Queensland University of Technology working in partnership with
Queensland Government and Brisbane City Council

Project Report

A Subtropical Urban Community:
Investigating Medium to High Density residential typologies
by Design Charrette

Rosemary Kennedy

9th October 2009

Contents

1 INTRODUCTION

1.1 *Purpose of the report*

The Centre for Subtropical Design at QUT, in partnership with the Queensland Government and Brisbane City Council, conducts research focused on 'best practice' outcomes for higher density urban living environments in the subtropics through the study of typical urban residential typologies, and urban design. The aim of the research is to inform and illustrate best practice subtropical design principles to policy makers and development industry professionals to stimulate climate-responsive outcomes.

The Centre for Subtropical Design recently sought project-specific funding from the Queensland Department of Infrastructure and Planning (DIP) to investigate residential typologies for sustainable subtropical urban communities, based on transit oriented development principles and outcomes for areas around public transport nodes.

A development site within the Fitzgibbon Urban Development Area, and close to a rail and bus transport corridor, provided a case study location for this project.

Four design-led multi-disciplinary creative teams participated in a Design Charrette and have produced concept drawings and propositions on a range of options, or prototypes. Analysis of selected prototypes has been undertaken to determine their environmental, economic and social performance

This Project Report discusses the scope of the project funded by DIP in terms of activities undertaken to date, and deliverables achieved. A subsequent Research Report will discuss the detailed findings of the analysis.

1.2 *Project Aim*

The aim of the project is to develop design principles for sustainable subtropical urban communities, relevant to transit oriented development in the context of South East Queensland.

The *South East Queensland Regional Plan 2009 – 2031* (the Plan) Part D8 Compact Settlement includes a policy that requires the design and siting of new development to reflect SEQ's subtropical climate, reinforce local character and achieve design excellence and innovation. This will require all new development and appropriate infrastructure to express a positive relationship with climate and place by adopting subtropical design principles, including passive climate control.

Compatible with subtropical design expectations, the Plan also seeks to protect biodiversity, contain urban development, build and maintain community identity, reduce car dependency, and support a prosperous economy.

Fundamental to achieving the vision and the strategic directions of the Plan is accommodating population growth through promoting a more compact, well-serviced and efficient urban form, through transit oriented corridors and centres.

1.3 *Research Objectives*

Incorporating sub-tropical design principles to achieve sustainable outcomes through appropriate orientation, aspect, cross-ventilation and integration of shade-giving vegetation is often perceived to be challenging in an environment where high levels of noise, odour and particulates occur.

The challenge is to solve a raft of perceived problems through design, whilst recognising that the outcomes need to respond to demographic trends, climate change, diminishing availability of land and fresh water supply, rising energy costs, developer expectations and an increasingly environmentally-aware consumer market.

The research objectives of this project are to use design typologies to articulate the following key advice to stakeholders:

- How subtropical design principles apply to buildings and public spaces in the context of higher density residential communities.
- How higher density subtropical design outcomes can contribute to key government strategies addressing climate change (mitigation and adaptation) and affordable housing.
- What level of density/building height and neighbourhood form provides the greatest opportunity for incorporating subtropical design principles.
- How potential amenity issues experienced in Transit Oriented Development (TOD) locations (e.g. noise, vibration, odour, particulates, lighting) can be dealt with, using a subtropical design approach.

1.4 *The Case Study: Fitzgibbon Urban Development Area*

The Urban Land Development Authority (ULDA) is a key part of the Queensland Housing Affordability Strategy. It was established to help make housing more affordable and to deliver a range of housing options for the changing needs of the community.

Located twelve kilometres from the Brisbane CBD, the Fitzgibbon Urban Development Area (UDA) covers 295-hectares of land in the northern suburbs of Fitzgibbon, Carseldine, Bald Hills, Taigum and Deagon. The ULDA completed the Development Scheme for Fitzgibbon in July 2009. The plans include over 160 hectares of green space, new homes for up to 6,500 people, sport and recreation areas, and mixed-use residential, commercial and office precincts. Fifty five percent of the area will be devoted to green space, recreation and bushland.

Fitzgibbon UDA is close to existing and planned public transport networks. The Development Scheme includes three distinct new areas:

- The Carseldine Urban Village - an active, transit oriented mixed use urban village centred on the Carseldine Railway Station and a future proposed busway station. It will include commercial, residential and retail developments as well as special purpose learning and research centres while retaining substantial bushland and open space.
- Residential Neighbourhoods - featuring affordable and sustainable residential communities including bushland and open space. The civil works are already underway on the sold-out first two stages of the 'Fitzgibbon Chase' development.
- Bushland, Sport and Recreation area - will include over 160 hectares of bushland and open space.

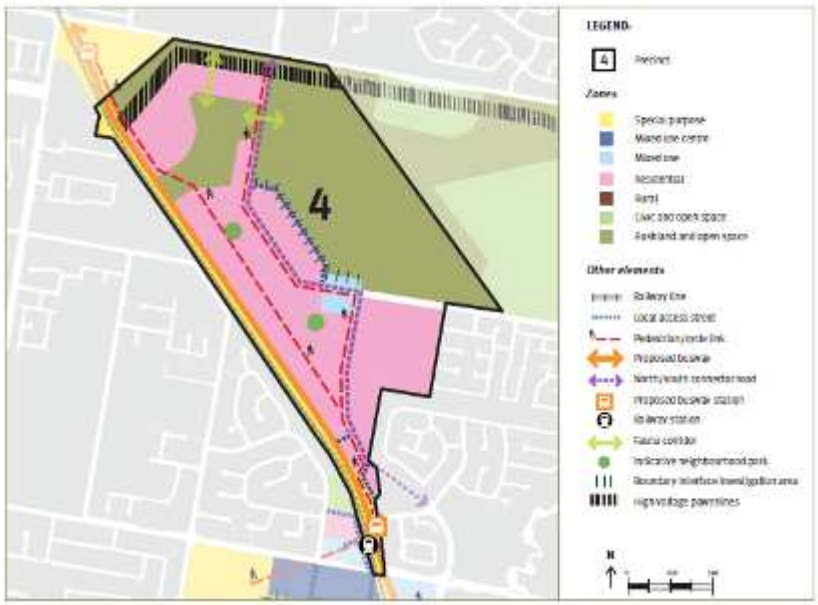


Fig. 1 Fitzgibbon Urban Development Area *(www.ulda.qld.gov.au)*

The Development Scheme describes maximum densities and heights in these areas, from 60 dwelling units per hectare (du/ha) and up to five storeys, to 30 du/ha and up to three storeys. Building heights adjoining the transport corridor range from two to five storeys.

2 RELATED RESEARCH BY THE CENTRE FOR SUBTROPICAL DESIGN

Recent research conducted by the Centre for Subtropical Design pertains to higher densities in SEQ and is relevant to support, evaluate and critique the outcomes of this project.

2.1 *Managing the social, environmental and economic impacts of high density living within inner urban environments.*

A major 'Linkage' project funded by the Australian Research Council (ARC) and in partnership with the Northshore Development Group (Port of Brisbane) has investigated the social, environmental and economic impacts of high density living within inner urban environments. Combining both quantitative and qualitative research data, this research evaluates the relationship between high density living and residents' satisfaction with their dwelling, the 'complex' it occupies, and the general neighbourhood. Findings suggest that factors such as poor design of communal spaces, lack of opportunities for reducing energy, water and wastage, noise, environmental quality, quality of surrounding streets for walkability, and traffic, are greater sources of dissatisfaction for respondents, rather than high density itself. The project partners are developing an on-line 'liveability' tool that focuses on balancing the attributes of sustainability with the qualities of the city as a place to live.

2.2 *The Subtropical Row House*

The Centre utilises design-led qualitative research methods to explore new urban forms that can express a positive relationship with climate and place, protect and enhance the subtropical character of the region, and reduce dependency on resource-intensive buildings and neighbourhoods.

The Subtropical Row House Design Workshop, conducted by the Centre for Subtropical Design, brought together key stakeholders and 'creative teams' of design consultants in an intensive workshop to explore the potential of the 'row house' typology to deliver significant benefits in terms of sustainable living, affordability and market appeal in a humid subtropical climate. The row house, as a residential typology which can achieve greater densities than the detached house, has featured little in Queensland generally, but may offer a viable alternative in both urban infill and greenfield urban expansion areas.

2.3 *Subtropical Design in South East Queensland: A Handbook for Planners Developers and Decision-makers*

The South East Queensland Regional Plan 2009-2031presents twelve guiding principles of subtropical design as high level concepts which support the key regional policy, Compact Settlement. The as-yet unpublished handbook contains comprehensive guidance for the planning community on how these subtropical design principles apply to the different contexts of urban planning. Strategies that can be applied to the entire spectrum of urban scales from the regional scale, to the city, neighbourhood, street, individual building or site are drawn predominantly from the accumulated and evolving body of knowledge of landscape architecture, architecture and urban design appropriate to the subtropical humid zone that the Centre for Subtropical Design has actively researched. The content of the handbook is informed by outcomes of design workshops in an iterative process.

3 PROJECT METHODOLOGY AND PARTICIPATION

3.1. The Research methodology

The 'charrette' formed the basis of the research methodology for this investigation. Characteristics of a charrette include:

- A clearly identified issue or set of problems
- A instigator who will coordinate the project and convene the creative teams
- A facilitator who will manage the event
- A group of experts
- Background material for participants prior to the Charrette
- A specified set of issues to be looked at or problems to be solved
- A tangible and realistic set of deliverables to be achieved within a specified timeline.

The charrette is particularly suitable for built environment design research because it allows for a range of experienced professionals to work collaboratively to examine options for a specific challenge. Collective inquiry is undertaken in a highly intensive effort aimed at idea generation focussed on a tangible outcome.

The *Subtropical Urban Communities Charrette* was held at QUT's Gardens Point campus. It involved a two-day design studio meeting of four teams of design professionals and leading thinkers from a range of disciplines to share expertise and knowledge. During this initial intensive phase, briefings on pertinent issues were provided by specialist advisers. The teams made several presentations to the wider group, generating options for overall site planning and individual sites.

Ongoing debate and dialogue was integral part to the team developing their ideas over the course of two days.

Creative teams were then given two weeks to develop particular multi-residential housing typologies that considered the wider context of the neighbourhood and reflected subtropical design principles. The teams reconvened in a 'show and tell' session to present the completed design concepts. Held at QUT's Gibson Room in exhibition format, invited guests included decision-makers from the Qld Dept of Infrastructure and Planning, the Urban land Development Authority, and **Cr Amanda Cooper** Brisbane City Council Chairman for Neighbourhood Planning and Development Assessment.

A series of prototypes were selected from the designed outcomes for further examination against criteria such as density and liveability, ESD performance and cost of construction. If the findings of these analyses suggest certain areas where performance may be improved, it is anticipated that teams will take the opportunity to work with the Centre for Subtropical Design to agree any proposed modifications to the designs. This will result in high quality outcomes for the subsequent deliverables, but also offers a valuable professional development opportunity for the design practices involved.

3.2 *Project participants*

Funding partners

Direct project costs of $140,000 for this research were funded by the Department of Infrastructure and Planning. In-kind support was forthcoming from the Urban Land Development Authority. QUT School of Design provided a design team pro-bono. The Centre for Subtropical Design coordinated the project and is responsible for collating the results, and delivering advice to the stakeholders.

Facilitator

Peter Richards of Deicke Richards Architects facilitated the Charrette. An urban designer and leading subtropical design thinker, Peter is highly experienced in the charrette process and has a deep knowledge of contemporary planning and development issues.

Multidisciplinary creative teams

The Centre for Subtropical Design appointed four Creative Leaders and invited them to form multi-disciplinary creative teams. Highly credentialed Queensland architects, each representing a diversity of approach and design concerns, were selected as Creative Leaders based on their experience and understanding of the concepts behind sustainable subtropical urban design and the principles of transit oriented development (TOD). Their respective teams included a broad range of consultants. Landscape architectural expertise was mandatory for each team.

- **Shane Thompson (Team Leader), Principal, BVN Architecture**
- Morgan Corkill, Senior Architect, BVN Architecture
- Duncan Betts Architectural Graduate, BVN Architecture
- John Ilett, Principal, EDAW/AECOM, Landscape Architecture
- Andrew Neighbour, Associate, EDAW/AECOM Landscape Architecture
- Jeff Humphreys, Director, Humphreys Reynolds Perkins Town Planners
- Andrew Bock, Director, Andrew Bock Architects

- **Jim Gall, (Team Leader) Director Gall & Medek Architects Pty Ltd**
- Nick McGowan, Landscape Architect, Associate, Visual Planning Assessment LVO, QUT post-graduate student
- Petra Perolini, Lecturer, Interior Design Queensland College of Art, Griffith University
- Geoffrey Walker, Director, Urban Designer Geoffrey Walker and Company
- Anne-Marie Willis, Director, Sustainability/Design TeamDES
- Carl Yap, Property Developer Jalbibi Pty Ltd

- **Richard Kirk, (Team Leader) Director Richard Kirk Architect**
- Andrew Green, Gamble McKinnon Green Pty Ltd, Landscape Architects
- John Pfeffer, Cundall, ESD Consultants
- Johnathon Ward, Richard Kirk Architects

- **Paul Sanders, (Team Leader) Senior Lecturer, Architecture, QUT School of Design**
- Gini Lee, Professor, Landscape Architecture, QUT School of Design
- Leigh Shutter, Senior Lecturer, Architecture, QUT School of Design
- Mark Taylor, Associate Professor, Interior Design, QUT School of Design
- Rebecca Murphy (Architecture Student)
- Susi Blackwell (Architecture Student)

Expert Advisers

A number of specialist advisers were invited to brief the charrette participants on issues including the regulatory environment, lending institutions' attitudes, market acceptability, consumer preferences, and environmental standards.

- **Steve Conner**, Senior Planner with ULDA provided an overview of the Strategic Context of the Fitzgibbon UDA including the guiding principles of the Land Use Plan. Key messages included the levels of density and height permitted, the extent of flood mitigation required, and the balance between open space and urban development.

- **Prof Lydia Morawska**, QUT School of Physical and Chemical Sciences and Director of the International Laboratory for Air Quality and Health at QUT is an expert on the interdisciplinary field of air quality and its impact on human health and the environment with a specific focus on fine and ultrafine particles. Prof Morawska's presentation dealt with air pollution relating to proximity to transport corridors including public transport and roads supporting private vehicles. Key messages were that busy road corridors are the major source of emissions in the Brisbane area, and that ultrafine and fine particulates most damaging to human health are most concentrated within 100 metres of a corridor.

- **Gail Brown**, banker with credit union mecu, provided the perspective of the lending institution toward financing purchasers of dwellings in medium density housing projects. Key messages were that people seeking loans for dwellings smaller than 50 sq metres are currently not financed. The total area may include private outdoor space, and a car park.

- **Jay Carter**, Director and Principal Acoustical Consultant, Carter Rytenskild Group (CRG), Traffic and Acoustics provided an insight on the impact of noise associated with

road, rail, air, or water based transportation systems on indoor and outdoor space. Key messages were that buffers such as berms are more effective than barrier walls in reducing noise transmission; low frequencies such as the rumbling of diesel engines 'climbs' over barriers; high frequencies such as the exhaust of diesel engines travel in straight lines from the noise source – the line of sight to a point three metres above the rail line indicates the path of travel of high frequency noise.

- **Mark Thomson**, Director, TVA Partnership and founding partner, Ecolateral, sustainability. Key messages were to consider mitigation and adaptation to climate change in every planning, design and development decision; business as usual can no longer be accepted for future-oriented developments; and planners, designers and developers all need to be proactive rather than reactive.

- **Prof Laurie Buys**, School of Design and QUT Institute for Sustainable Resources provided insights into social sustainability focusing specifically on issues identified through the ARC Linkage project which investigated impacts of high density living. Key messages were that people living in higher densities are more tolerant of the background hum of traffic than they are of neighbours' voices, music or sounds from animals. Most people value private outdoor space, but rarely use communal facilities, preferring to restrict their interactions to the public realm. However people also see the quality of landscaping in shared outdoor areas as being important, and value a high level of 'greenery' in the surrounding locality.

- **Michael Chapman**, Delfin Lend Lease and CSD board member participated as roaming advisor

4 GENERAL DISCUSSION OF OUTCOMES

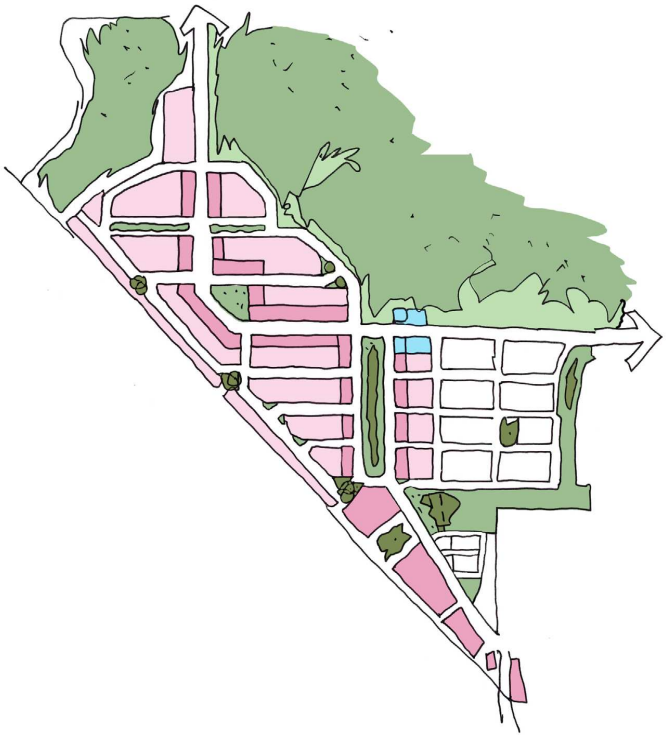
The following section gives an overview of the design solutions achieved during the charrette phase. The Research Report will include a comprehensive analysis of the solutions put forward, and identify critical issues for achieving sustainable outcomes appropriate for subtropical urban communities.

Masterplan

The foci of the research project are the dwelling/building types for transit oriented developments, not the Fitzgibbon UDA master plan. The case study master plan is the vehicle for developing ideas that have broader application, and that can promoted as good/best practice elsewhere in SEQ. Theoretically, the building designs developed could be utilised in the current master plan. However, during the charrette, the current masterplan for Fitzgibbon UDA was revisited in a 'what if?' approach, in order to allow the teams to understand the site and develop rationales to identify dwelling/building typologies in particular contextual locations. The following propositions were considered:

- Significant linear green corridors can be incorporated to enhance the sense of place and if so density targets could be reached on the smaller development area
- Additional density is possible, where, why and how
- Additional commerce may be located closer to the station

- Additional streets can create new primary routes through the project to enhance walkability
- Reconsider development within 100m band of corridor to avoid exposure to particulates and noise.



Source: P Richards Charrette Facilitator

Fig. 2 Conceptual Masterplan

The sketch masterplan above, prepared as part of the initial familiarisation stage is a composite of ideas that could add value to the current masterplan:

- Green 'fingers' extend into site
- Street grid emphasises east west street alignment with extended views to green areas
- Roughan Street realigned marginally with a shorter angled street. Park located on corner. Higher density development along street and facing onto park.
- Low rise buffer buildings to rail and bus corridor
- Castlegrove Street moves one block west to create a broad north south green boulevard with higher density dwellings overlooking. The existing proposed alignment can narrow and accommodate lower scale dwellings on both sides of the street.

Typologies

Design solutions for building types prepared during the charrette range from 2 storeys to 8 storeys and include strategies to balance thermal comfort and acoustic amenity with energy usage.

Designs use climatic design principles to optimise natural ventilation and air flow through and around the buildings, daylighting in dwellings, water consumption and green house gas reduction, at the same time as ensuring greatest liveability of dwellings.

The following is an overview of the charrette outputs. Critique and analysis does not form part of this overview.

BVN Architecture

A series of residential types suitable for an urban block based on a east-west grid were proposed. The 'block' dimensions are 200m (E/W) by 60m (N/S), divided longitudinally by a north-south running pedestrian zone. The range of housing types include split level apartments (4-5 storeys), gallery access apartments (4-5 storeys), walk-up apartments (2-3 storeys), attached houses and town houses (2-3 storeys).

The higher buildings are located on the southern edge of the block, with the lower heights to the north. This relationship allows northern light to penetrate into the common open space, and lower level apartments throughout the year.

Fig. 3 BVN: Typical Urban Block Site Plan

BVN Architects also developed concepts for the site closest to the rail and bus station. The perimeters of the block are lined with 3 storey single loaded apartments, and series of higher towers (8-9 storeys gallery access towers are placed transverse across the site.

Fig. 4 BVN: Typical Section, perimeter blocks and tower blocks

Gall and Medek Architects

A series of types conceptualised as buffer buildings for the wider neighbourhood were proposed to back on to the rail/bus corridor: the townhouse/studio/workshop model with carport; the flats over parking garage model; and the 'six pack' with business on street. Two models for a detached house, the 'lofty loft' on micro small lots were proposed.

Fig. 5 Gall and Medek: Buffer Townhouses Street View

A 5-6 storey Airy Apartment block was also proposed by Gall and Medek for the higher density sites.

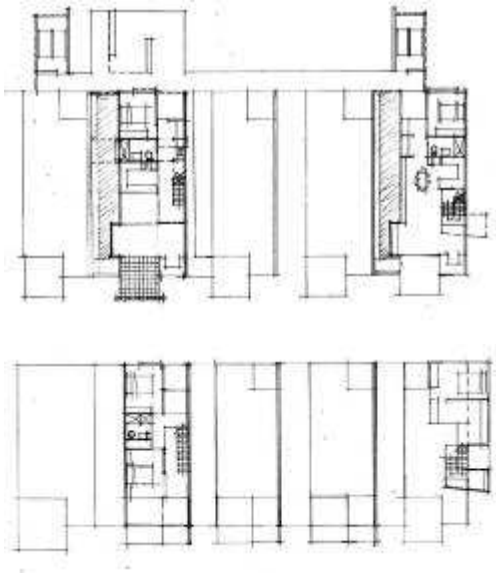


Fig. 6 Gall and Medek: Typical Plans, two storey apartments on levels 5 and 6.

Richard Kirk Architects

RKA focussed on an 8 storey typology on the remnant site close to the rail/bus station to take into account the compromised orientation typical of such sites.

Fig. 7 Richard Kirk Architects: Typical Plan, 8 Storey Gallery Access Apartment Building

QUT School of Design Team

Boulevard type transitioning to lower density within an urban block 200m by 60m.
5 storey apartment block facing onto Main Boulevard transitioning to less intense development behind nearer to green areas. Boulevard building faces west or east.

Fig. 8. QUT School of Design Team, Street Elevation, Walk up Apartments

5. NEXT STEPS

5.1 *Detailed Analysis and Modelling*

Four designs for apartment buildings were selected for detailed modelling and analysis in terms of environmental performance and cost of construction. Results of the analyses and subsequent design adjustments were synthesised and incorporated into recommendations and subtropical design principles in the final Research Report. The following information is provided to indicate the breadth of scope provided by the four design propositions:

BVN Architects

Typology: Double Loaded Corridor Access/skip stop alternative position

Scope: One level of basement parking for 43 cars with seven levels of residential units above for a total of 43 units, providing an overall Fully Enclosed Covered Area (FECA) of 4, 513m².

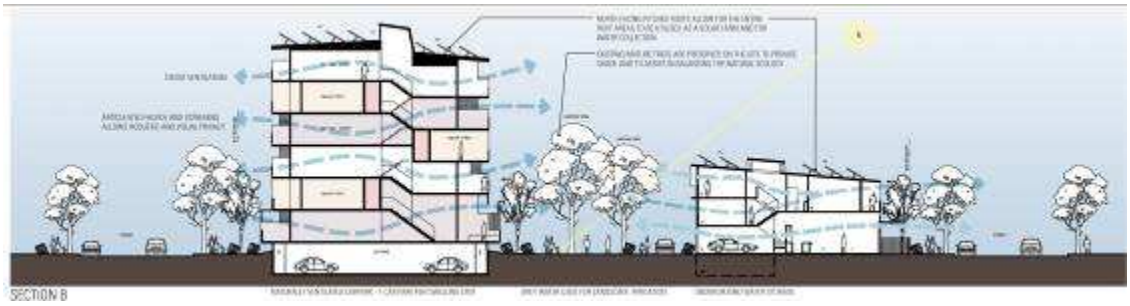


Fig. 9 BVN Apartments and Rowhouses: Typical Section

Gall and Medek Architects

Typology: Single Loaded Gallery access / stacked apartments

Scope: Undercroft parking and retail at ground level, with five levels of residential apartments above for a total of twenty units, including five double storey units, providing an overall FECA of 2,133m².

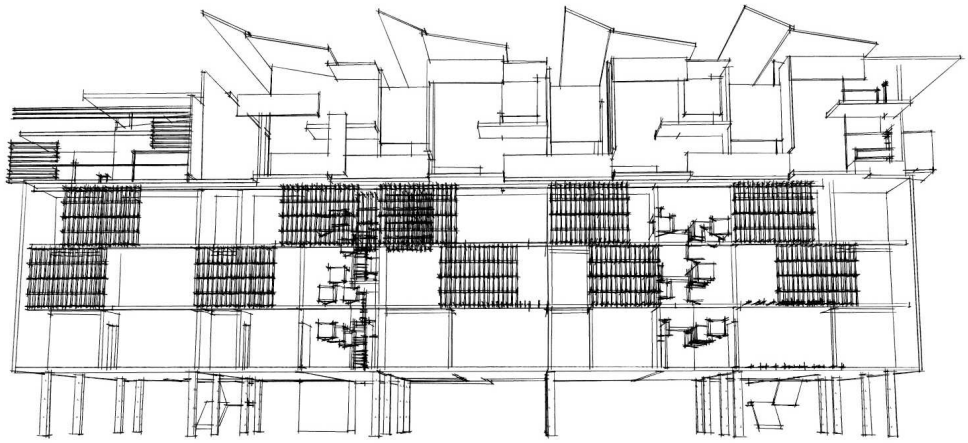


Fig. 10. Gall and Medek, Airy Units Typical Elevation (Street View)

Richard Kirk Architects

Typology: Single Loaded Gallery Access / level entry apartments

Scope: One level basement parking for sixty-four cars (stacked) with eight levels of residential units above for a total of 64 units, providing an overall FECA of 7,344m².

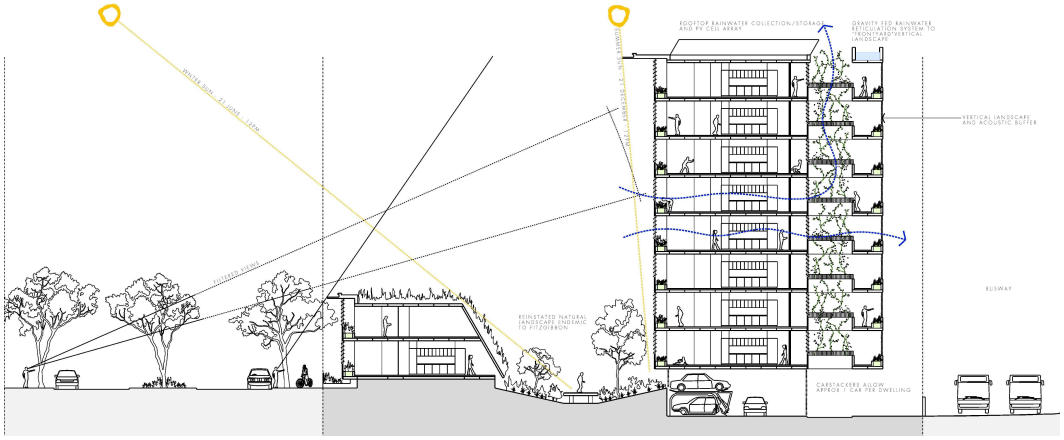


Fig 11 Richard Kirk Architects Typical Section Urban Block

QUT School of Design

Typology: Perimeter /Courtyard Walk-up terraces

Scope: the overall project comprises basement carparking, Type A and Type B residential apartments, for a total of 42 apartments, with an overall FECA of 8,538m².

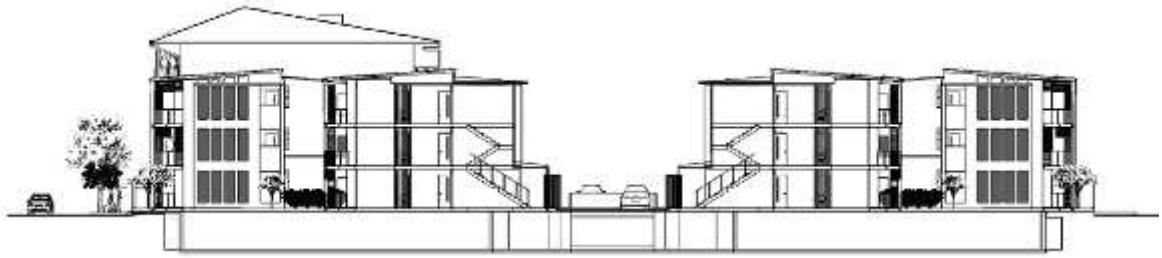


Fig. 12 QUT School of Design Typical Section, Type B buildings.

5.2 *Modelling – ESD Analysis*

Ecolateral Sustainability Consultants were engaged to model and undertake an integrated analysis of four typical buildings and typical dwellings (one example from each team) to measure environmental performance, and if necessary, make recommendations to improve performance of dwellings. For each typology, the following analyses have been undertaken:

- Degree of thermal comfort - Comment on material choice and passive solar design elements identifying benefits for optimum occupant comfort;

- Natural ventilation - Review of natural ventilation opportunities for dwellings considering orientation and building form and comment on rate of air flow. Where possible, describe expected indoor air quality considering proximity to pollution sources;
- Availability of daylighting - Review daylighting attributes of dwellings and comment on how they encourage energy efficiency and indoor environment quality;
- Acoustic amenity - Review noise abatement strategies taking into account materials, vibrations, and absorption and considering proximity of noise sources and appropriate acoustic environments for dwellings;
- Renewable energy, if applicable - Comment on practicality of a scheme's proposed renewable energy options and make practical recommendations;
- Average energy consumption per square metre of living space annually for the typical unit taking into account the above factors
- Predict energy rating and suggest strategies to improve through design if appropriate, and/or to assist occupants to achieve improved energy efficiency;
- Average water consumption - Comment on success of water conservation strategies, and recommend applicable and appropriate modifications.
- Other factors which affect overall environmental performance.

5.3 *Modelling – Cost of Construction*

Mitchell Brandtman Quantity Surveyors and Construction Cost Managers have carried out 'Concept Estimates' for the construction costs associated with one building design prepared by each team, using the cost/m2 Fully Enclosed Covered Area as the comparative basis. Elemental areas for the various project components were calculated from the drawings. Appropriate costs per square metre were applied to the relevant quantities, based upon Mitchell Brandtman's cost records for comparable developments.

Comprehensive reports have been prepared on each, including assumptions and clarifications. The estimates are based on a tendered lump sum type building contract (as distinct from a fast track procurement system). The estimates do not include the land component and development costs such as professional fees, and authority fees, charges and contributions.

Benchmarking information was supplied for each project. Generally, each of the selected projects performed within the range of costs for comparable developments. One was below the average, and two were higher than the average within the range. One was higher than the average – this, and each of the prototypes, will be subject to closer examination to ascertain whether the estimate was affected by innovations in the design and lack of comparable existing buildings.

The construction cost modelling results will be synthesised and integrated into the overall Research Report.

6 THE WAY FORWARD

This report summarises the activities undertaken to date in this project to determine the application of subtropical design thinking in the design of buildings suitable for transit oriented developments. The charrette outcomes should be seen as an exploration of innovative thinking, providing an opportunity to examine the concepts of subtropical design through research

conceptualization, design and presentation. The typologies provided in the outcomes should be seen as exemplars only and not as models for building construction. The Research Report will include easy-to-interpret information, which will be translated into messages and findings in our overall analysis of this entire investigation.

Charrette participants were surveyed following the completion of this phase. Feedback will be used to improve the process and delivery of future Centre for Subtropical Design charrettes. A summary of participant feedback is provided at Appendix D.

Stakeholder participants will be consulted on completion of the project.

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Rosemary Kennedy

Director

APPENDIX A

LIST OF PARTICIPANTS

Centre for Subtropical Design
Rosemary Kennedy, Director
Elizabeth Emanuel, Community Engagement
Kalara McGregor, Senior Research Officer

Facilitator
Peter Richards, Director Deicke Richards

Expert Advisers
Mark Thomson, Director, Ecolateral
Jay Carter, Director & Principal Acoustical Consultant CRG Traffic & Acoustics
Gail Brown, Personal Banking Service Manager, mecu
Laurie Buys, Professor, QUT
Lidia Morawska, Professor, QUT

Queensland Department of Infrastructure and Planning
Jemina Dunn, Director Transit Oriented Development Coordination Unit Specialist and Infrastructure Planning Division
Mark Saunders, Project Manager
Nina Maliszewski, Senior Urban and Regional Planner

Urban Land Development Authority
James Coutts, Director, Planning
Kylie Williams, Project Manager
Steve Connor, Development Manager – Fitzgibbon
Ian Purssey, Development Manager
Nicky Crane, Assistant Development Manager

Design Teams

BVN
Shane Thompson (Team Leader), Principal, BVN Architecture
Morgan Corkill, Senior Architect, BVN Architecture
Duncan Betts Architectural Graduate, BVN Architecture
John Ilett, Principal, EDAW/AECOM
Andrew Neighbour, Associate, EDAW/AECOM
Jeff Humphreys, Director, Humphreys Reynolds Perkins Town Planners
Andrew Bock, Director, Andrew Bock Architects

Gall & Medek
Jim Gall, (Team Leader) Director Gall & Medek Architects Pty Ltd
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Paul Sanders, (Team Leader) Senior Lecturer, QUT School of Design
Gini Lee, Professor, Landscape Architecture, QUT
Leigh Shutter, Senior Lecturer, QUT School of Design
Mark Taylor, Senior Lecturer, QUT School of Design
Rebecca Murphy (Architecture Student)
Susi Blackwell (Architecture Student)
Darren Giddy (Architecture Student - documentation)
Eric Sturlese (Architecture Student - documentation)

Cost Planning Consultant
Stuart Wearn, Associate, Mitchell Brandtman Quantity Surveyors and Construction Cost Managers
Caitlin Hintz
Kelly Foo

ESD Consultant
Mark Thomson, Ecolateral, Sustainability Consultants
Laura Raby
John Moynihan
Steve Watson
ASK Acoustics Consulting Engineers

APPENDIX B

Design Teams Deliverables

1) Concept Design Package
    - Prototypes presented in a consistent style and format, suitable for exhibition, and for print and online publication.
    - Workshop drawings, plans, sections and elevations to be drawn at appropriate scales with orientation, relevant configuration on the site and relationship to external spaces' clearly articulated.
    - Narrative information describing the designs' features and performance in terms of low-energy, low-water subtropical living, and affordability.

2) Digital Material
    - Drawings and narrative information for use in publications and website
    - Site plan (1:500)
    - Site sections
    - Typical dwelling plans (1:200)
    - Typical building sections
    - Diagrammatic representations of predicted air flows, access to daylight, sun protection
    - 3D views of public spaces including streets showing vegetation and shading.

3) Narrative Information
    - Urban context (relationship to surrounding street pattern, neighbourhood and infrastructure services – amenity and connectivity)
    - Outdoor living arrangements and landscape strategy
    - Energy use and water management strategies of overall scheme
    - Net residential density
    - Plot ratio
    - Gross Floor Area (Individual units and overall building)
    - Construction costs, operating costs for a typical dwelling.

Project Deliverables

- Exhibition material 18 x A1 Presentation Panels in 'landscape format' describing concepts.
- Video recording of creative leaders' presenting the concepts downloadable from website
- Project Report
- Research Report
- Summary handbook for wide target audience
- Conference paper
- Journal articles

APPENDIX C
Charrette Participants' feedback

FEEDBACK QUESTIONNAIRE

1) Planning Phase:	Comments
Did you feel that the background information and the aims of the charrette were clearly articulated? Were you given an opportunity to discuss your concerns and expectations?	All groups felt that the background information was adequate and appropriate. All groups said they had a good opportunity to discuss the process prior to commencement. One group said that the scope of the study could be limited to maximise the use of time and enhance the quality of the outcomes
2) Workshop Phase:	
Do you think the charrette was well facilitated? Did you think the expert advisors provided useful and interesting information? Did you think the *Review and Feedback* sessions were valuable? During the charrette, did your team have enough opportunity to come to grips with the main tasks?	All groups rated the facilitator highly. One group expressed an opinion that the expert advice was varied and some speakers were not as relevant as others. One group said that some of the information was "common knowledge" to most architects, and the content could have been pitched at a slightly higher level. One group suggested that the expert advice should be provided prior to the charrette. One group suggested that the briefing sessions be contained to one hour per day.
3) Design Development Phase:	
Did your group have sufficient time to complete the required tasks? Would you have liked further support or information during this phase?	Most groups said that the time was very limited and time for working together was the most valuable.
4) Outcomes and Presentation:	
Did your group have any difficulty producing the material outcomes in the required format? Did you have any problems with the presentation process on 16 July?	No groups expressed difficulty with producing the work required on time. One group said that they could not get the work done by the required date. Only two of the four groups got their work in on time.
5) Suggestions for CSD	
Would you be interested in participating in another CSD charrette? Do you have any suggestions as to how we might improve the charrette process in the future? *(You may wish to attach a further page)*	All groups said they would like to participate in future charrettes. One group said they found the experience to be "highly useful for testing ideas and discussing strategies with best practice firms and with the benefit of CSD's input". The group stressed the value of communicating these ideas with the general public, developers and planners at the earliest stages of projects.

APPENDIX D

Expert Adviser's biographies

Prof Lidia Morawska

Lidia Morawska is a Professor at the School of Physical and Chemical Sciences, Queensland University of Technology (QUT) in Brisbane, Australia, and the Director of the International Laboratory for Air Quality and Health (ILAQH) at QUT, which is a Collaborating Centre of the World Health Organization on Research and Training in the field of Global Burden of Disease due to Air Pollution. She conducts fundamental and applied research in the interdisciplinary field of air quality and its impact on human health and the environment, with a specific focus on science of airborne particulate matter. Professor Morawska is a physicist and received her doctorate at the Jagiellonian University, Krakow, Poland for research on radon and its progeny. Prior to joining QUT she spent several years in Canada conducting research first at McMaster University in Hamilton as a Fellow of the International Atomic Energy Agency, and later at the University of Toronto. Dr Morawska is an author of over two hundred fifty journal papers, book chapters and conference papers. She has also been involved at the executive level with a number of relevant national and international professional bodies and has been acting as an advisor to the World Health Organization. She is a past President of the International Society of Indoor Air Quality and Climate.

Prof Laurie Buys

Laurie Buys holds a PhD in Human Rehabilitation and a Graduate Diploma in Gerontology from the University of Northern Colorado. She is an Associate Professor in the School of Design, Faculty of Built Environment and Engineering at Queensland University of Technology. She is also the Coordinator for the Human Dimensions of Change Program within QUT's Institute for Sustainable Resources. Laurie is an experienced social science researcher and research manager. She is the chief investigator on several significant research projects and has successfully collaborated with scientists from various disciplinary backgrounds on complex research initiatives