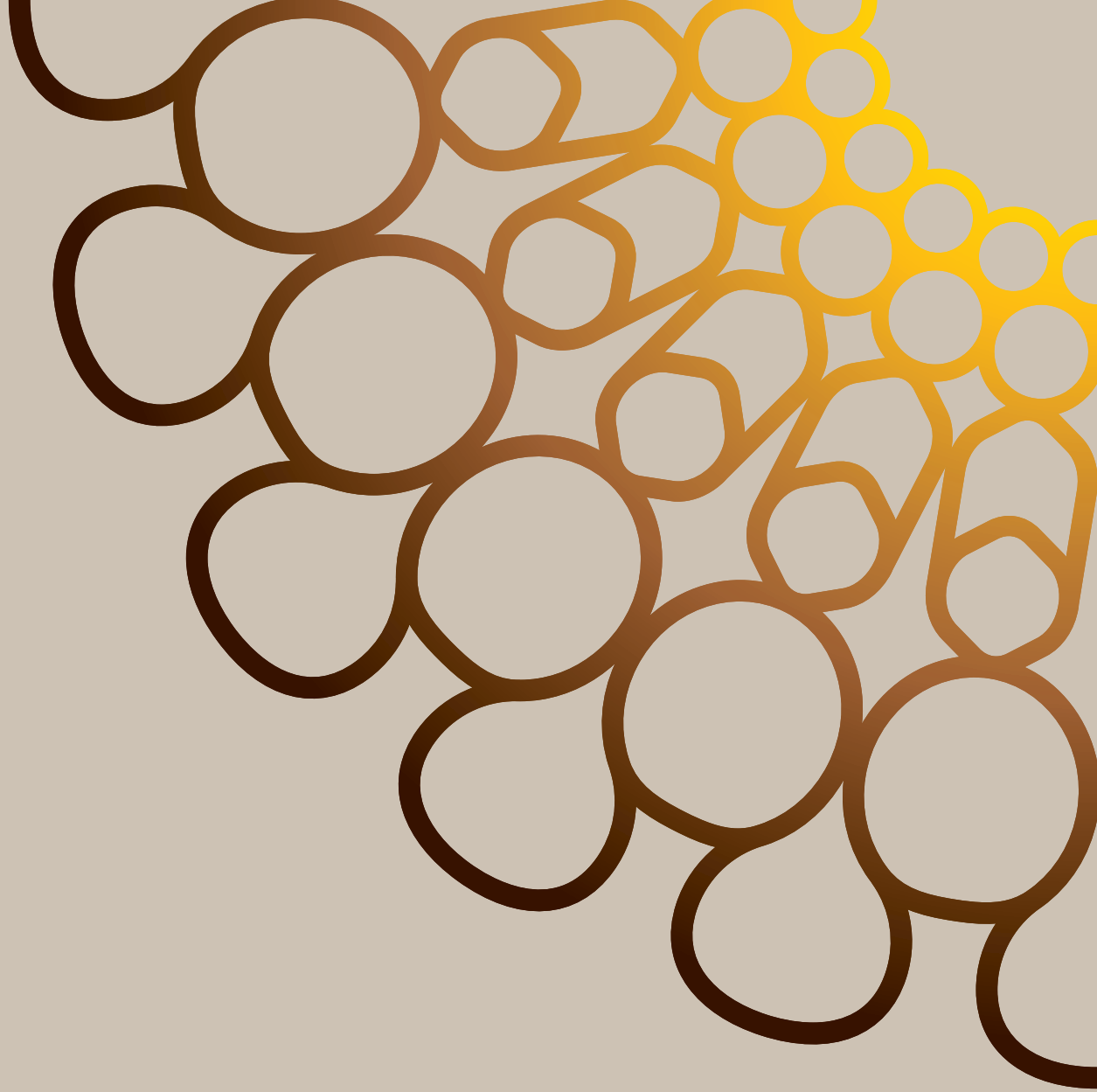




# Self-Build Pavilions Guide



إكسبو 2020 EXPO 2020  
دبي، الإمارات العربية المتحدة  
DUBAI, UNITED ARAB EMIRATES

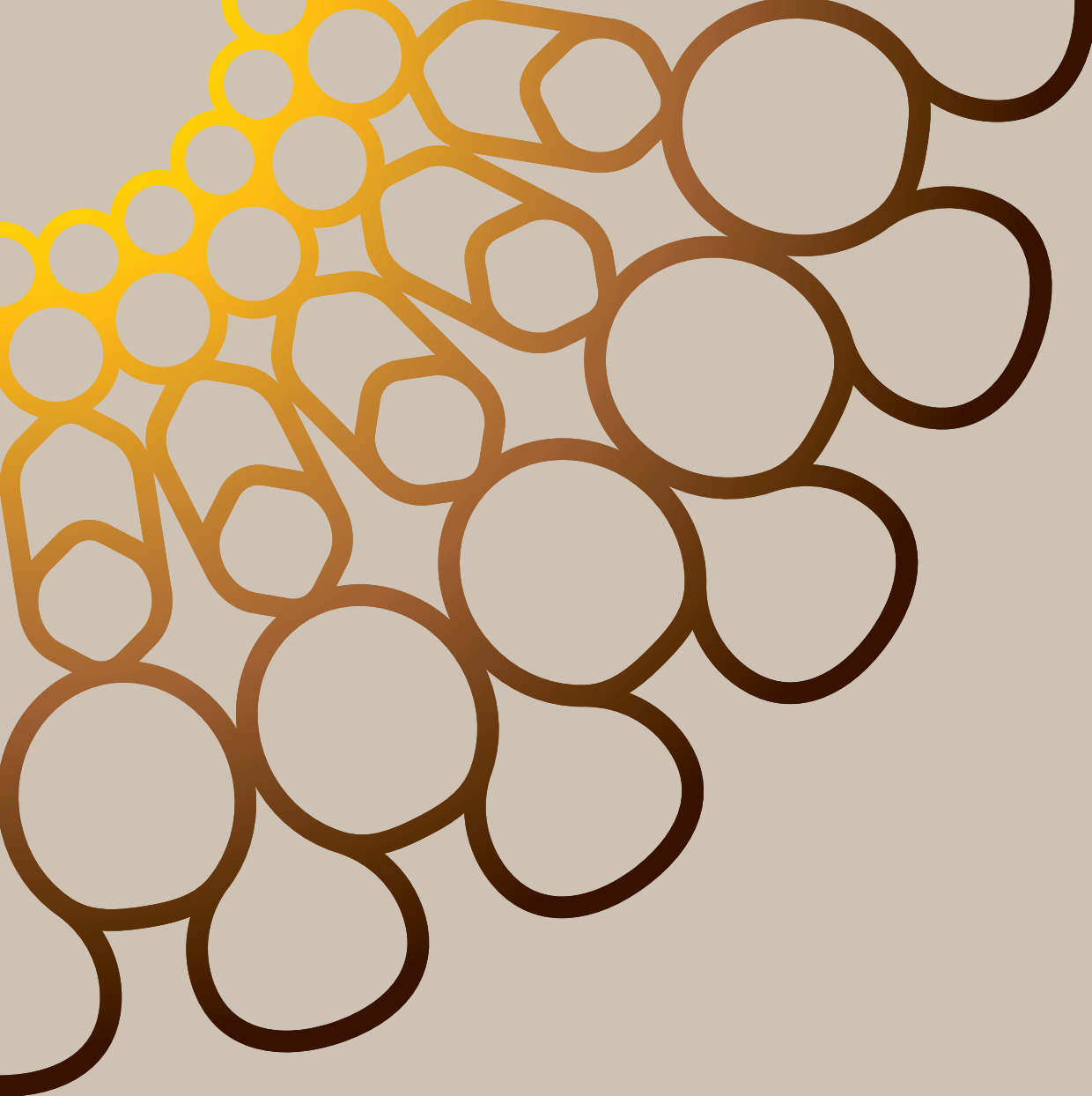


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# Executive Summary

The Expo 2020 Dubai theme of Connecting Minds, Creating the Future is a formula for innovation and progress. It was carefully designed to reflect the critical needs of our time as well as to build on a platform of global innovation for the participants to fulfil their potential, to share their journey, and to enhance the visitor experience.

Along with the subthemes of Opportunity, Mobility, and Sustainability, the theme supports the participants in maximising their benefits from Expo 2020 Dubai by developing synergies and interconnections with the visitors, with other participants, and with the Organiser.

The overall theme will help stimulate new partnerships for progress, encourage collaboration, and inspire global creativity on how to tackle the challenges of the future in ways that reflect our interdependencies with technology.

To fully harness the contributions of the participants, and to ensure that they are part of an outcome much greater than the sum of the individual stories, Expo 2020 Dubai has developed the Self-Build Pavilions Guide. This document provides design standards for building participant pavilions; recommendations for planning and designing food and beverage establishments; and requirements for procuring sustainable products or services. Self-Build Pavilions Guide contains two chapters:

- › **Chapter I Design Guide:** This chapter provides overall planning, design guides, and required controls for the participants to develop their plots on the site.
- › **Chapter II Excerpts from Dubai Municipality Food Code:** This chapter provides recommendations on the design and layout of food and beverage sections within the pavilions, in compliance with Dubai Municipality's Food Code.

Pavilions have always been a source of excitement and attraction for visitors at World Expos. Since the first World Expo in 1851, pavilions have become a magnet for millions of visitors and a source of timeless memories. Participants' pavilions and exhibits allow visitors to travel to unexplored places and learn more about the cultures and achievements that make up our diverse world.

Self-Build Pavilions Guide aims to be an effective tool to assist the participants in creating pavilion designs aligned with the theme and subthemes, while providing them the freedom to express their individual concepts.

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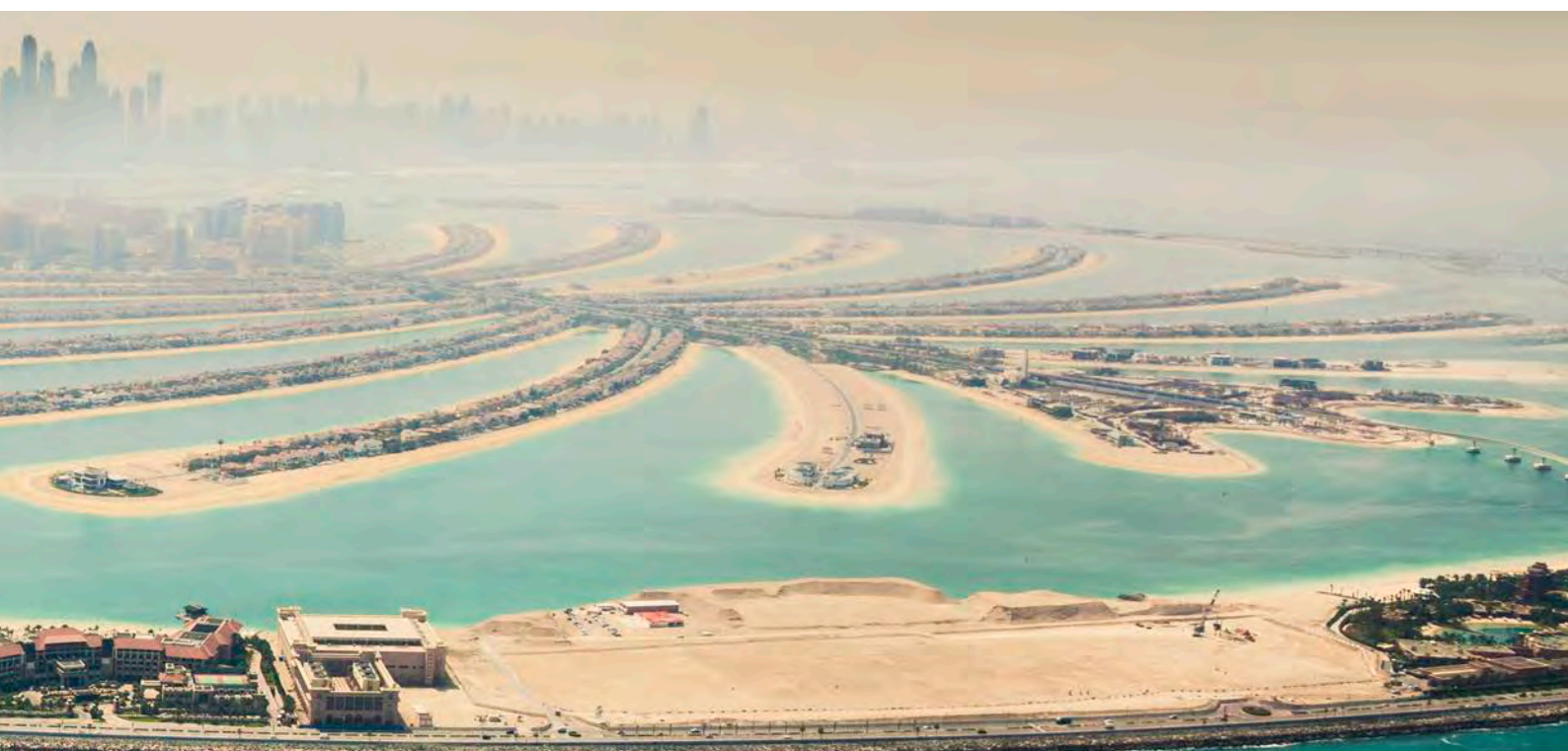
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# Acronyms, Abbreviations, Units, and Definitions

## Acronyms and Abbreviations

| Acronym/Abbreviation | Expansion                                                                  |
|----------------------|----------------------------------------------------------------------------|
| AS/NZS               | Standards Australia and Standards New Zealand                              |
| ASHRAE               | American Society of Heating, Refrigerating, and Air Conditioning Engineers |
| ASTM                 | American Society for Testing and Materials                                 |
| ATCM                 | Airborne Toxic Control Measure                                             |
| BIE                  | Bureau International des Expositions                                       |
| BMS                  | Building Management System                                                 |
| BoH                  | Back of House                                                              |
| CAP                  | Climate Action Programme                                                   |
| CARES                | Certification Authority for Reinforcing Steels                             |
| CCA                  | Crushed Concrete Aggregate                                                 |
| DEWA                 | Dubai Electricity and Water Authority                                      |
| DIN                  | German Institute for Standardisation                                       |
| DM                   | Dubai Municipality                                                         |
| DWC                  | Dubai World Central                                                        |
| ECVM                 | European Council of Vinyl Manufacturers                                    |
| EN                   | European Standards                                                         |
| FAR                  | Floor Area Ratio                                                           |
| FoH                  | Front of House                                                             |
| FSC                  | Forestry Stewardship Council                                               |
| GEP                  | Green Economy Partnership                                                  |
| GFA DM               | Gross Floor Area Dubai Municipality                                        |
| GFA RICS             | Gross Floor Area Royal Institution of Chartered Surveyors                  |
| GIA                  | Gross Internal Area                                                        |
| HVAC                 | Heating, Ventilating, and Air Conditioning                                 |
| IECC                 | International Energy Conservation Code                                     |
| IES                  | Illuminating Engineering Society                                           |
| ISO                  | International Organisation for Standardisation                             |
| JIS                  | Japanese Industrial Standards                                              |
| LEED®                | Leadership in Energy and Environmental Design                              |
| LVL                  | Laminated Veneer Lumber                                                    |
| MAFF                 | Japanese Ministry of Agriculture, Forestry, and Fisheries                  |
| MDF                  | Medium Density Fibreboard                                                  |
| PEFC                 | Programme for the Endorsement of Forest Certification                      |
| PVC                  | Polyvinyl Chloride                                                         |
| RICS                 | Royal Institution of Chartered Surveyors                                   |
| SRI                  | Solar Reflectance Index                                                    |
| TVOC                 | Total Volatile Organic Compounds                                           |
| UAE                  | United Arab Emirates                                                       |
| UNEP                 | United Nations Environment Programme                                       |
| VIP                  | Very Important Person                                                      |
| VVIP                 | Very, Very Important Person                                                |
| VOC                  | Volatile Organic Compound                                                  |
| WBCSD                | World Business Council for Sustainable Development                         |

## Units

| Unit                  | Expansion                        |
|-----------------------|----------------------------------|
| g/L                   | Grams per Litre                  |
| ha                    | Hectares                         |
| km                    | Kilometre                        |
| kV                    | Kilovolt                         |
| kW                    | Kilowatt                         |
| kWh/m <sup>2</sup>    | Kilowatt-Hours per Square Metre  |
| L/Flush               | Litres per Flush                 |
| L/m <sup>2</sup> /day | Litres per Square Metre per Day  |
| L/min                 | Litres per Minute                |
| lm/W                  | Lumens per Watt                  |
| m                     | Metre                            |
| m <sup>2</sup>        | Square Metres                    |
| mg/L                  | Milligrams per Litre             |
| mg/m <sup>2</sup> hr  | Milligrams per Square Metre-Hour |
| mg/m <sup>3</sup>     | Milligrams per Cubic Metre       |
| mm                    | Millimetre                       |
| W                     | Watt                             |
| W/linear metre        | Watts per Linear Metre           |
| W/m <sup>2</sup>      | Watts per Square Metre           |
| W/m <sup>2</sup> K    | Watts per Square Metre Kelvin    |



## Definitions

| Term                        | Definition                                                                                                                                                                                                                                                           |
|-----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Arrival Plaza               | Initial area inside the gated perimeter after passing the gate.                                                                                                                                                                                                      |
| Assisted Pavilions          | Pavilions allocated to developing countries eligible for the assistance programme.                                                                                                                                                                                   |
| Back of House               | Designated area used for service and accredited circulation.                                                                                                                                                                                                         |
| Baseline                    | Line upon which most letters 'sit' and below which descenders for letters such as 'g' extend.                                                                                                                                                                        |
| Cap Height                  | Height of a capital letter above the baseline for a particular typeface. It specifically refers to the height of capital letters that are flat—such as H or I—as opposed to round letters such as O, or pointed letters like A, both of which may display overshoot. |
| Concourse                   | Public circulation spaces within the Expo 2020 gated perimeter.                                                                                                                                                                                                      |
| Entrance Plaza              | First point of entry, where visitors arrive, adjacent to the gates, but outside the gated perimeter.                                                                                                                                                                 |
| Entrances                   | Entry points allowing access to the gated perimeter.                                                                                                                                                                                                                 |
| Expo 2020 Dubai             | Name of the event that will be hosted on the Expo site; Also referred to as 'Expo 2020,' 'Expo,' 'Dubai Expo 2020,' 'Expo Dubai 2020,' and 'Expo event.'                                                                                                             |
| Expo Site                   | The site on which Expo 2020 will be hosted. It includes areas within and outside the gated perimeter. Also referred to as 'site.'                                                                                                                                    |
| ExpoRider                   | Internal site transit system.                                                                                                                                                                                                                                        |
| Floor Area Ratio (DM)       | The ratio resulting from dividing the total built up area over the total plot area. Areas excluded from the calculation of the total built up area as per DM definition.                                                                                             |
| Floor Area Ratio (RICS)     | Defined by dividing the gross internal area defined by the RICS Code of Measuring Practice 6th Edition.                                                                                                                                                              |
| Front of House              | Area of the pavilion or site that will host the visitors.                                                                                                                                                                                                            |
| Fruin Level of Service      | Qualitative measure used to calculate visitor circulation and level of service for queuing and waiting areas.                                                                                                                                                        |
| Gate                        | Control point allowing entry to the gated perimeter.                                                                                                                                                                                                                 |
| Gated Perimeter             | The part of the Expo site that is fenced and gated.                                                                                                                                                                                                                  |
| General Regulations         | The regulations of Expo 2020 Dubai, which constitute part of the Registration Document.                                                                                                                                                                              |
| Global Warming Potential    | Measure of how much energy the emissions of one tonne of a gas will absorb over a given period of time, relative to the emissions of one tonne of carbon dioxide.                                                                                                    |
| Grey Water                  | Untreated wastewater, including water from bathroom wash basins and clothes washers.                                                                                                                                                                                 |
| Gross Floor Area (GFA DM)   | Total floor area less area of parking lots, access roads, loading/unloading bays, covered way, swimming pools, basement floors allocated for parking and services, mechanical services floors, roof service floors, non-closed balconies, and terraces.              |
| Gross Floor Area (GFA RICS) | Equal to the gross internal area defined by the RICS Code of Measuring Practice 6 <sup>th</sup> Edition.                                                                                                                                                             |
| Gross Internal Area         | Defined by the RICS Code of Measuring Practice 6 <sup>th</sup> Edition.                                                                                                                                                                                              |
| Heat Island Effect          | Thermal absorption by hardscape, such as dark, non-reflective pavements and buildings, and its subsequent radiation to surrounding areas.                                                                                                                            |
| Host Country                | UAE is the host country; The country that has been awarded the rights to organise Expo 2020.                                                                                                                                                                         |
| Light Reflectance Value     | Measure of visible and usable light that is reflected from a surface when illuminated by a light source.                                                                                                                                                             |
| Light Source Intensity      | Flux flowing out of a source in a given direction per solid angle and it is used to quantify the power of a light source.                                                                                                                                            |
| Lux                         | International standard unit of illuminance and luminous emittance measuring luminous flux per unit area.                                                                                                                                                             |
| Majlis                      | This is an Arabic term meaning 'a place of sitting' to describe various types of special gatherings, typically a large space, to discuss local events and issues, exchange news, receive guests, socialise and be entertained.                                       |
| Master Plan                 | The detailed plan that outlines the different real estate elements, open spaces, and other facilities within the Expo site.                                                                                                                                          |
| National Days               | Calendar days during the operation period of Expo 2020 Dubai dedicated to celebrating the national days of the participant countries.                                                                                                                                |
| Official Participants       | Foreign governments and international organisations who received and accepted the official invitation from the Government of the UAE to participate in Expo 2020 Dubai. These include countries and multilateral organisations.                                      |
| Organiser                   | Bureau Expo Dubai 2020; established by virtue of Decree No. 30 of 2014 issued on 25 June 2014 to administer the organisation of Expo 2020 Dubai.                                                                                                                     |
| Ozone Depletion Potential   | Potential for a single molecule of the refrigerant to destroy the ozone layer.                                                                                                                                                                                       |
| Participant Countries       | Official countries participating in Expo 2020 Dubai.                                                                                                                                                                                                                 |

## Definitions

| Term                         | Definition                                                                                                                                                                                                                                                                                                                                                                                                            |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Participant Portal           | Web-based portal that facilitates communication, events management, and service requests/delivery to the participants.                                                                                                                                                                                                                                                                                                |
| Participation Contract       | The contract agreed upon between each Section Commissioner General and the Organiser to establish the terms and procedures by which the official participants will take part in Expo 2020 Dubai.                                                                                                                                                                                                                      |
| Plot Coverage                | Extent of plot covered by the building(s) or structure and this is expressed in terms of percentage. It is the ratio of the building footprint area over the plot area.                                                                                                                                                                                                                                               |
| Post-consumer Content        | Material generated by households or by commercial, industrial, and institutional facilities in their role as end-users of the product that can no longer be used for its intended purpose.                                                                                                                                                                                                                            |
| Post-industrial Content      | Material diverted from the waste stream during the manufacturing process.                                                                                                                                                                                                                                                                                                                                             |
| Recycled Content             | Proportion, by mass, of recycled material in a product or packaging. Only pre-consumer and post-consumer materials shall be considered.                                                                                                                                                                                                                                                                               |
| Registration Document        | The document relating to the realisation and feasibility of Expo 2020 Dubai which the Inviting Government submitted to the BIE, and which the BIE registered during the 158 <sup>th</sup> General Assembly on 25 November 2015.                                                                                                                                                                                       |
| Rented Pavilions             | Pavilions built by the Organiser and rented by the participants for their exhibition.                                                                                                                                                                                                                                                                                                                                 |
| Section Commissioner General | Official participant representative appointed to manage the participation file in accordance with Article 13 of the Convention.                                                                                                                                                                                                                                                                                       |
| Self-Build Pavilions         | Pavilions built by the participants.                                                                                                                                                                                                                                                                                                                                                                                  |
| Service Road                 | The road within the gated perimeter going around the site behind the Self-Build Pavilion plots.                                                                                                                                                                                                                                                                                                                       |
| Setback                      | A space left between the outer surface of the building proposed and the edge of the plot boundary. Setbacks are usually classified into front, rear, and side setbacks according to the sides of the plot they occupy.                                                                                                                                                                                                |
| Sky Glow                     | Illumination of the night sky or parts of it.                                                                                                                                                                                                                                                                                                                                                                         |
| Solar Reflectance Index      | A measure of the solar reflectance and emissivity of materials that can be used as an indicator of how hot they are likely to become when solar radiation is incident on their surface.                                                                                                                                                                                                                               |
| Source Control Measure       | Post-development best management practices that prevent pollutant generation, discharge and runoff by controlling it at its source or, at a minimum, limiting pollutant exposure to stormwater.                                                                                                                                                                                                                       |
| Special Pavilions            | UAE Pavilion, Theme Pavilions, Multilateral Pavilions, Leadership Pavilion, Corporate Hospitality Pavilion, Children's Pavilion, Media Pavilion, and Service Pavilions                                                                                                                                                                                                                                                |
| Special Regulations          | The Special Regulations listed in Article 34 of the General Regulations.                                                                                                                                                                                                                                                                                                                                              |
| Subthemes                    | Expo 2020 subthemes of Opportunity, Mobility, and Sustainability.                                                                                                                                                                                                                                                                                                                                                     |
| Surface Luminance            | A utility node that tells the luminance (brightness) of a point on a surface as it is being rendered.                                                                                                                                                                                                                                                                                                                 |
| Thematic Districts           | Physical areas on the Expo site hosting pavilions built by the Organiser, Special Pavilions, Self-Build Pavilions, and Thematic Pavilions                                                                                                                                                                                                                                                                             |
| Thematic Pavilions           | Special pavilions located in each Thematic District addressing the subthemes.                                                                                                                                                                                                                                                                                                                                         |
| Theme                        | Expo 2020 theme of <i>Connecting Minds, Creating the Future</i> .                                                                                                                                                                                                                                                                                                                                                     |
| Theme Statement              | An integral part of the Participation Contract, the Theme Statement is the first official document to be submitted by participants for approval by the Organiser. The Theme Statement should define the overall theme and the general contents of participant pavilion, providing a general overview of the proposed strategy, thematic content, installations, events, and architectural expression of the pavilion. |
| Treated Sewage Effluent      | Reclaimed non-potable water that is treated to secondary or tertiary level and can be reused to meet non-potable water demand.                                                                                                                                                                                                                                                                                        |
| U-Value                      | Overall heat transfer coefficient that describes how well a building element conducts heat or the rate of transfer of heat (in watts) through one square metre of a structure divided by the difference in temperature across the structure.                                                                                                                                                                          |
| Vertical Illuminance         | Measure of light falling onto a point where the light metre at that point is tilted 90 degrees.                                                                                                                                                                                                                                                                                                                       |
| VIP                          | Special visitors and officials who can be integrated or escorted through a full range of visitor experiences with enhanced access arrangements.                                                                                                                                                                                                                                                                       |
| VVIP                         | Visitors that are members of the Royal Family, Heads of State and their representatives whose protocol arrangements are dictated by an external agency.                                                                                                                                                                                                                                                               |
| Welcome Plaza                | Area within the gated perimeter after passing the Arrival Plaza.                                                                                                                                                                                                                                                                                                                                                      |
| X-Height                     | The height of lowercase letters reach based on height of lowercase x; does not include ascenders or descenders.                                                                                                                                                                                                                                                                                                       |
| X-Spaces                     | X-Spaces are dynamic venues located at the heart of the public realm in each subtheme district, hosting Expo Live exhibitions and unveiling the latest innovations related to each subtheme.                                                                                                                                                                                                                          |

# Chapter I

## Design Guide



THE DESIGN GUIDE  
PROVIDES A  
COMPREHENSIVE  
PLANNING AND  
CONTROLS  
FRAMEWORK  
FOR THE DESIGN,  
CONSTRUCTION, AND  
DECOMMISSIONING  
OF PAVILIONS AT  
EXPO 2020 DUBAI®.

# 1 Introduction





# 1 Introduction

This chapter details the planning and controls required for the participants to commence design for the pavilions that will be constructed for Expo 2020 Dubai®. In addition to planning and controls, the design guide presents an overview of the Master Plan that will facilitate the design aspirations of the participants while considering the theme and subthemes.

## 1.1 Objectives

The objectives of the design guide are to:

- › Serve as an effective tool to implement the spatial aspirations of the Master Plan
- › Pursue a 'performance-based' approach to development control as opposed to a 'prescriptive' approach to allow a high degree of flexibility for the participants
- › Provide clear and consistent development control guides for the participants
- › Encourage site-responsive design and innovation that respects, enhances, and contributes to the character of the districts identified in the Master Plan
- › Promote sustainable development
- › Ensure that the built form and public realm within the site is coherent and of high quality

The design guide focuses on the Expo 2020 Dubai event, and provide controls and guides for the design, construction, and dismantling of pavilions.

Note that the content within this document is subject to BIE's approval or Special Regulation No. 4 - Construction.

## 1.2 Design Guide Overview

For ease of use, this chapter has been split into the following five sections:

- › **Section 1 Introduction:** This section provides the background to the design guide as well as the objectives.
- › **Section 2 Master Plan Context:** This section describes the key elements of the Master Plan to help the individual pavilion designers to understand the wider planning context.
- › **Section 3 Controls and Guides:** This section provides specific compliance framework for the development of plots.
- › **Section 4 Plot Sheets:** This section includes example plot sheets for small, medium, and large pavilions. Final plot sheets identifying specific plot parameters will be provided to the participants upon plot allocation.
- › **Section 5 Design Submission, Review, and Approvals:** This section explains the process that the Organiser will adopt to review and approve the pavilion design of the participants.







## 2 Master Plan Context







## 2 Master Plan Context

The Master Plan was developed to create a physical and engaging environment that embraces and reinforces the vision for the event by incorporating the theme and subthemes. By seamlessly accommodating the requirements of all visitors and participants, the Master Plan will help deliver an event that amazes, inspires, entertains, and educates everyone, while delivering an authentic cultural experience.

### 2.1 Site Context

The site for Expo 2020 Dubai was carefully chosen to provide maximum operational and logistical efficiency for the participants, ease of local and regional access for visitors, a high level of international visibility, and strong consideration for safety and security. Situated in an area of burgeoning economic growth that is home to

Dubai World Central, Dubai Industrial City, Jebel Ali Free Zone, and Dubai Investments Park, the location provides a unique opportunity to support the development of the core growth areas of Dubai South within the City of Dubai and its urban development strategy. Refer to Figure 2.1 and Figure 2.2 for site context and location plan.



Figure 2.1 Site Context and Location Plan (UAE)



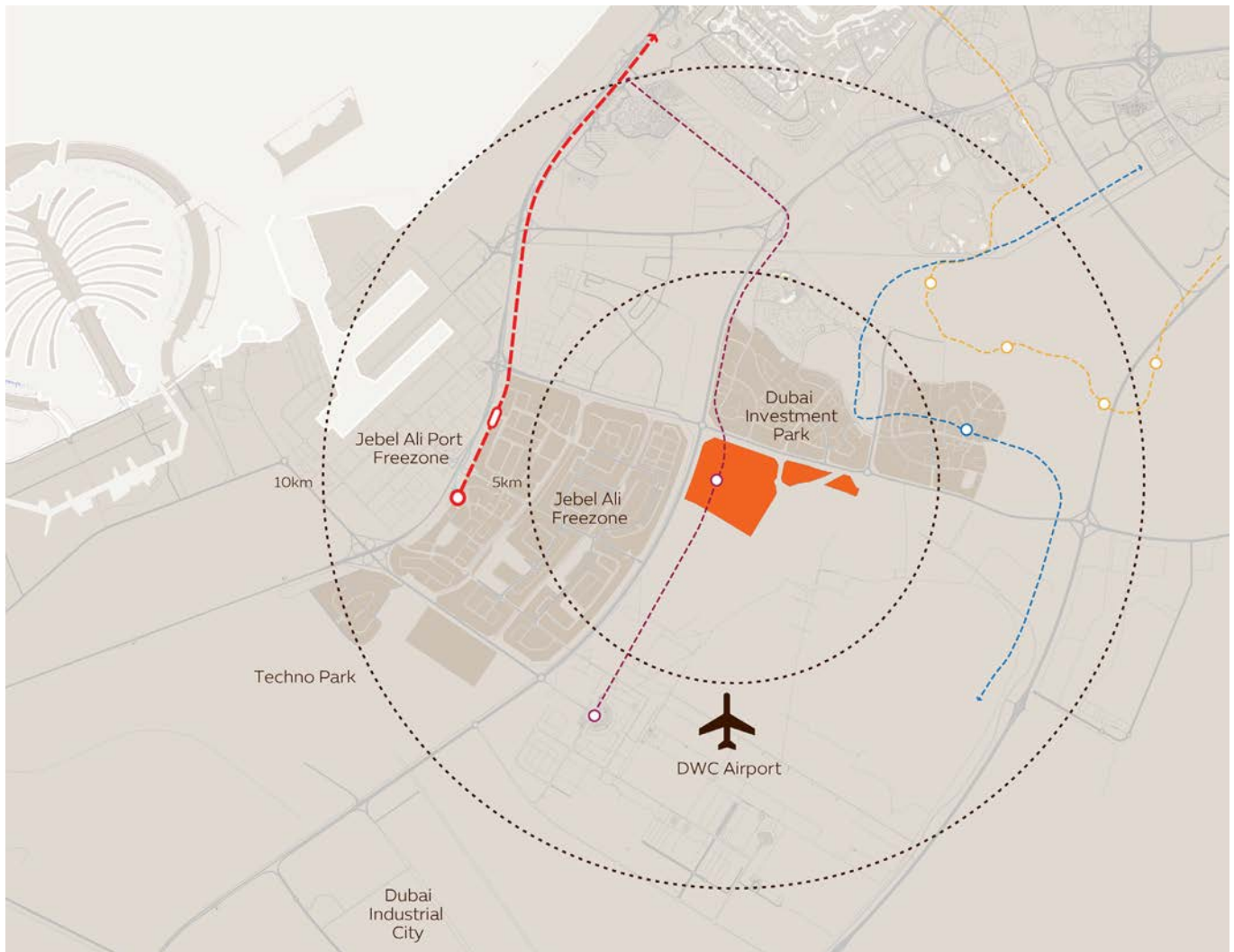


Figure 2.2 Site Context and Location Plan (Dubai)

**KEY**

- |                                                                                                                                                 |                                                                                                                                      |
|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|
| <span style="display: inline-block; width: 15px; height: 10px; background-color: orange; border: 1px solid black;"></span> Expo 2020 Dubai Site | <span style="display: inline-block; width: 20px; border-bottom: 2px dashed blue;"></span> Metro Blue Line - Future Proposed (2030)   |
| <span style="display: inline-block; width: 15px; height: 15px; border: 1px dashed black; border-radius: 50%;"></span> Radius from Expo          | <span style="display: inline-block; width: 20px; border-bottom: 2px dashed yellow;"></span> Metro Gold Line - Future Proposed (2030) |
| <span style="display: inline-block; width: 20px; border-bottom: 2px solid grey;"></span> Existing Road Network                                  | <span style="display: inline-block; width: 20px; border-bottom: 2px dashed purple;"></span> Metro Red Line (Extension)               |
| <span style="display: inline-block; width: 20px; border-bottom: 2px dashed red;"></span> Metro Red Line (Existing)                              |                                                                                                                                      |

### 2.1.1 Development Concept

The Master Plan is designed around the theme of *Connecting Minds, Creating the Future*. Three districts take their identity from the three subthemes: Opportunity, Mobility, and Sustainability. Each district will have an architectural expression created by an identifiable distinction in material, colour, and pattern based on the respective theme. This distinction created by the thematic architectural elements will facilitate easy navigation through the site. Refer to Figure 2.3.

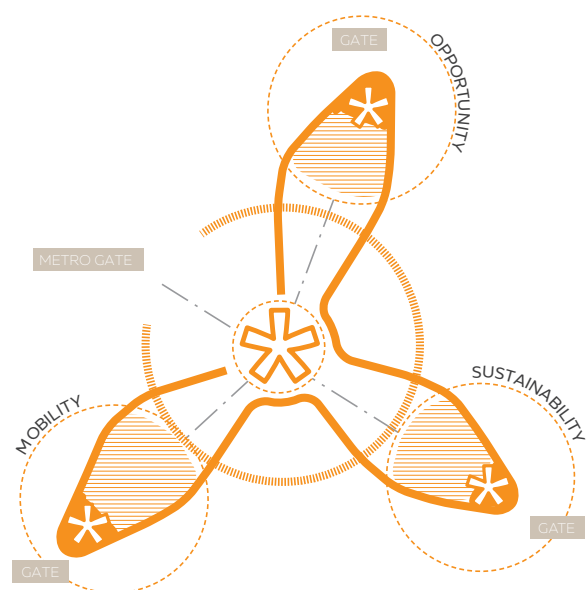


Figure 2.3 Development Concept Diagram

## 2.2 Master Plan Guiding Principles

The Master Plan is based on guiding principles that define its components, such as site layout, building positioning and massing, services, and operations. The guiding principles of the Master Plan are:

- › Showcase theme and subthemes
- › Catalyse and showcase innovation and culture
- › Embrace accessibility for all
- › Raise visitor experience standards
- › Facilitate collaboration among participants
- › Maximise visibility for all participants
- › Reflect UAE's culture and heritage
- › Achieve efficiency in participants' operations
- › Become a reference in sustainability for future World Expos
- › Demonstrate Smart Site initiatives
- › Prioritise health and safety in design, delivery, and operations
- › Build a lasting and viable legacy

These guiding principles are briefly discussed in the following sections.

### 2.2.1 Showcase Theme and Subthemes

The Master Plan reflects the theme of *Connecting Minds, Creating the Future*, and aims to seamlessly integrate the three subthemes of Opportunity, Mobility, and Sustainability into the urban design, infrastructure, delivery, operations, and legacy.

### 2.2.2 Catalyse and Showcase Innovation and Culture

Expo 2020 Dubai will leverage technological and cultural components across the site to foster programmes for developing solutions to challenges related to the subthemes.

### 2.2.3 Embrace Accessibility for All

The Master Plan lays a strong emphasis on ensuring that the event is accessible, engaging, and appropriate for everyone. It aims to enable all involved with the event to benefit from an inclusive experience with specific attractions, services, amenities, and design considerations that maximise enjoyment and comfort for all.

### 2.2.4 Raise Visitor Experience Standards

The site has been designed to provide a memorable experience for all visitors. All visitors arriving at the site will embark on a journey of discovery. All facilities and attractions will be conveniently located to enhance the visitor experience.

### 2.2.5 Facilitate Collaboration among Participants

The Master Plan allows collaboration among participants through a spatial layout that provides a blend of pavilion types in an interactive environment to foster engagement and partnership.

### 2.2.6 Maximise Visibility for All Participants

The configuration of the Master Plan maximises the exposure of all participants and minimises a hierarchy of locations. This guiding principle is also reflected in the plot allocation for participant countries.

### 2.2.7 Reflect UAE's Culture and Heritage

Several Organiser-built structures of Expo 2020 Dubai will showcase local culture. Specifically, the public realms and parks will be inspired by local landscapes, and will incorporate native plant species.

### 2.2.8 Achieve Efficiency in Participants' Operations

Expo 2020 Dubai aims to set logistics management standards. The Master Plan accounts for the logistics and service routes needed to provide efficient service levels to all areas where participants will be hosted.

### 2.2.9 Become a Reference in Sustainability for Future World Expos

Expo 2020 Dubai is driven by four high-level sustainability objectives:

- › Host one of the most sustainable World Expos ever, leaving a legacy of sustainable infrastructure, operations, and practices
- › Catalyse and support sustainability efforts in Dubai and the UAE
- › Increase public awareness about sustainability
- › Act as catalyst for the development of solutions to existing sustainability challenges

### 2.2.10 Demonstrate Smart Site Initiatives

Expo 2020 Dubai aims to excel in combining technology/innovation and culture to showcase Smart Site operations that will provide interactive, educational, and cultural experiences for both visitors and participants. Smart Site operations are incorporated into the Master Plan components and into the strategy to deliver an effective platform for visitors and participants.

### 2.2.11 Prioritise Health and Safety in Design, Delivery, and Operations

Health and safety in design, delivery, and operations is a priority for Expo 2020 Dubai. A centralised health and safety control room ensures that venue operations planning is integrated into every aspect. Health and safety considered throughout all design stages will minimise the risks associated with the construction, operations, maintenance, and decommissioning of pavilions.

### 2.2.12 Build a Lasting and Viable Legacy

Planning for legacy has been a key driver for the master planning process. To ensure minimal deconstruction of the pavilions built by the Organiser, the Master Plan has considered the following:

- › Maximising the number of pavilions built by the Organiser that will remain in legacy
- › Providing efficiency in utility design
- › Ensuring flexibility in the legacy Master Plan to be able to respond to market demands and ensure commercially viable legacy development opportunities

## 2.3 Master Plan Elements

The Master Plan has a variety of specifically designed key open spaces, building types, and several unique structures to provide an intriguing architectural and experiential urban environment. Refer to Figure 2.4.



Figure 2.4 Base Master Plan



2.3.1 Building Typologies

The Master Plan creates distinct districts for a range of building types within the gated perimeter. Defined according to their spatial distribution, the main building types are: Self-Build Pavilions; pavilions built by the Organiser; pavilions within the Thematic Districts; and Multipurpose Halls. Refer to Figure 2.5.

Self-Build Pavilions

These pavilions vary in plot size (categorised as extra large, large, medium, and small pavilions) and are distributed throughout the Master Plan. All Self-Build Pavilions are accessible from the main concourses and circulation areas. Further details and specifications on the design of Self-Build Pavilions are provided in Section 3 Controls and Guides.

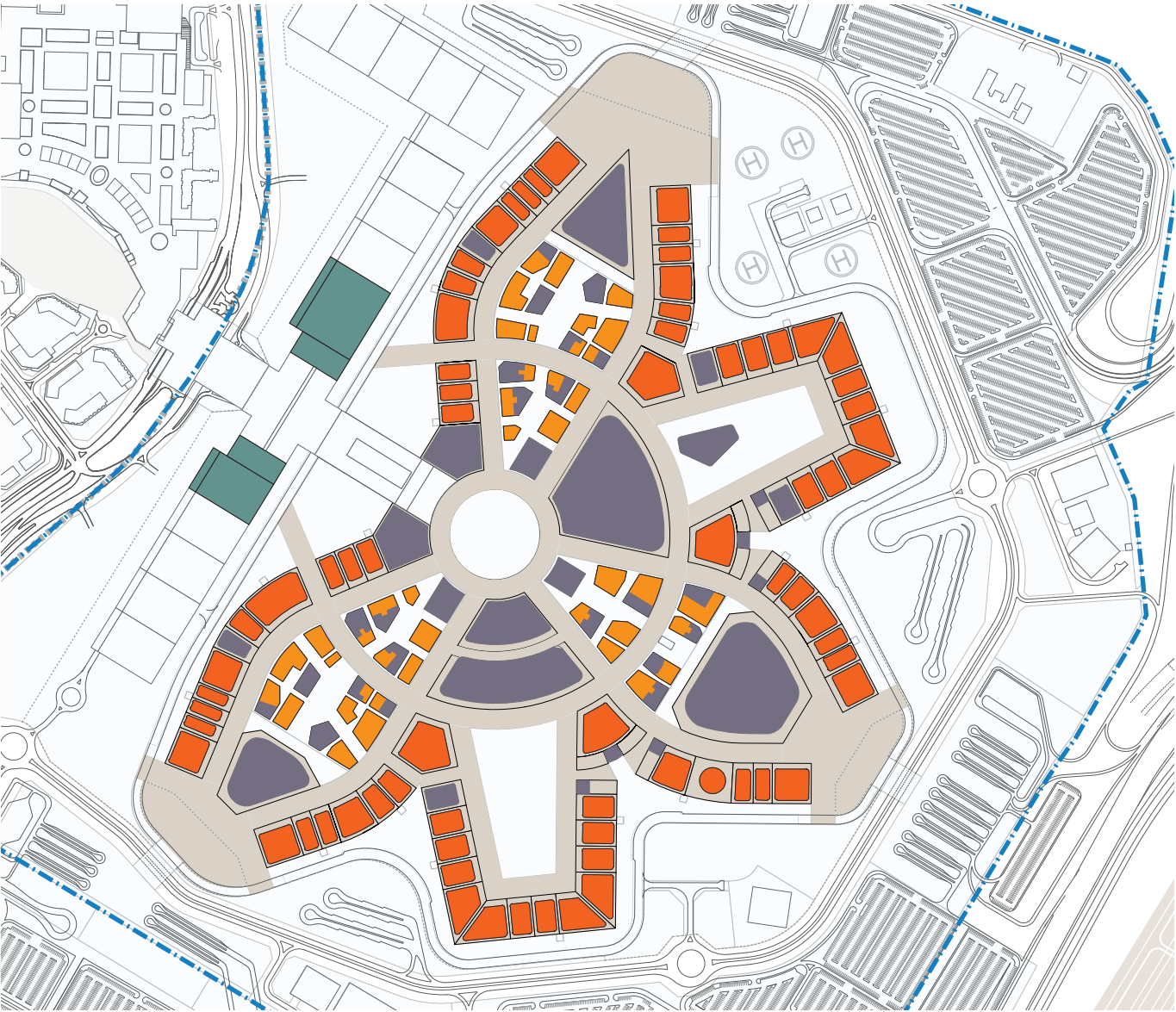


Figure 2.5 Building Typology Plan

## Pavilions Built by the Organiser

The following pavilions will be built by the Organiser:

### UAE Pavilion

This pavilion (host country pavilion) is located on the perimeter of Al Wasl Plaza and occupies the full segment of space extending between two of the six concourses. The UAE Pavilion is a permanent structure and will be retained in legacy.

### Mosque

A Mosque will be showcased in the site, reflecting unique design and architecture rooted in Emirati culture and traditions, and integrating innovation and technology.

### Theme Pavilions

Three Theme Pavilions form part of the welcome experience for visitors entering the site. Each of these pavilions are set back from the entrance gates by a large Welcome Plaza and have the potential to present a wide frontage to this view as well as an equally important frontage on the end of each Thematic District.

### Multilateral Pavilions

These pavilions are located within the Thematic Districts, providing accommodation for non-government and non-profit organisations.

### Corporate Hospitality and Media Pavilions

These pavilions are arranged symmetrically to frame the main approach to Al Wasl Plaza from the Metro Station entrance.

### Leadership Pavilion

The Leadership Pavilion will be the majlis of Expo 2020 Dubai where UAE leadership will host Heads of State, VVIP delegations, dignitaries, and other high-profile visitors.

### Gallery

The Gallery building features art space on the ground level with a fine dining experience on upper levels.

## Superstore

The Superstore aims to illustrate a futuristic shopping experience. Food and beverage facilities will also be incorporated throughout the store.

## Children's Pavilion

The Children's Pavilion is conceived as a space integrated with the landscape concept for the Children's Park, and is designed to directly appeal to a child's sense of discovery and cultural interaction.

## Service and Operations Pavilions

A number of Service and Operations Pavilions are located at regular intervals throughout the site. For visitors, these buildings will house food and beverage outlets, food courts, retail outlets, information points, WCs, multifaith prayer rooms, and first-aid rooms. Operationally, storage areas will ease logistics for event operations.

## Thematic Districts

The Thematic Districts will consist predominantly of Expo-built structures including Assisted, Rented, and Service Pavilions. These are designed around a permeable urban form with internal routes and courtyard/exhibition spaces.

The pavilions in the Thematic Districts are divided into three petal-shaped areas that project out from the central Al Wasl Plaza, and connect each main entrance and the Theme Pavilions.

## Multipurpose Halls

West of the main visitor area, the Multipurpose Halls activate the western side of the site. These halls form part of the cultural and event programme while framing the western entry from the Metro Station.

### 2.3.2 Open Space Typologies

Open spaces are carefully designed for an exciting and comfortable visitor experience. The Metro Station entrance, as well as its Welcome Plaza, connects with Al Wasl Plaza. Three entrances invite visitors to discover various pavilions while wandering through concourses or routes through Thematic Districts, gardens, and parks. Refer to Figure 2.6.

#### Entrance Plazas

The perimeter of the site contains four visitor entrances: the western entrance from the Metro Station and the three entrances adjacent to equally distributed parking to the north, south, and east.

#### Parks

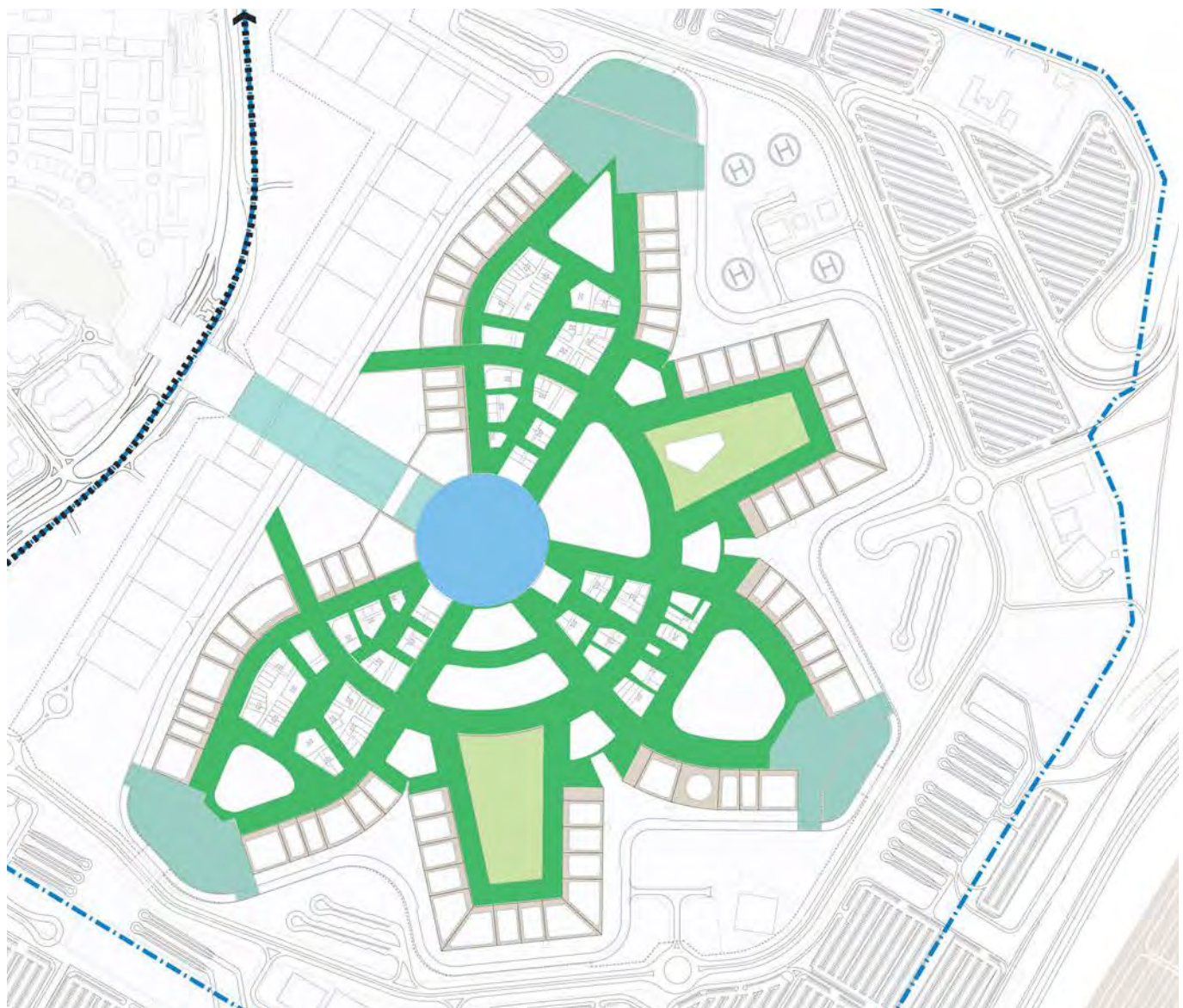
The Children's Park and Performance Park are two of the largest open spaces in the Master Plan.

#### Concourses

Concourses form the public circulation spaces within the gated perimeter. Along the concourses are the food and beverage outlets, retail areas, special exhibits, entertainment areas, visitor and participant service areas, and participant pavilions.

#### Al Wasl Plaza

Al Wasl Plaza will be the central open public space of the site. It will serve as an orientation point for visitors as well as a location for events and entertainment.



#### KEY

- |                                                                                                                                                          |                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #2e8b57; border: 1px solid black;"></span> Concourse and Circulation    | <span style="display: inline-block; width: 15px; height: 10px; background-color: #90ee90; border: 1px solid black;"></span> Parks |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #6495ed; border: 1px solid black;"></span> Al Wasl Plaza                | <span style="display: inline-block; width: 15px; border-bottom: 2px dashed blue;"></span> Site Boundary                           |
| <span style="display: inline-block; width: 15px; height: 10px; background-color: #90ee90; border: 1px solid black;"></span> Entrances and Welcome Plazas |                                                                                                                                   |

Figure 2.6 Open Space Typologies Plan



### 2.3.3 Pedestrian Movement Networks

Ease of navigation around the site contributes to a positive visitor experience. Concourse routes accommodate pedestrian movement and connect the three thematic entrances with Al Wasl Plaza. Refer to Figure 2.7.

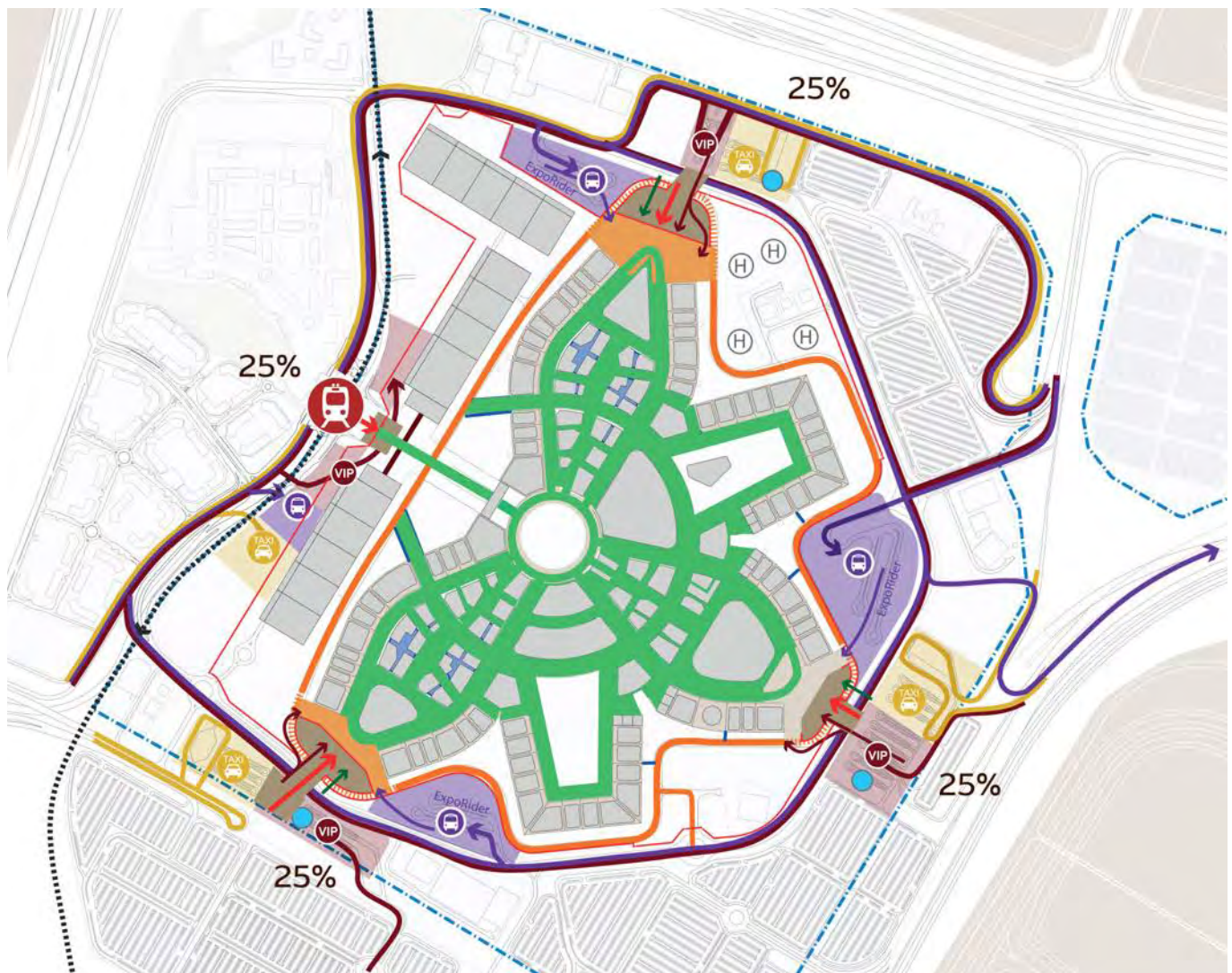
### 2.3.4 Shading

Shading will generally be provided to public pedestrian routes and plazas in the site. Shading canopies have the principal objective of ensuring comfort for all visitors and staff using the public realm.

However, they will also be a fundamental design element in the imagery of the event and necessary in bringing cohesion to the public realm.

### 2.3.5 Visitor Access and Circulation

Visitors will be welcomed at four main locations that ensure efficient access to the site: at the Metro Station entrance and at the three thematic entrances. Access to the thematic entrances will be from the parking areas and public transport drop-off zones. Official delegates will have separate access routes. The percentage distribution of visitor access is noted in Figure 2.7.



#### KEY

- |                                     |                                                      |
|-------------------------------------|------------------------------------------------------|
| Site Boundary                       | Gated Perimeter                                      |
| ExpoRider Route                     | Arrival Plazas                                       |
| ExpoRider Drop Off Areas            | Welcome Plazas                                       |
| ExpoRider Entrances                 | Thematic Pavilions Secure Servicing Area             |
| Taxi Route                          | Metro Station                                        |
| Taxi Rider Drop Off Areas           | Pedestrian Routes / Concourse                        |
| VIP and Valet Route                 | Concourse Secure Loop / Service Road                 |
| VIP Entrances (Pedestrian)          | Metro Route                                          |
| VIP Drop Off Areas                  | Public and Staff Entrances                           |
| Helipad                             | Participant Entrances                                |
| Car Park Shuttle Bus Drop Off Point | <b>25%</b> Percentage distribution of visitor access |

Figure 2.7 Pedestrian Movement, Visitor and Vehicle Access and Circulation Plan

### 2.3.6 Entertainment Expo

The entire site will be fully activated day and night with a range of entertainment options and exhibits. These include art installations, interactive displays, performance stages, and rest and play areas that will host a rolling programme of events.

These activation areas will be distributed throughout the Thematic Districts, concourses, and open spaces, including the two large parks. Examples of how this activation may be distributed are indicated in the Thematic District and Park extracts in Figure 2.8.

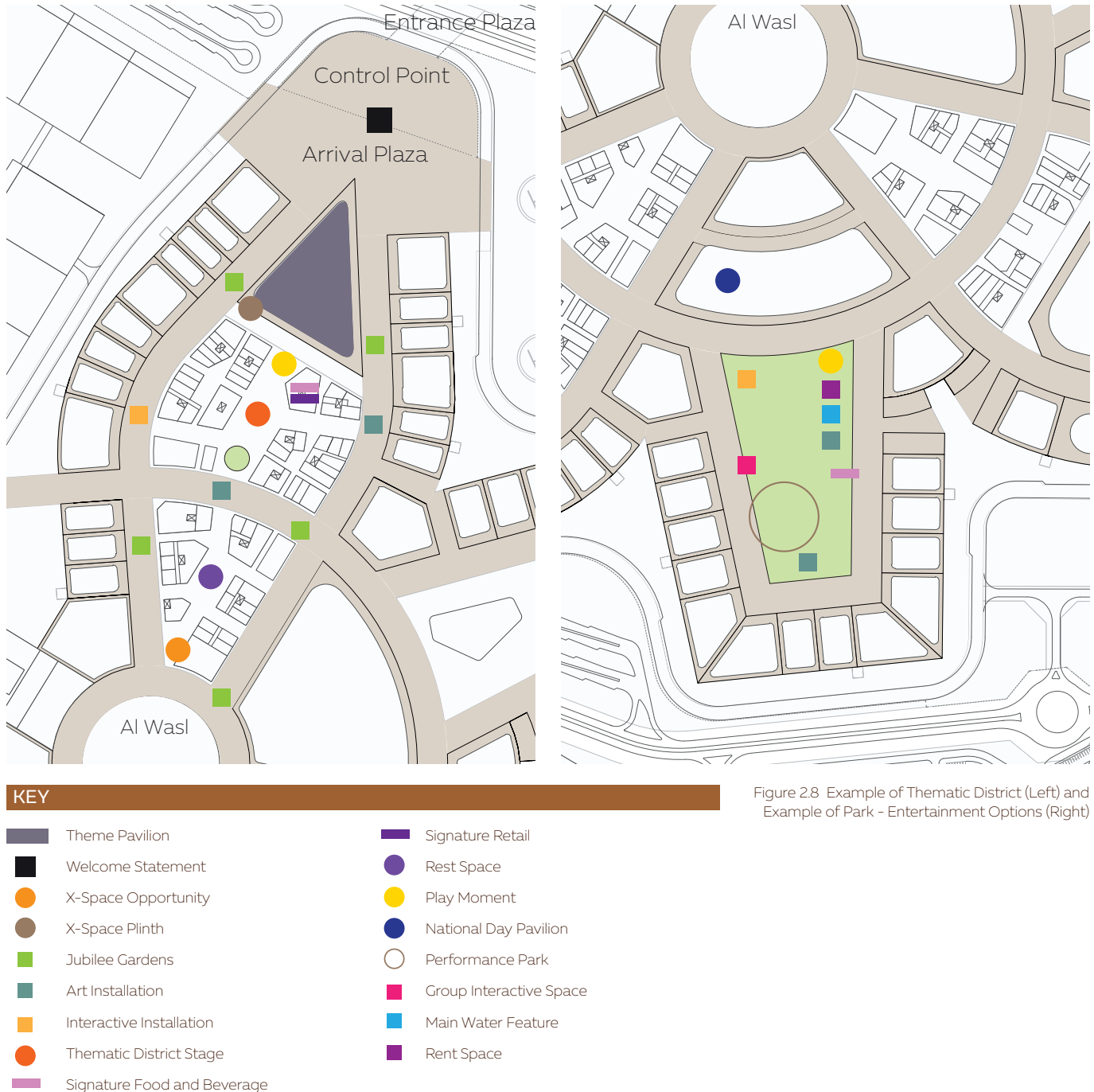


Figure 2.8 Example of Thematic District (Left) and Example of Park - Entertainment Options (Right)







### 3 Understanding Controls and Guides





### 3 Understanding Controls and Guides

The design guide aims to be an effective tool to implement the spatial aspirations of the Master Plan. To realise this goal and to aid the participants in checking their plot developments for adherence to the design guide, two criteria for compliance have been established – controls and guides. These criteria will facilitate the Organiser in assessing the design submissions of the participants.



Figure 3.1 Control and Guide Coding

**Controls** are ‘must’ statements that establish a limitation or prohibition of development. Some examples of controls that are established in the Master Plan include pavilion height limits, required setbacks, and maximum gross floor area (GFA).

**Guides** are ‘can’ or ‘should’ statements that describe methods or suggested ways that a design can demonstrate whether a particular development meets the specified goals and objectives. If the guides are followed, the design would be considered to meet the guiding principles of the Master Plan. Some examples of guides that are established in the Master Plan include expressing design identity through lighting, signage placement, and use of natural ventilation.

In this section, each control and guide is given a unique alphanumeric code. In Figure 3.1, the first character of the code identifies if the statement is a control (**C**) or a guide (**G**). The numeric character identifies the sequential order of the control or guide. For example, **C-75** is a control while **G-27** is a guide.

Each set of guides and controls sets out how the theme and subthemes can influence the design rules and parameters of various components of the Self-Build Pavilions. This includes guides on the design of the physical space (such as pavilion envelope, setbacks, heights, and open space on the plot); space planning of the key elements of the Self-Build Pavilions (such as access, key frontages,

queuing, shading, and servicing); fire and life safety design; universal access and inclusive design; signage and wayfinding; and sustainability.

Some controls and guides specifically address the requirements for the Self-Build Pavilions within the Thematic Districts. These are identified with ‘(Thematic Districts)’ in the text.

Controls and guides are divided into the following sections:

- › **Section 3.1 Fire Safety, Life Safety, and Building Codes:** This section provides controls that aim to safeguard the health and safety of everyone on the site. Fire and life safety as well as building codes are also discussed.
- › **Section 3.2 Plot Parameters:** These are controls for pavilion envelopes, including built form, setbacks, height, volume, and massing. Guides on roof design and potential for amalgamation or subdivision of pavilions are also addressed.
- › **Section 3.3 Entrances, Exits, and Frontages:** These are controls and guides for entrances, exits, universal access, and inclusive design.
- › **Section 3.4 Design Parameters:** These are controls and guides for land use, potential design responses, landscape, utility provision, shading, and comfort.
- › **Section 3.5 Operational Design Considerations:** These are controls and guides for queuing, servicing, emergency response plan, and pavilion security.



- › **Section 3.6 Sustainability:** These are controls for sustainability elements, such as use of energy, water, and materials. The section also provides controls and guides on managing waste and emissions while raising awareness on the subject.
- › **Section 3.7 Decommissioning and Removal:** These are high-level controls and guides for dismantling the elements of Expo 2020 Dubai.
- › **Section 3.8 Signage and Wayfinding:** This section sets the standards and provides guidance for signage, types, sizing, and language hierarchy.
- › **Section 3.9 Relevant Standards, Codes, and Regulations:** This section provides web links to local, national, and international standards, codes, and regulations which are referred to in the controls and guides.

## 3.1 Fire Safety, Life Safety, and Building Codes

Health and safety is of upmost priority on the Expo 2020 Dubai site. To ensure safety for all, the entire site will be integrated via a digital network to a central command centre. For further details, refer to items 16, 17, and 35 of Section 3.9.2 Relevant Standards, Codes, and Regulations.

- C-01** To ensure safety for all, participants must adhere to the UAE Fire and Life Safety Code of Practice (2011) as a minimum. This includes, but is not limited to specifications in relation to occupancy loads, fire service access requirements, emergency egress, fire detection and alarm systems, and emergency command centres.
- C-02** The design, layout, and construction of Self-Build Pavilions must adhere to the UAE building codes, local and national standards, including the Dubai Municipality Building Code Regulations and Construction Specifications, and the Dubai South Planning Regulations and Development Guidelines.

## 3.2 Plot Parameters

### 3.2.1 Site and Gate Levels

- C-03** The design of pavilions and open space must take account of plot gradients and plot limits. An example is provided in Section 4 Plot Sheets. The overall site will have a shallow gradient as a response to existing surrounding site levels. As a consequence, the plots of the participants are anticipated to have very shallow gradients, varying from 1:50 to 1:100. See Figure 3.2.

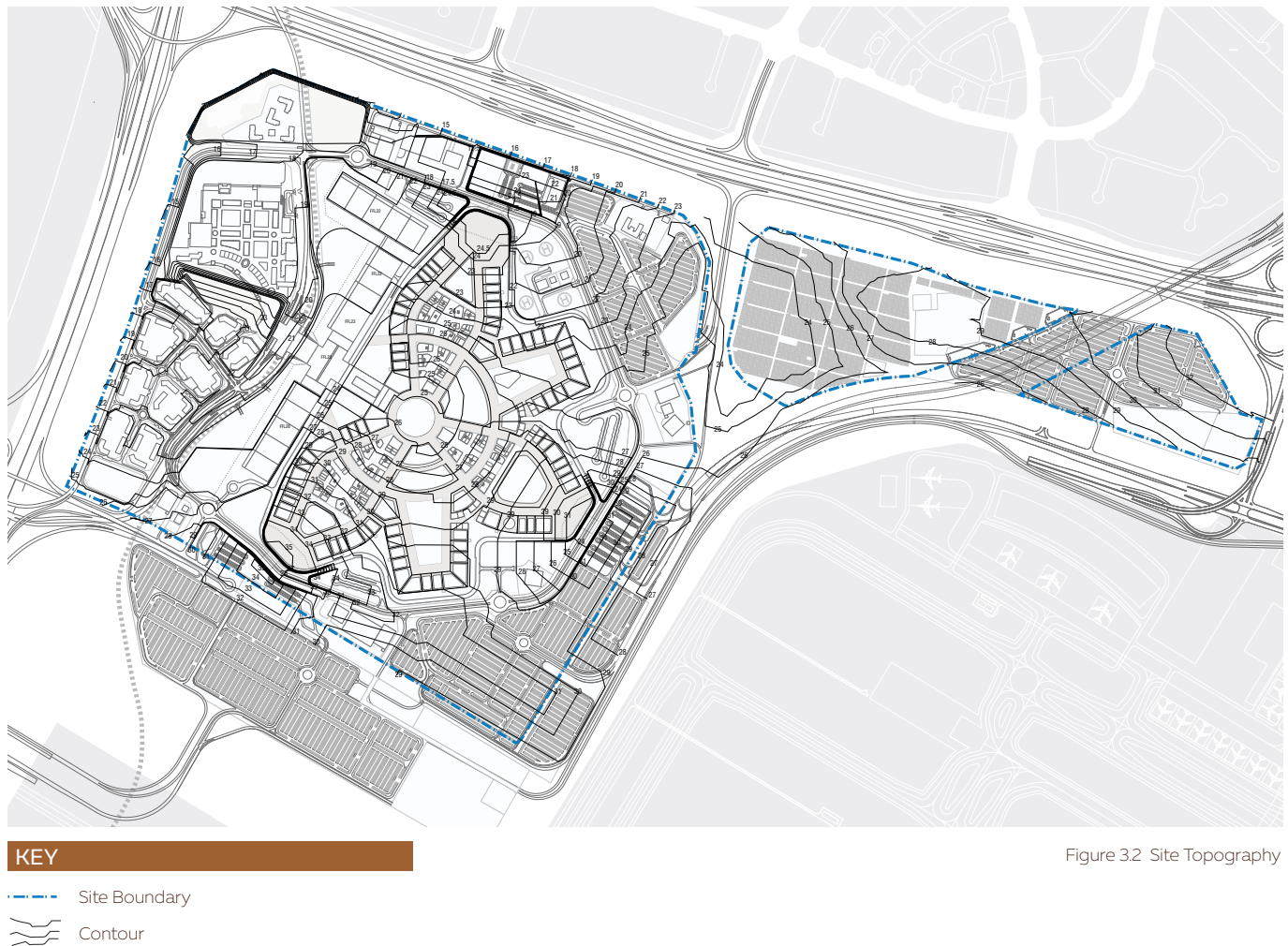


Figure 3.2 Site Topography

### 3.2.2 Setbacks

- C-04** Each plot must have a 10-m minimum setback from the front.
- C-05** Each plot must have a 3-m minimum setback from the rear boundary.
- C-06** Each plot must have a 3-m minimum setback ranging up to 5-m from the side boundary. See Figure 3.3. The exact setback will be defined in the individual plot sheets.

The example provided in Section 4 Plot Sheets specifies mandatory setbacks for the plot.

### 3.2.3 Setbacks (Thematic Districts)

- C-07** Public frontage boundary must be a minimum of 3-m from the front along the concourse.
- C-08** Secondary frontage boundary must be a minimum of 3-m from the boundary.
- C-09** Pavilion line must have a minimum of 3-m setback from the plot boundaries.

### 3.2.4 Plot Boundary Conditions and Frontages

- C-10** Pavilions must not include fences or barriers on any boundary.
- C-11** At the front boundary (onto concourses), participants must design the on-plot landscape with regard for its integration with the concourse public realm.
- G-01** Coordination and integration with the participants of adjacent plots is encouraged.

### 3.2.5 Pavilion Sizes

- C-12** The design of the Self-Build Pavilions must adhere to the maximum development areas for their respective sizes. Sizes will be specified in specific plot sheets. An example is provided in Section 4 Plot Sheets. Sizes will be within the ranges shown below:

| Size        | Plot       |       | Max Buildable Zone |       | Indicative Average GFA per Plot (m²) |
|-------------|------------|-------|--------------------|-------|--------------------------------------|
|             | Range (m²) |       | Range (m²)         |       |                                      |
|             | Min        | Max   | Min                | Max   |                                      |
| Extra Large | 4,523      | 6,069 | 3,166              | 4,248 | 10,822                               |
| Large       | 3,417      | 3,720 | 2,392              | 2,604 | 6,510                                |
| Medium      | 1,812      | 2,282 | 1,262              | 1,597 | 3,005                                |
| Small       | 1,238      | 1,550 | 866                | 1,085 | 2,713                                |

### 3.2.6 Height and Volume

- C-13** All participants must contain their design within the identified pavilion envelope and maximum height limits of each plot. An example is provided in Section 4 Plot Sheets. If the participants wish to extend beyond these limits, the design must be proportional to the setback and must be submitted to the Organiser for authorisation. See Figure 3.4.

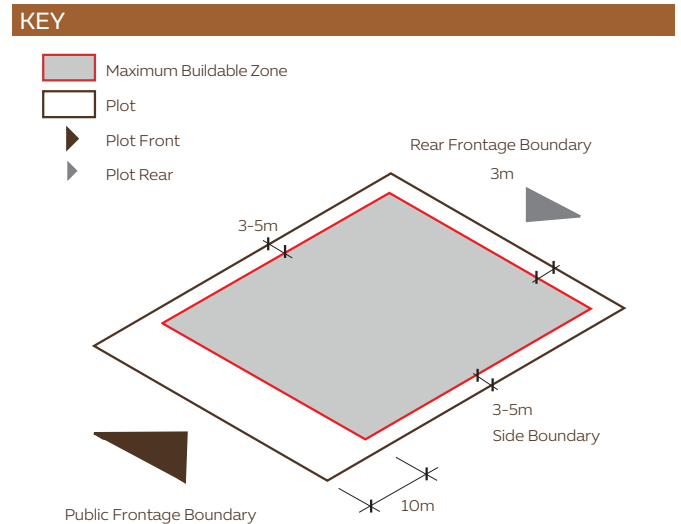


Figure 3.3 Self-Build Pavilion Setbacks

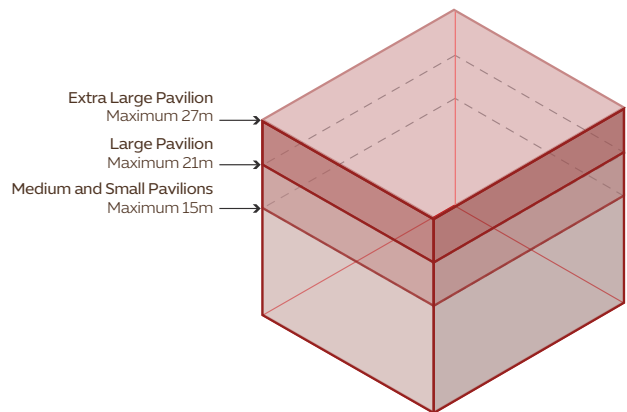


Figure 3.4 Self-Build Pavilions - Maximum Heights

- C-14** The maximum pavilion height and allowable built-area dictates the maximum allowable pavilion volume.
- G-02** Participants should build their pavilions within the volume constraints. An example is provided in Section 4 Plot Sheets.
- G-03** Although no minimum pavilion height is stipulated, participants should be mindful of the context within which their pavilion exists and of the need for maintaining appropriate visibility for their pavilion, including distant views (where these exist), to attract visitors.

### 3.2.7 Built Form

- G-04** The Self-Build Pavilions are intended to allow a high amount of design freedom to enable the participants to aesthetically express their architecture, landscape, culture, and resource in recognition of the theme and subthemes of Expo 2020 Dubai. Some potential design responses that should be considered are discussed below.
- G-05** Pavilions can have the flexibility to incorporate multiple levels, as well as terraces, semi-covered spaces, and atria. See Figure 3.5.
- C-15** The design of the built form must allow for appropriate measures to clean, service, and access structures. It must not require complicated scaffolding to clean the structure.
- G-06** To alleviate radiated and generated noise from creating uncomfortable noise, levels sound attenuation should be incorporated into the design. Sound baffling should also be considered in the design of external spaces to avoid noise spill to public realm and adjacent pavilions. Refer to Section 3.6 Sustainability.
- C-16** Pavilions within the Thematic Districts must consider all structural limitations, such as weight and grid layout.

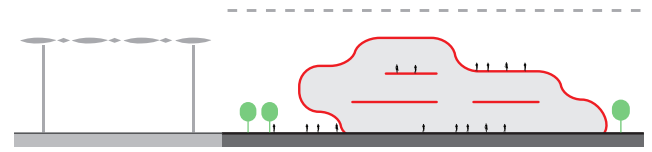
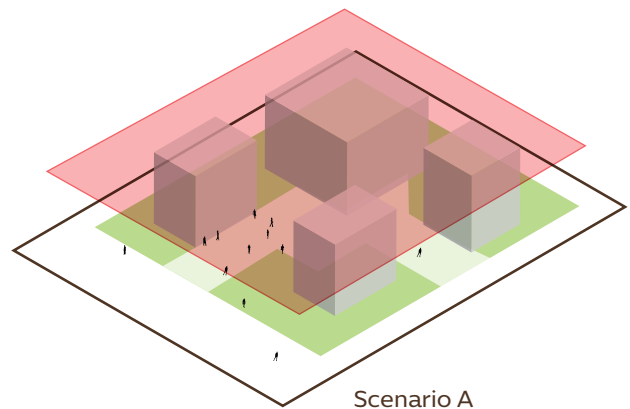


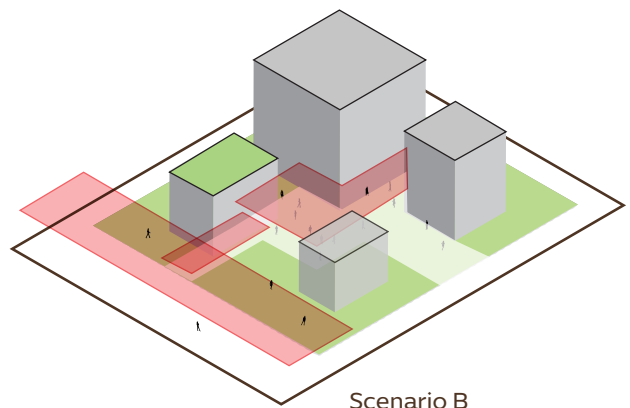
Figure 3.5 Example of Flexibility in Design for Covered and Enclosed Spaces



Scenario A

### 3.2.8 Roof Design and Rooftop Facilities

- C-17** The roof areas may be used for roof terraces. All rooftop facilities or structures must comply with plot parameters set out for maximum pavilion envelope. See Figure 3.6.
- G-07** All pavilions should provide a dedicated area for photovoltaics or similar renewable energy technologies. These should be integrated into the pavilion design and the participants are encouraged to incorporate these into the exhibition itself. Refer to Section 3.6 Sustainability.
- C-18** Any rooftop terraces designed for visitor use must be fully accessible to all persons with disabilities.
- C-19** The roof design must consider rainfall run off which must be contained and not impact public realm or queuing area. Refer to Section 3.6 Sustainability.
- G-08** Pavilions can incorporate roof terraces for visitors. Rooftop facilities or structures cannot exceed the maximum pavilion height as set out in the individual plot sheets. See Figure 3.7.
- C-20** Rooftop planting must comply with water usage requirements for the landscape design. Refer to Section 3.6 Sustainability.



Scenario B

Figure 3.6 Roof Design Scenarios

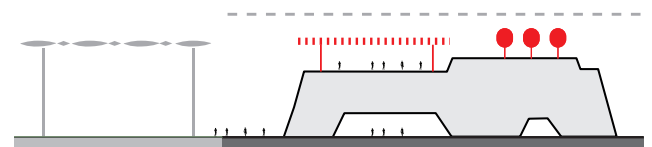


Figure 3.7 Example of Roof Design



### 3.2.9 Massing

**G-09** Massing for the Self-Build Pavilions can be developed according to a wide range of scenarios. For illustrative purposes, two scenarios are shown in Figure 3.8. However, these scenarios should not be considered prescriptive.

#### Pavilion Fabric

**C-21** To minimise heat gains for enclosed spaces, participants must demonstrate fabric efficiency by ensuring that average thermal transmittances do not exceed:

Wall U-value =  $0.32 \text{ W/m}^2\text{K}$

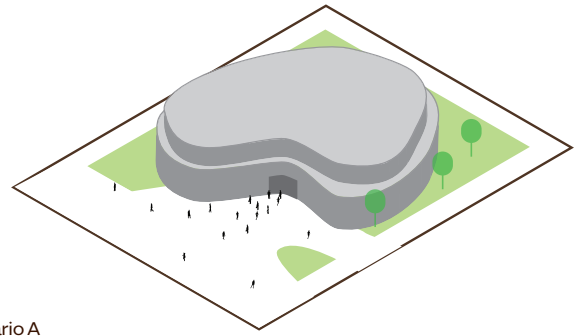
Roof U-value =  $0.30 \text{ W/m}^2\text{K}$

External Floor U-value =  $0.30 \text{ W/m}^2\text{K}$

Glazing U-value =  $1.9 \text{ W/m}^2\text{K}$

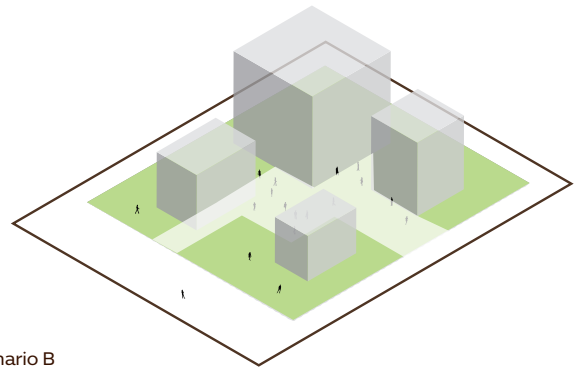
where  $\text{W/m}^2\text{K}$  means watts per square metre Kelvin.

**C-22** Participants must use efficient glazing products that have a maximum solar shading coefficient of 0.4 and a minimum visible light transmittance of 0.25.



**Scenario A**

The plot can be designed and massed as a free-standing, whereby all of the built area is confined within one pavilion volume. This can be used to provide a single indoor exhibition space. Participants should ensure that a strong relationship is established between the pavilion and open space.



**Scenario B**

The buildable volume can be designed as a collection of structures, creating a variety of indoor and outdoor exhibition spaces, whereby all of the built volumes equate to the maximum permissible development on the plot. An example is provided in Section 4 Plot Sheets. This arrangement can result in a cluster of smaller pavilions which may enable a more fluid relationship with the landscape.

Figure 3.8 Massing Scenarios

## 3.3 Entrances, Exits, and Frontages

### 3.3.1 Entrances

**C-23** Self-Build Pavilion plots must have primary access off one of the concourse streets, which will provide the access to and from the main circulation routes beneath the shade structure.

**C-24** Self-Build Pavilion plots must have access for servicing from the rear or back of house (BoH) at all times, which allows clear segregation between public and private access.

**C-25** Food and beverage outlets within the pavilion must have dedicated entrance, separate from the pavilion's primary access.

**G-10** Pavilions should consider separate access for VIPs and VVIPs noting that vehicular access is likely to be from the BoH service road.

### 3.3.2 Exits

**G-11** Pavilion design should separate the ingress point from the egress points to maintain pedestrian flow and minimise congestion.

### 3.3.3 Universal Access and Inclusive Design

**C-26** A continuous external accessible path to travel within the plot limits must be provided from the plot boundary to the main entrance(s) of the proposed pavilion.

**C-27** The continuous external accessible path of travel must be well-lit and sheltered from the sun and general weather.

**C-28** Rest stations must be incorporated if the travel route to the proposed pavilion is long.

**C-29** A firm, smooth, and non-slip surface with a gradient of no more than 2.5 percent is required.

**C-30** Walkways, ramps, step ramps, or lifts must be incorporated at changes of level along the path of travel (permitted within the confines of the plot).

**C-31** The accessible path of travel must not incorporate any step, stairway, turnstile, revolving door, escalator, or other impediment that would limit accessibility.

**G-12** The points of transition between the internal and external exhibition areas are to be accessible. It is recommended that any step forming a transition have a change in level not exceeding 5 mm.

## 3.4 Design Parameters

### 3.4.1 Land Use

**G-13** The Self-Build Pavilion plots should allow design freedom to enable the participants to aesthetically express their architecture, landscape, culture, events, entertainment, and resources in line with the event's theme and subthemes.

**G-14** The design of Self-Build Pavilions should suitably consider their location adjacent to public routes along the concourses.

### 3.4.2 Utility Provision

- C-32** The Organiser will provide potable water, power (11 kV), sewer, telecommunications, gas, and irrigation connection points to within 2 m of the plot boundary. Participants must connect these services to meet their individual and regulatory requirements. Exact utility locations will be denoted on indicated plot sheets.
- C-33** For the Self-Build Pavilion (Thematic Districts), the Organiser will provide connection points for the above utilities along the concourse or the side edge of the plot boundary. Participants must continue these services within their plot to meet their individual and regulatory requirements. Exact utility locations will be defined on indicated plot sheets.
- C-34** All utility and service installations and equipment within the plot must be adequately concealed and accessible to vehicles and contractors of utility providers.
- C-35** All participants must adhere to the GFA permitted per plot as well as the associated utility allocations. An example is provided in Section 4 Plot Sheets.
- C-36** Participants must identify the need for backup power generation, and suitably locate the equipment on plot. Potential noise, air quality, and visual amenity impacts must also be identified and mitigation measure must be demonstrated within the final design submissions.

### 3.4.3 Landscape

- G-15** All participants should develop designs for open space, landscape, and exhibition in keeping with the Self-Build Pavilion's position in the relevant Thematic District. These designs should include responses to adjacencies and interfaces with key open spaces and public routes. For further details, refer to Section 3.6 Sustainability.

### 3.4.4 Shading and Comfort

- C-37** All participants must consider the need to provide shade within open areas and for queuing zones either through the integration of shade trees or shade structures.
- G-16** External exhibits should include shaded areas to provide shelter to visitors.
- G-17** Participants should consider the thermal comfort of visitors, particularly in external areas designated for queuing. Thermal comfort can be improved by providing:
- › **Solar shading:** Direct solar radiation can cause significant discomfort. Design should ensure comprehensive shading during the middle part of the day when solar radiation is most intense.
  - › **Natural ventilation:** Maximise local wind penetration by considering the prevailing wind direction. This will help remove heat and allow the environment to cool, particularly at night.

- › **Evaporative cooling:** This is a process that increases local humidity, but reduces the air temperature, thus improving thermal comfort. Water should be used sparingly, so the benefit of evaporative cooling should be contained.

- G-18** The design of the pavilions can provide over-ground level space to allocate shaded and permeable exhibition space. See Figure 3.9.
- G-19** Awnings, canopies, and other lightweight, freestanding structures can also be built within the plot boundary. See Figure 3.10.

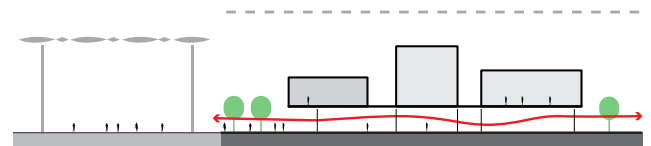


Figure 3.9 Example of Ground-Level Permeability

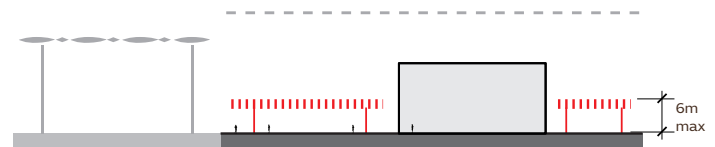


Figure 3.10 Example of Usage of Light Structures

## 3.5 Operational Design Considerations

### 3.5.1 Queuing

- C-38** Queuing for each pavilion must be accommodated within the respective plots along the front and side boundaries of the pavilion. Participants must ensure that visitors are able to queue within these constraints and allowance should be made within the pavilion design for this. See Figure 3.11.

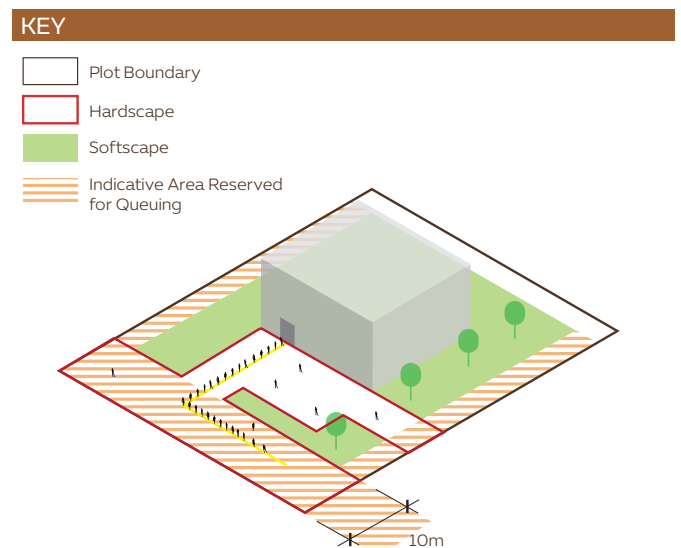


Figure 3.11 Landscape Area and Queuing Scenario

- G-20** A ticketing or booking service should be considered to reduce the need for long queues.
- G-21** The design of the queuing areas within plots should be based on Fruin level of service 'D.'
- C-39** Participants must ensure that queuing to the rear side of the pavilion does not impact BoH operations.
- G-22** In cases where queuing density could be exceeded, participants should provide additional queuing space within the plot. This may require parts of the ground level of the pavilion be given over to queuing space.
- G-23** Shading, water provision, locations for rest area, and introduction to pavilion content and thematic events should be considered to provide comfort and entertainment to the queuing visitors.

### 3.5.2 Servicing

- G-24** All Self-Build Pavilions adjacent to the service road benefit from rear access. This allows servicing, deliveries, and other BoH operations to be segregated from the front of house (FoH). See Figure 3.12.
- C-40** The primary servicing of Self-Build Pavilions must be before opening and after closing hours.
- C-41** All Self-Build Pavilion (Thematic Districts) plots must have access for servicing and deliveries from BoH. This allows servicing, deliveries, and other BoH operations to be segregated from the public areas FoH.
- C-42** Vehicular servicing of Self-Build Pavilions (Thematic Districts) must be out of hours if access will be via the public realm FoH.
- C-43** All BoH areas must be appropriately concealed. Plots should be designed to allow ease of movement of goods, unhindered by kerbs, steps, steep inclines, narrow doorways, or any other obstruction.
- C-44** Pavilion storage must accommodate stock requirements for a minimum of two days. BoH service area must also be reserved to accommodate the need for a dry and wet waste stores, space for logistics deliveries, facilities management vehicles and equipment, queue management equipment, and pavilion transport requirements.
- C-45** Pavilion waste must be sorted on the pavilion plot to comply with the controls and the recommended guides in Section 3.6 Sustainability.
- C-46** Hazardous waste must not be stored on plot and all waste storage must be out of sight from the public realm. Refer to Section 3.6 Sustainability.

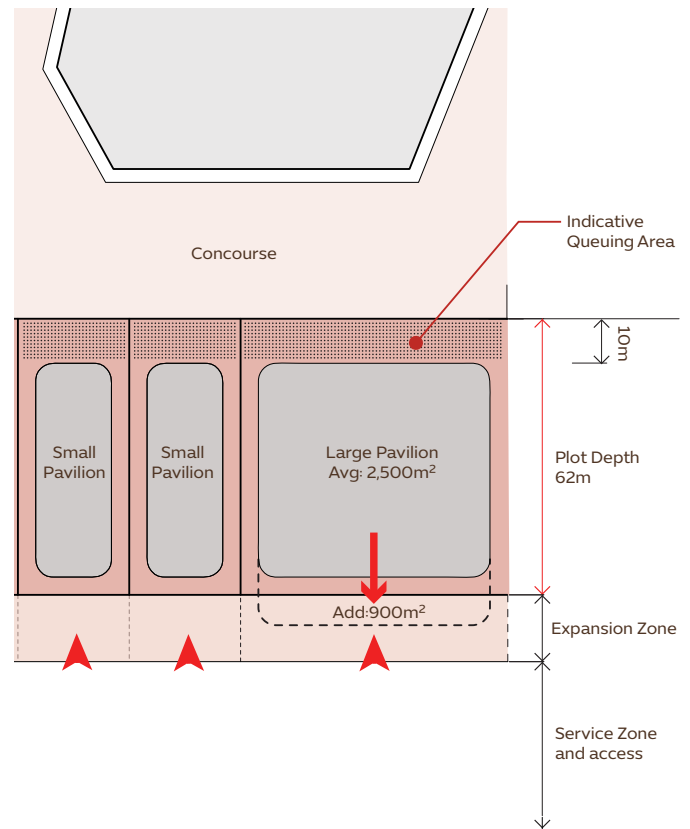


Figure 3.12 Plot Servicing

- G-25** Loading areas should be at ground level. A raised loading dock is not a requirement.
- G-26** All surfacing should be able to support emergency vehicles to meet regulatory access requirements.

### 3.5.3 Emergency Response Plan

- C-47** It is the responsibility of the plot designer to prepare an Emergency Response Plan specific for the pavilion, mitigating any potential impacts upon adjacent uses if an emergency event arises. The plan must include preparing for possible dangers, including fires, security incidents, and accidents involving hazardous materials. Upon approval by the Organiser, the plan must be fully integrated into the overall site Emergency Response Plan and connect back to the central command centre.

### 3.5.4 Pavilion Security

- C-48** Participants must take full responsibility for the security of their own pavilions.
- C-49** Participants must submit the details of their security systems to the Organiser for review and for integration with the central command centre.



## 3.6 Sustainability

Expo 2020 Dubai aims to become a sustainability benchmark for future World Expo events. To achieve this goal, all participants are encouraged to contribute to the site-wide sustainability commitments. It is important that the participants understand the site-wide sustainability aspirations, and develop their own design and approaches to support these aspirations.

- C-50** In line with the sustainability approach of Expo 2020 Dubai, all pavilions, buildings, and structures must consider sustainability as an integral component of their exhibition development.

### 3.6.1 Sustainability Themes

The sustainability themes of Expo 2020 Dubai are:

- › **Energy:** Minimising energy consumption through energy efficiency, supplemented with extensive use of renewable energy sources
- › **Water:** Optimising potable water use by focusing on water conservation and using alternative water resources to meet non-potable water demand
- › **Materials:** Adopting a holistic view of the life cycle of materials; encouraging the use of locally sourced and recycled materials
- › **Waste:** Achieving high rates of waste segregation into different waste streams – during construction, operation, and decommissioning – to allow for diversion from landfill.
- › **Emissions:** Implementing a carbon emissions management programme that measures, reduces, and offsets emissions in a responsible way
- › **Public Realm and Ecology:** Creating a comfortable and enjoyable environment that promotes biodiversity and the ecological value of the site
- › **Sustainability Awareness:** Inducing sustainable lifestyles with the use of smart monitoring and reporting to educate the public and participants

### 3.6.2 Sustainability Certification

- G-27** Participants are not required to achieve sustainability certification, however, they should target certification. Due to the international nature of the event, participants may choose to use recognised certification systems of their own choice to align with the commitment of Expo 2020 Dubai to LEED® Gold.

### 3.6.3 Energy

- C-51** Pavilions represent one of the largest energy demands across the event and must implement energy efficiency measures to meet the event's sustainability principles.

- G-28** Energy-efficient electrical appliances and cooking facilities that hold international certification for efficient or sustainable operations should be used. Where possible, these should be powered by connecting to renewable energy sources.

### Renewable Energy Production

- G-29** Onsite renewable energy generation should be adopted. All participants should consider generating 25 percent of their energy demand of Expo 2020 Dubai from renewable sources to align with the site-wide commitments. Note that across the site, 50 percent of the overall energy demand will be supplied from renewable technologies, of which a minimum 25 percent will be generated onsite. If sustainability certification is targeted, project teams are advised to consult individual schemes and consider how onsite renewable strategies can contribute to the site-wide targets.
- G-30** Solar thermal generation should be considered to meet hot water demands.
- G-31** Participants should maximise energy output by reducing overshadowing of pavilion-mounted solar technologies.
- G-32** Incorporating other pavilion-scale renewable energy technologies should be considered. These technologies include solar, thermal storage, fuel cells, or small-scale wind turbines.

For guidance, refer to DEWA's **Standards for Distributed Renewable Resources Generators Connected to the Distribution Network** and **Connection Guidelines for Distributed Renewable Resources Generation Connected to the Distribution Network**.

### Natural Ventilation

- G-33** Participants should consider the height and shade of the pavilion interior as this can facilitate internal air movement and natural ventilation. See Figure 3.13.
- G-34** Use of fans powered by renewable energy to increase air flow within the pavilions should be considered.

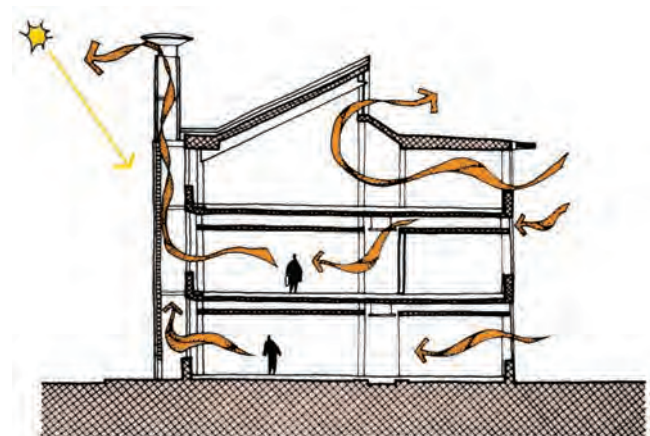


Figure 3.13 Example of Stack Ventilation

## Solar Shading

- G-35** Participants should incorporate passive solar control measures (such as sun screens, pergolas, and trellises) in their pavilion design to control solar gain and maintain thermal comfort adjacent to facade openings.
- G-36** Participants should incorporate external horizontal and vertical screening in their pavilion design according to sun path altitude and azimuth angles to minimise direct solar heat gain during the day. Horizontal screening should be used on the South facade and vertical screening is optimal on East and West facades.
- G-37** Stepping and recessing the built form should be considered to enhance self-shading.
- G-38** Participants should consider the geometric shape and orientation of fixtures as well as the surface materials used when screening the pavilions' horizontal and vertical surfaces.

## Artificial Cooling System Performance

- C-52** All artificial cooling systems must comply with the minimum standards outlined in Section 502.01 of the Green Building Regulations and Specifications in the Emirate of Dubai.

## Energy Consumption

- C-53** To support the site-wide target of Expo 2020 Dubai to reduce energy consumption during operations, participants must either:
  - › Reduce pavilion energy consumption by 20 percent compared to ASHRAE 90.1 Baseline, or
  - › Demonstrate that the predicted energy consumption during Expo 2020 Dubai is less than 90 kWh/m<sup>2</sup>. This should be based on the total GFA and include all energy used for cooling, lighting, small power, and process loads. Any renewable energy generated on-plot maybe deducted from the total energy consumption. See Figure 3.14.

## Metering and Controls

- C-54** Energy and water consumption within the pavilion must be captured through smart metering. The submeters must be connected to the Building Management System (BMS) with the hardware and software capability to:
  - › Record hourly, daily, weekly, monthly, and annual energy consumption for each end-use
  - › Compare consumption to previous days, weeks, months, and years for trend analysis
  - › Determine 'out-of-range' values to alert pavilion operators to unusually high consumption
  - › Record peak energy and water consumption for each end-use
- G-39** Metering should be tied to the pavilion's sustainability awareness strategy.

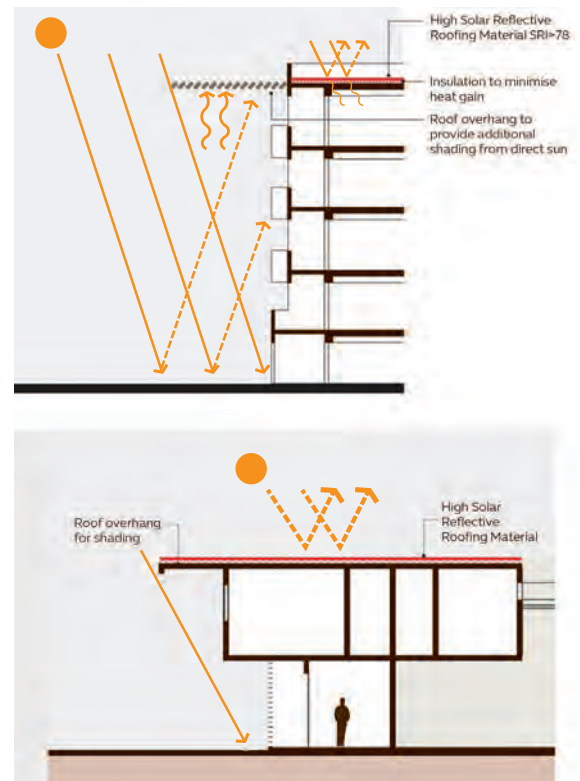


Figure 3.14 Passive Design Techniques to Reduce Energy Consumption

- C-55** All accessible water fixtures must be fitted with smart controls.
- G-40** Water monitoring and leak detection should be tied to the pavilion's sustainability awareness strategy.

## 3.6.4 Lighting

### Lighting Levels and Brightness

- C-56** Lighting must be provided to safely move around, enter, and exit the pavilions.
- G-41** Pavilions should express design identity and individuality through lighting design and technology.
- G-42** Dynamic and functional lighting should be coordinated with concourse lighting applications and content.
- C-57** Light levels must comply with the Illuminating Engineering Society (IES) Guidelines.

### Obtrusive Lighting Limitations

- G-43** Lighting effects should be localised with minimal impact on neighbouring pavilions.
- G-44** Consideration should be given for light trespass, glare, uplight, and light spill.
- C-58** Obtrusive lighting must comply with the IES Guidelines.

### Installed Lighting Power

- C-59** Reduce external lighting power density (20 percent) and landscape feature lighting (50 percent) as compared to IECC 2009, Section 505.6.

- C-60** Incandescent light bulbs must not be used.
- G-45** If the participants choose to target pavilion level certification, they should consider that individual certification systems may have different requirements, standards, and thresholds for light pollution reduction.

### Lighting Control

- C-61** Localised and centralised control systems must be coordinated with the site-wide lighting control infrastructure.
- C-62** Photoelectric lighting control must be incorporated in to the external lighting systems to reduce energy demand. Reduce lighting power density or shutoff external lighting during out-of-hours periods.
- C-63** Motion lighting control must be used to limit lighting in areas with infrequent usage.

## 3.6.5 Water

This section addresses water holistically, looking at indoor use, outdoor use, specialised reduction strategies, and metering. There is particular emphasis on reducing potable water demand within the region and taking an 'efficiency first' approach to water conservation.

- C-64** Water saving measures must consider the use of both indoor and outdoor water demand within the Self-Build Pavilions.

### Irrigation

- C-65** Public realm water consumption, including water features, must not exceed 7 L/m<sup>2</sup>/day in streetscape areas and 4 L/m<sup>2</sup>/day in the remaining landscape or open space areas.
- C-66** One hundred percent of irrigation demand must be met from non-potable sources.
- C-67** Smart moisture, air flow, and underground irrigation systems must be used to reduce irrigation demand.
- C-68** High efficiency equipment, such as climate-based controllers, must be used for irrigation. Plant irrigation density must be matched to irrigation requirements and piping arrangement.
- C-69** Permits must be provided when importing plants and seeds for soft landscaping. These are controlled by the regulations and legislations of the UAE Federal Customs Authority and the Ministry of Environment and Water.
- C-70** Watering/irrigation systems and maintenance of plot landscapes must not impact the public realm. Overspills, damage, or encroachment into the public realm from watering or maintenance must be rectified by the participants.
- G-46** Water retention within landscape areas should be facilitated using traditional water harvesting techniques.

- G-47** The potential for capturing and reusing rainwater condensation for irrigation should be considered.
- G-48** Landscape irrigation demands should be considered against the species type used within planted areas.

### Grey Water Usage

- G-49** Participants should investigate opportunities to recycle grey water within pavilions, through the installation of septic tanks and landscape filtration technologies.

### Condensate Capture

- C-71** Pavilions must reuse at least 80 percent of the condensate collected from pavilions with cooling loads over 350 kW.

### Indoor Water Consumption

- C-72** Water demand must be reduced by 25 percent compared to the Dubai Electricity and Water Authority Guidelines. Where possible, participants are encouraged to install:
  - › Low-flush, high-efficiency, or dual-flush toilets
  - › Ultra-low flush urinals
  - › Waterless urinals
  - › High-efficiency faucets
- C-73** Water-efficient fixtures and fittings must be installed in line with Section 601.01 of the Green Building Regulations and Specifications in the Emirate of Dubai. The following maximum flow rates must be met:
  - › Shower – 8 L/min
  - › Hand basin – 2.5 L/min
  - › Kitchen sink – 4.5 L/min
  - › Toilet main – 4.5 L/flush
  - › Toilet low – 3 L/flush
  - › Urinal – 0.5 L/flush or waterless
  - › Shattaf – 4.5 L/min

Where L/min means litres per minute and L/flush means litres per flush.

## 3.6.6 Materials

The materials strategy for Expo 2020 Dubai focuses on selection of non-hazardous materials, life cycle impacts, promotion of recycled and reused content, and local sourcing for reduced carbon footprint.

### Hazardous Materials

- C-74** Materials must not be carcinogenic and must not emit toxicants or irritants. An environmental health product declaration or a manufacturer inventory can be used to determine the toxicity of a product's ingredients.



**C-75** Materials with low or no volatile organic compounds (VOCs) must be chosen. This should be demonstrated by ensuring that 95 percent of internal material finishes, by cost, meet the total VOC content limits in Table 3.1.

| Product Type                                                                                   | Max. Total VOC (g/L ready to use product)                             |
|------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| <b>Paints, varnishes and coatings</b>                                                          |                                                                       |
| California Air Resources Board 2007 Suggested Control Measure for Architectural Coatings       | As defined by the standard                                            |
| South Coast Air Quality Management District Rule 1113 (USA)                                    |                                                                       |
| European Decopaint Directive (2004/42/EC)                                                      |                                                                       |
| Canadian VOC Concentration Limits for Architectural Coatings                                   |                                                                       |
| Hong Kong Air Pollution Control (VOC) Regulation                                               |                                                                       |
| Walls and ceilings – interior gloss Trim – gloss, semi-gloss, satin, varnishes and wood stains | 75                                                                    |
| Walls and ceilings – interior semi-gloss, low sheen and flat washable                          | 16                                                                    |
| Ceilings – interior flat                                                                       | 14                                                                    |
| Timber and binding primers                                                                     | 30                                                                    |
| Latex primer for galvanised iron and zincalume                                                 | 60                                                                    |
| Interior latex undercoat and sealer                                                            | 65                                                                    |
| <b>Adhesives and sealants</b>                                                                  |                                                                       |
| South Coast Air Quality Management District Rule 1168 (USA)                                    | As defined by the standard                                            |
| European Decopaint Directive (2004/42/EC)                                                      |                                                                       |
| Canadian VOC Concentration Limits for Architectural Coatings                                   |                                                                       |
| Hong Kong Air Pollution Control (VOC) Regulation                                               |                                                                       |
| Indoor carpet and carpet pad adhesive                                                          |                                                                       |
| Wood flooring and laminate adhesive                                                            | 100                                                                   |
| Rubber flooring adhesive                                                                       | 60                                                                    |
| Sub-floor and cover base adhesive                                                              | 50                                                                    |
| Ceramic tile adhesive                                                                          | 65                                                                    |
| Dry wall and panel adhesive                                                                    | 50                                                                    |
| Structural glazing adhesive                                                                    | 100                                                                   |
| Architectural sealants                                                                         | 250                                                                   |
| <b>Carpets and floor coverings</b>                                                             |                                                                       |
| Carpets                                                                                        | 4-PC (4-Phenylclohexene)                                              |
| Floor coverings other than carpets (ASTM D5116 or ISO 16000)                                   | 5 mg/m <sup>2</sup> /h at 3 days, 0.5 mg/m <sup>2</sup> /h at 28 days |
| Floor coverings other than carpets (ISO 10580)                                                 | 0.5 mg/m <sup>2</sup> /h at 24 hours                                  |

Table 3.1 VOC Limits

**C-76** Composite wood products with low formaldehyde emissions must be chosen. This must be demonstrated by ensuring that 95 percent of materials, by cost, do not exceed emission levels as shown in Table 3.2.

| Product Type                                                                                  | Emission Limit/Unit of Measurement              |
|-----------------------------------------------------------------------------------------------|-------------------------------------------------|
| California Air Resources Board ATCM for various composite wood applications                   | As defined by the standard                      |
| AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood                 | ≤ 1 mg/L                                        |
| AS/NZS 1859:2004, Particle Board with use of testing procedure AS/NZS 4266.16: 2004 method 16 | ≤ 15 mg/L                                       |
| AS/NZS 1859:2004, MDF with use of testing procedure AS/NZS 4266.16: 2004 method 16            | ≤ 1 mg/L                                        |
| AS/NZS 4357.4, Laminated Veneer Lumber (LVL)                                                  | ≤ 1 mg/L                                        |
| Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL          | ≤ 1 mg/L                                        |
| JIS A 5908:2003 Particle Board and Plywood, with use of testing procedures JIS A 1460         | ≤ 1 mg/L                                        |
| JIS A 5905:2003 MDF, with use of testing procedures JIS A 1460                                | ≤ 1 mg/L                                        |
| ASTM D5116                                                                                    | ≤ 0.1(±0.0005) mg/m <sup>2</sup> hr             |
| ISO 16000 part 9, 10 and 11 (also known as EN 13419)                                          | ≤ 0.1(±0.0005) mg/m <sup>2</sup> hr (at 3 days) |
| ASTM D6007                                                                                    | ≤ 0.1(±0.0005) mg/m <sup>2</sup> hr (at 3 days) |
| ASTM E1333                                                                                    | ≤ 0.12 mg/m <sup>3</sup>                        |
| EN 717-1 (also known as DIN EN 717-1)                                                         | ≤ 0.12 mg/m <sup>3</sup>                        |
| EN 717-2 (also known as DIN EN 717-2)                                                         | ≤ 0.12 mg/m <sup>3</sup>                        |

Table 3.2 Formaldehyde Limits

## Recycled and Reused Materials

- C-77** Use of products with identifiable recycled content, including post-industrial content with a preference for post-consumer content, must be maximised.
- C-78** Materials must be selected based on their capacity to be reused and recycled after construction in accordance with the guidance in Section 3.7 Decommissioning and Removal.

## Materials Life Cycle Impacts

- G-50** External materials should be sufficiently durable to withstand the local environmental extremes, including high humidity and sandstorms.
- G-51** Materials which are used significantly onsite or with a high cost, such as concrete or steel, should have an associated environmental product declaration. These should be collected and held by the main contractor.
- G-52** Materials must be procured from sustainably managed sources accredited by independent third-party organisations. This should be demonstrated as follows:
  - › **Steel:** CARES Sustainability Standard, or World Steel Association Climate Action Programme (CAP) membership, or equivalent
  - › **Concrete:** Certified to the WBCSD Cement Sustainability Initiative Responsible Sourcing Scheme, or equivalent
  - › **Timber:** Forestry Stewardship Council (FSC) certification or Programme for the Endorsement of Forest Certification (PEFC) certification
- C-79** Rapidly renewable materials must have a harvest cycle of 10 or fewer years. These include materials such as bamboo, rubber, or agrifiber products.

## Materials Selection

- C-80** Crushed concrete aggregate (CCA) is permitted for certain applications:
  - › Use of coarse CCA in base and sub-base: up to 90 percent
  - › Use of fine CCA in pavement surface: up to 15 percent
  - › Concrete production: up to 15 percent
 Use of CCA must conform to BS 8500 or ACI 555R.

## Polyvinyl Chloride

- C-81** Where polyvinyl chloride (PVC) is required for performance-based reasons, and if it can be robustly demonstrated that no other more suitable alternative substance or material exists, mitigating measures must be pursued.

The supplier must confirm that the production of PVC does not result in effluent discharges exceeding the established water quality standards, or vent gases exceeding the European standards for waste incineration, and that the production of PVC is conducted in a way that prevents fugitive emissions during manufacture and protects the health and safety of employees.

- C-82** PVC used in pavilions must comply with 'ECVM Industry Charter for the Production of VCM and PVC.'
- C-83** The non-recycled content of PVC must not contain lead, mercury, or cadmium stabilisers and be produced using non-phthalate plasticisers.
- C-84** The contractor must use reasonable endeavours to procure PVC with a recycled content of at least 30 percent.

## 3.6.7 Waste

Through Expo 2020 Dubai, participants have the opportunity to showcase innovative responses to waste management, disposal, and materials reuse.

### Solid Waste Management

- G-53** Participants should develop a Solid Waste Management Plan detailing all major waste streams generated during operation, including disposal, segregation, and diversion rates.
- C-85** Participants must achieve 85 percent segregation of all waste streams (by weight).
- G-54** Within the pavilion, collection stations for recyclable materials should be integrated in to the pavilion design and layout. These stations should be dedicated to the separation, collection, and storage of materials for recycling.
- C-86** Recycling must cover at least paper, corrugated cardboard, glass, plastics, and metals.
- C-87** All participants must avoid using hazardous materials as they are detrimental to the natural environment and are non-reusable. Participants must interface with site-wide waste network and hazardous waste management during construction and operation. Examples of potentially hazardous wastes include paints, solvents, oil, mercury-containing lamps, electronic waste, and batteries.
- G-55** Collection containers for recyclable materials should be installed either adjacent to or integrated into the design of other receptacles.
- G-56** After the event, green waste (which requires disposal) should be taken to the site composting area to be recycled.

### 3.6.8 Emissions

- C-88** All refrigerants and insulation products must have an ozone depletion potential (ODP) of zero.
- C-89** All insulation products must have a global warming potential (GWP) of less than 5.
- C-90** Chlorofluorocarbon-based refrigerants must not be used in HVAC and refrigeration systems.
- G-57** Carbon emissions should be reduced by considering the emissions generated during manufacturing or processes as a result of the design, construction, materials procurement, and operations.

### 3.6.9 Public Realm and Ecology

- G-58** Enhancing the natural systems and biodiversity throughout the site will be fundamental to showcase the region's landscapes. Participants should embed this concept within the landscape design of their pavilions to promote the UAE's flora and fauna.
- C-91** All participants must consider the public realm in terms of outdoor thermal comfort, stormwater management, and noise pollution. Public realm also includes consideration to indoor environment quality elements such as ventilation and air quality.

#### Ecological Enhancement

- C-92** Planting within the plot must be selected for low water use and must be appropriate to the UAE climate.
- G-59** Plants used in the pavilion should, where possible, be native to the UAE or adaptive to the local climatic condition which is generally dry, hot, and with limited rainfall.
- G-60** Where landscaping is proposed within the plot, five different types of native or adaptive plant species are recommended for incorporation in to the landscape design.
- C-93** Plant selection must ensure that no pest or invasive plants are included.
- G-61** Use of pesticides within the landscaped areas should be minimised.
- G-62** Seeds, plants, and landscaping furniture should be procured from local suppliers, where possible. Local nurseries should be used if plants are required to be propagated and grown prior to being planted at the site.
- G-63** Participants should maintain healthy plants suitable for transplantation at the end of the event.

### Outdoor Thermal Comfort

- C-94** To reduce the heat-island effect within the outdoor public realm, the following solar reflectance index (SRI) values must be achieved for external surfaces:
  - › Hardscape: 30
  - › Non-flat roof: 30
  - › Flat roof: 80
 These elements can be assessed in aggregate.
- C-95** For wall surfaces, light reflectance value must target a minimum of 45 percent in aggregate.

### Stormwater

- G-64** Volume of stormwater runoff should be reduced by promoting infiltration methods.
- G-65** External areas should be designed to protect receiving stream channels from excessive erosion.
- G-66** Source control measures (such as grease traps) must be implemented to improve the quality of any stormwater discharge.

### Noise Pollution

- G-67** Where relevant, any noise mitigation measures should be implemented. These may include, but not limited to:
  - › Positioning the noise-tolerant sections of the pavilion (bathrooms, kitchens, and stairwells) to face the potential noise sources
  - › Using landscape to reduce noise, and absorb sound and vibration during operations

### 3.6.10 Indoor Environmental Quality

- G-68** Pavilion design should aim to improve the indoor environmental quality through design decisions that passively improve the indoor environment. This includes air quality, access to daylight, pleasant acoustic conditions, and thermal comfort. The aesthetic and indoor environment gives identity to particular locations, aligned with shading and energy reduction strategies for the pavilion as a whole.

### Ventilation

- G-69** Adequate ventilation and exhaust is important to prevent build-up of odours, carbon dioxide, allergens, and toxins in indoor air. Vegetation should be located along the plot boundary in line with the predominant wind direction to filter the indoor air. Separate exhaust should be provided to food preparation areas, toilets, and waste storage.
- G-70** Participants should consider cross ventilation in the design of their pavilions. Wind should not pass over external hot surfaces before entering the pavilion.



## Daylighting

- G-71** Light-coloured surfaces should be used to disperse daylight throughout the space.
- G-72** Glazing areas should be sized appropriately to balance daylighting requirements with reduced heat gains. Glazing ratios between 20 to 35 percent are likely to be appropriate.

## Air Quality

- G-73** The design of the HVAC system, if utilised, and pavilion envelope should be considered to meet the requirements of ASHRAE Standard 55, Thermal Environmental Conditions for Human Occupancy.
- G-74** Indoor planting should include species that improve indoor air quality and can support the removal of formaldehyde, benzene, carbon monoxide, and xylene from the air.

## 3.6.11 Sustainability Awareness

- G-75** Educational signage or displays should be incorporated within the pavilion highlighting the sustainable features of the plot and pavilion design.
- G-76** Smart technology should be integrated into the pavilion design to educate visitors about its sustainability features.

## 3.6.12 Responsibility and Compliance

It is the responsibility of each participant to follow and adhere to their specific sustainability controls and guides. All participants will be required to provide a commitment to sustainability and demonstrate how the sustainability controls and guides have been integrated into the exhibition design, construction, and disassembly planning.

### Sustainability Compliance Requirements and Drivers

Compliance with environmental laws and regulation will be required. Strategic alignment with the following national and sub-national initiatives will also be required, where applicable:

- › UAE Vision 2021
- › UAE Green Growth Strategy
- › UNEP's Sustainable Public Procurement Programme
- › Dubai Green Economy Partnership
- › 2030 Dubai Integrated Energy Strategy
- › Green Building Regulations and Specifications in the Emirate of Dubai

### The UAE Vision 2021

The UAE Vision 2021 outlines the future challenges facing the UAE and provides an overarching perspective on mitigation over the coming years. The strategy focuses on economic, social, and environmental factors.

## The UAE Green Growth Strategy

The UAE Green Growth Strategy was launched in January 2012 by His Highness Sheikh Mohammed Bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai. This is a long-term initiative that aims to promote sustainability in the economy and the public and private sectors, to help the UAE become a global hub and a successful model of the new economy.

### UNEP's Sustainable Public Procurement Programme

The UAE's Green Economy push aligns with the United Nations Environment Programme's (UNEP) Sustainable Public Procurement Programme, of which the Federal Ministry of Environment and Water is a member. The Sustainable Public Procurement Programme is a set of activities to support the implementation of sustainable public procurement around the world under the mandate of UNEP's 10-year framework of programmes, with a vision of embedding environmental, economic, and social aspects of sustainability into public procurement and associated supply chains.

### Dubai Green Economy Partnership

Launched in May 2012 by His Highness Sheikh Hamdan Bin Mohammed Bin Rashid Al Maktoum, Crown Prince of Dubai and Chairman of Dubai Executive Council, the Dubai Green Economy Partnership (Dubai GEP) is inspired by the UAE Green Growth Strategy. Dubai GEP is a multi-stakeholder and cross-sector partnership to promote green growth in the Middle East and position Dubai as global gateway for green investment and trade that is leading the worldwide transition to the new economy.

### Dubai Integrated Energy Strategy 2030

The Dubai Integrated Energy Strategy 2030, outlined by Dubai Supreme Council of Energy, sets an ambitious target of a 30 percent reduction in energy consumption by 2030. Renewable energy is tapped to satisfy 7 percent of the city's energy requirements by 2020, increasing to 15 percent by 2030.

### Green Building Regulations and Specifications in the Emirate of Dubai

The Green Building Regulations and Specifications administered by the Dubai Municipality cover the standard elements of green building design, such as energy, water, healthy buildings, ecology, materials, and waste.

## 3.7 Decommissioning and Removal

- C-96** All participants must provide a strategy for decommissioning and relocating the pavilion following the completion of the Expo 2020 Dubai event. The site must be left in a similar condition as received, with all structures (surface and subterranean) removed.
- C-97** A plan must be provided that indicates how the pavilion will be decommissioned in such a way that ensures the health and safety of workers and the public, while minimising the environmental impacts and risks associated with waste.
- C-98** Pavilions must be designed to redeploy, recycle, or return back to the manufacturer 75 percent of construction materials.
- G-77** Participants are encouraged to use prefabricated, factory assembled, or constructed components which can be transported to and assembled on the site.
- G-78** Participants are encouraged to use locally sourced materials that can be easily dismantled, reused, recycled, or redeployed.
- G-79** Participants should design pavilions using components which can be easily and safely placed or removed without compromising structural integrity or requiring extensive assembling and dismantling. The larger the size of pavilion components, the easier the disassembly post event. Modular pavilion design can also facilitate the reuse of single units arranged in various combinations in other context.
- G-80** The average structural recovery index should be a minimum of 60 percent.

## 3.8 Signage and Wayfinding

Wayfinding is not only about directional signs but also about systems which communicate information to help and educate people to understand their environment and to know how to effectively move through it. Wayfinding solutions can and should include architectural elements, such as the angle of a wall, position of a door, direction of a pattern applied to a wall or floor, lighting of corridors, and reflection from shiny surfaces that provide directional information.

The wayfinding design controls and guides have been developed in line with current industry recognised best practices. The following set of controls and guides will serve to inform the integration of:

- › Wayfinding information
- › Statutory signage requirements
- › Special assistance areas and routes for persons with reduced mobility

The controls and guides in this section focus on the general arrangement of signage locations, placement, and sizing of elements. These will ensure consistency in signage, decrease visual clutter, and contribute to the quality of the built environment at Expo 2020 Dubai. See Figure 3.15.

- C-99** Wayfinding must facilitate mobility for all, ensuring that everyone on the site can move quickly and efficiently to their required destination using clearly defined routes.
- G-81** Participants should provide signs that communicate information on what or who is situated in the pavilion or space.

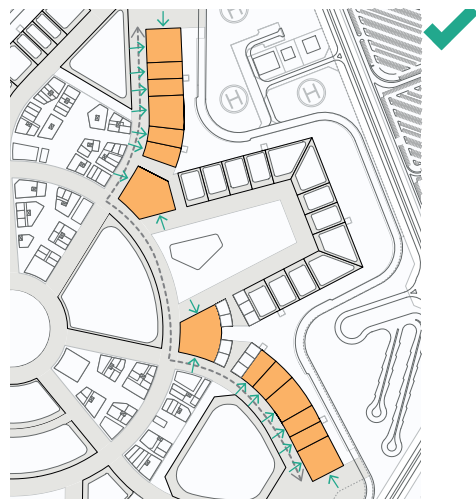


Figure 3.15 Pavilion Identification Signage Facade Placement

- C-100** Hazards, restricted access areas, and other necessary details on the specific pavilion must be provided.
- G-82** All signage should be highly integrated and aligned with the area's visual appearance in terms of signage location, materiality, and graphic design.
- C-101** Participants must be responsible for the wayfinding, informational signage, pavilion identification, and safety/emergency signage within their pavilion.
- G-83** To ensure a clean and consistent streetscape, each pavilion should have only one identification sign. No additional advertising signage is permitted. Pavilion identification signage should only be placed on the primary entrance facade. If a pavilion is on a corner, it may have the signage facing two directions.
- G-84** Pavilion identification signage should not be oversized. Identification signage should occupy a maximum of 15 percent of the overall pavilion facade. See Figure 3.16.
- G-85** Pavilion identification signage should not be placed on rooftops. However, this may have been considered a necessary control at the discretion of the Organiser.
- G-86** Signage should be placed at a height below the shading structure.
- C-102** Signage wayfinding must not obstruct service roads and footpaths, and must not overhang the plot boundary.
- C-103** Internal signage must ensure legibility for users of all abilities and groups.

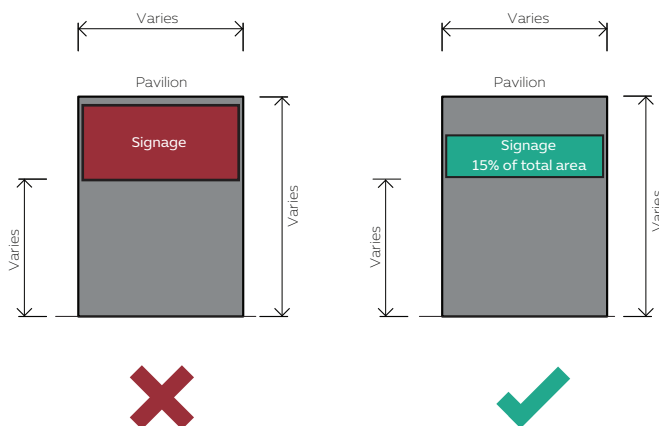


Figure 3.16 Permissible Signage Area for Pavilion Identification Signage on Facade

### 3.8.1 Safety and Emergency Signs

- C-104** Emergency signage must be provided to all pavilions within the plot up to the public realm, and must comply with local and national codes and standards.
- C-105** Safety and emergency signage must be simple, clear, and concise. Only essential information must be included in the signage.
- C-106** Designated assembly points must be clearly signed to guide people during an emergency situation. These areas must be coordinated with the Organiser.
- C-107** Safety and emergency signage must include the use of illuminated signs, hand signals, acoustic signals (such as fire alarms), spoken communication, and the marking of pipework containing dangerous substances.

### 3.8.2 Accessibility Signage

- C-108** All accessible facilities must be clearly signed. Pavilion accessibility signage must include the following:
- › Signage for sanitary facilities
  - › Signage for doorways serving as exits or entries
  - › Signage for areas with hearing augmentation system
  - › Signage directing to nearest accessible point of entry, where a (secondary) point of pedestrian entry is not accessible
- C-109** Pavilion signage and wayfinding must cater to people with visual or hearing impairments. Audible messaging or a similar system must be provided for the visually impaired.

### 3.8.3 Back-of-House Areas

- G-87** All materials used for signs should be of a quality which is durable for the exterior environment and for the duration of the event.
- C-110** Delivery entrances must have appropriate signage for logistics and BoH services.



3.8.4 Type Sizing and Distance

**C-111** Type and character sizing is expressed in both Cap Height (CH) and X-Height (X). All sizes of typeface must be expressed and applied in millimetres (mm).

**C-112** Figure 3.17 and Figure 3.18 show the distance at which certain sizes of lettering can be read by a person with average eyesight. The data obtained here must be used by the participants to determine the minimum letter size for any piece of wayfinding environmental graphics.

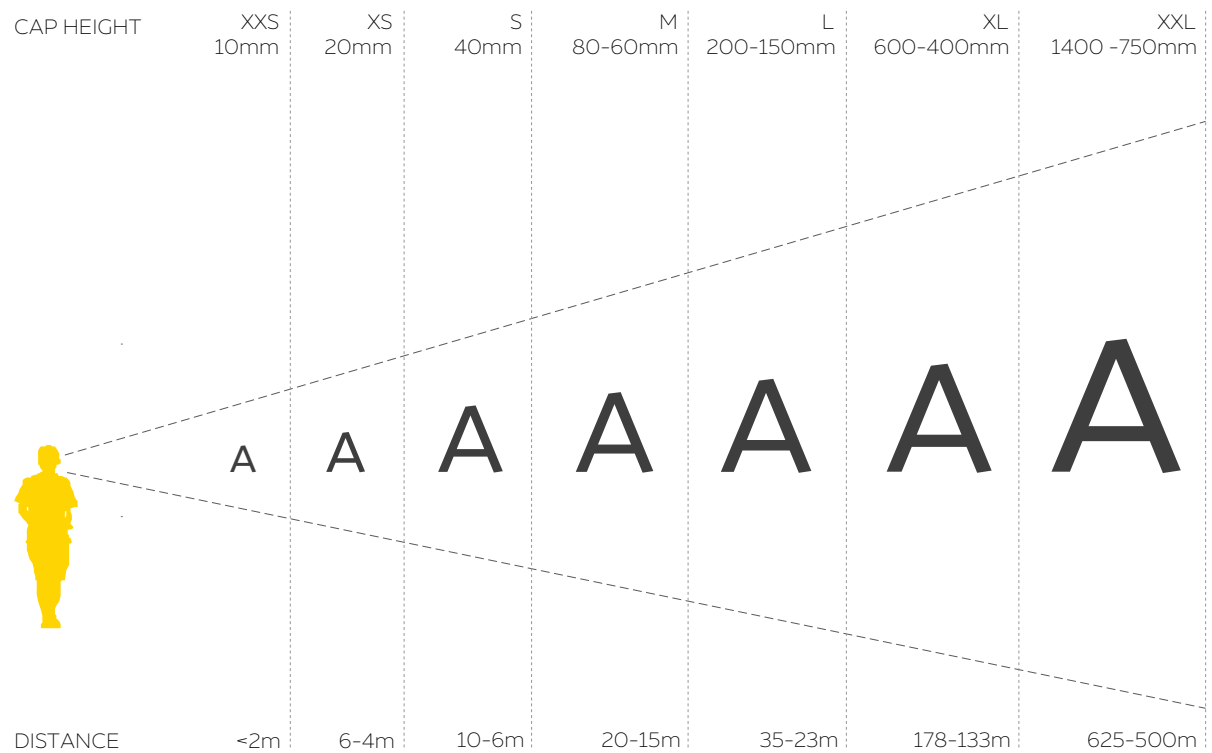


Figure 3.17 English Signage Sizing Legibility Criteria

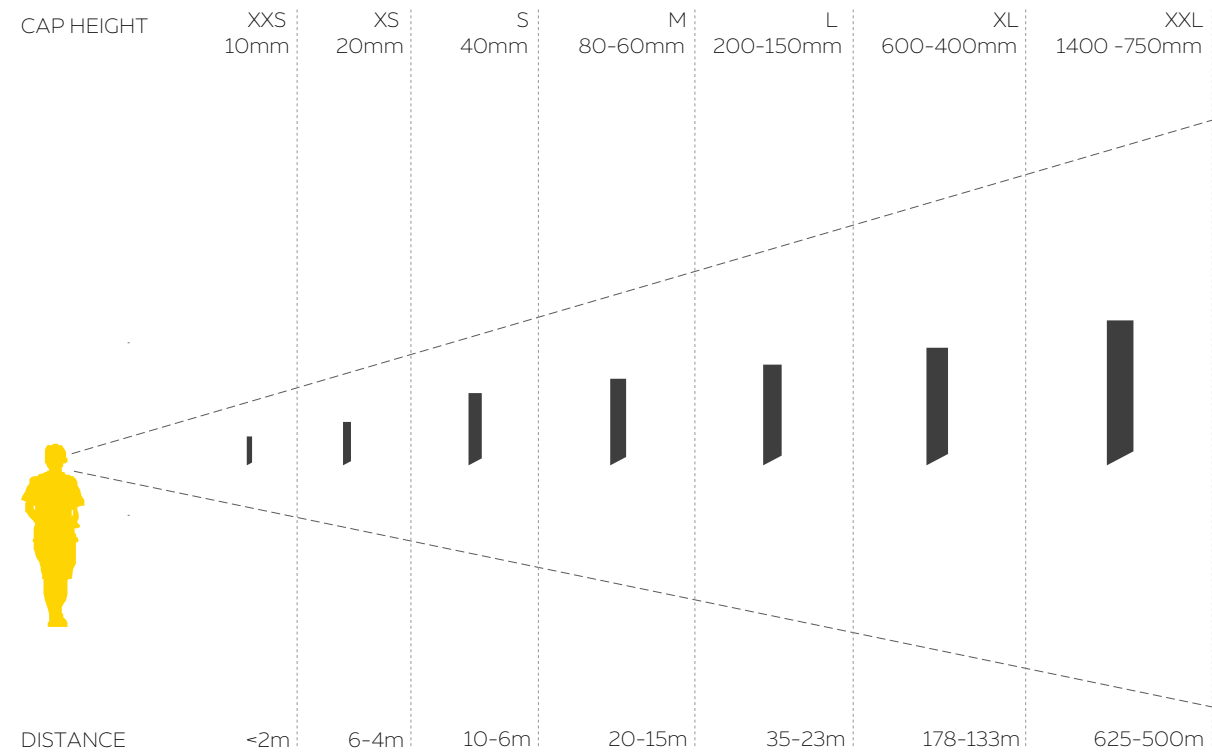


Figure 3.18 Arabic Signage Sizing Legibility Criteria

**C-113** Type sizes must be limited to a number of standard sizes, which will be named XXS, XS, S, M, L, XL, and XXL. By using such sizing categories, consistency will be maintained for sizing of type based on importance.

**G-88** Scales of signage should address scales of space. These are related to the distance from which signs are viewed as well as to how important the sign is within the total hierarchy of information. See Figure 3.19 and Figure 3.20.

**XXL**

Expo 2020 Dubai  
Branding Zone  
Identification

Dubai Expo

CAP height (CH)

1,440-750 mm

Baseline

**XL**

Main Building Identity  
Pavilion Identity

United Arab E

CAP height (CH)

600-400 mm

Baseline

**L**

Interior Identification  
Interior Branding

Pavilion

CAP height (CH)

200-150 mm

Baseline

**M**

Primary  
Destinations

Exhibition

CAP height (CH)

80-60 mm

Baseline

**S**

Secondary  
Destinations

Children's Park

CAP height (CH)

40 mm

Baseline

**XS**

Services  
Public Amenities

Food court

CAP height (CH)

20 mm

Baseline

**XXS**

Directory Text

Toilets

CAP height (CH)

10 mm

Baseline

Figure 3.19 English Signage Sizing Legibility Criteria



Figure 3.20 Arabic Signage Sizing Legibility Criteria



### 3.8.5 Arabic and English Text Placement and Hierarchy

- C-114** Arabic is the primary language in the hierarchy and must be placed above English in all wayfinding and signage placement. See Figure 3.21.
- C-115** Arabic is read from right to left, and as the primary language, must be right justified on wayfinding and signage placement.
- C-116** The content and typeface for all signage must be authorised by the Organiser.

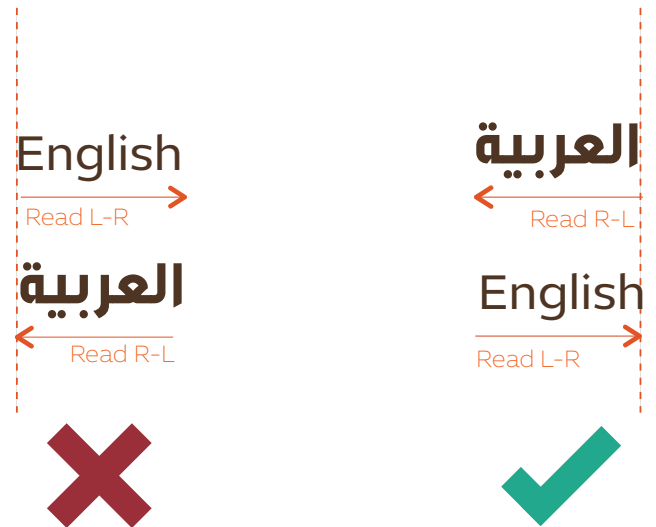


Figure 3.21 Arabic and English Language Hierarchy and Signage Placement



## 3.9 Relevant Standards, Codes, and Regulations

### 3.9.1 Dubai, UAE, and International Building Codes and Regulations

Safety is of upmost priority on the Expo 2020 Dubai site. To ensure safety for all, the entire site will be integrated via a digital network to a central command centre. In line with C-01 and C-02, please refer to the standards, codes, and regulations listed in the following section.

### 3.9.2 Links to Standards, Codes, and Regulations

National and international references in the Self-Build Pavilions Guide:

- 2030 Dubai Integrated Energy Strategy  
[http://www.dubaisce.gov.ae/images/EB\\_newsletter\\_book\\_forwards\\_final\\_spreadss.pdf](http://www.dubaisce.gov.ae/images/EB_newsletter_book_forwards_final_spreadss.pdf)
- AS/NZS 1859  
<https://infostore.saiglobal.com/store/PreviewDoc.aspx?saleItemID=448701>
- AS/NZS 2269  
<https://infostore.saiglobal.com/store/PreviewDoc.aspx?saleItemID=453141>
- AS/NZS 4357:4  
[https://shop.standards.govt.nz/catalog/4357.4%3A2005\(AS%7CNZS\)/view](https://shop.standards.govt.nz/catalog/4357.4%3A2005(AS%7CNZS)/view)
- ASHRAE 90.1  
<https://www.ashrae.org/resources--publications/bookstore/standard-90-1>
- ASHRAE Standard 55  
<https://www.ashrae.org/resources--publications/bookstore/standard-55>
- ASTM D5116  
<http://www.astm.org/Standards/D5116.htm>
- ASTM D6007  
<http://www.astm.org/Standards/D6007.htm>
- ASTM E1333  
<http://www.astm.org/Standards/E1333.htm>
- BS 8500 or ACI 555R  
<https://www.concrete.org/store/productdetail.aspx?ItemID=55501&Format=DOWNLOAD>  
[http://www.brmca.org.uk/documents/Concrete\\_Apr%2014\\_Revision\\_of\\_BS\\_8500.pdf](http://www.brmca.org.uk/documents/Concrete_Apr%2014_Revision_of_BS_8500.pdf)
- California Air Resources Board ATCM  
<http://www.arb.ca.gov/toxics/compwood/compwood.htm>
- Canadian VOC Concentration Limits for Architectural Coatings  
<http://www.ec.gc.ca/lcpe-cepa/eng/regulations/detailReg.cfm?intReg=117>
- CARES  
<http://www.bsigroup.com/en-GB/bes-6001-responsible-sourcing-of-construction-products/>
- Connection Guidelines for Distributed Renewable Resources Generation Connected to the Distribution Network  
[https://www.dewa.gov.ae/images/smartinitiatives/DRRG\\_Connection\\_guidelines\\_final.pdf](https://www.dewa.gov.ae/images/smartinitiatives/DRRG_Connection_guidelines_final.pdf)
- Dubai Green Economy Partnership  
<http://greeneconomy.ae/>
- Dubai Municipality Building Code Regulations and Construction Specifications  
<https://www.dm.gov.ae/wps/portal/businessinner?url=wc:path:/DMContentEnglish/Home/Business/Planning+and+Construction/Building+Publications1&mapping=businessinner>
- Dubai South  
<http://dubaisouth.ae/>
- ECVM Industry Charter for the Production of VCM and PVC  
<http://www.pvcinfo.be/bestanden/S-PVC%20charter.pdf>
- EN 717-1 (also known as DIN EN 717-1)  
<http://www.beuth.de/en/standard/din-en-717-1/72155632>
- EN 717-2 (also known as DIN EN 717-2)  
<http://www.beuth.de/en/standard/din-en-717-2/2473367>
- European Decopaint Directive (2004/42/EC)  
[http://ec.europa.eu/environment/air/pollutants/stationary/paints/paints\\_legis.htm](http://ec.europa.eu/environment/air/pollutants/stationary/paints/paints_legis.htm)
- Forestry Stewardship Council (FSC)  
<https://us.fsc.org/en-us>
- Green Building Regulations and Specifications in the Emirate of Dubai  
[https://www.dewa.gov.ae/images/greenbuilding\\_eng.pdf](https://www.dewa.gov.ae/images/greenbuilding_eng.pdf)
- Hong Kong Air Pollution Control (VOC) Regulation  
[http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/air/prob\\_solutions/files/voc\\_reg\\_guide.pdf](http://www.epd.gov.hk/epd/sites/default/files/epd/english/environmentinhk/air/prob_solutions/files/voc_reg_guide.pdf)

25. IECC 2009  
<http://publicecodes.cyberregs.com/icod/iecc/2009/>
26. IES Guidelines  
[www.ies.org](http://www.ies.org)
27. ISO 10580  
<https://www.iso.org/obp/ui/#iso:std:iso:10580:ed-1:v1:en>
28. ISO 16000 part 9, 10 and 11 (also known as EN 13419)  
[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=38203](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=38203)
29. Japanese Agricultural Standard MAFF Notification No.701 LVL  
<http://www.maff.go.jp/e/jas/jas/index.html>
30. JIS A 5905  
<http://www.webstore.jsa.or.jp/ebstore/Com/FlowControl.sp?lang=en&bunsyold=JIS+A+5905%3A2014&dantaiCd=JIS&status=1&pageNo=0>
31. Leadership in Energy and Environmental Design (LEED®)  
<http://www.usgbc.org/leed>
32. Programme for the Endorsement of Forest Certification (PEFC)  
<http://www.pefc.org/>
33. South Coast Air Quality Management District Rule 1168  
<http://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1168.pdf>
34. Standards for Distributed Renewable Resources Generators Connected to the Distribution Network  
[https://www.dewa.gov.ae/images/smartforms/DEWA\\_Standards\\_for\\_Distributed\\_Renewable\\_Resources\\_Generators.pdf](https://www.dewa.gov.ae/images/smartforms/DEWA_Standards_for_Distributed_Renewable_Resources_Generators.pdf)
35. UAE Fire and Life Safety Code of Practice  
<http://www.dcd.gov.ae/eng/images/pdf/uae-fire-code-eng.pdf>
36. UAE Green Growth Strategy  
<http://www.moew.gov.ae/assets/e3bd136a/uae-state-of-green-economy-report-2014.aspx>
37. UAE Vision 2021  
<https://www.vision2021.ae/en>
38. United Nations Environment Programme's (UNEP) Sustainable Public Procurement Programme  
<http://www.unep.org/10yfp/Programmes/ProgrammeConsultationandCurrentStatus/Sustainablepublicprocurement/tabid/106267/Default.aspx>
39. WBCSD Cement Sustainability Initiative Responsible Sourcing Scheme  
<http://www.wbcscement.org/index.php/key-issues/sustainability-with-concrete/responsible-sourcing>
40. World Steel Association Climate Action Programme (CAP)  
<https://www.worldsteel.org/steel-by-topic/climate-change/members.html>



## 4 Plot Sheets







## 4 Plot Sheets

The development plot sheets apply to all identified plots to be developed for Expo 2020 Dubai®. The intent of each individual plot sheet is to provide a graphic representation and data summary of the key development controls within the plot boundary. Plot development must conform with the relevant controls of the relevant plot sheet.

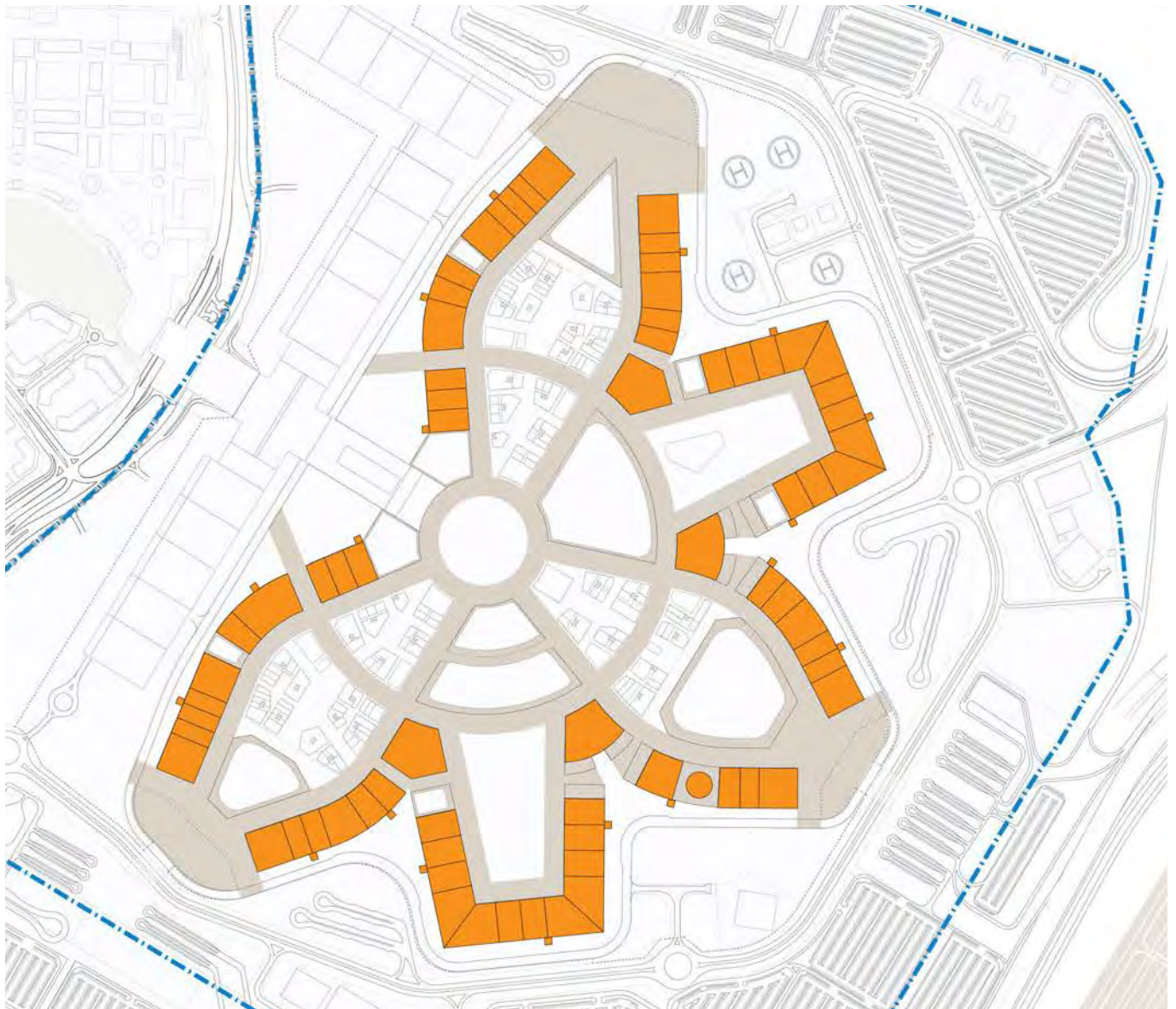


Figure 4.1 Development Plots Plan

### KEY

- Site Boundary
- Development Plots

The development plot plan in Figure 4.1 is indicative. Exhibition spaces and specific plots will be allocated upon approval of the Theme Statement and signing of the Participation Contract. Refer to the Participant Guide for further details on participation procedures.







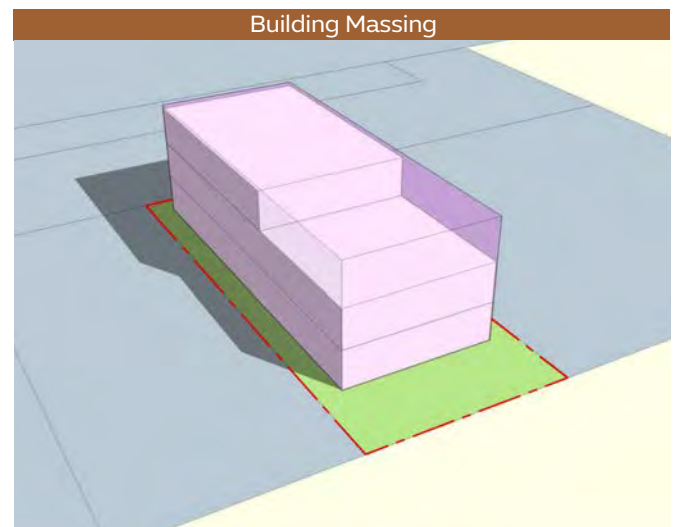
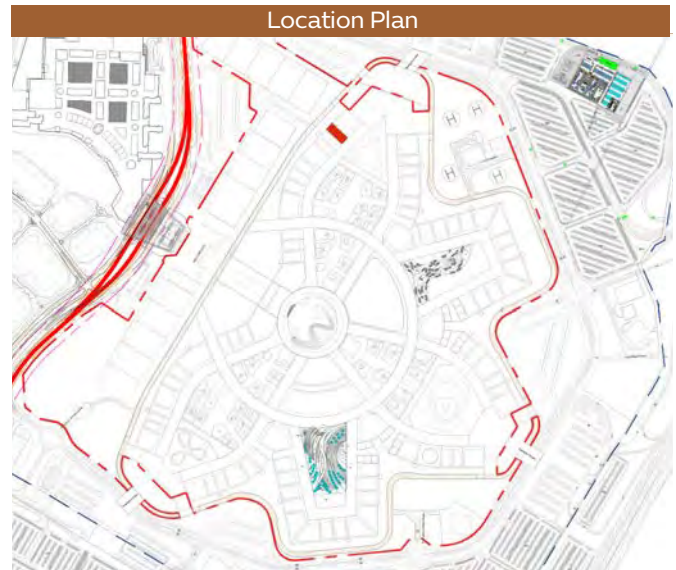
## 4.1 Expo 2020 Dubai – Small Plot Sheet Example

| Plot Details                |                             |
|-----------------------------|-----------------------------|
| Land Use                    | Commercial                  |
| Building Typology           | Self-Build Pavilion (Small) |
| Plot Area (m <sup>2</sup> ) | 1,550 m <sup>2</sup>        |
| Maximum Buildable Zone      | 1,085 m <sup>2</sup>        |
| Indicative GFA (RICS)       | 2,713 m <sup>2</sup>        |
| Indicative GFA (DM)         | 2,496 m <sup>2</sup>        |
| Indicative FAR              | 1.8                         |
| Maximum Plot Coverage       | 70%                         |
| Assigned Building Height    | 12.5 m                      |
| Maximum Number of Floors    | 2.5                         |
| Number of Basement Levels   | -                           |

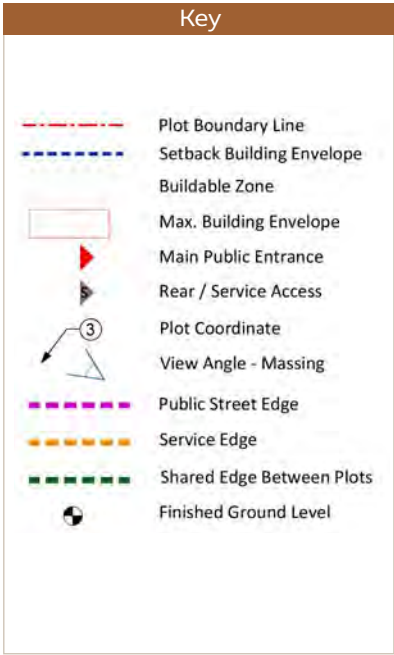
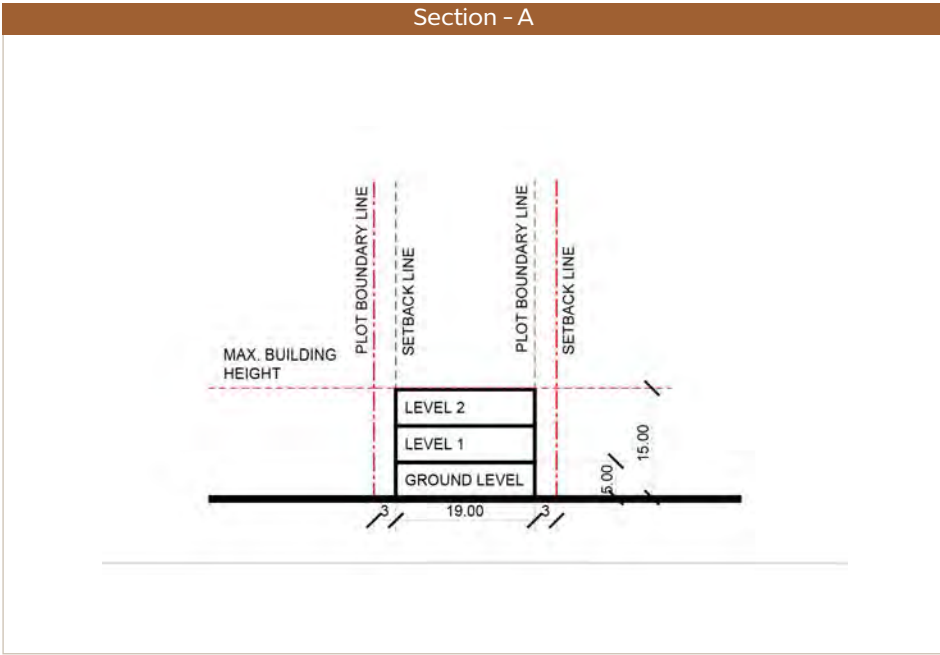
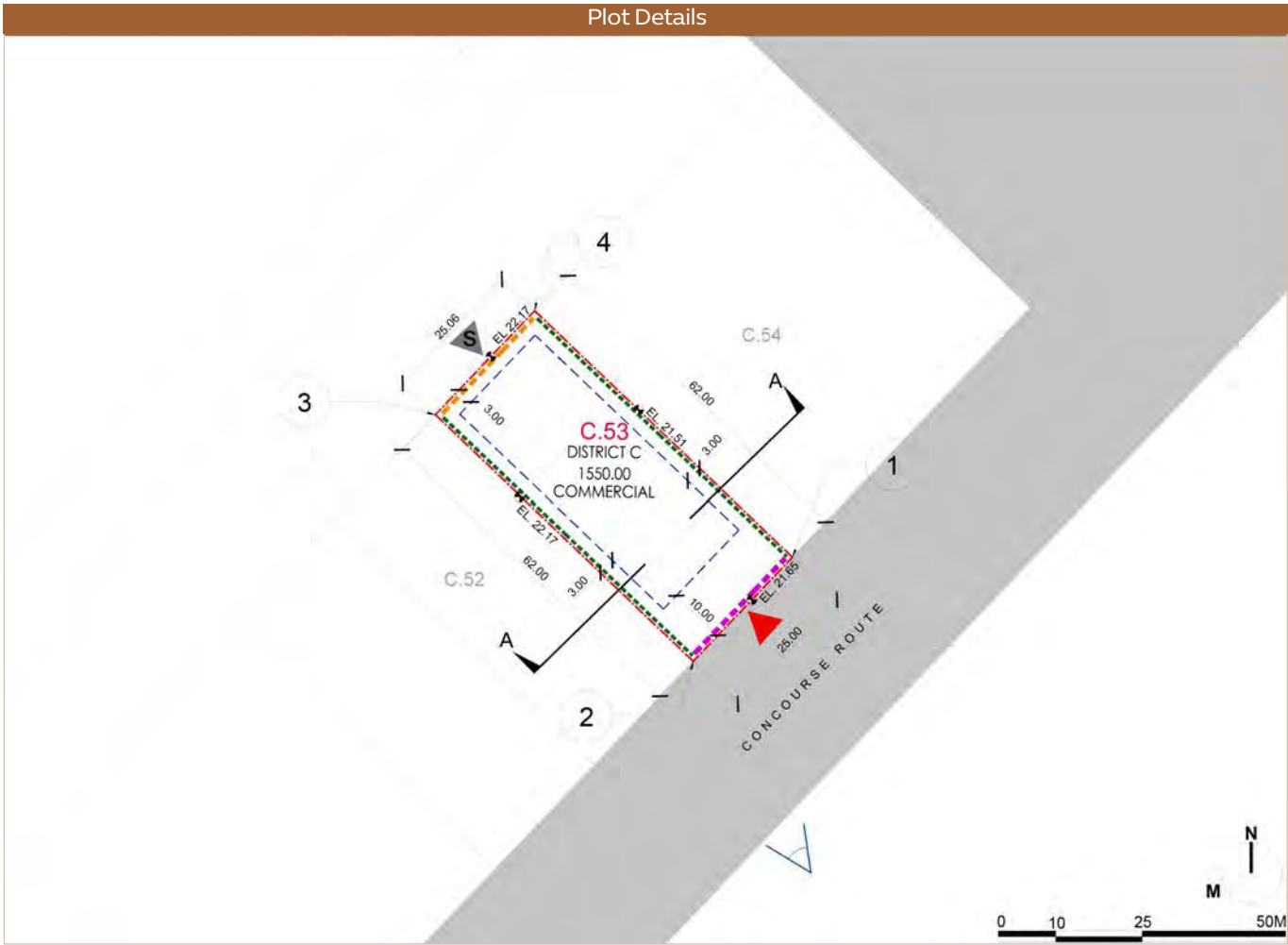
| Infrastructure Allocation                       |     |
|-------------------------------------------------|-----|
| Demand (m <sup>3</sup> /day)                    | 29  |
| Average Sewage Flow (m <sup>3</sup> /day)       | 26  |
| Average Irrigation Demand (m <sup>3</sup> /day) | 2   |
| Total Connected Load (kW)                       | 722 |
| Average Gas Demand (m <sup>3</sup> /day)        | -   |

| Design Notes |                                                                                                                                                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.           | Refer to 'Self-Build Pavilions Guide' for design guides and controls.                                                                                   |
| 2.           | All dimensions and coordinates are approximate until final survey is carried out by the Organiser. All dimensions indicated are in metres.              |
| 3.           | Heights are indicative only and subject to approval by the regulating authority.                                                                        |
| 4.           | This plot sheet is in draft form and is subject to change.                                                                                              |
| 5.           | Refer to the Infrastructure Fact Sheet, Drawing No. 1008-DWG-H030000-IF-200607 for the latest utility demand and connection points.                     |
| 6.           | Plot Details and Infrastructure Allocation is based on Master Plan Ref. 10002-DWG-H02000-MP-200003 dated 04.24.2016 and maybe subject to minor changes. |
| 7.           | Infrastructure allocation is based on DM GFA definition.                                                                                                |
| 8.           | Participants should abide by Dubai Municipality code and standards, including submission for building permits.                                          |

| Plot Coordinates Table |           |            |
|------------------------|-----------|------------|
| Point                  | East      | North      |
| 1                      | 481659.23 | 2762253.78 |
| 2                      | 481641.97 | 2762235.69 |
| 3                      | 481597.11 | 2762278.48 |
| 4                      | 481614.37 | 2762296.57 |



| Definitions                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Gross Floor Area:</b> Equal to the gross internal area defined by the RICS Code of Measuring Practice 6 <sup>th</sup> Edition.                                                                      |
| <b>Gross Internal Area:</b> Defined by the RICS Code of Measuring Area Practice 6 <sup>th</sup> Edition.                                                                                               |
| <b>Floor Area Ratio (RICS):</b> Defined by dividing the gross internal area defined by the RICS Code of Measuring Practice 6 <sup>th</sup> Edition.                                                    |
| <b>Floor Area Ratio (DM):</b> The ratio resulting from dividing the total built up area over the total plot area. Areas excluded from the calculation of the total built up area as per DM definition. |
| <b>Plot Coverage:</b> Extent of plot covered by the building(s) or structure and this is expressed in terms of percentage. It is the ratio of the building footprint area over the plot area.          |





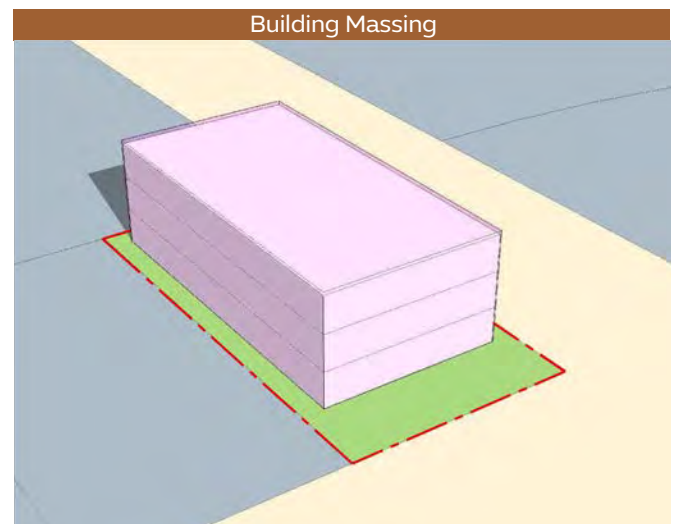
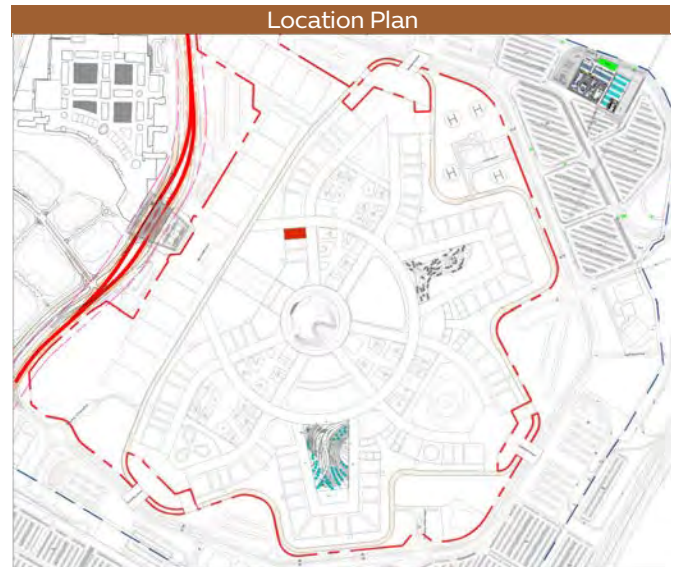
## 4.2 Expo 2020 Dubai – Medium Plot Sheet Example

| Plot Details                |                              |
|-----------------------------|------------------------------|
| Land Use                    | Commercial                   |
| Building Typology           | Self-Build Pavilion (Medium) |
| Plot Area (m <sup>2</sup> ) | 1,922 m <sup>2</sup>         |
| Maximum Buildable Zone      | 1,346 m <sup>2</sup>         |
| Indicative GFA (RICS)       | 3,364 m <sup>2</sup>         |
| Indicative GFA (DM)         | 3,095 m <sup>2</sup>         |
| Indicative FAR              | 1.8                          |
| Maximum Plot Coverage       | 70%                          |
| Assigned Building Height    | 12.5 m                       |
| Maximum Number of Floors    | 2.5                          |
| Number of Basement Levels   | -                            |

| Infrastructure Allocation                       |     |
|-------------------------------------------------|-----|
| Demand (m <sup>3</sup> /day)                    | 35  |
| Average Sewage Flow (m <sup>3</sup> /day)       | 32  |
| Average Irrigation Demand (m <sup>3</sup> /day) | 3   |
| Total Connected Load (kW)                       | 895 |
| Average Gas Demand (m <sup>3</sup> /day)        | -   |

| Design Notes |                                                                                                                                                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.           | Refer to 'Self-Build Pavilions Guide' for design guides and controls.                                                                                   |
| 2.           | All dimensions and coordinates are approximate until final survey is carried out by the Organiser. All dimensions indicated are in metres.              |
| 3.           | Heights are indicative only and subject to approval by the regulating authority.                                                                        |
| 4.           | This plot sheet is in draft form and is subject to change.                                                                                              |
| 5.           | Refer to the Infrastructure Fact Sheet, Drawing No. 1008-DWG-H030000-IF-200607 for the latest utility demand and connection points.                     |
| 6.           | Plot Details and Infrastructure Allocation is based on Master Plan Ref. 10002-DWG-H02000-MP-200003 dated 04.24.2016 and maybe subject to minor changes. |
| 7.           | Infrastructure allocation is based on DM GFA definition.                                                                                                |
| 8.           | Participants should abide by Dubai Municipality code and standards, including submission for building permits.                                          |

| Plot Coordinates Table |           |            |
|------------------------|-----------|------------|
| Point                  | East      | North      |
| 1                      | 481530.57 | 2761996.77 |
| 2                      | 481532.85 | 2761965.86 |
| 3                      | 481471.02 | 2761961.29 |
| 4                      | 481468.74 | 2761992.21 |



| Definitions                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Gross Floor Area:</b> Equal to the gross internal area defined by the RICS Code of Measuring Practice 6 <sup>th</sup> Edition.                                                                      |
| <b>Gross Internal Area:</b> Defined by the RICS Code of Measuring Area Practice 6 <sup>th</sup> Edition.                                                                                               |
| <b>Floor Area Ratio (RICS):</b> Defined by dividing the gross internal area defined by the RICS Code of Measuring Practice 6 <sup>th</sup> Edition.                                                    |
| <b>Floor Area Ratio (DM):</b> The ratio resulting from dividing the total built up area over the total plot area. Areas excluded from the calculation of the total built up area as per DM definition. |
| <b>Plot Coverage:</b> Extent of plot covered by the building(s) or structure and this is expressed in terms of percentage. It is the ratio of the building footprint area over the plot area.          |

Section - A

Diagram illustrating the building footprint and setbacks for Section - A. The building is shown with three levels: GROUND LEVEL, LEVEL 1, and LEVEL 2. The total width of the building is 25.00. The setbacks from the plot boundaries are 5.00 on the left and 15.00 on the right. The maximum building height is indicated by a dashed line.

| Key                                                                                   |                           |
|---------------------------------------------------------------------------------------|---------------------------|
|  | Plot Boundary Line        |
|  | Setback Building Envelope |
|  | Buildable Zone            |
|  | Max. Building Envelope    |
|  | Main Public Entrance      |
|  | Rear / Service Access     |
|  | Plot Coordinate           |
|  | View Angle - Massing      |
|  | Public Street Edge        |
|  | Service Edge              |
|  | Shared Edge Between Plots |
|  | Finished Ground Level     |

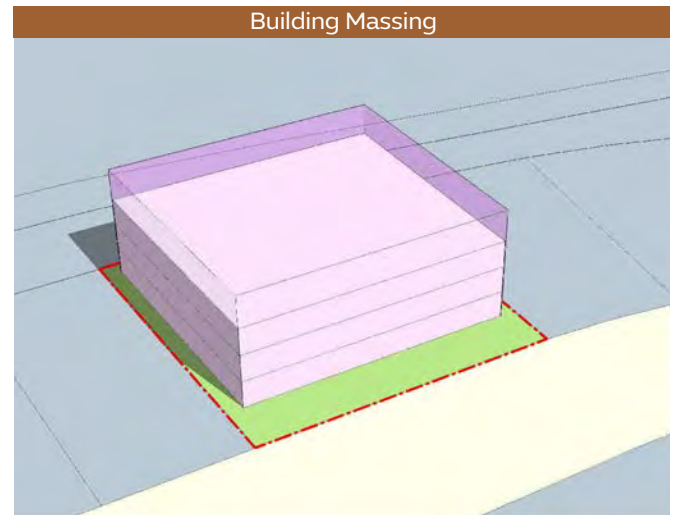
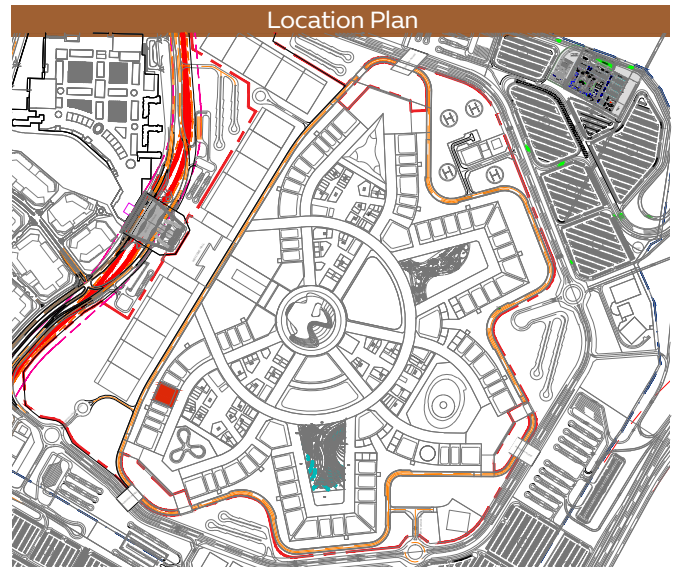
## 4.3 Expo 2020 Dubai - Large Plot Sheet Example

| Plot Details                |                             |
|-----------------------------|-----------------------------|
| Land Use                    | Commercial                  |
| Building Typology           | Self-Build Pavilion (Large) |
| Plot Area (m <sup>2</sup> ) | 3,565 m <sup>2</sup>        |
| Maximum Buildable Zone      | 2,495 m <sup>2</sup>        |
| Indicative GFA (RICS)       | 6,238 m <sup>2</sup>        |
| Indicative GFA (DM)         | 5,739 m <sup>2</sup>        |
| Indicative FAR              | 1.8                         |
| Maximum Plot Coverage       | 70%                         |
| Assigned Building Height    | 12.5 m                      |
| Maximum Number of Floors    | 2.5                         |
| Number of Basement Levels   | -                           |

| Infrastructure Allocation                       |       |
|-------------------------------------------------|-------|
| Demand (m <sup>3</sup> /day)                    | 66    |
| Average Sewage Flow (m <sup>3</sup> /day)       | 59    |
| Average Irrigation Demand (m <sup>3</sup> /day) | 5     |
| Total Connected Load (kW)                       | 1,660 |
| Average Gas Demand (m <sup>3</sup> /day)        | -     |

| Design Notes |                                                                                                                                                         |
|--------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.           | Refer to 'Self-Build Pavilions Guide' for design guides and controls.                                                                                   |
| 2.           | All dimensions and coordinates are approximate until final survey is carried out by the Organiser. All dimensions indicated are in metres.              |
| 3.           | Heights are indicative only and subject to approval by the regulating authority.                                                                        |
| 4.           | This plot sheet is in draft form and is subject to change.                                                                                              |
| 5.           | Refer to the Infrastructure Fact Sheet, Drawing No. 1008-DWG-H030000-IF-200607 for the latest utility demand and connection points.                     |
| 6.           | Plot Details and Infrastructure Allocation is based on Master Plan Ref. 10002-DWG-H02000-MP-200003 dated 04.24.2016 and maybe subject to minor changes. |
| 7.           | Infrastructure allocation is based on DM GFA definition.                                                                                                |
| 8.           | Participants should abide by Dubai Municipality code and standards, including submission for building permits.                                          |

| Plot Coordinates Table |           |            |
|------------------------|-----------|------------|
| Point                  | East      | North      |
| 1                      | 481183.87 | 2761530.90 |
| 2                      | 481162.26 | 2761479.12 |
| 3                      | 481104.97 | 2761502.81 |
| 4                      | 481127.69 | 2761557.13 |



| Definitions                     |                                                                                                                                                                          |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Gross Floor Area:</b>        | Equal to the gross internal area defined by the RICS Code of Measuring Practice 6 <sup>th</sup> Edition.                                                                 |
| <b>Gross Internal Area:</b>     | Defined by the RICS Code of Measuring Area Practice 6 <sup>th</sup> Edition.                                                                                             |
| <b>Floor Area Ratio (RICS):</b> | Defined by dividing the gross internal area defined by the RICS Code of Measuring Practice 6 <sup>th</sup> Edition.                                                      |
| <b>Floor Area Ratio (DM):</b>   | The ratio resulting from dividing the total built up area over the total plot area. Areas excluded from the calculation of the total built up area as per DM definition. |
| <b>Plot Coverage:</b>           | Extent of plot covered by the building(s) or structure and this is expressed in terms of percentage. It is the ratio of the building footprint area over the plot area.  |



### Section - A

Section A diagram illustrating the building envelope and setbacks. The diagram shows a cross-section of a building with three levels: GROUND LEVEL, LEVEL 1, and LEVEL 2. The building is bounded by a MAX. BUILDING ENVELOPE. The setbacks are defined by the SETBACK LINE and the PLOT BOUNDARY LINE. The maximum building height is indicated by a dashed line. The dimensions shown are 51.65 for the width and 21.00 for the height. A 5.00 dimension is also shown for the ground level setback.

| Key                                                                                   |                           |
|---------------------------------------------------------------------------------------|---------------------------|
|  | Plot Boundary Line        |
|  | Setback Building Envelope |
|  | Buildable Zone            |
|  | Max. Building Envelope    |
|  | Main Public Entrance      |
|  | Rear / Service Access     |
|  | Plot Coordinate           |
|  | View Angle - Massing      |
|  | Public Street Edge        |
|  | Service Edge              |
|  | Shared Edge Between Plots |
|  | Finished Ground Level     |

# 5 Design Submission, Review, and Approvals







## 5 Design Submission, Review, and Approvals

The Organiser will facilitate the authorisation of the submissions of the participants. The submission process has been split into three stages.



### 5.1 Stage 1 Submission: Theme Statement

The Theme Statement submission should be a general proposal for the plot development. The submission should illustrate the proposed installations, events, thematic content, and architectural expression of the pavilion. For specific submission requirements, refer to the Theme Guide.

On authorisation of the Stage 1 submission by the Organiser, participants can proceed to Stage 2 submission.

If additional information is needed for authorisation, the Organiser will provide technical guidance and recommend modifications.

### 5.2 Stage 2 Submission: Exhibition Proposal - Concept Design

The Stage 2 submission should expand upon the approved Theme Statement, and include the following documentation as a minimum:

- › Statement of compliance with the design guide.
- › Plot layout, including indoor and outdoor spaces, landscaping, and access, provided at a scale of 1:200

- › Architectural concepts, including plans, elevations, and sections, provided at a scale of 1:100. Plans should highlight elements such as floor space, height, open space, and layout of the exhibition space. The submission should also include renderings and sketches of how the spaces will be developed and of the planned aesthetic of the facade.
- › Exhibition Design: A description of the exhibition content should be coupled with the way the content will be represented. Participants should state how the content will be presented and how visitors will make use of it, considering queue management to exhibitions.
- › Retail, Food, and Beverage: The concept should describe the overall thematic approach to the retail, food, and beverage components of the pavilions.
- › Technology Plan: The plan should highlight the interactive technological applications that will be used to display content and enhance visitor experience and operations.
- › Preliminary material specifications
- › Preliminary engineering proposals, including structural, mechanical, electrical, and plumbing
- › Preliminary utility loads
- › Preliminary sustainability report addressing the guides and controls set out in the document
- › Preliminary schedule of works, including design, tender, construction, and deconstruction

On authorisation of the Stage 2 submission by the Organiser, participants can proceed to Stage 3 submission.

If additional information is needed for authorisation, the Organiser will provide technical guidance and recommend modifications.

## 5.3 Stage 3 Submission: Exhibition Proposal – Final Design

The Final Design should expand on the approved Stage 2 submission. It should also be to a standard and level of detail that allows all necessary building approvals and permits to be issued by the Organiser and statutory approving authorities to allow construction to commence. The following documentation must be included as a minimum:

- › Statement of compliance with the design guide and the codes, laws, and regulations of Dubai, the UAE, and international standards
- › Plot layout, including indoor and outdoor spaces, landscaping, and access as well as details of visitor movement and queuing areas
- › Floor plans, elevations, and sections, provided at a scale of 1:100. These should expand upon the detail given at the Concept Design, and provide a complete description of the exhibition space design, including all materials and technologies used.
- › Exhibition design: Participants should clearly state how the content will be presented and demonstrate that it does not impact upon the exhibition's fire strategy or visitor flow, and consider queue management
- › Final material specifications
- › Final engineering proposals, including structural, mechanical, electrical, and plumbing
- › Final sustainability report
- › Final schedule of works, including design, tender, construction, and deconstruction
- › Final utility distribution and loads
- › Retail, food, and beverage: The plan should give a detailed layout of kitchen, storage, and dining areas.
- › Accessibility report
- › Fire prevention strategy
- › Deconstruction plan

On authorisation of Stage 3 submission, a permit to commence works will be provided to the participant country. Once received, participants can commence works on their plot within the site.

After approval of the final design, participants will continue to engage with the Organiser to develop event and operational plans that align with the Organiser's event operation requirements.

### 5.3.1 Submission Process Overview and Instructions

Submissions can be through a web-based Participant Portal or in hard copy format. Details of the portal and the manual submission process will be shared separately.

Documents submitted through the portal must be in PDF format.

Drawing files must be submitted in PDF format as well as in native formats as listed in Table 5.1.

| Submittal     | File Format      | Notes                                                                                                                                                                       |
|---------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3D BIM Models | Native, IFC, NWD | Specified file formats must be submitted from 3D models as a minimum.                                                                                                       |
| 2D Drawings   | Native, DWG      | PDF and DWG formats of each drawing deliverable must be submitted for records retention at each stage gate of each phase. This must include the associate drawing register. |

Table 5.1 Approved Drawing Formats

### 5.3.2 Approval Timescales

The timescale for approval of each submission is shown in Table 5.2.

| Stage                                | Approval for First Submission | Approval for Each Resubmission |
|--------------------------------------|-------------------------------|--------------------------------|
| Theme Statement                      | 20 days                       | 5 days                         |
| Exhibition Proposal – Concept Design | 20 days                       | 5 days                         |
| Exhibition Proposal – Final Design   | 20 days                       | 10 days                        |

Table 5.2 Timescale for Submission and Resubmission

# Chapter II

Excerpts from Dubai Municipality

Food Code



FOOD AND  
BEVERAGE  
SECTIONS WITHIN  
PAVILIONS MUST  
BE PLANNED  
AND DESIGNED  
IN COMPLIANCE  
WITH DUBAI  
MUNICIPALITY'S  
FOOD CODE.

# 1 Introduction







# 1 Introduction

The evolution of the UAE's local food and beverage culture is a testament of the country's success in catering to its multinational resident population. In Dubai alone, thousands of restaurants cater to every palate, from traditional Asian to classic European, and almost every distinctive cuisine in-between. Dubai will leverage its distinguished food and beverage appeal to offer a world-class experience to the participants and visitors of Expo 2020 Dubai®.

Visitors will be able to choose from a wide variety of quality food and beverage offerings that will be distributed throughout the site. Some of these will be delivered through the participants within the designated area of their pavilions while others will be carefully selected outlets.

This will include a full range of dining options from quick service and snacks to fine dining and cuisines that reflect the multicultural offerings available in Dubai.

It is important to properly plan the layout and design of food and beverage sections within the pavilions that will be operated during the event. The layout and design should allow adequate maintenance and cleaning; prevent air borne contamination; and provide adequate working space for the hygienic performance of all operations. Food and beverage sections should be planned according to the items that will be served. This will allow for proper equipment selection, spacing, determination of capacity, and purchase specification.

Chapter II contains excerpts from the '[Food Code](#)' to provide some initial guidelines to the participants. The Food Code is provided by the Food Control Department of the Dubai Municipality. All participants have an obligation to align with the Food Code.

This chapter aims to provide a set of minimum requirements related to the design and layout of retail food and beverage sections within pavilions. A detailed guide on the food and beverage requirements and policies of Expo 2020 Dubai will be developed and shared with the participants at the appropriate time.

This chapter should be read in conjunction with Chapter I, Section 3 Controls and Guides.





## 2 General Layout and Design Requirements







## 2 General Layout and Design Requirements

To ensure smooth workflow, the layout and design should be appropriate for the activities for which the premises will be used. The food and beverage sections should also be sized to meet the operational requirements and suit the type of food and the number of people working in the space.

### 2.1 Spatial Planning

A well-planned kitchen should allow efficient and effective movement of staff, equipment, materials, and waste. It should also provide adequate storage for raw food, kitchen utensils, and tableware as well as adequate space for food and beverage preparation, awaiting service, and checking in stock.

The amount of space to be allotted on food and beverage premises should consider the following criteria:

- › Quantity of food to be prepared per day (such as an estimated number of meals or portions)
- › Type of menu and process involved in preparing the food
- › Days and hours of operation
- › Number of staff who work in the kitchen per shift
- › Shape, size, and number of equipment used for food preparation and storage
- › Type of facilities available for staff (such as toilet, changing room, lockers, and hand wash area)

The recommended commercial area per pavilion is 20 percent of the overall floor area of the pavilion. To allow smooth movement in a kitchen, minimum floor space to accommodate all storage and cooking facilities and free movement of staff is required. This minimum ratio is indicative and may vary depending on specific catering requirements.

However, there are minimum space requirements depending on the type of catering.

The following should be considered in planning the kitchen layout:

- › Sufficient space in which to operate
- › Separation of raw and cooked food storage, preparation area, or display
- › Protection of food from contamination
- › Route for soiled crockery not through food handling areas
- › Ready access for removal of waste (from food handling area and the site)

### 2.2 Workflow

The layout and design of food and beverage sections should allow smooth and continuous workflow, from delivery of raw materials to storage, through to food and beverage preparation and the serving. This will facilitate efficient operation supervision, better productivity, and cost effectiveness. To prevent the risk of cross contamination, a simple linear workflow is recommended to segregate food as necessary.

#### 2.2.1 Workflow Recommendations

##### Physical Separation

- › Production or handling of high-risk finished products, such as cooked foods, requires complete physical separation in terms of product, equipment, utensils, and tools.

## Structures

- › Preparation areas and tables must have smooth, impervious, and easy-to-clean surfaces. For display purposes, plastic sheeting (minimum 100 gauge) must be securely fixed over wooden structures.
- › A properly equipped first-aid kit and an adequate supply of food-safe disinfectants and cleaning agents must also be provided and stored in a safe place.

## Floors

- › Floors must be constructed of smooth, durable material.
- › Floors that are water-flushed for cleaning, that receive water or fluid waste discharge from equipment, or where pressure spraying is used for equipment cleaning, must be graded to drain and must have properly installed trapped floor drains and floor drain covers.
- › Duckboards and mats, if used, must be of non-absorbent, grease-resistant materials and can be easily cleaned.

## Walls

- › Walls, non-supporting partitions, and wall coverings in preparation areas, equipment washing facilities, and toilet rooms must be light-coloured, smooth, non-absorbent, and easily cleanable.
- › Wall-to-floor joints must be covered to facilitate cleaning.

## Ceilings

- › Ceilings in preparation areas, equipment washing facilities, and toilet rooms must be light-coloured, smooth, non-absorbent, and easily cleanable with no exposed rafters.

## Lighting

- › Premises must be supplied with sufficient natural or artificial light to ensure safe and sanitary production and to facilitate cleaning of premises. Unless otherwise specified and referring to the design guide, the minimum lighting intensities must be:
  - 110 lux in walk-in coolers, dry food storage areas, and in all other areas and rooms during periods of cleaning
  - 220 lux in areas where fresh produce or packaged foods are sold or offered for consumption; areas used for hand washing, ware washing, and equipment and utensil storage; and in toilet rooms
  - 540 lux at the surface where a food handler is working with unpackaged potentially hazardous food or with food utensils and equipment, such as knives, slicers, grinders, or saws, where handler's safety is a factor
- › Light must be shielded when over or within food storage, preparation, service and display, and equipment cleaning and storage areas.

## Utensils and Kitchen Equipment

- › Utensils, containers, pans, and cooking and storage equipment must be made of non-toxic, non-absorbent, smooth, easily cleanable, durable, and corrosion-resistant materials.
- › Refrigerators and freezers must be of adequate size so as not to be overcrowded and to avoid disruption of circulation of cold air.
- › Adequate equipment for operations to maintain the required temperatures of food during transportation, storage, display, preparation, and service should be provided.
- › Equipment must be easy-to-dismantle and accessible for cleaning.
- › Non-portable equipment that is placed on a table or counter must be sealed to the table or counter, or elevated on legs.
- › Floor-mounted equipment must be sealed to the floor, or installed on a raised platform of smooth masonry (meeting the requirements of floor clearances), or elevated on legs with at least 0.10 to 0.15 m clearance from floor.
- › Sufficient space should be provided for easy cleaning of surrounding equipment.
- › Each refrigerator, freezer, or any other hot or cold holding device should have calibrated thermometer for monitoring interior temperature.
- › All people preparing food must have a thermometer to check food temperature.

## Food Contact Surfaces

- › Food contact surfaces should be made of non-absorbent, safe, smooth, easily cleanable, durable, and corrosion-resistant materials, such as stainless steel, hardwood, or plastic.
- › Wooden counters or shelves are not allowed in food preparation areas.

## Temperature and Humidity

- › Provisions should be made to ensure that the temperature in the kitchen is comfortable. The recommended temperature is less than 30°C and humidity less than 60 percent.

## Pest Control

- › Buildings should be pest-proof.
- › Tight fitting, self-closing door, closed windows, and screening not less than 16-mesh to the inch shall be used. Air curtains, plastic curtains, or a combination of both shall be used on the doors leading to outdoors.



- › Electronic fly killers must be installed in suitable location, ideally between 2 to 2.5 m in height. The units must be placed on the side of the doors and not directly facing the open door. This will prevent the light from attracting insects from outside the room and making the problem worse. In addition, install the units away from sensitive areas and do not place them directly above the food preparation area.

### Utility and Mop Room

- › A utility sink with floor drain for cleaning mops and for disposing of liquid waste (such as mop water or liquid waste) should be provided.
- › A chemical storage cabinet with lock (of suitable size), resistant shelving, and ventilation should be provided.

### Laundry

- › Storage area for dirty linen and uniforms, away from food and clean equipment, should be provided.
- › Clean uniforms and linen must be stored in a clean area, protected from contamination. Cabinets can be made in areas where open food is not handled.

### Employee Facilities

- › Adequate, conveniently located, and easily accessible toilet facilities should be provided
- › Toilet should have self-closing door and an adjacent hand washing sink facility.
- › A designated area or room for routine change of clothes should be provided.
- › Adequate and secure storage facilities for employees' personal belongings (lockers) should be provided.

### First aid box and personal medications storage should be provided. Receiving Area

- › An area should be allocated for receiving food. This area should be equipped with hand sink, receiving scale, sorting table (for separating spoiled or contaminated food), containers for boxes and trash, and space for return items.

### Dry Storage Area

- › The dry store should be of suitable size enough to store all dry foods, food contact equipment, and unused packing materials that come in direct contact with food.

## 2.3 Handling and Preparation Area and Other Kitchen Facilities

### 2.3.1 Handling and Preparation Area

The food and beverage handling and preparation area should be at least 30 m away from any chemical and restroom facilities and waste collection zones. The size of the area should be based on the type of food and processes involved.

The area should have:

- › An overhead covering and a hand wash sink
- › Hygienic and washable floor
- › Sufficient supply of clean water
- › Adequate lighting (natural lighting may have to be supplemented by artificial lighting)
- › Proper wastewater disposal
- › Separate preparation sinks for raw meat and poultry products, raw fish, raw vegetables, and high-risk foods (such as cooked foods, salads, and other ready-to-eat foods)
- › Adequate size of preparation table and sink (based on the quantity of food handled)
- › Adequate storage facilities for 48 hours storage of dry and cold stock

### 2.3.2 Storage Facilities

Raw meat and fish should be stored separately from high-risk foods using refrigerators and freezers (with thermometers) to prevent cross contamination. The storage space should be consistent with the quantity of food stored to avoid overcrowding and disruption of air circulation.

For hot food, double boilers or hot holding boxes (with thermostats) should be used to maintain the food temperature to 60°C. This facility should also be suitable to hold the entire volume of hot food produced. On the other hand, refrigerated displays inside and outside the kitchen should be used to keep cold food at 5°C or less. Moreover, food and beverage sections that cook and chill foods should have adequate facilities to rapidly cool food.

### 2.3.3 Other Facilities

#### Dishwashing Area

An automatic or manual dishwashing area should be provided.

#### Pot and Pan Washing Area

The pot and pan washing area should have at least one 2-compartment sink of suitable size to handle the volume of food and to submerge the largest pan and cutting boards. An adequate landing area (table or portable shelving) should also be provided for clean pots and pans.

#### Hand Washing Area

Foot- or sensor-operated hand wash stations, equipped with liquid soap dispenser, paper towel dispenser, and proper hand washing signage, should be provided in all work areas

### Ice Machine

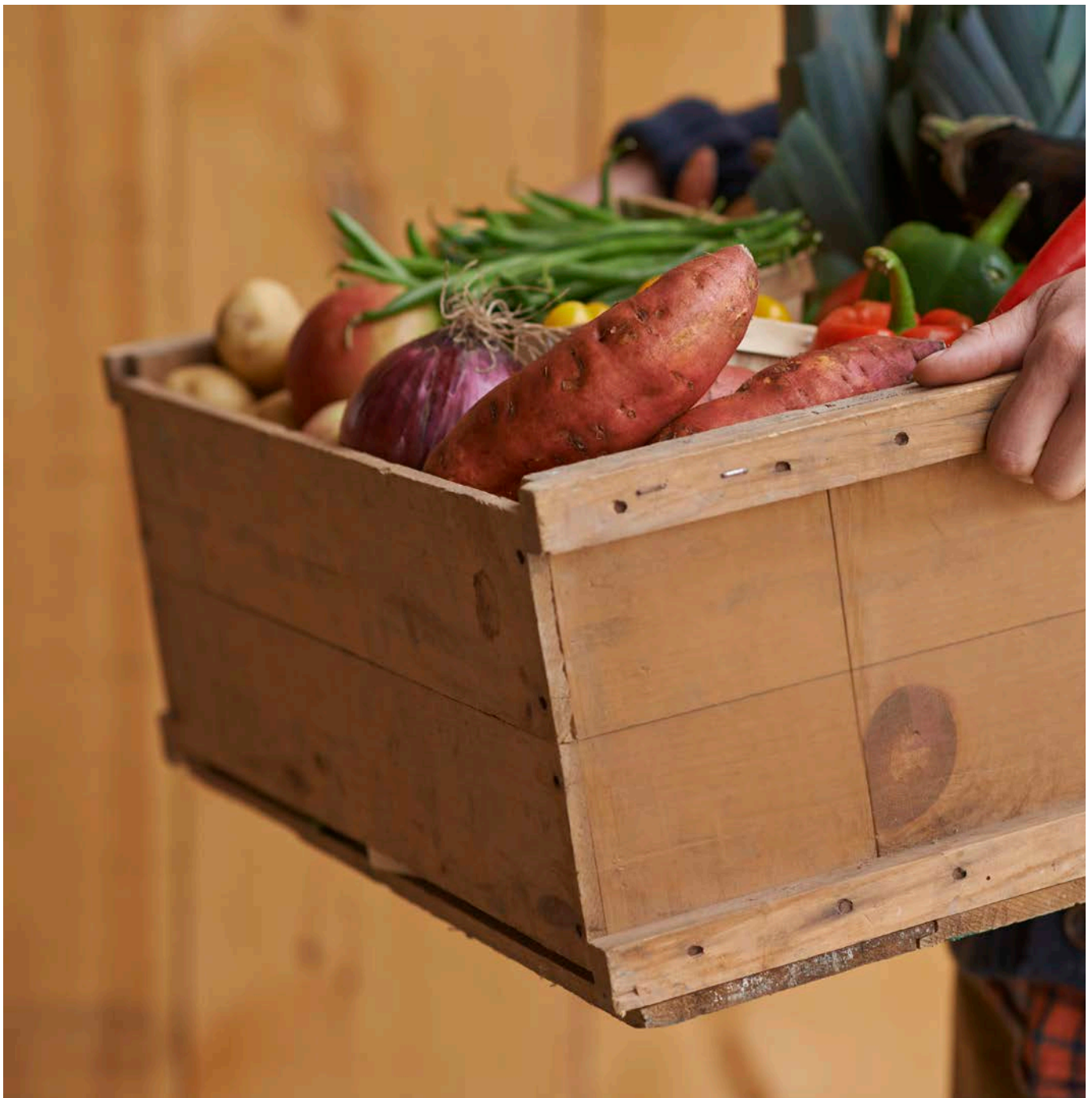
Ice machine, if used, should be located in a place free from contamination. It should have water filter with easy access for cleaning, and stainless steel or plastic scoop with specific storage area.

### Service Station

Service station of dining area should have tableware storage facilities, water dispenser, and waste disposal bin.

### Administration

To support inspections, an agent is required for the 'on-hand' storage of documents to support their routing inspections. For further information, consult with the Food Control Department of the [Dubai Municipality](#).



### 3 Permit and Licensing Requirements







### 3 Permit and Licensing Requirements

The Organiser will facilitate the submission of the design and layout of the food preparation and handling sites (master layout) to the Food Control Department. In addition, the Organiser will also ensure that relevant permissions are obtained within the required timescales.

To obtain the necessary permit, the following information will be required from the participant:

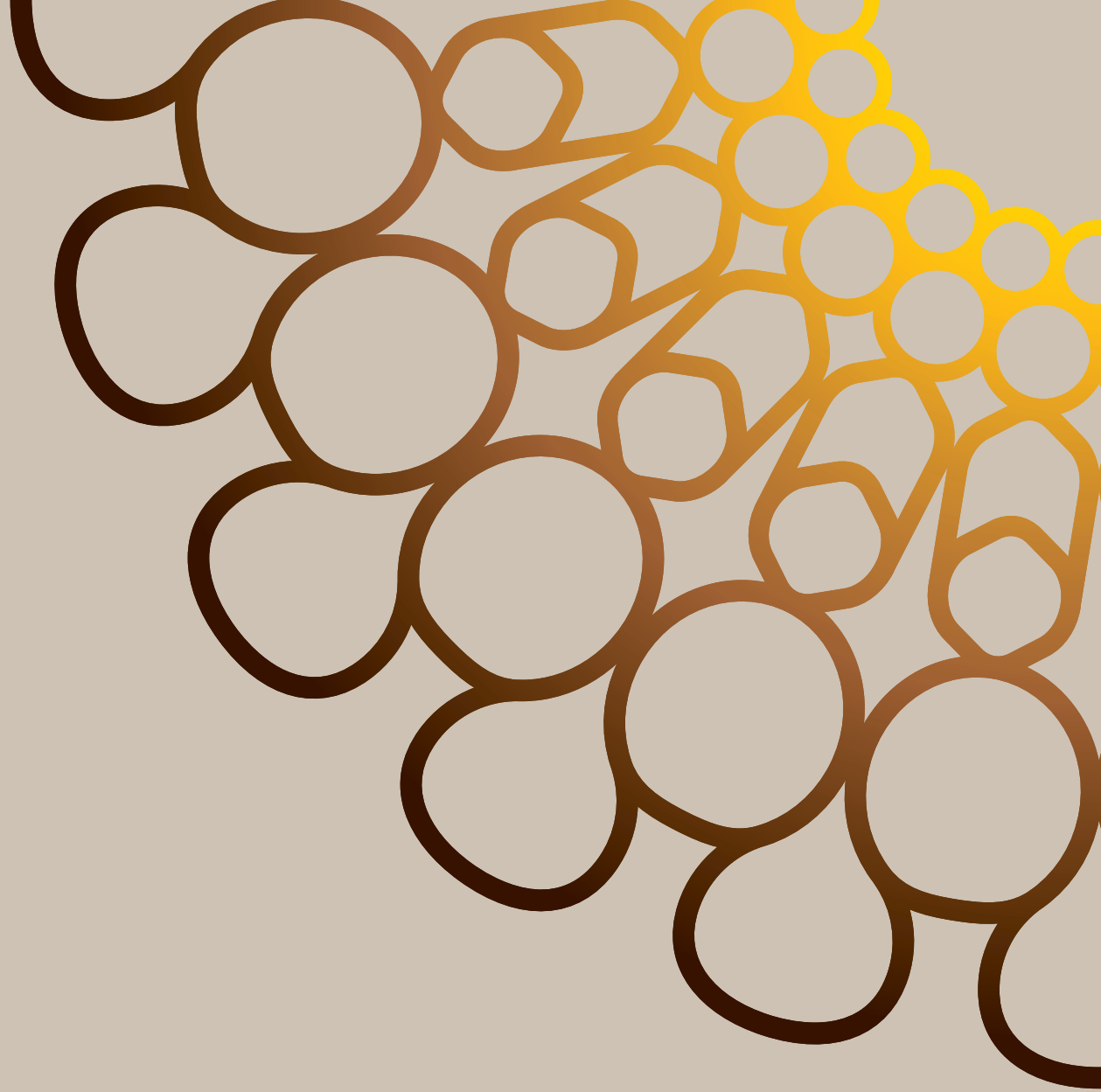
- › Completion of the application form for Temporary Food Events which will include details on the following points:
- › Layout and workflow
- › Number of people who will work onsite
- › Number of people anticipated to be served
- › What food is planned to serve (list of foods)
- › Where the food will come from
- › How the food will be prepared and transported
- › What precautions are taken to prevent contamination

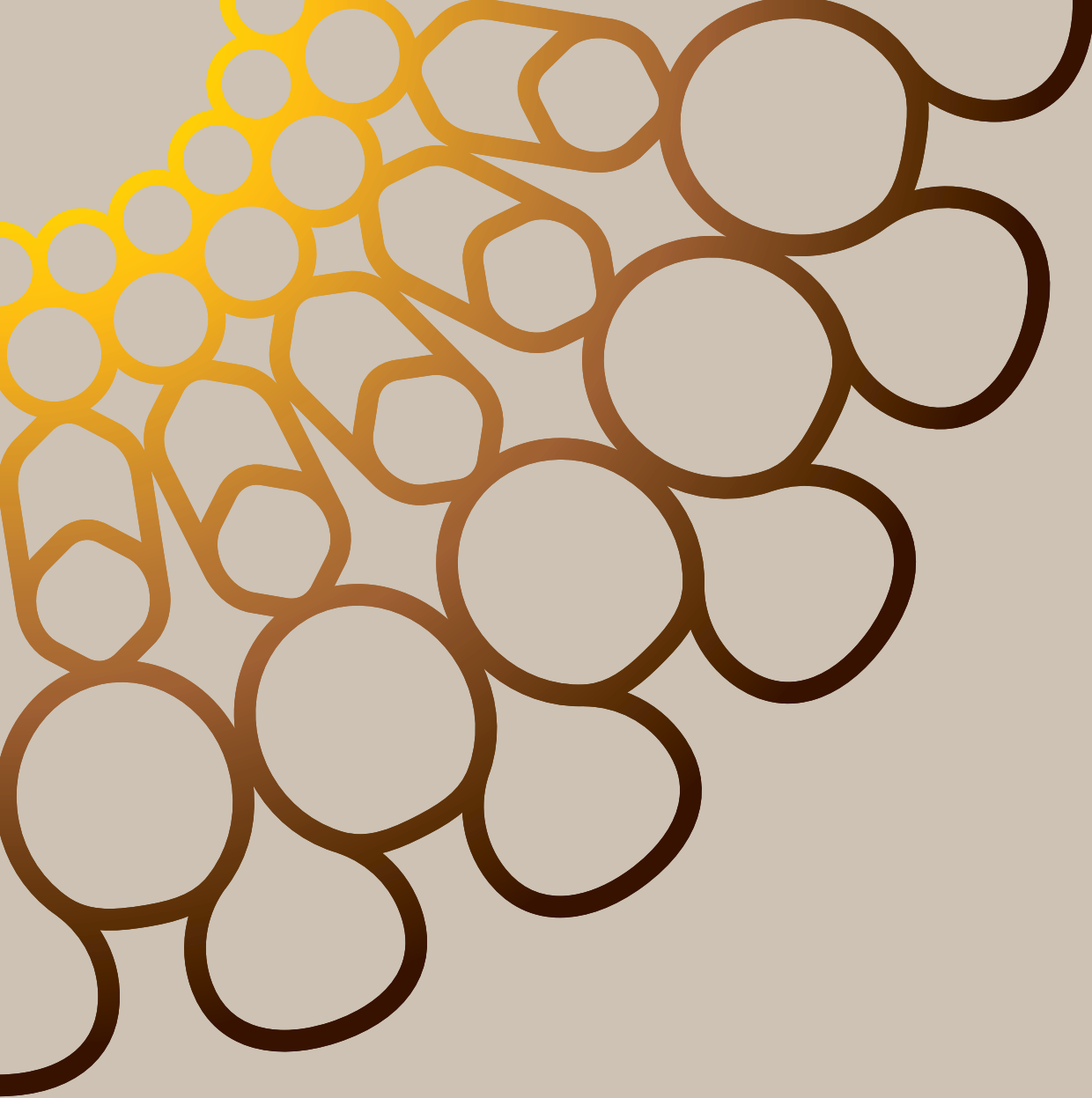
All participants are advised to consult with the Dubai Municipality for further updates on the necessary documentation to obtain relevant permits

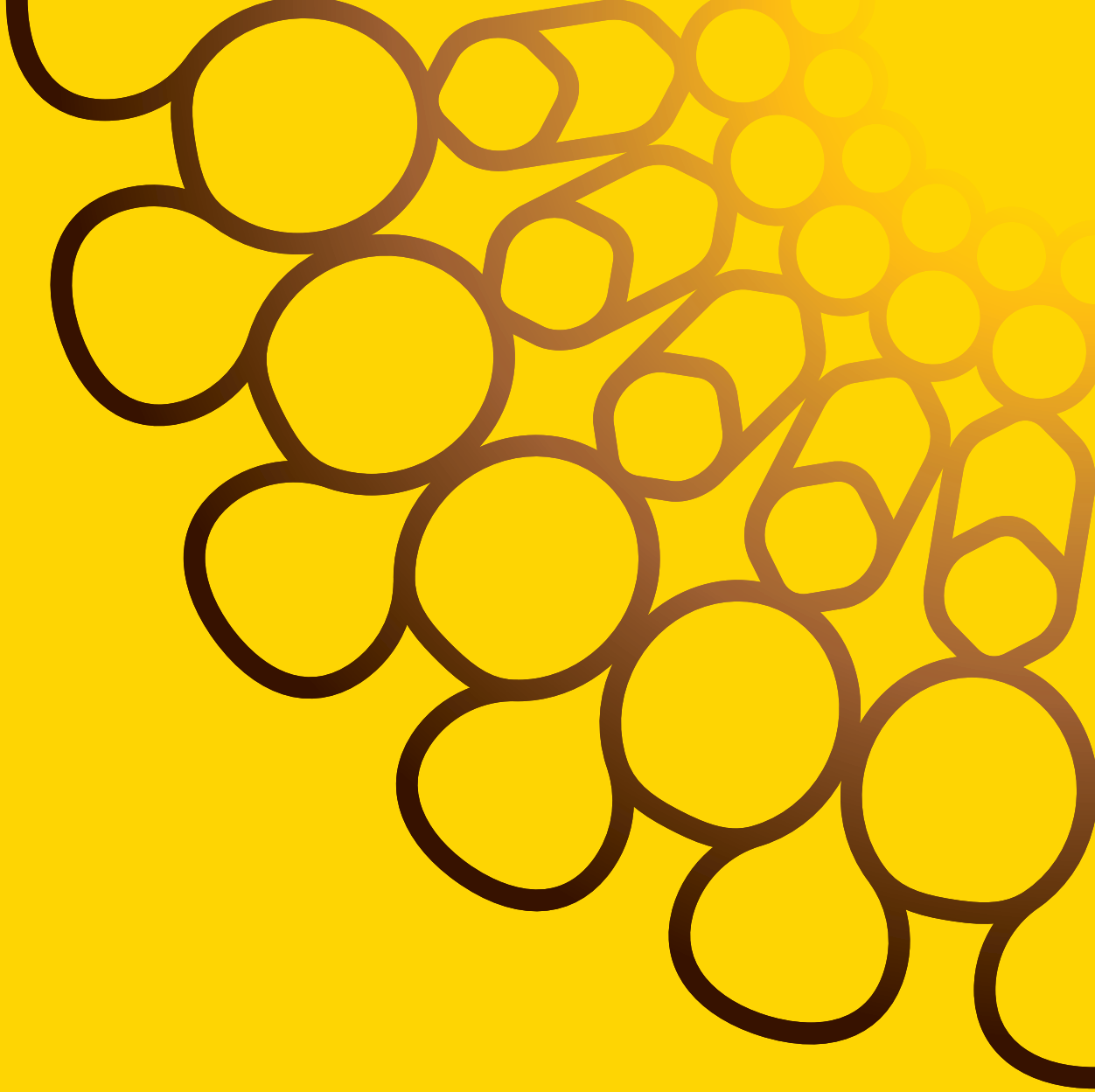
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