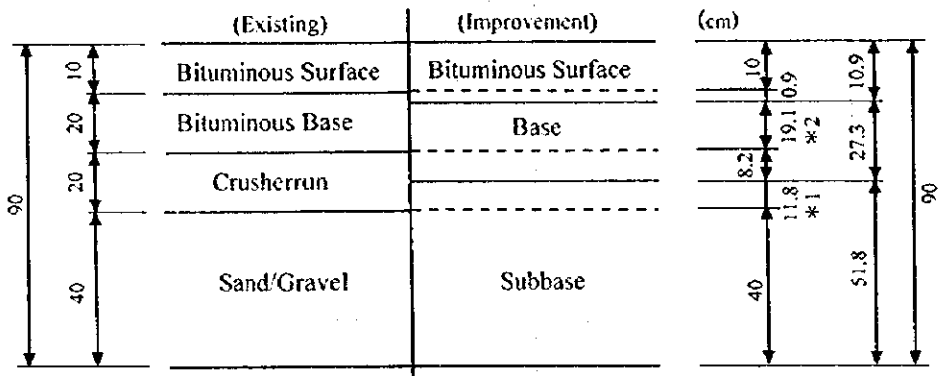


Required Single Thickness = 35 cm
Equivalent Existing Single Thickness

$= \sqrt{0.75 \times (24^2 + 22^2)}$
$\fallingdotseq$ 28 cm

Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.81
h = 35 cm
Cb = 1
he = 28 cm
= 2.5 (0.81 x 35 - 1 x 28)
$\fallingdotseq$ 1 cm → 20 cm (Minimum Requirement)

6. Existing Taxiway No. 11 ~ No. 15 Overlay

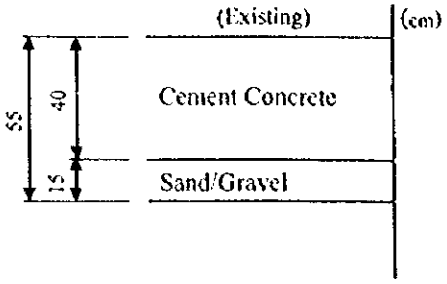


*1 (60 cm - 40 cm) x 1/117 $\fallingdotseq$ 11,8 cm
*2 (35 cm - 8,2 cm) x 1/1.4 $\fallingdotseq$ 19.1 cm

Overlay Thickness
= 90 cm - 90 cm
= 0 cm → 5 cm (Minimum Requirement)

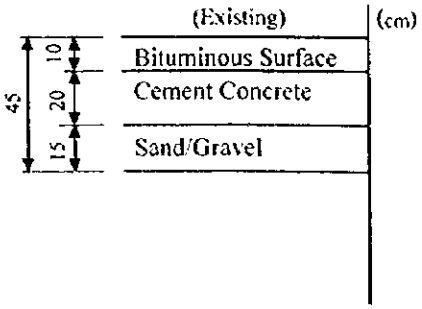
7. Existing Apron No. 1 (Domes.) Overlay

(1) Existing Cement Concrete Portion



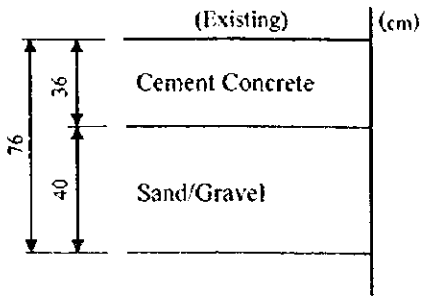
Required Single Thickness = 35 cm
Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.81
h = 35 cm
Cb = 0.75
he = 40 cm
= 2.5 (0.81 x 35 - 0.75 x 40)
= 0 cm → 20 cm (Minimum Requirement)

(2) Existing Overlay Portion



Required Single Thickness = 35 cm
Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.81
h = 35 cm
Cb = 0.75
he = 20 cm
= 2.5 (0.81 x 35 - 0.75 x 20) - 10
≒ 23 cm

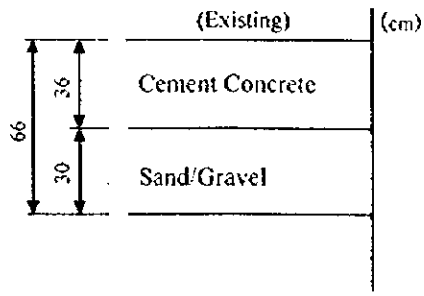
8. Existing Apron No. 2 (VIP) Overlay



Required Single Thickness = 35 cm
Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.81
h = 35 cm
Cb = 0.75
he = 36 cm
= 2.5 (0.81 x 35 - 0.75 x 36)
≒ 3 cm → 20 cm (Minimum Requirement)

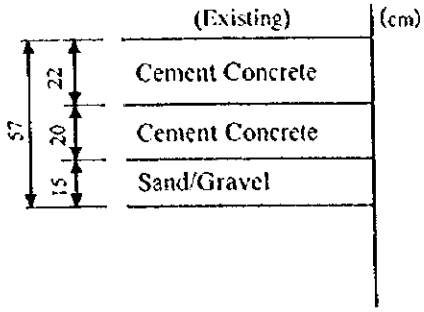
9. Existing Apron No. 3 (International) Overlay

(1) B 747 Use



Required Single Thickness = 35 cm
Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.81
h = 35 cm
Cb = 0.75
he = 36 cm
= 2.5 (0.81 x 35 - 0.75 x 36)
≒ 3 cm → 20 cm (Minimum Requirement)

(2) Others



Required Single Thickness = 35 cm
Equivalent Existing Single Thickness

$= \sqrt{0.75 \times (22^2 + 20^2)}$

$\fallingdotseq$ 26 cm

Overlay Thickness

= 2.5 (F · h - Cb · he)

F = 0.81

h = 35 cm

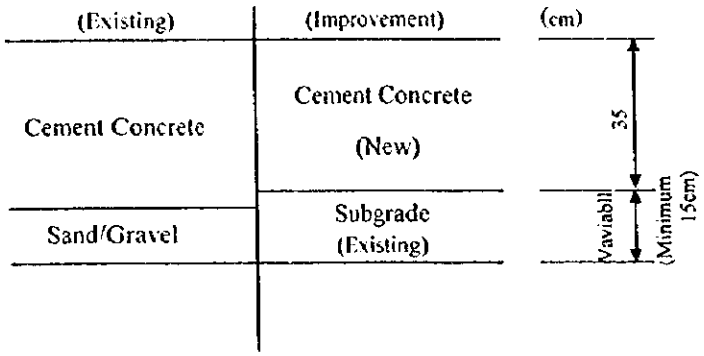
Cb = 1

he = 26 cm

= 2.5 (0.81 x 35 - 1 x 26)

$\fallingdotseq$ 6 cm → 20 cm (Minimum Requirement)

10. New Apron Construction (Rigid)



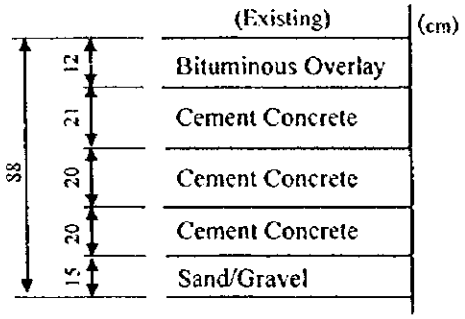
- Tashkent Airport Pavement Structure Design (Option) -

1. New Pavement Construction

Design Aircraft	:	B 747-400
Equivalent Annual Departure	:	9000
Assumed CBR of Subgrade	:	6 %
Required Thickness	:	127 cm (Flexible)
• Bituminous Surface	:	13 cm
• Crusher-run Base	:	47 cm
• Sand/Gravel Sub-base	:	67 cm

2. Existing Runway 08L/26R Overlay

Design Aircraft	:	B 747-400
Equivalent Annual Departure	:	9000
Assumed K-value of Subgrade:		80 MN/m^3
Required Thickness	:	37 cm (Rigid)



Equivalent Existing Single Thickness

$= \sqrt{0.75 \times (21^2 + 20^2 + 20^2)}$

$\fallingdotseq$ 30 cm

Overlay Thickness

$= 2.5 (F \cdot h - Cb \cdot he) - 12$

F = 0.9

h = 37 cm

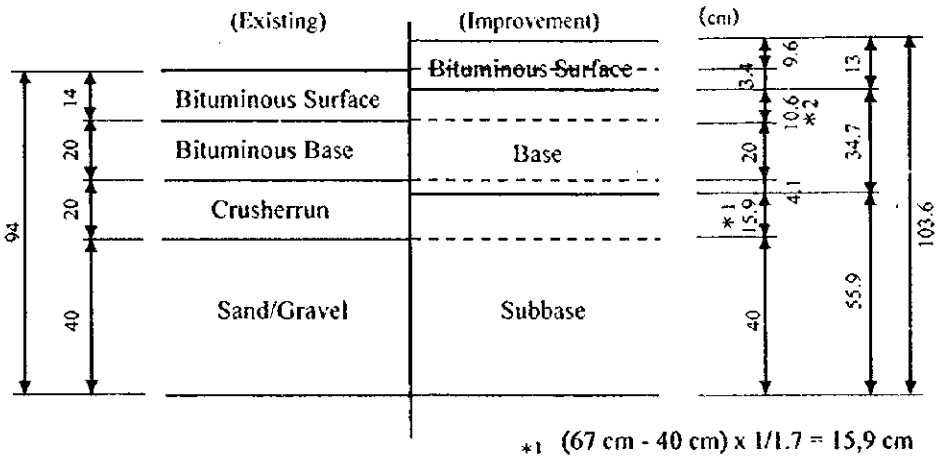
Cb = 1

he = 30 cm

$= 2.5 (0.9 \times 37 - 1 \times 30) - 12$

$\fallingdotseq$ 0 cm → 8 cm (Minimum Requirement)

3. Existing Runway 08R/26L Overlay



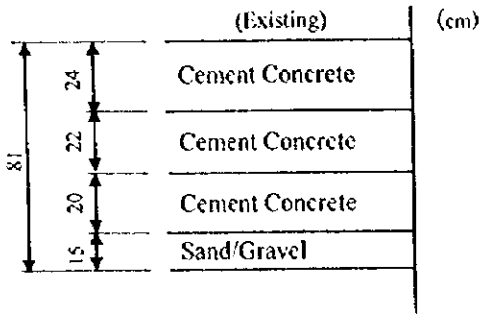
*1 (67 cm - 40 cm) x 1/1.7 = 15,9 cm

*2 (47 cm - 4,1 cm) x 1/1.4 - 20 = 10.6 cm

Overlay Thickness = 103,6 cm - 94 cm

$\fallingdotseq$ 10 cm

4. Existing Taxiway No. 1 ~ No. 5 Overlay



Required Single Thickness = 37 cm
Equivalent Existing Single Thickness

$= \sqrt{0.75 \times (24^2 + 22^2 + 20^2)}$

$\fallingdotseq$ 33 cm

Overlay Thickness

= 2.5 (F · h - Cb · he)

F = 0.9

h = 37 cm

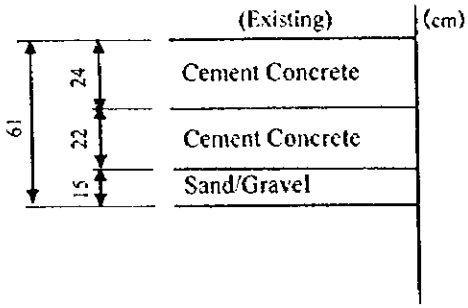
Cb = 1

he = 33 cm

= 2.5 (0.9 x 37 - 1 x 33)

$\fallingdotseq$ 1 cm → 20 cm (Minimum Requirement)

5. Existing Taxiway No. 6 Overlay



Required Single Thickness = 37 cm
Equivalent Existing Single Thickness

$= \sqrt{0.75 \times (24^2 + 22^2)}$

$\fallingdotseq$ 28 cm

Overlay Thickness

= 2.5 (F · h - Cb · he)

F = 0.9

h = 37 cm

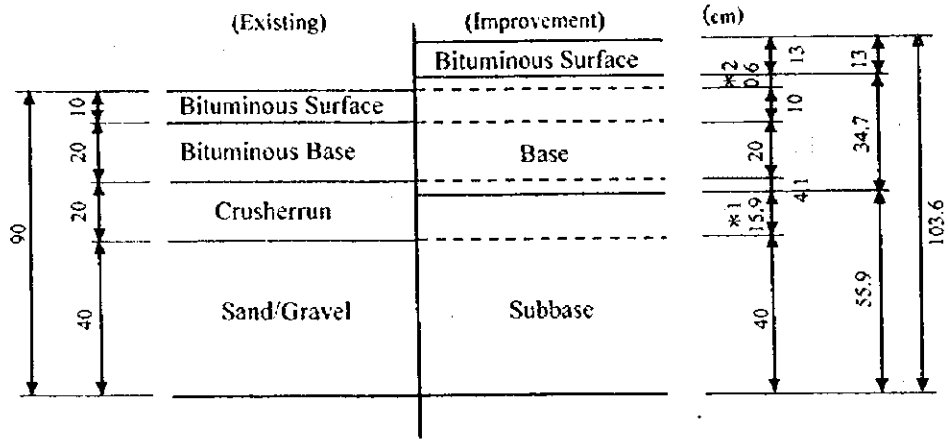
Cb = 1

he = 28 cm

= 2.5 (0.9 x 37 - 1 x 28)

$\fallingdotseq$ 13 cm → 20 cm (Minimum Requirement)

6. Existing Taxiway No. 11 ~ No. 15 Overlay



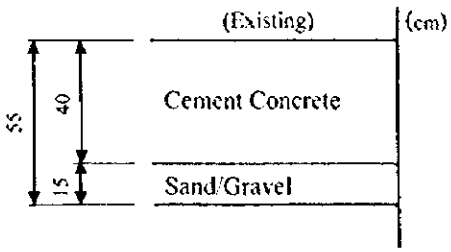
*1 (67 cm - 40 cm) x 1/1.7 $\fallingdotseq$ 15,9 cm

*2 (47 cm - 4,1 cm - 20 cm x 1.4 - 10 cm x 1.4) x 1/ 1.6 $\fallingdotseq$ 0.6cm

Overlay Thickness = 103.6 cm - 90 cm $\fallingdotseq$ 14 cm

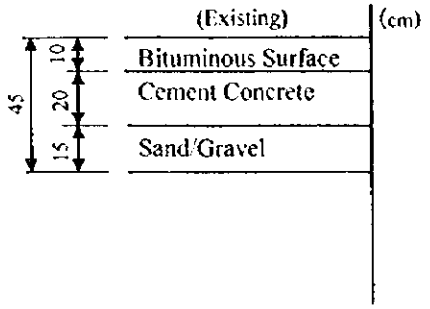
7. Existing Apron No. 1 (Domes.) Overlay

(1) Existing Cement Concrete Portion



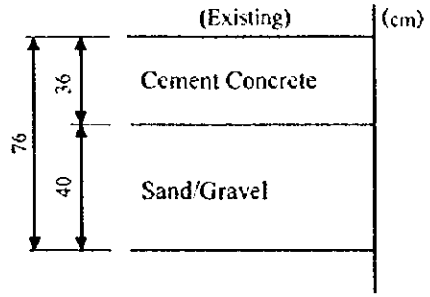
Required Single Thickness = 37 cm
Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.9
h = 37 cm
Cb = 0.75
he = 40 cm
= 2.5 (0.9 x 37 - 0.75 x 40)
≒ 8 cm → 20 cm (Minimum Requirement)

(2) Existing Overlay Portion



Required Single Thickness = 37 cm
Overlay Thickness
= 2.5 (F · h - Cb · he) - 10
F = 0.9
h = 37 cm
Cb = 0.75
he = 20 cm
= 2.5 (0.9 x 37 - 0.75 x 20) - 10
≒ 36 cm

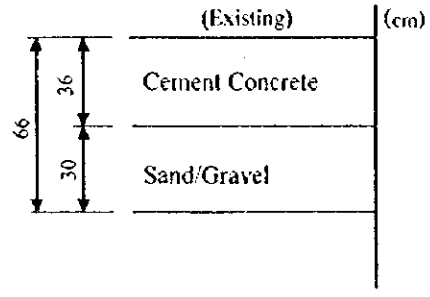
8. Existing Apron No. 2 (VIP) Overlay



Required Single Thickness = 37 cm
Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.9
h = 37 cm
Cb = 0.75
he = 36 cm
= 2.5 (0.9 x 37 - 0.75 x 36)
≒ 16 cm → 20 cm (Minimum Requirement)

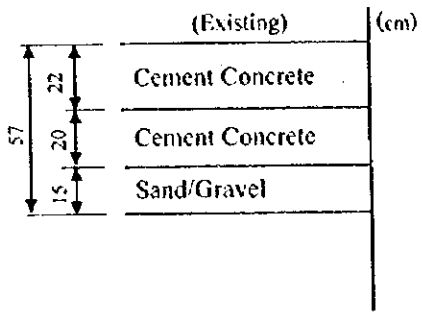
9. Existing Apron No. 3 (International) Overlay

(1) B 747 Use



Required Single Thickness = 37 cm
Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.9
h = 37 cm
Cb = 0.75
he = 36 cm
= 2.5 (0.9 x 37 - 0.75 x 36)
≒ 16 cm → 20 cm (Minimum Requirement)

(2) Others



Required Single Thickness = 37 cm
Equivalent Existing Single Thickness

$= \sqrt{0.75 \times (22^2 + 20^2)}$

$\fallingdotseq$ 26 cm

Overlay Thickness

$= 2.5 (F \cdot h - Cb \cdot he)$

F = 0.9

h = 37 cm

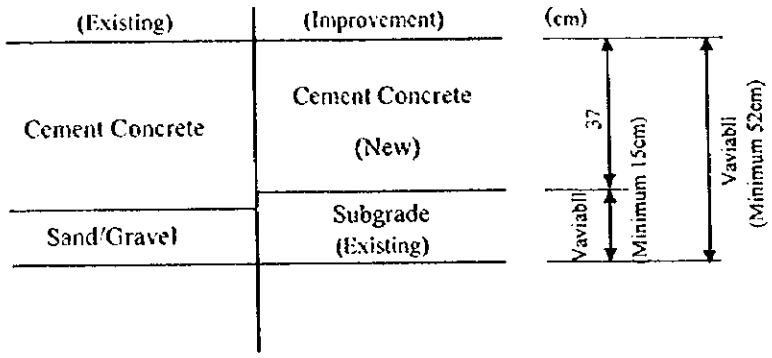
Cb = 1

he = 26 cm

$= 2.5 (0.9 \times 37 - 1 \times 26)$

$\fallingdotseq$ 18 cm → 20 cm (Minimum Requirement)

10. New Apron Construction (Rigid)



- New Tashkent Airport Pavement Structure Design -

1. New Pavement Construction (Flexible)

Design Aircraft	:	B 747-400
Equivalent Annual Departure	:	15,000
Assumed CBR of Subgrade	:	4 %
Required Thickness	:	170 cm (Flexible)
• Bituminous Surface	:	13 cm
• Crushed Aggregate Base	:	40 cm
• Sand/Gravel Sub-base	:	117 cm

- Option -

• Bituminous Surface	:	13 cm
• Bituminous Treated Base	:	15 cm
• Crushed Aggregate Base	:	30 cm
• Sand/Gravel Sub-base	:	90 cm

117-(30+15 x 1.4-40)x 1.7
≒98cm

2. New Pavement Structure (Rigid)

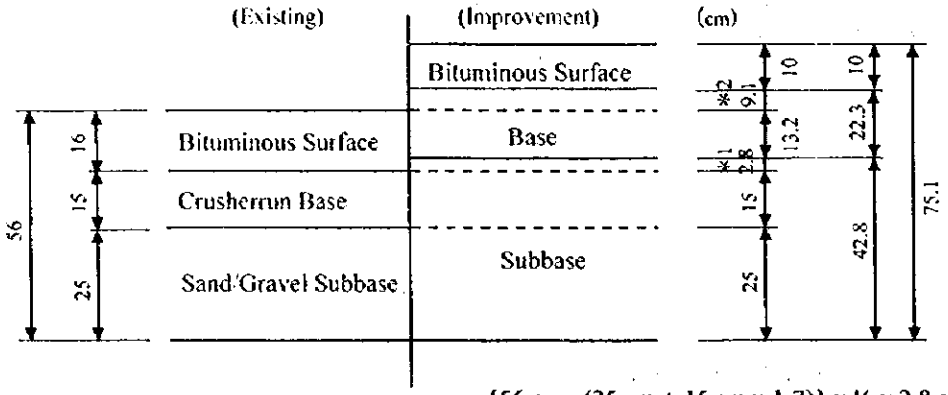
Design Aircraft	:	B 747-400
Equivalent Annual Departure	:	15,000
Concrete Flexural Strength	:	50kgf/cm^2 (≒710 psi)
Expected K-value of Sub base	:	7kgf/cm^2 (≒250 pci)
Assumed K-value of Sub grade	:	3kgf/cm^3 (≒100 pci)
Required Concrete Thickness	:	39 cm
Required Sub base Thickness	:	
• Sand/Gravel	:	33 cm
(Assumed K-value on Top : 200 pci)		
• Crushed Aggregate	:	15 cm
(Assumed K-value on Top : 250 pci)		

- Namangan Airport Pavement Structure Design -

1. New Pavement Construction (Flexible)

Design Aircraft	:	B 767-300
Equivalent Annual Departure	:	1200
Assumed CBR of Subgrade	:	6 %
Required Thickness	:	99 cm (Flexible)
• Bituminous Surface	:	10 cm
• Crusher-run Base	:	33 cm
• Sand/Gravel Sub-base	:	56 cm

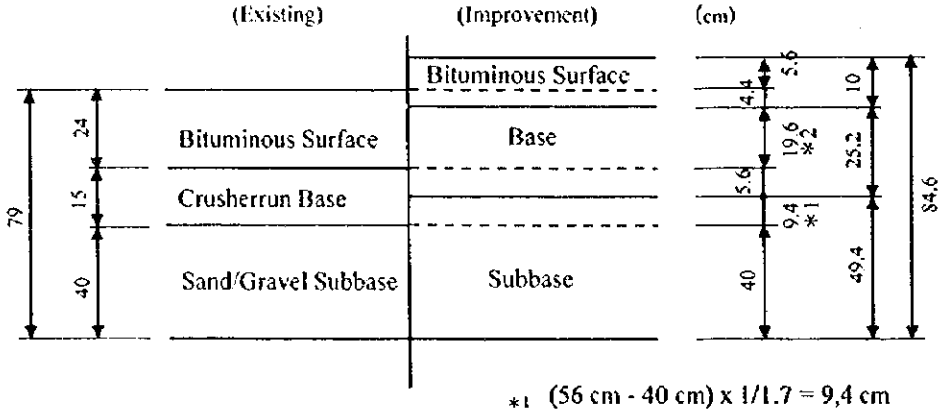
2. Existing Runway Overlay



*1 {56 cm - (25 cm + 15 cm x 1.7)} x ½ = 2.8 cm
*2 (33 cm - 13,2 cm x 1.4) x 1/1.6 = 9.1 cm

Overlay Thickness = 75.1 cm - 56 cm
≒ 19 cm

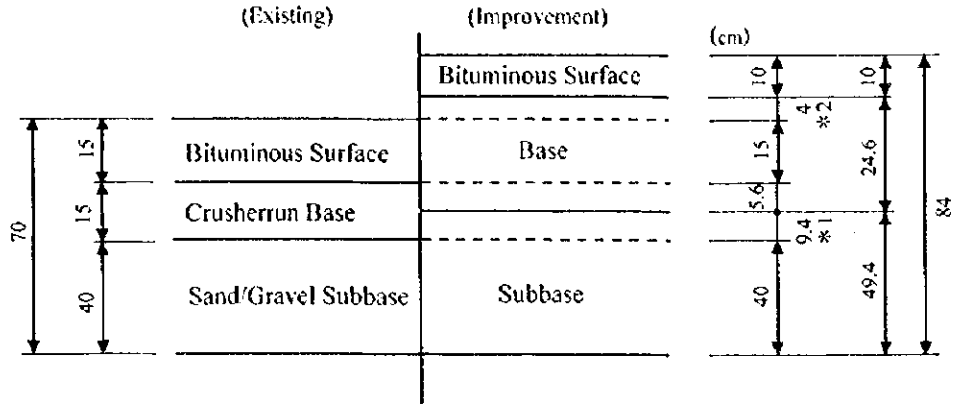
3. Existing Taxiway Overlay



*1 (56 cm - 40 cm) x 1/1.7 = 9,4 cm
*2 (33 cm - 5,6 cm) x 1/1.4 = 19.6 cm

Overlay Thickness
= 84.6 cm - 79 cm
≒ 5.6 cm → 8 cm (Minimum Requirement)

4. Existing Apron Overlay



*1 (56 cm - 40 cm) x 1/1.7 = 9,4 cm

*2 {33 cm - (5,6 cm + 15 cm x 1.4)} x 1/1.6 = 4 cm

Overlay Thickness

= 84 cm - 70 cm

= 14 cm

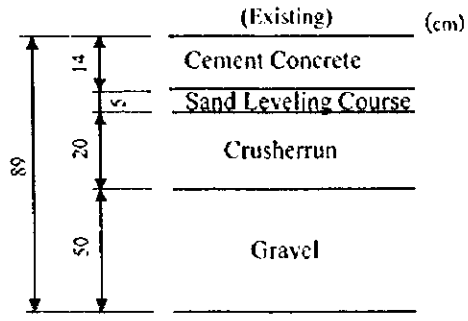
- Termez Airport Pavement Structure Design -

1. New Pavement Construction (Flexible)

Design Aircraft	:	B 767-300
Equivalent Annual Departure	:	1200
Assumed CBR of Subgrade	:	6 %
Required Thickness	:	99 cm (Flexible)
• Bituminous Surface	:	10 cm
• Crusher-run Base	:	33 cm
• Sand/Gravel Sub-base	:	56 cm

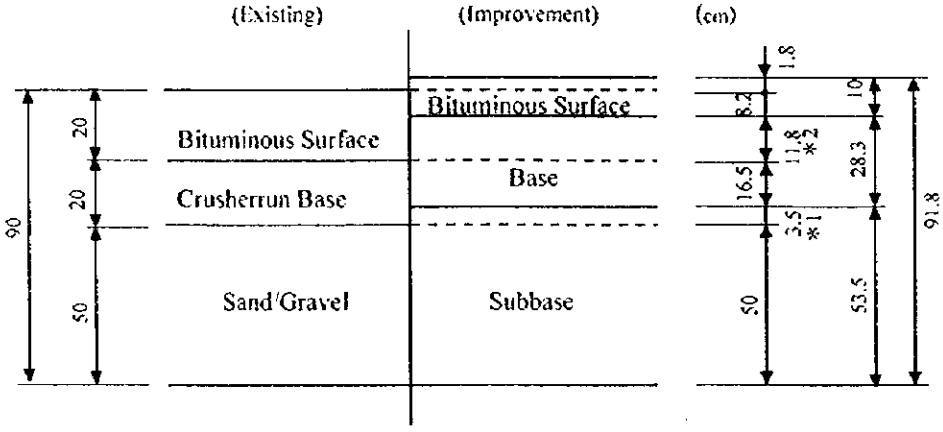
2. Existing Runway Overlay

Design Aircraft	:	B 767-300
Equivalent Annual Departure	:	1200
Assumed K-value of Subgrade:		150 MN/m^3
Required Thickness	:	29 cm (Rigid)



Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.6
h = 29 cm
Cb = 0.75
he = 14 cm
= 2.5 (0.6 x 29 - 0.75 x 14)
= 17.3 cm → 20 cm (Minimum Requirement)

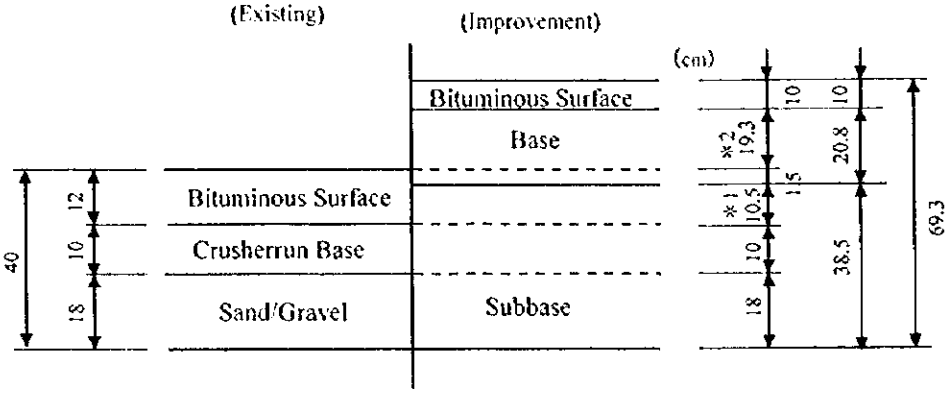
3. Existing Taxiway No. 1, No. 2 and No. 3 Overlay



*1 (56 cm - 50 cm) x 1/1.7 = 3.5 cm
*2 (33 cm - 16.5 cm) x 1/1.4 = 11.8 cm

Overlay Thickness =
= 91.8 cm - 90 cm
= 1.8 cm → 8 cm (Minimum Requirement)

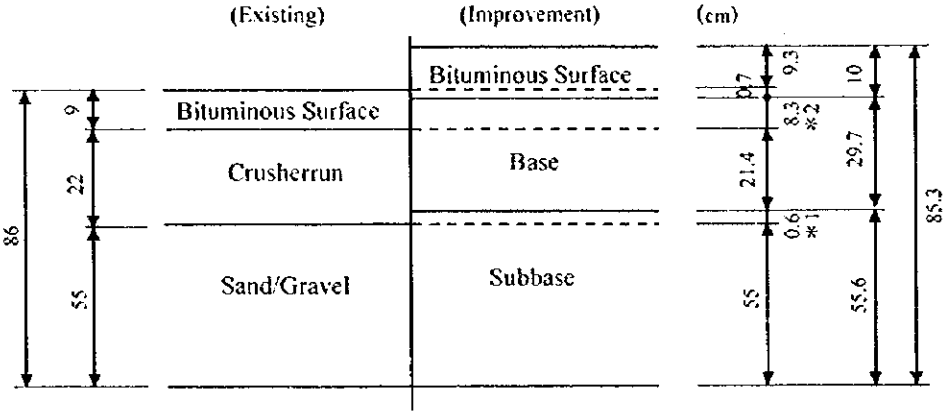
4. Existing Taxiway No. 4 Overlay



*1 (56 cm - 18 cm - 10 cm x 1.7) x 1/2.0 = 10.5 cm
*2 (33 cm - 1.5 cm x 1.4) x 1/1.6 = 19.3 cm

Overlay Thickness
= 69.3 cm - 40 cm
≒ 29 cm

5. Existing Parallel Taxiway Overlay



*1 (56 cm - 55 cm) x 1/1.7 = 0.6 cm
*2 (33 cm - 21.4 cm) x 1/1.4 = 8.3 cm

Overlay Thickness
= 95.3 cm - 86 cm
≒ 9 cm

6. Existing Apron Overlay

Overlay Thickness = 8 cm

(same as Taxiway No. 1, No. 2 and No. 3)

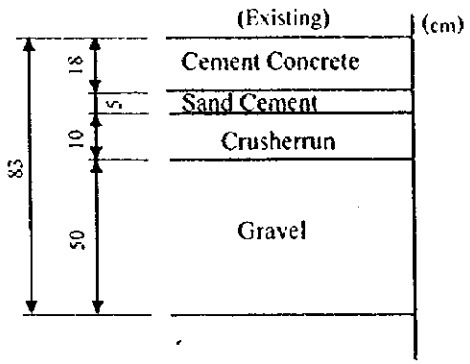
- Nukus Airport Pavement Structure Design -

1. New Pavement Construction (Flexible)

Design Aircraft	:	B 767-300
Equivalent Annual Departure	:	1200
Assumed CBR of Subgrade	:	10 %
Required Thickness	:	69 cm (Flexible)
• Bituminous Surface	:	10 cm
• Crusher-run Base	:	33 cm
• Sand/Gravel Sub-base	:	26 cm

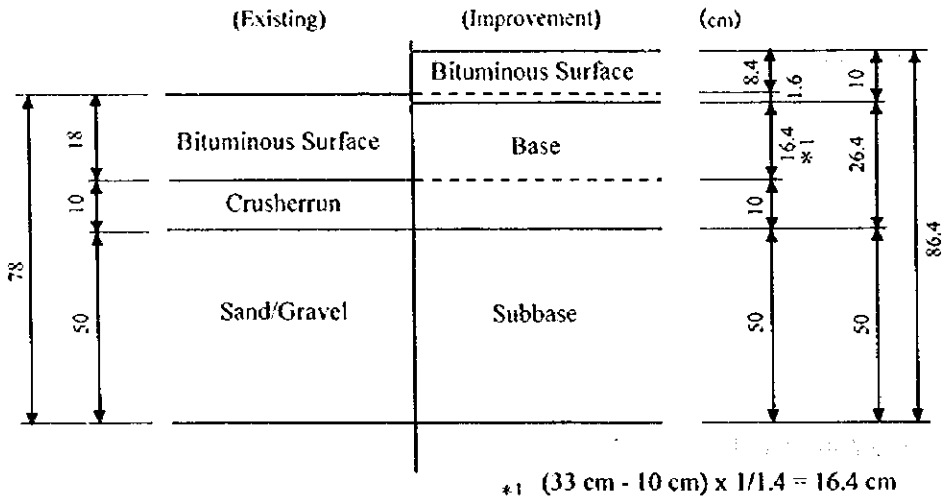
2. Existing Runway Overlay

Design Aircraft	:	B 767-300
Equivalent Annual Departure	:	1200
Assumed K-value of Subgrade:		150 MN/m^3
Required Single Thickness	:	29 cm (Rigid)



Overlay Thickness
= 2.5 (F · h - Cb · he)
F = 0.6
h = 29 cm
Cb = 0.75
he = 18 cm
= 2.5 (0.6 x 29 - 0.75 x 18)
≒ 9.8 cm → 20 cm (Minimum Requirement)

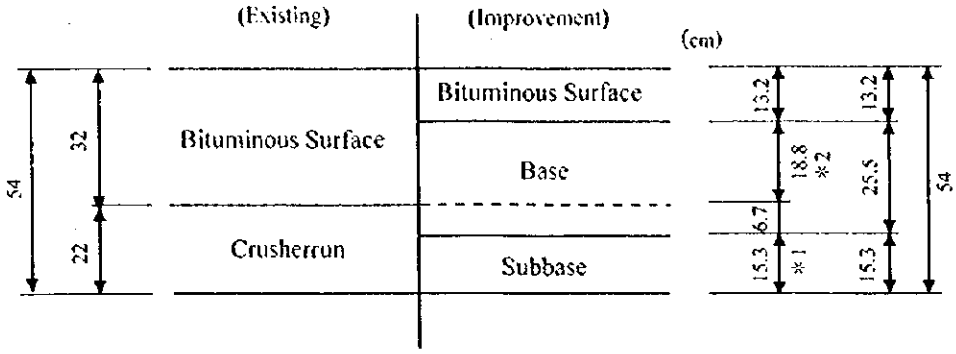
3. Existing Taxiway No. 1, No. 2 and No. 3 Overlay



*1 (33 cm - 10 cm) x 1/1.4 = 16.4 cm

Overlay Thickness
= 86.4 cm - 78 cm
≒ 8 cm

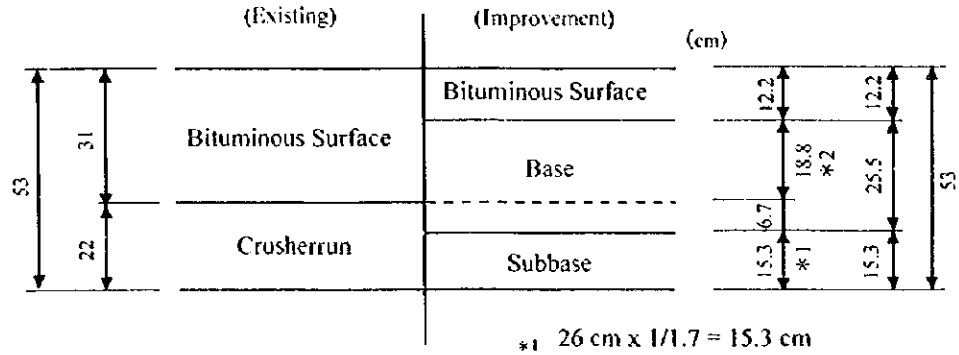
4. Existing Taxiway No. 4 Overlay



*1 26 cm x 1/1.7) ≒ 15.3 cm
*2 (33 cm - 6.7 cm) x 1/1.4 ≒ 18.8 cm

Overlay Thickness
= 54 cm - 54 cm
= 0 cm → 5 cm (Minimum Requirement)

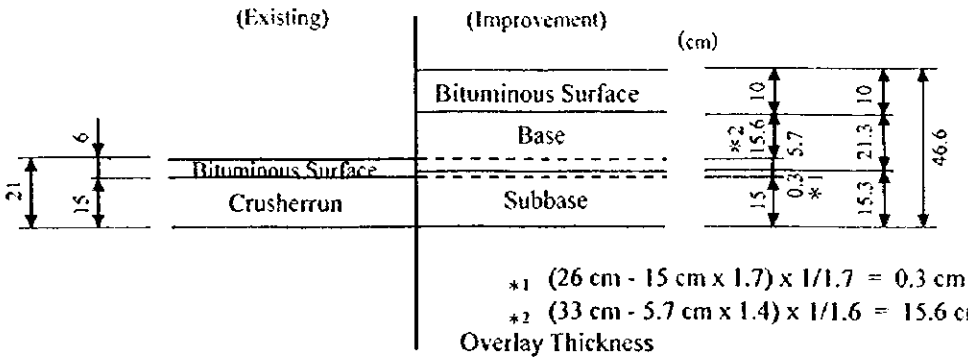
5. Existing Taxiway No. 5 Overlay



*1 26 cm x 1/1.7 = 15.3 cm
*2 (33 cm - 6.7 cm) x 1/1.4 = 18.8 cm

Overlay Thickness
= 53 cm - 53 cm
= 0 cm → 5 cm (Minimum Requirement)

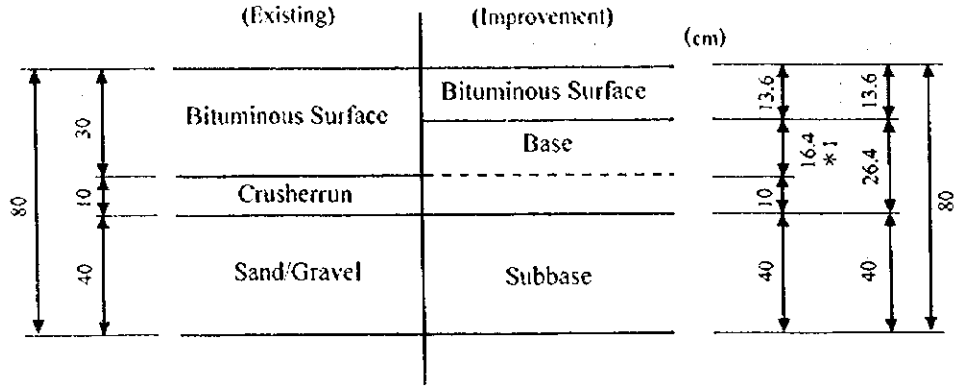
6. Existing Taxiway No. 6 and No. 7 Overlay



*1 (26 cm - 15 cm x 1.7) x 1/1.7 = 0.3 cm
*2 (33 cm - 5.7 cm x 1.4) x 1/1.6 = 15.6 cm

Overlay Thickness
= 46.6 cm - 21 cm
≒ 26 cm

7. Existing Apron Overlay



*1 (33 cm - 10 cm) x 1/1.4 ≒ 16.4 cm

Overlay Thickness =
= 80 cm - 80 cm
= 0 cm → 5 cm (Minimum Requirement)

- New Shoulder Construction (Flexible) -

1. Tashkent

Design Aircraft	:	B 767-300
Equivalent Annual Departure	:	3000
Assumed CBR of Subgrade	:	6 %
Required Thickness	:	105 $^{cm}/_{2}$ ≒ 53 cm
• Bituminous Surface	:	5 cm
• Crusher-run Base	:	30 cm
• Sand/Gravel Sub-base	:	18 cm

(Option)

Design Aircraft	:	B 747-400
Equivalent Annual Departure	:	9000
Assumed CBR of Subgrade	:	6 %
Required Thickness	:	127 $^{cm}/_{2}$ ≒ 64 cm
• Bituminous Surface	:	5 cm
• Crusher-run Base	:	30 cm
• Sand/Gravel Sub-base	:	29 cm

2. New Tashkent

Design Aircraft :	:	B 747-400
Equivalent Annual Departure	:	15000
Assumed CBR of Subgrade	:	4 %
Required Thickness	:	170 $^{cm}/_{2}$ ≒ 85 cm
• Bituminous Surface	:	5 cm
• Crusher-run Base	:	35 cm
• Sand/Gravel Sub-base	:	45 cm

3. Namangan and Termez

Design Aircraft	:	B 767-300
Equivalent Annual Departure	:	1200
Assumed CBR of Subgrade	:	6 %
Required Thickness	:	99 $^{cm}/_{2}$ ≒ 50 cm
• Bituminous Surface	:	5 cm
• Crusher-run Base	:	30 cm
• Sand/Gravel Sub-base	:	15 cm

4. Nukus

Design Aircraft	:	B 767-300
Equivalent Annual Departure	:	1200
Assumed CBR of Subgrade	:	10 %
Required Thickness	:	69 $^{cm}/_{2}$ ≒ 35 cm → 40 cm
• Bituminous Surface	:	5 cm
• Crusher-run Base	:	20 cm
• Sand/Gravel Sub-base	:	10 cm → 15 cm (Minimum Requirement)

- New Apron Service Road Construction (Flexible)-

1. Tashkent

Design Equipment	:	Pushing Equipment for B 767-300
Equivalent Annual Departure	:	3000
Assumed CBR of Subgrade	:	6 %
Required Thickness	:	44 cm
• Bituminous Surface	:	9 cm
• Crusher-run Base	:	20 cm
• Sand/Gravel Sub-base	:	15 cm

(Option)

Design Equipment	:	Pushing Equipment for B 747-400
Equivalent Annual Departure	:	9000
Assumed CBR of Subgrade	:	6 %
Required Thickness	:	58 cm
• Bituminous Surface	:	10 cm
• Crusher-run Base	:	25 cm
• Sand/Gravel Sub-base	:	23 cm

2. New Tashkent

Design Equipment	:	Pushing Equipment for B 747-400
Equivalent Annual Departure	:	15000
Assumed CBR of Subgrade	:	4 %
Required Thickness	:	74 cm
• Bituminous Surface	:	10 cm
• Crusher-run Base	:	25 cm
• Sand/Gravel Sub-base	:	39 cm

3. Namangan and Termez

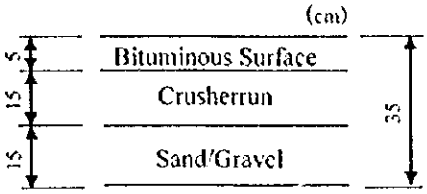
Design Equipment	:	Pushing Equipment for B 767-300
Equivalent Annual Departure	:	1200
Assumed CBR of Subgrade	:	6 %
Required Thickness	:	44 cm
• Bituminous Surface	:	9 cm
• Crusher-run Base	:	20 cm
• Sand/Gravel Sub-base	:	15 cm

4. Nukus

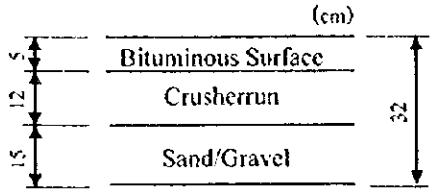
Design Equipment	:	Pushing Equipment for B 767-300
Equivalent Annual Departure	:	1200
Assumed CBR of Subgrade	:	10 %
Required Thickness	:	39 cm
• Bituminous Surface	:	9 cm
• Crusher-run Base	:	15 cm
• Sand/Gravel Sub-base	:	10 cm → 15 cm (Minimum Requirement)

- Perimeter Road -

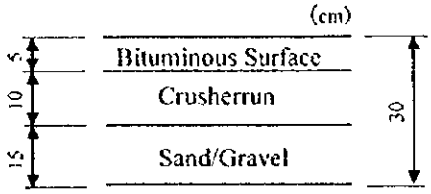
Design CBR=4%
Traffic Condition: L



Design CBR=6%
Traffic Condition: L

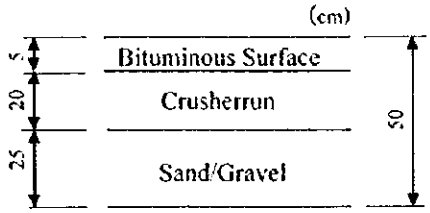


Design CBR=10%
Traffic Condition: L

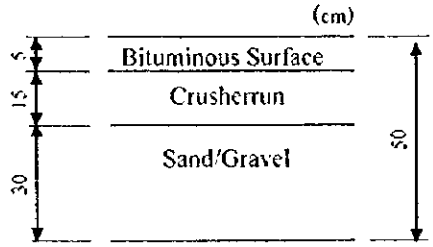


- Car Parking -

Design CBR=4%
Traffic Condition: A



Design CBR=6%
Traffic Condition: A



Design CBR=10%
Traffic Condition: A