منتدى دبي العالمي لإدارة المشاريع
DUBAI INTERNATIONAL PROJECT MANAGEMENT FORUM

RTA

# Etihad Museum Project

## Case study and lessons learnt

dipmf.ae

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# 01

# Case study

## 1.1 About Dubai

Dubai is located on the eastern coast of the Arabian Peninsula, in the south west corner of the Arabian Gulf. It is well known for its warm hospitality and rich cultural heritage, and the Emirati people are welcoming and generous in their approach to visitors. With year round sunshine, intriguing deserts, beautiful beaches, luxurious hotels and shopping malls, fascinating heritage attractions and a thriving business community, Dubai receives millions of leisure and business visitors every year from around the world.

## 1.2 Dubai's history

**Around 800 members of the Bani Yas tribe, led by the Al Maktoum family, settled at the mouth of the creek in 1833. The creek was a natural harbour and Dubai soon became a centre for fishing and pearl trading.**

**By the turn of the 20th century Dubai was a successful port. The souk (Arabic for market) on the Deira side of the creek was the largest on the coast with 350 shops and a steady throng of visitors and businessmen. When oil was discovered in 1966, the late Sheikh Rashid bin Saeed Al Maktoum utilised the oil revenues to spur infrastructure development in Dubai.**

# 1.3 Dubai city and its attractions

Dubai is now a city that boasts unmatchable hotels, remarkable architecture and world-class entertainment and sporting events.

The beautiful Burj Al Arab hotel presiding over the coastline of Jumeirah Beach is the world's only hotel which offers seven star services. The Burj Khalifa is the world's tallest structure and reminds us of the commercial confidence in a city that expands at a remarkable rate. From the timeless tranquility of the desert to the lively bustle of the souk, Dubai offers a kaleidoscope of attractions for visitors. The Emirate embraces a wide variety of scenery in a very small area. In a single day, the tourist can experience everything from rugged mountains and awe-inspiring sand dunes to sandy beaches and lush green parks, from dusty villages to luxurious residential districts and from ancient houses with wind towers to ultra-modern shopping malls.

The Emirate is both a dynamic international business centre and a laid-back tourist escape; a city where the sophistication of the 21st century walks hand in hand with the simplicity of a bygone era. But these contrasts give Dubai its unique flavour and personality; a cosmopolitan society with an international lifestyle.



# 1.4 About RTA

The Roads and Transport Authority (RTA) emerged in November 2005 as a public entity with an independent corporate body and a full legal capacity to perform all business and actions needed to achieve its objectives. RTA is a government-owned entity and based in Dubai.

RTA plans and constructs transportation and road projects within Dubai, or between Dubai and neighboring emirates. It enacts rules and regulations and draws up comprehensive strategic plans for road systems, and land and marine transit networks to keep pace with Dubai's economic development plans according to highest international standards. Its roles include developing and implementing policies necessary for achieving optimal utilisation of existing transport and traffic elements. It attends to studying and endorsing the privatisation of related businesses, and establishing, managing and commissioning an integrated transport system that provides services customised to community needs. It sets up regulations, and administrative and operational systems relating to its core business.

It compiles and implements findings of studies conducted for fixing and implementing fees to traffic and roads including proposing fares for using roads network, licensing drivers and vehicles, and setting fare structure for mass transit routes. It attends to upgrading legislations and procedures of drivers and vehicles registration and licensing to realise the strategic objectives of transport system in Dubai, conducts licensing of mass transit routes and all RTA business-related activities.

Its Board of Directors oversees administrative, technical and financial affairs, develops the overall policy and project programs, prepares budget proposals for onward submission to Dubai's Executive Council for endorsement, sets up Organisation Charts, endorses fare structure for transportation, and appoints auditors.

RTA comprises five agencies: the Traffic and Roads, Public Transport, Licensing, Rail and Dubai Taxi Corporation and three support sectors: Strategy and Corporate Governance, Administrative Corporate Support Services and Technology Corporate Support Services.

# 1.5 RTA's organisational structure

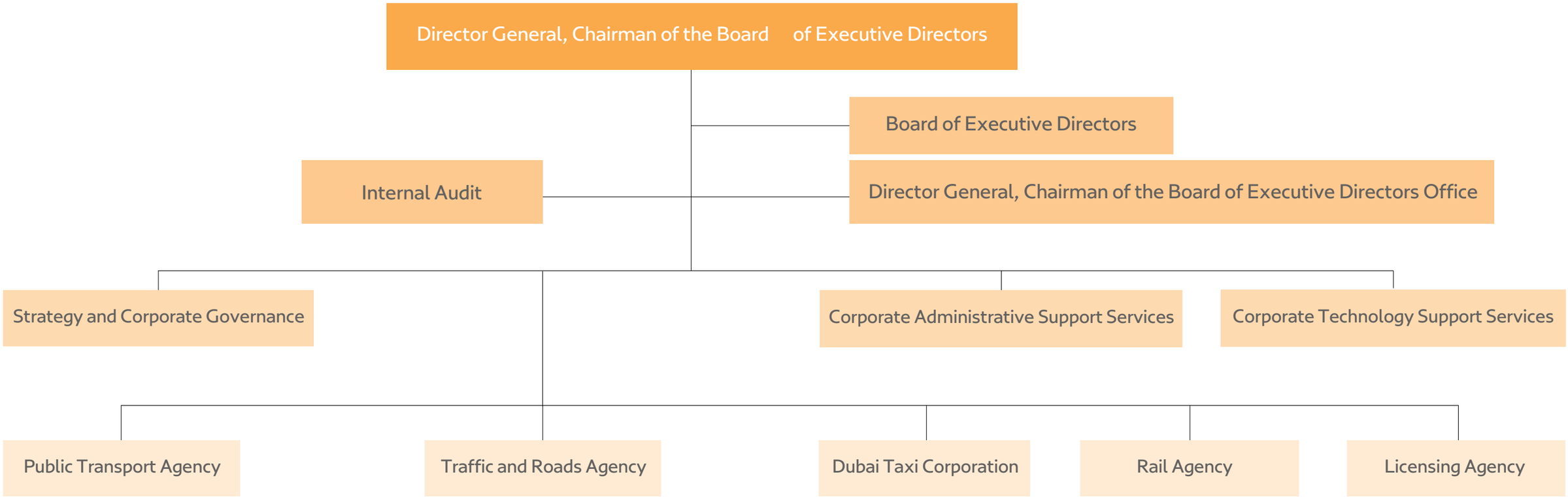


Figure 01. Aerial view from Jumeirah Road

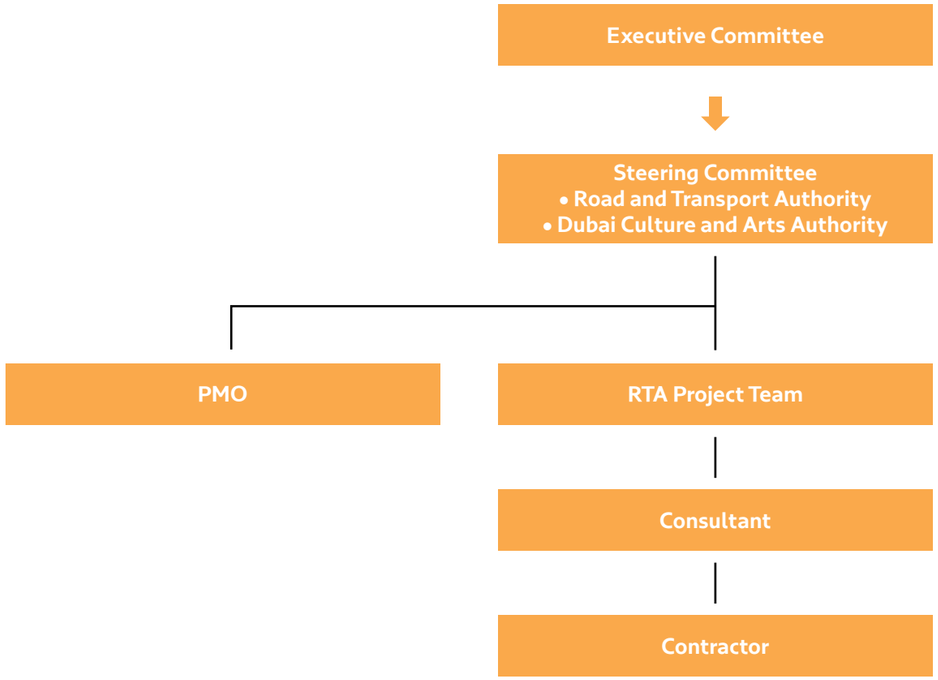
# 1.6 Project description

The new 26,000 m² museum and associated buildings celebrate the Union of the Emirates in 1971. The museum will focus on the years 1968 to 1974, with the political and social context of how the union of the truciate states came about and how they subsequently flourished. The site consists of both restored and reconstructed historic buildings and a new pavillion entrance in the form of a scroll with seven inclined columns representing the pen used to sign the constitution document. The museum contains permanent and temporary galleries, an auditorium, teaching spaces, cafes, as well as administration and many back-of-house functions. The fast-tracked project also includes an extensive plaza and the provision of both underground and surface parking. Etihad House, where the treaty was signed, is being restored to its original form along with structural upgrades. The structure of the nearby guesthouse is being re-built and its fittings and furnishings being restored to their original condition. The curved Ministers building is being re-built on its original location and will serve as a VIP function space.

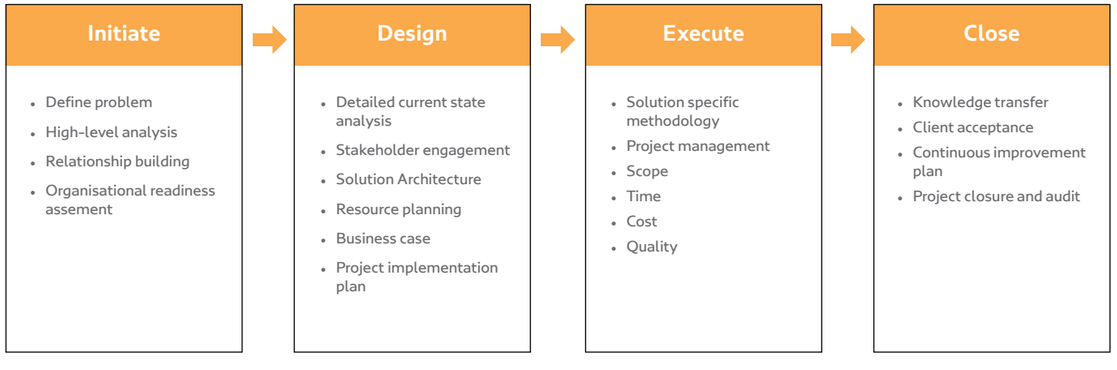
The museum is located underground and connects the pavillion, guesthouse, and Ministers' building. Landscaping surrounding the historic site will be restored to its original look from 1971. The new water feature edge matches the original shoreline from 1971. Further, a new 123 m flagpole has been constructed to replace the existing landmark flagpole, which is located in the middle of the excavation.



# 1.7 Project team structure




# 1.8 Overall project implementation methodology



# 1.9 Project milestones

## Revised Procurement Strategy - Level 1 Programme

| | Contractor | 2014 | | | | | | | 2015 | | | | | | | | | | | 2016 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J | J | A | S | O | N | D |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
| Option 1 - Two stage tender | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stage 1 - Enabling Works | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Final Design | | | | | 3 months | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Negotiate - Enabling Works | ASGC | | | | 2 months | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Enabling Works | ASGC | | | | | | | | 6 months | | | | | | | | | | | | | | | | | | | | | | |
| Stage 2 - Main Contract | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Preliminary Design | | | | 2 months | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Final Design and Tender Docs | | | | | | | | | 3 months | | | | | | | | | | | | | | | | | | | | | | |
| Tender and Awards | 6 No. | | | | | | | | 2 months | | | | | | | | | | | | | | | | | | | | | | |
| Main Contract | | | | | | | | | | | | | | | | | | | | 19 months | | | | | | | | | | | |
| Operational | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operational Setup | | | | | | | | | | | | | | | | | | | | 4 months | | | | | | | | | | | |

# 1.10 Exhibition planning

The Union Museum will tell the story of the unification of the Emirates and the ongoing process of unification since 1971.

As a major new public attraction in Dubai, and the vehicle that will announce the story of unification to all, with a particular focus on the period spanning from 1968 to 1971, but capturing nonetheless the major factors that contributed to this major event and the resulting positive impact to UAE's residents. The intent of the Client is to ensure the Museum project will be housed in a world class facility and will encompass a world class visitor experience.

The Exhibition Designers have summarised the criteria that define such a classification for museums, as would be recognised internationally, and is included in Appendix A. World class goes beyond achieving the architectural expression. It also refers to a generous space program and a sustained world-class operation, with programmed activities and adequate staffing.
Three exhibition space options were studied to determine how size impacts the world class qualities as well as how it affects the anticipated visitor attendance.
Refer to attached appendices.



# 1.11 Overview of museum zones

### ZONE A Public/Non Collections:

Spaces accessible by the visiting public, which do not contain collections such as the Lobby, Retail, Cafe and Theater spaces.

### ZONE B Public/Collections:

Spaces for public use that contain collections such as Galleries, which meet Museum standards for public presentation as well as collections standard security and environmental controls

### ZONE C – Non Public/Collections:

Spaces to which public does not have general access but which house collections such as Collection storage, Shipping and Receiving areas, Crate Storage, Conservation Laboratories and other collection handling areas. These spaces require museum collection standards of environmental control and security but not levels of finish required for public use.

### ZONE D Non Public/Non Collections:

Spaces to which the public does not have general access and which do not contain collections such as staff offices and work areas.

# Figure 01 - Overview of museum zones

**Zone A - Public Non-Collection**

Public Entry and Assembly
Retail And Public Food Services
Visitor Amenities
Education And Research Centre

**Zone C- Non-Public/Collection**

Collection Storage
Collection Workshop/Shipping Area

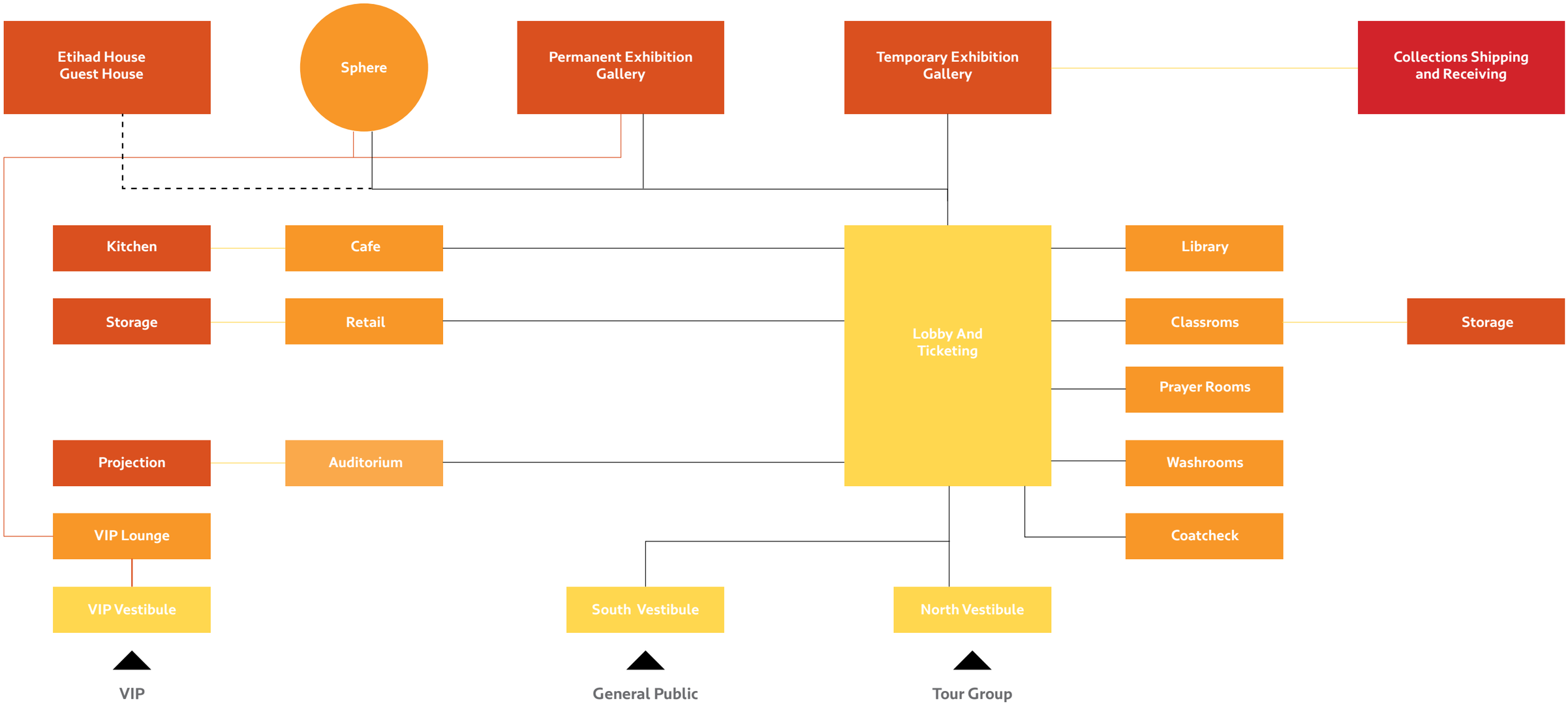
**Zone B - Public Collection**

Permanent Galleries
Temporary Galleries

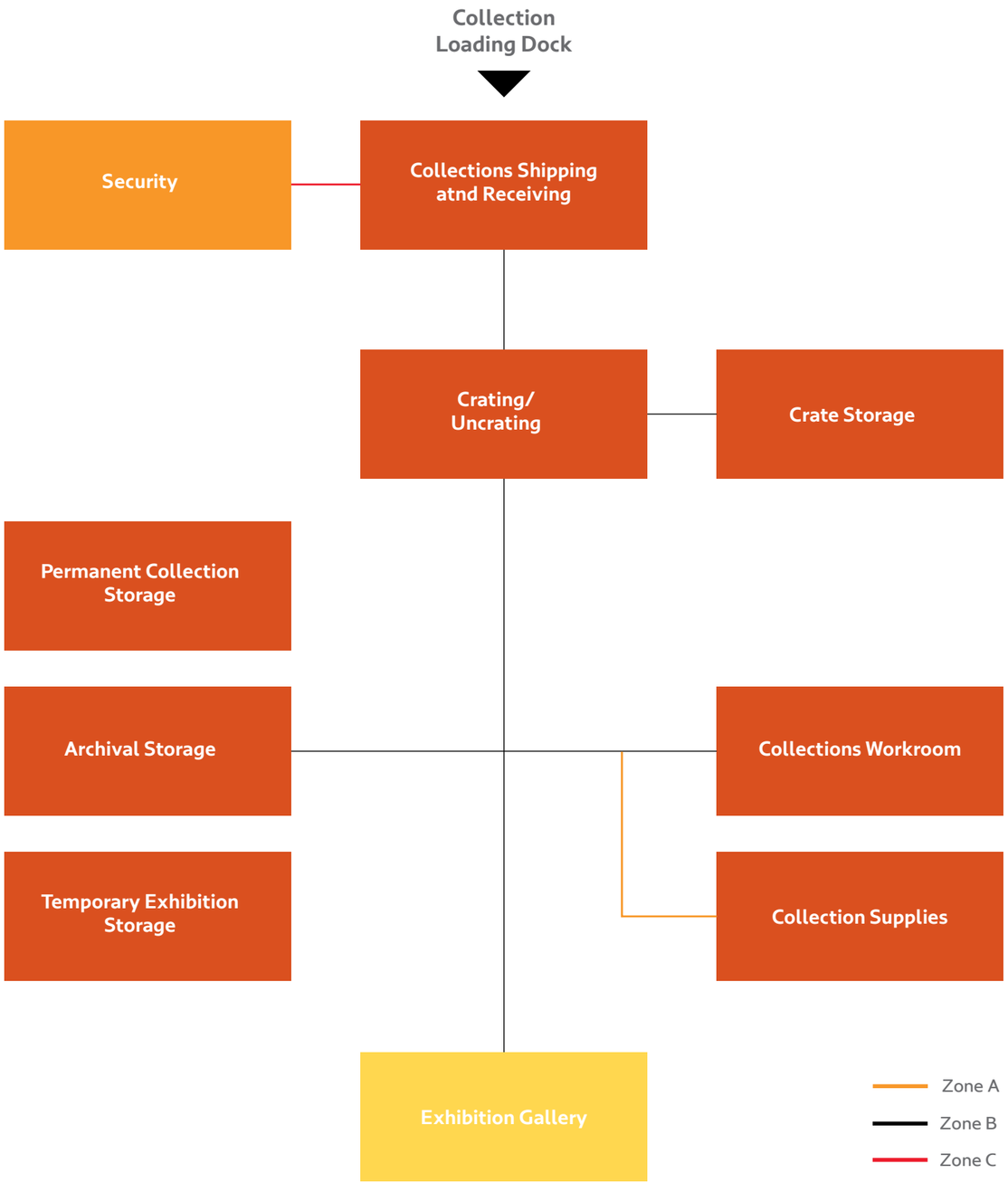
**Zone C- Non-Public/Non-Collection**

Administration
General Storage
Operations
Staff Amenities

# Figure 02 - Visitors circulation



# Figure 03 - Collections circulation






# 1.12 Artifact sourcing process

Identification of potential artifacts for display in the exhibition is an ongoing process that begins with the Interpretive Master Plan, continues through the content development and exhibition design phases, and finally into the fabrication and procurement phase of work.

## Phase 1 Interpretive Master Plan

- At this stage of the process we begin to identify the types of artifacts that may be available for display in exhibits, based on our background research, and discussion with the clients and other institutions regarding the availability of relevant artifacts.
- As the story being told by the permanent exhibition in the Etihad Museum is largely idea based, focusing on unity, identity and the concepts behind UAE Constitution, it was decided early on that this exhibition would not be heavily artifact based. There is also the limitation that no collection exists already that has artifacts related to the events around unification.
- It has been noted in the Interpretive Master Plan that where an authentic artifact cannot be sourced for display, in some cases a replica could be made instead.
- For the most part, the Interpretive Master Plan was devised to make use of dramatic imagery, audio, video and multimedia interactives that can express the key concepts to visitors. This is a word class, high-tech, experiential exhibition rather than a traditional artifact based one.

## Phase 2 Content Development & Exhibition Design

- The next step in identifying artifacts occurs when the exhibits identified in the Interpretive Master Plan are broken out in the Research Matrix. The Matrix identifies which exhibits could feature artifacts or replicas, and directs research into potential objects and sources.
- The Draft Content Package makes some preliminary recommendations on potential artifacts for display based on research done to date. For example this military uniform, or that Abu Dhabi stamp, and any information on potential sources for these items.
- The Final Content Package will incorporate feedback from the client on the preliminary artifact recommendations and will have new recommendations based on ongoing research.
- As content development and exhibition design happen concurrently, each will continue to inform the other and changes can be made as design evolves or new research uncovers potential artifacts.
- By the end of this phase of work there will be a good understanding of the types of artifacts desired for the exhibition, as well as direction on which will likely need to be replicas and which should be authentic artifacts sourced from different institutions.

### Phase 3 Fabrication and Procurement

- Once the final content package is approved by the client, the next step will be to start the artifact procurement process. This may involve requesting loans from other institutions or individuals, or procuring artifacts in another way, for example through purchase.
- The loan process must be undertaken by the owner of the project, who will be responsible for the artifacts on display in the exhibition. Consultants cannot make loan requests. Borrowing from other institutions is a formal process that involves making the initial request, agreeing to terms, completing loan agreement forms, shipping and installing the artifacts.
- Artifacts that the museum will formally take into its own collection must follow an accessioning process. This does not apply to artifacts on loan.
- Objects that are to be reproduced will be the responsibility of the exhibition fabricator, who will make them according to specifications in the content and design packages.
- The museum must have the capability to securely store all artifacts–borrowed and acquired–until the time that they are needed for exhibition installation. It is not wise to take possession of these too early if there is not appropriate storage.
- Artifacts and replicas will be installed by the exhibition fabrication team, except in some circumstances where borrowed artifacts are required to be installed by professional curators under the terms of the loan agreement.
- In some cases, certain artifacts may not be in the possession of the museum in time for installation, and plans should be made to accommodate these in the future once they are secured. In some cases a reproduction could be used in the interim, or a display case added



# The artifacts that identified in the artifact recommendations document:

A. Traditional coffee service implements

B. Traditional Bedouin guns

C. Falconry equipment

D. Traditional Emirati drums

E. Traditional period head coverings

F. Pearl diving equipment

G. Camel racing gear

H. Flags of each of the seven Emirates, prior to Unification (modern or reproduction)

I. Stamps from the individual Emirates, prior to Unification

J. Trucial Oman Scouts Uniform

K. UAE Constitution

L. First aid box from the Medical Services Corp of the Abu Dhabi Defense Force

M. Passports issued in the Emirates before and after union

N. UAE Flag (modern or reproduction)

O. UAE Coat of Arms (modern or reproduction)

P. UAE Stamps showing important national symbols, events, people, etc.

Q. Taxidermy falcon

R. Commemorative coins issued by the UAE Central Bank to commemorate Rulers or special events

S. UAE dirhams from a range of dates

T. Uniforms from the UAE Military, including from humanitarian missions, and women's uniforms

U. UAE Military medals

V. Uae Military equipment set rocket launcher, gas mask, medical bag, gas detector used in Kosovo

# 1.13 Permanent exhibition sections

Introduction + Entry Ramp

Founding Rulers

Dreams of Unity

Road to Unification

Pillars of Union + Unifying the Emirates

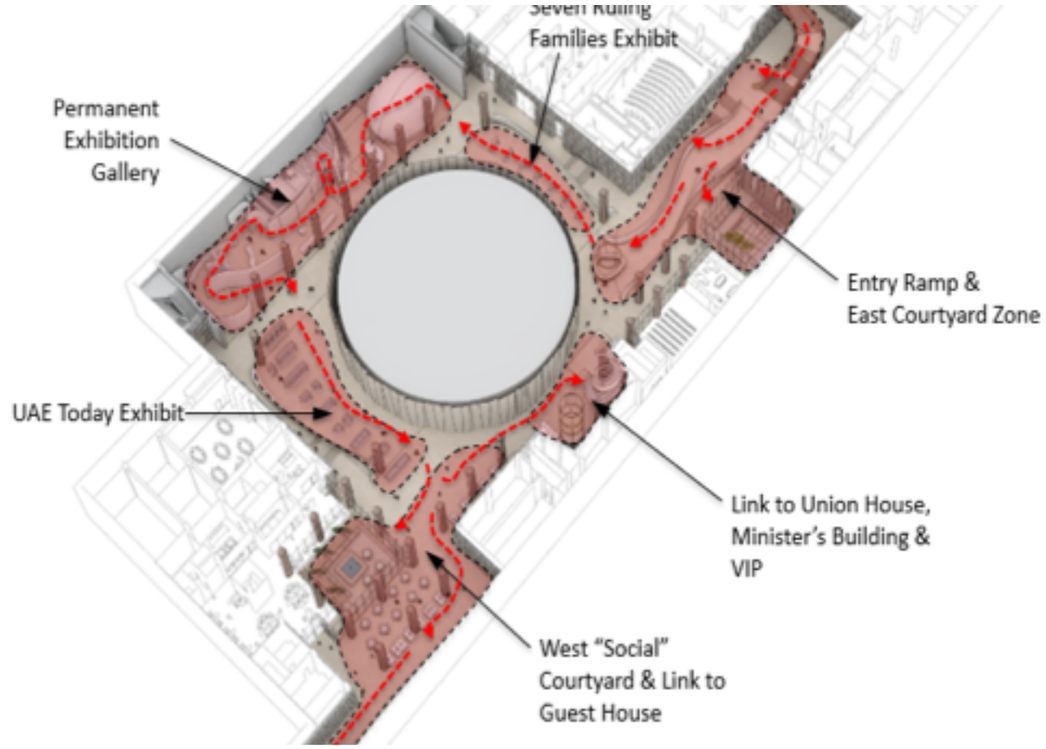
Seeds of Unity

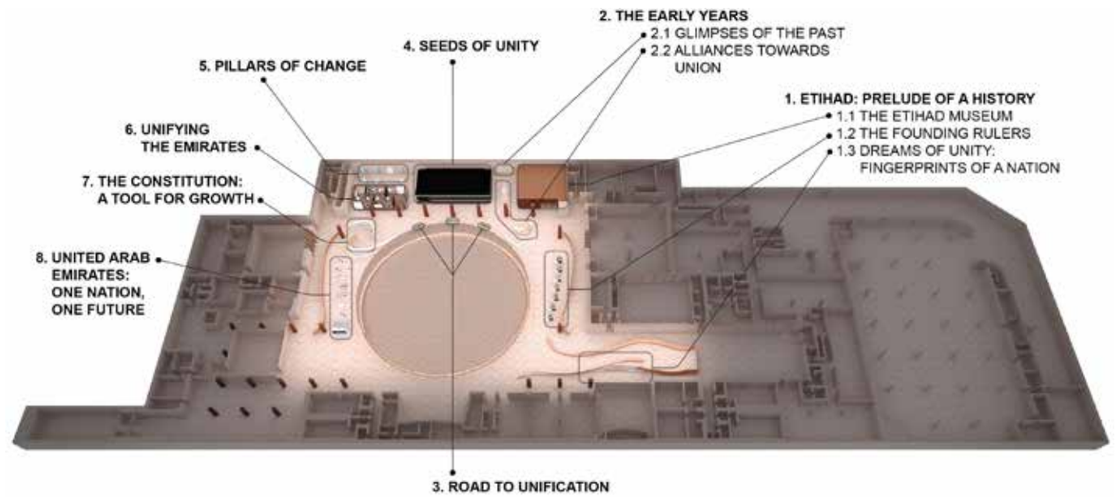
The Consitiution

One Nation, One Future



# Diagram explaining the primary visitors route



# 1.14 Special construction methods used for restoration of the historical buildings

## Cathodic Protection System to restore Etihad House

- **Corrosion is a natural but controllable process**
- **CP system can be applied to mitigate corrosion**
- **Unions House protected by ICCP system**
- **CP design based on 20mA/m2 current density in accordance with BS EN 12969**
- **All materials and Installation shall comply with the requirements of the CP design**
- **Only qualified and experience contractors shall carry out the CP installation and commissioning**
- **Quality control during installation and commissioning**
- **CP Monitoring after commissioning**



### 3D Laser Survey done for Guest House

Depending on the technology employed, UTEC can scan millions of points per second with a range of up to 180 meters, with typical accuracies of +/- 3 millimeters. Such precision offers clients many advantages, including the ability to survey an entire site at one time, safely and efficiently. This eliminates the need for return visits and minimises the exposure of personnel in dangerous or hazardous environments. UTEC laser scanning services deliver high-resolution data to support many areas of Surveying and Engineering for clients in the Oil and Gas, Heavy Civil, or Archeological sectors. Some sample applications include the following:

- Clash Detection Aid in pipe design and clash detection by scanning an area of interest and Eenerating a CAD model
- Civil Engineering Collect topographic data or create accurate volume calculations of a stockpile to determine how much substance has been removed from a location
- Transportation Sector minimise or eliminate downtime during roadway or runway construction, while capturing an accurate model of the area
- Historical Buildings and Sites Capture a 3D point cloud with minimal disturbance to the location

### Commissioning Survey

It is unlikely that professionals in the heritage sector who require laser scanning data or products will themselves have the means or expertise to undertake the work. It is more likely that survey work will need to be commissioned and undertaken by a specialist contractor. The following considered in the survey.

- Consider the level of detail required and the extent of the subject. These are often the overriding parameters used to determine the appropriate survey technique and/or deliverable product.
- Start by working out what data are needed in order to answer the questions you have set. Try to come up with requirements for accuracy and products. It may not be necessary to specify the actual technique to be used, just the required products.
- To consider how you will use the product; additional costs might be hidden in buying new software/hardware.
- To discuss the requirements with possible contractors. A good contractor will be able to advise you if your requirements are achievable, realistic and necessary, as well as provide information on an alternative deliverable product that you may not have considered. Also, discuss the work with other members of your organisation, especially with those with relevant expertise, as other uses for the survey data and products may be apparent to them, and may increase the overall value of the work to be commissioned.

**A quality assurance (QA) check done before accepting the survey and passing it into the archive and on for use.**

# 1.15 Lessons learnt

**The Etihad Museum Project faced many challenges during the project life cycle from conceptualization to completion. RTA documented these challenges as lessons learnt to be used in future projects as also to benefit for the Engineering community as a whole.**

**This section provides a summary of the main challenges faced by Etihad Museum Project classified according to the project phase where the occurred.**

12.1. **Concept and Studies Challenges:**

12.1.1. A large number of stakeholders was involved in this project

12.1.2. Different nationalities of contractor(s), and Consultant(s) resulting in complicated communication

12.1.3. Availability of the copyrights of the historical documents

12.2. **Design Challenges**

12.2.1. Many changes and variations to adopt the design to cover the historical moments

12.2.2. Restoration of historical buildings (Etihad House, and Guest house)

12.2.3. Complexity due to high flow of the water table in the project area (next to the beach)

12.2.4. A large number of information came from different entity in regards of the museum storyline

12.2.5. Availability of artifacts was affecting the design decisions in regards of the story timeline

12.2.6. Design techniques: the strategies for achieving the goals using the design resources available



12.3. **Tendering Challenges**

12.3.1. Most of materials of the exhibitions was part of the provisional sum items due to availability of the information during the design stage

12.4. **Construction Challenges**

12.4.1. Short period of construction (18 months for the Main Works package including the exhibition works)

12.4.2. Excavation around the historical buildings

# 1.16 Challenges faced by the Etihad Museum Project

**13.1. Very tight schedule to complete the project (18 months)**

**13.2. Digging a very deep excavation around the Etihad House**

**13.3. Restoration of the historical buildings**

Digging a very deep excavation around the Etihad House

02

# Lessons learnt from the Etihad Museum project

To overcome the challenges faced the Etihad Museum Project, RTA had to adopt innovative project management techniques as well as utilise all the resources available for it. From these management techniques and their adaptation, RTA could draw several lessons learnt.

The following section summarise the lessons learnt from this prestigious/ historical project into five categories: Managerial, Technical, Administrative, Financial and Contractual.



## 2.1 Managerial lessons learnt

These managerial lessons learnt apply to top management of the owner organisation and can be useful to any governmental agency and/ or privet developer who plans to undertake a similar project.

### Leadership

For projects to succeed, the project leader must possess, display and apply several characteristics of leadership excellence as listed below:

- A clear, strong and unwavering vision.
- Absolute trust in the team and the team must also have absolute trust in the leader and his vision
- Ability to influence all major players on the project
- Technical knowledge
- Momentum, control and follow -through
- A positive, no-nonsense, can do attitude

### Planning

- Client must develop its own project management plan covering the entire project including such as Engineer, the project management company (PMC), the Independent Safety Assess and the Operator.
- Integration of the work of the Engineer, the PMC and the client with clear roles for each.
- Studying the effects of any changes on all aspects of the project (Time, Cost, Quality, Safety, etc.)

### Organisational

The Etihad Museum Project should be treated as a mega project; however, the client should do the following:

Client must develop its own complete project organisation chart with experienced staff and clear roles, responsibilities and Authorities.

- The Client's project staff must focus 100% of their time and effort on the delivery of the project.

### Monitoring and Control

- Client needs to set challenging deadlines
- Client must develop and use strong reporting systems to monitor progress
- Top management should always use multiple sources of information to ensure that they have full picture
- Client must make the right decisions at the right time. Delaying decisions will only result in problems getting larger and the project going into stagnation
- Client must ensure a balanced work distribution between all parties

### Risk Management

- The client must have a robust risk management process of their own without relying on those of the Engineer or the contractor
- Client must develop plans to deal with all anticipated risks
- The client should always have alternative plans and work-arounds



# 2.2 Technical lessons learnt

**The technical lessons learnt apply to the technical aspects of project management. Although these lessons learnt are drawn from a museum's project, they actually apply across most disciplines within the construction industry.**

### Exhibitions Works

- The list of content must be ready before announcing the project in the media, to avoid the monopoly of the artifacts
- Artifacts and all related documents must be collected before starting the project
- Operators need to be involved from the early stage of the project
- All websites related to the museum should be booked before the project started
- MOU needs to be signed with all stakeholders at the early stage of the project

### Monitoring & Controlling

- Client must have direct control over time management
- Client must double check some of the construction works on site
- Client needs to use the opinions of experts (sometimes external) to ensure they are getting the right information

### Engineering

- Client must conduct a detailed soil investigation report before starting the design
- Client must get involved in the reviewing the design with Authority
- Client must have technical team onboard at the site to control the quality, cost, and time
- Client must have BIM 5D to avoid the claims by Contractors and to minimise the number of RFI (s)
- Construction methodology must be defined very well before proceeding with the baseline programme
- Enabling works recommended to be separate phase of the project
- Steel structure design must be developed by specialist, not by consultant

# 2.3 Administrative lessons learnt

- Client must finish all the agreements related to the museums copyrights
- Client should use the time laps cameras in the project to control the progress
- Client must identify all project stakeholders (internal and external) and their requirements and influence on the project
- Client needs to develop a clear communication plan showing the reports, the meetings and all other items of communication
- Client must always have accurate and on-time reporting

# 2.4 Contractual lessons learnt

- Client needs to spend sufficient time in formulating the contract to avoid ambiguity and confusion
- Client can minimise the contractor's chances for claims by providing all documentation, approvals, etc. on time
- Client must have a very strong contract management team
- Client must keep and maintain accurate and complete documentation of all meetings, correspondence, emails, etc.
- Client must ensure that any and all changes are processed through the change management procedure