NEW WORLD CITY DESIGN GUIDE:

BUILDINGS THAT BREATHE

brisbane
australia's new world city

BRISBANE CITY

Dedicated to a better Brisbane

VISION

As Brisbane grows as a New World City, we want a responsive subtropical design that speaks on behalf of our city - design that demonstrates the best elements of living in subtropical Brisbane.

Building walls and windows open up to natural light and air, capturing ambient daylight and cooling breezes, reducing our energy needs.

Shaded outdoor spaces with panoramic views create memorable places to meet and relax.

Generous planting grows on our streets, rooftops and walls, embedding green into our city and enriching our urban biodiversity and habitat.

In Brisbane, our new buildings celebrate our unique city and subtropical climate.

NEW WORLD CITY DESIGN - BUILDINGS THAT BREATHE
EIGHT ELEMENTS

Brisbane needs exemplary buildings that respond to and embrace our subtropical climate and showcase our city's urban character and outdoor lifestyle. Openness, permeability and a strong connection with the natural environment are the main characteristics of well-designed subtropical cities. This design guide illustrates how residential and commercial buildings in our city centre, mixed-use inner city, transport corridors and principal regional activity centres should be designed to respond to our subtropical climate and improve sustainability. The following eight elements form a kit-of-parts that have been identified by Brisbane City Council as the key considerations to creating 'buildings that breathe'.

01	ORIENTATE YOURSELF
02	OCCUPY OUTDOOR SPACES
03	ILLUMINATE WITH DAYLIGHT
04	NATURAL AIR AND VENTILATION
05	SHADE AND PROTECT
06	LIVING GREENERY
07	IDENTITY MATTERS
08	REDUCE ENERGY AND WASTE

FOREWORD

LORD MAYOR GRAHAM QUIRK

Brisbane is a thriving New World City with a subtropical climate enhancing our lifestyle. As our city grows, we have the opportunity to shape our city's future in a way which embraces our distinctive climate and architectural traditions.

Our aspiration is that new buildings in our city will embrace our subtropical climate, opening up to cooling breezes, while providing lush landscaping, shade and comfort.

This guide will encourage new development to contribute to our architectural and landscape design to create an enviable urban environment that attracts investment and tourism, celebrates our lifestyle and stimulates economic activity.

COUNCILLOR JULIAN SIMMONDS, CHAIRMAN CITY PLANNING COMMITTEE

Brisbane's subtropical climate offers an enviable lifestyle that can attract international investment and a highly skilled workforce. This design guide has been prepared to provide a shared vision for subtropical building design in Brisbane's inner-city areas, transport corridors and principal centres. This guide will complement Brisbane City Plan 2014 by providing an inspirational design benchmark for architects, planners, developers, property professionals and the broader community.

DELIVERING BUILDINGS THAT BREATHE

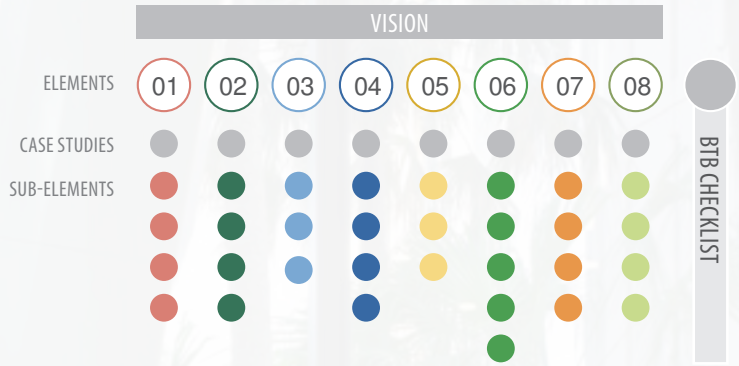
This design guide illustrates easy-to-understand design elements and best-practice examples for the subtropical design of high density development. The development industry is encouraged to use the guide to inform them in delivering climate responsive developments in Brisbane.

Council understands the delivery of Buildings that Breathe will require partnering with industry and the community. Statutory amendments will be made to City Plan to support climate responsive design through the development assessment process. Council will also support industry through the DesignSMART pre-lodgement process, which will involve three pre-lodgement meetings focused on collaborative design development. DesignSMART will involve a senior assessment team, supported by the Independent Design Advisory Panel (IDAP), and will deliver guaranteed assessment timeframes. This process will actively support industry in the development of Buildings that Breathe from context analysis through to development approval.

HOW TO USE THIS DOCUMENT

This design guide is a multi-dimensional tool prepared by Council to provide a common reference point among architects, planners, developers and the community when discussing the design of high-density residential and commercial buildings in our city centre, mixed-use inner city, transport corridors, and principal regional activity centres. It includes:

- *one vision:* articulates the overarching vision for new residential and commercial buildings in our city
- *eight key elements:* the eight essential elements of buildings that breathe
- *sub-elements:* a kit-of-parts contained within each element that provides guidance on potential ways to deliver buildings that breathe
- *case studies:* best-practice examples that demonstrate on-the-ground delivery and measured benefits
- *buildings that breathe checklist:* a quick reference guide providing a summary of the key elements to consider when designing high-density buildings in our city.

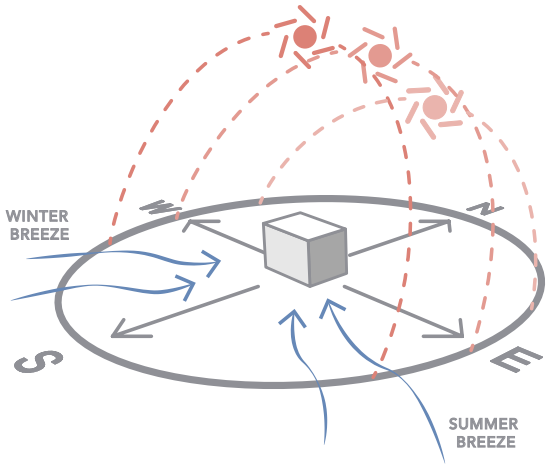


OUR CLIMATE

BRISBANE'S CLIMATE DEFINES OUR CULTURE.

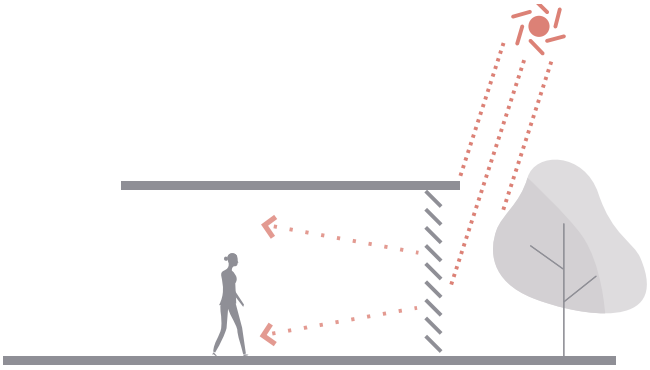
Climate plays a key role in how we live and breathe in our city. Sunny days, cooling breezes and comfortable temperatures are just some of the climatic conditions that set Brisbane apart from other cities. New buildings in our city will be required to respond to these unique conditions by providing protection from the sun and rain, capturing cooling breezes and opening up to the outdoors.

EAGLE STREET | BRISBANE



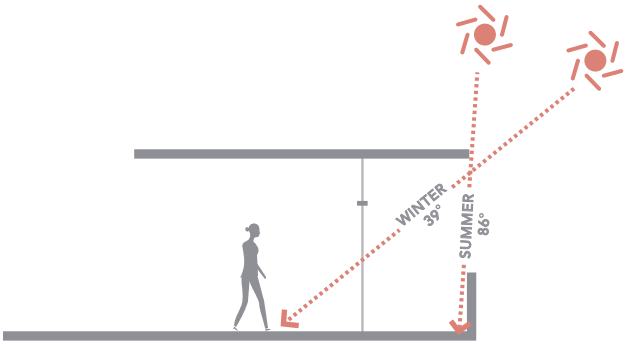
OUR CLIMATE

- Summer solstice 86 degrees
- Equinox 63 degrees
- Winter Solstice 39 degrees
- Southeast onshore breezes prevail during summer
- Dry, cool winds from southwest are common in winter



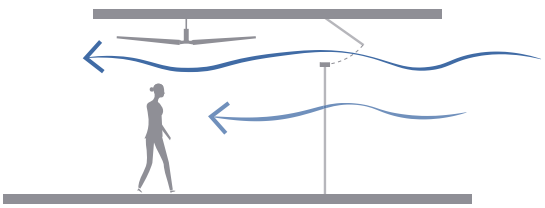
SHADE FROM SUN

- Board eaves, awnings, balconies, shading device and landscape should be used according to form and orientation to assist with solar control.



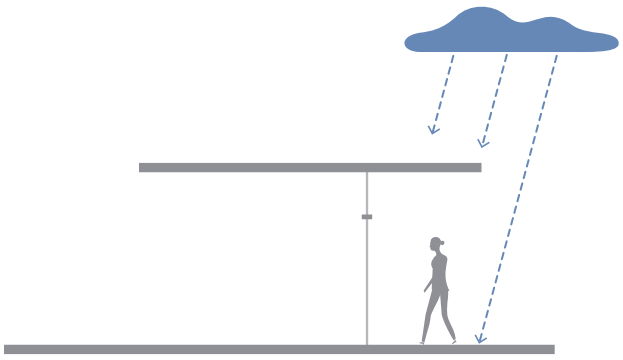
ALLOW LIGHT IN

- Summer sun should be excluded and warm sunshine welcomed in the cooler period of the year.



ALLOW BREEZES THROUGH

- Openness and permeability to allow for cross ventilation
- All bedrooms have ceiling fans.

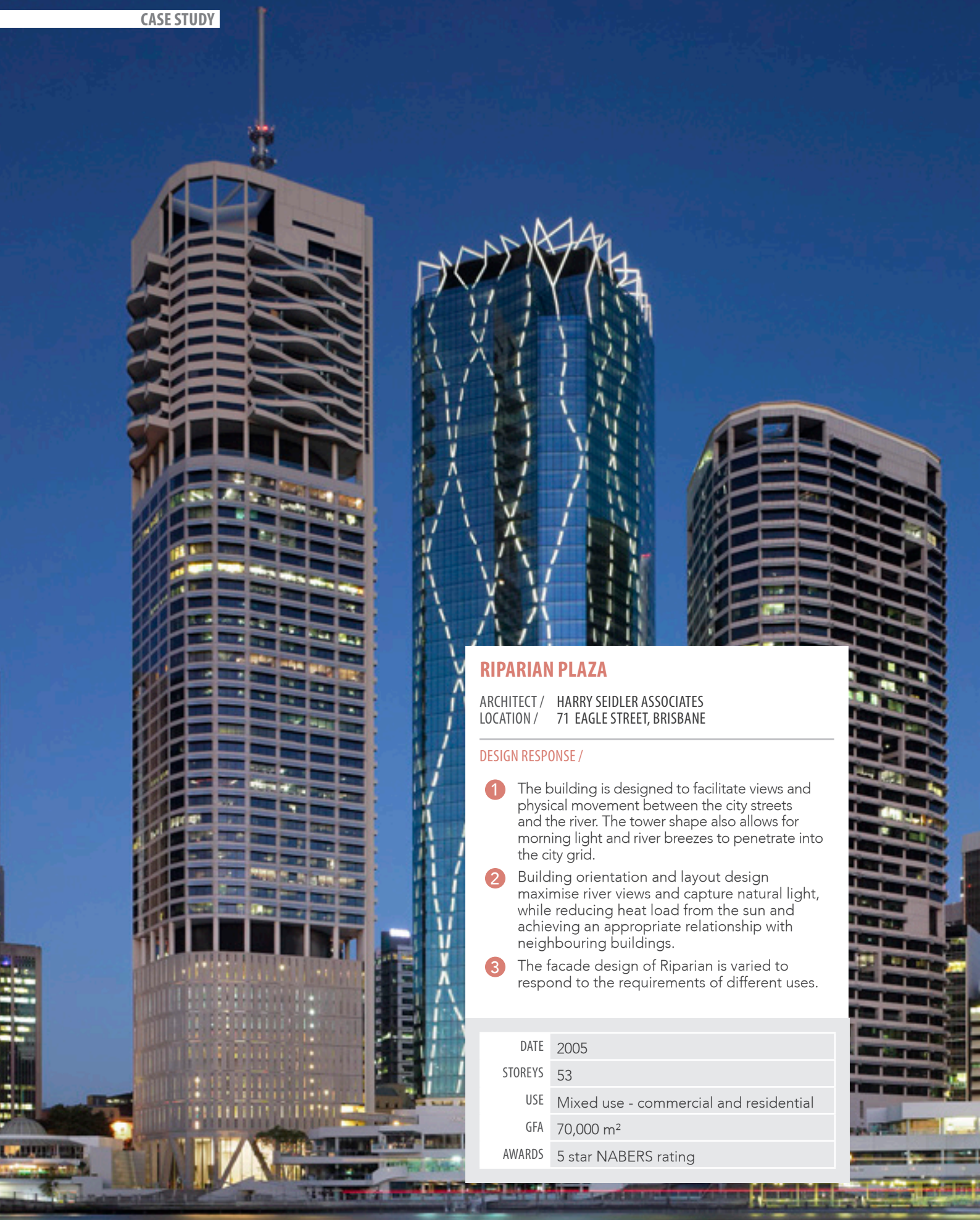


PROTECT FROM WEATHER

- Provides protection from rain during downpours.

clever building orientation saves energy, improves comfort and reduces operating costs

ORIENTATE YOURSELF



RIPARIAN PLAZA

ARCHITECT / HARRY SEIDLER ASSOCIATES
LOCATION / 71 EAGLE STREET, BRISBANE

DESIGN RESPONSE /

1. The building is designed to facilitate views and physical movement between the city streets and the river. The tower shape also allows for morning light and river breezes to penetrate into the city grid.
2. Building orientation and layout design maximise river views and capture natural light, while reducing heat load from the sun and achieving an appropriate relationship with neighbouring buildings.
3. The facade design of Riparian is varied to respond to the requirements of different uses.

DATE	2005
STOREYS	53
USE	Mixed use - commercial and residential
GFA	70,000 m²
AWARDS	5 star NABERS rating

ORIENTATE YOURSELF

ORIENTATING OUR BUILDINGS IS THE FIRST STEP.

Brisbane's subtropical climate has more than 300 'comfortable' days each year. Characterised by warm summers and mild, dry winters, our enviable natural conditions provide our greatest untapped resource for low-energy, sustainable building design. Orienting buildings to respond to our local climatic conditions can create comfortable, internal and external spaces while reducing our reliance on artificial energy sources. Proper building orientation is a key consideration in reaching zero-emission architecture throughout Brisbane. Why not embrace the elements?

DID YOU KNOW?

In Brisbane cooling breezes primarily come from the north-east and south-east in summer and colder winds come from the south and west in winter.

SUB-ELEMENTS

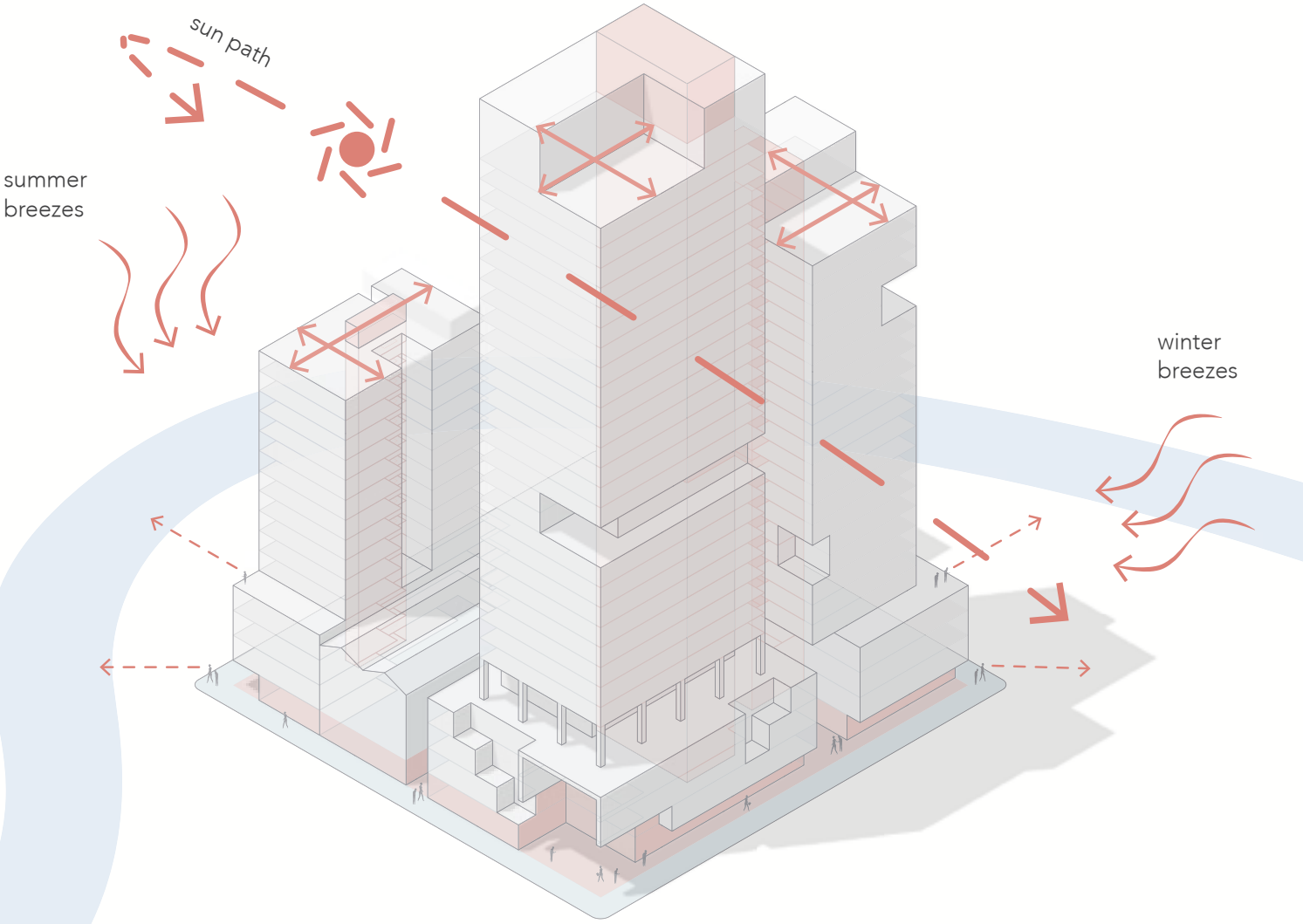
LADY CILENTO CHILDREN'S HOSPITAL | BRISBANE
Building massing responds to orientation and context

LOCATION AND ORIENTATION

» Clever orientation can minimise exposure to the harsh western sun and capture easterly breezes in summer, while embracing northern sun in winter.

MASSING AND INTERNAL LAYOUT

» Lift wells and circulation cores can be located adjacent to adjoining buildings and to protect from unwanted solar gain.



STREET ACTIVATION

» Building entrances, laneways and outdoor spaces activate our streets, public spaces and riverfront.

VIEWS

» Overall orientation considers the potential to capture both immediate and long views.

1.1 LOCATION AND ORIENTATION

The dimension, location and context of a site heavily influences the shape and form of a building. Overall city form as well as immediate context are both key considerations. The orientation of a building considers solar access, prevailing breezes, natural features and topography. Buildings are also designed to respond to neighbouring buildings and spaces in the city ensuring they retain sunlight to key public spaces, contribute positively to the skyline, maintain views and provide access to natural light and air creating a city that breathes. Orientation is the first and most influential step in improving the passive performance of a building, including energy consumption and internal comfort.

1.2 MASSING AND INTERNAL LAYOUT

The intended use of the building will shape the overall massing including optimal floor plate and internal layout. Considering orientation in the location of occupied areas and the positioning of circulation and servicing areas will inform choice of materials, including use of glass, location of windows and positioning of circulation and services. In this context, different uses often require different building forms.

1.3 VIEWS

Building orientation provides the opportunity to capture significant views. This includes immediate views to vegetation and human activity or distance views to natural landscape features or building skylines.

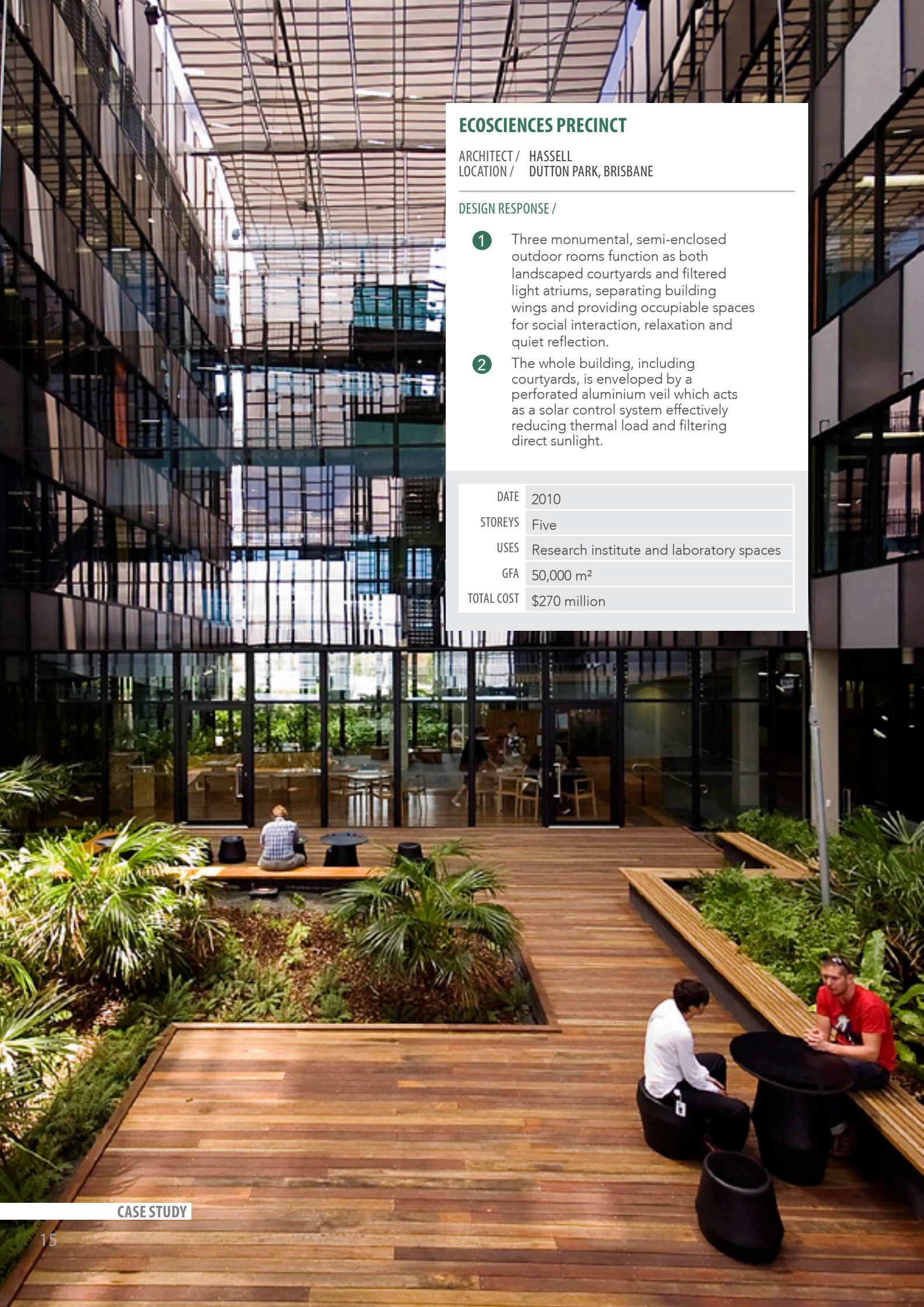
1.4 STREET ACTIVATION

The design of the street building to respond to local conditions ensures our buildings activate our streets, public spaces and riverfront. This includes careful placement of windows, openings and entry ways to connect to our public realm. Deep planting, shade treatments and street trees will be included in our public realm and positioned so as to respond to local conditions.

SW1 | BRISBANE
Overall massing and location of balconies considers optimal orientation, internal uses and opportunities to capture views.

our outdoor spaces are high performance infrastructure, providing amenity, recreation spaces and enhancing biodiversity

OCCUPY OUTDOOR SPACES



ECOSCIENCES PRECINCT

ARCHITECT / HASSELL
LOCATION / DUTTON PARK, BRISBANE

DESIGN RESPONSE /

1. Three monumental, semi-enclosed outdoor rooms function as both landscaped courtyards and filtered light atriums, separating building wings and providing occupiable spaces for social interaction, relaxation and quiet reflection.
2. The whole building, including courtyards, is enveloped by a perforated aluminium veil which acts as a solar control system effectively reducing thermal load and filtering direct sunlight.

DATE	2010
STOREYS	Five
USES	Research institute and laboratory spaces
GFA	50,000 m²
TOTAL COST	$270 million

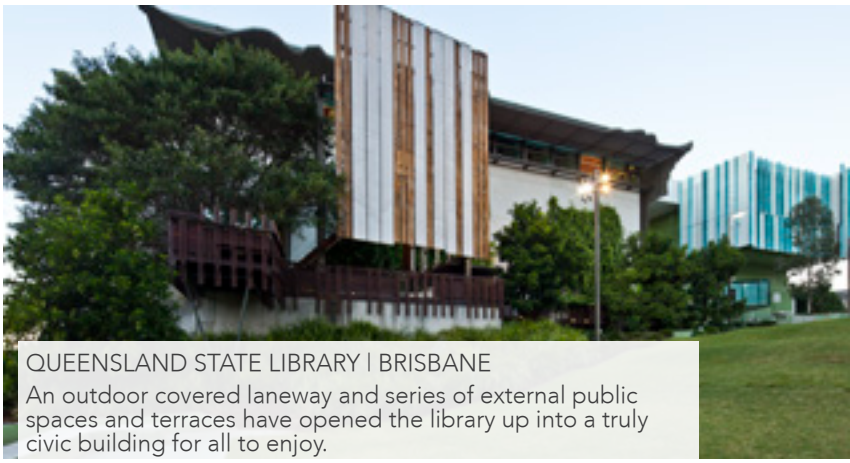
OCCUPY OUTDOOR SPACES

02

THE OUTDOORS IS A BIG PART OF OUR LIFESTYLE.

Brisbane is famed for its enviable climate. Clear blue skies, clean air and a mean annual temperature range of 15 to 25 degrees leaves little reason to stay indoors. Our buildings will be designed to make the most of this climate, creating outdoor spaces that are comfortable all year round. Incorporating rooftop gardens, sky terraces, generous balconies and open-air tenancies at ground level will ensure our buildings reflect our outdoor lifestyle. These spaces will provide a flexible and seamless transition between indoor and outdoor, public and private and will create a comfortable, and green building interface at street level. Characterised by subtropical landscaping and water-sensitive design, these outdoor spaces will be visible from the street and will contribute to the city landscape. As celebrated spaces they will embody the identity and experience of our city as a subtropical urban oasis.

SUB-ELEMENTS

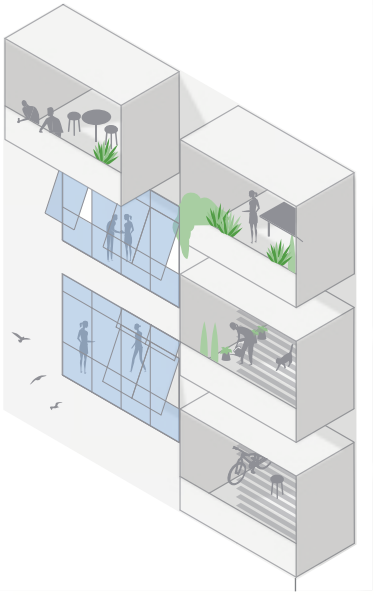


QUEENSLAND STATE LIBRARY | BRISBANE

An outdoor covered laneway and series of external public spaces and terraces have opened the library up into a truly civic building for all to enjoy.

RIVER QUAY | BRISBANE

Conceived as an extension of the landscape the design includes a series of distinctive outdoor rooms celebrating Brisbane's subtropical climate.

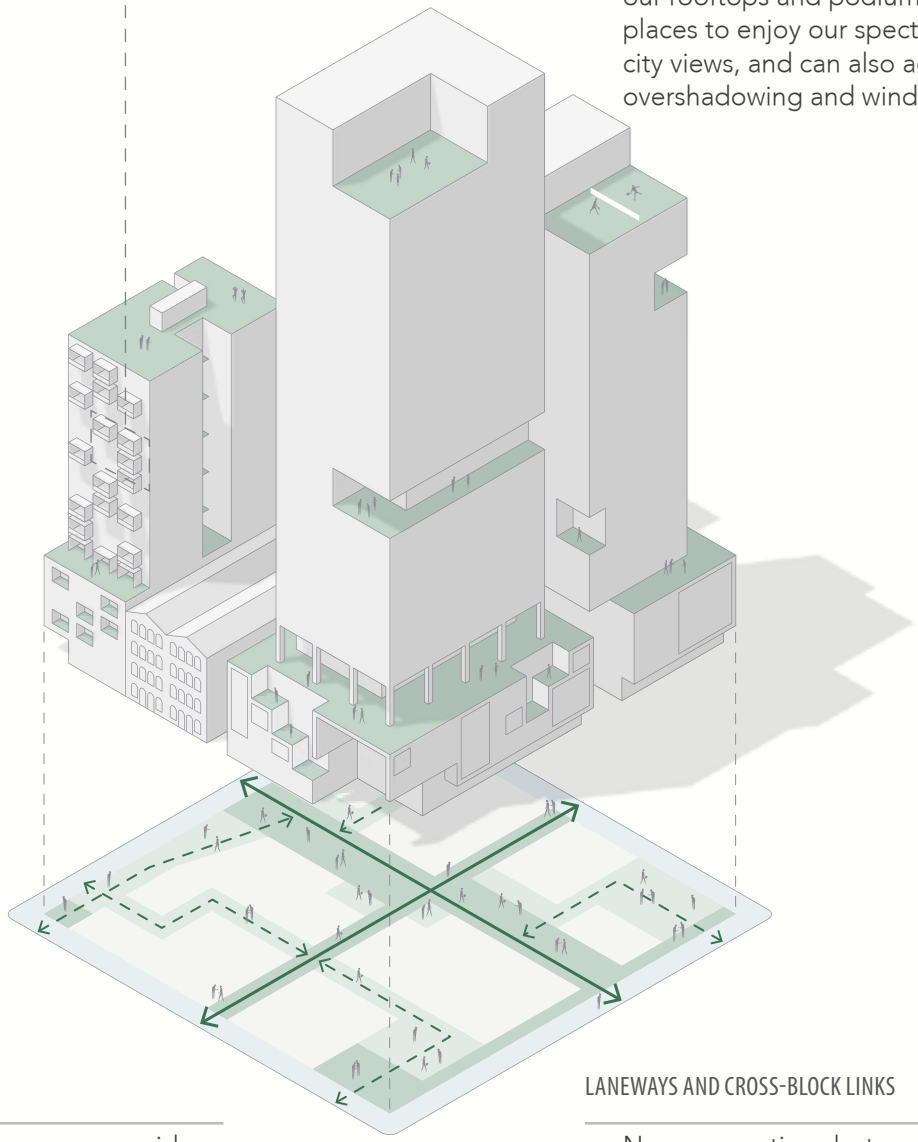


BALCONIES

» Balconies provide both physical articulation and private outdoors spaces for occupants that are protected from the sun and rain.

SKY TERRACES

» Elevated outdoor spaces transform our rooftops and podiums into great places to enjoy our spectacular city views, and can also address overshadowing and wind effects.



CITY ROOMS

» These semi-outdoor spaces provide places for people to meet, with access to natural air and subtropical planting that animates the edges of our buildings.

LANEWAYS AND CROSS-BLOCK LINKS

» New connections between and through our buildings make a more permeable city and provide valuable urban spaces in our fast-growing city.

2.1 CITY ROOMS

The provision of generous semi-outdoor, subtropical spaces within the lower levels of our buildings creates an open and permeable ground plane where people can meet for work, lunch and to relax. Strategically located along building frontages, these city rooms create visual and physical connections between indoor and outdoor spaces, drawing landscape and natural air into buildings. Varied in shape and size, they are united by the intent to open buildings up to the street and encourage occupation.

2.2 SKY TERRACES

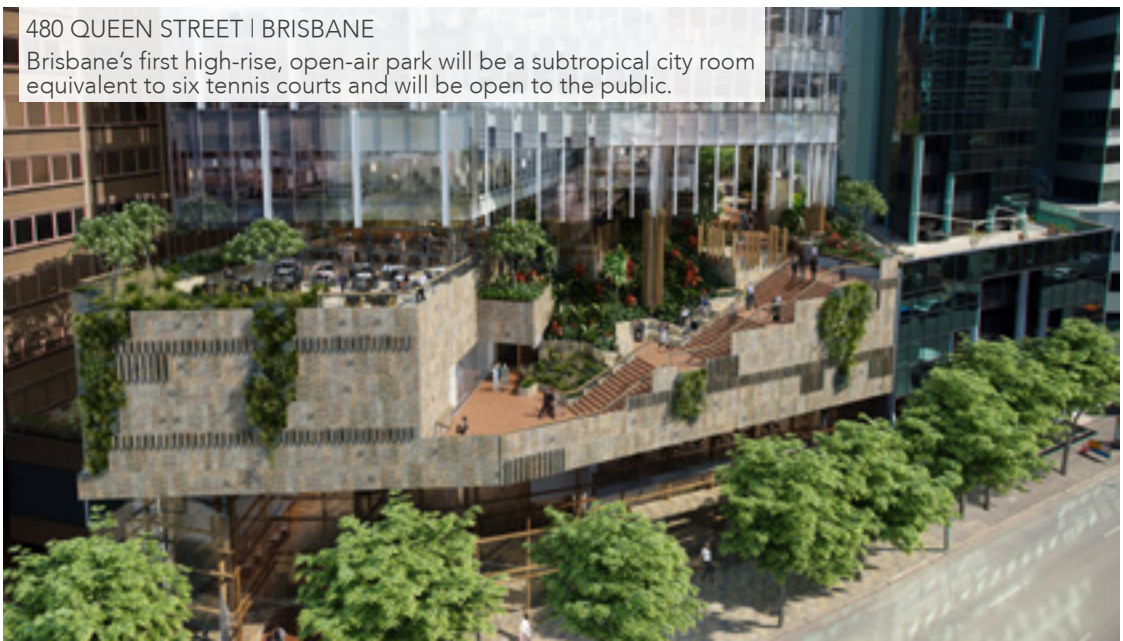
In our city outdoor space of all forms is at a premium. Elevated spaces for recreation support our active lifestyles and provide breathing room in an increasingly dense urban environment. Sky terraces transform latent spaces on podiums, towers or rooftops into recreational spaces, meeting facilities, bars and restaurants. Green and shaded, they are places to relax and enjoy spectacular city views.

2.3 BALCONIES

As with most elements, the role of a balcony is two-fold: it serves a public function as part of the visual expression of a building; and most importantly, creates private outdoor space to enjoy natural light, air, views and landscape. Where designed with consideration to solar orientation and exposure, they also provide shade to building facades and reduce heat load. The opportunity exists to further evolve our concept of the balcony to create private gardens, common recreation areas and more comfortable and energy efficient living and working spaces.

2.4 LANEWAYS AND CROSS-BLOCK LINKS

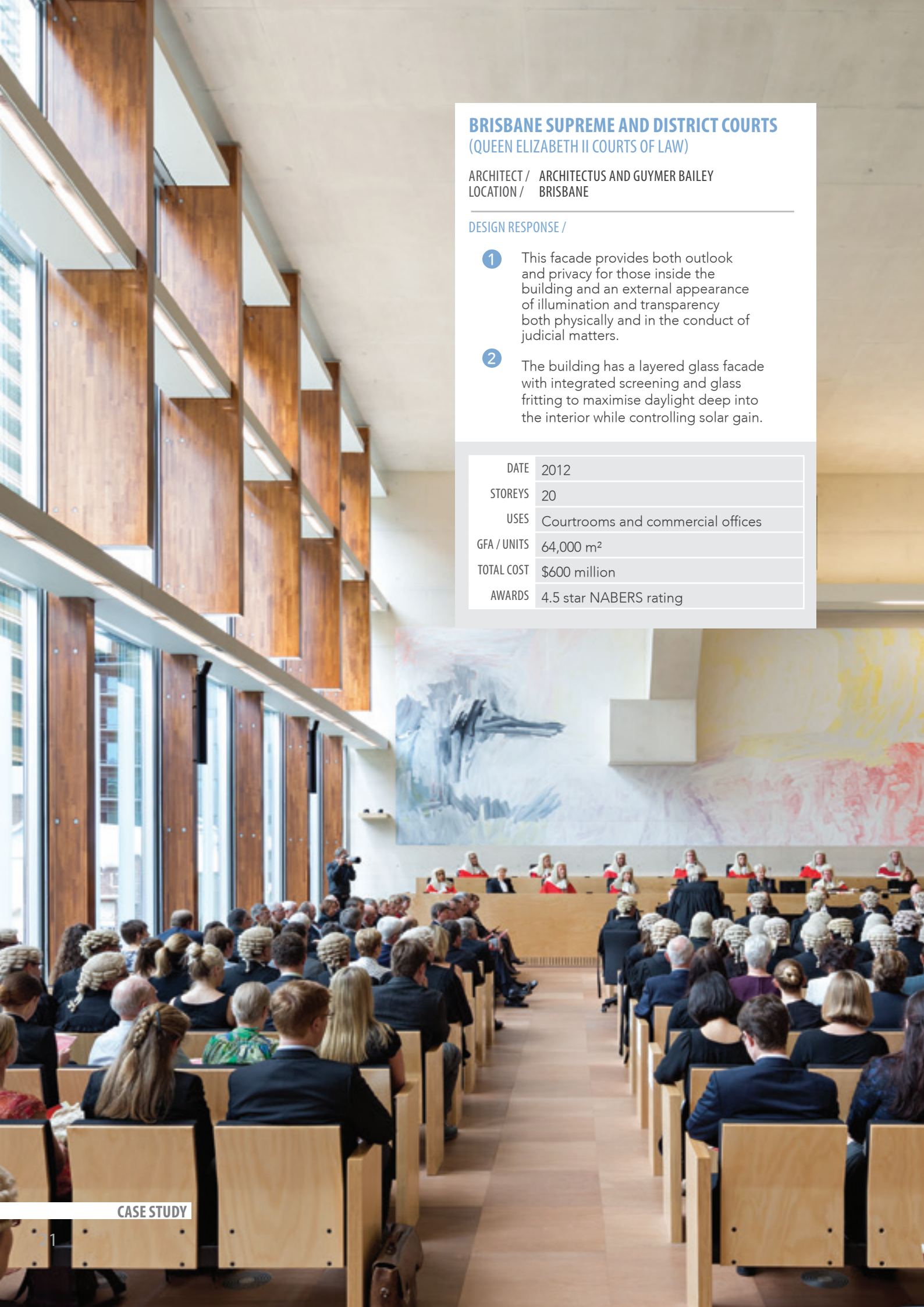
Incorporating existing laneways, arcades, and new cross-block links into the design of our ground floor public spaces contributes to the permeability and vibrancy of our city. These spaces increase opportunities for pedestrian movement, business activity and urban vibrancy at the street level, particularly where populated with fine grain tenancies and access to natural light and air.



480 QUEEN STREET | BRISBANE
Brisbane's first high-rise, open-air park will be a subtropical city room equivalent to six tennis courts and will be open to the public.

maximising
access to daylight
enriches our lives
and saves us
money

ILLUMINATE WITH NATURAL DAYLIGHT



BRISBANE SUPREME AND DISTRICT COURTS
(QUEEN ELIZABETH II COURTS OF LAW)

ARCHITECT / ARCHITECTUS AND GUYMER BAILEY
LOCATION / BRISBANE

DESIGN RESPONSE /

1. This facade provides both outlook and privacy for those inside the building and an external appearance of illumination and transparency both physically and in the conduct of judicial matters.

2. The building has a layered glass facade with integrated screening and glass fritting to maximise daylight deep into the interior while controlling solar gain.

DATE	2012
STOREYS	20
USES	Courtrooms and commercial offices
GFA / UNITS	64,000 m²
TOTAL COST	$600 million
AWARDS	4.5 star NABERS rating

ILLUMINATE WITH NATURAL DAYLIGHT

03

MAXIMISING ACCESS TO DAYLIGHT ENRICHES OUR LIVES AND SAVES US MONEY.

Brisbane is blessed with an average of 261 sunny days each year. Utilising this abundant and free natural resource to illuminate our homes and workplaces has multiple long-term benefits. Natural light reduces our reliance on artificial lighting resulting in reduced electricity consumption, cheaper energy bills and less pollution.

Additionally, exposure to direct sunlight, ambient natural light and the natural rhythms of the day have been proven to result in improved employee performance and positive health benefits. Buildings in Brisbane will consider the careful design and placement of glazing and light wells to maximise natural light penetration while managing solar gain.

The design of buildings should also provide opportunities for occupants to control their own shading needs in sequence with the natural movement of the sun.

SUB-ELEMENTS

DID YOU KNOW?

Natural light produces a spectrum of light unobtainable by artificial lighting. For indoor planting this allows them to photosynthesise, producing oxygen more effectively and creating truly breathable buildings.

GLOBAL CHANGE INSTITUTE | BRISBANE
LANDSCAPE: HASSEL

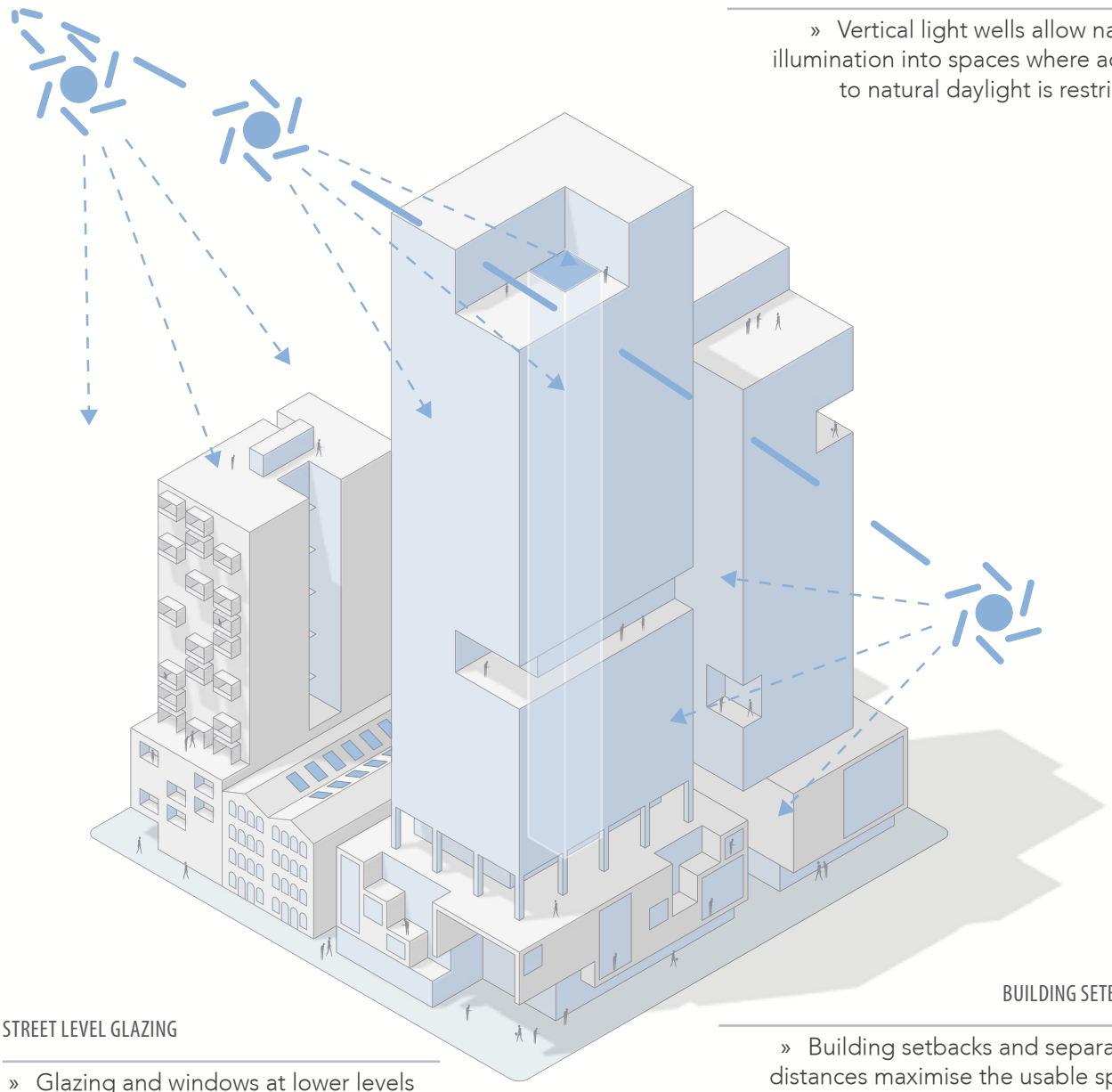
Translucent ETFE atrium roof allows natural light into the interior while insulating from the sun's heat.

GLAZING

» The choice and location of glazing balances daylight penetration with the need to provide privacy and reduce heat load.

LIGHT WELLS AND SKYLIGHTS

» Vertical light wells allow natural illumination into spaces where access to natural daylight is restricted.



STREET LEVEL GLAZING

» Glazing and windows at lower levels in the city can be larger than those at higher building levels where less exposed to direct solar radiation.

» High ceilings and permeable facades allow natural light to penetrate deep into the foyers, open-air tenancies and laneways enlivening the lower levels of our city.

BUILDING SETBACKS

» Building setbacks and separation distances maximise the usable space within buildings ensuring daylight penetrates all sides of a building.

3.1 BUILDING SETBACKS

Building setbacks and separation distances are to respond to the land use, scale and context. Separation distances between adjoining buildings and setbacks to the street allow light to penetrate into buildings, between buildings and down to the ground plane. This ensures both internal and external spaces have access to natural light.

3.2 GLAZING

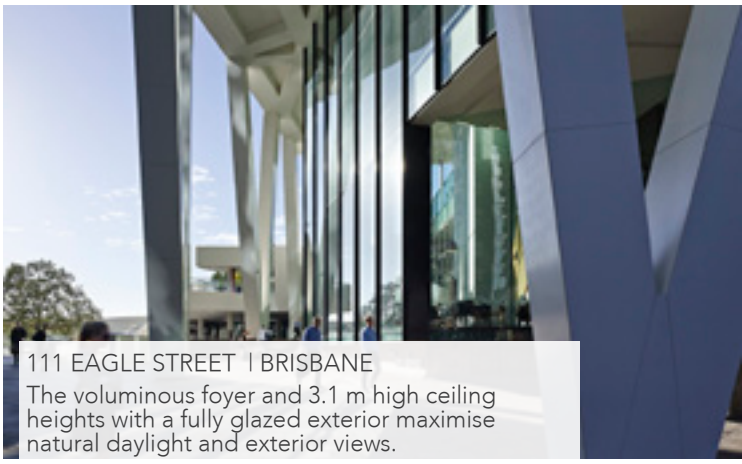
Natural daylight can penetrate several metres into a building, reducing the need for artificial lighting. High floor to ceiling heights also help natural light penetration, particularly to ground floors and common areas. Buildings are designed to optimise exposure to natural light through the use of glass and windows, while ensuring privacy and providing shade from the hot summer sun. Glass design and technology coupled with appropriate solar shading and automated blinds, can help optimise light penetration while minimising heat load. Performance glass should not be a stand alone solution. Appropriate UV ratings of glazing and operable shading are also key considerations that will help to achieve subtropical design outcomes.

3.3 LIGHT WELLS AND SKYLIGHTS

The provision of natural light to common areas of buildings is important in creating attractive and welcoming spaces as well as ensuring safe access during power outages. Atriums, vertical light wells and skylights allow natural illumination to penetrate deep into spaces where access to natural daylight is restricted. This includes the use of multi-storey outdoor rooms around which internal spaces are wrapped.

DID YOU KNOW?

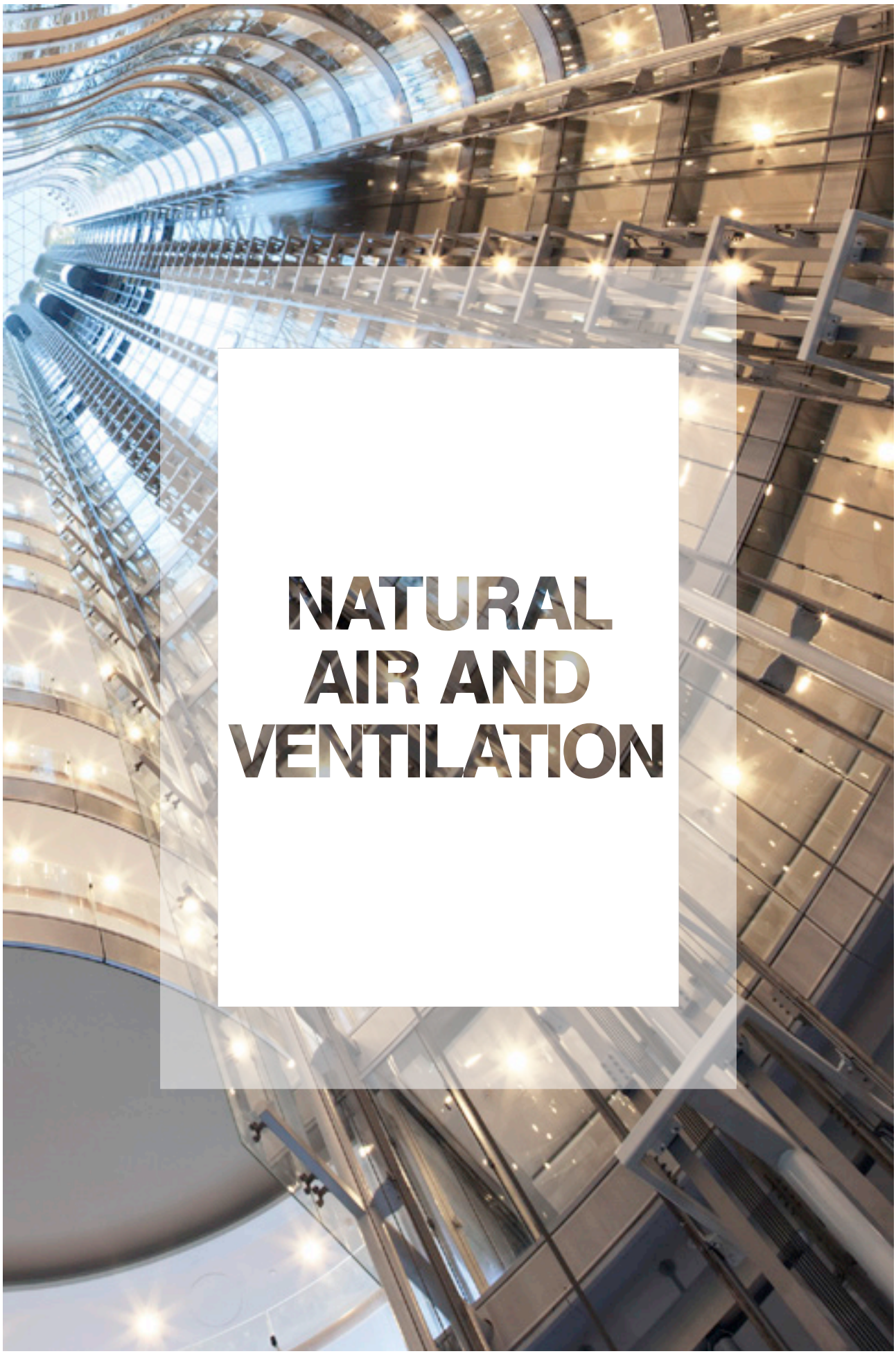
Daylighting from the perimeter windows will generally be adequate to a depth of two and a half times the height of the window.



111 EAGLE STREET | BRISBANE
The voluminous foyer and 3.1 m high ceiling heights with a fully glazed exterior maximise natural daylight and exterior views.

"with mechanical heating, ventilation and air conditioning systems accounting for between 30-40% of overall energy consumption in buildings, the provision of natural or hybrid ventilation systems could be the most important single step we could take in making tall buildings more sustainable"

Council on Tall Buildings and Urban Habitat (CTBUH) Natural Ventilation in High-Rise Office Buildings Technical Guide 2012



NATURAL AIR AND VENTILATION

COMMON GROUND

ARCHITECT / NETTLETONTRIBE
LOCATION / SOUTH BRISBANE

DESIGN RESPONSE /

1. Building orientation and floor plan design take advantage of Brisbane's subtropical climate.
2. All units have natural cross-room ventilation which eliminates the need for air conditioning.
3. Every two floors are linked, sharing a common lobby space with garden.
4. Spaces available to the wider community including a large meeting/board room, rooftop function room with city and river views, an adjoining rooftop garden.
5. The basement holds 130,000 litres of rainwater to be used for gardens, wash down areas, unit toilets and laundries.

DATE	2012
STOREYS	14
USES	Residential and ground floor commercial and retail space. Brisbane Common Ground provides supportive housing (housing with on-site support services) for people who have experienced long-term homelessness and for people of low incomes
GFA / UNITS	146 units
AWARDS	6 star BERS Energy Rating

NATURAL AIR AND VENTILATION

04

BUILDINGS ARE PART OF THE EVERYDAY LIFE, ACTIVITY AND EXPERIENCE OF A CITY.

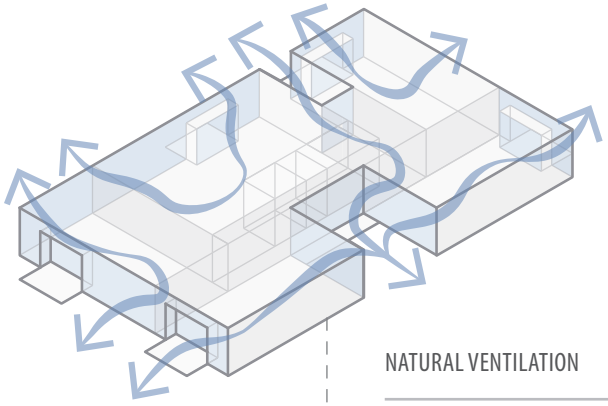
Designing our buildings to embrace the benefits of our subtropical climate not only contributes to the identity and experience of our city, it can save us money as well. With a pleasant temperature range for much of the year, designing natural ventilation into our buildings greatly reduces the need for artificial heating and cooling.

Incorporating operable elements, such as windows, doors and movable walls, into the facades and rooftops of our buildings provides occupants greater control over the internal environment while contributing essential activity to life on the street.

The use of constant fresh air through natural or hybrid ventilation systems increases indoor health and occupant productivity while saving up to 50 per cent on capital and ongoing costs. The inclusion of natural ventilation helps reduce pollution and could be the most important step in making tall buildings more sustainable.

SUB-ELEMENTS

CH2 | MELBOURNE
The 'displacement ventilation system' supplies fresh air to the floor at low velocity while older air is exhausted through ceiling vents on the roof.

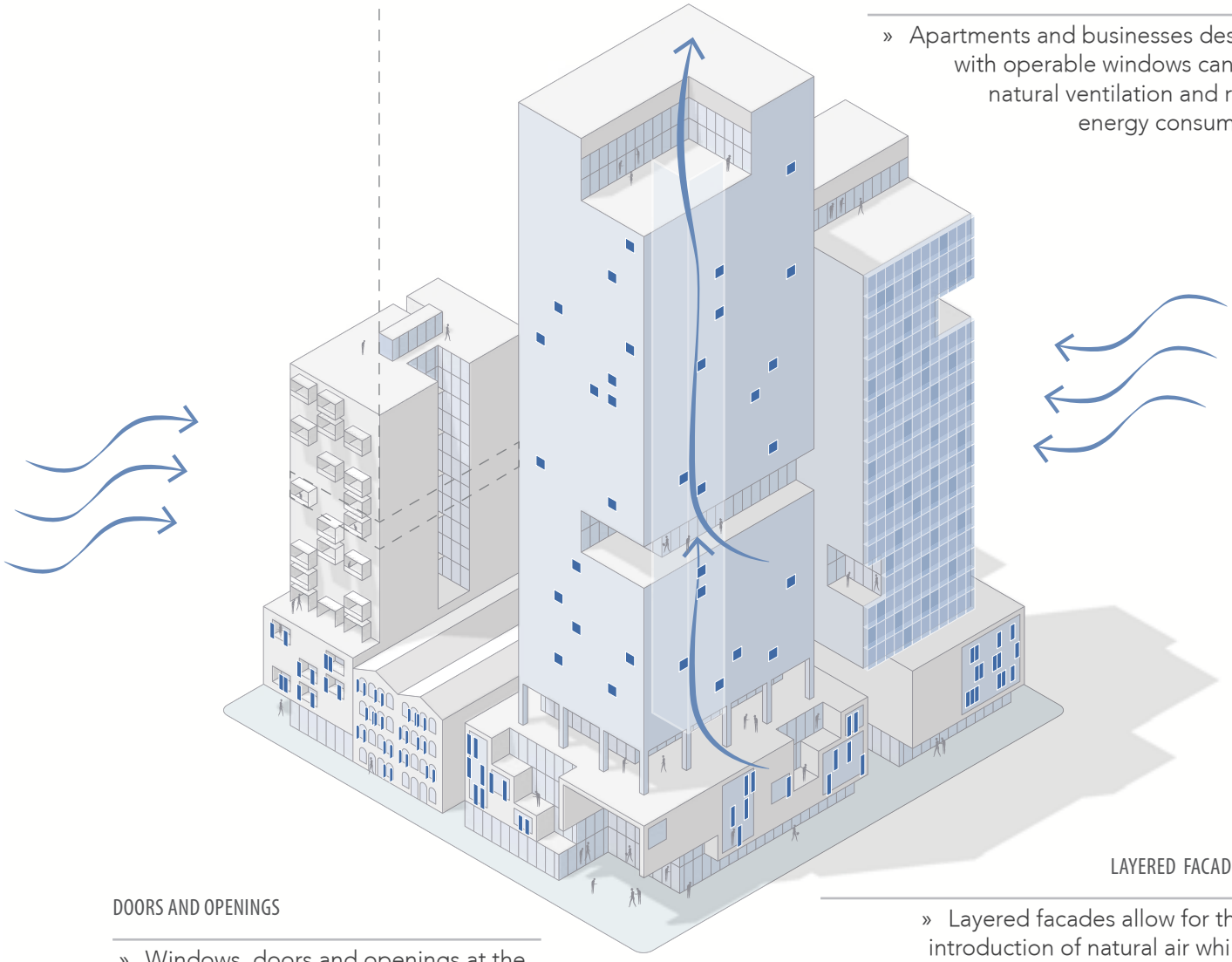


NATURAL VENTILATION

» Cross and stack ventilation systems in apartments introduce fresh air into closed internal environments.

OPERABLE WINDOWS

» Apartments and businesses designed with operable windows can enjoy natural ventilation and reduce energy consumption.



DOORS AND OPENINGS

» Windows, doors and openings at the ground level and in street buildings create connections between indoor and outdoor spaces.

LAYERED FACADES

» Layered facades allow for the introduction of natural air while managing solar gain.

SUB-ELEMENTS

4.1 OPERABLE WINDOWS

Operable windows are located, oriented and designed to capture cooling breezes, facilitate cross ventilation and allow the passage of daylight while reducing unwanted heat transfer. The placement of these needs to be considered in the context of building setbacks and separation to allow the penetration of light and air through the city.

4.2 DOORS AND OPENINGS

Doors and openings function as the physical connections between indoor and outdoor spaces, both public and private, and allow natural ventilation into common areas. Building entrances, foyers, atriums and large, outdoor rooms create welcoming, transparent spaces that are naturally ventilated. Larger tracts of movable walls, doors, windows and screens allow for the seamless connection between indoor and outdoor spaces providing multiple opportunities for occupants to experience natural air without leaving the building.

4.3 NATURAL VENTILATION

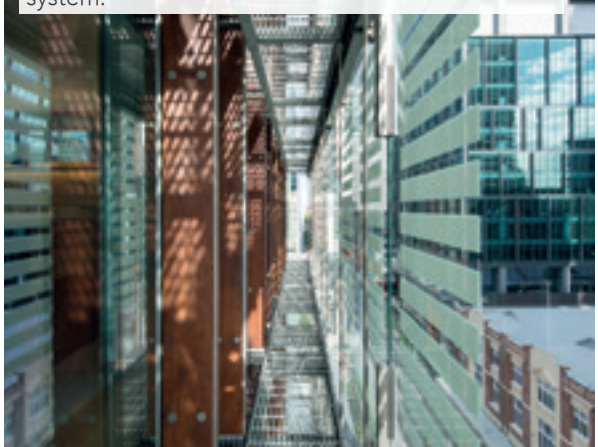
Natural ventilation is one of the most effective ways to reduce the energy consumption of both apartments and commercial buildings. The inclusion of natural or hybrid ventilation systems, including stack ventilation, introduces fresh air into closed internal environments. Hybrid or mixed ventilation systems commonly use natural ventilation when the external conditions allow, but switch to full mechanical systems when external conditions are not optimal due to temperature, humidity, noise or pollution.

4.4 LAYERED FACADES

Layered facades can provide insulation and facilitate natural ventilation, while protecting from rain and excessive heat. They can manage the flow of fresh air, buffer external noise and reduce energy consumption. Layered facades come in many shapes and sizes with the common elements of an inner and outer wall with a cavity between them. Shading devices are often located within the cavity to manage solar gain.

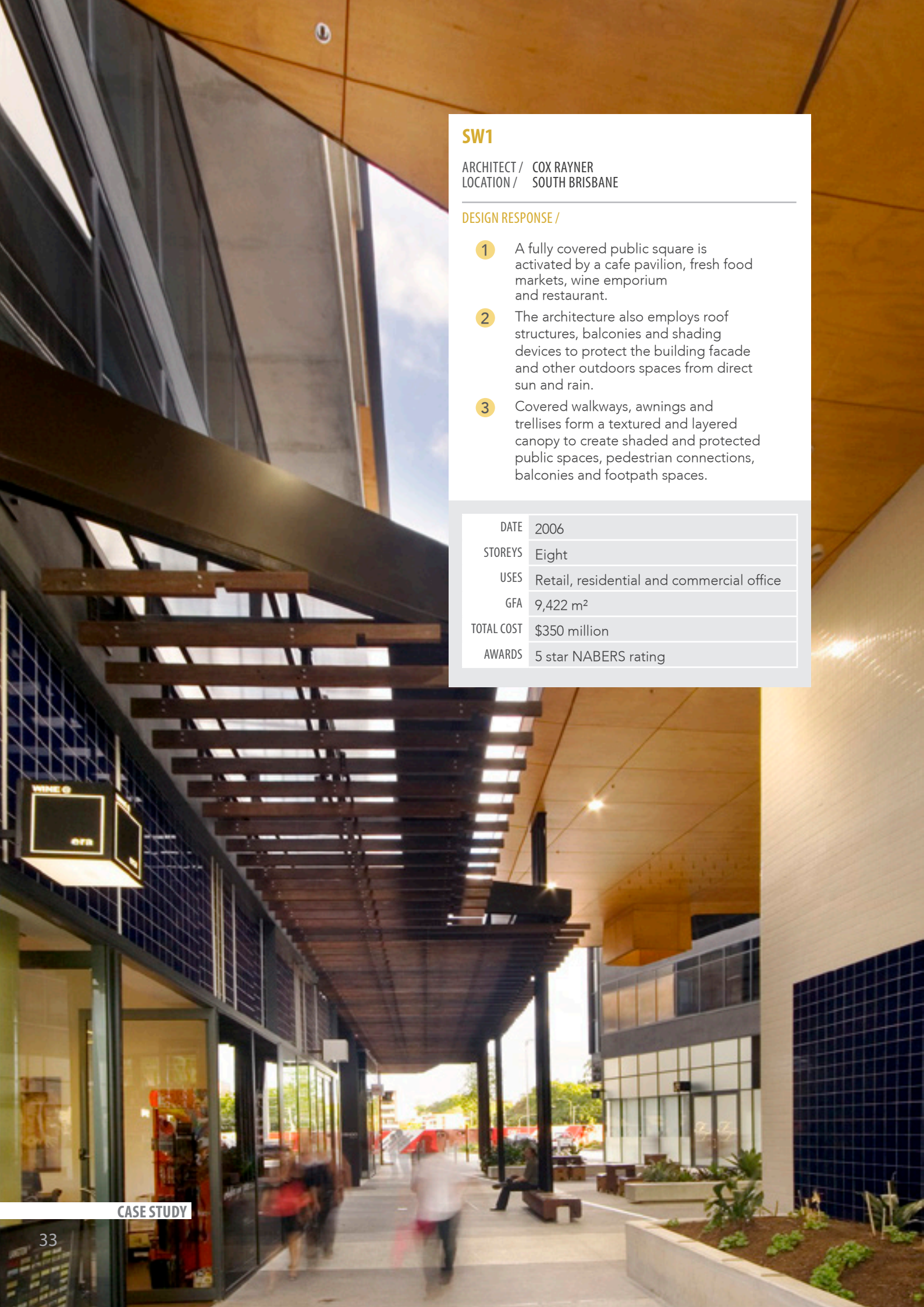
QUEEN ELIZABETH II COURTS OF LAW | BRISBANE

The active layered facade and glass cavity is an integral component of the air climate control system.



basic shading devices provided by the building regulate solar gain in our buildings without any user effort, reducing the demand on mechanical heating and cooling

SHADE AND PROTECTION



SW1

ARCHITECT / COX RAYNER
LOCATION / SOUTH BRISBANE

DESIGN RESPONSE /

1. A fully covered public square is activated by a cafe pavilion, fresh food markets, wine emporium and restaurant.
2. The architecture also employs roof structures, balconies and shading devices to protect the building facade and other outdoors spaces from direct sun and rain.
3. Covered walkways, awnings and trellises form a textured and layered canopy to create shaded and protected public spaces, pedestrian connections, balconies and footpath spaces.

DATE	2006
STOREYS	Eight
USES	Retail, residential and commercial office
GFA	9,422 m²
TOTAL COST	$350 million
AWARDS	5 star NABERS rating

SHADE AND PROTECTION

BRISBANE'S CELEBRATED CLIMATE OCCASIONALLY DELIVERS SOME HARSH CONDITIONS.

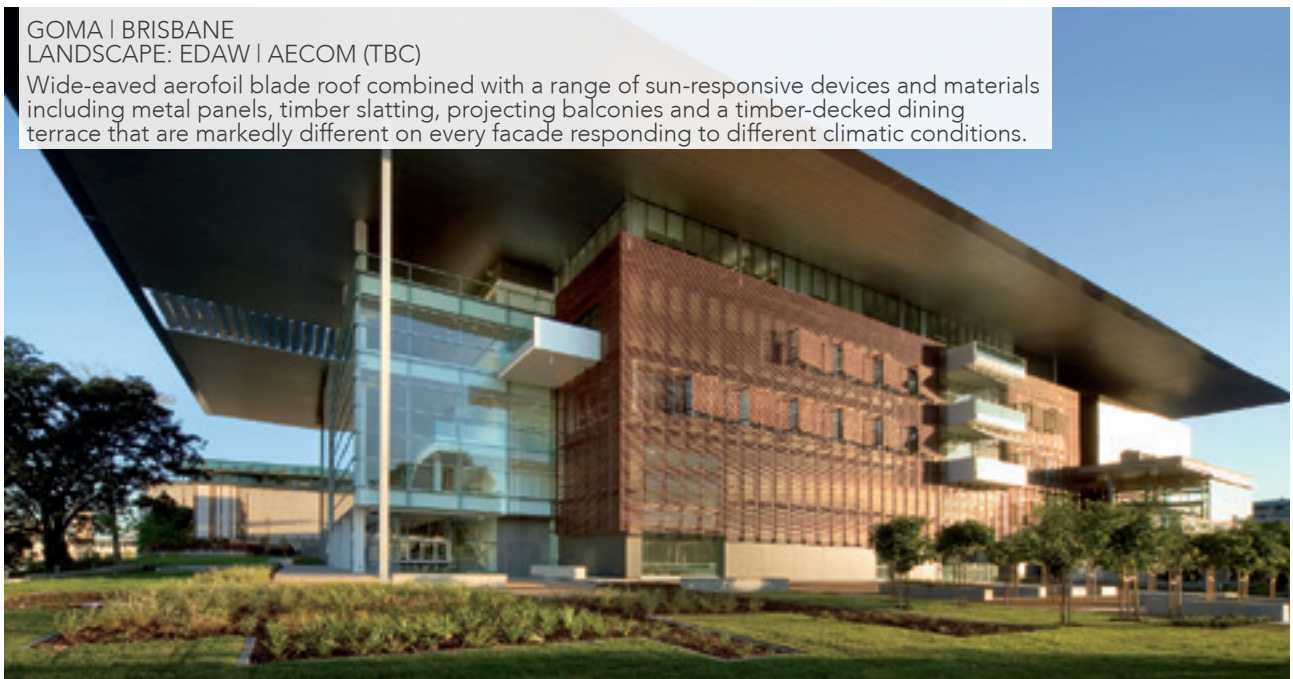
Be it torrential rainfall or hot summer sun, our building design will protect us from the worst of our climate, while always welcoming its best.

The distinctiveness of our 'tin and timber' vernacular provides obvious clues as to how our climate shapes our identity. Deep verandahs, covered colonnades, operable screens and external shading devices both shade our buildings and protect us from the elements. Overall they combine to create a sense of sheltered openness, with layered screens providing degrees of privacy. Building occupiers have unique needs and preferences for shade. The sun is a dynamic element, and it is necessary that shade can be controlled by the occupants. The adaptation of these elements into the architecture and public spaces of the city contributes to our uniquely Brisbane identity and allows us to revel in a relaxed, outdoor lifestyle.

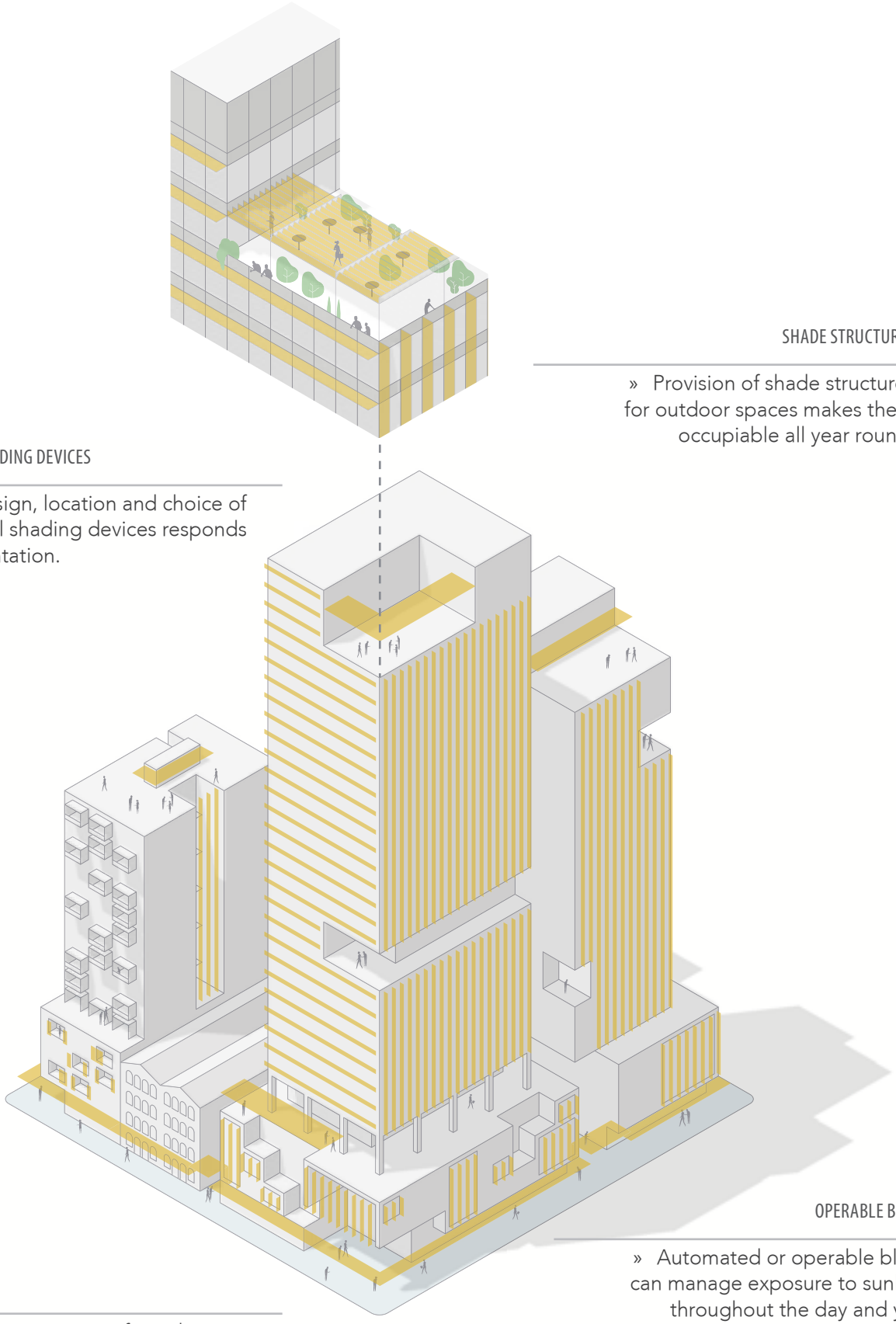
SUB-ELEMENTS

DID YOU KNOW?

Well-designed sun control and shading devices can dramatically reduce building peak heat gain and cooling requirements and improve the natural lighting quality of building interiors.



GOMA | BRISBANE
LANDSCAPE: EDAW | AECOM (TBC)
Wide-eaved aerofoil blade roof combined with a range of sun-responsive devices and materials including metal panels, timber slatting, projecting balconies and a timber-decked dining terrace that are markedly different on every facade responding to different climatic conditions.



SHADE STRUCTURES

» Provision of shade structures for outdoor spaces makes them occupiable all year round.

EXTERNAL SHADING DEVICES

» The design, location and choice of external shading devices responds to orientation.

OPERABLE BLINDS

» Automated or operable blinds can manage exposure to sunlight throughout the day and year.

AWNINGS

» Providing protection from the elements along the street frontage transforms the edges of our buildings into habitable spaces.

SUB-ELEMENTS

5.1 AWNINGS AND COLONNADES

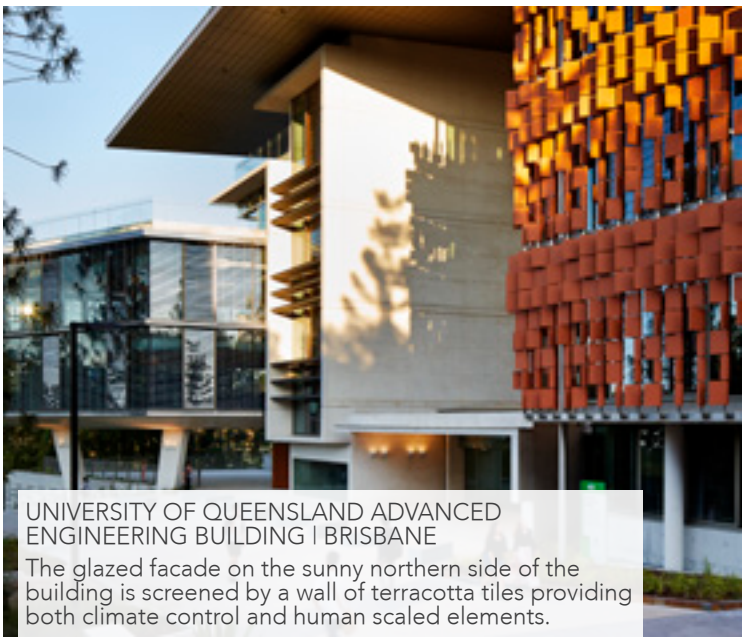
Awnings and colonnades transform our public footpaths, verandahs and terraces into habitable edges. They provide protection from the summer sun and seasonal storms, allowing us to create breathable, outdoor spaces and maintain activity on our busy city streets all day long.

5.2 SHADING DEVICES

External screens and shading devices that are light, tactile, and transparent, are at the heart of Queensland's design vernacular. They reduce heat load, temper bright light and protect against wind and rain, which in-turn reduces energy consumption and improves the comfort of residents and workers. Architecturally, they contribute to a sense of transparency, texture, rhythm, scale and composition, with built-in occupant operability key to ensuring user control and comfort. Additionally, automated or operable blinds can manage exposure to sunlight throughout the day and year providing control internally.

5.3 SHADE STRUCTURES

Planted trellises, sheltered walkways, free-standing shade structures and trees create occupiable outdoor spaces that are comfortable all year round. They embrace our indoor-outdoor lifestyle while protecting us from the hot summer sun and torrential rain. They allow us to cross bridges, occupy parks and enjoy rooftop views while enjoying the fresh air, natural light and openness our city is known for.



UNIVERSITY OF QUEENSLAND ADVANCED ENGINEERING BUILDING | BRISBANE

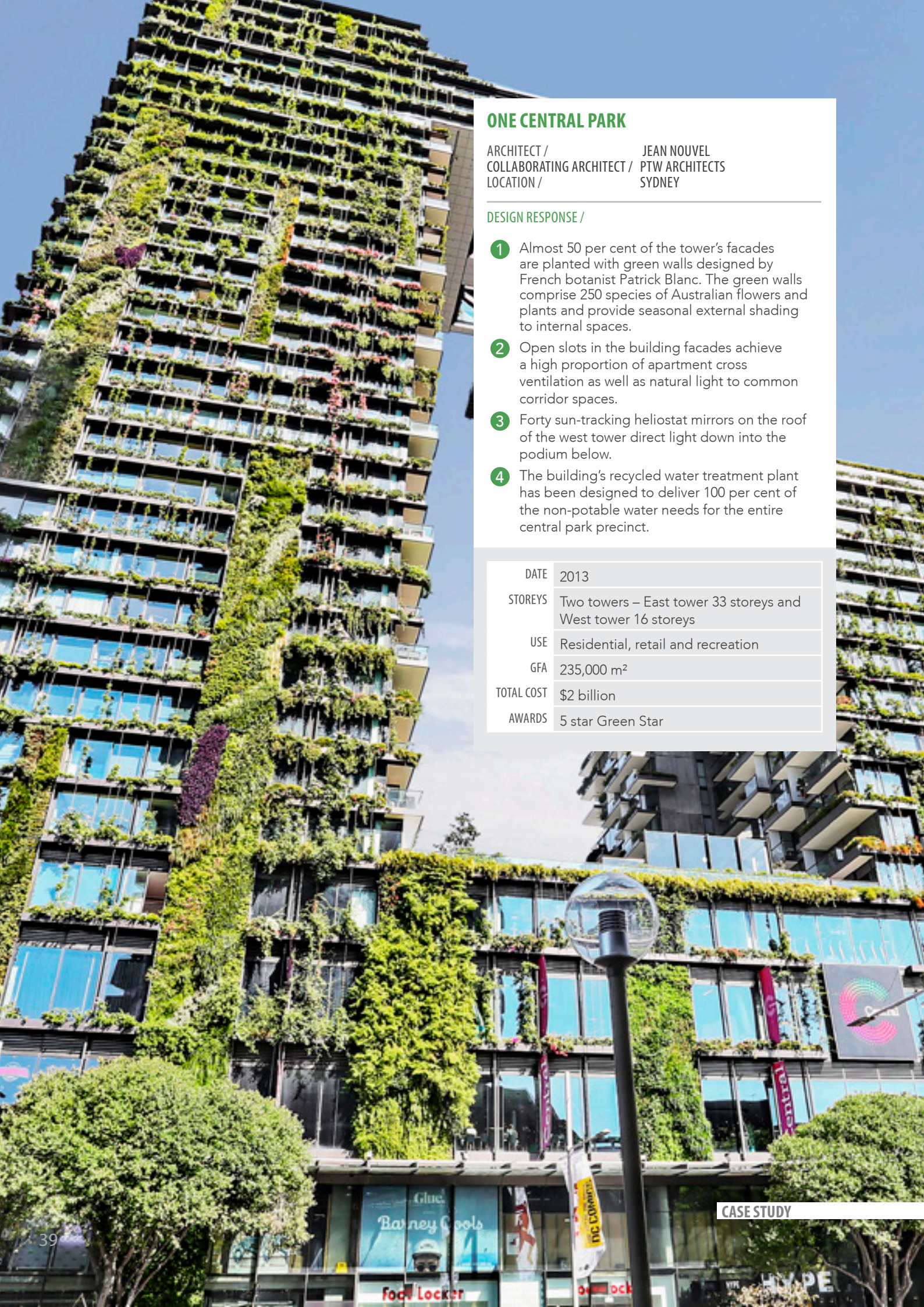
The glazed facade on the sunny northern side of the building is screened by a wall of terracotta tiles providing both climate control and human scaled elements.

SOUTH BANK GRAND ARBOUR | BRISBANE

The one kilometre long structure, located in South Bank Parklands, comprises 443 steel tendrils upon which a bougainvillea canopy grows providing shade and acting as the key pedestrian wayfinding device in the precinct.

urban green space can reduce the heat-island effect, improve the micro-climate, undertake localised air-cleansing, absorb pollutants, reduce noise levels and contribute to biodiversity

LIVING GREENERY



ONE CENTRAL PARK

ARCHITECT / JEAN NOUVEL
COLLABORATING ARCHITECT / PTW ARCHITECTS
LOCATION / SYDNEY

DESIGN RESPONSE /

1. Almost 50 per cent of the tower's facades are planted with green walls designed by French botanist Patrick Blanc. The green walls comprise 250 species of Australian flowers and plants and provide seasonal external shading to internal spaces.
2. Open slots in the building facades achieve a high proportion of apartment cross ventilation as well as natural light to common corridor spaces.
3. Forty sun-tracking heliostat mirrors on the roof of the west tower direct light down into the podium below.
4. The building's recycled water treatment plant has been designed to deliver 100 per cent of the non-potable water needs for the entire central park precinct.

DATE	2013
STOREYS	Two towers – East tower 33 storeys and West tower 16 storeys
USE	Residential, retail and recreation
GFA	235,000 m²
TOTAL COST	$2 billion
AWARDS	5 star Green Star

LIVING GREENERY

BRISBANE IS AUSTRALIA'S MOST BIODIVERSE CAPITAL CITY WITH MORE SPECIES OF NATIVE PLANTS AND WILDLIFE THAN ANY OTHER IN AUSTRALIA.

The benefits of urban greenery and elevated sky gardens are extensive. Vegetation provides shade, reducing the urban heat-island effect and cooling our public spaces. It contributes significant visual amenity and interaction with the natural environment, which has been proven to calm anxiety and contribute to overall health.

Usable green spaces promote opportunities for physical activity and active lifestyles while fostering community interaction. Research also shows that urban greenery and elevated gardens increase property values.

New developments that incorporate living greenery and vegetation enrich our urban experience and contribute to a vision for a distinct city profile that is open, green and subtropical. Our city is an urban garden.

SUB-ELEMENTS

VERTICAL GREENERY	6.1
ELEVATED GARDENS	6.2
INTERNAL PLANTING	6.3
GROUND PLANE GARDENS	6.4
MAINTAIN THE GREENERY	6.5

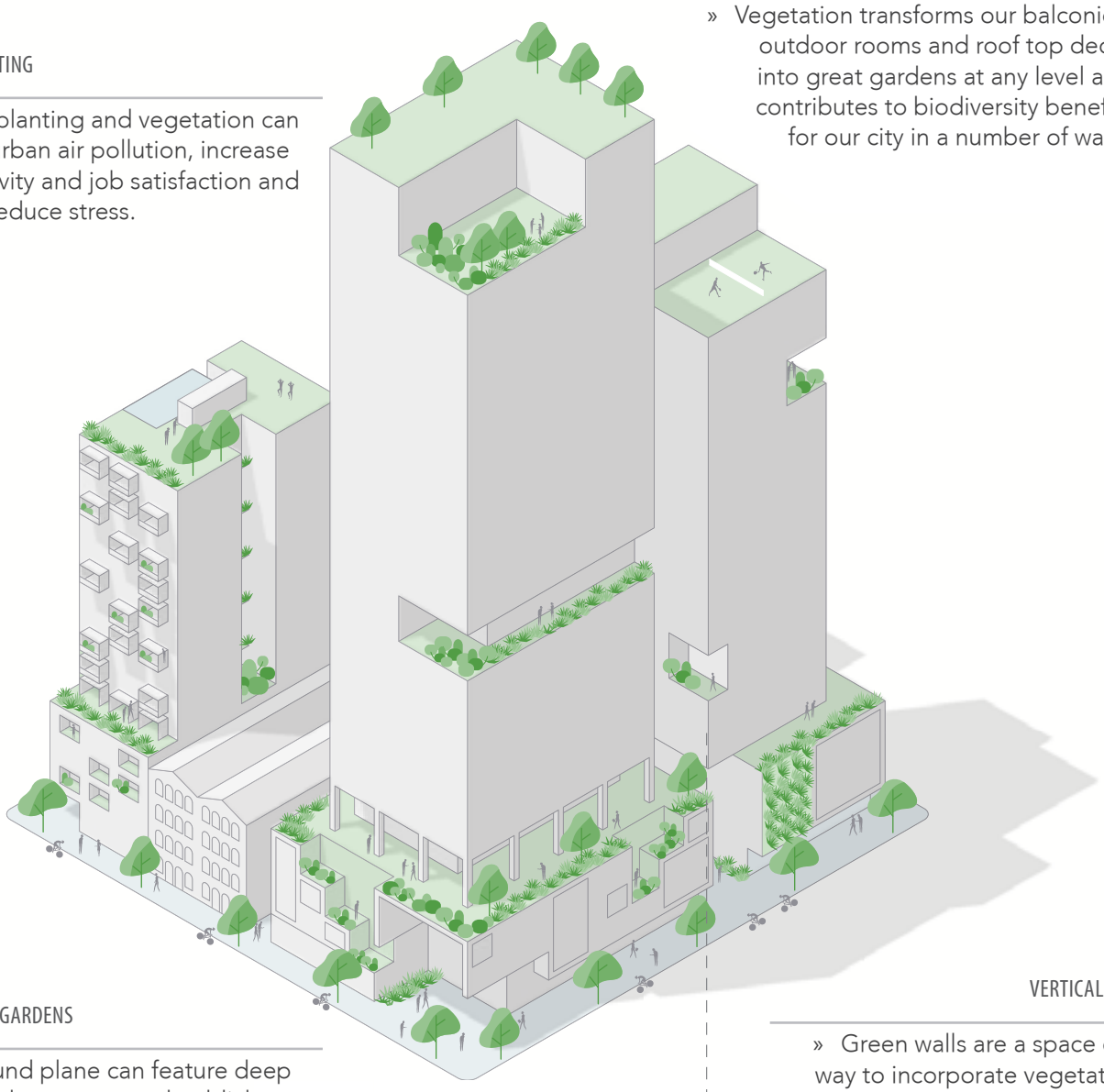
PARKROYAL ON PICKERING | SINGAPORE
LANDSCAPE: TIERRA DESIGN

INTERNAL PLANTING

» Internal planting and vegetation can reduce urban air pollution, increase productivity and job satisfaction and greatly reduce stress.

ELEVATED GARDENS

» Vegetation transforms our balconies, outdoor rooms and roof top decks into great gardens at any level and contributes to biodiversity benefits for our city in a number of ways.

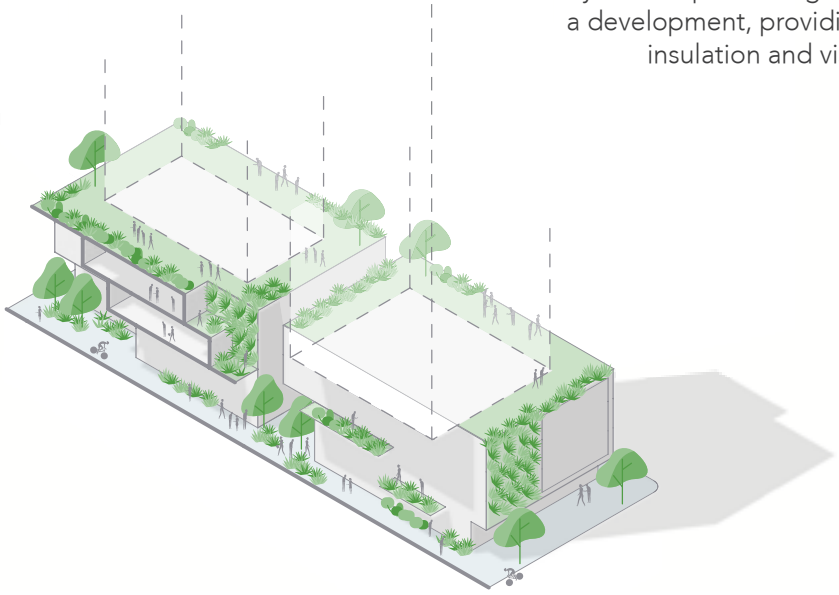


GROUND PLANE GARDENS

» The ground plane can feature deep planting, large trees and publicly accessible space. Laneways, arcades, atriums and street frontages are all opportunities for subtropical planting which contributes to our subtropical city identity.

VERTICAL GREENERY

» Green walls are a space efficient way to incorporate vegetation into a development, providing shade, insulation and visual relief.



SUB-ELEMENTS

6.1 VERTICAL GREENERY

The green wall typology is diverse and includes green facades, living walls, vertical gardens, hanging gardens, bio-shaders and bio-facades. Green walls can be located internally and externally, providing shade and insulation as well as visual relief.

6.2 ELEVATED GARDENS

Private balconies, communal recreation spaces, outdoor rooms, roof-top decks and podium gardens are all opportunities for elevated green spaces that create usable outdoor spaces. While allowing for active recreation and passive occupation they can also offer multiple benefits including absorption of rainwater, providing insulation, creating a habitat for wildlife, providing a more aesthetically pleasing roofscape, and mitigating the urban heat-island effect.

6.3 INTERNAL PLANTING

Indoor plants are easy to install and enhance our experience of office spaces, apartments and communal areas. Research also shows that internal planting and vegetation can reduce urban air pollution, increase productivity and job satisfaction and reduce stress.

6.4 GROUND PLANE GARDENS

Street trees and ground plane landscaping are essential to the livability and beauty of our subtropical city. They provide shade, cool our streets and public spaces and reduce the heat-island effect in our city. Street trees and landscaping in laneways, arcades and atriums also contributes to development aesthetics and marketability as they contribute to the public's experience of a development.

6.5 MAINTAIN THE GREENERY

Trees, gardens and other green landscaping elements require regular maintenance to ensure optimal benefits. A maintenance regime is expected for all new buildings.

LADY CILENTO CHILDREN'S HOSPITAL | BRISBANE
Landscape: Conrad Gargett
Subtropical elevated gardens

responsible material selection protects the biodiversity of the environment, ensures the health of occupants and minimises environmental impacts - it can even save you money

IDENTITY MATTERS

AM60

ARCHITECT / DONOVAN HILL
LOCATION / 60 ALBERT STREET, BRISBANE

DESIGN RESPONSE /

1. The use of materials on the facade includes colourful glass, tactile brick and concrete shading elements providing a contrast in colour, scale and texture while delivering substantial solar control to internal building spaces.
2. The tactile brick and concrete facade is embellished by perforations to allow filtered light to penetrate into four levels of glass-skinned board rooms within the building.

DATE	2009
STOREYS	23
USE	Commercial office and retail space
GFA	21,000 m²
TOTAL COST	$177 million
AWARDS	5 star NABERS Energy rating

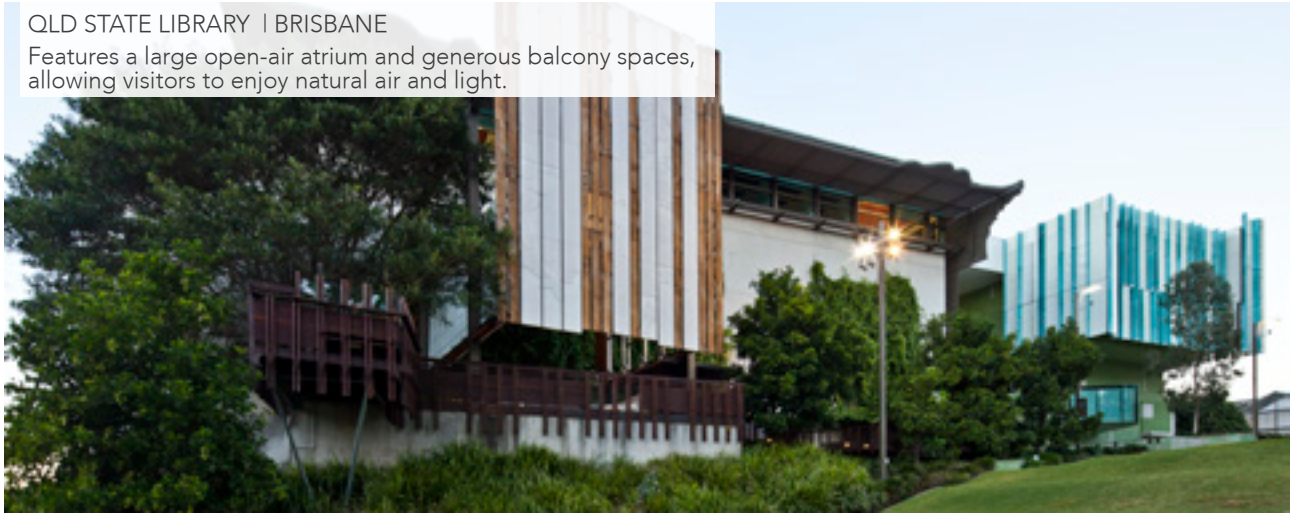
IDENTITY MATTERS

OUR BUILDINGS ARE AN EXPRESSION OF OUR IDENTITY.

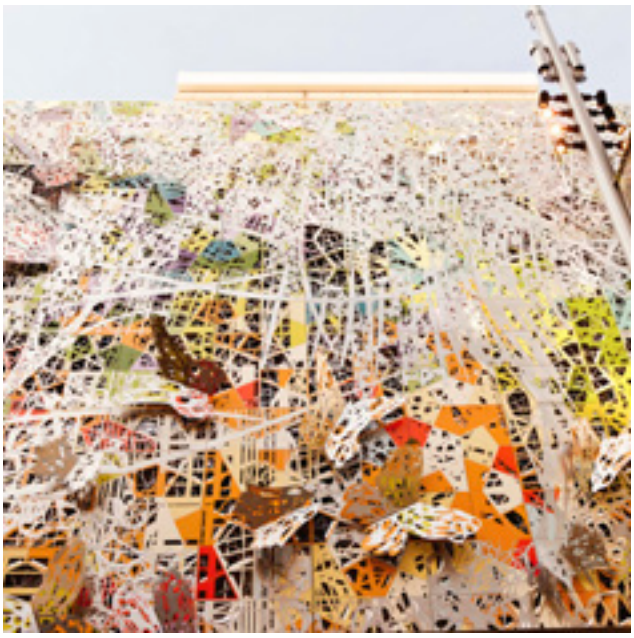
Brisbane's subtropical character is the defining element that sets it apart from other Australian cities. The creativity and materiality of our buildings will express our identity and ensure the city is culturally diverse and vibrant throughout the day and night. It is essential that our buildings are a reflection of our culture, climatic conditions and local character. Well-designed buildings relate to their surrounding environment and enliven the public realm with a distinctive and memorable urban experience.

Considerations such as choice of materials, public art and lighting design are essential to the way that buildings represent Brisbane's unique qualities and contribute to the overall identity of our city. For these reasons, identity matters.

SUB-ELEMENTS



QLD STATE LIBRARY | BRISBANE
Features a large open-air atrium and generous balcony spaces, allowing visitors to enjoy natural air and light.



SUB-ELEMENTS

7.1 CHOICE OF MATERIALS

The selection of high-quality building materials and their creative application in the design of buildings needs to respond to our local character, climate and lifestyle. The cumulative effect of doing this in every street, building and public space of our city has the ability to evolve our timber and tin design vernacular and translate our distinctive character and identity onto the world stage. Locally sourced materials, strong articulation through rhythm and a layering of transparent and solid materials and spaces provide texture and contribute to a sense of breathable, occupied buildings.

7.2 LONGEVITY

High quality materials selected for their durability yield innumerable benefits in terms of maintenance, robustness and sustainability. They also have the ability to save money in the long term as well as contributing to an enduring sense of civic pride.

7.3 PUBLIC ART

Public art is an expression of our city's culture and creativity, playing an integral role in sharing stories and interpreting places and people. The integration of artwork into buildings contributes to a person's city experiences, offers a new perspective and enriches our global identity.

7.4 CREATIVE LIGHTING

In moving towards a vibrant night-time economy for our city quality lighting outcomes are essential, meeting functional needs as well as a means of creative expression. Innovative ideas for the illumination of our buildings will showcase our architecture and enliven our city streets.

“achieving high environmental ratings reduces exposure to commercial risk and asset obsolescence by ensuring that assets are ‘future-ready’ ”

John Dillon, Fund Manager, APPF Commercial - joint owner of Commonwealth Bank Place

REDUCE ENERGY AND WASTE

QUT SCIENCE AND TECHNOLOGY PRECINCT

ARCHITECT / DONOVAN HILL AND WILSON ARCHITECTS
LOCATION / QUT GARDENS POINT CAMPUS, BRISBANE CITY

DESIGN RESPONSE/

1. Roof-mounted 'solar trees' (photovoltaic system) are programmed to follow the sun and have saved QUT $40,000 and 183,000 kg of CO^2.
2. The building is powered by a tri-generation plant (combined cooling, heating and power generation) which reduces maximum peak energy demand by 33 per cent.
3. State-of-the-art intelligent lighting controls including a fully automated system consisting of detectors, integrated switching and daylight harvesting.
4. Extensive intelligent energy metering and initiatives for increased plant monitoring.
5. Power and light circuit metering to analyse energy demand.

DATE	2013
STOREYS	Nine
USE	Research, education, retail and recreation
GFA	45,000 m²
TOTAL COST	$230 million
AWARDS	5 star Green Star

REDUCE ENERGY AND WASTE

08

OUR CITY WILL SHOWCASE INNOVATIVE TECHNOLOGY AND BEST-PRACTICE SUSTAINABILITY.

Cities are central to the causes and consequences of climate change. Consuming 78 per cent of the world's energy and producing 60 per cent of all carbon dioxide, cities are a major source of carbon emissions. With more than 90 per cent of all urban areas being coastal, cities are also at risk of increased flooding, storms and sea level rise.

Designing our buildings to incorporate passive solar design principles such as orientation, shading and natural ventilation will reduce energy consumption. Employing new technology can further enhance a building's performance by utilising renewable energy, reducing water consumption and minimising waste. Reducing the energy needs of our buildings will also help mitigate climate change and create a more resilient and robust economy.

SUB-ELEMENTS

DID YOU KNOW?

The Australian Property Institute's *Building Better Returns* report showed Green Star certified buildings can reduce outgoings by 1.5 per cent while increasing rental values by 5 per cent and sales values by 12 per cent.

GLOBAL CHANGE INSTITUTE | BRISBANE
The outer layer incorporates automated sun-shading to reduce solar heat gain.

WASTE AND WATER

» Efficient air conditioning systems, water harvesting and recycling, and energy efficient fittings and fixtures conserve and protect our natural resources.

CERTIFICATION

» Helps protect our environment, reduce operational costs and attract tenants.

ENERGY AND TECHNOLOGY

» City developments showcase the best of our technological advancements, reducing energy and water consumption, including generation of renewable energy and rainwater storage.

ACTIVE TRANSPORT

» Cycle centres and 'end of trip facilities' can influence travel behaviour and encourage healthy lifestyles, and can assist in achieving city-wide subtropical design outcomes, particularly where such facilities are meaningfully integrated into the building streetscape and urban fabric.

8.1 ENERGY AND TECHNOLOGY

New developments throughout Australia and the world are embracing renewable and low-carbon energy sources to power their buildings. Solar panels and tri-generation plants are increasingly common features in Brisbane projects. Chilled-beam and district cooling technologies reduce the energy required for air conditioning, while intelligent lighting systems can sense available daylight and movement to minimise energy consumption. These and other emerging technologies, including the advancement of battery technology, will help to reduce operational costs and carbon emissions, generating significant economic savings for building occupants and managers over a building's life-cycle.

8.2 WASTE AND WATER

Water is a vital and yet a temperamental element of our climate. Water harvested from rooftops, open spaces and air conditioning systems can be stored in tanks for use in toilets and to irrigate landscaping throughout the development. Efficient fittings and fixtures reduce water consumption and clever waste disposal systems improve recycling to conserve and protect our natural resources. The integration of water sensitive urban design principles into the design of buildings and open spaces reduces overland flow, captures and treats pollutants, and contributes to a clean and green city identity.

8.3 ACTIVE TRANSPORT

Integrating active transport facilities, such as cycle centres and end of trip facilities into the fabric of our city and its buildings can influence travel behaviour and contribute to active, healthy lifestyles and improve occupant productivity all while reducing carbon emissions and traffic congestion.

8.4 CERTIFICATION

Industry recognised certification systems provide independent ratings for the sustainable design and operation of buildings. This includes detailed requirements on energy reduction, waste minimisation and operational performance. Industry and Council recognised tools in Brisbane include Green Star, NABERS and EnviroDevelopment.

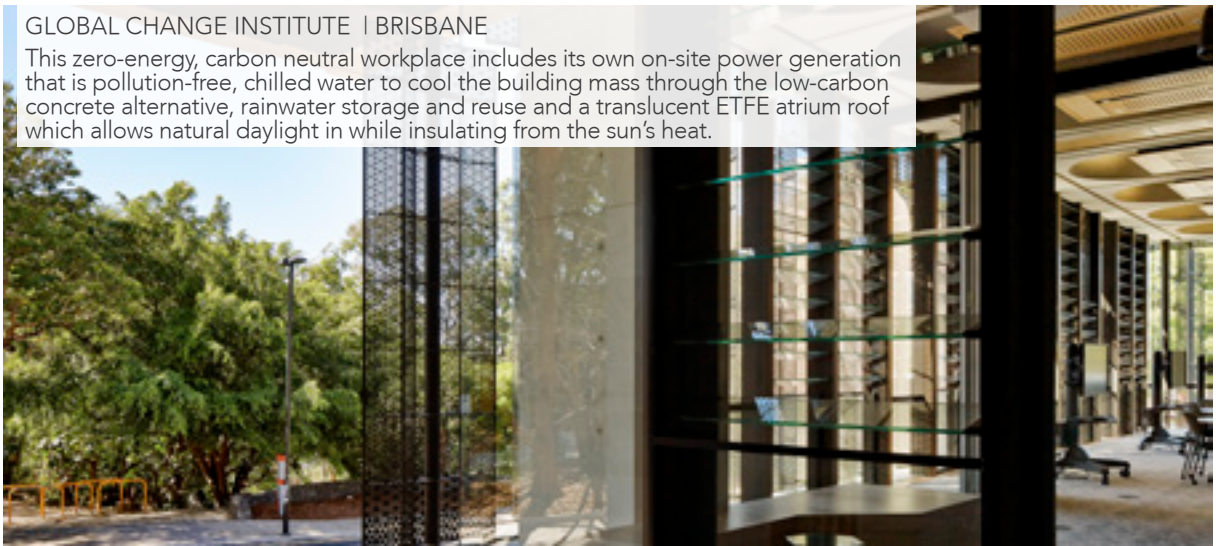
DID YOU KNOW

The Brisbane district cooling system will provide energy savings of 10 to 30 per cent for individual buildings in the city centre, and has the potential to reduce CO_2 emissions by up to 24,000 tonnes per annum.

Source: CitySmart

GLOBAL CHANGE INSTITUTE | BRISBANE

This zero-energy, carbon neutral workplace includes its own on-site power generation that is pollution-free, chilled water to cool the building mass through the low-carbon concrete alternative, rainwater storage and reuse and a translucent ETFE atrium roof which allows natural daylight in while insulating from the sun's heat.



A future vision of Brisbane as a New World City with buildings that incorporate subtropical design

ACKNOWLEDGEMENTS

Brisbane City Council thanks the following architects and photographers for their invaluable contribution to the New World City Design Guide - Buildings that Breathe.

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12 CREEK STREET | BVN DONOVAN HILL

480 QUEEN STREET | BVN DONOVAN HILL

WHARF STREET STUDENT HOUSING | ARKHEFIELD

Brisbane's architects and developers are already embracing the concept of buildings that breathe with a number of recent development approvals proposing innovative architecture incorporating the key elements.

	ELEMENTS	NOTES	Y/N
01	ORIENTATE YOURSELF		☐
1.1	LOCATION AND ORIENTATION		☐
1.2	MASSING AND INTERNAL LAYOUT		☐
1.3	VIEWS		☐
1.4	STREET ACTIVATION		☐
02	OCCUPY OUTDOOR SPACES		☐
2.1	CITY ROOMS		☐
2.2	SKY TERRACES		☐
2.3	BALCONIES		☐
2.4	LANEWAYS AND CROSS-BLOCK LINKS		☐
03	ILLUMINATE WITH DAYLIGHT		☐
3.1	BUILDING SETBACKS		☐
3.2	GLAZING		☐
3.3	LIGHT WELLS AND SKYLIGHTS		☐
04	NATURAL AIR AND VENTILATION		☐
4.1	OPERABLE WINDOWS		☐
4.2	DOORS AND OPENINGS		☐
4.3	NATURAL VENTILATION		☐
4.4	LAYERED FACADES		☐
05	SHADE AND PROTECT		☐
5.1	AWNINGS AND COLONNADES		☐
5.2	EXTERNAL SHADING DEVICES		☐
5.3	SHADE STRUCTURES		☐
06	LIVING GREENERY		☐
6.1	VERTICAL GREENERY		☐
6.2	ELEVATED GARDENS		☐
6.3	INTERNAL PLANTING		☐
6.4	GROUND PLANE GARDENS		☐
6.5	MAINTAIN THE GREENERY		☐
07	IDENTITY MATTERS		☐
7.1	CHOICE OF MATERIALS		☐
7.2	LONGEVITY		☐
7.3	PUBLIC ART		☐
7.4	CREATIVE LIGHTING		☐
08	REDUCE ENERGY AND WASTE		☐
8.1	ENERGY AND TECHNOLOGY		☐
8.2	WASTE AND WATER		☐
8.3	ACTIVE TRANSPORT		☐
8.4	CERTIFICATION		☐

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