Airport Master Planning Regional Seminar

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Hurghada, Egypt

Airport Master Planning - Borj Al Arab Int. Airport

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ECAA
Egyptian Civil Aviation Authority

EHCAAN
القابضة للمطارات والملاحة الجوية

الشركه المصريه للمطارات
Egyptian Airports Co.
ISO 9001:2015 Certified No. EG1/3037

Overview

1 INTRODUCTION

1.1 Overview of the Airport.

1.2 Property and Original Layout of the Airport.

1.3 Airport Location.

2 AIRPORT MASTER PLAN

2.1 Background Information.

2.2 Master Plan Context.

2.3 Work Flowchart for the Study.

2.4 Purpose and Objectives of the Master Plan.

2.5 Key Stakeholders.

2.6 Procedure of air passenger demand forecast.

2.7 Forecast of Future Passengers.

2.8 SWOT Analysis.

2.9 The Airport Master Plan.

3 SITUATION OF DEVELOPMENT PHASES

3.1 Chronicle of Major Events for Phase 1.

3.2 Layout Of Phase 1.

3.3 Critical Airport Planning Parameters.

3.4 Design Concept Of Phase 1.

3.5 SAPI – Update & Recommendation.

3.6 Major Airport Planned Facilities.

3.7 Principle PAX Processing at PTB 2.

3.8 Chronicle of Major Events for Phase 2.

3.9 Layout Plan Of Phase II.

3.10 The Strategy of Eco-Friendly Airport.

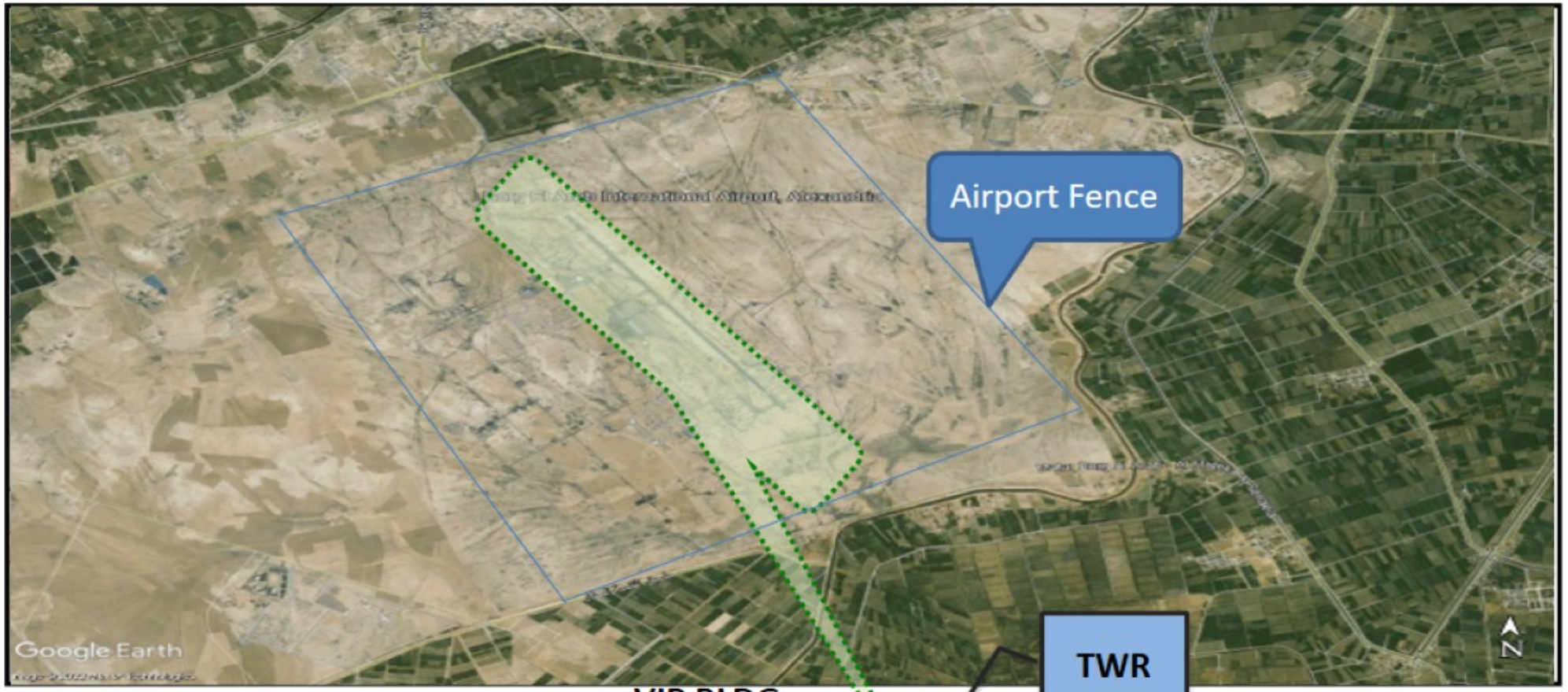
3.11 Project Prospective Photos.

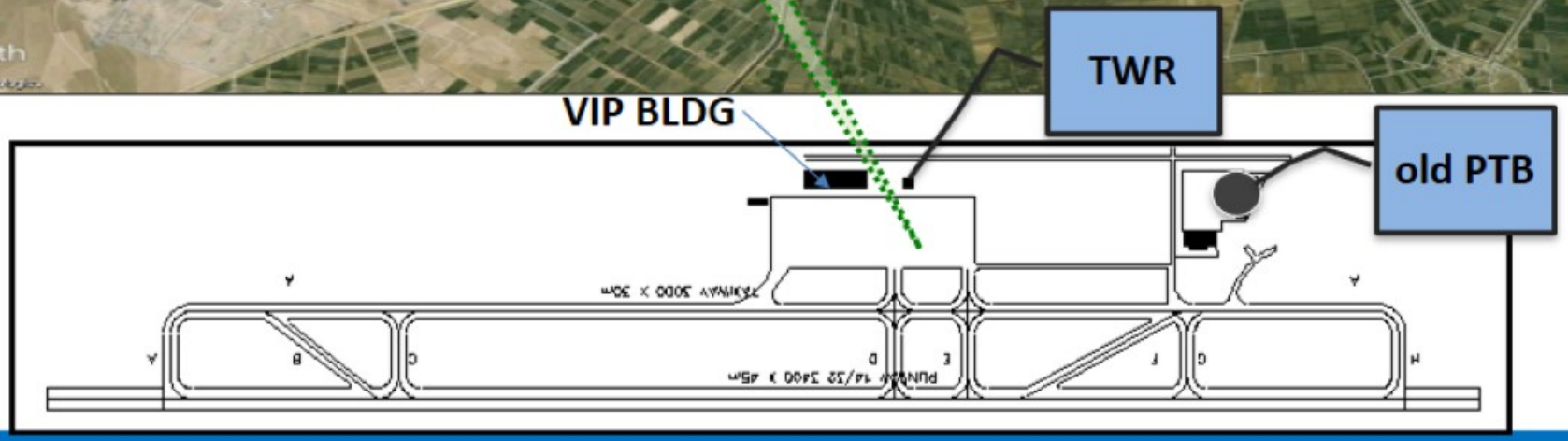
1 INTRODUCTION

1.1 Overview of the Airport:

- Borg El Arab Airport was established in 1990s originally to cater for a joint-use by military and civil aviation, with its 3,400 m long runway, parallel Twy, apron, control tower, fire station, passenger terminal (2,500 sq.m), road and car parks, and other infrastructures built by EAC.
- It is located about 40 km (25 mi) southwest of Alexandria, The airport also serves the nearby areas of the Nile Delta.
- There are 3 major national highway networks leading to the Airport (Agriculture road, Desert road, and North coast road).
- There is a railway link (Cairo - Marsa Matruh) Passing in front of the Airport.

1.2 Property and Original Layout of Borg El Arab Airport:





1.3 Airport Location:

2 AIRPORT MASTER PLAN

2.1 BACKGROUND INFORMATION:

As the number of visitors increases in Alexandria, the 2nd largest city in Egypt, the existing Nozha Airport located in the middle of downtown, is no longer capable of accommodating safe aircraft operations. EAC wants to construct a new international passenger terminal complex at Borg El Arab International Airport. The Airport could offer the highest quality service with hospitality and safety to the passengers who visit this magnificent City of Cleopatra..

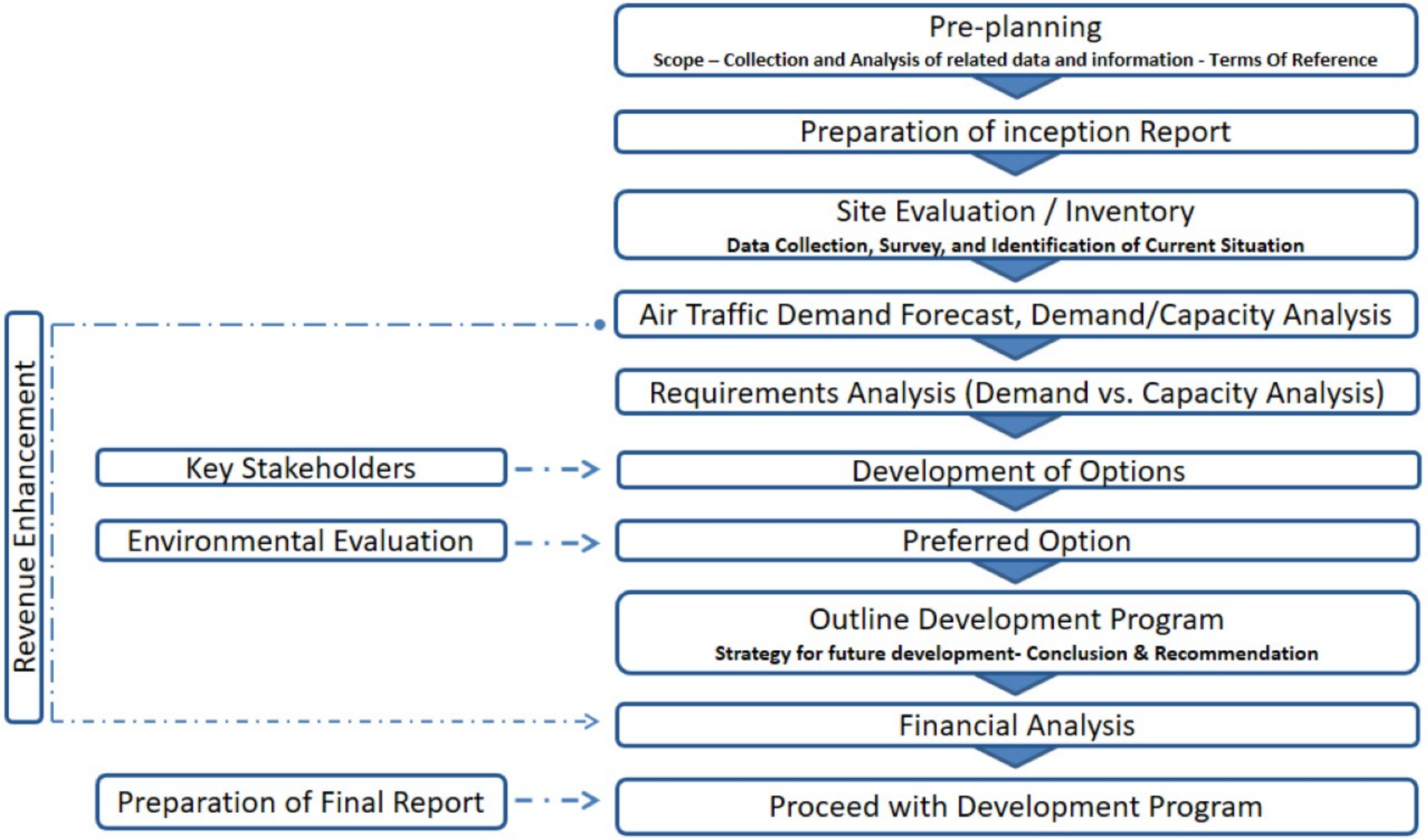
In 2004, EAC requested technical and financial assistance from the Government of Japan, to construct a new civil aviation facility complex in the Airport.

2.2 Master Plan Context:

SAPROF Study was conducted by JBIC, based on the data and information on the surrounding conditions available for Alexandria region and/or entire Egypt, consisting of the following:

- Socio-economic indices and analyses.
- Industrial products' data.
- Tourism data (numbers of visitors, origin, and destination) and development plans.
- Road, railway, Air and sea transportation network.
- Environmental Impact Assessment EIA.
- Aviation industries, network and traffic volumes (passengers, cargos, aircraft movements, by airports).
- Financial situation of EAC and Airport developments.

2.3 Work Flowchart for the Study:



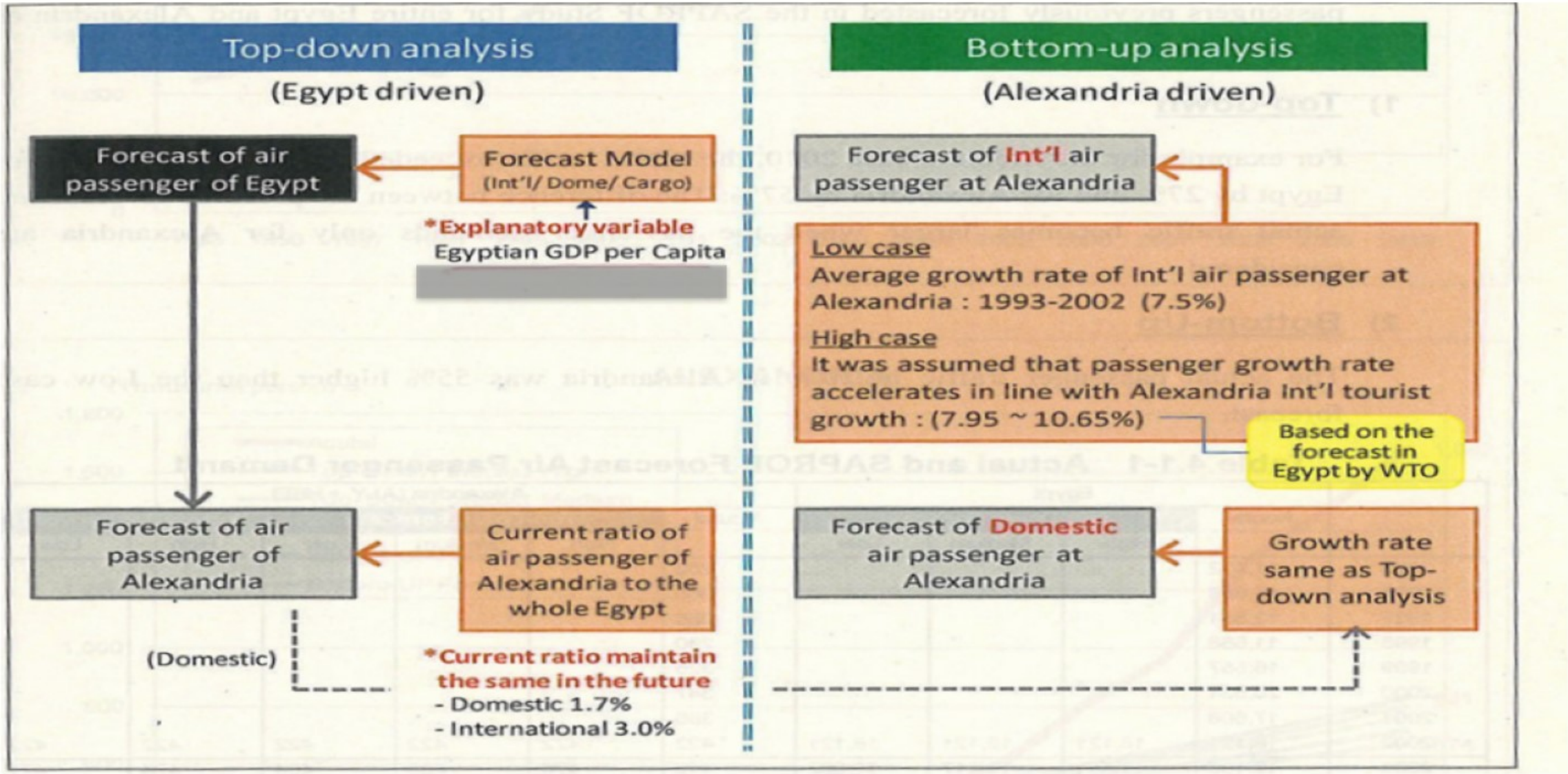
2.4 Purpose and Objectives of the Master Plan:

- Prepare to accommodate increasing air passengers and air cargo at the airport.
- Develop required facilities to accommodate growing demand at the airport.
- Improve service quality to meet the global standards at the airport.
- Plan future strategies to keep the position as a base of air transportation in the region.
- Operate and manage the airport more efficiently.

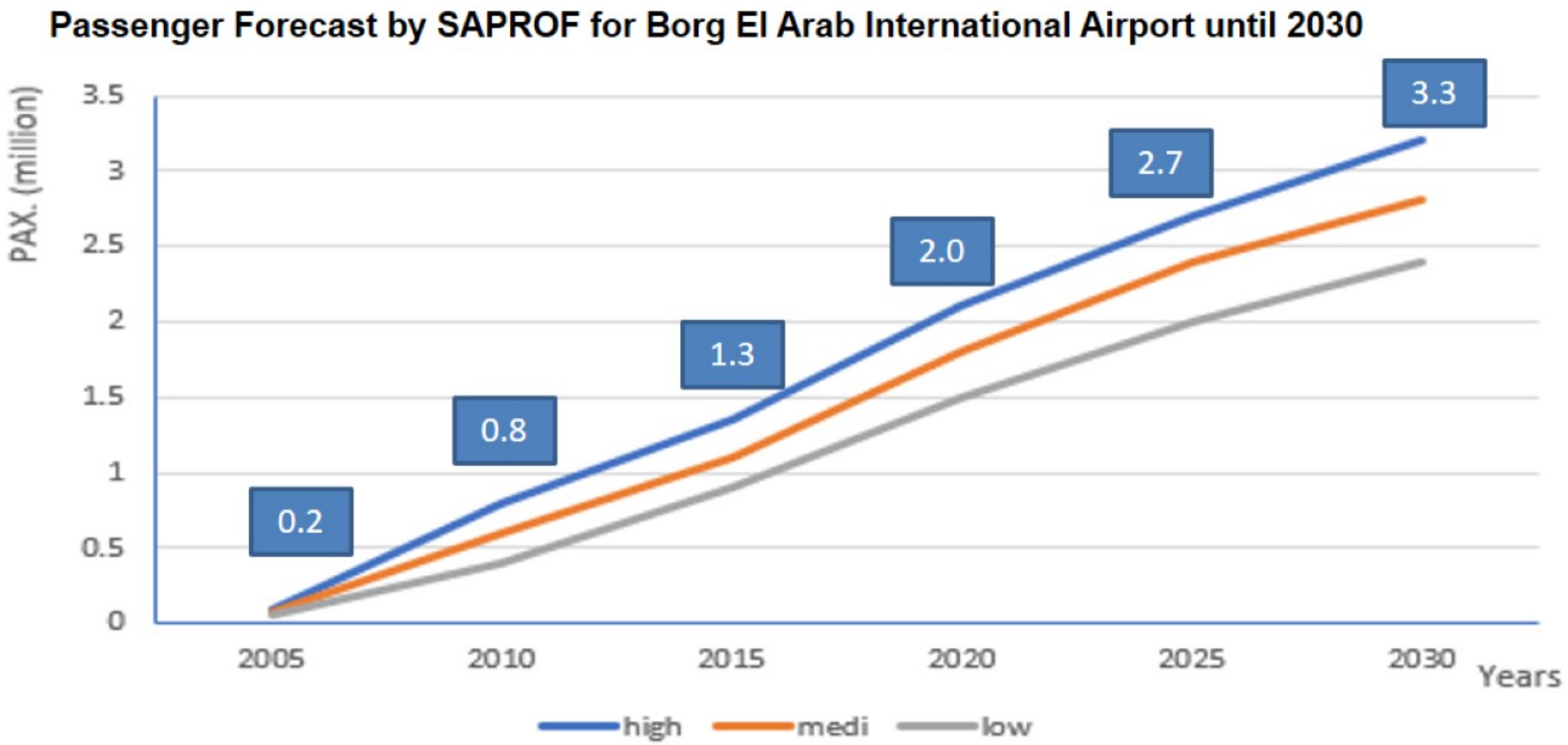
2.5 Key Stakeholders:

- Airlines & Customs.
- Egypt Air Holding Company.
- Egyptian metrological agency EMA.
- Egyptian Holding Company for airports (EAC – airport operator) and air navigation NANSC.
- World Tourism Organization WTO.
- Governorate & Governmental Authorities (Electrical,Water companies-police-… etc).
- Japan Government.

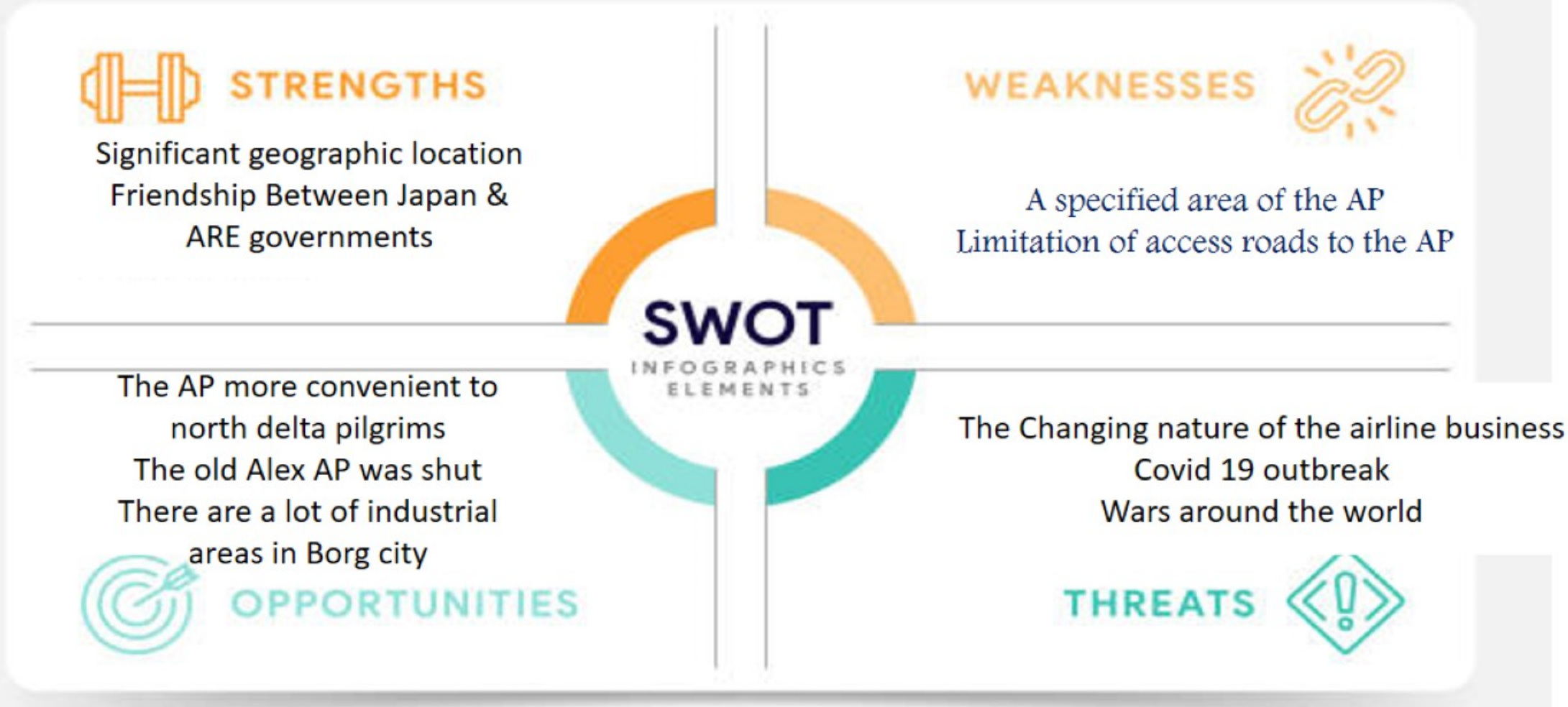
2.6 Procedure of air passenger demand forecast:



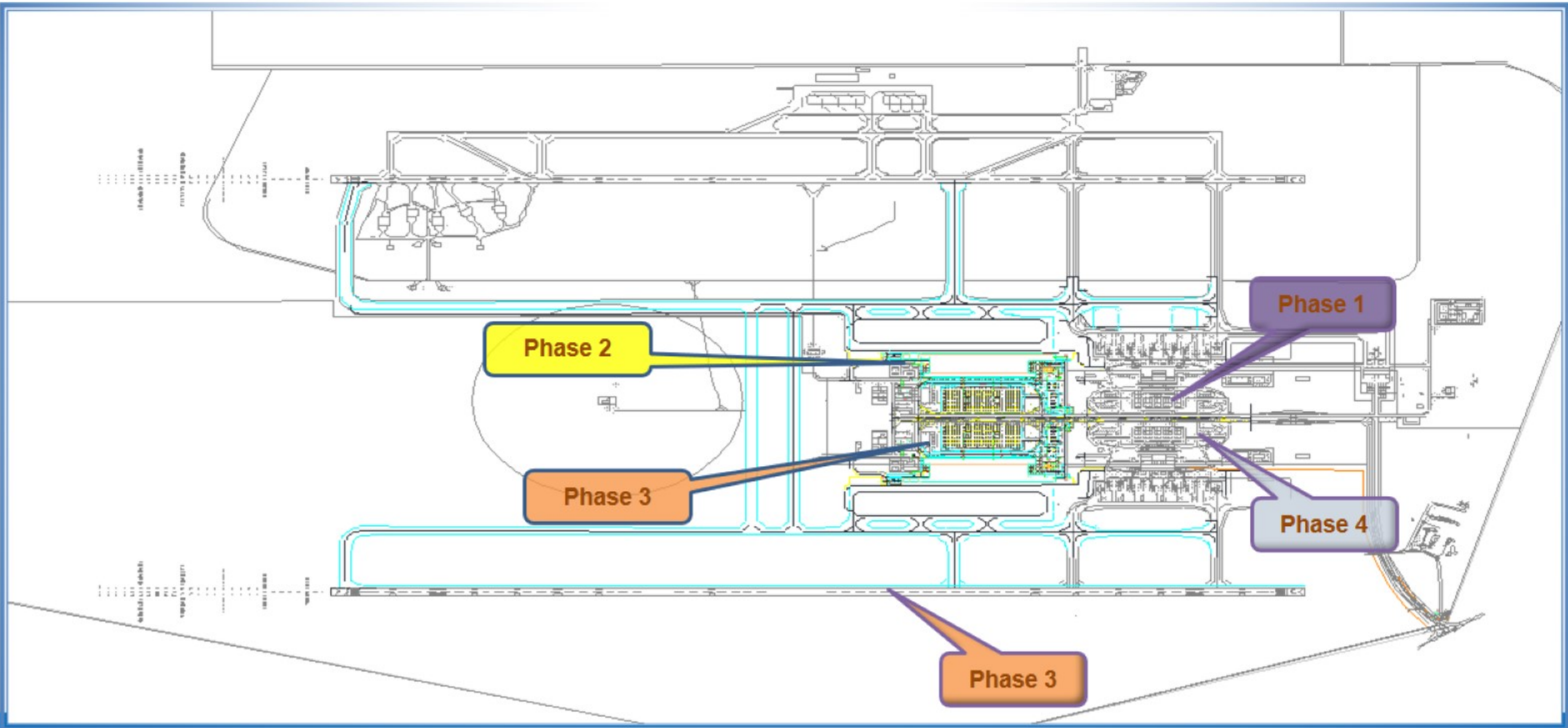
2.7 Forecast of Future Passengers:



2.8 SWOT Analysis:



2.9 The AIRPORT MASTER PLAN:



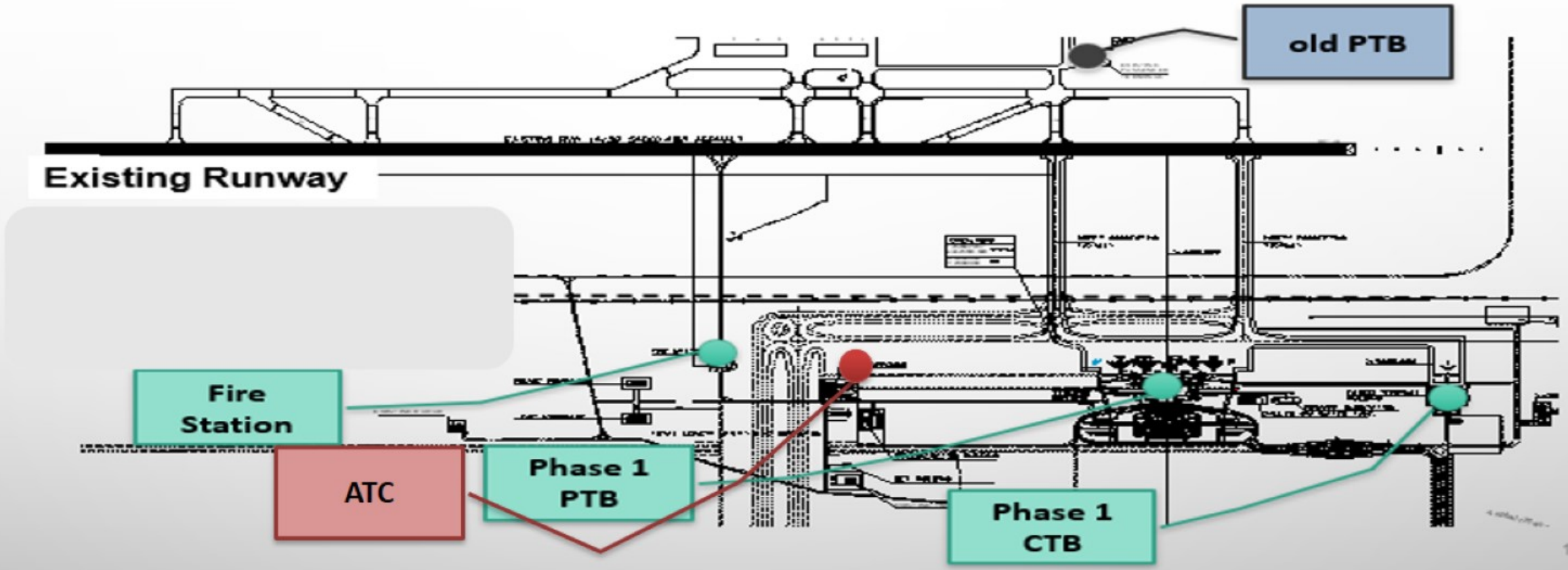
3 SITUATION OF DEVELOPMENT PHASES

3.1 Chronicle of Major Events for Phase 1:

- 1990: Opening of Borg El Arab International Airport
- 2004: SAPROF for construction of civilian airport facilities as technical assistance by Japanese Government
- 2006 : phase 1 Detailed Design
- 2007 April – 2010 October: Construction (DLP completed in November 2012.)
- 2010 December: Operation started.
- 2012 : SAPI Update & Evaluation.
- Actual project cost around 50 million USD

3.2 LAYOUT Of PHASE 1:

Completed Facilities in the Borg El Arab Airport Modernization Project



Note that the completed airport facilities had been improved to meet 2 million annual passengers in the year 2010 - 2011.

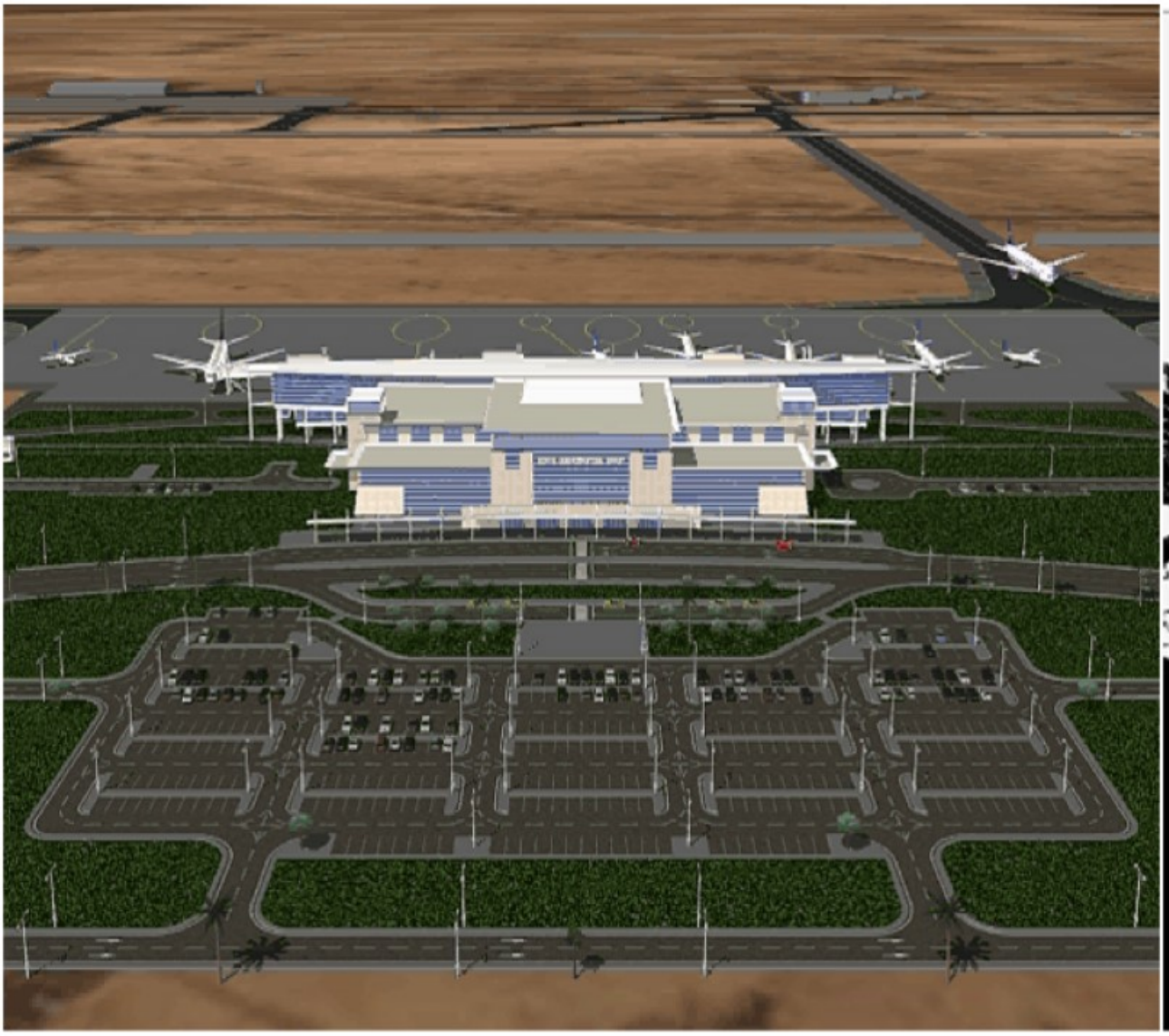
3.3 Critical Airport Planning Parameters:

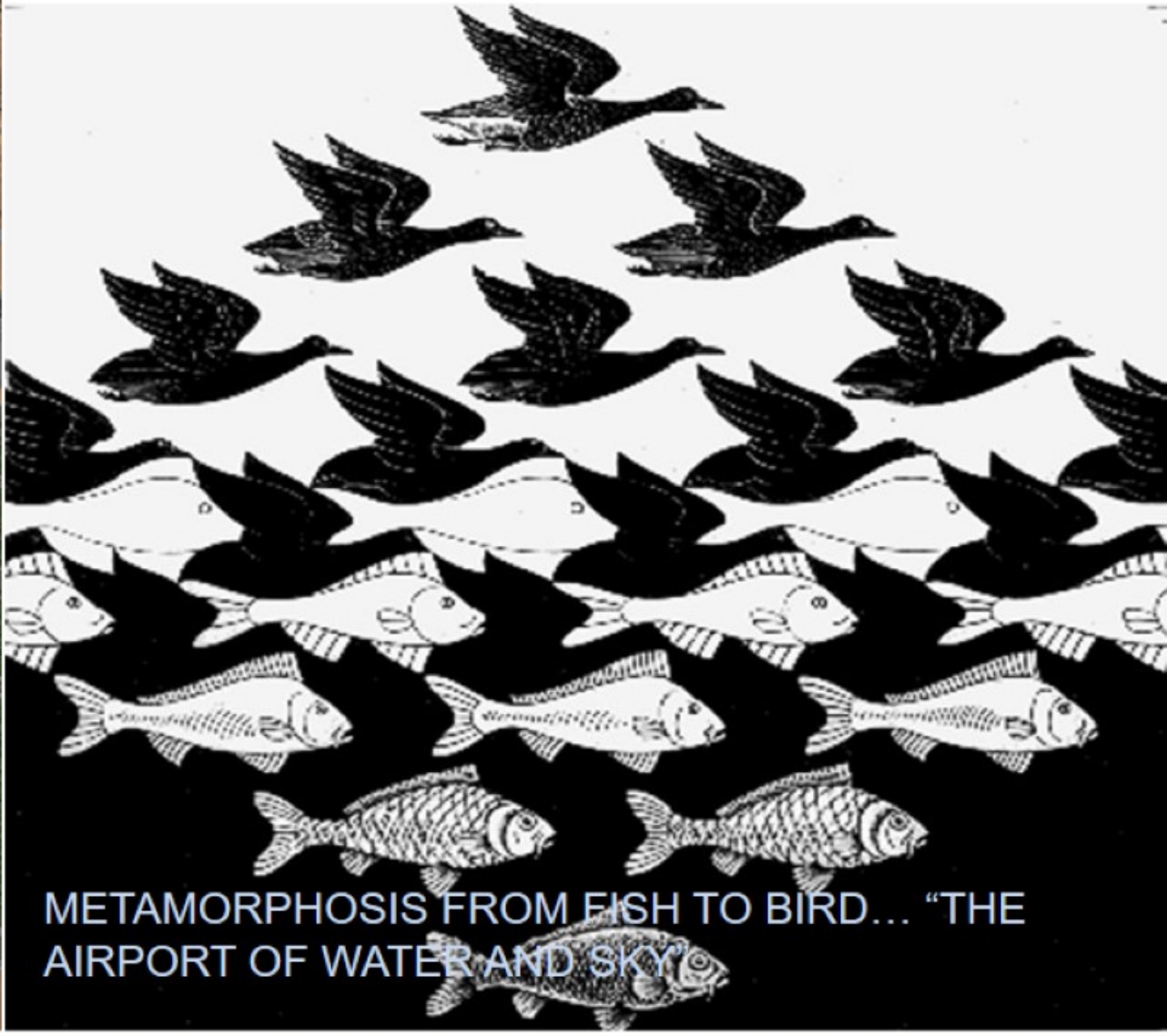
- PTB to accommodate Max. 2.0 million passengers

(1)	Annual 2-way Passengers		2 million
(3a)	Peak-hour 2-way passengers (PHP)		610
(3b)	Peak-hour 2-way Aircraft Movements		6
(4a)	Peak-hour 1-way passengers (PHP/2)		370
(4b)	Peak-hour 1-way Aircraft Movements		4
(5)	Check-in Desks:	processing speed	25 pax/hr
(6)		total desks	15
(7)	Checked-in baggage /hr	piece per pax	2 pieces/ pax
(8)		total baggage	740 pieces/hr
(9)	Passport Control Desks	processing speed	60 pax/hr
(10)		total desks	7
(11)	PTB Floor Area	Area per PHP	40 m^2/PHP
(12)		Total area	24,400 m^2
(13)	Apron Spots	90 min.in average	11

- Special Airport Systems
- Low Current Systems
- RWY 32-14 3400X45 M
- Apron 12 stands to cope with 4E
- Parallel TWY
- 2 Exit Taxiways
- Cargo Terminal (3240m2)10,000 T/Year
- Booster pump room , water tank,STP
- ATC, Administration Building, Fire fighting building, etc
- ILS CAT II - GP - VOR/DME – Radar
- RVR

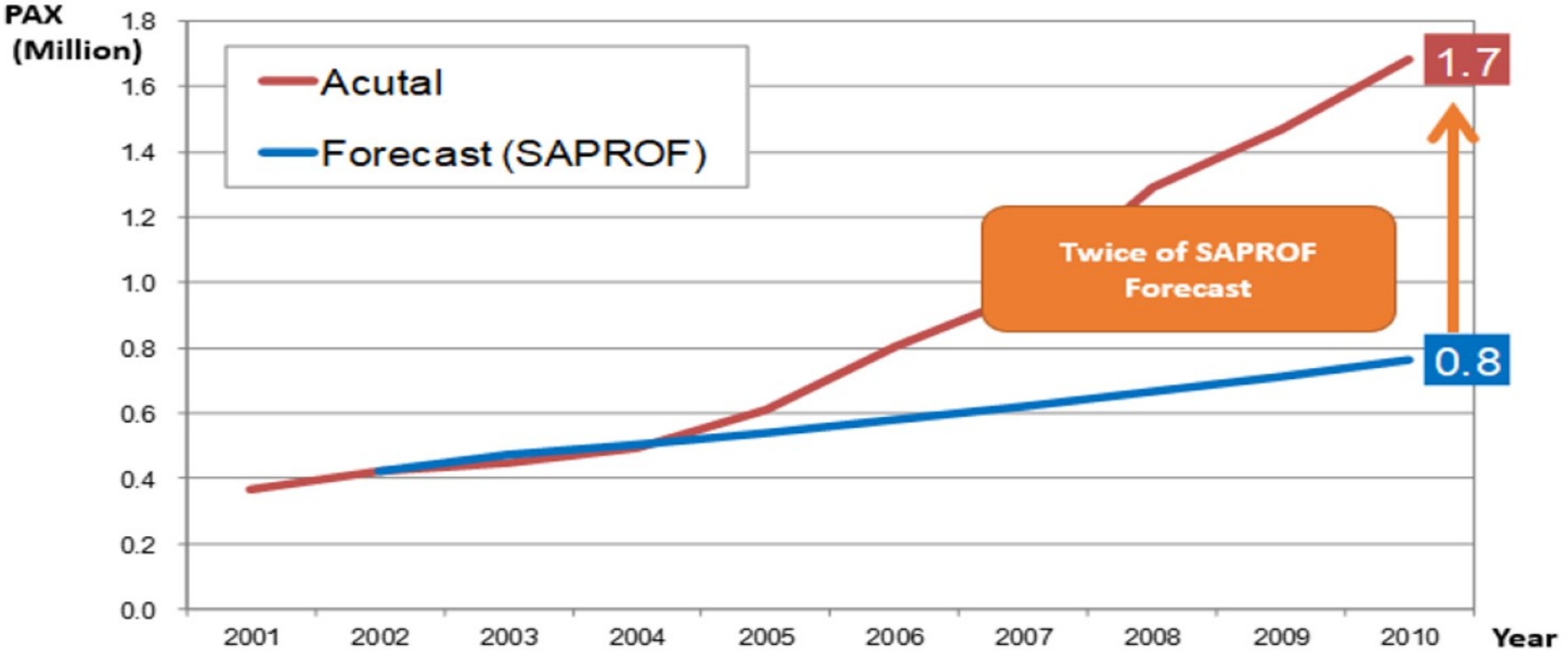
3.4 DESIGN CONCEPT Of PHASE 1:





3.5 SAPI – Update & Recommendation:

In 2012 Special Assistance for Project Implementation SAPI conclude its study to Evaluate the benefits of the project and determine the actual growth of Passengers at the Airport until 2010 compared with SAPROF Forecast



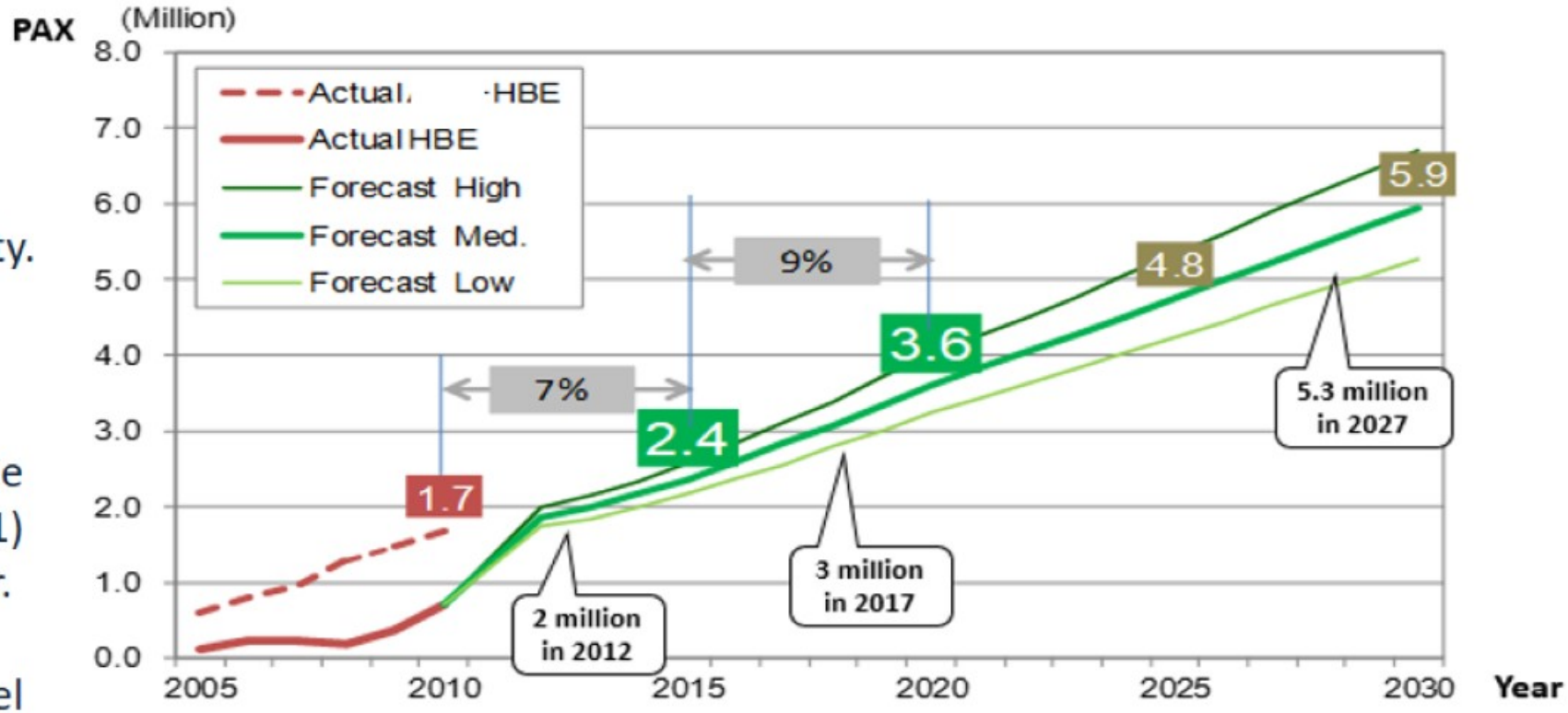
➢ Cont. SAPI – Update & Recommendation:

Passenger Forecast by JICA-SAPI for the Airport until 2030 & Actual

1- The Average annual growth rate
from 2010 to **2015** was 7%
Which represents **1.7 million**
Passengers per year as an actual capacity.

2- The Average annual growth rate
from 2015 to **2020** will be 9%
On 2018 the actual capacity of the existing Terminal building (phase 1) reached **2.8 million** passengers per year.

3- **On 2030** the actual capacity of Borg el Arab international airport is expected to reach **6 million** passengers per year According to SAPI studies.



4- As a result the actual capacity is almost 2 million and expected to reach 6 million
Based on, EAC demand is the developing of Borg el Arab international airport(phase 2, lot 1) with a design capacity of 4 million passengers per year.

➢ Cont. SAPI – Update & Recommendation:

- With the new terminal the capacity will be 6 million passengers per year which will be developed under Japanese ODA (Official Development Assistance) funding provided by (JICA) with 18.2 BILLION YEN as a tide loan.
- The Terminal building is designed to be LCC according to the standards of The International Air Transport Association (IATA) with level of service C, with a special increase in the standards to suit the nature of the travelers.
- The current cargo terminal building at the Airport has still vacant space for further cargo to be handled. Then as a consequence, the Study Team recommends that the planning and design of the cargo terminal be examined later.
- Air cargo demand at Borg El Arab International Airport may increase in future; considering the fact that Egypt Air Cargo has been planning to launch their business to the airport and the recent growth rate of 10% per annum.

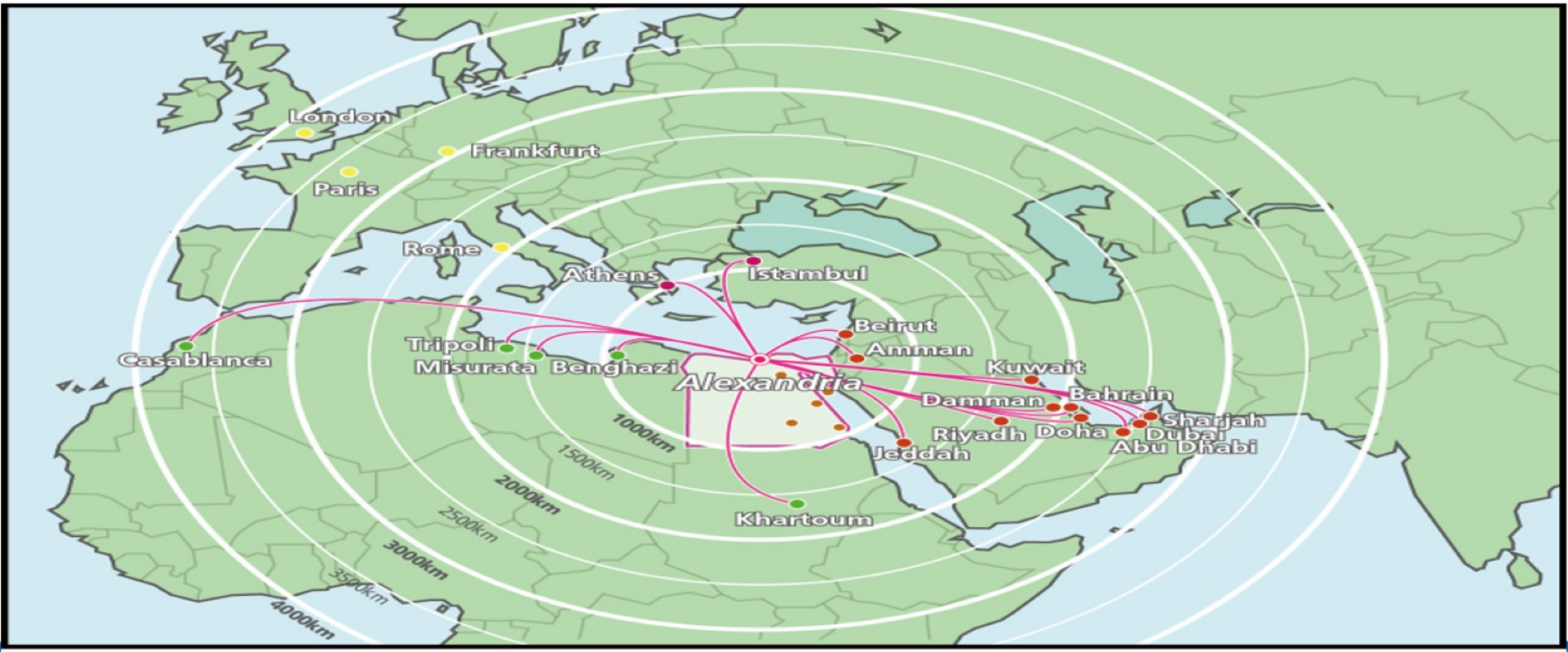
➢ Cont. SAPI – Update & Recommendation:

LCCs (Low Cost Carriers) at Borg El Arab International Airport :

- LCCs are expanding their activities in Europe, the US, Asia and around the world. In the Middle East as well, LCCs are expanding demand in the centers of Dubai and Saudi Arabia.
- There were four (4) LCCs operating at Borg El Arab International Airport. Air Arabia Egypt, one of the four, operates 26 flights a week to seven destinations using Borg El Arab International Airport as its hub. The airline plans to increase its fleet and will probably expand its network further from Borg El Arab International Airport.
- Aircraft of 150 seats (ICAO Code C) has been the major type of aircraft because of the LCCs business model unifying the aircraft type (i.e. A320 series) for the purpose of reducing operation and maintenance costs.

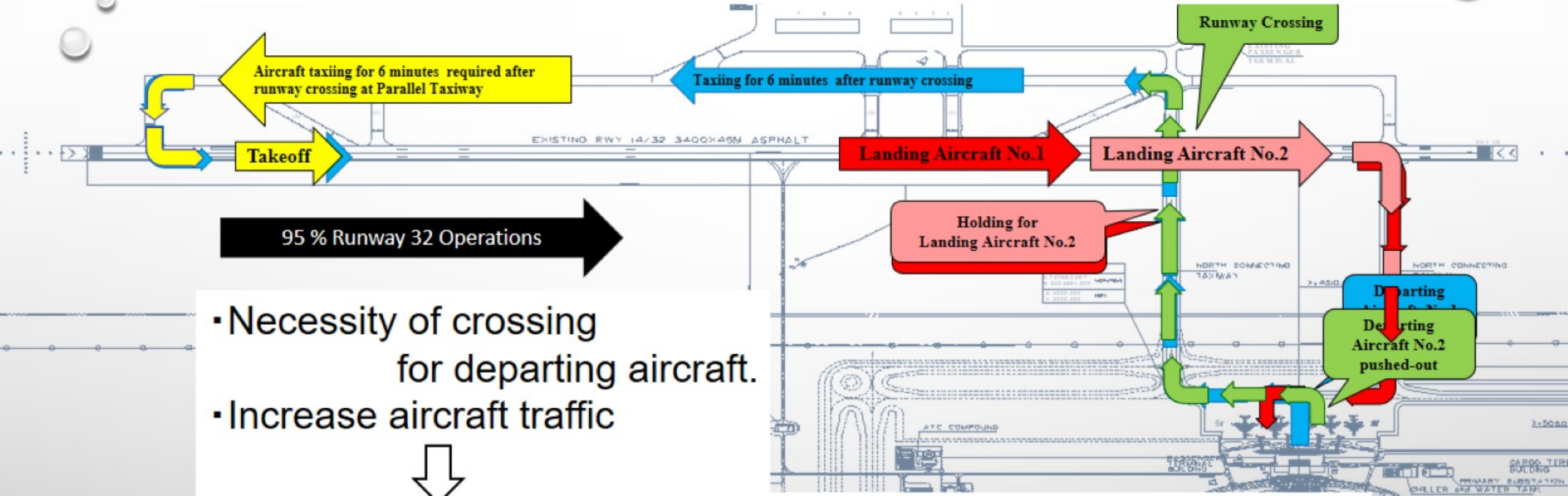
Distance to Major Destinations from Alexandria

Distance from the Airport to Middle East countries are within a range of 3,000 km, and that to the current furthest destination is 3,700 km to Casablanca, or 3,800 km to London.



Current Problem in Aircraft Operations; studied by JICA-SAPI

Since prevailing wind (95%) is from north direction, main runway operations are made from the south, i.e. Runway 32



- Necessity of crossing for departing aircraft.
- Increase aircraft traffic

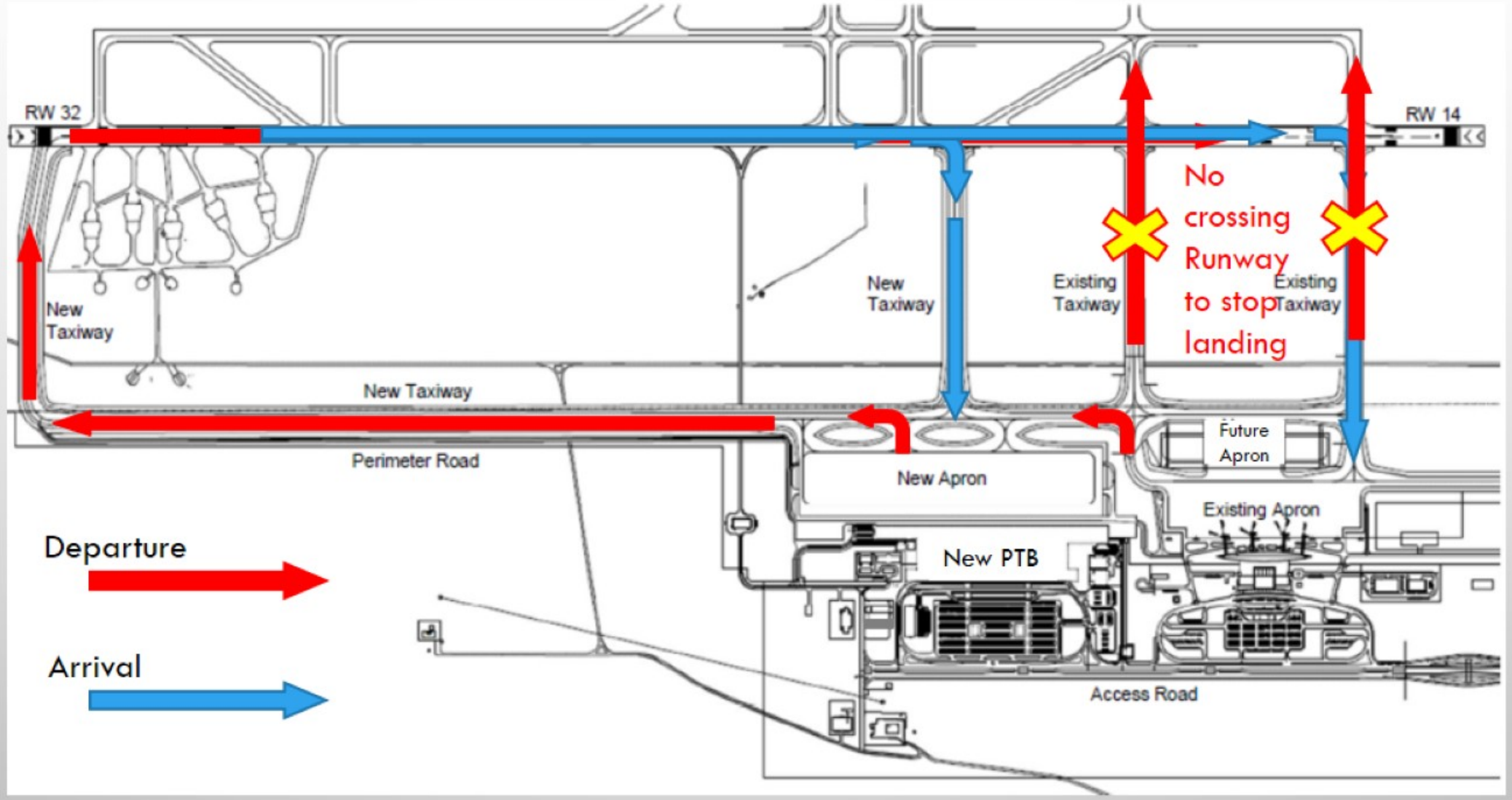
⇩

Necessity of Efficiency of aircraft movement

⇩

Adding Parallel Taxiway (No need to cross Runway)

Aircraft Taxing Route after Completion of the Project



3.6 Major Airport Planned Facilities:

رقم No.	الحركة الجوية المطلوبة لعام 2030 Air Traffic Demand for 2030/ المتطلبات اللازمة لتشغيل مبني الركاب Requirements for PTB processing facilities		ملاحظات Remarks	مبنى الركاب (1) 1st PTB	مبنى الركاب (2) 2nd PTB
				legacy terminal Dome. & Int'l	budget terminal All International
			for 2030	رجال اعمال / غير مصريين business travelers/ foreign tourist	حجاج / عاملين بالخارج pilgrims/ oversees worker
(1)	Annual 2-way Passengers		5,941,699	2 million	4 million
(3a)	Peak-hour 2-way passengers (PHP)		1,831	610	1,220
(3b)	Peak-hour 2-way Aircraft Movements		16	6	10
(4a)	Peak-hour 1-way passengers (PHP/2)		1,104	370	740
(4b)	Peak-hour 1-way Aircraft Movements		10	4	6
(5)	Check-in Desks:	processing speed		25 pax/hr	20 pax/hr
(6)		total desks	(4a) ÷ (5)	15	37
(7)	Checked-in baggage /hr	piece per pax		2 pieces/ pax	3 pieces/ pax
(8)		total baggage	(4a) x (7)	740 pieces/hr	2,220 pieces/hr
(9)	Passport Control Desks	processing speed		60 pax/hr	40 pax/hr
(10)		total desks	(4a) ÷ (9)	7	19
(11)	PTB Floor Area	Area per PHP		40 m^2/PHP	30 m^2/PHP
(12)		Total area	(3a) x (11)	24,400 m^2	40,000 m^2
(13)	Apron Spots	90 min.in average	(3b) x 90/60	9	15

3.7 Principle PAX Processing at PTB 2:

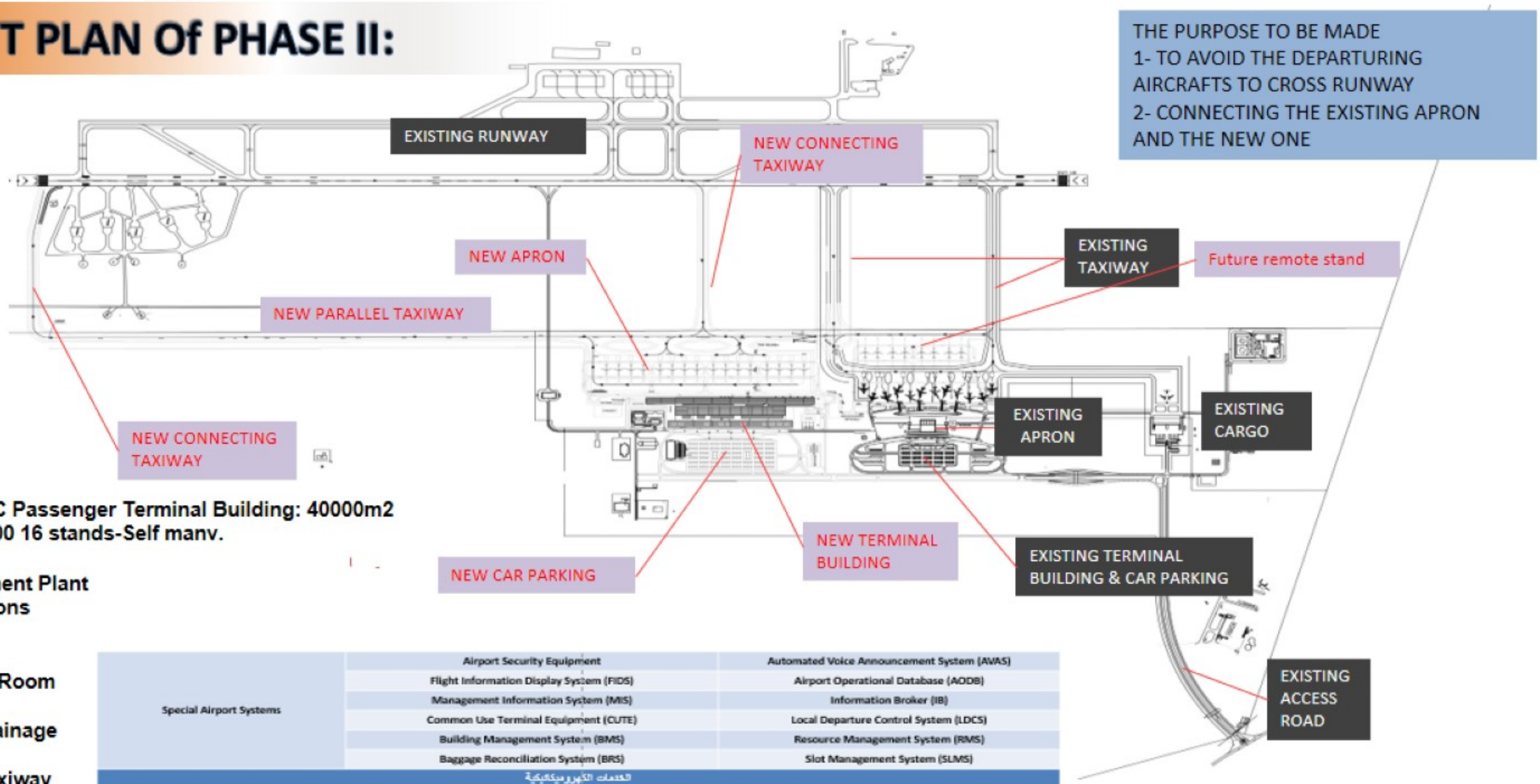
Area	Equipm.	No.	Justification
Security Check Entrance	Xray Unit	6	400 Pcs/hr (IATA + Experience 3 bags per PAX)
Check-in	Counter	40	180 second (IATA + Experience)
Passport Control Dept	Counter	20	75 seconds (IATA + Experience)
Security Check Lounge	Xray Unit	4	IATA
Gate Lounges	Seating	104	6 Gates
Passport Control Arrival	Counter	20	IATA + arrival of 2 apron buses
Baggage Claim hall	Belts	5	Claim Length = 50 meters / belt
Custom Control	Counter	6	IATA + Experience (120 sec /50% check)

3.8 Chronicle of Major Events for Phase 2:

- Phase 1 Operation start 2010
- Signing Contract of Consulting Services JAC: July 2017
- Announcement of Bidding: October 2018
- Signing Contract with Taisei-Orascom Construction Joint Venture: October 2019
- Commencement Date: 12 February 2020
- Ceasing the Contract of the construction: 7 April 2019 for 2 months
- Completion Date: 11 March 2023
- **Contract Sum 157 million USD**

3.9 LAYOUT PLAN Of PHASE II:

THE PURPOSE TO BE MADE
1- TO AVOID THE DEPARTURING AIRCRAFTS TO CROSS RUNWAY
2- CONNECTING THE EXISTING APRON AND THE NEW ONE



Lot 1 Facilities

1. Eco-friendly LCC Passenger Terminal Building: 40000m2
2. Apron: A321-200 16 stands-Self manv.
3. Car Park
4. Sewage Treatment Plant
5. Three Substations
6. Workshop
7. Water Tank
8. Booster Pump Room
9. Utilities
10. Stormwater Drainage

Lot 2 Facilities:

1. New Parallel Taxiway
2. Two External Toilets
3. Three Guard Houses

Special Airport Systems	Airport Security Equipment	Automated Voice Announcement System (AVAS)
	Flight Information Display System (FIDS)	Airport Operational Database (AODB)
	Management Information System (MIS)	Information Broker (IB)
	Common Use Terminal Equipment (CUTE)	Local Departure Control System (LDCS)
	Building Management System (BMS)	Resource Management System (RMS)
	Baggage Reconciliation System (BRS)	Slot Management System (SLMS)
الخدمات الكهروميكانيكية MEP Facilities		
Electrical Facility	Power Capacity	5000 KVA
Domestic Water Supply Capacity	Capacity/ Day	1700m3
Sewage Water Treatment	Capacity/ Day	1160 m3

3.10 The Strategy of Eco-Friendly Airport :

The design of the new passenger terminal makes it the first environmentally friendly building in Egypt & Africa, for the existence of strategies to save energy and reduce the emissions of carbon dioxide, the most important of these strategies:

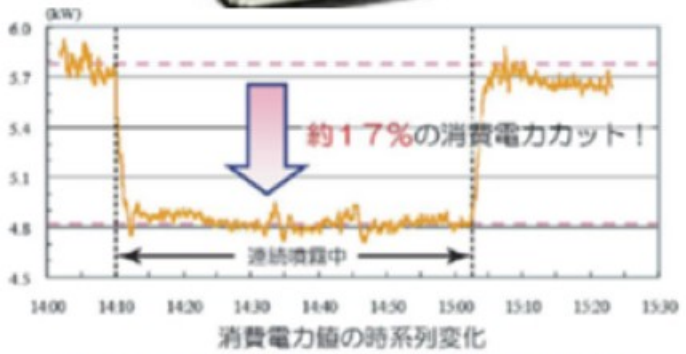
First: The solar system, depends on installing solar panels on the roof with large flat areas, to be able to produce renewable energy that provides the building between **50% to 75%** of the total consumption of electricity & Reduction of Co2 / Year: 1,346 ton.

Second: the VRV system for air conditioning that system makes air condition able to work separately in the different areas of the building completely efficiently, reduces heat emissions and toxic fumes, and also 17% Power Consumption Cut.

Third: Natural and industrial lighting systems the design of the building provide glass openings on the surfaces and facades that allow natural light to enter broken to contribute saving energy during daylight hours. The LED lighting will be fully used in industrial lighting which provides at least **50%** of the consumption with the same capacity required for lit areas.

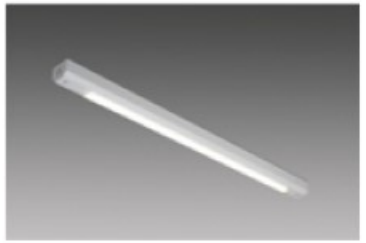
Green Airport: Eco-friendly facilities

- PHOTOVOLTAIC Power supply system
- LED LIGHTING
- Variable Refrigerant Volume HVAC system



17% Power Consumption Cut

Photovoltaic Power Supply system

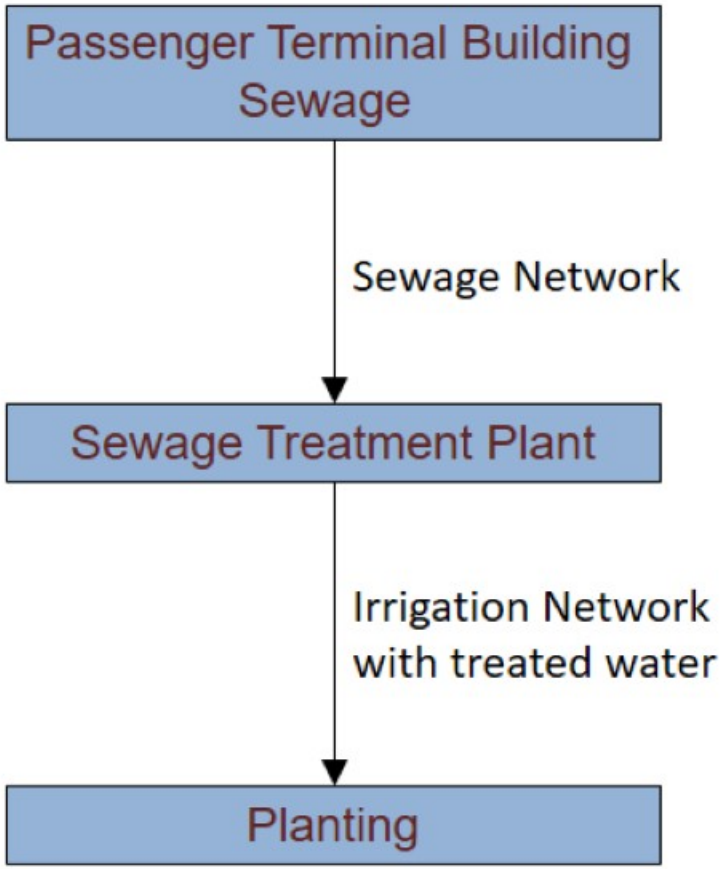


LED Lighting

Use of Motion Detector in Toilets

Daylight Sensor for Lounge and Lobby

Irrigation Network by recycling water



Building Management System (BMS)

- ECO Monitoring in combination with systems from that support energy management. The BMS offers real-time monitoring and reporting of the airport systems, HVAC, Lighting and Security performance from an economic and ecological point of view.
- Optimizes the operation in order to reduce energy consumption and wear and tear of components.
- Creates schedules to automate the operation of electrical systems based on occupancy schedules.

Other Systems and/or Equipment aiming to be introduced in the airport

- Electrical Bus, vehicles (Follow-Me etc.) and GSE Vehicles like Forklift, Toeing Tractor and Cargo Truck inside the airport
- Electrical Shuttle Bus for the passenger from the airport to the station will be established near in Alexandria Region in the near future
- Electrical GPU (Electrical Ground Power Unit)
- Emission Control Equipment for Generator
- Waste Control and Treatment Equipment and/or System inside airport

3.11 Project Prospective Photos:

Passenger Terminal Building Front view

Airside View

VIP - Airside View

Check In Area View

Departure Lounge

Baggage reclaim Area View

View of the Landside Concessions

BORG EL ARAB INTERNATIONAL AIRPORT EXTENSION PROJECT PHASE 2

video by abdelrahman sharafaddin

Thank you for your attention.