

# Pattern, Contingency and Lifestyle

*The Houses of Troppo Architects*



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## Dedication

This work is dedicated to:

### **Those who are passionate about a simple way of life**

It is hoped that this thesis will contribute to our appreciation of how architecturally designed spaces can bring delight into everyday experience.

And

### **Environmental concerns**

In search of sustainability, it is also hoped that this study will heighten the concerns that we ought to have for the design of our fragile living and built environments.

And

### **My family**

My father who sadly passed away before the submission of this thesis once taught me the perseverance and determination to achieve dreams in life, despite unexpected difficulties and challenges the life throws at me. My mother, who never doubts my ability, always displays her faith in the intention of my studies although she has no clue what they are for and how they can be useful for building a better world tomorrow. My two boys, who have spent most of their weekends in my office showed their support and belief in my hunch about the fruitful outcomes of this study and how they might influence the ways that people understand the use of everyday space and live life to its fullest!

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## Abstract

*Tropo Architects*, a multi-award-winning practice originally established in Darwin in the tropical Top End of Australia in 1980, has long been regarded as a leader among a small vanguard of Australian architects focused on climatically responsive design. Over a period of three decades, founding partners, Phil Harris and Adrian Welke, grew and incrementally expanded the practice to five regional offices – Darwin, Townsville, Adelaide, Byron Bay and Perth – across Australia. Whilst the practice has had to adapt in order to address and respond to a greatly expanded range of both climatic and socio-cultural variations in context, it has continued to attract outstanding critical acclaim including a Global Award for International Sustainable Architecture in 2010 and the Gold Medal of the Australian Institute of Architects (AIA) in 2014. How this design practice has succeeded in sustaining its own internal cohesion through such a process of major organisational growth and change while it has also sustained its capacity to respond effectively to context and clients' needs in a distinctive and exemplary manner, is the multifaceted question explored in this thesis.

The study focuses exclusively on Tropo's single family houses. It investigates how residential designs from the regional offices in the decade up to 2014 relate to the ideas and values that Harris and Welke espoused in their first decade of practice in Darwin. Through a theoretical framework that engages this work with concepts of pattern language, contingency, and responsive cohesion between designs and their physical and psychological contexts, the study offers insight into relationships between Tropo's design ideas, their values, and their attitudes to space, place, culture, and the quality of delight in environments for everyday living. Fieldwork-based and centred on a cluster of comprehensive case studies, the methodology also includes extensive interviews with both the architects and the residents of the houses in question, formal analysis of original design documentation as well as the built and

occupied houses, observation of design processes within the different regional Troppo offices, and the most thorough examination yet undertaken of the archives of the Troppo practice.

PART 1 presents an initial historical overview of the Troppo practice, the aims and objectives of the research, and a review of the relevant literatures underpinning the theoretical framework and methodologies to be applied. PART 2 first discerns and describes a pattern language that is observed to have emerged from a corpus of Darwin houses designed and built in the first decade of the Troppo practice, through the 1980s. Identifying visually distinctive patterns in plan or form for particular spatial functions as well as psychological spaces associated with particular sensory experiences, the thesis reconstructs the original contexts and design reasoning in and through which these patterns were first explored. Representative houses designed and built by each of Troppo's regional offices in the past decade (up to 2014) are then examined in a series of five comprehensive case-studies. These map the relationships between these later houses and Troppo's early residential commissions in Darwin. PART 3 then discusses the similarities and differences between the respective formal languages of these regionally dispersed cases and the early houses with respect to the broader theoretical foci and the framework of the study (pattern, contingency, responsive cohesion). The thesis concludes with a brief overview of the key findings of the study and their implications for contemporary architectural practice and education, and for further research in those sub-fields.

The thesis shows how the design of Troppo's houses reflects a process of cohesion between architects and owners around shared values and aspirations for delight in the spaces within houses and for experiencing close links with nature. It also reveals the critical importance of mentoring in the relationships between Harris and Welke, the regional directors and their clients. It also shows how the practice has negotiated conflict between its values and the realities of commercial practice in diverse regional offices with changing client expectations, code requirements and building costs.

## Acknowledgements

I have had a great passion for computational visualizations and generative design since I was an architecture student. The 'unseen' and 'unheard' creative design ideas formed in design processes had always been the most curious human activity in my academic training, teaching and working in the architectural field for almost two decades. Productivity, speed and visual representations of design were matters in the early years. The more time I spent working on quantity and visual aspects of architecture, the farther I found myself away from grasping the truth to my curiosity as to what was the 'something' that made architecture meaningful, aesthetically striking and functionally satisfactory for the user of spaces. Furthermore, what it is in the space of a building that influences the way the user lives and works with delight on a daily basis. This 'something' has been elevated to become the impetus of this study and set a course to seek, unravel and examine those 'unknowns' in the design process of architects.

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## Statement of Originality and Agreement

This thesis contains no material which has been accepted for an award or any other degree or diploma in any university. It is the best of the candidate's knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

One journal article was completed and published during the candidature of the PhD with my supervisor Emeritus Professor Antony Radford as the second author in 2013. The quotations and illustrations by other authors and media have not been included in the body of this thesis unless stated in the text otherwise.

I consent to the thesis being made available for photocopying and loan if accepted for the award of the degree. The interviews with the associated stakeholders have been conducted with consent that recordings, transcripts and quotations would only be used in the thesis and academic publications in the future. Any quotations and/or use of graphic images, photographs, sketches and working drawings of selected case studies will need explicit permission from them.

Jessica Huang

Date:

## Statement of Authorship

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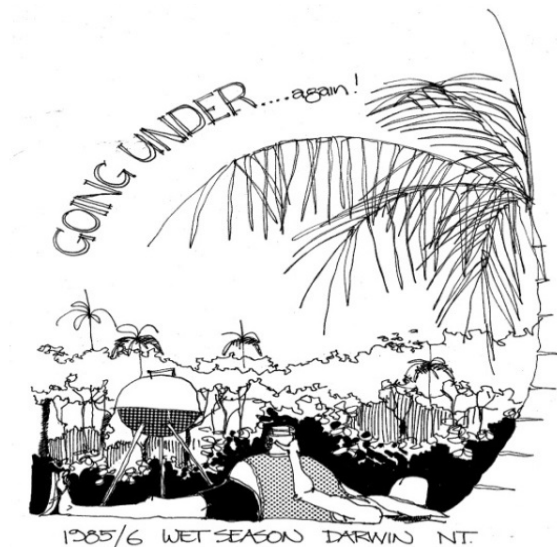
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## Chapter 1

### Introduction



**Figure 1.** This is the sketch drawn by Phil Harris, the Co-founder of Troppo Architects. It expresses the informality of Australian everyday living at the Top End in the tropics. Date unknown.

patterns of daily activities that they unconsciously perform within such spaces, and that these changes can be potent. By altering the relationships between people, place, and nature that constitute lived environments and mould the occupants' behaviour, their attitudes to the socially constructed world may be re-shaped as well. This research has sought, therefore, to address these seemingly intangible experience-effects of architectural design, and how the spaces it creates can give new meaning to everyday routines and lifestyles. To do so it examines a body of work and the design thinking and processes of an award-winning Australian architectural practice noted for the design of distinctive houses and dwelling experiences that are responsive to both their immediate natural surroundings and less tangible qualities of regional culture.

This practice is the collective known as Troppo Architects (hereinafter referred to as Troppo). This thesis – *Pattern, Contingency and Lifestyle: The Houses of Troppo Architects* – concentrates in particular on how the ethos of the Troppo practice – its values, principles and methods – is materialised in the making



of pattern forms, and how their understanding about climates and regional culture has contributed to the distinctive quality of their evolving designs over the past three and half decades, through contingencies and the changing circumstances of an expanding practice that now operates across Australia and overseas. This research has aimed, therefore, to reveal factors underpinning Troppo Architects' sustained and widely-recognized success. Their body of residential work is closely and critically examined as a case-study of how the quality of lived spaces is manifested through everyday experience the occupants gained within the Troppo houses, and connections they built with landscapes and the world. Through this inquiry into the architectural substance of the delightful lifestyles that Troppo strives to create and offer to their clients, the meaning and 'worthiness' of what architects do 'for others through their works'<sup>1</sup> may thus be better understood.

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<sup>1</sup> Richard Saul Wurman, *What will be has always been: The words of Louis I. Kahn* (New York: Access Press and Rizzoli, 1986), 121.

## 1.1 Background

The subject of this research is the private houses of Troppo Architects, a residential-focused practice initially based in the tropical climate of Darwin, Australia. Troppo has been situated at the forefront of innovative architecture in Australia for the last thirty-four years. It is the recipient of numerous awards, including the highest and the most prestigious architectural award in Australia – the Gold Medal of the Australian Institute of Architects – in 2014. Their status as one of Australia's leading architecture firms in residential practice has led to numerous requests for architectural services from government housing authorities, public and private organizations and private business owners, as well as individuals. Troppo has also designed a wide range of commercial projects in Australia and overseas such as cultural centres, schools, multi-storey medium density housing developments, cultural heritage restoration projects, restaurants, holiday resorts and hotels, a mixed use multi-storey project and Aboriginal community-based projects. Now, as of 2015, Troppo has five regional offices scattered around Australia in Darwin, Townsville, Adelaide, Byron Bay (now Byron Bay/Sydney) and Perth, in chronological order of establishment.

Troppo Architects has been the subject of many publications in newspapers, architectural construction magazines, national and international periodicals, academic journals and books. The early award-winning buildings built in Darwin have become icons of tropical design in Australia. Most previous research on Troppo has focused either on their iconic buildings or the contribution of the practice to the design of a sustainable built environment. In contrast this study focuses on Troppo's values for a responsible practice, and the experience-effects of the distinctive form and volume they bring to the design of domestic space on the everyday living of occupants. It investigates experience-effects from an occupant's perspective, looking closely at how his or her experience of lived everyday space is influenced by Troppo's particular design ethos and value-based approach to the making of architectural form. It also investigates the consistency of Troppo's design principles and methods, as well as the cohesiveness of the designs they have produced over more than three decades of practice, focusing on two themes in particular: how Troppo responded to the diversity of Australian regional sub-cultures, and to immediate environmental concerns (see Figure 1.1).



**Figure 1.1** This is the invitation for the relocation-opening of Troppo Architects' office in Darwin (drawing date unknown). The composition of images and texts displays their playful attitude with a hint of informality (two crosses) as well as architectural rigor through the sketch, the proportion, layout and scale of the image and texts. Long-thin form elements on each side (the images of Troppo flag, the office, and two trees behind their office) implicitly express their design principles for incorporating nature and a subtle suggestion of their passive design in long-thin-space concepts.

## 1.2 The Significance of Troppo Architects

The early residential work of Troppo in Darwin was at the centre of a controversial debate in the 1980s involving their revival of lightweight construction methods and vernacular character of their architecture. The background to the debate was Cyclone Tracy which wiped-out eighty-percent of Darwin's houses in 1974 and still remained a devastating psychological trauma for the local residents a decade later.<sup>2</sup> Troppo responded to the rebuilding of Darwin with a revival of regional vernacular architecture and with innovative compositions of geometry, form and materiality. This revival prompted two extreme voices in a public display of 'love or hate' reactions in the local newspaper.<sup>3</sup>

Vernacular architecture in the Top End is often characterised by its lightweight structure, locally available materials (corrugated iron and timber) and simple geometrical form (a linear and rectangular shape) which reflects economic situations and social development, the preferred lifestyle and needs of 'Northerners' for 'their easy-going manner, friendliness and parochialism'<sup>4</sup> at the time. After a decade of designing tropical houses with a contemporary version of this Top End vernacular architecture, the founders of Troppo, Adrian Welke and Phil Harris, earned the respect of the local public through media exposure in news columns and public addresses about their voluntary services to the Northern Territory's cultural heritage<sup>5</sup>. Their 'hybrid' vernacular architecture was well-received regionally with over six hundred residential projects of various scales (extensions, renovations and house projects are shown in Figure 1.2a) completed in their first decade (1980-1990) of practice. Welke and Harris also won two open competitions: best design for low-cost housing competition with The Green Can House (1981); and, in 1990, in collaboration with the local architect Danny Wong of Speargrass Architects, the best design for a low-energy residential house, The Troppo Type Five. As more recent scholarship has observed, Troppo was gaining a reputation as a 'young and avant-garde practice that was breaking

<sup>2</sup> The information about Cyclone Tracy is taken from Bureau of Meteorology, <http://www.bom.gov.au/cyclone/history/tracy.shtml> viewed on 28th March, 2014.

<sup>3</sup> One of the residents of the early Troppo Houses emphasized this relationship in the columns of the local newspaper in the early 80s.

<sup>4</sup> In her book, *Australian Architecture Since 1960*, Jennifer Taylor points out that climate is always a primary consideration in the design of buildings for the north. 'Northerners' as they call themselves as a distinctive group differs from the 'Southerners' because '*the north has a regional heritage in architecture of a delightful unself-conscious style admirably suited to local needs*'. Jennifer Taylor, *Australian Architecture Since 1960* (Canberra: The Law Book Company, 1968), 116.

<sup>5</sup> The co-founder of Troppo, Adrian Welke, received a National Trust award in 1992 for more than a decade of voluntary service with architectural advice on heritage structures. 'Adrian also took a leading role in saving the Myilly Point Heritage Precinct' (*Northern Territory News*, 1992 according to Troppo's own record).

cultural boundaries' with their alternative housing models attuned to the tropical north lifestyle and the 'influence of the Anglo-Asian Bungalow'.<sup>6</sup>

Fitout Darwin Plaza	593	PORTER VERANDAH
K - DAY USE	599	RED CROSS KIEVE, DARWIN HOSPITAL
	600	TROPICAL HOUSE DESIGN COMPETITION
Z	601	EMERALD SPRINGS DAM PROPOSAL - RCS
	602	CRADOCKS COST. ADMIN.
L	603	RED CROSS HOSTEL, RICE SPRINGS
KICKER (TRAVEL NORTH) DOLD).	604	ANPWS: ULLURU
S	605	DARWIN FUNERAL SERVICES
MARK	606	JOHN BOSTCHORS HOUSE REPT, WINDILLA
10 SPRING.	607	EMERALD SPRINGS - SPECIAL PROPOSAL: RCS
	608	COSTAL URBANIZATION
IS/1008	609	PAPAP PRE-SCHOOL STEWARDS
RAY ST.	610	TOM TORRES' PODIUM
	611	ALIGAR WYLLI'S OFFICE
	612	ROS + GEORGINA HOUSE
	613	JONAS REEVES FRONT COLOURS
	614	SHIRLEY WILLIAMS SURVEY
	615	JACK BULLS' HOUSE EXTENSION
	616	WELLS ST TOWNHOUSES
	617	CRADOCKS SHOWER HOUSE
JT	618	GEORGE CRADOCKS HOUSE EXTENSION
AND	619	RED CROSS BLEND PARK RECEPTION
MEMORIAL PROJECT	620	RED CROSS PENRITH HOME - ?
	621	<del>CRADOCKS HOUSE</del>
WRE	622	RESIDENTIAL HOUSING SURVEY - NATIONAL TRUST
	623	URBAN VERANDAHS ETC
WRE	624	MAPS - <del>MUNICIPALITY</del> 1990
	625	GUN TOWER - DARWIN FILM SOCIETY
GEORGE CRADOCKS P/S	626	FAM/TISLER HOUSE EXTENSION
	627	CRADOCKS: MEMORIAL SURVEY
	628	ANPWS - MUNICIPALITY EMPLOYMENT REPORT
	629	GREEN GAP, NIMPAI ROAD
RM	630	PAKHLITA ULLIARRE HOUSE DESIGN PRODUCTION
- MASTER PLANNING	631	HARLES HOUSE ADDITION
	632	MACHIN SHADE

**Figure 1.2a** This image displays the record of residential jobs that Troppo Architects were commissioned to design for private clients over a period of ten years in Darwin up to job 624 in 1990. This record was found in their office in Perth during the field work in 2010.

Two milestones of Troppo's early work were a Troppo poster and a Tour Map. The Troppo poster (Figure 1.2b) summarised the diversity of tropical housing design in the first decade of their practice.<sup>7</sup> The Tour Map (Figure 1.2c) showcased the variety in design of Troppo houses built in and around Darwin. The

<sup>6</sup> David Bridgman, *The Anglo-Asian Bungalow*, PhD thesis (Melbourne: RMIT University, 2006), 386.

<sup>7</sup> 'The poster was a product of a few beers PH and I (Welke) had one night in the (Darwin) office after viewing the Russell Hall poster. We did not want to be out done by him! This was Welke's unexpected response regarding the copyright of the poster for the journal article in the phone interview on 7 April, 2014.

Tour Map not only promoted the distinctive features of Top End lifestyles that characterised Troppo houses at the time but also served as an educational tool for academics, design professionals and the general public about using a regional architectural design to express the diversity of multi-cultural Darwin and as a means to embrace the climate and environment of the Top End by incorporating the surrounding flora and fauna into the dwelling rather than isolating the residents from their environment. The 'climatic sense' and 'high visual interest' of Troppo's design approach also attracted attention in contemporary academic research.<sup>8</sup> Some 1980s Troppo houses were used as exemplars of a Northern regional style of Australian Architecture in important publications, such as *Housing, Dwelling and Homes*<sup>9</sup> by Roderick Lawrence (1987), *Australian Architecture since 1960*<sup>10</sup> by Jennifer Taylor (1986), *Building a Nation: A History of the Australian House*<sup>11</sup> by John Archer (1987), *A Pictorial Guide to Identifying Australian Architecture: Styles and Terms from 1788*<sup>12</sup> to the present by Richard Apperly, Robert Irving and Peter Reynolds (1994), *A History of European Housing in Australia*<sup>13</sup> edited by Patrick Troy (2000) and the most recent *The Encyclopedia of Australian Architecture*<sup>14</sup> edited by Philip Goad and Julie Willis (2012). Collectively, these publications described and characterised the visual features of the early Troppo houses – in form, structural detailing, materials and architectural elements – as a recognizable expression of the Tropical architecture of the Top End. Yet, with the important exception of Goad's work (to be discussed in greater detail below), few of these broader studies had scope to consider Troppo's design philosophy, values and attitudes closely, or their impact on the quality of space and the occupants' associated feelings, behaviours and psychological states.

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<sup>8</sup> One of the residents of the early Troppo Houses emphasized this relationship in the columns of the local newspaper in the early 80s.

<sup>9</sup> Roderick Lawrence, *Housing, Dwelling and Homes: Design Theory, Research and Practice* (Chichester: John Wiley & Sons Inc, 1987).

<sup>10</sup> Jennifer Taylor, *Australian Architecture Since 1960* (Canberra: The Law Book Company, 1968).

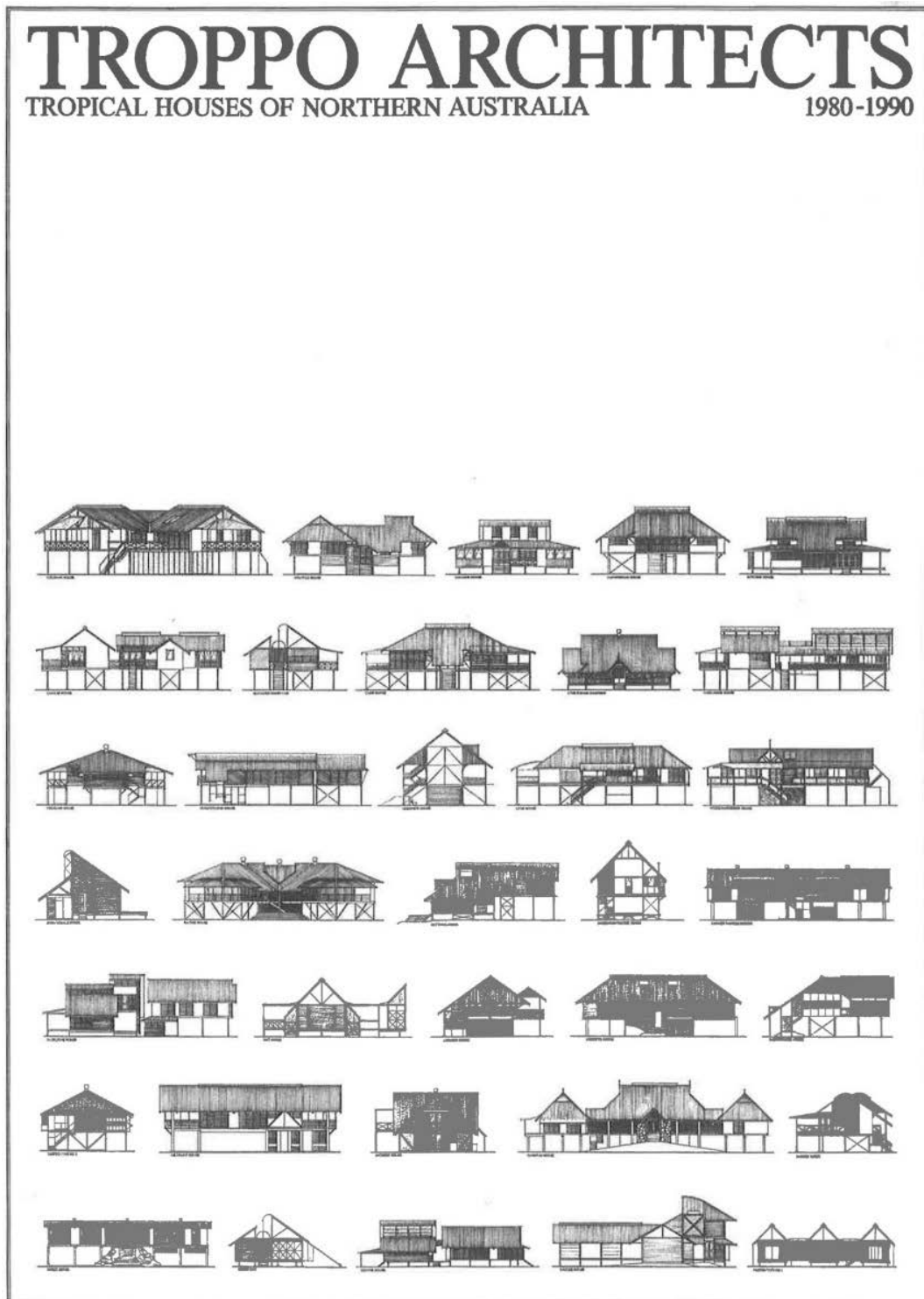
<sup>11</sup> John Archer, *Building a Nation: A History of the Australian House* (Sydney: Collins, 1987).

<sup>12</sup> Richard Apperly, Robert Irving and Peter Reynolds, *A Pictorial Guide to Identifying Australian Architecture: Styles and Terms from 1788* (Pymble, N.S.W.: Angus & Robertson, 1994).

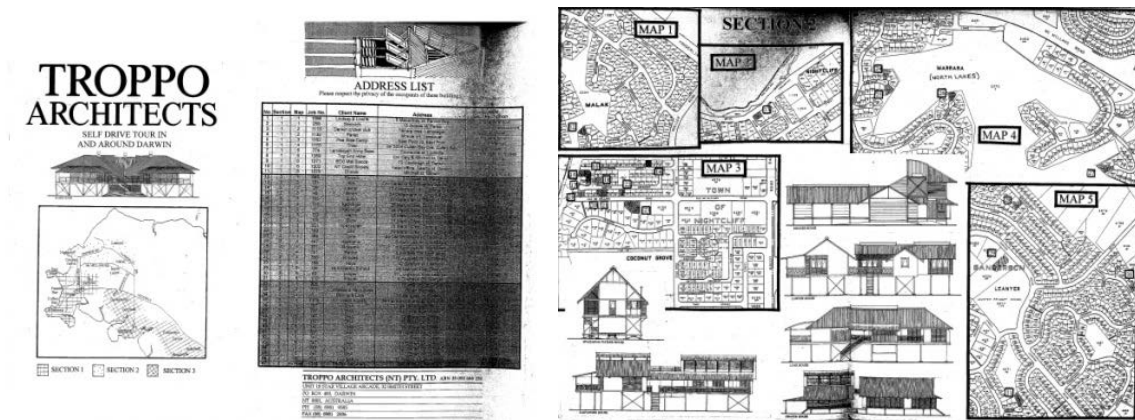
<sup>13</sup> Patrick Troy, *A History of European Housing in Australia*, eds (Cambridge: Cambridge University Press, 2000).

<sup>14</sup> Philip Goad and Julie Willis, *The Encyclopedia of Australian Architecture*, eds (Cambridge: Cambridge University Press, 2012).





**Figure 1.2b** This Troppo poster marked the significance of the first decade of the Troppo practice, mimicking the design of a well-known poster of the 1980s celebrating the work of Andrea Palladio's poster. (ca. 1990. The exact date the poster was produced has not been recorded)



**Figure 1.2c** The Tour Map produced by Troppo illustrates a cluster of representative Troppo houses built in and around Darwin between 1980 and 2000.

Troppo's practice widened when several medium-density housing projects were commissioned by the Federal Government's Defence Housing Authority (DHA) in the early 1990s at Palmerston, Northern Territory, The Larrakeyah Army Barracks in Townsville, North Queensland, and the naval base HMAS Coonawarra in Darwin, Northern Territory. Through other commissioned projects, Troppo also had an opportunity to work with Indigenous Australian communities. Observing Aboriginal lifestyles and communicating with them deepened Troppo's understanding of lived everyday space in the Australian outback. Troppo has always had a deep sense for both the designers' imperative to provide 'shelter' and to respect the spirit of the building site and its natural surroundings.<sup>15</sup> In 1990 the Troppo Type Five House (also known as the Tropical House) won the Tropical House Design Competition for a public 3-bedroom-house specifically built for an affordable lifestyle in the Top End. Significantly, the Troppo Type Five house received formal recognition for its innovative design incorporating an authentically tropical lifestyle centred on 'living on a verandah'.<sup>16</sup>

By the start of the twenty-first century, due to the on-going success of their practice, the expression of "Going Troppo" was no longer just Australian slang for going crazy in the tropical heat and humidity. In architectural practice, "Going Troppo" stood for 'flexible designs for Top End lifestyles'<sup>17</sup> and became

<sup>15</sup> Philip Goad, *Troppo: Architecture for the Top End* (Balmain: Pesaro, 2005), 41.

<sup>16</sup> This similar design of including a verandah as internal living and sleeping space can be seen in the Inside-outside House built in Milikapiti in 1990.

<sup>17</sup> *Northern Territory Construction*, February/March (1993), 14-15. Author is unknown.



associated with 'low costs more style',<sup>18</sup> 'good living possible using less energy',<sup>19</sup> 'responsive housing',<sup>20</sup> and 'defending a house up on stilts'.<sup>21</sup> Combined, such catch-phrases were defining the emerging ethos of the Troppo practice (figure 1.2d).

The second decade of Troppo's practice (1990-2000) was characterised by a wider variety of materials, colours and patterns in their designs for residential buildings commissioned by the government and private clients, as well as a growing number of commercial projects. Relative to the tropical housing designs of the first decade, this shift was distinctive, particularly in the design of elevations, detailing, layouts and volumes. During this period, drawings, photographs and publications about Troppo's work also became more widely and regularly available to academics, professionals, builders and the general public because of the recognition of their work by a number of national and international awards. According, their work was the subject of many local newspaper columns, citations and references, as well as articles in national and international periodicals (Figure 1.2d). This media coverage indicated a growing appreciation of the scope and distinctive qualities of a 'contemporary regional architecture of considerable strength and beauty'.<sup>22</sup>

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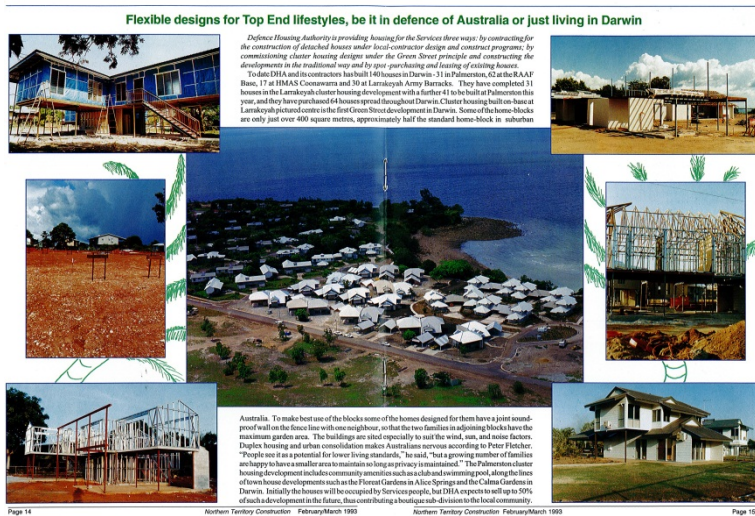
<sup>18</sup> A local *Northern Territory Newspaper* article was found in the Perth office and the published date was unknown.

<sup>19</sup> It is the special feature supported by National Energy Conservation Program on *The Northern Territory News*, May 1983. Author is unknown.

<sup>20</sup> Phil Harris and Adrian Welke, *The Star*, April (1981), 19.

<sup>21</sup> *Ibid*, 20.

<sup>22</sup> This is one of the jury comments made by John Morphett for Troppo's Special Jury Award (RAIA) for the contribution of their entire body of work to date in the Northern Territory, from an article appearing in *Building Today* (1992), 27.



Medium density of Tropical housing development at Palmerston (middle image), Larrakeyah Army Barracks, RAAF Base, and HMAS Coonawarra in Darwin



An article about Troppo's first collaborative design project - Bowali Cultural/Visitor Center

Figure 1.2d The article (Left) published in the local construction magazine, *Northern Territory Construction*, is about Troppo's first government commissioned project for a medium density housing project. Published in February/March 1993. The other article (Right) published in the *Darwin Construction Journal* covers Troppo's first collaborative project with the renowned Australian architect, Glenn Murcutt, Bowali Cultural/Visitor Centre at Kakadu National Park, Northern Territory. Published in February 1995.

During this time a large heterogenous assortment of archive material reflecting the Troppo design attitudes and approaches was collected. This material was not made available to the public and was later stored primarily in Welke's Perth office and partially in Harris's Adelaide office. This archive material includes a substantial number of early sketches on various subjects: local buildings in the Northern regions of Australia; landscapes; and random details of miscellaneous 'stuff', such as broken chairs, bicycles, pots of plants; and people in informal places (airplanes, in corners of random sitting places); party invitations; flyers and posters for a public speaking series; photographs and computer models of their built work. Among these documents are written materials advocating the importance of preserving regionally iconic and cultural heritage, which were published in newspapers and local media in the 1980s and 1990s. There is also a portfolio containing Troppo's residential and commercial projects in the 1980s, 1990s and 2000s in metropolitan regions, suburban contexts and remote areas of Australia. National and international competition entries are also found in a collage of computer-simulated 3-

dimensional models, together with hand-drawn sketches and a narrative of the objectives and aims relative to the selection criteria for these competitions.

From this archive material, it is clear that there was a visual development in respect to the design, quantity and types of projects that Troppo undertook. The first decade of Troppo practice (1980 – 1990) was a time for incubating new interpretations of Top End Australian architecture and the characteristics of tropical houses.

*'There weren't many jobs around at the time when we started our practice. We kept ourselves busy by going around the community and drew some sketches and chilled out with some beers in the heat (chuckling) after work in the late afternoon. This quiet period of our practice gave us time to think about what we really do as architects and what architecture means...apart from providing shelter.'* (Interview with Welke at the Perth office in 2010)

In the second decade between 1990 and 2000 Troppo embarked on an ambitious expansion by setting up regional branches and designing houses set within very different environmental conditions to Australia's tropical north. The highlight of Troppo's practice was well captured in the design themes identified by Philip Goad in his monograph, *Troppo: architecture for the Top End*, about their twenty years of work that will be discussed in detail later. The third decade (2000 – 2010) saw Troppo's further commitment to interpersonal relationships and connections with private and public clients. They constantly customised their design strategies to suit the needs of local communities, aiming for sincere interpretation of the regional culture and adopting advanced construction methods to minimize the physical impact of their architectural designs on the immediate environment. During this third decade, versatile forms, Troppo-resemblant structures and specific use of design elements were consciously developed to highlight the practicality of distinctive features for regionally specific environments across Australia.

The versatility of Troppo's design principles and methods over these three decades can be seen in a body of residential, commercial and institutional work that includes government commissioned projects as well as privately-owned residential and commercial buildings of various scales and types. The scales range from single-family houses to medium-density private and public housing projects, and from community schools to art centres, hotels, shops and restaurants. Many of these projects have been received positively for their aesthetic appearance, functionality of space, open structures and details, passive design for achieving sustainability, and their expression of regional characteristics associated

with climate, cultural identify and surroundings. Prominent projects include Lavarack Barracks medium-density housing in Townsville (North Queensland), community housing in Arnhem Land (Northern Territory), Pee Wees restaurant in Fanny Bay (Northern Territory), the Top End Hotel in Darwin (Northern Territory), Bowali Cultural/Visitor Centre in Kakadu (Northern Territory), Tyto Wetlands Cultural Centre in Ingham (North Queensland), Marrkolidjban Outstation School in Arnhem Land (Northern Territory), a mixed-use shopfront and accommodation in Byron Bay (Northern New South Wales), Nganampa Aged Care facility in Alice Springs (Northern Territory) and Whitmore Square medium-density apartments in Adelaide (South Australia) (Figure 1.2e). Most of these projects won state and national awards in the categories of Residential and Commercial Practices.<sup>23</sup> As commissioned projects they offered Troppo the opportunity to evolve their design principles and methods for diverse climatic conditions, site scenarios and surroundings. The same projects also exposed Troppo to the challenges of working with tight budgets, and the spectrum of complex issues architects have to deal with when working with a wider cohort of clients (community users, Australian Aboriginals, government servants and army officers, the general public), and associated stakeholders such as engineers, contractors, planners, service consultants and retail businesses. Most importantly, Troppo adopted 'the best of both worlds'<sup>24</sup> approach, with sophisticated and smooth negotiation skills allowing them to present an easy-going attitude towards their clients. This attribute allowed them to establish productive relationships, both personally and professionally, with the people with whom they worked. Flexibility and being able to listen to the concerns of others became a significant factor in Troppo's ability to build long-term associations with their clients, who in turn spread the word of Troppo's positive work ethics, environmental-centred designs, and the good quality of their service.

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<sup>23</sup> These awards include Sustainability Awards, Urban Design Award, Public Architecture Award, People's Choice Award, Multiple Housing Award, John Chappel Award, Robin Boyd Award, Winner of Adelaide Affordable Eco-housing Competition, Winner of Thuringowa City Council's Climate Responsive Design Competition, both State and National RAI A Sustainable Architecture Awards, and the National RAI A Award for Commercial Buildings. These awards are listed on Troppo's official website <http://www.troppo.com.au/awards2-1/>.

<sup>24</sup> The description of 'the best of both worlds' was seen in the design work document of the 1980s Darwin Troppo houses. The both worlds was referring to human (man-made) and environmental (natural) worlds. A good design of houses could be achieved by adopting both passive and active design principles.

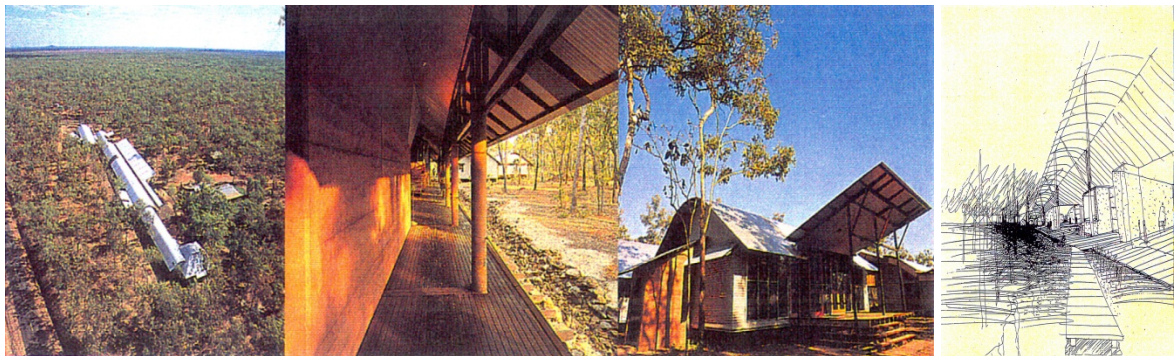




1. Lavarack Barracks Medium-density housing



2. Community housing in Northern Territory



3. Bowali Cultural/Visitor Centre, Kakadu



4. Marrkolidjban Outstation School, West Arnhem Land



5. PeeWees Restaurant



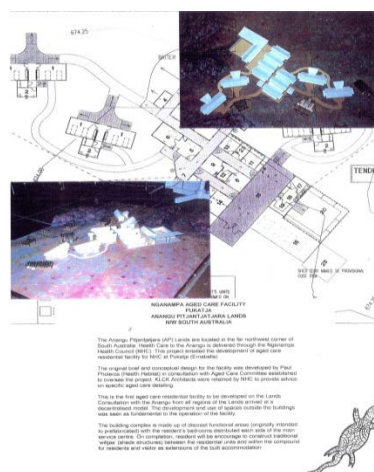
6. Tyto Wetlands Cultural Centre



7. A mixed-use Urban Shopfront



8. Top End Hotel



9. Nganampa Aged Care facility



10. Whitmore Square Apartment

**Figure 1.2e** The collective photographs display the diversity of Troppo's work in residential and commercial design at a larger scale

During the period between 1990 and 2013, two houses, the Thiel House (1996) and Rozak House (2002) (Figure 1.2f) which were built on the outskirts of Darwin, drew a lot of local, national and international attention to Troppo's tropical architecture and environmentally responsive features. These two houses were featured in foreign language magazines such as *Le Monde* in French, and *Casabella, Corrado Gavinelli* and *Ville Giardini* in Italian.



Prior to receiving national and international success, Troppo published numerous conference papers and regional newspaper articles. These early publications are significant as they emphasise Troppo's core belief in creating an ecologically responsible practice. In particular, they elaborate the need for the cultivation of an architectural design specifically for the tropical lifestyle, climate and landscape settings of the Northern Territory. They also express Troppo's enthusiasm and commitment to preserving the diverse vernacular architecture in the Northern Territory by identifying the multi-cultural influences which inspired residential building types in the region. After 1990, their second decade of practice, Troppo became preoccupied with work on the government commissioned projects, and had limited time to publish. Nevertheless, they did author a series of articles in *Architecture Australia* in 1998 and in again 2002. From 2010, there was a significant shift in Troppo's public engagement with both Harris and Welke presenting lectures, public addresses, radio interviews and public exhibitions.



**Rozak House 2002,**  
Lake Bennett,  
Northern Territory

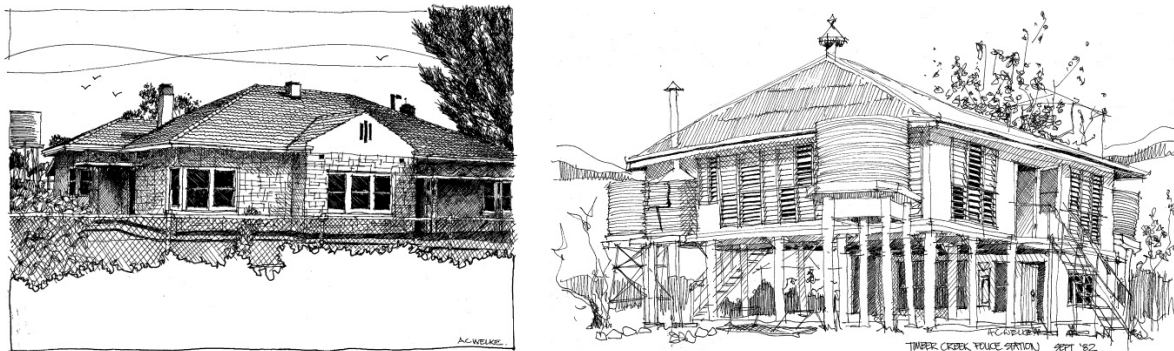
**Thiel House 1999,**  
Cullen Bay,  
Northern Territory  
Courtesy of Troppo



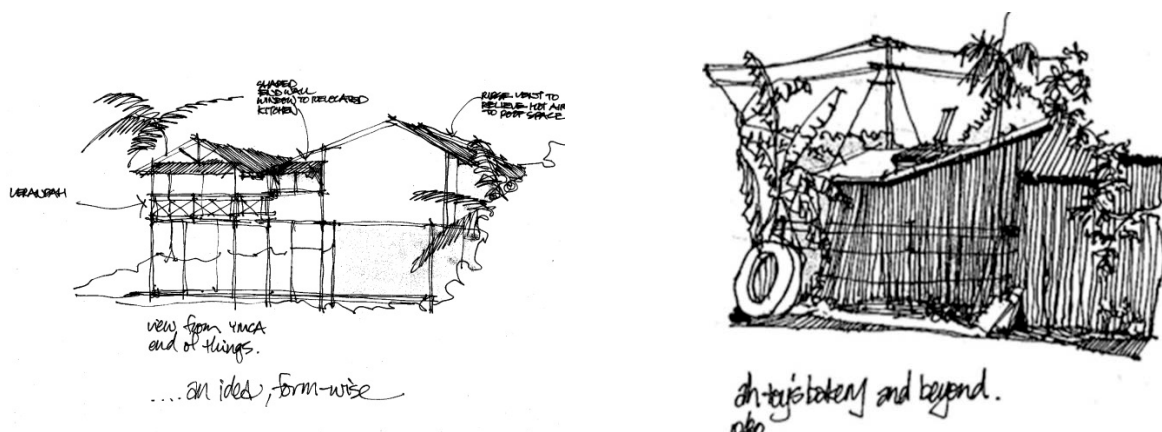
**Figure 1.2f** Rozak House (Left) wins 2 state and 2 national awards including RAI A Sustainable Architecture Award in 2002. Thiel House (Right) wins 2 state and 1 national commendation award in 1999.

Many of Troppo's writings and presentations have received little attention and analyses. The early conference papers laid the foundations for Troppo's environmentally responsible practice. Sadly these papers are not easily available to the general public, professional practitioners and design students. Troppo's concerns for architecture that embraces the Australian lifestyle, the preservation of regional culture, and sustainable and environmentally friendly architectural design have remained at the heart of their ethos.

Evidence silently resides in random sketches which capture their philosophy through the representation of the serenity of natural landscapes and their buildings, the imperfections in the composition of everyday objects, and the natural interactions between people in a space. These sketches are crucial to the comprehension of Troppo's design philosophy and values for everyday living. Troppo's Perth office, and to a lesser extent the Adelaide office, hold an extensive collection of these early sketches. The common feature of the sketches is the harmonic cohesion between dwelling, inhabitants, objects, nature and the physical world. Taken together, they show the intention to delineate the co-existence, in a harmonious relationship, between man-made objects and natural elements (Figure 1.2i & 1.2j).



**Figure 1.2i** Welke's sketches display a neat drawing style of clean and acute precision in his observation. His innate feelings are infused through his lines for a calm and contented way of life. (Date of the sketch on the left is unknown)



**Figure 1.2j** Harris's sketches display a vivid drawing style that is able to portray the informality and simplicity of imperfections in life and relations between man-made objects, natural elements and the surroundings. (Drawing dates unknown) Their passion for retaining the beauty of regional cultures and the harmony of local environments is heard in their conference papers, lecture talks and public addresses which are yet to be studied in depth.



A monograph *Tropo: Architecture for the Top End*, by Philip Goad (text) and Patrick Bingham-Hall (photographs), published in 1999 and revised in 2005, is the primary publication which offers relevant and chronological descriptions and analyses of Tropo's work. Goad details Tropo's background, practice history, and contributions to sustainable architecture up to 2005. Special attention is paid to descriptions of Tropo's concepts for their award-winning projects and the summary of 'a series of ideas' developed over twenty years of Tropo practice as design themes<sup>25</sup> that can be seen as general guidelines for design professionals, academics and architecture students. These themes were '*hearing the rain*', '*transported materials*', '*house as compound*', '*Bali bathroom*', '*nature in the Territory*', '*looms larger than man*', '*the adjustable skin*', '*the natural chimney*', '*the inside-outside house*', '*a house is...*', and '*the tenth line*'<sup>26</sup> with a brief interpretation of each theme. They were important because through these ten themes, Goad draws connections between the narrative of some recognisable Tropo buildings, and their philosophy for adopting natural phenomena as sources of design ideas, and their responses to natural environments and the social behaviour of inhabitants. Goad also elaborates the early journey of the Tropo founders to the Top End of Australia, the ups and downs as they dispersed their practice in different regions of Australia, their active participation in heritage protests, and their particular interests in expanding vernacular architectures on a global scale by participating in institutional design projects and competitions in Asia and the Pacific region. The range of these projects extends from holiday resorts, commercial and school projects, to an expedition to restore the hut of Australian's greatest polar explorer Sir Douglas Mawson located at Cape Denison on Commonwealth Bay, the winter base station for the Australasian Antarctic Expedition of 1911-1914. (Fig 1.2g *Northern Territory News* 2002).

<sup>25</sup> Philip Goad, *Tropo: Architecture for the Top End* (Sydney: Pesaro Publishing, 1999), 83.

<sup>26</sup> To Goad, these ten themes were design thematic constants which he also included in another book, *New Directions in Australian Architecture*. Philip Goad, *New Directions in Australian Architecture* (Balmain: Pesaro Publishing, 2005), 243 – 246.



Figure 1.2g Adrian Welke's expedition helped to preserve the Australian explorer Douglas Mawson's hut in Antarctica in 2002. The hut which was built in 1912 is located at Cape Denison, 3000 km south of Hobart, Tasmania. It has significant historical value and was described by Mawson as 'the home of the blizzard' (NT news 2002) which date was unknown.

Tropo's story began in 1978, as Goad recounts, when Phil Harris and Adrian Welke took a study tour with two classmates, James Hayter and Justin Hill, as part of their final year course requirement in architectural studies at the University of Adelaide. In that year, the four young men from the southern state spent five months travelling in a Volkswagen Kombi van around Australia exploring the regional identity of small inland and coastal towns in remote areas (Fig 1.2h). On their journey, they observed the everyday living of townships, the social interaction and activities of regional communities, and began recording and noting the relationship between diversity in landscape and diverse types of historical and contemporary buildings. They produced a documentary report, *Influences in Regional Architecture*, illustrating the significance of the vernacular architecture of different regions in Australian contemporary architecture at the time. This report elaborated the heterogeneous architectural remnants and building types in rural communities, which was a response to the different climates and diversity of flora and fauna around coastal and inland areas of Australia. Arguably, it became an important social and cultural document as it revealed 'the historical architecture of the Australian tropics'.<sup>27</sup>

<sup>27</sup> Philip Goad, "2014 Gold Medal: Environmental fit", *Architecture Australia*, Vol 103, no.2, March (2014). (Accessed online and viewed April, 2014)

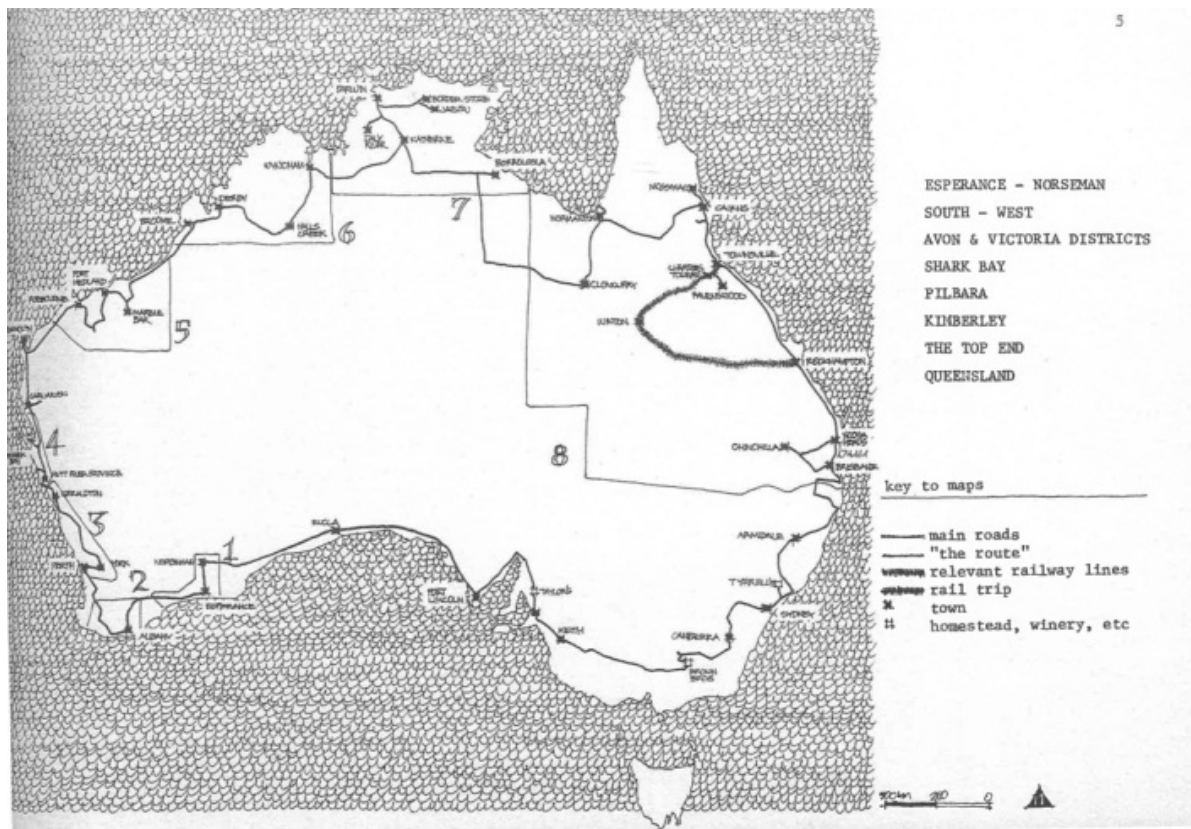


Figure 1.2h The map shows Troppo's adventurous journey around Australia in 1978.

Another important research report, *Punkahs & Pith Helmets: Good Principles of Tropical House Design*, was published by Troppo in 1982. This report continued Harris' and Welke's exploration of design principles and methods for building tropical housing in the Top End. It focused on the fundamental logic of following the sun paths, wind directions and orientation on site (fans and rotary vents) to maximize the level of human comfort for indoor and outdoor spaces. Goad points out that invitations for project opportunities from the Top End coincided with an economic recession in Adelaide which prompted them to set up their practice in Darwin. Goad mentions that the nickname of 'Troppo' conveyed the idea of 'southern yobbos', in mockery of their appropriated tropical design methods and particularly of their attempts to restore multi-cultural and diverse traditional architecture after the destruction caused by Cyclone Tracy. Nevertheless, as Goad's descriptive accounts show, Troppo started their Darwin practice with a clear sense of the imperatives to pursue sustainable and climate-responsive design.

Although it does not explicitly mention Troppo's 'hedonist' attitude, Goad picks up Troppo's sense of humour as being 'an intrinsic element of the practice'.<sup>28</sup> This attitude was the main driver for the manifestoes of Troppo's affections, initiatives and innovations regarding tropical house designs. A hedonist is understood as 'a person who believes that the pursuit of pleasure is the most important thing in life; a word for a pleasure-seeker'.<sup>29</sup> The significance of this attitude is addressed in their publication: *A Hedonist Handbook for Full Enjoyment of the Elements* in The Australia and New Zealand Association for the Advancement of Science ANZAAS Conference in Townsville in 1987, which cleverly capitalises on 'Troppo' mockery to draw a crucial link between tropical climate, Troppo's design methods and a distinct and fun hedonistic lifestyle. Significantly, public perception of Troppo's ambition to create distinct tropical Top End architecture changed from mockery to respect when they started to win government commissioned projects. At the same time, Troppo's innovative designs, and structures engineered for strength, stability, durability and cyclone-resistance directly addressed local fear of cyclones, floods and other natural hazards that punctuate life in the Top End. A noticeable changing attitude by members of Top End local communities is seen in their steadily increasing demand for Troppo houses and the hedonist-lifestyle in the tropics that they were designed to experience.

Goad and Bingham-Hall's monograph provides a straightforward illustrated narrative of Troppo's history, showing the architectural fabric, built forms, spatial planning and visual imagery of significant Troppo houses up to 2005. The book offers the visual experience of Troppo's composite system as well as an exploration of Troppo's design features, rich materiality, visual-tectonic representations of steel framework, configurations of design elements, and the passive design strategies for cross ventilation and natural lighting incorporated in the design. It also throws light on the general social dimension of Troppo's work in expanding their practice regionally, while a key theoretical contribution of this book was to highlight Troppo's concept of the 'tenth line'.

*"Behind all of these strategies is Troppo's notion of the tenth line. When one draws a solid cube in axonometric or isometric, nine lines are required to represent that cube in three dimensions. To draw a tenth line across any of the cube's corners is to immediately imply transparency to the volumetric system. This is an intrinsic design philosophy for Troppo. Their architecture obviates*

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<sup>28</sup> Philp Goad, *Troppo: Architecture for the Top End* (Sydney: Pesaro Publishing, 1999), 11.

<sup>29</sup> The definition of this word, hedonist, was defined and used from the *Oxford English Dictionary* in 2012.

*the need for examining the idea of the open frame and potentially unenclosed volumes. Space is extendible and also infinitely adjustable – if one allows the addition of the tenth line.*<sup>30</sup>

In the format of a relatively concise monograph, however, Goad and Bingham-Hall did not have scope to address the cultural dimension of Troppo's work in depth, or its responses to changes in business management, practice culture, design methods, building regulations, and the diversity of needs and requirements of clients. Another significant aspect of the work that has yet to be closely studied is the observable evolution in the typical Troppo plans and design features over the years. These include the use of under-house space in moderate climates, multi-functional living verandahs, the concept of shared space, the dynamics of spatial sequencing between indoor and outdoor spaces, and the psychological effects of spatial experience on the occupants in accordance with the diverse social, cultural, economic and environmental contexts of regions. The existing literature also offers little insight into the highly significant influence of place, people and circumstances on the development of Troppo's design approach, most notably in the nuances of design elements, the adaptation of Troppo practice culture through new partners and in-house architects, and the noticeable signs of changing values across regional offices.

Considering previous visual documentation and analyses of the work, Bingham-Hall's evocative photographs in his collaborative monograph with Goad, have primarily display Troppo's proclivity for lightweight construction and use of local material in response to conditions of climate, site, and landscape. These include distinctive examples of Troppo's idiosyncratic design elements such as the Bali bathroom and courtyard of Thiel House, and the twisted mono-pitched roof forms of Rozak House, which offer readers a visual understanding of variations in the houses. However, in the text accompanying these photographs there is little explanation of how the forms relate to Troppo's endeavour to draw connections between functions of space, their ethical values for sustainability, and the sense of people's belonging and their everyday activities over time. For example, the incorporation of the complete openness of the Bali bathroom demonstrates a different approach to the semi-open bathroom of early tropical houses. A further dynamic transformation is seen in the evolution of roof-

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<sup>30</sup> Philip Goad, *Troppo: Architecture for the Top End*, 84.

forms from their early work using traditional gable-roof forms to the rounded roof of Barkus House, to the pyramid of Troppo Type 5.

While Goad and Bingham-Hall's seminal monograph is an invaluable foundation for further research that offers an insightful understanding of 'a coherent sequence of events'<sup>31</sup> through which the Troppo office was established and subsequently expanded, its scope does not extend to how Troppo have developed the diverse design forms of their houses, or their ways of interacting with clients and engaging with social events (academic and professional), the normality of their sustainable practice, and the cultural immersion strategies that Troppo have integrated in developing their office culture in a multi-branch practice.

Other publications on Troppo's work have been written almost exclusively from a professional perspective (by academics, researchers, architects and design critics), focusing on functionality, materiality, architectonic structure and detail, and aesthetics of form. However, multiple other potentially significant perspectives on the work – including those of Troppo's regional directors, in-house architects, clients and the occupants of Troppo houses – have, so far, remained unexamined if not overlooked.

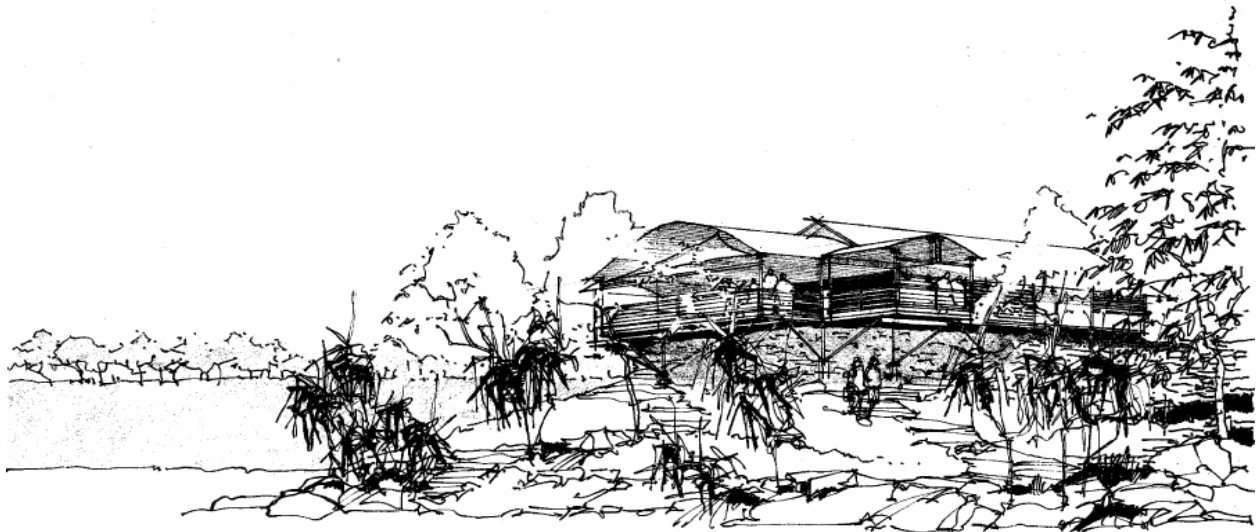
'Irreverent but sophisticated, inventive with a tinge of larrikin spirit',<sup>32</sup> was the jury that awarded the partnership the 2014 AIA Gold Medal described their work. Troppo's profound influence on the design principles, theory and practice of architecture in Australia (Figure 1.2k) has yet to be fully explained and understood.

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<sup>31</sup> Carlo Ginzburg, trans John Tedeschi and Anne Tedeschi, "Clues: Roots of an evidential paradigm," *Clues, Myths, and the Historical Method* (Baltimore: Johns Hopkins University Press, 1989), 96-125.

<sup>32</sup> The citation of the 2014 Gold Medal awarded by the Australian Institute of Architects addresses the distinctive features of Troppo's approach specifically to the online publication of *Australian architecture*. [http://www.architecture.com.au/docs/default-source/act-notable-buildings/winners\\_webcontent.pdf?sfvrsn=0](http://www.architecture.com.au/docs/default-source/act-notable-buildings/winners_webcontent.pdf?sfvrsn=0). (Viewed on 28<sup>th</sup> March 2014)





RESTAURANT

**Figure 1.2k** This sketch is for a multi-use cultural precinct with a restaurant and multi-purpose centre at Tyto Wetlands Community, Queensland. The lightweight appearance of the building gently blends into the surrounding landscape. Sketched by Harris and collected at the Perth office in 2010.

### 1.3 Research Questions

The research questions for this study focus on the intangible factors that have influenced Troppo's practice over three decades and across five regions in Australia. A design philosophical approach is taken to explore the peripherals of the 'unknown' design processes of Troppo's work in order to better understand their ideas and values. Seeking the character and meaning of the design of Troppo houses of specific times in specific regional contexts helps make sense of why their work is significant in terms of understanding the evolving form-patterns needed to express the diversity of Australia's cultural contexts. Identifying the nuances of form-patterns provides an indication of Troppo's observations of a vast range of geographical settings and variations of building policy in response to the dynamics and variations of the Australian lifestyles that are associated with different climates and times.

One primary research question is identifying the intangibles that shape the design of Troppo houses over time. That is

How do the designs of houses from Troppo Architects' five regional offices in the decade up to 2014 relate to the ideas and values Harris and Welke espoused in their first decade of practice in Darwin from 1980?

Sub-questions are proposed in terms of looking at the design features of the early and contemporary Troppo houses and ascertaining the process of changes in design principles and design form. These questions are intended to go beyond the aesthetic appeal of architectural elements. They seek to uncover the affect of design on individual's everyday experience of space and how design reorientates his and her relation with place, cultural identity, and surrounding landscape. The sub-questions are

1. What are the principal coherent patterns in the designs of houses in Troppo's first decade (1980-1990) of practice in Darwin?
2. What are the nuances and similarities of design features over the course of Troppo's thirty-four-years of practice between the opening of the Darwin office and the set of five regional offices that were operating in 2014?



3. How do the designs of houses reflect the architects' values and attitudes in response to everyday living, cultural references, climate and site conditions?
4. What can be learnt from the designs of Troppo houses that is relevant to contemporary house design?

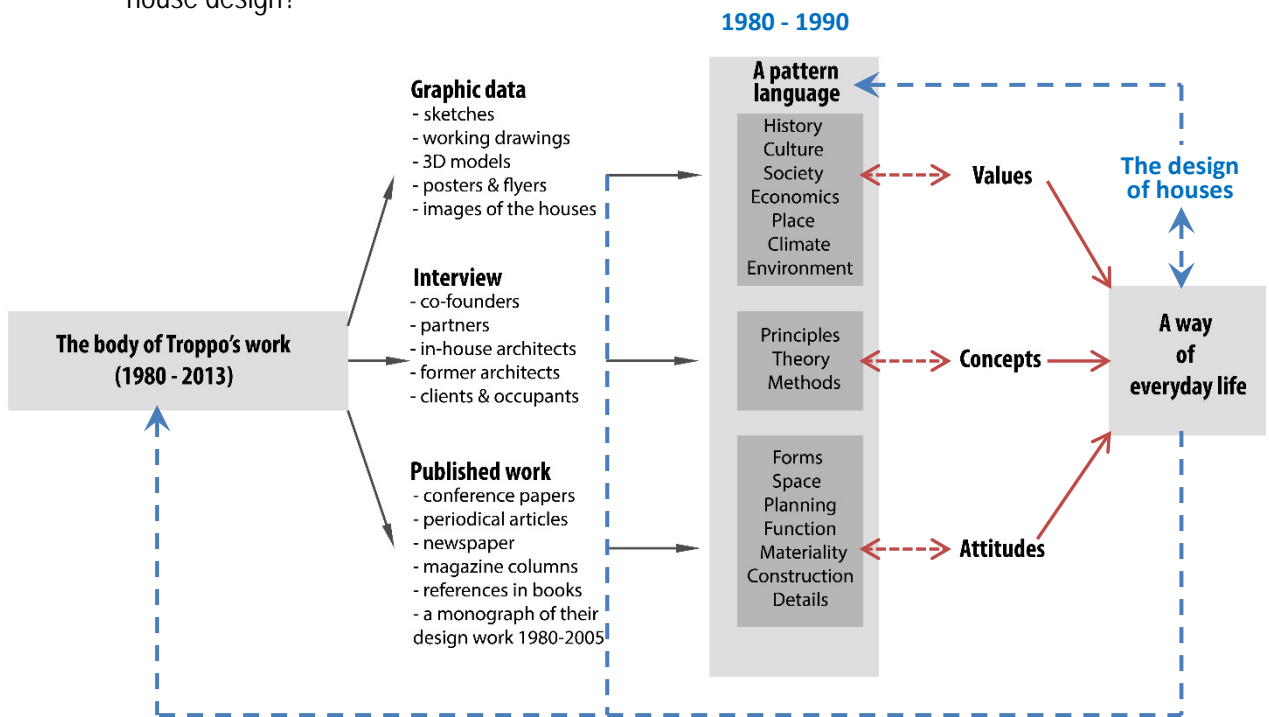


Figure 1.3 This diagram offers an overview of the process for seeking the objectives of this study.

## 1.4 Aims and Objectives

In searching for the answers to the research questions, this thesis aims to:

- reveal the intangibles embedded in the ideas and values Harris and Welke espoused in the first decade of practice, and how their ideas and values have been expressed and operationalised by regional partners and in-house architects in the process of contemporary housing design;
- identify the configurations of form patterns for a language and distinctive features in the designs of Darwin houses in the first decade;
- distinguish nuances and similarities of design features between the first Darwin singular operational practice and five regional practices (2014), and identify their approaches for dealing with circumstances, climate zones, the unity of cultural practice, the diversity of client groups, policy changes, and the invention of new technologies and construction methods over time;
- show interconnections between Troppo's and partners' values and attitudes to creating an everyday lifestyle that reflects regional expressions of cultural significance, climate-responsiveness, and a reciprocal relation with nature and built environments in harmony;
- offer lessons for creating adaptable and flexible designs with a potentially personalised style and design elements from design patterns of Troppo houses.

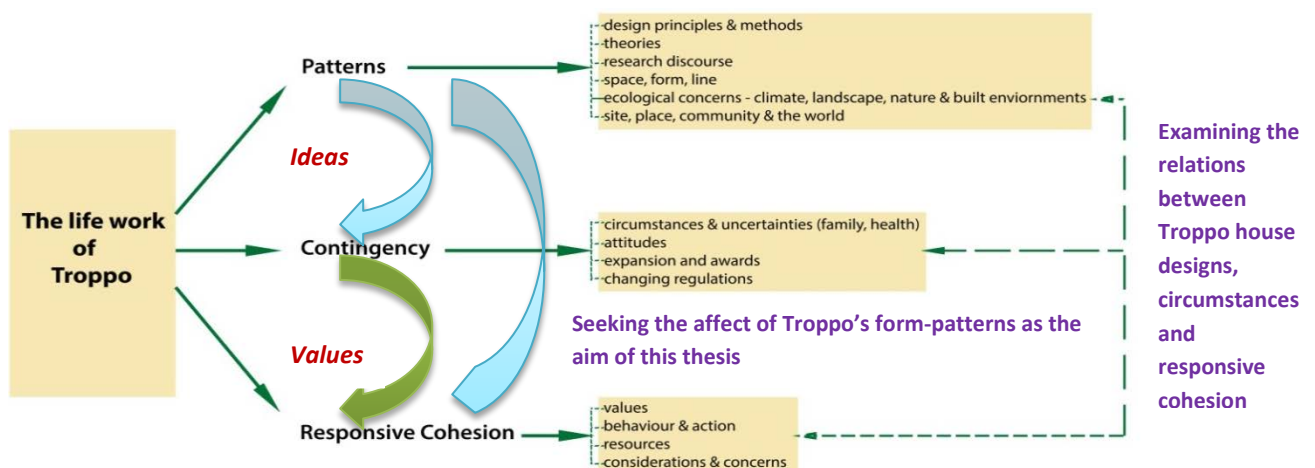


Figure 1.4 This diagram displays Troppo's ideas and values to achieve the aims and objectives.

## 1.5 Theoretical Framework

The theoretical framework is developed and based upon three concepts: patterns, contingency and responsive cohesion (RC) (Figure 1.4). These concepts are explored in Christopher Alexander's *A Pattern Language* (1974), Jeremy Till's *Architecture Depends* (2009), and Warwick Fox's *A Theory of General Ethics: Human Relationships, Nature and the Built Environment* (2010). In combination, they offer a basis for grasping the connections between dynamics of spatial arrangements and changes of social patterns; an insight into the impacts of uncertainties on architects' decision making processes, and the influences of stakeholders in contingent architectural practice; and a general understanding on the relational qualities of things, people and their internal and external relationships. This theoretical framework intends to draw links between philosophical theory in practice and the life - work of early and later Troppo houses. The purpose is to highlight the relevance and correlations between the pragmatic-based theory of pattern language and the distinctive characteristics of Troppo houses, influences of circumstances and the changes of architects' values and attitudes; and responsive cohesion as a general theory for a way by which people should live and the core of Troppo's design philosophy for an everyday lifestyle in response to place, people and sustainability.

The theoretical framework is divided into three stages in accordance with these three concepts. Stage One emphasizes Alexander's approach to the adaptability and consistency of a pattern in design process. His theory of 'a pattern language' assists in examining a cluster of early Troppo houses built in Darwin in the first decade from 1980 to 1990, seeking to identify patterns in form, spatial arrangement, material and detailing. Stage Two is developed from Till's recognition of opportunity amongst the 'mess' typical of architectural practice. Till's 'mess' is the term he uses to describe the combination of tangled issues of external dependencies (people, geographical, ecological and political contexts) and influences on the decision-making of design processes as they engage in practice. It is used as a tactic to investigate changes and developments between the features of early Troppo houses built in the 1980s and contemporary regional houses built between 2003 and 2014. Stage Three applies Fox's foundational value of responsive cohesion to examine values and relationships amongst Troppo's responsibility as architects, the character of Troppo houses, the meaning of their design features, and their integration of site, local community, building regulations, technology and issues of sustainability in contemporary architectural practice. As a whole, this framework provides a basis for unravelling

Troppo's pattern-forms in the distinctive style of their practice, for examining the intangibles in relation to their evolving design features in response to changing climate, constraints and circumstances, and for drawing interconnections between intangible reasoning and tangible design elements, and verifying Troppo's goals as responsible architects for a better quality of living through rigorous and ambitious architecture.

## 1.6 Research Methodology

The methodology concentrates on qualitative research as this study focuses on real-world situations, human responses and life-quality experiences in the design of Troppo houses. Research methods are adopted to capture personalised perspectives, identify the events and activities of specific circumstances, and investigate the physical and psychological experiences of the study participants without judgement. Case study, exploratory interview and empirical observation are the main research methods. The case study offers an opportunity to look at a corpus of Troppo houses from a specific timeframe at a detailed level. Interviews provide multiple-perspectives on the issues, events and circumstance of the time by the participants. The setting of an interview gives the interviewee a chance to describe the situations and reflect their thoughts. This particular method enables the researcher to comprehend the reasoning behind the physical outcomes of the projects and grasp the considerations and concerns for the design decisions taken during the design processes. Observation involves the researcher taking notes to understand the responses of the participants (Troppo partners, in-house architects and clients/occupants) to the questions put to them in an environment of their choosing such as their work place or their own home.

Figure 1.6 illustrates the flow and interrelationships between the body of Troppo's life-work, the literature review and the three research methods. The characteristics and strategies of these methods will be elaborated in Chapter 3.

### The body of Troppo's life work

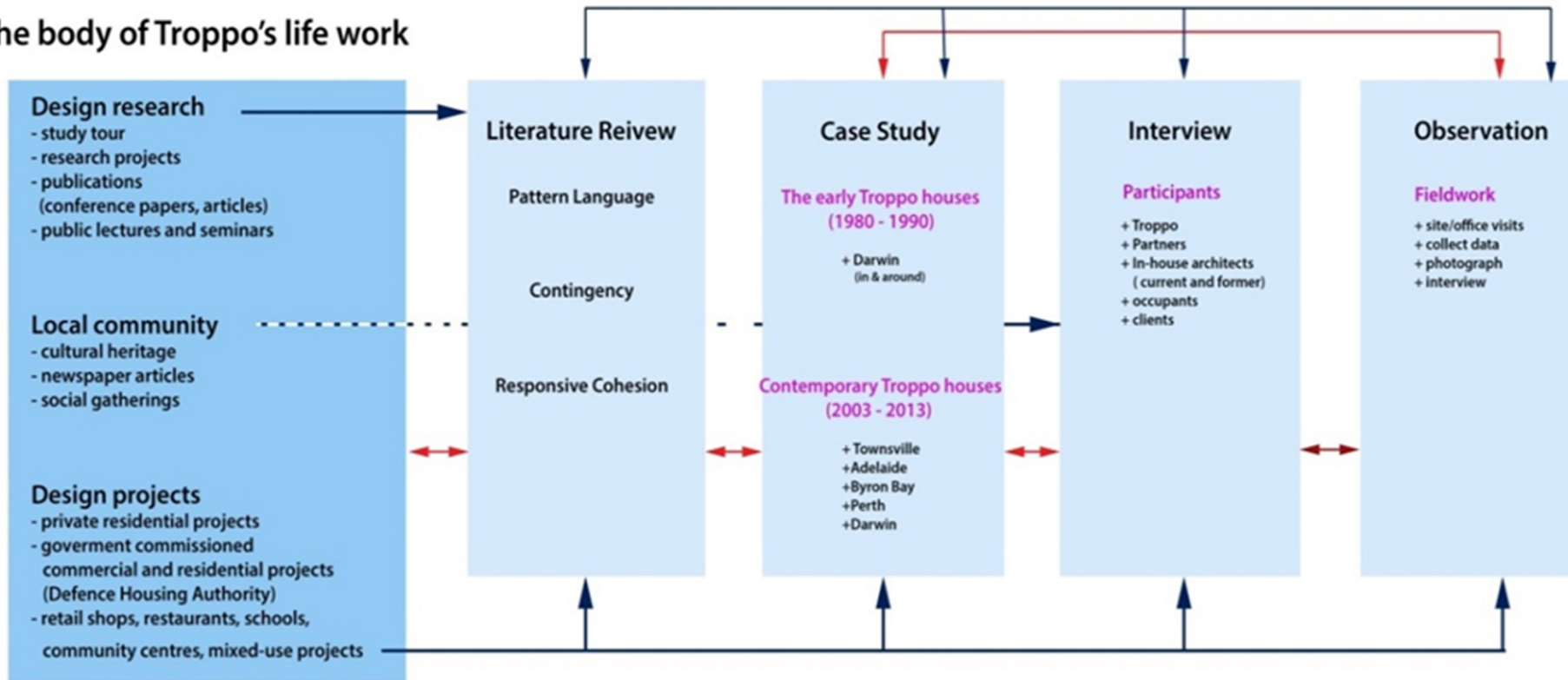
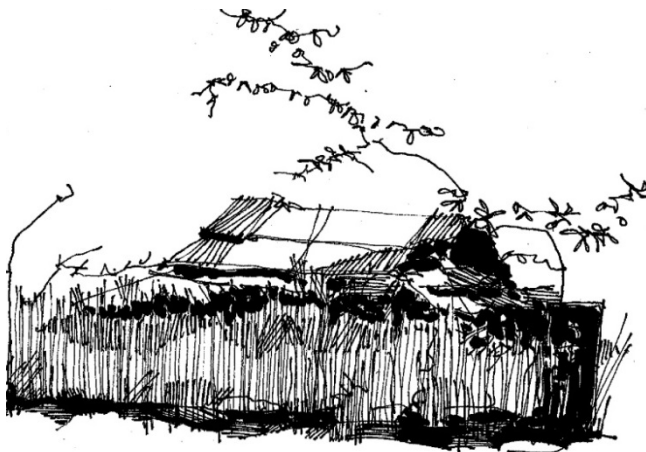


Figure 1.6 An overview of research methodology



## 1.7 Structure of the Thesis



POSE-CREEK HOUSES:  
OLD CHRISTMAS HOLIDAY  
AT END OF THE WEST '81.

**Figure 1.7** This sketch implicitly depicts the imagery of a peaceful lifestyle as a Utopia that inspires Troppo to create lightness, simplicity, tranquillity and calmness in harmony with nature

The structure of the thesis offers a narrative on Troppo's singular practice in Darwin and its development into five linked regional offices. It examines their design processes chronologically to identify changes in design approach, development in architectural ethos, and the significance of the coming-and-going of members in their regional offices. The thesis is divided into three parts with seven chapters to highlight the important elements, sources of information, events and findings.

PART 1 comprises chapters 1, 2 and 3 and presents an initial historical overview, research aims and objectives and a review of relevant literatures underpinning the theoretical framework and methodology. PART 2 comprises chapters 4 and 5. Chapter 4 explores the pattern language within a corpus of Darwin houses in Troppo's first decade of practice. A language consists of form patterns for functional physical space and psychological spaces associated with sensory and spatial experiences. Chapter 5 describes and analyses representative houses from each of Troppo's five regional offices, mapping the links between them and Troppo's early Darwin houses to identify the similarities to and differences from the early pattern language. PART 3 comprises chapters 6 and 7, and presents a discussion of the findings and the conclusions of the research. The factors that generate the differences are discussed in Chapter 6 where some influential themes and impactful factors on design decision-making are revealed. Finally Chapter 7 draws the conclusions in relation to the discovery of interconnections between Troppo's values and attitudes, the designs of houses, spaces for everyday living, other 'things' and their contexts, with some final comments on the wider relevance of Troppo's work to contemporary architectural practice.

## Chapter 2

### Literature Review

Chapter 1 reviewed the relatively limited literature on Troppo and their projects. Chapter 2 expands the discussion in an overview of some relevant design literature that presents perspectives on how architects shape this socially constructed world through physical forms. Contemporary studies have analysed architects' approaches and design responses for dealing with daily circumstances, exploring the attitudes and values to which architects give priority in shaping an everyday-architecture that connects place, people, things and the rapidly changing environments of life experiences today. This chapter focuses on three domains of design discourses: patterns in form-making, contingency in architecture, and the concept of responsive cohesion as an aspect of architects' ethical values.

## 2.1 Introduction

'A design process is a perpetual discovery.'<sup>33</sup> It is a journey for exploring infinite possible solutions to evolving problems. Every architectural design solution tangles with changing challenges associated with a large and diverse range of human-environment issues: the integration of technology and advanced building materials; the functionality of space and the aesthetic appeal of form; social implications, cultural interpretations in relation to context; building regulations and codes; and economic means. Design professionals encounter these challenges as they are 'fundamental to one's being' in relation to the 'uncertainty, contingency and vulnerability' of everyday life.<sup>34</sup> In the book of Jeremy Till, *Architecture Depends*, uncertainty and contingency characterise the 'mess' that he calls the tangle of issues that design professionals have to address with discipline, order and a set of core values and skills in the everyday world of their work.<sup>35</sup> In doing this, architects seek to make space and form in buildings both utilitarian and psychologically satisfying. Christopher Alexander points at an essential 'quality without a name'<sup>36</sup> that makes even the humble work of architecture more than just the production of a practical structure. Alexander's concept may be compared with the relational quality described by the environmental ethicist, Warwick Fox, in which there is responsive cohesion between the components of 'things', and 'things' and their context.<sup>37</sup> Both these concepts point to an integral relationship between design and a way of life, embracing the wholeness of the inhabitants, site, place and the built environment.

To identify useful conceptual tools with which the present study may explain the interconnections between Troppo's stimuli, design processes, and values in response to everyday life, this chapter examines these three key works – Christopher Alexander's *A Pattern Language: Buildings, Towns Construction*, Jeremy Till's *Architecture Depends*, and Warwick Fox's *A Theory of General Ethics* – as the foci for a broader review of other relevant design literature. The intention is to assemble an effective theoretical framework in which connections between the meanings of daily living in space and the

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<sup>33</sup> Dana Cuff, *Architecture: The Story of Practice* (Cambridge, Mass: MIT Press, 1991), 94.

<sup>34</sup> Randall Teal, "Immaterial Structures," *Journal of Architectural Education* 62, no. 2 (2008), 14-23.

<sup>35</sup> Jeremy Till, *Architecture Depends* (Cambridge, Mass: MIT press, 2009).

<sup>36</sup> Christopher Alexander, *The Timeless Way of Building* (New York: Oxford University Press, 1979).

<sup>37</sup> Warwick Fox, *A Theory of General Ethics: Human Relationships, Nature and the Built Environment* (Cambridge, Mass: MIT Press, 2009).

comprehensive theories associated with formalism, critical regionalism, humanism, and utilitarianism can be examined and explained.

## 2.2 Patterns

Patterns are ubiquitous, especially in design and daily activities of a human life. They offer a sense of order, growth of connections, and possibilities of innovative combinations. In *A Pattern Language: Towns, Buildings, Construction*, the architect and academic Christopher Alexander argues that the concept of pattern in design is built upon 'a fundamental view of the world.'<sup>38</sup> It represents a sense of social network, the natural structure of a growing organism, a recurring form of motifs and actions. Patterns are implicitly and explicitly generated by a set of rules in form and event to which we seem to pay no attention. They are inevitably integrated in every aspect of human lives, with the process of generating them being embedded in behaviours and actions that dominate daily routines and the creative activities that they comprise. Patterns are woven into everything we do in this rich tapestry of life, in processes of dreaming, thinking, making, designing and living – that is of being. Alexander's conception of patterns is similar to Neil Stillings' representation of knowledge through semantic networks, frames, scripts and the production of rules from a cognitive science perspective.<sup>39</sup> Both Alexander and Stillings emphasize the quality of order in a sequence of events. The notion of rule-based representations is apparent in the sense of situation-action behaviour in creating a pattern and in generating an elaborate chain of 'scripts' or 'frames'. The situation-action behaviour is driven by reasoning about things from everyday life.<sup>40</sup>

Phil Harris refers to Troppo's 'Alexandrian love affair' suggesting their indebtedness to the works of Christopher Alexander, to whom they referred in one of their public lectures hosted by the Australian Institute of Architects (or Royal Australian Institute of Architects, as it was called in the 1990s) in Melbourne in September 1990.<sup>41</sup> In the title of the notes of Polemic Lectures *Humpty Darwin sat on a Wall: The Teetering Times of an Outback City*, Harris and Welke addressed the 'rotten hard life on the edge' in Darwin as being an unstable entity requiring abandoning the old and devising the new after the

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<sup>38</sup> Christopher Alexander, Sara Ishikawa, and Murray Silverstein, *A Pattern Language: Towns, Buildings, Construction* (New York: Oxford University Press, 1977), 12.

<sup>39</sup> Neil Stillings, Mary Anne Ramirez, and Laura Wenk, "Assessing critical thinking in a student-active science curriculum," In *meeting of the National Association of Research on Science Teaching, Boston* (1999).

<sup>40</sup> Neil Stillings, Steven Weisler, Christopher Chase, Mark Feinstein, Jay Garfield, and Edwina Rissland, *Cognitive Science: An Introduction* (Cambridge: MIT Press, 1987).

<sup>41</sup> Harris presented a speech in which he argued the significance of learning the built forms and structures of the historical buildings in response to the natural setting of a city and the forming of a community.

effect of Cyclone Tracy. To both the Troppo founders, a house provides more than is generally understood as the basic need for shelter provided by physical boundaries in contemporary urban living. A house should offer inhabitants freedom, transparency, security, privacy and connections with nature, wildlife and all elements of the living environments as a whole. Their perceptions resonate with Alexander's proposed social-living patterns and Jonathan Raban's book, *Soft City*, about the conceptual idea of malleable city space associated with a combination of physical fabrication (hard space) and social-sustenance (soft space) on emotional, intellectual and physical levels.<sup>42</sup>

Patterns lay a foundation for design decision-making, drawing connections between the design processes of problem-solving, sources of references, formalism and the concept of shape grammar. The forming of patterns demonstrates an understanding of a process of integrating design principles and architectural theory<sup>43</sup> in visual representation in the field of architectural practice. In Alexander's early publications about pattern language,<sup>44</sup> he suggested each pattern as an interactive dialogue between a particular design problem and a strategic solution, with detailed explanations gained from real-life project experiences. Despite focusing on a generic and systematic means for creating a sequence of everyday experiences for occupants, Alexander's form-patterns display adaptability and stability which offer relevance for design in general regardless of region, climate, culture, and policy change. The achievement of Alexander's pattern language is to be 'the archetypal core of all possible pattern languages which can make people feel alive and human.'<sup>45</sup> There are implicit associations made between patterns, geometry, climatic conditions, cultural references and environmental considerations in Alexander's patterns but explicitly they create a vision of the experiences of everyday life in the physical contexts of the socially constructed world.

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<sup>42</sup> Jonathan Raban's book, *Soft City*, is a documentary about one man's exploration of metropolitan life through living in a myriad of small and overlooked city spaces. By moving through a sequence of crowded and compact living spaces, Raban creates an intriguing and fluid narrative about the experiences of living between the physical hard and constructed fabricated city walls and the intangible spaces that offer mental escape in a complex and modern urban jungle.

<sup>43</sup> Phil Harris, and Adrian Welke, *Punkahs and Pith Helmets: Good Principles of Tropical House Design* (Darwin: Troppo Architects, 1982), and Bryan Lawson, *How Designers Think: the Design Process Demystified* (London: Routledge, 2006).

<sup>44</sup> Christopher Alexander, *Houses Generated by Patterns* (Centre for environmental structure, 1969), Christopher Alexander, ed. *The Oregon Experiment* (London: Oxford University Press, 1975), Christopher Alexander, Sara Ishikawa, and Martin Silverstein, *A Pattern Language* (Centre for Environmental Structure, 1977), Christopher Alexander, *The Production of Houses* (London: Oxford University Press, 1985), Christopher Alexander, "The origins of pattern theory: The future of the theory, and the generation of a living world," *Software, IEEE* 16, no. 5 (1999), 71-82.

<sup>45</sup> Alexander, *A Pattern Language*, xvii.



### 2.2.1 Definition of pattern

A pattern, according to Alexander,<sup>46</sup> is defined as a cluster of elements repeated in a predicable manner. The repetition is familiarized and formed as a 'template', a term that is often used in disciplines of mathematics, language, computing science, art and architecture. In the domain of architecture, patterns are longstanding and crucial design elements, which, taken together, form an architectural language. They play a significant role in defining periods of history, styles of architects, sources of configurations, and the fundamental rules of generative design in contemporary practice that are dominated by computational production. In this thesis, patterns are used as a term to identify the repetitions in the processes and outcomes of design decision-making, representing the means of spatial arrangement, the formality of geometric compositions and a potential design vocabulary of architectural elements.

### 2.2.2 Pattern and design process

Patterns are associated with the production of a design through the decisions, preferences, creative intuitions and experiences of the designer. Making preferences plays a predominant role in a design process as each preference is 'a response to changes in the wider social and cultural context.'<sup>47</sup> Every response is a solution for a particular design problem, but a new problem potentially emerges and changes the dynamics and structure of the process. Design is an on-going process. Nevertheless, creative intuitions and experiences grow into preferences and form certain recurring patterns over time in a manner which is related to cognitive aspects of the design process. There have been some extensive studies to comprehend these relationships through design-strategy-based experiments, case studies and computational knowledge-based models in both academia and practice.<sup>48</sup> The findings of these studies offer insight into the significance of the innate feelings which psychologically drive the behaviour of a designer. In order to reveal the implicit yet crucial factors connecting these four elements – decision-

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<sup>46</sup> The relevance of the definition of a pattern language is taken from Alexander's book, *A Pattern Language* on page xix.

<sup>47</sup> Bryan Lawson, *How Designers Think: the Design Process Demystified* (London: Routledge, 2006), 17.

<sup>48</sup> Christopher Alexander, ed. *The Oregon Experiment* (London: Oxford University Press, 1975), Bryan Lawson, "Schemata, gambits and precedent: some factors in design expertise," *Design Studies* 25, no. 5 (2004), 443-457, Menezes Alexandre, and Bryan Lawson, "How designers perceive sketches," *Design Studies* 27, no. 5 (2006), 571-585, John Gero, "Computational models of innovative and creative design processes," *Technological forecasting and social change* 64, no. 2 (2000), 183-196, William Mitchell, "A computational view of design creativity," *Modelling Creativity and Knowledge-Base Creative Design* (1993), 25-42, Charles Eastman, *On the analysis of intuitive design processes* (Carnegie-Mellon University, 1968), Charles Eastman, "Representation of design processes." In *Conference on Design Thinking, MIT, April* (1999), 23-25.

making, preference, intuition and experience – that is, the relationship between pattern and design process, some literature will be reviewed and references made to architects' experiences in real-life projects.

In design practice, patterns are often seen as visual representations of design in form and spatial arrangement without knowing the psychological impacts on its users. Some patterns often appear in a linear sequence representing the specific formation of repetitive elements. The more experiences a designer has had, the easier and quicker he or she can create patterns that work in any designated context. At the fundamental level, one attribute that does not change is the core value of personal beliefs embedded in the actions, representations and meaning of these patterns. In the literature, however, relationships between pattern making and designers' values are yet to be examined, as most consideration focuses on the variety of ways for representing the order of physical patterns. The psychological impacts that some patterns create, such as certain 'feelings' and 'emotions' that occupants experience in a particularly formed pattern of space, have not been a focus of attention. Architects have anticipated the way occupants may experience the space they use, but the extent to which the patterns of spatial arrangements actually generate the 'feelings' they imagined, whether they influence their way of thinking about the use of space and their growing awareness of connection to nature and the outside world have remained unexplored.

Preferences of individuals set up 'a reflective conversation with the situation';<sup>49</sup> they are subjective and made to reflect scenarios, conditions and constraints for the architect and for the occupant of a building. While they determine the patterns that reflect the distinctive characteristics of a designer's style and response to various scenarios, inevitably, as a result of how the spaces are used daily, these preferences also develop the feelings and specific patterns of the inhabitant's behaviour. This understanding can be seen in *Looking for the Beach under the Pavement* by Herman Hertzberger, who points out that:

*"Everyone is doomed to be the one he wants to be seen as by the others: that is the price the individual pays to society in order to remain an insider, by which he is simultaneously possessor of and possessed by a collective pattern of behaviour. Even if people built their houses themselves, they could not escape from this, but instead of having to accept the fact that there is*

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<sup>49</sup> Donald Schön, *The Reflective Practitioner: How Professionals Think in Action* (New York: Basic Books, 1983).

*only one place to put the dining table, everyone would at least be enabled to interpret the collective pattern in his own personal way.”<sup>50</sup>*

The Malaysian architect Ken Yeang elaborates a similar thought in search of his personal preference. He proclaims that:

*“I trust the gut feeling, the intuitive hand, the intuitive feel about the project... You can technically solve accommodation problems, you can solve problems of views and so on but which problem to solve first is a gut feeling... You can't explain it but you feel that's right and nine times out of ten you are right.”<sup>51</sup>*

Yeang's perception of the 'gut feeling' for problem solving and solution seeking as 'you can't explain it but you feel that's right' echoes the meaning of the 'connections' that Alexander expresses in his idea of a 'quality without a name'. Over the years, many design researchers have looked at architects' feeling from cognitive aspects of design processes through symbolic logic,<sup>52</sup> as well as using knowledge-based and computational models for problem-solution explorations. It is intuitive and exists as a part of the non-material structures of human existence in everyday activities.<sup>53</sup> The act of designing requires human knowledge derived from experience, thinking, and learning in design processes. 'Feeling right' becomes a part of this human knowledge that demonstrates the capacity to comprehend present situations and make appropriate decisions. Architects' intuitive feelings are guided by what they know with accumulating experiences for challenging uncertainty and contingency.

Hertzberger and Yeang identify the connections between decisions, processes, preferences and a feeling of what is right in creating 'a collective pattern of behaviour' for design. There is a sense of order and discipline derived from a designer's cognitive power for 'feeling right', which grows out of the processes of problem solving and solution seeking. British architect Richard MacCormac also writes of 'the feeling born of experience.'<sup>54</sup> It is apparent that architects rely on their past experience of feeling right in seeking better solutions for resolving design problems and avoiding making more future problems. This

<sup>50</sup> Herman Hertzberger, "Looking for the beach under the pavement," *RIBA Journal* 78, no. 8 (1971), 128.

<sup>51</sup> Ken Yeang, quoted in Bryan Lawson, *Design in Mind* (Oxford: Butterworth Architecture, 1994).

<sup>52</sup> John Gero, ed. *Artificial Intelligence in Design* (Springer Science & Business Media, 2002).

<sup>53</sup> Randall Teal, "Immaterial Structures," *Journal of Architectural Education* 62, no. 2 (2008), 14.

<sup>54</sup> Bryan Lawson, and Kees Dorst, *Design Expertise* (London: Routledge, 2013), 10.

phenomenon can be understood through John Christopher Jones's concept that he points out that design is of 'the performing of a very complicated act of faith'.<sup>55</sup> 'The [design] searching is probably much more important than the finding.'<sup>56</sup> An understanding about the design searching can also be linked to Bryan Lawson's book, *How Designers Think: The Design Process Demystified*. In his book, he reports that design experts attempt to understand design processes through looking at the spectrum of design activity conducted in various design disciplines in terms of the relationships between problems, solutions, situations, decision-makings, creativity and outcomes. He points out that one common design exploration takes place when a designer performs in either a linear process of analysis, synthesis and evaluation, or in a recursive pattern of highly creative thinking because design is 'a continuous and continuing, rather than a once and for all process'.<sup>57</sup> The perception of a linear process is partially aligned with Alexander's notion of 'a straight linear sequence'.<sup>58</sup> In *A Pattern Language* Alexander proclaims that:

*"The patterns are ordered...This order, which is presented as a straight linear sequence, is essential to the way the language works...What is most important about this sequence, is that it is based on the connections between the patterns."*<sup>59</sup>

The 'connections' between patterns reveal how components of a pattern internally correlate as a 'sequence' and externally interact with other patterns to make a bigger, cohesive 'whole'. There is a network of many scales, in accordance with Alexander's 'clinging together' and Warwick Fox's 'holding together'. Alexander and Fox share the view of 'connections' as a way of understanding how everything works in coherence and harmony in an ecological and socially constructed everyday world.

*"No pattern is an isolated entity. Each pattern can exist in the world... that is supported by other patterns... This is a fundamental view of the world. So that one place becomes more coherent, and more whole."*<sup>60</sup>

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<sup>55</sup> John Christopher Jones, *Design Methods: Seeds of human Futures* (New York: John Wiley, 1970), 56, John Christopher Jones, Design Methods reviewed, in S. A. Gregory (ed) *The Design Method*, 1966.

<sup>56</sup> Lawson, *How Designers Think*, 23.

<sup>57</sup> *Ibid*, 91.

<sup>58</sup> Christopher Alexander et al , *A Pattern Language*, xii.

<sup>59</sup> *Ibid*.

<sup>60</sup> Christopher Alexander et al , *A Pattern Language*, xii.

In this concept, there is a sense of the integration of cognition, integrity, experience and harmony in design processes. The quality of design is fostered by the designers' 'gut feelings' and intuition that leads them to find and combine appropriate, fruitful patterns.

### 2.2.3 Patterns and their sources

The more an architect has seen and experienced, the more references he or she can utilize in solving various problems in different situations. In Hertzberger's book, *Lessons for Students in Architecture*, he highlights how sensory experience is relevant in accumulating sources of references and why it is significant for architects to collect a network of sources in order to produce a cluster of ideas as solutions. He points out that:

*"Everything that is absorbed and registered in your mind adds to the collection of ideas stored in the memory: a sort of library that you can consult whenever a problem arises. So, essentially the more you have seen, experienced and absorbed, the more points of reference you will have to help you decide which direction to take: your frame of reference expands."<sup>61</sup>*

Hertzberger's point that the 'frame of reference expands' denotes an idea of a designer's expanding range of patterns for design. He focuses on the probabilities of solutions, and sets out explanations for the selections of more sources of reference. Architects' cognitive powers for feeling right and connections to their experiences are not addressed and investigated in his book.

Some researchers have characterized this cognitive power to source reference materials as skills.<sup>62</sup> Others symbolize them with representations of computational models,<sup>63</sup> design behaviour,<sup>64</sup> and a

<sup>61</sup> Herman Hertzberger, *Lessons for Students in Architecture* (Rotterdam: Uitgeverij 010 Publishers, 1998), 135.

<sup>62</sup> Bryan Lawson, and Kees Dorst, *Design Expertise* (London: Routledge, 2013).

<sup>63</sup> Nigel Cross, "Descriptive models of creative design: application to an example," *Design Studies* 18, no. 4 (1997), 427-440; John Gero, "Conceptual designing as a sequence of situated acts," In *Artificial Intelligence in Structural Engineering*, Springer Berlin Heidelberg (1998), 165-177; John Gero, "Computational models of creative design processes," In *Artificial Intelligence and Creativity*, Springer Netherlands (1994), 269-281.

<sup>64</sup> Hideaki Takeda, Sasaki Hiromitsu, Nomaguchi Yutaka, Yoshioka Masaharu, Shimomura Yoshiki, and Tomiyama Tetsuo, "Universal abduction studio-proposal of a design support environment for creative thinking in design," In *DS 31: Proceedings of ICED 03, the 14th International Conference on Engineering Design, Stockholm* (2003), Kees Dorst, and Judith Dijkhuis, "Comparing paradigms for describing design activity," *Design Studies* 16, no. 2 (1995), 261-274.

structure of relations within the domain of design space.<sup>65</sup> In this context, with the nature of Troppo's work, the most direct link is between the 'feeling right', 'relevant life experiences', and 'skills'<sup>66</sup> in Troppo's way of creating their own set of characteristics for design patterns. They refined their design 'skills' through the experience of living locally, traveling widely and their enthusiasm for seeing, feeling and experiencing 'things' around them, especially through their intuitive eye-hand-mind connections between their sketches and place they live in the tropics. In his book *The Thinking Hand*, Juhani Pallasmaa argues that the birth of creative work is driven by eye-hand-mind fusion of an architect by 'thinking through senses' and experimenting in architectural creative work through artistic experience, emotion, existential knowledge, imagination and memory.<sup>67</sup> These 'skills' are demonstrated and recognized by the 'quality' of characteristics of patterns without being standardized by a particular style<sup>68</sup> as architects embrace, accept and enjoy whatever nature offers them. Harris and Welke developed their skills by improvising the amenity of tropical house designs from the heat, the sun, rain, monsoon, land and the wild in the tropics. Nonetheless, their cognitive powers for design also resonate with Hertzberger's sensual experience and Till's perception in *Architecture Depends* of 'observers in life'.<sup>69</sup> Yet there is little research to date which draws links between the formality of architects' skills, the complexity of everyday life experience, and patterns, in order to cultivate 'quality' in the character of architects' designs. The following subsection examines the relations between patterns and formalism in some renowned architects' life works to confirm their importance in design.

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<sup>65</sup> Gabriela Goldschmidt, "Capturing indeterminism: representation in the design problem space," *Design Studies* 18, no. 4 (1997), 441-455., Claudia Eckert, and Stacey Martin, "Sources of inspiration: a language of design," *Design studies* 21, no. 5 (2000), 523-538., Gabriela Goldschmidt, "Quo vadis, design space explorer?," *AIE EDAM: Artificial Intelligence for Engineering Design, Analysis, and Manufacturing* 20, no. 02 (2006), 105-111.

<sup>66</sup> In Lawson's book, *How Designers Think*, he points out that 'design is a highly complex and sophisticated skill. It is not a mystical ability given only to those with recondite powers but a skill which, for many, must be learnt and practised rather like the playing of a sport or a musical instrument.' <sup>66</sup> Bryan Lawson, *How Designers Think: The Design Process Demystified* (London: Routledge, 2006), 6.

<sup>67</sup> Juhani Pallasmaa, *The Thinking Hand: Existential and Embodied Wisdom in Architecture* (Chichester: Wiley, 2009).

<sup>68</sup> In both books of Frank Lloyd Wright, *An American Architecture* (New York: Horizon Press, 1955), and Frank Lloyd Wright, *In the cause of architecture*. Ed. by Frederick Albert Gutheim (Publisher not identified, 1975), the idea and the significance of a particular style in defining and understanding architecture was extensively discussed with the life work of Frank Lloyd Wright.

<sup>69</sup> Jeremy Till, *Architecture Depends* (Cambridge, Mass: MIT press, 2009), 212.

### 2.2.4 Patterns, shape grammars and styles

For most parts of design processes, patterns and grammars share forms of expertise, life experience, and aesthetics which are easily understood by being seen in visual representations. An approach to understanding patterns in design has focused on the ideas of rule-based or knowledge-based design. This offers a mechanical and systematic way for generating graphic representations of patterns in 2D or 3D computational models. Shape grammars are known and used to denote the recursive generation of arrangements of shapes.<sup>70</sup> A shape grammar that provides alternative patterns is based on a system of shape rules. Rules are derived from a set of preferences and a set of variables for generating the possibilities of a base design. In design practice, especially in industry and engineering domains, the rules are aimed to maximize alternatives from a single design idea for time efficiency and productivity.

The rule for a shape grammar is defined as the unit of measure<sup>71</sup> or the fundamental unit<sup>72</sup> which is potentially used to generate the possibilities of a pattern. This concept is popular within the domain of computational design and has been used for generative design in architectural research.<sup>73</sup> Categorizing rules for spatial arrangement is a way of understanding particular styles of architects' work. The use of a shape grammar is found in analysing many pre-eminent and influential architects' works such as those by Palladio,<sup>74</sup> Frank Lloyd Wright,<sup>75</sup> Glenn Murcutt,<sup>76</sup> Christopher Wren,<sup>77</sup> and Santiago Calatrava.<sup>78</sup> It is also widely used in understanding a particular traditional style of housing, ornament or garden, such

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<sup>70</sup> George Stiny, "Two exercises in formal composition," *Environment and Planning B*, 3, no. 2 (1976), 187-210.

<sup>71</sup> George Stiny, and William Mitchell, "The Palladian grammar," *Environment and Planning B*, 5, no. 1 (1978), 5-18.

<sup>72</sup> Carlos Hernandez, and Roberto Barrios, "Symmetry, rules and recursion," Session 11: Shape Grammars - eCAADe 23, 2005, 538.

<sup>73</sup> Jessica, Huang, T.W. Chang, and Antony Radford, "A Derivation Graph of Computer Models for the design process on the Web" In Tan, B.-K., Tan, M., and Wong, Y.-C., editors, *Proceedings of the fifth Conference on Computer Aided Architectural Design Research in Asia*, (2000), 307-316, Singapore. School of Architecture, Centre for Advanced Studies in Architecture, National University of Singapore.

<sup>74</sup> George Stiny, and William Mitchell, "The Palladian grammar," *Environment and Planning B*, 5, no. 1 (1978), 5-18.

<sup>75</sup> Hank Koning, and Julie Eizenberg, "The language of the prairie: Frank Lloyd Wright's prairie houses," *Environment and Planning B*, 8, no. 3 (1981), 295-323.

<sup>76</sup> Neil Hanson, and Antony Radford. "On Modelling the Work of the Architect Glenn Murcutt," *Design Computing* 1, no. 3 (1986), 189 – 203.

<sup>77</sup> Glasgow Buelincks, "Wren's language of City church designs: a formal generative classification," *Environment and Planning B: Planning and Design*, no. 20 (1993), 645-76.

<sup>78</sup> Carlos Hernandez, and Roberto Barrios, "Symmetry, Rules and Recursion," Session 11, Shape Grammars - eCAADe 23, 537-543.



as the vernacular style of a Japanese tearoom,<sup>79</sup> Chinese lattice design,<sup>80</sup> bungalows,<sup>81</sup> Taiwanese traditional houses,<sup>82</sup> Mughul gardens<sup>83</sup> in India, and the most recent work on Alvaro Siza's houses at Malagueira.<sup>84</sup> A graphic representation for the design process of a house by Samer Akkach shows how a derivation graph unfolds the same results even when an architect applies several different rules to formulate variations of designs but still lead to similar outcomes.<sup>85</sup>

Shape grammars offer an explanation for similarities or unities underlying variations. They have been used to explore correlations among variations of a design. As a rule-based computational approach to design analysis, however, shape grammars work best where there is relative little variation in the corpus of work – particularly floor plans, from which the rules are derived – as compared, for instance, to the 1980s Troppo houses that will be examined later in this thesis. Notably shape grammars fail to capture the ways in which humans interpret and respond to designs, or to reveal the untold circumstances which influence decisions in the making of designs. But even where grammar-based explanations are inadequate, a body of work that seems to respond or relate to other factors, such as place, people, invention, cultural movements, historical events, may still be similar in terms of a distinctive physical appearance or 'style'.

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<sup>79</sup> Weissman Knight, "The forty-one steps," *Environment and Planning B*, 8, no.8 (1981), 97-114.

<sup>80</sup> George Stiny, "Ice-ray: a note on the generation of Chinese lattice designs," *Environment and Planning B* 4, no. 1 (1977), 89-98.

<sup>81</sup> Frances Downing, and Ulrich Flemming, *The bungalows of Buffalo* (Pennsylvania: Department of Architecture, Carnegie-Mellon University, 1981), Ulrich Flemming, "Structure in bungalow plans," *Environment and Planning B* 8, no. 4 (1981), 393-404.

<sup>82</sup> SC Chiou, and Ramesh Krishnamurti, "The grammar of Taiwanese traditional vernacular dwellings," *Environment and planning B* 22 (1995), 689-720., SC Chiou, and Remish Krishnamurti, "The grammatical basis of Chinese traditional architecture," *Language of Design* 3 (1995), 5-31, SC Chiou, and Remish Krishnamurti, "The grammar of Taiwanese traditional vernacular dwellings," *Environment and Planning B* 22 (1995), 689-720.

<sup>83</sup> George Stiny, and William Mitchell, "The grammar of paradise: on the generation of Mughul gardens," *Environment and Planning B* 7, no. 2 (1980), 209-226, Terry Knight, "Mughul gardens revisited," *Environment and Planning B: Planning and Design* 17, no. 1 (1990), 73-84.

<sup>84</sup> José Duarte, *Customizing Mass Housing: A Discursive Grammar for Siza's Malagueira Houses*, PhD Thesis. (Cambridge: MIT Press, 2001), José Duarte, "A discursive grammar for customizing mass housing: the case of Siza's houses at Malagueira," *Automation in construction* 14, no. 2 (2005), 265-275.

<sup>85</sup> Jessica Huang, Honours thesis, *A Graphic Representation for the Derivation of the Design of Akkach House*, The School of Architecture, Landscape Architecture and Urban Design, The University of Adelaide, 1998. See also Jessica, Huang, T.W. Chang, and Antony Radford, "A Derivation Graph of Computer Models for the design process on the Web" In Tan, B.-K., Tan, M., and Wong, Y.-C., editors, *Proceedings of the fifth Conference on Computer Aided Architectural Design Research in Asia*, (2000), 307-316, Singapore. School of Architecture, Centre for Advanced Studies in Architecture, National University of Singapore.

The concept of styles in architecture is of paramount importance in the present study as the style of a building may epitomise the social, cultural, economic and political contexts of the particular place and particular time in which it was built. Recognizing a specific regional or nation-wide style is important in the context of Australian architecture because it offers insight into the vital role of architecture in shaping the built environment and constructing interpretations of Australian cultural landscape. This is, – especially relevant in the case of the Troppo practice. Through the course of modern Australian history, since the beginning of European settlement in 1788, the visual characteristics of buildings – formal elements, materials, construction detailing and techniques – have revealed social development and order, cultural changes and integration, and economic status, in particular shifts of political power and influence. A review of relevant literature reveals a broad spectrum of architectural discourse in Australia in recent decades regarding the identification of building types and architectural styles, and the relationships between these and various facets of the progression of Australian history more broadly. Specific architectural features and elements that characterise these buildings have been classified in accordance with regional and cultural influences,<sup>86</sup> climatic conditions<sup>87</sup>, social, cultural and psychological factors,<sup>88</sup> and residential typologies.<sup>89</sup> The search for style in Australian architecture during the long experimental journey from the colonial to the post-war periods was a social phenomenon through which distinctive hybrid designs in form and spatial layout gradually emerged in response to climate, the land, the built environment and the inhabitants and communities of this island continent's regional sub-cultures.

David Bridgman's PhD thesis, *The Anglo-Asian Bungalow*,<sup>90</sup> is particularly relevant as an elaborated historical narrative on the significant role of Anglo-Asian bungalows in the Northern Territory during the

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<sup>86</sup> Jennifer Taylor, *Australian Architecture Since 1960* (Canberra: The Law Book Company, 1968), Richard Apperly, Robert Irving and Peter Reynolds, *A Pictorial Guide to Identifying Australian Architecture: Styles and Terms from 1788 to the Present* (Pymble: Angus & Robertson, 1994).

<sup>87</sup> Richard Hyde, *Climate Responsive Design: A Study of Buildings in Moderate and Hot Humid Climates* (Melbourne: Taylor & Francis, 2013), David Bridgman, *Acclimatisation: Architecture for the Top End of Australia* (Melbourne: Royal Australian Institute of Architects, 2003).

<sup>88</sup> Roderick Lawrence, *Housing, Dwellings and Homes: Design Theory, Research and Practice* (Chichester: Wiley, 1987).

<sup>89</sup> Patrick Troy, *A History of European Housing in Australia* (London: Cambridge University Press, 2000), John Archer, *Building a Nation: A History of the Australian House* (Sydney: Collins, 1987)

<sup>90</sup> David Bridgman, *The Anglo-Asian Bungalow*, PhD thesis (Melbourne: RMIT University, 2006).

mid-1930s, and their stylistic influences on the architecture of the tropical north till the early twenty-first century. Bridgman points out an important fact that the 'successive generations of buildings'<sup>91</sup> not only occurred by adapting to regional influences (Papua and New Guinea, Singapore, India and South-East Asia), but was also driven by difficulties, constraints and uncertainties such as the orthodox perspective of long Northern Territory architectural history, the consequence of physical changes to the built environment caused by unpredictable natural disasters (cyclones) or a direct result of war-time bombing.<sup>92</sup> The global dissemination of bungalow designs infused with a diversity of cultures, limited local resources and experiences, tight economics and rudimentary new construction techniques developed by architects in Canberra and Darwin for the relatively isolated region of northern Australia. A region specific style for the tropical north was given the opportunity to emerge by the Department of Works in the late 1930s. Despite their advocacy of 'the colonial farmhouse model of central rooms and surrounding verandah' seen as 'utopian vision of the imperial powers in Canberra',<sup>93</sup> the important precedents of fusing cultures and adopted histories of architecture played a vital role in encouraging Troppo to develop a new design language. Bridgman used the twenty years work of Troppo as the exemplars to highlight the birth and influential revolutionary model for the creation of new styles of tropical housing designs in the Top End. In every situation, there are contingencies and uncertainties taking place along the process that contribute to unanticipated outcomes. The present research has explored how a contingent event such as Tracy Cyclone in 1974 turned into an opportunity for Troppo's regionally appropriate housing design to thrive within the conservative architectural practice of the north in the 1980s, and to revitalize recognition of the patterns and styles of vernacular tropical architecture even while the ideology of modernism remained heavily embedded in the mind of local practices that had adopted its more universal patterns and associated styles after WW II. There are other contingencies that have also intervened in the development of the Troppo practice that need to be unravelled.

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<sup>91</sup> Ibid, 4.

<sup>92</sup> Ibid.

<sup>93</sup> Ibid, abstract.

## 2.3 Contingency

Contingency is unavoidable as it is a part of life that individuals have to encounter and endure, being challenged by the uncertainty it brings. The consequences are carried forward depending on the choices individuals make. Making sense of how choices are being made reveals the circumstances, constraints and conditions impacting on individuals at the time. Consequently, through a lens of understanding 'contingency' in Troppo's real life practice in the five different regions in which it operates, this study seek to observe the nuances of design elements and 'unknown' decision-making processes that may help explain and interpret the survival and successes of Troppo's situated practice. For this purpose, Jeremy Till's concern – *mess* - in the current culture of architectural practice is the most relevant and recent scholarship on architectural contingency.<sup>94</sup> It opens up a realm of design decisions within 'mess' to explore what intangible influences potentially work in contemporary practice. Analysis of the contingent elements (humans, circumstances, things) as architects perform their discipline can help to make buildings operate in the ways they are intended for inhabitants, or can show why these buildings fail to perform their design purposes. Subsequently, such analyses can generate common inquiries that emerge in relation to derivatives of the distinctive character of buildings with aesthetic appeal, and to their functionality in the eye and mind of the beholder. There is a balance between chaos and harmony embedded somewhere along our common perceptions of mess in the world in which we live.

Till's perspective of 'mess' focuses on the dilemmas architects encounter in daily practice and forces being imposed by stakeholders in design processes. There is a disconnection for architects between the basic 'truth' of their everyday practice and the fantasy of their constructed world. Till argues that architects need to practise design with an ethical stance, as they make an irreversible impact on the physical world. They ought to demonstrate their responsiveness to specific challenges through their empathy and determination for a sustainable living environment, rather than only seeking aesthetic configurations and pure forms. He examines a tendency in current practice to examine the pure formality of form in the internationalism of architecture, instead of emphasising considerations for social constructions, regional cultural references, and implications for environmental issues and concerns.

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<sup>94</sup> Jeremy Till, *Architecture Depends* (Cambridge, Mass: MIT Press, 2009).

To engage these ideas, the following subsections offer various perspectives on Till's argument and investigate connections between mess, opportunities, contingent architecture and architects' attitudes in relation to critical regionalism and sustainability in built environments. They provide a background for comprehending the motivation of the Troppo founders to tour Australia and seek opportunities in the contingency of architectural practice within an unstable economic crisis and destructive built environments in order to seek a regionally responsive architectural identity in the Top End of Australia in the 1980s.

### 2.3.1 Definition of contingency

Contingency in this study is defined as unanticipated circumstances, events and activities. It covers personal matters, business operations, and decisions made in response to unexpected circumstances. It implicitly bears the connotations of crisis or fortuity depending on the impact of the circumstances, the nature of events, and the way in which humans respond. The idea of contingency carries a sense of the ancient Chinese philosophy of ying-and-yang (darkness and brightness) which describes how seemingly opposite forces are bearing within each other because they are interconnected and interdependent. In other words, adversities and interruptions can be regarded as opportunities in an unstable situation (yang bears within ying) and opportunities can be foreseen as hidden dilemmas in a convenient situation (ying bears within yang).

### 2.3.2 Contingency, institutional and social contexts

In Till's perception, the situation of architectural practice remains 'a social and institutional mess' in the inescapable reality of the world because 'architecture is a dependent discipline.'<sup>95</sup> Till argues that architecture is shaped more by external circumstances than by the internal thinking of the architect: 'Architecture is defined by its very contingency, by its very uncertainty in the face of these outside forces.'<sup>96</sup> Till's statement is clear and straightforward. He simply points out the truism that architectural practice is unavoidably buffeted by a wide variety of external forces such as people (clients, engineers, governmental and private agencies), building regulations, and contexts of social, cultural, economic, political and environmental pressure at every stage of the process. These pressures are a feature of the

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<sup>95</sup> Jeremy Till, *Architecture Depends* (Cambridge, Mass: MIT Press, 2009), 45.

<sup>96</sup> *Ibid.*

early stage of generation of intuitive and perceptive ideas, of the final production stage of a physical form, and of every decision made between the two stages. These external forces mediate decisions and yet they are difficult to 'teach' and integrate in design courses as architecture students are usually detached and placed in an ideal 'imaginary-real' world without having to deal with site constraints, people conflicts, financial issues and real-life circumstances. They often find themselves lost and perplexed once they join the real professional world yet, unless architecture professionals are ready, the mess remains and continues to shape the socially constructed world of architecture work.<sup>97</sup> A more informed understanding of architecture as a dependent profession is now needed, through in-depth exploration of the relationship between professional institutional and social contexts. Such exploration provides an insight into the complexity of decision-making processes, and the interactions among architects' values, attitudes and disciplinary practices, as well as uncovering the 'unseen' forces which act through dependencies in relation to the survival of their work.

*"Architecture is peculiarly exposed to these external dependencies.... Architecture is dependent on others at every stage of its journey from initial sketch to inhabitation."*<sup>98</sup>

Till argues that some particular rituals and certain codes are specifically taught to architects and other professions in the early years of their professional training for the real world. These rituals and codes are generally pre-set and architects immerse themselves within them so that they act as boundaries for 'a black box' – an isolated place of mental enclosure in which architects exercise creativity and innovative design ideas without physical limits. This is a state of virtual space where they engage with stakeholders to work on design briefs and seeking solutions for pre-assumed scenarios, constraints and conditions, as described by the architectural critic Reyner Banham.<sup>99</sup> Banham points out that architects continue with their autonomous processes in this safe-guarded world because in it they feel content and comfortable. Till argues that architects often experience ambivalence and struggle between resistance to these dependencies and their reliance on others. A 'black box' training does not prepare them for the messy contingency of real-life practice.

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<sup>97</sup> Eric Cesar, *Down Detour Road* (Cambridge, Mass: MIT Press, 2010).

<sup>98</sup> *Ibid*, 45.

<sup>99</sup> Reyner Banham, "A Black Box: The Secret Profession of Architecture", *A Critic Writes*, ed. Mary Banham (Berkeley: University of California Press, 1996), 295.

'Architecture is never alone', argued the late Italian architectural historian, Manfredo Tafuri.

*'Whereas architecture, in searching for definitive solutions to the challenges it confronts, realizes one possibility among many, history places architecture before an open field of possibilities, exposing the most stable plans to unforeseen forces that inevitably disrupt them.'*<sup>100</sup>

Japanese philosopher Kojin Karatani also claims that architecture is

*'An event, it is always contingent. It is thus a form of communication conditioned to occur without common rules – it is a communication with the other, who, by definition, does not follow the same set of rules.'*<sup>101</sup>

These statements illuminate the fact that architecture is not only a dependent discipline but also inevitably contingent as it is completely exposed to a stream of changing rules, external influences and alternative possibilities.

Till himself, quoting from Joseph Conrad, argues that 'Architecture as a discipline is thus far from a linear procedure running along idealized tramlines. It is "a balance of colossal forces."<sup>102</sup> Confidently seeking this 'balance of colossal forces' is suggested by Till as the means to confront contingency with the nature of its fragility. The same remark is made by both Zygmunt Bauman and Anthony Giddens when they each define the condition of contingency as being 'inescapable and need[ing] to be faced' in light of the impossibility of prioritizing everything and proposing feasible solutions to all problems in a real world.<sup>103</sup> Bauman further emphasizes the fact that we have, 'for better or worse, to live with that impossibility' as 'we are *bound* to live with contingency for the foreseeable future.'<sup>104</sup> He goes on to argue that to cope with this balance of colossal forces one needs 'nerves of steel' to overcome the uncertainties derived from contingency.

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<sup>100</sup> Manfredo Tafuri, *Interpreting the Renaissance: Princes, Cities, Architects*. Trans. Daniel Sherer, (London: Yale University Press, 2006), 16.

<sup>101</sup> Kojin Karatani, *Architecture as Metaphor: Language, Number, Money*, trans. Sabu Kohso, (Cambridge, Mass: MIT Press, 1995), xxxix.

<sup>102</sup> Jeremy Till, *Architecture Depends* (Cambridge, Mass: MIT press, 2009), 46.

<sup>103</sup> Zygmunt Bauman, *Mortality, immortality and other life strategies* (Chicago: Stanford University Press, 1992), 134.

<sup>104</sup> *Ibid.*



Architects' attitudes are seen as holding the key to unlock the flexibility and adaptability required for creatively facing the seemingly impossible contingencies thrown into their everyday professional life. Their attitudes create certain choices and opportunities in the face of contingencies. This perspective is strongly held by Buddhist thinker Sogyal Rinpoche, who passionately points out that uncertainty and freedom come with the realization of latent transformative potential.<sup>105</sup> This implicitly indicates the notion of freedom of 'choices' by the Italian thinker Alberto Melucci<sup>106</sup> who argues that choice makes destiny in the contingent world. This concept echoes Rinpoche's perception for the reinforcement of an alternative approach for confronting the impossibility of contingent forces. However, attitudes of 'acceptance' and 'tolerance' of our vulnerability in the rapidly changing world of architecture, have rarely been discussed in the literature or exemplified in architecture theory and everyday professional practice.

*"Because we engage with those choices with a degree of intent and vision, there is an end in sight and a hope driving that end. Where in the modern project, the end is overseen by values of truth and reason, and thus to a large extent predetermined, in the contingent world the exact end is uncertain and the choices made along the way are exposed to other forces, and in particular the hopes and intents of others."*<sup>107</sup>

Recognizing the opportunity in the uncertain contingency of architecture promotes a fruitful optimism which allows us to seek an exemplary form of transformative practice. A progressive approach for seeking this exemplary form is offered in the concept of 'Critical Regionalism.

### 2.3.3 Contingency and Critical Regionalism

Critical Regionalism is a term originally coined by Alexander Tzonis and Liane Lefaivre in a discussion of theories in modern Greek architecture, published the same year that Troppo's practice was established.<sup>108</sup> The discourse of Critical Regionalism that subsequently developed in their work, and that of Kenneth Frampton in particular,<sup>109</sup> is linked with concerns for the contingency of architecture at both regional and global levels. Tzonis and Lefaivre argue that to thrive in a coherent and sustainable

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<sup>105</sup> Sogyal Rinpoche, *The Tibetan Book of Living and Dying*, ed. P. Gaffney and A. Harvey (San Francisco: Harper One, 1992).

<sup>106</sup> Alberto Melucci, *The Playing Self: Person and Meaning in the Planetary Society* (Cambridge: Cambridge University Press, 1996), 238.

<sup>107</sup> Jeremy Till, *Architecture Depends* (Cambridge, Mass: MIT press, 2009), 59.

<sup>108</sup> Alexander Tzonis, and Liane Lefaivre, "The grid and the pathway", *Architecture in Greece*, 15 (1980): p 164-178

<sup>109</sup> Kenneth Frampton, "Critical regionalism: Modern architecture and cultural identity," In K. Frampton, *Modern Architecture: A Critical History* (1985).

world, one has to recognize the values of community in pursuit of 'an alternative way of living and unique human aesthetic experiences.'<sup>110</sup> Critical Regionalism suggests a way to 'challenge not only the established actual world but the legitimacy of the possible world view in the minds of the people.'<sup>111</sup>

Critical Regionalism is a significant paradigm by which to examine architects' work in regionally specific social and cultural contexts through the lenses of time and place. Tzonis and Lefaivre draw dynamic links between ethical values and an aesthetic perspective for locally inflected manifestations of "world culture" with like-minded theorists such as Frampton. In their article "Why Critical Regionalism Today?", Tzonis and Lefaivre point out that being a regionalist in a globalising world, an individual can be an interdependent whole with global awareness and possessing an environmental consciousness of social, economic and technological contexts. Regionalism has been a recurring tendency in cultural and architectural history, but with different characteristics at different times, from '*Romantic*' to '*Picturesque*', to the '*Over-familiarizing*' *Regionalism* of totalitarian and commercial propaganda.<sup>112</sup> They argue that in the context of the 'contemporary trend of Regionalist architecture – Critical Regionalism is, in fact, the resistance to 'the obsolescence of the region', a commitment to 'placeness',

*"...which has come about as a response to new problems posed by contemporary global development of which it is strongly critical, and that the poetics of this new movement are to a great extent different from if not antithetical to other architectural regionalist techniques of the past."*<sup>113</sup>

These authors carefully examine the evolutionary movement that defined the Critical Regionalism of the second half of the twentieth century, beginning with Lewis Mumford, through Walter Gropius, James Stirling, Kenzo Tange, the work of Alvar Aalto, and Scandinavian architecture. Mumford was seminal for his fundamental understanding that region should not focus on objects, attributes and territories but

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<sup>110</sup> Alexander Tzonis, and Liane Lefaivre, "Tropical critical regionalism: introductory comments," *Tropical Architecture: Critical Regionalism in the Age of Globalization* (2001), 1-13.

<sup>111</sup> Keith Eggener, "Resisting Critical Regionalism: A Postcolonial Perspective," S. Akkach, S. Fung and P. Scriver, eds. In *Self, Place and Imagination: Cross-Cultural Thinking in Architecture, The 2nd International Symposium of the Centre for Asian and Middle Eastern Architecture, Adelaide* (1999).

<sup>112</sup> Alexander Tzonis, and Liane Lefaivre, "Why critical regionalism today," *A+ U-ARCHITECTURE AND URBANISM* 236 (1990), 23-33; Alexander Tzonis, and Liane Lefaivre, and Bruno Stagno, eds. *Tropical Architecture: Critical Regionalism in the Age of Globalization* (New York: Wiley, 2001).

<sup>113</sup> Alexander Tzonis, and Liane Lefaivre, "Why critical regionalism today," *A+ U-ARCHITECTURE AND URBANISM* 236 (1990), 23-33.

rather look at contexts in relation to economic rationality, ecological sustainability and community.<sup>114</sup> He emphasized the concept of regionalism by highlighting 'the actual conditions of life' and the feelings of inhabitants which 'make them feel at home', in resistance to the lack of humanity in the 'mechanical order' issuing from the 'international style' prevalent in contemporary architecture.<sup>115</sup> Thus, there is a defence of nostalgia for the past and a resistance to enthusiasm for a homogenous International style. Hertzberger describes this 'feeling at home' as a sense of 'belonging' or a sense of place - *Genius Loci* - that coheres with Mumford's perception. He states that:

*"The architects can contribute to creating an environment which offers far more opportunities for people to make their personal markings and identifications, in such a way that it can be appropriated and annexed by all as a place that truly 'belongs' to them."*<sup>116</sup>

Thus, while Critical Regionalism remains an elusive concept for a style or a theory of design, it has asserted some validity as a critical concept for human experience in the creation of architecture.

As a progressive approach, Critical Regionalism takes an ethical stance, for understanding a specific regional-cultural context and expanding the realization of this understanding to a world-realm cultural context. The term 'critical' does not imply constraints or rules for the making of forms, but rather indicates a high level of self-critical consciousness in the processes of making form for a particular site and its contexts. In this way, architects have freedom of choice in recognizing the underlying opportunities presented by Critical Regionalism for adapting the conditions of a site and the richness of regional culture as sources of patterns. Distinctive characteristics of architectural forms can be created by utilizing robust materiality and tectonic poetics for creating positive sensual experiences in everyday living. Critical Regionalism also offers a progressive stance for a 'hybrid' or 'mixed' architecture in responding to contingencies by designing from direct environmental concerns and critical awareness for sustainability. In this respect, there is a need to draw relationships between contingency and sustainability as interdependent influences on architectural practice.

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<sup>114</sup> Mumford, quoted in Liane Lefavre and Alexander Tzonis, "The suppression and rethinking of regionalism and tropicalism after 1945," *Tropical architecture: Critical regionalism in the age of globalization* (2001), 14-58.

<sup>115</sup> Lewis Mumford, "Utopia, the City and the Machine," *Daedalus*, (1965), 271-292, Lewis Mumford, *Technics and Human Development: The Myth of the Machine, Vol. I* (Washington: Harvest Books, 1971), Lewis Mumford, *Technics and civilization* (Chicago: University of Chicago Press, 2010).

<sup>116</sup> Herman Hertzberger, *Lessons for Students in Architecture*, trans. (1991), 125.

### 2.3.4 Contingency and sustainability

There are innumerable definitions of 'sustainability'. The word has been applied to and extensively used in a broad range of social, economic and environmental contexts at micro and macro levels over the last three decades. In architecture it started as a critical yet fundamental concept for fulfilling the basic human need for shelter.<sup>117</sup> In *the Dimensions of Sustainability* symposium held in 1998, Andrew Scott points out that prominent researchers, design practitioners, and academics examined the meaning of the term, seeking feasible ways in which architecture can integrate a meaningful and sophisticated understanding of environmental change and performance into design decisions.<sup>118</sup>

*"What it [sustainability] actually becomes is not just an environmental strategy but a means of making buildings that are more user responsive, more humane places to inhabit, more intelligent in the way they balance their energy flows, more respectful of nature and the resources it offers, and more understanding of buildings having a life span during which they undergo substantial change and adaption. Put together, it simply equates to better designed places in tune with the environment."*<sup>119</sup>

An awareness of sustainability inescapably influences design and construction and beyond the completion of a building for its future performance. For architects, taking an ethical stance requires a deep understanding of the long-term importance of sustainability as an essential part of design decision-making processes. In *Understanding Sustainable Architecture*, Williamson, Radford and Bennetts refer to architects performing 'beautiful acts' in designing more sustainable buildings.<sup>120</sup> These 'beautiful acts' resonate with what Alexander conceives as architects' responsibility for 'healing the site' and also reflect what Swiss architect Mario Botta envisages as an engagement in building the site.<sup>121</sup>

In his book, *Design with Nature*, Ian McHarg advocates that designers should 'work *with*, not *against*, nature.'<sup>122</sup> He recognizes the importance of harmony and responsiveness between nature and material

<sup>117</sup> Brundtland Commission (World Commission on Environment and Development), *Our Common Future* (Oxford: Oxford University Press, 1987).

<sup>118</sup> Andrew Scott, *Dimensions of Sustainability: Architecture, Form, Technology, Environment, Culture* (London: E & FN Spon, 1998), 8.

<sup>119</sup> Andrew Scott, *Dimensions of Sustainability: Architecture, Form, Technology, Environment, Culture*, 3.

<sup>120</sup> Terry Williamson, Antony Radford, and Helen Bennetts, *Understanding Sustainable Architecture* (London: Spon Press, 2003).

<sup>121</sup> Mario Botta, "Architecture and Environment", *Architecture and Urbanism* 105 (1979), 51-110.

<sup>122</sup> Ian McHarg, *Design with Nature* (New York: American Museum of Natural History, 1969), 126.

structure when 'building become[s] one cell in a larger ecological and cultural system.'<sup>123</sup> McHarg's argument conjures the spirit of design consciousness in architects depending on the engagement with both 'things' (living and non-living things) and human desires. This spirit of design consciousness is recognised as an architect's ethical concerns, considerations and compassions to constitute their responsibility for a sustainable living and built environment. The awakening of this consciousness is an act of faith and reconciliation by an architect who demonstrates his or her understanding of theory about sustainability and establishes cohesive relationships between nature, building and things. This faith confronts the contingency of the myriad of challenges and difficulties in the 'mess' of architectural practice by asserting ethical values.

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<sup>123</sup> Terry Williamson, Antony Radford, and Helen Bennetts, *Understanding Sustainable Architecture*, 135.

## 2.4 Values

For architects to embrace and integrate their ethical concerns in the fulfilment of their responsibility in the design of buildings, they inevitably confront architecture values. Vitruvius, the Roman architect and engineer, defined three essential components of architecture values, *firmitas* (solidity or firmness), *utilitas* (functionality or commodity), and *venustas* (beauty or delight).<sup>124</sup> These components have equal value in achieving harmonious and responsive design. 'Values', as they are conceived in architectural practice, have no monetary worth but carry emotional currency and are taken to present standards of behaviours, beliefs and principles. In this way, they influence the priority, worthiness and importance of an idea or a concept for a design. For centuries, the making of authentic architecture for enhancing life has been a priority for architects. It is clear that Vitruvius's three architectural values are primarily taken from anthropocentric approaches to the human-centred ethics of the time.

Over the years, there has been a gradual shift away from these anthropocentric approaches to human-environmental ethics towards a non-anthropocentric approach as 'an exploration of alternative moral' positions,<sup>125</sup> and eventually to environmental ethics that has expanded since the early 1970s. This trend follows the published evidence for climate change, increasing population, land development and exploitation through advanced technology, scarce resources, ever greater extinction and endangering of wild life, and irreversible damage to living environments. These developments have strengthened the role of architects' values in relating their design decisions to work ethics and environmental concerns, as articulated in Warwick Fox's philosophical treatment of 'responsive cohesion'.

Fox's concept of responsive cohesion includes the built environment as a priority. In his book *A Theory of General Ethics: Human Relationships, Nature and the Built Environment*, he argues that the most relevant and fundamental value for a designer deals with the quality of the relations among the internal components of a 'thing' (living or non-living, or an artificial structure, or an organic system), and those that exist between the 'thing' and its contexts.<sup>126</sup> These contexts refer to three environments: the human

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<sup>124</sup> Vitruvius Pollio, *Vitruvius: The Ten Books on Architecture* (Cambridge: Harvard university Press, 1914).

<sup>125</sup> Baird Callicott, "Non-anthropocentric value theory and environmental ethics," *American Philosophical Quarterly*, Vol. 24, no. 4 (1984), 299.

<sup>126</sup> Warwick Fox, *A Theory of General Ethics: Human relationships, Nature, and the Built Environment* (Cambridge, Mass: MIT Press, 2006).

environment, the materialised-cultural environment, and the larger natural or bio-physical environment. Fox's theory focuses on achieving responsive cohesion between the 'thing' and multiple other 'things' and their contexts in a mutual state. Responsive cohesion refers to the quality of relations that exists internally as well as contextually. According to Fox, a 'relational quality' of responsive cohesion occurs,

*"whenever the elements or salient features of things can be characterised in terms of interacting (either literally or metaphorically) with each other in mutually modifying ways such that these mutually modifying interactions serve (at least functionally if not intentionally), generate or maintain an overall cohesive order – an order that 'hangs together' in one way or another."*<sup>127</sup>

This order 'cuts across the literal/metaphorical distinction',<sup>128</sup> including tangible and intangible 'things' in human-constructed and natural environments. Thus the ideal of Fox's theory of responsive cohesion embraces the conventional categories of inter-human ethics from the anthropocentric approach, in balance with the now recognised values of environmental ethics.

In order to fully review the concept of value in an architectural context, the following sub-sections will begin by defining the existing ethical values developed from anthropocentric perspectives and then move to consider the perspective from environmental philosophy. This is followed by Fox's proposition for a general ethics that embraces the built environment. Drawing connections between Fox's responsive cohesion, Alexander's patterns, contingency and sustainability can, I argue, assist in understanding the significance of Troppo's work.

#### 2.4.1 Definition of value

Value can be defined as a set of principles or standards held by individuals who assign certain importance and worth to things, opinions, events and people. Value possesses no rules and fixed assumptions but has famously been regarded as an aspect of 'human consciousness'<sup>129</sup> for 'a consequence of choices'.<sup>130</sup> Value, in any form of discussion in this study, is taken as the French

<sup>127</sup> Ibid, 72.

<sup>128</sup> Ibid, 66.

<sup>129</sup> Edward Anderson, Lisa Bohon, and Lee Berrigan. "Factor structure of the private self-consciousness scale," *Journal of Personality Assessment* 66, no. 1 (1996), 144-152.

<sup>130</sup> Jean-Paul Sartre, *Existentialism and human emotions* (New York: Citadel Press, 1985), Philippe D'Anjou, "An alternative model for ethical decision-making in design: A Sartrean approach," *Design Studies* 32, no. 1 (2011), 45-59.



philosopher, Simone de Beauvoir's moral freedom to present the full rights, growth, and subjective responsibility for adopting moral principles and beliefs.<sup>131</sup> It carries no meaning of financial worth but indicates the particular standards, and social rituals of conscientious mental currency that an individual upholds. It varies and changes in accordance with an individual's circumstances and conditions, and reflects the mental-state of a person at the time of a given situation.

### 2.4.2 Anthropocentric approaches to ethical values

Architecture is a creative art that seeks meaningful experience for humans with 'philosophical, symbolic, social and artistic importance.'<sup>132</sup> This experience is initially created to fulfil the basic need for shelter for the body in everyday life. Over time, the basic need is extended and associated with expectations, dreams, fantasies, desires and the power created by an experience of architecture. Furthermore, Tom Spector suggests that the expectations and dreams are of improvement for a better way of living. Pallasmaa's idea of 'contour[ing] of our consciousness'<sup>133</sup> highlights fantasies, desires and dreams arising from an architect's innermost mental space; and finally, power is experienced in the innovative ability to create the aesthetic and meaningful forms which represent 'visions of social and cultural frontiers' in the world.<sup>134</sup> Anthropocentric approaches in design have been adopted in practice for a long period of time in order to construct a better world in which creating desirable experiences for humans-centred living environments such as pleasure, comfort and aesthetics is the ultimate goal.

In the earlier anthropocentric approaches, Vitruvius's three categories of architectural values are assurances for achieving these intangible objectivities. Here, there is an indication of redefining the purpose of shelter beyond protection for the body, shifting its basic purpose from physical safeguard to a sophisticated social and psychological experience. Shelter is no longer addressed as physical protection but also as a factor in living quality and an expression of cultural significance and historical installation. The conception of style holds a key to understanding Vitruvius's architectural values. The

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<sup>131</sup> Simone De Beauvoir, *The Coming of Age* (New York: WW Norton & Company, 1996).

<sup>132</sup> Tom Spector, *Ethical Architect: The Dilemma of Contemporary Practice* (New York: Princeton Architectural Press, 2001), 177.

<sup>133</sup> Juhani Pallasmaa, *The Thinking Hand: Existential and Embodied Wisdom in Architecture* (Chichester: Wiley, 2009), 9.

<sup>134</sup> Tom Spector, *The Ethical Architect: The Dilemma of Contemporary Practice*, 177.

expression of style celebrates the validity of the architectural values of the architects' work, and yet it implicitly denotes parochialism in the purity of architectural aesthetics from a material-cultural perspective. Aesthetic appreciation is fixed, with fixed relationships between humans, buildings and aesthetic values for architectural appeal.

In the nineteenth century, aesthetics empowered the solidity of a style as it came to form an ethical basis for constructing a core set of architects' skills for good architecture. A.W.N Pugin, a prominent English architect and artist of the time, argued that the key responsibility of the architect is to construct a city with beautiful buildings in an ethically valuable style. The responsible architect, according to him, needs to realize the ethical duty and aesthetic sensibility of the time in architecture.<sup>135</sup> In *Seven Lamps of Architecture*, John Ruskin, the English art critic and social thinker, emphasizes that the role of the architect presupposes an obligation to progressively replace appalling buildings with more aesthetic buildings.<sup>136</sup> There is a conviction of 'this fusion of beauty and morality',<sup>137</sup> requiring, as Lagueux argues, the 'operation of cleaning the architectural world and of improving the life of its inhabitants.'<sup>138</sup> The ethical values of architects are thus associated with the capability of their aesthetic judgements that defines them as responsible architects and justifies their aspirations for creating better living conditions.

Karsten Harries goes on exploring the ethical aspects of architectural design. In *The Ethical Function of Architecture*, Harries emphasizes the suppression of the 'human dimension of dwelling' by the forces of modernity. He argues that the meaning of ethics is beyond 'its task to help articulate a common ethos.'<sup>139</sup> In his writing, he makes a critique of modernism, the static abstractions of postmodernism, the false impression of a hope for aesthetics, and the autonomous deterioration of architectural languages in 'an ever more disorienting world.'<sup>140</sup> He suggests that a person needs to learn to express 'more' appreciation and to cultivate his or her differentiations through the works of architecture. He argues that 'a view of aesthetic appeal' in the making of architecture can be achieved when he or she creates a design with

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<sup>135</sup> Augustus Pugin Welby Northmore, *Contrasts: Or, A Parallel Between the Noble Edifices of the Fourteenth and Fifteenth Centuries and Similar Buildings of the Present Day* (1836).

<sup>136</sup> John Ruskin, "The Seven Lamps of Architecture. Vol. 5 of The Complete Works of John Ruskin," The Library Edition 39 (1894).

<sup>137</sup> Maurice Lagueux, "Ethics versus aesthetics in architecture," In *The Philosophical Forum*, vol. 35, no. 2 (2004), 125.

<sup>138</sup> Ibid.

<sup>139</sup> Karsten Harries, *The Ethical Function of Architecture* (Cambridge, Mass: MIT Press, 1997), 4.

<sup>140</sup> Ibid, 4.

an ethical approach.<sup>141</sup> He also argues that by doing so, architects could make architecture meaningful with 'the interpretation of a way of life valid for our period.'<sup>142</sup> Harries employs Pevsner's conviction in the power of 'aesthetic appeal' that inevitably defines the beauty, functionality and meaning of a building without imposing any presupposed opinions. He also praises Panofsky's analysis on experiencing the pleasure of seeing the intangible attributes of the object. He states that someone who 'simply and wholly abandons himself (or herself) to the object of perception will experience it aesthetically,'<sup>143</sup> and that ethics are an integral component of this perception.

'Ethics and aesthetics are mutually dependent' one upon the other.<sup>144</sup> The fundamental values of architectural ethics focus on enhancing the aesthetic appeal of buildings from within the dimension of the material world in which people live. Till argues that architects are regarded as 'arbiters of aesthetics' and they are placed as central figures in this human-material ethical process.<sup>145</sup> He points out that the concept of 'a loop' best describes the relationship between ethics and aesthetics, and the danger of losing the unity of beauty and wholeness arises in the potentially out-of-loop, the 'place-less' character of architectural buildings. He claims that:

*"Good aesthetics, in the form of beauty, leads directly to good life, in the form of an ethical society, and equally that ethical society is the necessary context for good aesthetics."*<sup>146</sup>

Till raises a different view from this perception of being in 'a loop' focusing on a relationship between ethics and aesthetics. He argues that the core skill of an architect is to develop an understanding of 'the other', an awareness of place and natural environment which is the responsibility of environmental ethics and of sustainability. He points out that this recognition of 'the other' is crucial in architecture as difference is continuously emerging in the phenomena of daily living, yet are routinely suppressed in our living environments.<sup>147</sup> The sense of disrespect for 'the other', including living creatures and non-living

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<sup>141</sup> Nikolaus Pevsner, *Shropshire: The Buildings of England Series*, (1958), Nikolaus Pevsner, "New Architecture and New Art," *New Zealand Listener* 40, no. 1010 (1958), 4.

<sup>142</sup> Sigfried Giedion, *Space, Time and Architecture*, 5<sup>th</sup> eds, (Cambridge: Harvard University Press, 1974), xxxii.

<sup>143</sup> Karsten Harries, *The Ethical Function of Architecture*, 23.

<sup>144</sup> Jeremy Till, *Architecture Depends* (Cambridge, Mass: MIT press, 2009), 175.

<sup>145</sup> *Ibid.*

<sup>146</sup> *Ibid.*

<sup>147</sup> Till, *Architecture Depends*, 175.

objects, is often disregarded in the process of seeking unity in the beauty of forms and in the assumed quality of a culturally material-constructed world. Awareness of place and the natural environment shapes the space and place in which inhabitants live in profound ways. By extension, this awareness is a 'place-based'<sup>148</sup> cognition that has invisible impact on the local communities and natural environments it touches.<sup>149</sup> Recognizing differences and significance of a place influences our social behaviour, action and connection to the place in which we live.<sup>150</sup> The aesthetic appeal of buildings only becomes pleasant and cohesive when ethics is included.

An architect working in this ethic focuses on the improvement of the physical quality of everyday living, facilitating inhabitants' emotional well-being as well as caring for the fragility of the bio-physical world.<sup>151</sup> This is addressed by Warwick Fox in the theory of responsive cohesion.

#### 2.4.3 A general ethics of the built environment

Warwick Fox's general theory of responsive cohesion offers an understanding of everyday moral dilemmas that people encounter in that it recognises a value that embraces both inter-human and environmental ethics in all contexts. Fox declares that this ethical value 'exists at a deep, general or abstract level of analysis'.<sup>152</sup> Under most circumstances, people perceive a thing, and position themselves through an opinion of people, events and matters with a personal judgement based on an anthropocentric approach to the non-material structure of human existence. They generally try to be objective and display a freedom of choices, as people innately comprehend the moral significance of ethical values, but there is no obligation attached to them. These deep and general sources of value, Fox argues, are worth recognizing and appreciating as principles that we ought to live by in this world.<sup>153</sup>

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<sup>148</sup> Greig Guthey, Gail Whiteman, and Michael Elmes, "Place and Sense of Place: Implications for Organizational Studies of Sustainability," *Journal of Management Inquiry* (2014).

<sup>149</sup> Michael Elmes, Scott Justo, Gail Whiteman, Robert Hersh, and Greig Guthey, "Teaching social entrepreneurship and innovation from the perspective of place and place-making," *Academy of Management Learning & Education* (2012).

<sup>150</sup> David Burley, Pam Jenkins, Shirley Laska, and Traber Davis, "Place attachment and environmental change in coastal Louisiana," *Organization & Environment* 20, no. 3 (2007), 347-366.

<sup>151</sup> Christopher Alexander, Hansjoachim Neis, and Maggie Moore Alexander, *The Battle for the Life and Beauty of the Earth: A Struggle Between Two World-Systems* (London: Oxford University Press, 2012).

<sup>152</sup> Warwick Fox, *A Theory of General Ethics: Human Relationships, Nature, and the Built Environment* (Cambridge, London: MIT Press, 2003), 56.

<sup>153</sup> *Ibid.*

Consequently, his theory of responsive cohesion advocates a fundamental and general approach for seeking these sources of value.

Fox describes fundamental (or foundational) values as those that we ought to 'live by'. He has developed an approach integrating both anthropocentric and non-anthropocentric forms of value. This view has had its critics, who see it as 'ends-oriented' and 'non-anthropocentric',<sup>154</sup> and 'misanthropy' and 'totalitarianism'. It differs from the holistic and relational theories of values for environments in order to grasp a secular basis for the ideas of human dignity, intrinsic values and individual responsibility.<sup>155</sup> However, these values should be understood as a guide rather than a method to teach us what to do in any situation. There is no fixed rule for how people should act in the world but a deep and general interpretation derived from what Till refers to as 'different ways of thinking'.<sup>156</sup>

A 'relational quality' or 'form of recognition' is the core principle of responsive cohesion that one needs to recognise 'a quality of the relations between the internal components of a "thing" and between the "thing" and its contexts.'<sup>157</sup> This notion of an abstract relational quality between the internal components of a 'thing' and between the 'thing' and its contexts is linked to the notion of 'connections' between patterns according to Alexander's description. Fox's 'relational quality' for responsive cohesion and Alexander's 'connections' for pattern language are also stressed by Zygmunt Bauman as he expands the earlier thought of Emmanuel Levinas<sup>158</sup> that in this quality lies an ethical stance for 'assume(ing) responsibility for the Other.'<sup>159</sup> The significance of upholding the ethical thinking and responsibility is apparent to make people, things and their contexts work together as a whole.

Thinking for the 'Other' represents the fundamental value of an ethics. It is an adhesive that connects each component of a pattern into a sequence as well as into other patterns to form a 'whole'. Levinas proclaims a simple and direct definition of an ethics, originally stated as 'being-for the Other'. This

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<sup>154</sup> Carlos Silva, "Urban planning and ethics," *Encyclopedia of Public Administration and Public Policy* (2005), 311-316.

<sup>155</sup> Andrew Brennan, and YS Lo, *Understanding Environmental Philosophy* (Durham: Acumen, 2010), 138-182.

<sup>156</sup> Jeremy Till, *Architecture Depends*, 164.

<sup>157</sup> Antony Radford, "Urban design, ethics and responsive cohesion," *Building Research & Information* 38, no. 4 (2010), 379-389.

<sup>158</sup> Emmanuel Levinas, "Time and the Other. 1947," *The Levinas Reader*, ed. Sean Hand (Oxford: Basil Blackwell, 1987), 37-58.

<sup>159</sup> Zygmunt Bauman, *Globalization: The Human Consequences* (New York: Columbia University Press, 2000), 389.

emphasizes the dynamics of social and cultural space rather than the 'statics of vision' that is fixed ethics when morals are conflated with a universal code of morals, as envisaged by Harries.

Till elaborates further the meaning of 'Other', based upon the notion of an anthropocentric 'Other' in terms of social relations. He points out that a crucial relationship exists between the 'Other' and the individual, which is co-related and not mutually exclusive, especially in architectural practice. He argues that the 'Other' is 'inevitably diverse and unpredictable, and so an ethical stance must accept this difference rather than attempt to muffle it under a blanket of universal morals.'<sup>160</sup>

The meaning of understanding the 'difference' for the 'Other' in social and cultural contexts is particularly well illustrated by a student project carried out in Canada. In *Thinking the Other: Towards Cultural Diversity in Architecture*, Tania Martin and Andre Casault have raised an increasingly difficult challenge for architects facing current problems in designing for diverse communities due to the lack of considering the 'Other' as being 'different'.<sup>161</sup> In order to investigate the significant difference of the 'Other' in divergent architectural practice, they collaborated with a group of their students and the Innu of Uashat mak Mani-Utenam, a group of First Nations peoples in Quebec, to develop housing prototypes that would demonstrate the sense of 'hybrid' of traditional and modern values. Through this project, they emphasize that it is 'essential' to understand concepts of differences and divergence in current architecture as a core value. Martin and Casault express their understanding that a successful project depend on the fact that:

*"People tacitly construct their personal and group identities against the "other" or others as it is commonly through comparison, a process of figuring out how one differs from and how one is similar to another that ultimately yields understanding and respect of self and other."*<sup>162</sup>

Then, from a regional perspective, understanding the 'Other' offers an opportunity to think about the significance of community values, and, as we have seen, Critical Regionalism shares similar concerns for the value of linking aesthetics and ethics at both regional and global levels. This linking is emphasized

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<sup>160</sup> Jeremy Till, *Architecture Depends*, 164.

<sup>161</sup> Tania Martin, and André Casault, "Thinking the Other: Towards cultural diversity in architecture," *Journal of Architectural Education* 59, no. 1 (2005), 3-16.

<sup>162</sup> *Ibid*, 3.

by Anthony Radford in the journal article, 'Responsive Cohesion as the Foundational Value in Architecture', when he argues that 'the core skill' of architects refers to a general ethical value applied to the distinctive field of architecture. He claims that:

*"If an ethic of responsive cohesion underlies our design process, the architect's core set of skills moves from being purely the invention of beautiful forms through a spatial/material language to a core aptitude involving the connection of all natural, social, and material contexts surrounding a construct. In other words, "core skill of an architect is the ability to give effect to a general foundational value within the specific domain of architecture. This skill distinguishes architects from other members of society." <sup>163</sup>*

For an architect, value must lie in the integration of ethics and aesthetics within the specific frame of design.

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<sup>163</sup> Antony Radford, "Responsive cohesion as the foundational value in architecture," *The Journal of Architecture* 14, no. 4 (2009), 532.



## 2.5 Summary

This chapter has offered a range of theoretical perspectives on how the design of everyday built space can be understood in relation to: the creative design of form-patterns; architect's ethical and aesthetic values; constructed social experiences; environmental impacts and concerns; and interpretations of lifestyle in a given place and time. Analysing the process of creating innovative everyday spaces, recent discourse on the nature of contingent architectural practice draws out the responsibilities that architects have in confronting the challenges they meet. Their work reflects the distinctive natural characteristics of the local environment, and interprets the identity of regional culture in a variety of building types and design forms. Understanding 'place' is the means to produce the everyday 'lived' design of regional architecture which is rooted in sites, local culture and natural environments. Quality in this process can be achieved through an architect's positive mindset for an environmentally-friendly lifestyle and for recognizing the significance of responsive living in relation to the physical world, that is holding ethical values for considering 'others', living and non-living things, to achieve harmonious co-existence in the larger ecological system. This chapter has addressed the importance of making everyday space by linking the creation of innovative patterns of physical built forms to design processes that seek possibilities, with flexibility, tolerance and acceptance of the constant changes of everyday life, and to architect's ethical values for healing undeveloped and damaged built environments. In this way this chapter has provided a theoretical framework for exploring the design principles, theory and methods that inspired the aspirations of the Troppo practice. Alexander's pattern language, Till's perception in challenging contingency in architecture, and Fox's responsive cohesion provide relevant design theories to make sense of Troppo's design ideas and values for the design of houses. They will be examined in Part 2 in relation to Harris's and Welke's attitudes towards circumstances, difficult situations, changes of social, cultural and environmental contexts while Troppo expanded from one to five regional offices. The following chapter presents the research methodology and procedures through which this study was conducted.

## Chapter 3

### Research Design and Methodology

This study utilises qualitative research on design to investigate the research questions using concepts of patterns, contingency, and responsive cohesion. The methodology used in this research combines design-based methods to seek answers, and to accomplish the research aims and objectives. These methods are based on a theoretical framework established in the literature review in Chapter 2, case study, interview, and explanatory observation. The methods are specifically used to collect primary data (visual, written and oral sources), to analyse interview transcripts to extract themes and patterns, and to compare the designs of Troppo's built work through the lenses of time and of regional social, cultural and environmental contexts.

### 3.1 Introduction

Chapter 2 provided a literature review background of the theoretical framework for this research: pattern, contingency and responsive cohesion. This framework comprises three themes that explore form-making in Troppo's design processes, seek reasons for certain solutions and decisions made in response to circumstances and challenges in practice, and examine Troppo's responses to changing social, cultural and environmental contexts over time. Since this study is qualitative research, the methodology used is to investigate various design factors, circumstances and situations affecting the designs of houses in Troppo's thirty-three-years of practice from the Top End dispersing to five regions across Australia. There would be no specific coding program needed for seeking general patterns in word and language usage in interview as the number of interviewees and the length of interviews were manageable. Due to the nature of this design-practice-based research, the three research methods proposed are case study, interview, and exploratory observation. These three methods offer ways to look in depth at verbal descriptions, written narratives, graphical representation, sense-making decisions in process, and work and life experiences. By using these methods, the analyses present information that is meaningful and 'information rich' about human experience to capture a thick description<sup>164</sup> and connection between the meaning of architecture, unexpected circumstances and events, and the architects' ideology and design philosophy for constructing a vision of a sustainable world.

Case study offers a context-specific-based method to examine collected data in depth and breadth. Interview offers interviewees a means to position themselves in a situational context to be able to recall and depict the time of relevant events and activities in a natural-environment. Exploratory observation gives an observer (the researcher of this study) the opportunity to take notes and gather relevant information without disturbing the flow of events or activities.

Due to the complexity and number of design works Troppo have done over the years, the scope of this research focuses on their built houses in Australia. This study concentrates on houses designed and

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<sup>164</sup> Clifford Geertz, "Thick Description: Toward an Interpretive Theory of Culture," in *Readings in the Philosophy of the Social Science* (1994), 213 – 231.

constructed in the first (1980 – 1990) and recent decade (2003 – 2013) of their practice<sup>165</sup>. The primary reason for only looking at the houses in the first and the recent decade was to seek similarities and differences in the designs of Troppo houses with a span of a decade apart. Since Troppo and the regional offices produced over a thousand residential projects at various scales and types, criteria for the selection process of early and later houses was crucial as they might generate different answers to the research questions. The primary research question focuses on seeking relationships between Troppo's Darwin office and the other four regional offices through the designs of houses they produce in different times and places, and how contemporary regional designs reflect Troppo's ethos and relevance to an everyday lifestyle in particular. Some tactics are deployed to explore the answers for the secondary research questions.

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<sup>165</sup> There was an eleven-year gap between the first decade and the recent decade of Troppo's practice. During this gap, Troppo mainly received commissioned projects from the Northern Territory government to build medium-density military housing complex, community centre and school and public housing. There were only a few private residential projects.

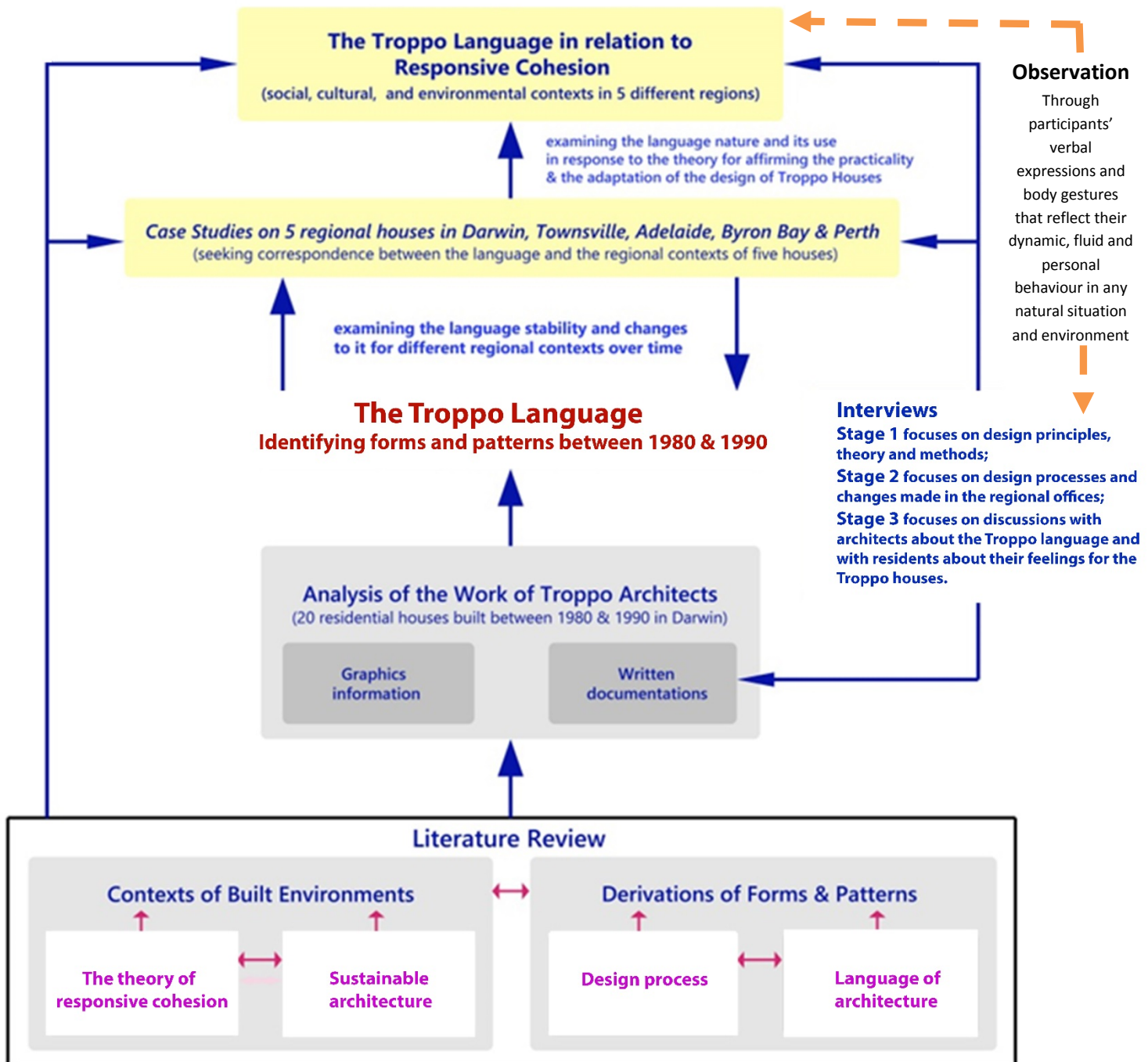


Figure 3.1 This conceptual diagram displays an overview of how theoretical framework, research methodology and methods work together for seeking the answers of the research questions.

### 3.2 Three Stage tactics

In stage one a corpus of early Troppo houses was examined to seek repetitive forms, commonly used materials, specific sequences of spatial arrangements, and frequently used architectural components, details and construction methods. These features can be characterised to form a representation of Darwin Troppo houses in the 1980s, and be regarded as a Troppo language reflecting their expertise in Tropical architecture during a decade of practice. In stage two, this language was then used to compare contemporary regional houses to reveal nuances developed over time. Tactics for stage two investigated the nature of Troppo's expansion to five regional offices. Circumstances, unexpected human factors, and influential situations and aspects were sought for their impact and affect on Troppo's values, attitudes, and ethos in contemporary housing design. Tactics for stage three drew interconnections, relevance and significance of the findings in relation to design themes – patterns, contingency and responsive cohesion. The thesis concludes by briefly examining how patterns developed in the designs of Troppo houses over three decades of practice are useful to designers, architects, students and other professionals in enhancing ways of creating everyday spaces in response to social, cultural and environmental contexts.

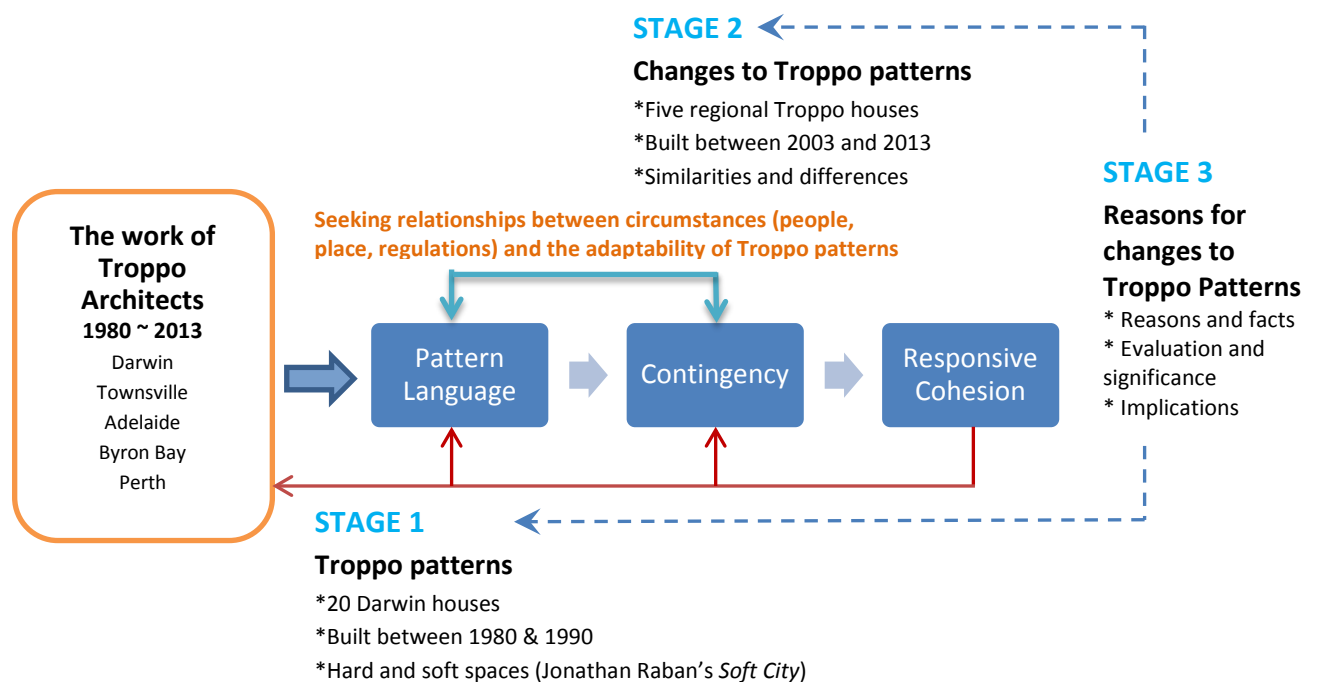


Figure 3.2 The conceptual diagram for the 3 stages of the theories applied in the research.

### 3.3 Scope and Limitations

One thousand four hundred and eighty-one houses<sup>166</sup> are recorded in Troppo's special job-record notebook up to 2003. A list of criteria was therefore needed to narrow down to an appropriate number of case study houses. The criteria were based on the merit and significance of houses that suited the nature of the case studies. The scope of this study seeks the presence of patterns in hard (physical and architectural) space and soft (psychological and sensual) space, any contingency that causes changes to the patterns, and the state of achieving responsive cohesion in relation to the quality of lived everyday spaces. The criteria were:

- the early houses built in the first decade should be in Darwin;
- each selected house must be recommended or endorsed by Troppo, such as Harris and Welke for the selection of the 1980s Darwin houses, and the regional directors for the selection of contemporary houses;
- a corpus of early Darwin houses was recommended by Welke for design significance, supplied by merit demonstrated by awards, and being used as references in publications;
- some accessibility for site visits to take photographs and the surroundings,
- the occupants' availability for interviews and a house tour for the five contemporary houses;
- all selected houses have gone through design and construction processes with Troppo, and are currently occupied and used as a family home.

This set of criteria imposed some limitations on this research, requiring the selected houses to be designed and built within specific time-frames.

The following section describes how research methods were used to analyse the first-hand data — written, verbal and graphic materials — for seeking repetitive design features and characteristics of spatial planning, and the connotations associated with the use of certain building materials, details and

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<sup>166</sup> According to the record of Troppo's job bookkeeping and Welke's explanation in an interview in 2010, the number hits one thousand four hundred and eighty-one number job and the recording is then stopped after the year 2003 due to the scribbles of children all over the page.



construction methods. Most importantly, the methods were used to search for the meaning of these design components in relation to Troppo's values, attitudes and ethos.

### 3.4 Research methods

The methodology is a constructivist hermeneutic approach for interpreting the verbal materials of 'unheard truth' and 'worthiness' as socially constructed fragments, values and beliefs of individuals. This approach makes sense of how Troppo, its partners and clients interact in design processes, and the derivation of design outcomes associated with their understanding and the ways they perceive everyday living in this world. The analysis of the collected information and the way transcribing the findings is based from a third-person interpretative perspective. A hermeneutic approach reveals unknown, unheard, and unseen design patterns and actions through illustrations and narratives.

Case study, interview and exploratory observation were the three methods for getting closer to the 'reality' of participants' views of the world and for exploring the 'social construction of knowledge'.<sup>167</sup> The case study approach offers an in-depth understanding of the physical making of an artefact. By analysing designs and the design-making processes of Troppo houses, an insight is offered into the impact of Troppo's values and rigor on form and practice. Interview and exploratory observation are tactics for unravelling the influences of external forces (people, circumstance and policy), unanticipated events and circumstances. Both offer an opportunity to depict the unseen interactions with the inhabitants/clients, partners of practice, in-house architects and Troppo through the tone of voice, body gestures and verbal descriptions of their relationships. Figure 3.3 illustrates how these methods sought answers to the primary and secondary research questions and offer ways to accomplish the aims and objectives of this study.

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<sup>167</sup> Egon Guba and Yvonna Lincoln, "Competing paradigms in qualitative research." *Handbook of Qualitative Research 2*, (1994), 163-194.

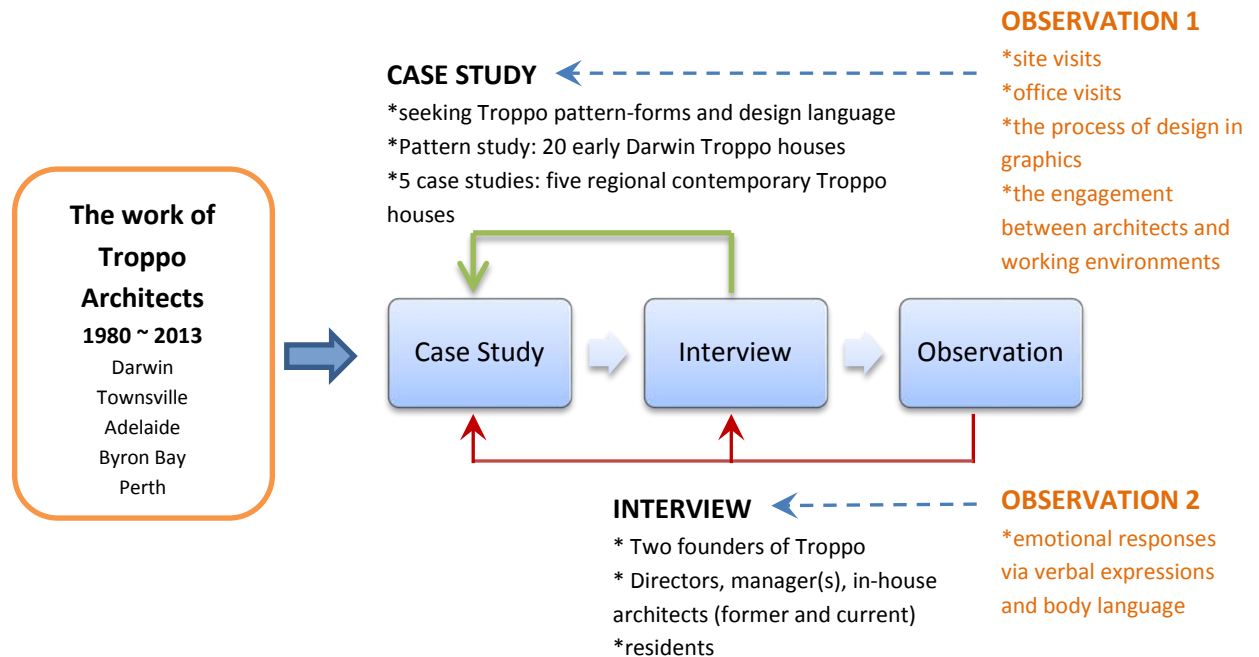


Figure 3.4 This conceptual diagram presents the research methods and ways of operation

### 3.4.1 Case study

Case study is a method for a holistic and in-depth investigation. This method aims to identify the relationships between participants, real-life contexts, boundaries and contemporary phenomena.<sup>168</sup> It helps to set up a context for understanding multiple perspectives of 'insiders' for real-life contexts, and retrieve interpretative findings which can be as close as possible to reality.<sup>169</sup>

<sup>168</sup> Robert Yin, *Case Study Research: Design and Methods* (London: SAGE Publications, 2008); Robert Yin, "Discovering the future of the case study method in evaluation research." *Evaluation Practice* 15, no.3 (1994), 283 -290; Anthony Orum and Feagin Sjoberg, "Introduction: The nature of the case study," *A Case for the Case Study* (Chapel Hill, NC: University of North Carolina Press, 1991), 1-26; Winston Tellis, "Application of a case study methodology," *The Qualitative Report* 3, no.3 (1997), 1-17.

<sup>169</sup> Robert Yin, *Case study research: design and methods*, 3<sup>rd</sup> ed, (Thousand Oaks, CA: Sage, 2003). Yin's four steps of conducting a case study are 1) Design the case study, 2) conduct the case study, 3) analyse the evidence collected and/or found from the case study, and 4) Develop the conclusions, recommendations and implications from the case study.

Case study in this research consists of collecting first-hand data, analysing these data, seeking repetitive design features and characterising them into patterns. Through this method sensual experiences offer a feel of how everyday life is lived in the house. Physical-spatial experience can be gained by site visits, taking photographs, and a tour of the selected house. They are intended to experience spatial arrangements and see Troppo's architectural components and elements in detail. The case studies also help grasp the outcomes of Troppo's design principles by analysing floor plans, section drawings and publications. In this way design and construction processes, influential decisions that change design principles, theory and methods, and the impact on the design outcomes of external forces (people, building codes, situations) can be revealed.

Two stages were implemented to collect graphic data and analyse them to provide an overview of design processes, decision-making situations, contextual relationships between drawings, the architect, and clients, and other design-related factors that lead to final productions. Timeframe was a factor in setting up two stages as it divided Troppo's practice into a 'developing design phase' and a 'stability design phase'. They are as follows.

**Stage One** focused on a corpus of twenty 1980s Darwin houses. These houses were specifically selected with Welke in the Perth office as the Perth office holds the archive of Troppo' early projects up to the year when Harris moved and set up the Adelaide office. In stage one, collecting first-hand data encompasses original full sets of working drawings and old photographs, early and developed manuscripts for publications, news articles, conference papers, party invitations, sketches of objects, people, houses and landscapes, and flyers for public speaker series and lectures. They offered an insight into how Troppo developed their design principles, theory and method, and implemented them in real life projects, and how they used their spare time to enrich their local experience, knowledge and interaction with the local communities. The use of unedited old photographs in the later chapters was intended to retain their originality, express history and draw contrast between old and new photographs.

Tropo's sketches and drawings are key media to understand the authenticity of their architecture and a means to observe the inner world of their thinking. Tropo's ideas and dreams reside in the lines of their drawings. These are the origin of many of the forms that have become characteristic of their architecture. They also express their architectural values, and reflect their understanding of how 'place, people and stuff'<sup>170</sup> work as a whole.<sup>171</sup>

**Stage Two** focused on five contemporary regional houses built in the recent decade of practice (2003 - 2013). These were chosen according to the regional directors' recommendations. These recommendations were based on the significance of the house to the director in terms of its architectural merit and their judgement of the appropriateness of the project to this study. Each regional house was relatively close to the location of its regional office as they are the representative of each regional Tropo practice. The first-hand data was collected at all five regional offices. The data was mainly digital graphics in 2D and 3D drawings as there was very little writing about these houses. The collected materials cover sets of working drawings, 3-D computer models, sketches, and relevant information such as design project posters prepared as part of work portfolios for future clients. The design language found in stage one was used to examine similarities and differences between the 1980s Darwin houses and the five regional houses. Form, materiality, texture, detail, technology and construction were design aspects looked at in drawing links between the Tropo founders and the regional directors' design objectives, perceptions, and intrinsic values, particularly in relation to sustainability.

### 3.4.2 Observation

Observation on site and office visits was crucial as it allowed a spontaneous recording of real-life events and activities. The note-taking approach was used as design processes and conversations in Tropo's office environment are vibrant and fast-paced. These descriptive notes captured actions in terms of Tropo, directors and in-house architects producing sketches for preliminary design concepts, engaging

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<sup>170</sup> 'Place, people and stuff, in that order' was an expression Sydney Architect Paul Pholeris used to categorize architectural characteristics in design with the consideration of environmental factors, such as levels of human comfort, the consumption of energy use and material in response to the local and global contexts.

<sup>171</sup> In *Understanding Sustainable Architecture*, the authors further extend this expression to make sense of housing design fit cohesively and responsively into the multifaceted aspects of the reality world people live in.

themselves in interaction and dialogue for design problems and details with each other on office-visit occasions. Most importantly, the trace of Troppo's office culture identified their natural responses to each other and detected the sense of mentorship in their everyday work environment.

Observation of participants' behaviour was also made while conducting interviews with them. It was important to take notes of their tone of voices, verbal and facial expressions and body gestures as they were indicators of their psychological and natural responses, such as excitement, delight, frustration, consent, disagreement, contemplation and satisfaction. With the occupants of Troppo houses, responses yielded a previously unknown and yet vital expression of their values, attitudes and beliefs about the quality of the designs of their houses.

### 3.4.3 Exploratory interview

Face-to-face interviews offered in-depth descriptions of the architect's design concerns for typology and ecological issues, external criteria, and ethical values. They also provided an opportunity for engaging in the visual reality for residents of their physical and emotional experiences with, within and around space and nature. An intriguing insight was articulated through architects' words about the processes of spatial arrangements, of the relationships between spaces, breezes, lights, sound, movements, and changing outlooks. Immersing oneself within Troppo's space through words was a way to explore and feel the resident's 'inner soul' in connecting with their living space, community, nature and the world.

Interviewees were the founders of Troppo, Phil Harris and Adrian Welke, and the stakeholders associated with the selected Troppo houses. Three interviews were scheduled with both Harris and Welke between 2010 and 2016. The first interview focused on the first decade of their practice and the history of their practice development and the second interview focused on their reflections on thirty-three-years of practice with variations of design projects and the expansion and development of regional offices. The last interview focused on their personal reflection on the success and/or shortcomings of their practice in five regional offices. For interviews with Harris, Welke, the regional former and current directors and in-house architects, an hour was scheduled each time with semi-structured questions via office phone, Skype on-line and personal contact if the interviewee was unavailable at the time of the fieldwork. For interviews with the occupants of the selected early and contemporary Troppo houses,

they were conducted once during the site visit of the field work or via the researcher's office phone when the occupants of the house were not available at the time of the visits in 2011, 2012 and 2013. For interviews with the former regional directors and former in-house architects, the interviews were conducted via emails and video-conferences on Skype in accordance with their availability between 2011 and 2014.

Troppo founders:

- Adrian Welke (Founder of Darwin office, now practising in Perth)
- Phil Harris (Founder of Darwin office, now practising in Adelaide)

The first interview with Welke was on the 11<sup>th</sup> of December, 2010 while conducting the field work collecting the first-hand information (sketches, news articles, conference papers, working drawings for the projects built up to 1998) at the Perth office, and followed by another interview with Harris scheduled on the 12<sup>th</sup> of February, 2011 as well as to collect some first-hand information mostly on the projects built in Adelaide after 1999. The second interview with Harris was scheduled on the 18<sup>th</sup> of March, 2013 followed by another second interview with Welke on the 5<sup>th</sup> of April 2014. The final interview with Harris was scheduled on the 1<sup>st</sup> of March, 2016 followed by the interview with Welke on the next day 2<sup>nd</sup> of March, 2016 to conclude the process.

Directors of regional offices:

- Greg McNamara (deceased former director of Troppo in Darwin)
- Geoff Clark (former director of Troppo in Townsville and now Senior Lecturer in the University of Tasmania)
- Terry O'Toole (current director of Troppo in Townsville)
- Cary Duffield (co-director of Troppo with Phil Harris in Adelaide)
- Dan Connolly (manager of Troppo in Byron Bay)

Cary Duffield was the regional co-director of the Adelaide office with Harris and was interviewed first on the 15<sup>th</sup> of April, 2011. Greg McNamara was the regional director of the Darwin office, interviewed on the 11<sup>th</sup> and 12<sup>th</sup> of July, 2011. Terry O'Toole was the regional director of the Townsville office,



interviewed on the 11<sup>th</sup> of May, 2012. Dan Connolly was the regional manager (Welke specifically defined his role in the Troppo's practice) of the Byron Bay office, interviewed on the 11<sup>th</sup> of July, 2012. Geoff Clark was the former regional director of the Townsville office, interviewed on the 14<sup>th</sup> of December, 2012 via Skype. Clark was working and living in Tasmania at the time.

Selected residents of early Darwin houses (1980 – 1990) and contemporary houses (2003 – 2013):

- Residents of a cluster of Troppo houses in Troppoville, Coconut Grove, and Palmerston, Darwin
- One contemporary house in the locale of each of the regional offices: Darwin, Townsville, Adelaide, Byron Bay and Perth

The residents in Troppoville, Coconut Grove were interviewed during the first field trip to Darwin between the 10<sup>th</sup> and 14<sup>th</sup> of July, 2011. The residents in Palmerston were not available during the time of that visit. The residents in each regional contemporary house were successfully interviewed mostly in person, except those living in Perth who were interviewed via a phone call in 2013. The dates of these interviews were on the 13<sup>th</sup> of July, 2011 in Howards Spring, Darwin; on the 13<sup>th</sup> of July, 2012 on the Magnetic Island, Townsville; on the 5<sup>th</sup> of June, 2012 in Torrens Park, Adelaide; on the 13<sup>th</sup> of July, 2012 in Brighton, Byron Bay; and last on the 5<sup>th</sup> of May, 2013 to the residents who lived in Perth respectively.

Former and current in-house architects:

- Andrew O'Loughlin (Troppo's associate in both Darwin and Adelaide)
- Joanna Rees (Former architect in Darwin office who now runs her own practice, Jar Architect, in Darwin; associated particularly with the Rozak House with Welke)
- Victor Ci (a senior architect who is in charge of CAD system in the Adelaide office)
- Aftab Khasmina (former architect in the Townsville office who now works in Dubai)
- Zammi Rohan (former architect in the Townsville office and now the director of his own practice – 9 point 9 Architect)

Andrew O'Loughlin was an associate of both Darwin and Adelaide offices and the very first person who was interviewed on the 6<sup>th</sup> of June, 2010, followed by an interview with the senior architect, Victor Ci, who was in charge of CAD system in the Adelaide office on the 18<sup>th</sup> of June, 2010 in the researcher's

office in the University of Adelaide. Aftab Khasmina was the former architect of the Townsville office interviewed on the 12<sup>th</sup> of May, 2012. Joanna Rees was the former architect of the Darwin office interviewed on the 12<sup>th</sup> of July, 2012. Finally, Zammi Rohan was the former architect of the Townsville office interviewed via several email exchanges on the 26<sup>th</sup> of September, 2014.

All interviewees received an email about the convenient time and date. After conducting each interview, the content of the interview was documented as a transcription and sent to the interviewee for confirmation. Dwelling clients/occupants were asked to complete a survey about their feelings and the process of involvement with the architects after the interview. This survey was distributed by email. Completion of the survey signified willingness to participate. Participants, according to the agreements, could withdraw from interviews at any time.

Before conducting interviews, applying for human research ethics approval was mandatory. Approval through The University of Adelaide Faculty of the Professions Human Research Ethics Committee process for conducting interviews was sought because the nature of this research was classified as 'low risk'. The approval was received in July 2010, the first six months of the researcher's candidature prior to the scheduled dates of interviews. All consent forms and relevant information for the objectives of this research were sent to all participants two weeks to one month in advance before the field trips were planned. Most participants agreed to the terms and conditions of the interviews that the researcher was given the permission to use full names, the location of the house and office, and the members of the households as well as to quote and publish the content of the conversations in the thesis, conference papers and journal articles. General descriptions, such as the residents, were used instead of full names because most residents of the 1980s Troppo Darwin houses and contemporary Troppo houses made the request of remaining anonymous. A few participants in the Coconut Grove, Darwin, proactively asked to participate in this research voluntarily without contact prior to the trip. They signed the consent forms and retrieved the relevant information before the interview was conducted.

### 3.5 Summary

The theories, research methodology and methods aim to seek the objectives and influences that lead to Troppo's design forms and compositions by:

1. Collating and analysing the distinctive built forms, details, materials, construction methods, and daily living-routines in the space of the early Troppo houses in Darwin, allowing the articulation of a design language consisting of architectural forms (vocabulary for visual features) and patterns (syntax for configurations);
2. Seeking the significance of Troppo's visual forms and spatial patterns in correspondence to the design of physical movements in space, of functionality of spaces, and of interactions between occupants and indoor space, outdoor space, changing views, senses, sounds, wildlife and their surroundings for everyday life as well as recognizing the embedded meaning of these forms and patterns for an interpretation of the richness of regional culture and of distinctive tropical climate in the Top End of Australia;
3. Investigating any intangible elements associated with these forms and patterns that distinguish the design of Troppo from the work of other architects;
4. Collecting relevant information and evidence that make noticeable changes to the work of Troppo over time and drawing correlations between changes, processes and products in practice;
5. Identifying changes to Troppo's values and attitudes during the expansion to different branches;
6. Examining changes in design strategies and adoption of technology in response to different climates, and regional social, cultural and environmental contexts in contemporary architectural practice;
7. These six research components are built on Alexander's theory of *A Pattern Language*, Fox's concept of responsive cohesion in his *Theory of General Ethics*, and Till's highlighting of architecture as a contingent practice in his *Architecture Depends*. Through this multifaceted methodology, the work and experience of Troppo has been examined as a possible exemplar

for developing a personal design language for responsive practice in the inevitable 'mess' of life.

## Chapter 4

### Identifying Patterns

This chapter focuses on the first decade of Troppo's residential houses (1980-1990) in order to identify their distinctive architectural features and design elements. It has been suggested that a professional takes 10 years of practice to become an expert.<sup>172</sup> Through an analysis of a corpus of twenty Darwin houses over 10 years, the development of Troppo's design ideas and concepts will be revealed. Some important connections will be drawn between Troppo's design ideas and four fundamental principles, identifying the variations of forms to make sense of their values and their practice ethos. These connections can be sought by looking closely at a collection of sketches and old photographs, working drawings (plans, sections and details), interviews, and written documents which, taken together, are a record of Troppo's design processes and their responses to site and climatic conditions, as well as to social, cultural and environmental contexts. Form patterns are identified by seeking similarities in the designs of the Darwin houses. The presence of a Troppo language will then be identified through these similarities in spatial planning, form, materiality, detail, and construction. Through this language the significance of a symbolic line – 'the tenth line' – is understood as a key to the design of Troppo's early houses. This tenth line is a crucial line in a drawing of a cubic space which visually transforms a solid and enclosed space into a transparent and open space. The descriptions of the tenth line, as mentioned in Chapter 1, are included in Philip Goad's books, *Troppo*<sup>173</sup> and *New Directions in Australian Architecture*.<sup>174</sup> This chapter will finally show how Troppo's tenth line manifests itself in a variety of Troppo houses that reflect a laid-back lifestyle. Most importantly, connections will be drawn between the

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<sup>172</sup> Anders Ericsson, Ray Perez, David Eccles, Laura Lang, Eva Baker, John Bransdord, Kurk Vanlehn, and Paul Ward, "Development of professional expertise: toward measurement of expert performance and design of optimal learning environments", *The Measurement and Development of Professional Performance: An Introduction to the Topic and a Background to the Design and Origin of this Book* (Cambridge: Cambridge University Press, 2009), 1-25.

<sup>173</sup> Philip Goad, *Troppo: Architecture for the Top End* (Balmain: Pesaro Publishing, 1999), 90.

<sup>174</sup> Philip Goad and Patrick Bingham-Hall, *New Directions in Australian Architecture* (Singapore: Periplus, 2005), 246.

idea of this tenth line, the Australian slang of '*Going Troppo*', and a tropical lifestyle characterised by qualities of delight and excitement.

## 4.1 Introduction

To Harris and Welke, 'the tenth line' represents infinite opportunities for innovative designs; it becomes a symbol for shelter, and the means for creating everyday living space. This simple line that sits between two-dimensional and three-dimensional drawings offers a perspective for understanding plans, forms, and spaces in relation to styles of everyday living. The meaning of this line, which Harris and Welke sought to explain both in popular local newspaper articles as well as academic conference papers (as will be examined below), is embedded within the design of Troppo's early Darwin houses. They were inspired by the sequence of dwellings from Australian Aboriginal humpies and built-on-site shelters to complex regional vernaculars in what Harris called 'The shelter numberline' (Figure 4.1a).



**Figure 4.1a** Harris's 'The shelter numberline' as an inspiration for 'shelter for everyday living'. Sketches by Harris. Date unknown.

In their first conference paper *Relevant Housing: An Historic Overview of Tropical Housing in the Northern Territory, with Implications for Future Solutions*, shelter was conceived as the way to 'everyman's decision to live or partly live in the North' and showed 'responsiveness to both climate and place.'<sup>175</sup> This paper demonstrated their intent to define and espouse the significant heritage of regional housing in the Tropical Top End (Figure 4b). Their local knowledge and experience were accumulated

<sup>175</sup> Phil Harris, and Adrian Welke, "Relevant Housing: An Historic Overview of Tropical Housing in the NT with Implications of Future Solutions," *Menzies Foundation Conference*, June (1981), 63.



through their observation of the relationships between past and present lifestyles, the availability of resources, and the opportunities that climate, site, place and the local community could offer.

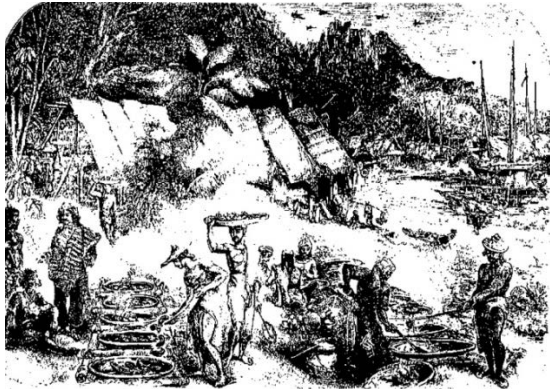
*Architecture is the study of shelter. It all consciously began with the exploration of geometry and its lessons of relationships between lines, shapes and space, in the early Egyptian and Greek days (3000-500BC)... Between then and now architects have come to know a fair bit about what shelter can achieve for us... so that we might function a little better in sharing it, might feel just right in it and looking at it, and notice afresh aspects of a location and site.<sup>176</sup>*

Tropo were advocates for establishing relationships between appropriate built forms, affordable lifestyles in the tropics, the diversity of built environments, ecological balance, easily accessible resources, and local cultural identity. They attempted to rectify the misconception of heritage in ruins, such as seen in Australian Aboriginals' shelter and humpies, and they took the simplicity of this built form as inspiration for fundamental principles for passive design. They also found exemplars of both climatically appropriate and affordable housing designs the structure on stilts and construction materials (bamboo and palm leaves) of Southeast Asian vernacular architecture associated with the 'Macassan' fisherman (from Makassar and other ports in the Indonesian archipelago), who had been seasonal visitors to Northern Australian shores before and during the era of European colonial contact<sup>177</sup> (Figure 4.1b). Other regional vernaculars and climatic conditions were used as the foundations of design concepts for spatial arrangements and configurations of geometric form for expressing their knowledge and awareness of physical impacts on the environments and as interpretations of regional cultures and social patterns. The award winning 'Green Can' house of 1981 and the 'Tropo Type Five' house designs of 1990 became some of the most recognised statements of Tropo's gestures towards Australian regional architecture in the Top End and their advocacy of low-cost and low-energy approaches to house design. Tropo continually learned from historical and regional buildings, integrating their lessons into innovative designs and go-with-the-flow attitudes relating to the heat, the rain, and the harsh built environments of the Top End. Their ambition for a sustainable living lifestyle was not impacted by the increasing presence and pressure of boxed homes but was rather strengthened by their active role in publishing their practice ethos both locally and nationally.

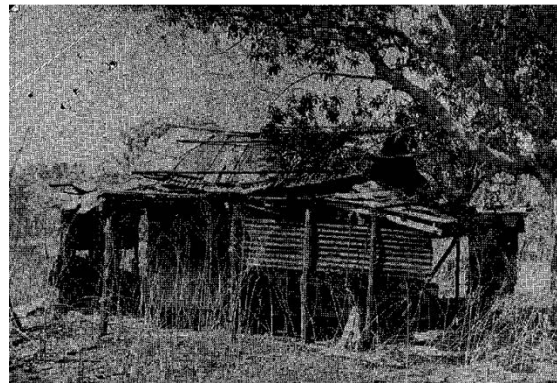
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<sup>176</sup> Phil Harris, and Adrian Welke, "Relevant Housing: An Historic Overview of Tropical Housing in the NT with Implications of Future Solutions," 18.

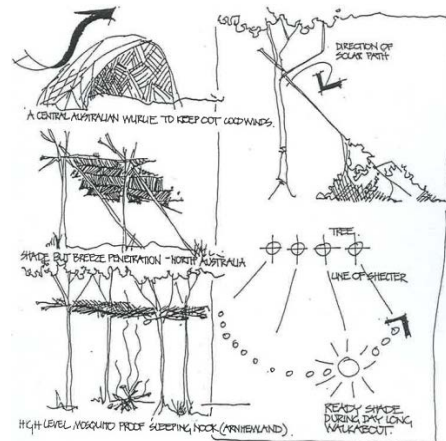
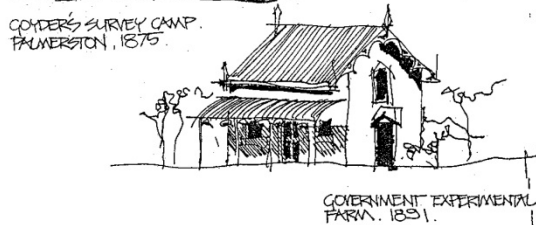
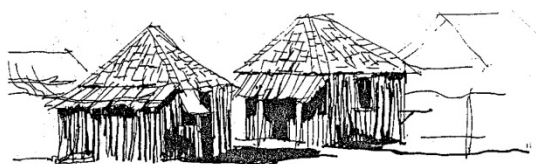
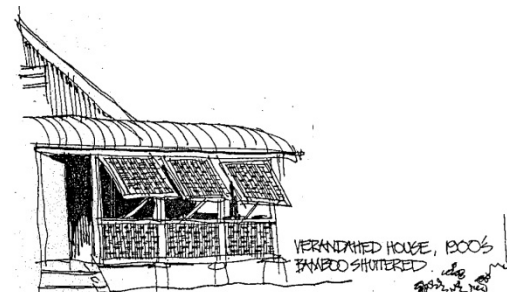
<sup>177</sup> Charles Macknight, "Macassans and the Aboriginal past," *Archaeology in Oceania* 21, no. 1 (1986), 69-75



Macassan Shelter: 'Macassans at Victoria drawn by Melville in 1845



Chinatown remnant humpy, Pine Creek Goldfields



Aboriginal shelter for rain, wind and shade

**Figure 4.1b** Troppo's architecture begins with the concept of shelter and heritage, which is evident from their collection of images, old photographs and sketches drawn for a joint paper presented to the Northern Territory Secondary Schools Year 12 Geography Conference at the Northern Territory Museum, Bullocky Point, Darwin on 14 June, 1984.

## 4.2 The contexts of the Top End

Understanding the contexts of the Top End gives an insight to understand the development of Troppo's design principles, theory, methods and ethos for their tropical house design in response not only to climate but to social, cultural and environmental aspects of the northern region of Australia as well. The following sub-sections offer an overview of the geographical setting, climate, social, cultural and environmental contexts of Darwin. They provide important contextual information to draw links to the development of Troppo's four fundamental design principles, as well as to the process of creating their theory and design methods, especially their philosophy for sustainability and simplicity. An overview of the contexts of the Top End offers an understanding of how Troppo design elements and features were shaped by their own research, observations, living experiences and publications, especially for a lifestyle that suits the site, the climate, the residents of the local communities, the diversity of regional cultures, the dynamics of social structures, and the living environment of the tropics.

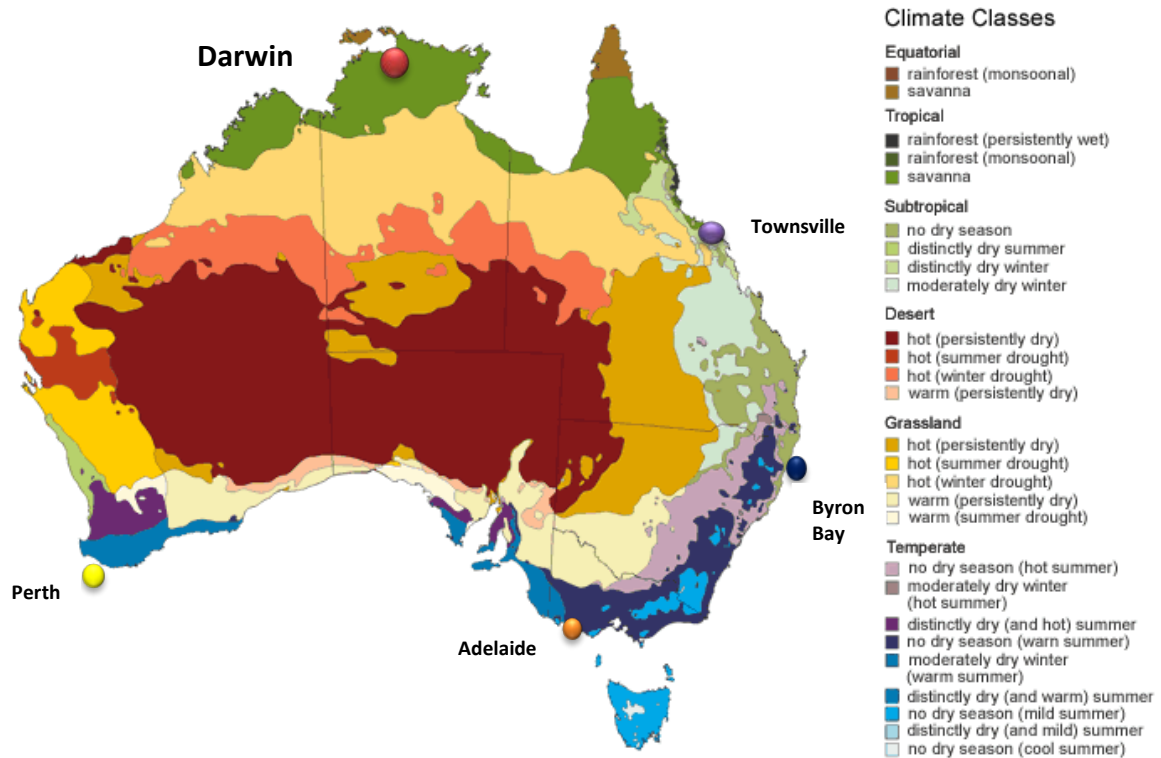
### 4.2.1 Climatic conditions and built environments in the Top End

Darwin's weather offers residents and travellers unique living experiences with its distinctive Wet and Dry seasons of tropical living conditions. This schizophrenic Wet and Dry weather creates some extreme conditions which houses need to accommodate. The average temperature in Darwin is 28.0 °C and the average temperature range is 4°C. The highest average temperature is 34 °C in October and November. The lowest average temperature is 20°C in July. The monthly average rainfall is 124mm with an average rainfall of 0mm in July as the driest month and 411mm in January as the wettest month. The average annual relative humidity is 56% and the average monthly relative humidity range is from 44% in July to 72% in February.<sup>178</sup> The weather is described as a tropical savannah region (Figure 4.3.1a). An elaborated and detailed description of the Wet and Dry weather in this climatic region is presented in David Bridgman's book, *Acclimatisation: Architecture at the Top End of Australia* which documents early

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<sup>178</sup> The Australia map is accessed via Bureau of Meteorology website online link <http://maps.unomaha.edu/peterson/funda/MapLinks/Australia/Australia.htm> and viewed on 4 July, 2013. The diagram of Darwin temperatures and rainfall is taken from Weather zone website online link <http://www.weatherzone.com.au/climate/station.jsp?It=site&lc=14015> and viewed on 17 April, 2016.

domestic buildings constructed by the government, individual architects and church groups throughout the Northern Territory.<sup>179</sup>



<sup>179</sup> David Bridgman, *Acclimatisation: Architecture at the Top End of Australia* (Melbourne: Royal Australian Institute of Australia, 2003). Bridgman's book illustrates a series of domestic scale buildings from the beginning of European settlement (1788) in the eighteenth century up to the turn of the twenty-first century (2003). Those buildings are selected in particular because they were designed by prominent and influential architects of the tropical northern region throughout the transition of defining Australian architecture, particularly the ones responded to climatic and environmental constraints such as Edwin Henderson, John George Knight, Glenn Murcutt and Troppo.



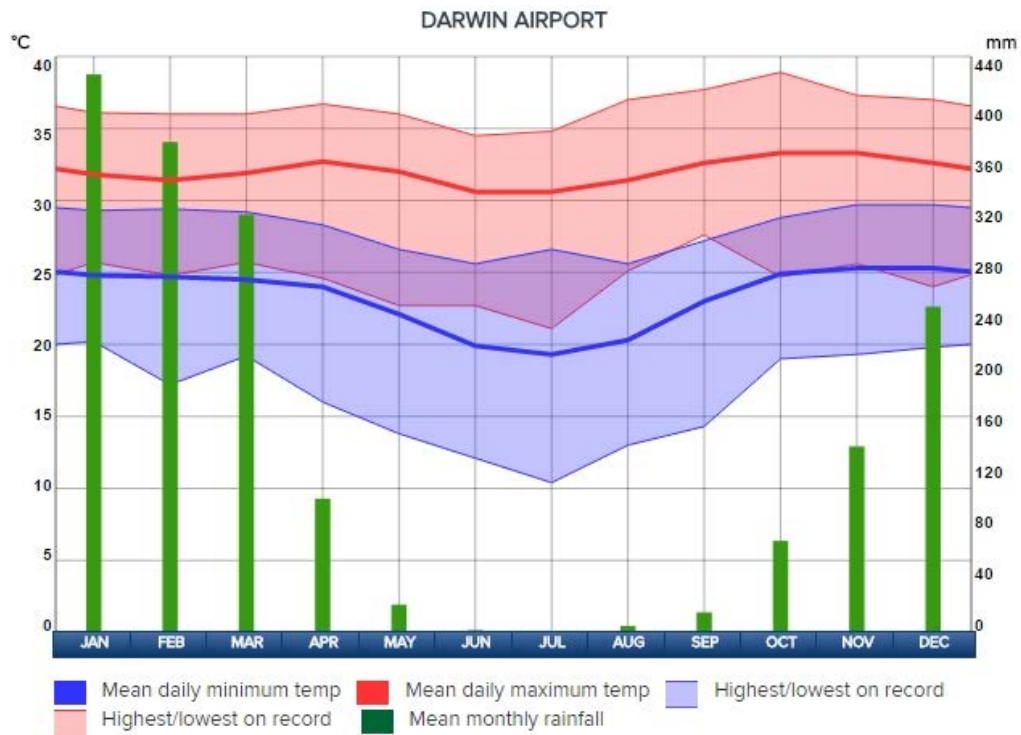
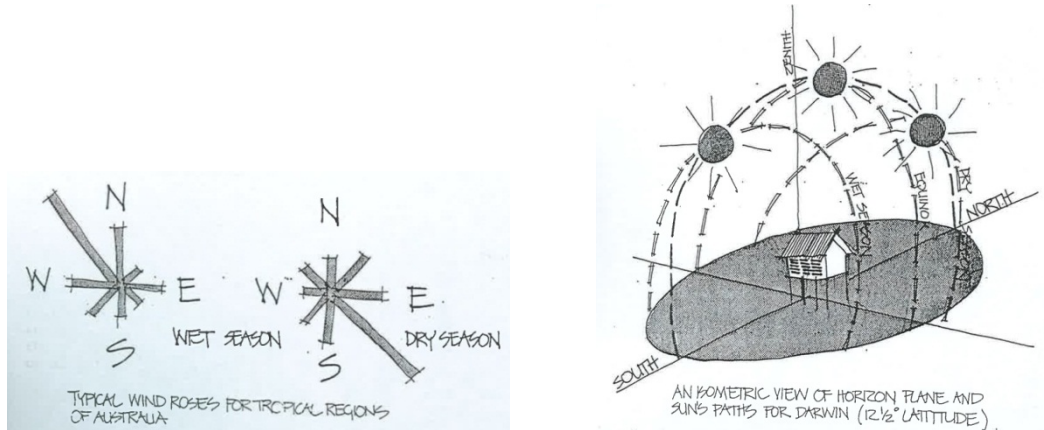


Figure 4.2.1a The climate groups in Australia (Top) and the climate graph (Bottom) of Darwin.

In Troppo's 1981 research report, *Punkahs and Pith Helmets: Good Principles of Tropical House Design*, they placed central importance on the issues of climate and setting. They emphasized the significance of sun paths and wind directions in both Wet and Dry Seasons through relevant illustrations (Figure 4.2.1b). These diagrams show their awareness of the climate of the Top End as the basis for considering the orientation of floor plans, spatial arrangements, construction materials and the necessity for architectural elements such as verandahs, positions of windows, shutters, and louvres in conjunction with a building's natural settings of site and surroundings. Furthermore, Darwin's savannah tropical climate and distinctive landscape settings (sandstone plateau, escarpment and forests) is home to many unique flora and fauna,<sup>180</sup> which Troppo included as part of considerations for their design ideas.

<sup>180</sup> The source of information was taken from the Savanna Explorer, North Australia information resource website online link [http://www.savanna.org.au/al/al\\_landscape.html](http://www.savanna.org.au/al/al_landscape.html), viewed on July 9, 2012.

'Site features: trees and landforms are positively used for climatic – sun and wind control.'<sup>181</sup>



**Figure 4.2.1b** Diagrams of wind roses (Left) and of sun paths (Right) display Troppo's rigor in establishing a fundamental understanding of the local climate and sensitivity of the place.

Thus climatic conditions played a crucial role in influencing the Troppo approach to responsive architecture. However, the evolution of Troppo's principles and concepts in design was also integrally connected to the social and cultural contexts of their early work. The following section gives an overview of how their design philosophy reflects the vital importance of regional cultural identity and gives an appropriate interpretation of tropical design.

#### 4.2.2 Social structure and cultural references

These two important technical-report-based documents, *Influences in Regional Architecture* in 1978 and *Punkahs and Pith Helmets* in 1981, were not only presenting Troppo's knowledge in acclimatised designs but also demonstrating how the major cultural aspects of the region, notably the significance of foreign cultures and historical settlements, impacted on their thinking in the first decade of their practice. Here they provided detailed descriptions of archetypal vernacular dwellings – Aboriginal peoples'

<sup>181</sup> Phil Harris, and Adrian Welke, *Punkahs & Pith Helmets: Good Principles of Tropical House Design* (Darwin: Professional Services Branch, Northern Territory Department of Education, 1981), 15.

humpies, Macassan fishermen's elevated huts, 'southern and western-world-everywhere'<sup>182</sup> cottages of colonial and early post-colonial and hybrid vernacular – in sketches and in writing. They documented the diversity of forms, the sources of local materials and the reasoning behind elevated constructions. Their sketches and descriptive narratives of native and colonial life show the nuances of form and details of tropical housing associated with social patterns and economic situations in the Top End since the early 1800s.

These Troppo writings track the historical movements and conditions of life of Darwin's diverse inhabitants. Apart from the original Aboriginal inhabitants, the second group of settlers were Macassan fishermen, who came from the South Celebes in search of their food resources of trepang (sea slug) along the Top End shores in the 1830s.<sup>183</sup> The stilted constructions and steep pitched roofs of their bamboo and palm dwellings brought in a unique and exotic model of 'island architecture'<sup>184</sup> to northern Australia. Elevated floors on stumps, steep-pitched roofs, lightweight cladding and open planning were then adopted by English settlers and progressively integrated and adapted by later British migrants during the 1800s.

Along with British Military settlements between 1824 and 1849, there were Singaporean, Pacific and Indian settlers carrying a 'totemic image' of tropical dwellings to Top End housing. There was a tendency to integrate foreign design features with the Top End vernaculars, showing a sense of respect and acceptance for cultural differences. The act of 'conscious borrowing' indicated a critical thinking in enhancing the practicality of regional architecture at the time.

*"One could have hardly expected these settlers (British) to learn about habitation of isolation and environmental hostility... it is not impracticable to suggest that a conscious borrowing of 'architectural' principles, form and detail did occur... though naturally always in application to a 'civilised house'. Architectural evidence does in fact suggest this to be the case."<sup>185</sup>*

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<sup>182</sup> A paper, "Climate as a Determinant in Tropical Architecture with Particular Reference to the Top End", was presented to the NT Secondary Schools Year 12 Geography Conference on 14 June, 1984.

<sup>183</sup> Charles Macknight, "Macassans and the Aboriginal past," *Archaeology in Oceania* 21, no. 1 (1986), 69-75.

<sup>184</sup> Charles Macknight, *The Farthest Coast: a Selection of Writings Relating to the History of the Northern Coast of Australia* (Melbourne: Melbourne University, 1969), 69.

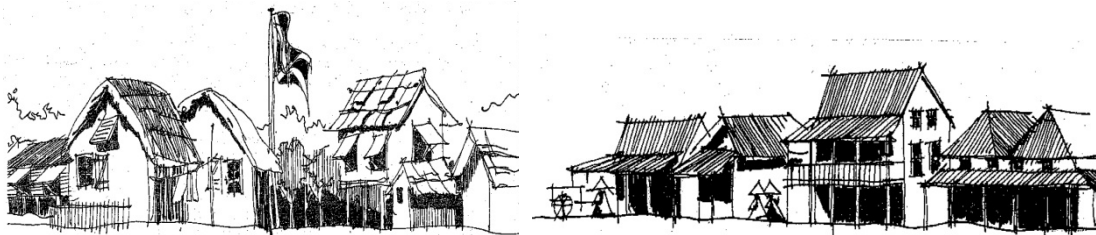
<sup>185</sup> Phil Harris, and Adrian Welke. *Punkahs & Pith Helmets: Good Principles of Tropical House Design*, 10.



In the *Punkahs and Pith Helmets* report, Troppo elaborated in detail the early Australian links between the Northern Territory and South Australia which were made in two expeditions by McDouall-Stuart in the early 1860s. The first attempted settlement was near the Adelaide River in 1865 but this was unsuccessful. The second attempt was in Palmerston in 1886, proclaimed to be the first ‘impetus for civilian settlement’. This first site of combined activities was identified as a cosmopolitan and culture-rich settlement with the subsequent development of the Overland Telegraph line from Adelaide to Darwin, gold mining around Pine Creek, and the planned construction of a rail link from Adelaide to Darwin, begun in 1889 but not completed until 2004. Further activity brought Singaporean, Malay, Chinese and Japanese people to be employed in a northern pearling industry at Broome in the north of Western Australia. Thus the Troppo interest was to show how, during this period between 1865 and 1897, a progressive display of diverse building designs was made in response to a combination of Eastern and Western lifestyles and how this led to the distinctive characteristics of some residential and commercial buildings.

Government House in Darwin in 1883 was an early example of what became a ubiquitous northern Australian housing style with Oriental architectural features in a symbolic expression of cultural acceptance in the dwellings of white settlers.

*“This diversity was expressed in buildings of the time, too. Administrative buildings of stone, suggestive of pretension and permanence, borrowed architectural form and detail directly from contemporary southern colonial building; galvanized iron streetscapes of Chinatowns offered a rich, alternative aesthetic of proportion, decoration and form; and weatherboarded, front-verandahed stores and canvas clad hotels were reminiscent of their southern frontier counterpart...cross-cultural adaptations to traditional building forms began to be manifest – adaptations perhaps wrought of regional climatic and landscape peculiarities.”<sup>186</sup>*



<sup>186</sup> Phil Harris, and Adrian Welke. *Punkahs & Pith Helmets: Good Principles of Tropical House Design*, 11.

**Figure 4.2.2** Adapted architecture was obvious with 'iron roof ...shaded with bark' (Left) and early architect J. G. Knight's bungalow (Right) of 'wood and iron and laced bamboo' for 'a tropical paradise.' Sketches by Harris, date unknown.

Another point of interest identified by Troppo was that there were two distinct phases in the development of the Top End housing styles and these were characterised by two features: the first being the Australian cultural symbol of the verandah,<sup>187</sup> and the second, the use of materials and spatial planning. The first phase was in the period between 1913 and the late 1920s and the second phase was after the 1930s. The dominant housing style in the first phase had a simple building form with 'enclosed' verandahs with slatted walling and shutters of timber or bamboo, with kitchen and bathroom in an outbuilding (Figure 4.2.2). Internal light canvas blinds were installed to offer additional protection from heat and excessive sunlight. Roofing was of corrugated iron and invariably ridge-vented. After the 1930s, floor plans and roof forms became more complex with innovative designs and robust materiality of asbestos-cement sheet for internal walls, corrugated iron roof cladding, and casement windows. Most importantly, houses were elevated on stumps or stilts for gaining 'under-the-house' space for cooling, storage and alternative living space. The 'post-and-beam' construction with steel and timber became the construction norm for its lightweight, easy construction and portability. They were characterised as a distinctive residence style of the Anglo-Asian Bungalow in the tropical north. These features were later modified by the then government architect, B.C.G Burnett and promoted by the Department of Works for generating a series of twenty-two Anglo-Asian Bungalow types (Type A to Type W) with a 'Department of Works tropical style' for housing Commonwealth officers residing in Darwin.<sup>188</sup> These government housing designs became the inspiration for tropical housing more generally, and were influential much later in Troppo's designs for houses in the Top End which, as Bridgman has noted, were 'evocative of the tropics and reminiscent of a long-distant colonial past' associated with 'leisure, pleasure and prosperity'.<sup>189</sup>

<sup>187</sup> The word, verandah, came from India and became a culturally significant feature in Australian vernacular architecture in colonial buildings during the 1850s. It is not an Australian invention and yet extensively used for a prominent 'Queenslander' style for residential construction in particular. This style is characterised by large verandah spaces in order to adapt subtropical climates in Queensland, Australia. Over time, verandah has become a 'climatic necessity' and 'always an honest expression of the land, its climate, and its people' (Moffit 1976, 5-6) across Australia.

<sup>188</sup> David Bridgman, *The Anglo-Asian Bungalow*, PhD thesis (Melbourne: RMIT University, 2006), Abstract.

<sup>189</sup> *Ibid*, 3.

'Sleeping verandahs' were referred to as 'sleepouts' and became popular by the late 1950s.<sup>190</sup> These were a primary feature in the designs of Government housing in which verandah space was used as living and bedroom space. Banks of louvres, metal and glass windows, simple linear planning and stilts gave the houses a tropical feel. Unpainted grey asbestos-cement sheet emerged as the primary outside finish to external walls. For the first time steel columns became supports and cross-bracing exemplified an engineering understanding of design for cyclonic conditions. The simplicity and adaptability of post-and-beam construction was the primary feature of tropical house design in the time of war and was regarded as a regional tropical vocabulary progressing through to the 1950-60s. With booming mining and pastoral industries, the Top End slowly became a source of cattle and raw materials for the nation. By 1959 Darwin had officially become the capital city of the Top End and Northern Territory mining promoted the use of new materials such as steel, which was actively encouraged in this period.

Further significant influences on Top End housing between World War II and the later 1960s were identified by a renowned Australian architect and architectural historian, who coined the term 'stylism' for describing this process and categorizing the commonly seen housing styles which could be called as Australian housing styles at the time. These Australian housing styles could be identified through the series of Type D houses and Stuart McIntosh's responses to building houses in Darwin. In his book, *Australia's Home*, Robin Boyd identified various distinctive styles of Australian housing such as Italianate, Boom Style, Queen Anne, Californian Bungalow and Spanish Mission.<sup>191</sup> The emergence of these housing styles in the southern states was apparent to the local communities of the Top End in the 1970s because of the influx of new European immigrants and the increasing numbers of people who had moved up from southern regions. As a result, especially during the redevelopment of the housing industry after the devastation caused by Cyclone Tracy in 1974, the monolithic brick box imported from southern states came to dominate the designs of tropical housing in the Top End due to the fear of natural disasters as mentioned previously. In these brick box styles, heavy thermal-mass materials were used to take

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<sup>190</sup> Ibid, 16.

<sup>191</sup> Robin Boyd, *Australia's Home: Its Origins, Builders and Occupiers* (Melbourne: Melbourne University Press, 1952).

advantage of the use of air-conditioning (AC) in the hot summer. The use of AC prompted significant shifts in social behaviour and became a selling point for offering controllable and comfortable indoor-living spaces with security and safety. The distinctive characteristics of tropical stilted lightweight housing disappeared as they were replaced by the monolithic and, arguably, claustrophobic brick box houses. The aesthetic quality of unique tropical house designs in response to place, people, culture and the built environment for the Top End gradually faded away.

By 1980, most of the new houses in Darwin were monolithic brick or concrete boxes with air-conditioning devices which were similar to those found in the moderate climate of southern Australia. Troppo challenged this irrational design for the Top End and it was at this time that their design principles, and methods were developed into their theory of *The tenth line*. The following section unfolds the process of their search for redefining the regional expression of Top End architecture.

### 4.3 Sources of contemporary reference to Troppo's work

Troppo's energy and enthusiasm for rejuvenating simple, open and easy lifestyles from the past in their continuous design research and publications over the first decade of their practice have been noted by both journalists and academic commentators.<sup>192</sup> Their level of design confidence and knowledge developed as they recognized the tropical climate as the 'easiest climate to design for'.<sup>193</sup> At the beginning of their start-up practice, they had plenty of time to write and publish their thoughts. In these writings, they emphasized the significance of regional buildings and their concerns for climatically-inappropriate and impractical designs, such as concrete blockwork and double-brick houses, which made no sense in the tropical climate, social organization, and environmental contexts of the Top End. Troppo were prompted by the Indigenous humpies, and the minimal enclosure of shelters made of readily available on-site materials epitomised for them the temporary living arrangements of most Darwin local residents. There is a sense of dynamism, and a momentum of moving in and out of Darwin which fits in with a pleasure-seeker and itinerant lifestyle in the tropics. As Harris recalled:

*'Everyone is an outsider in Darwin. It is a multi-cultural city with lots of immigrants and workers from Asia and people like me from other states... People here come and go... (laughing) It's an Aboriginals' lifestyle that expects you to do so – come and go.'* (Interview with Harris in 2011)

The pleasure-seeking and energetic nature for exploring the old and discovering the new was rooted in Troppo's passion. Their diligent attitude to seeking appropriate and responsive designs was displayed by continuously studying and enriching their understanding of local vernaculars and the ways people lived in the past in response to time, place, other people, and contexts. This attitude could be seen in their early student years. With their advocacy, they undertook a six-month journey which offered them an opportunity to seek to understand '*Influences in Regional Architecture*'<sup>194</sup> by experiencing and observing communities, towns, cities, wetlands, bush and outback life on the planned coastal routes of

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<sup>192</sup> These journalistic and academic observations range from Philip Goad's monograph *Troppo Architects* and Troppo's own publications published in the 1980s and 1990s, to local news and magazine articles by others. These will be illustrated in more detail in the following sub-sections of this thesis.

<sup>193</sup> Both Harris and Welke mentioned this fact in the separately arranged interviews.

<sup>194</sup> Phil Harris, Adrian Welke, James Hayter, and Justin Hill, *Influences in Regional Architecture* (Adelaide: Architecture Department, University of Adelaide, 1978).

Australia. The findings of this journey were a joint research report as one of the requirements for accomplishing their final architecture student year in the Department of Architecture, at The University of Adelaide in 1978 (Figure 4.3a).

The findings from this journey gave Troppo a broad understanding of external influences on regional vernaculars in Australian architecture: overseas immigrants, settlers and workers, financial recessions, booming businesses, local infrastructures of railways and housing construction, and geographical settings and climatic conditions. Their study also presented them with a basis for starting a professional practice in Environmentally Sustainable Design (or Ecologically Sustainable Development) (ESD), whilst 'no one else was doing it' (interview with Harris in 2011). *Punkahs and Pith Helmets: Good Principles of Tropical House Design* (Figure 4.3a) was another important report that had its origins in the findings of that initial research trip. In this document they formalised a set of design principles and methods specifically for tropical climates, as a result of a commission to conduct further extensive research on tropical house design in the Top End. Both design-research-based studies strengthened their knowledge and enriched their experience of inland and coastal lifestyles. Most importantly, these works exhibited the unseen hedonist attitudes that defined Troppo designs of Darwin houses, advocating a tropical lifestyle characterised by delight and enjoyment.



**Figure 4.3a** 'Influences in Regional Architecture' (Left) was written in 1978 by Harris and Welke and their classmates Jim Hayter and Justin Hill as a research project on regionalism in Australian architecture. 'Punkahs and Pith Helmets: Good Principles of Tropical House Design' (Right) was written in 1981 as a technical report on

pragmatic principles from vernacular architecture that could be set as exemplars for tropical architecture in the Top End in 1982. It was commissioned from Troppo by the Department of Education in Darwin. It became a stepping stone for Troppo's development of their climatically responsive design theory of *The tenth line*.

*'No one else was doing it [ESD] and we thought a lot about that after touring around Australia and writing a commissioned report on investigating local vernaculars for the Department of Education for tropical housing design.'* (Interview with Harris in 2011)

History, nature, and humans were the key Troppo references in the designs of their Darwin houses. They were developed further into design concepts for 'regional expression', 'relevant housing', 'backyard architecture' and 'save our history'. They reflect Troppo's ethos of simultaneously retaining the tradition while inventing new ways to embrace the uniqueness of regional cultures. Catch-phrases were developed, such as 'climate as a determinant in tropical architecture', 'hedonist handbook', 'turn down the heat', 'eco-housing', 'responsive housing' and 'weaving a new cloth', to draw links between history, nature, and humans in Troppo's critical regionalist architectural practice. Their goal was to embrace the co-existence of living and non-living things, objects and people in a cohesive and sustainable living environment.

These concepts were developed in engaging narratives that document Troppo's ethos in the built forms of Darwin houses in the 1980s. They were reflections on the contextual sensitivity of regional culture and their everyday local experience. Troppo's design ideas expressed their concerns for the impact on built environments of inappropriate materials and construction methods, and for unjustified socio-economic development in demolishing old buildings and heritage for new and homogenous boxed housing design. These analyses were mostly in newspaper columns, conference papers, and articles published in local architectural and housing construction magazines at the time. They were informative, straightforward and descriptive, reflecting the contemporary social structure, the housing development industry, and prevailing economic climate. They not only pinpointed what they regarded as the inappropriate use of 'new wonder materials'<sup>195</sup> such as precast concrete and masonry, which were routinely used to mimic the southern Australian experience, but also highlighted the diversity of Top End housing and Australian historical building styles. Troppo's house designs emphasized the adaptability

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<sup>195</sup> Phil Harris, and Adrian Welke, "Relevant Housing: An Historic Overview of Tropical Housing in the NT with Implications of Future Solutions". It was their manuscript for the housing conference. No page number.



of Top End housing, incorporating 'pre-existent regional patterns' to defy the monolithic box housing style with heavy thermal mass materials and minimal openings that was infiltrating from the southern states.

The occurrence of Cyclone Tracy on Christmas Eve 1974 destroyed major infrastructure and city fabric in Darwin. Seventy percent of Darwin's buildings were badly damaged or destroyed. Cyclone Tracy brought severe impacts on both social behaviour and economic stability for the next decade of redevelopment of the city. One significant change in social behaviour was an increasing fear in local communities for the reoccurrence of unpredictable natural disasters. The post Tracy-trauma house design of the monolithic box style was promoted by the local government to ease this fear and suffering.<sup>196</sup> A restructure of housing construction and a rapid production of thermal building development were encouraged and widely accepted by the local communities with seventy percent of Darwin's buildings being destroyed, including eighty percent of its houses. Local residents lost their faith in the old way of living in vernacular buildings and accepted southern house designs. Troppo argued that inappropriate designs failed to reflect the identity of regional culture and local environment (Figure 4.3b). They prompted the preservation of heritage and natural landscapes. With the endorsement of Christopher Alexander's body of social housing projects and his theory of a pattern language,<sup>197</sup> Troppo took on an explicit Australian attitude to life – laid-back – for the emerging design theory of the tenth line as the backbone of their design methods in response to the heat and humidity of tropical climate in the Top End.

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<sup>196</sup> Phil Harris, and Adrian Welke, "Relevant Housing: An Historic Overview of Tropical Housing in the NT with Implications for Future Solutions", Darwin 1988.

<sup>197</sup> In a public lecture hosted by the AIA and presented in Melbourne in 1990, Harris and Welke used Christopher Alexander's theory of a pattern language as a basis for explaining the infinite possibilities when each design works well on its own at a micro-level in its physical context, whilst connecting with other parts to form a cohesive network at the macro-level in social, cultural and environmental contexts. Refer to previous discussion and details of Alexander's influence in, Chapter 2: Literature Review.





## RELEVANT HOUSING: AN HISTORIC OVERVIEW OF TROPICAL HOUSING IN THE NORTHERN TERRITORY, WITH IMPLICATIONS FOR FUTURE SOLUTIONS

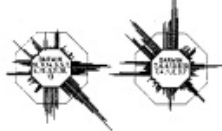
P. N. Harris, B. Arch. and A. C. Welke (B. Arch. Hons.)

**Figure 4.3b** Three newspaper articles (Top) were published as a call to gain public awareness on the demolition of local vernacular architectural housing designed by B.C.G Burnett. Dates unknown. An early Troppo conference paper (Bottom) was written in 1988, reflecting Troppo’s seriousness in valuing the uniqueness of historical tropical housing in Darwin.

Troppo’s writings of this time not only confronted the negative trends in architectural practice in the Top End, but also publicised the vital and positive potential of climatically responsive building design in the tropics. Their developing theory epitomised the Troppo design strategy for seeking full personal enjoyment and delight in connecting region, climate, nature, humans and ‘everything else’ in their context. ‘*A Hedonist’s Handbook to Full Enjoyment of the Elements*’ was a conference paper published in 1987, which was comprised of texts and various kinds of sketches from the floor plans to the analytical drawings for construction detail and technical devices. This paper elucidates Troppo’s persuasive argument for being responsible hedonists after ten years of experiencing the tropical heat and humidity of living in the Top End. It makes sense of the ‘behind-the-scenes’ design of Troppo houses with a hint of that larrikin attitude the can be found in traces in Troppo’s writings and drawings.

Altogether the Troppo archives contain fifty-nine written items that were published on Troppo's design projects between 1980 and 2000. They cover a spectrum of residential design discourses and urban and regional planning considerations in design conference papers, lecture notes, speaker series talks, newspaper and magazines articles, and periodical writing for professional practitioners, plus twenty-nine lectures and public addresses. Publications by others also described the distinctive characteristics of the design features and construction methods of Troppo's significant projects in relation to their focus on sustainability, including their passive design concepts, regionally responsive schemes, robust materiality, and functionality of space. These sources cover a wide variety of discursive contexts and styles (Figure 4.3c) and many of them show handcrafted detailing and incorporation of artistic work. These writings were predominantly written about visual characteristics and building techniques of Troppo's award-winning commercial and residential projects, and design theory, construction and materials of these buildings, how spaces function as wholes as well as how the general performance of these buildings was perceived from a professional's or an architectural critic's perspective. These writings were written from a subjective perspective of a professional or an academic to evaluate and determine how well Troppo's buildings perform in accordance with their knowledge, social and cultural experiences and expectations. There was little written about the 'ordinary' or 'everyday' use of residential space in terms of the interactions with the occupants, the living experience, the natural setting of the site, and unconsciously or consciously changing psychological behaviours in response to the social and cultural contexts of community and the world as a whole. On the other hand, the significance of psychological influences on the occupants' behaviour and thinking by the design of houses was overlooked in particular.

Figure 2: Wind Rose



Source: Spinkooy, S. V. 1982. Climate Data and its Use in Design, RAAIA, Canberra.

1.3 Background

A visitor information centre and park headquarters previously existed on the site but, with increasing tourism and engagement of the park itself, these facilities clearly were becoming inadequate. In consultation with traditional aboriginal owners, the Australian Nature Conservation Agency developed a comprehensive brief for a new park management and visitor information centre on the present site. Existing efforts were to be retained for future use, and a more recently constructed bird information centre was to be incorporated into the new development.

Figure 3: Plan



LEGEND

- 1 Bird Information Centre
- 2 Link-in-Bird Information Centre
- 3 Visitor's Amphitheatre
- 4 Kiosk/Shop
- 5 Arts and Crafts
- 6 Picnic Area
- 7 Office/Shop
- 8 Information Desk
- 9 Orientation Board
- 10 Library
- 11 Stairway
- 12 Picnic
- 13 Link-in-Scenic/Play Building
- 14 Administration
- 15 Executive Office
- 16 Plant Office
- 17 Kitchen Room
- 18 Staff Restrooms
- 19 Architects
- 20 A.C. Plant
- 21 Old 6th Building

2.0 BUILDING DESIGN AND CONSTRUCTION

The building relates to the local aboriginal inhabitants of the land (the Djubidjubi and Gajadju people), the use of local materials, as well as typical Top End building forms and the ubiquitous wet season element of water.

Raw materials for the masonry earth components, the stone reception counter, and display and landscaping materials have been collected locally by aboriginal community members and incorporated with the assistance of the builder and designers.

2.1 Siting and Layout

The new development is fragmented into the separate pavilion structures of the visitor information centre and the park headquarters connected by a circulation spine beginning at the existing bird information centre. The linearity of the plan arrangement is directly influenced by the climate, and by the architect's desire to minimize energy consumption. At the same time, this plan arrangement maintains the opportunity for visitors to engage with the landscape while viewing displays.



Steed on a gentle rise, the pavilions focus outward to the woodland environment. Upsward sweeping verandah roofs contribute strongly to a sense of the buildings wanting to actively engage with their setting, rather than isolate the visitor in an enclosed conditioned museum environment. By these architectural devices, the buildings themselves contribute to the visitor's appreciation of the tropical condition before even viewing the formal display. The architecture invites, even dares, the visitor to come to terms with Kakadu as a place and not just as a tourist destination.

2.2 Building Fabric

The building fabric consists of in-situ and precast concrete and steel primary structure, concrete slab and earth floors, stabilised rammed earth walls, and steel roofing and roof framing.

The performance of structural steel rather than timber is attributable to a range of influences peculiar to the Top End of Australia. Timber for construction framing is not readily available. The options are Jarrah, imported from the south of Western Australia, or a variety of hardwoods imported from south-east Asia. These timbers may not be produced in an ecologically sustainable manner.

Harman grass softwoods, such as Redgum Pine (Pinus radiata), do not possess sufficient strength and durability in conventional assemblies to be used in cyclone affected zones. The extra material and connection detailing required to construct a complying structure make softwood an expensive financial term as well as material and resulting

environmental costs (see Section 2.2.1). In contrast, lightweight steel framing systems have been developed specifically for cyclone affected regions and now dominate the market in the Northern Territory.

The main display verandah and other external circulation spaces are supported on steel columns and timber joists. Northern Ironwood (Erythrophloeum chlorostachya) is used for decking, with spaces between boards to allow incidental rain to fall through and to enable air circulation from below.

Internal spaces feature reinforced concrete slabs, suspended above the ground on stabilised rammed earth foundation walls and strip footings. The concrete slabs are topped with 50mm of compressed earth which is buffed and provides the finished wearing surface.

Walls are built up off the floor slabs in stabilised rammed earth. Raw materials for the earth elements were sourced from the nearby Uluṛu road. Precast concrete columns have been used to support one side of the main roof over the visitor facilities and the main circulation spine. The columns have been treated to match the colour and texture of the rammed earth elements.

Roofs are curved corrugated aluminium, framed in light galvanneal sections. Gables over the display and information verandah are torpedine plywood with an ochre wash.

Louvre windows are both steel and aluminium framed and are supported within galvanneal steel framed openings.

Figure 4: Section



**TROPPO ARCHITECTS**  
Winner of the 1992 RAAIA Special Jury Award

10.30am Oct. 26th - 16th Floor Conference Room

**PHILIP HARRIS: Architect, Tropo Architects.**  
... environmentally intelligent, resource-careful, constructionally innovative and locationally responsive. Neville Quarry.  
Tropo's buildings are exactly right for their place. Jamieson Allom  
Australian tropical architecture ... of considerable strength and beauty. John Morphett.

**SPECIAL PROJECTS**

**Going Tropo**

*Tropo Architects - the name Phil Harris and Adrian Wicks chose for their firm gives a clue both to the firm's tropical Darwin location and the environmentally responsive approach to architectural design adopted by these Adelaide University graduates.*

It's an approach that has allowed Tropo to create a new and relevant architecture in the far, the South (climate and cultural setting and one that has brought the design good increasing national and international recognition over the past few years.

Winners of the 1992 National Architectural Jury Award, presented in recognition of their 'constructionally innovative and locationally responsive designs', Tropo's ever-probationed curved corrugated metal roof is now popular on all new houses as a result of the firm's designs have been chosen by the Northern Territory Authority as models for new houses for the Arnhem Valley.

Principals Adrian Wicks and Phil Harris completed the five year Bachelor of Architecture degree offered at the University of Adelaide in 1978 and served a final apprenticeship in Adelaide before moving to the Top End to work with a local firm, Van Kennedy and Associates. They had mapped out their design philosophy while still at University as a book produced after five months spent touring Australia studying regional architecture. They wanted to design a house appropriate to the environment and the people of the region, 'housing that wasn't based on the technical progress of environmental control by refrigerated air conditioning.'

After obtaining a heritage grant from the Northern Territory Government to research the history of tropical architecture it wasn't long before the team established their own firm, offering in Adrian Wicks' words, 'good tropical Darwin housing.'

But the Tropo team soon found the public either loved them or hated them.

Their entry in the 1981 low cost housing competition in Darwin - the Green Can - while admired for its 'tropical idiosyncrasy' also offended many because of its blatant disregard for 'mod' con.

Phil Harris attributes this to the viewer's environmental perception.

'The house (was) considered symbolic of regression, an insult to today's marvelously comfortable, plugged-in, digital society by those who hate the local climate and seek not to participate in it.'

However, the Green Can, identified by its split curved corrugated metal roof and walls, symbolises an architecture that continues to evolve, these are houses designed to feel right in a monsoonal climate.

Tropo Houses are usually built on stilts with the main floor elevated well off the ground. This provides storage space below and improves ventilation. The concrete form is modelled with verandahs and overhangs to control the impact of sun and rain. The shaded windows may be merely insect screens, sometimes shutters, slats or louvers but seldom glass.

'There is a freedom in planning with the great outdoors and a tropical breeze never far away,' says Wicks.

Tropo are happy to style themselves as the 'thinking man's architects'. But according to Professor Jeffrey Cook from Arizona State University's School of Architecture, 'they have stamped popular culture with high style in a distinct Australian evolution of the Modern Movement beyond international aesthetic to bioclimatic solutions.'

Professor Neville Quarry from the University of Technology Sydney describes their buildings as 'typical in concept, excessive and appropriate,' adding that 'to achieve so much on modest budgets... is evidence of real creativity.'

Fourteen years on they continue to amaze clients who have their belief in an architectural 'fit', producing contemporary architecture with a traditional base.

MB

Figure 4.3c A report published by the Royal Australian Institute of Architects (RAIA) (Top row) was written on Tropo's award-winning collaborative project with renowned architect Glenn Murcutt, the Bowali Centre in Kakadu National Park, south east of Darwin. A poster for a public talk in 1992 by Harris and a magazine article (Bottom row, date unknown) demonstrate the variety of sources dealing with Tropo's work between 1980 and 2000.

#### 4.4 Aspirations for design principles, theory and methods

Many of Troppo's clients possessed the typical Darwinians' larrikin attitude<sup>198</sup> – a laid-back and easy-going mindset, enjoying the tropical lifestyle that the Top End has to offer. They were not wealthy and yet wanted distinctive houses. Understanding the character of Troppo, the needs of their clients, and the socio-economics and socio-cultural situations at the time helped to draw connections between the development of Troppo's design principles, theory and methods and the design of the early Troppo houses. Troppo's design responses were to use local northern Australian resources, adapt their tropical house designs to local microclimate and retain the social and cultural expressions in form. Four design principles for doing this were set out in the government-funded research project report, *Punkahs and Pith Helmets*. Harris illustrated and summarised these same principles in an article entitled *Four Principles of Climatically Responsive Housing in the Top End*, later published in a special issue of *Artlink* in 1991/1992 (*Artlink* is an Adelaide-founded international periodical about contemporary art, architecture and environment). These four principles were as follows: promoting cool breezes, interacting with the outdoors, natural ventilation by creating potential barriers to control the paths of breezes, and reducing heat radiation by incorporating rotary vents and wind traps. These principles could be followed with the use of lightweight materials and incorporating features from tropical architecture, Aboriginal shelters, and post-and-beam building construction.

*Punkahs and Pith Helmets* illustrated the four fundamental principles' typology shown in Figure 4.4a. The first principle focused on appropriate orientations, breathing skins, and a thin-shape of a house toward prevailing cool breezes. The second principle focused on spatial relations with its surrounding contexts for shading and cooling reasons. The third principle focused on dynamics between adjustable exterior walls and semi-open interior walls allowing the free-flow of breezes at all times. The fourth principle focused on the aid of simple technology to allow hot air to escape.

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<sup>198</sup> In the interviews, Troppo's clients who were local residents or had lived in the Top End for a long time unanimously characterised Darwinians generally as having an easy-going attitude and laid-back lifestyle.



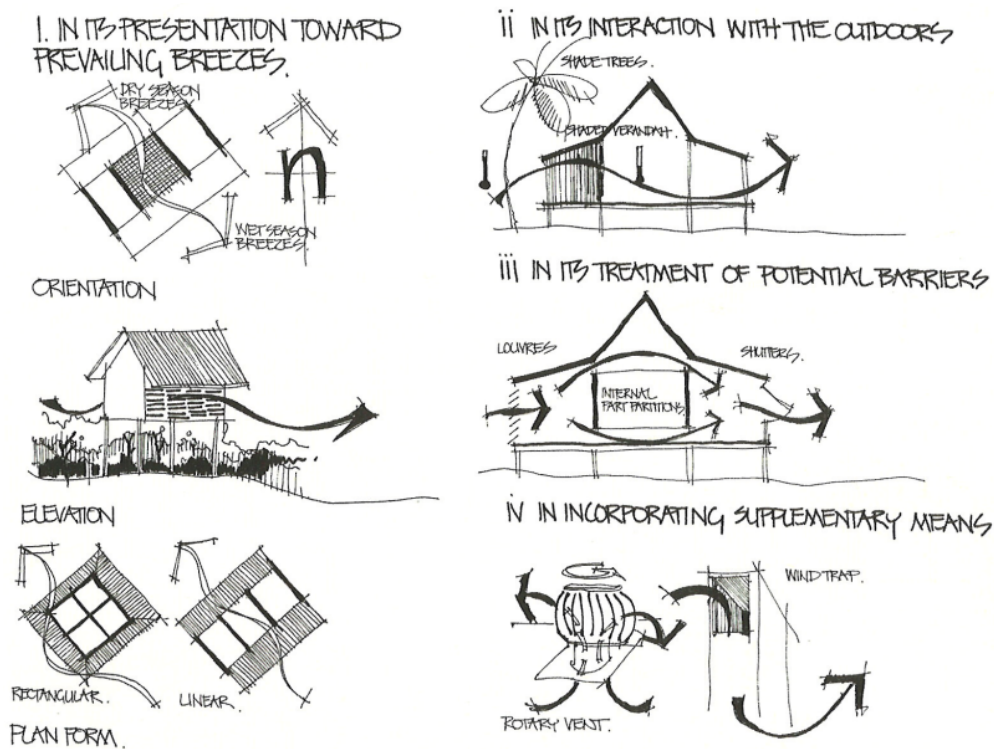


Figure 4.4a The illustrations of Troppo's four fundamental principles for tropical house designs.

To Troppo, this Australian cultural symbol, the shed, indicated that understanding an Australian's informal way of everyday life started with a close look inwards to one's backyard. Intimate connections were sought and understood between lifestyles, space, people, culture, and built environments with Troppo's specific interpretation of Top End vernacular – Backyard architecture.

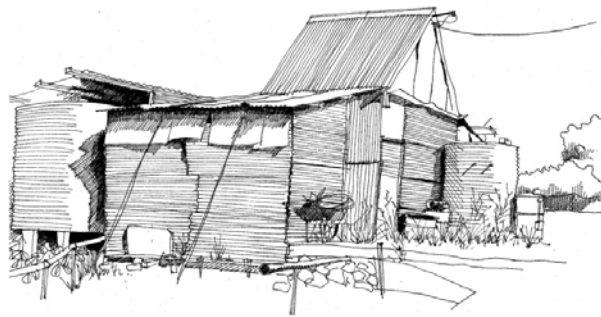
#### 4.4.1 Backyard Architecture

In promoting these four principles, Troppo called for an unpretentious 'backyard architecture'.<sup>199</sup> In local newspaper columns and conference papers;<sup>200</sup> a style that accentuated the notion of belonging and embraced the goal of leaving nature undisturbed. 'Backyard architecture' was their way of expressing their concern for the faded local tradition of living with less, and the loss of historical building types with

<sup>199</sup> Phil Harris and Adrian Welke, 'Responsive Housing', *The Star*, March 21, (1981), 18.

<sup>200</sup> This concept was implicitly referred to in the conference papers *The History of Regional Expression in Top End Housing* and *Relevant Housing: An Historical Overview of Tropical Housing in the Northern Territory, with Implications for Future Solutions* in 1981 and 1982. Troppo's backyard architecture was referred to as an idiosyncratic expression for 'the stereotype of the Northern Territory yobbo' (*Vogue Living* 1995: 146).

their climate-sensible design responses. Harris and Welke were advocates for Christopher Alexander's concept of 'healing the site', as this had been explicated in *A Pattern Language*.<sup>201</sup> It demonstrated their sensitivity for conserving historical building types, their awareness of sustainable issues in the built environments and respect for co-existence with the 'others' as a whole. In their view, Aboriginal humpies and arrangements of sites were inspirations for non-material everyday living (Figure 4.4.1a).



**Figure 4.4.1a** A shed as an inspiration for Troppo's backyard architecture. (Drawn by Welke, date unknown)

Troppo's backyard architecture responded to the natural environment by offering inhabitants access to cooling breezes, the picturesque presence of flora and fauna, and the sensual experiences of seasonal changes to 'the nuances of natural setting, the improbable vagaries of climate and the present 24 hours that will never be again'.<sup>202</sup> Troppo's conception of backyard in the designs of houses symbolized the concept of scarce resources, the simplicity of minimalism in form and the portable constructed frameworks. It was their interpretation of simple living. Their characteristics of backyard architecture were lightweight houses on stilts, timber and glass louvres and shutters, open-indoor spaces, banks of windows, roofed sleep-out verandahs and corrugated steep-pitched iron roofs (Figure 4.4.1b). 'Backyard architecture' reflected Troppo's aim to maintain the 'moral high ground whilst having a bloody good time' (the title for an unpublished manuscript)<sup>203</sup> in the tropics.

<sup>201</sup> Christopher Alexander, Sara Ishikawa, and Murray Silverstein, *A Pattern Language*.

<sup>202</sup> It was an unpublished draft for a newspaper article written by Harris and Welke, Northern Territory in 1980. Date unknown.

<sup>203</sup> Some unpublished manuscripts were found in the Perth office. In one of these manuscripts this quote is the title next to the definition of 'hedonism' extracted from the dictionary (unknown dictionary).



Figure 4.4.1b Articles by Harris and Welke published in local NT newspaper in the 1980s.

Troppo's design approach for responsive housing was summarised and developed into a formal design theory in Harris's manuscript, *A Hedonist's Handbook for Full Enjoyment of the Elements: Housed in the Top End Australia* (ca. 1986). Troppo envisioned a hedonist sitting on the edge between a solid and a frame of space with the full freedom of interplay between enclosure and openness. The edge between solid and wireframe, inside and outside space, enclosed and open, and private and public was blurred. This particular Troppo text indicated important connections between their hedonist attitude for everyday living, their rigor in architectural design and their awareness of a need to sustain the significant building knowledge that was captured vernacular tropical architecture, as well as a vision for how they could create diverse and exciting new Tropical architecture in the northern region exploiting opportunities at the time.



#### 4.4.2 Architectural hedonism

A hedonist is understood to be ‘a person who believes that the pursuit of pleasure is the most important thing in life; a word for a pleasure-seeker.’<sup>204</sup> This was the mindset that Troppo was prepared to promote publicly, at least among their peers, by the late 1980s. Harris’s unpublished manuscript *A Hedonist’s Handbook for Full Enjoyment of the Elements*, prepared for the annual conference of Australia and New Zealand Association for Architectural Science (ANZAAS) conference in 1987, was the first time that Troppo drew explicit connections between their design ideas and philosophy, and hedonistic attitudes. However, this concept of architectural hedonism remained unstated in other published articles and papers of that period that focused mainly on the highly visual architectural features, layouts and design construction of their award-winning projects. The significance of hedonism among Troppo’s design inspirations remained unfamiliar, therefore, to both former and current senior in-house architects and regional directors of the Troppo practice – as recent interviews conducted for this study have revealed – who expressed surprise and interest to know more about the ‘responsible hedonism’ of the early partnership.<sup>205</sup> Nevertheless, Troppo strongly asserted this attitude with architectural rigor in the design of the layouts, detailing and construction of their early tropical houses.

Harris described how Troppo interpreted hedonism as a conceptual approach for people who sought pleasure and quality in everyday living. People who were like-minded with Troppo found ‘further stimuli in our architecture: diversity, profound and subtle, in texture, colour and layers of detail; rooms to amplify all moods, all seasons; spaces that flaunt definition of inside and outside, a precarious architecture.’<sup>206</sup> The nationally and internationally renowned architect, Glenn Murcutt,<sup>207</sup> compared and contrasted their outrageous-and-yet-seriously-responsive attitude with that of most other Darwin architects at the time:

*[Troppo’s] whole philosophy may have seemed renegade, outrageous even to some, but it was Troppo who were focused on an authentic architecture for the tropics. It was most of the other*

<sup>204</sup> ‘Hedonist’, as defined by the *Oxford English Dictionary*, 2012.

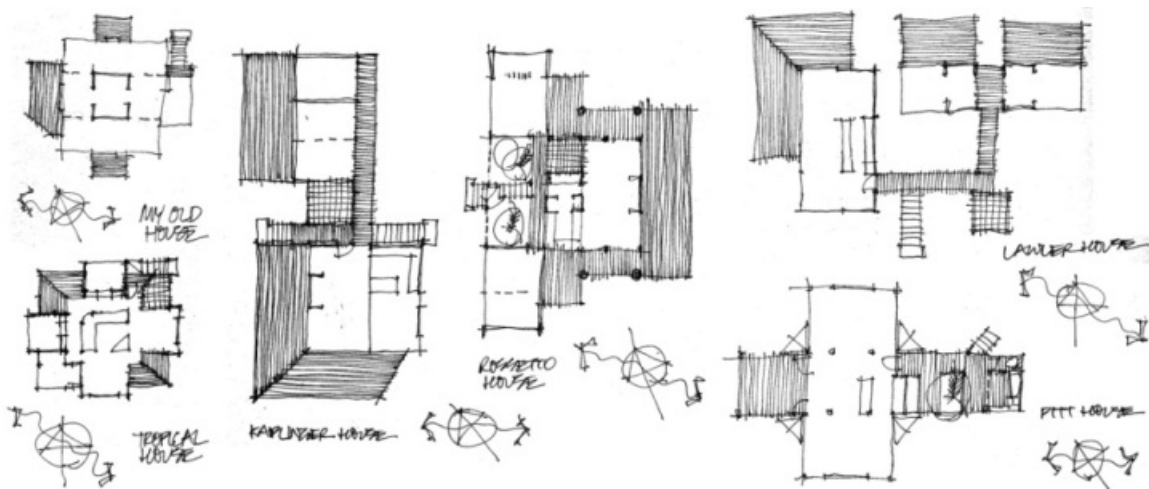
<sup>205</sup> Interviews with Reeves, Cai, Khamisa, McNamara, Connolly, Duffield, and O’Toole.

<sup>206</sup> Phil Harris, and Adrian Welke, *A Hedonist’s Handbook for Full Enjoyment of the Elements: Part 1 Housed in the Top End*, 1.

<sup>207</sup> Murcutt was the winner of several prestigious awards including the 1992 Alvar Aalto Medal, the 2002 Pritzker Prize and the 2009 Australian Institute of Architects Gold Medal. This reference was taken from e-architect website online link <http://www.e-architect.co.uk/architects/glenn-murcutt> and viewed on 9 July, 2013.

*architects in Darwin who were so unresponsive to their special place [...] Phil and Adrian clearly understood their place, their clients and their way of building, and the budget.*<sup>208</sup>

Despite such notable exceptions, however, Troppo's responsible hedonist attitude has remained largely unexposed as the conceptual source of the design forms, spatial arrangements, and expression of tropical lifestyles characteristic of the 1980s Darwin Troppo houses (Figure 4.4.2). Experiencing better living in specifically arranged outdoor verandahs, for example, gave way to Troppo's intended hedonistic way of everyday living with nature and the great outdoors.



**Figure 4.4.2** Interactive and dynamic indoor-outdoor movements are intentionally designed with an integration of generous verandah space between and around main living spaces and long breezeways. Sketches by Harris. Date unknown.

#### 4.4.3 Greater-than-the-indoors-will-ever-be-outdoors

Experiencing 'greater-than-the-indoors-will-ever-be-outdoors'<sup>209</sup> was one way of being a Troppo's responsible hedonist. This experience was only gained emotionally when occupants felt physical and psychological connections to the outdoors while being in protected spaces (Figure 4.4.3). Verandahs created a shift in the conventional concept of separation between internal living enclosure and external

<sup>208</sup> Foreword to Goad's book *Troppo* written by Glenn Murcutt, 7.

<sup>209</sup> This is the sub-title for a subsection of the Troppo's conference paper *Hedonist's Handbook for Full Enjoyment of the Elements*. Phil Harris, and Adrian Welke, *A Hedonist's Handbook for Full Enjoyment of the Elements: Part 1 Housed in the Top End*, Harris wrote it in 1986 for the ANZAAS Conference, Townsville, 1987.

outdoor nature. The feeling of 'greater-than-the-indoors-will-ever-be-outdoors' encouraged a carefree lifestyle with 'a great reservoir of spirit.'<sup>210</sup> In an impromptu conversation with Welke during the first visit to the Perth office in late 2010, he explained Troppo's thoughts about an authentic architecture achieved through sketching and observing compositions of landscapes and buildings to grasp the intimate connections between buildings, people, and nature. The aims to leave a site as undisturbed as possible, or to heal it if already disturbed, were essential to retain tranquillity and harmony in the context of the largest bio-physical world. In their sketches, the sensual experience of great outdoors-in-living is seen to infuse Troppo's impulse to conceive and improvise distinctive forms in their design ideas.



**Figure 4.4.3** Troppo's understandings of the relationships with nature, the conventional view about man-made space, and an inhabitable space with harmony and cohesion. Sketches by Harris. Date unknown.

#### 4.4.4. The tenth line for verandahs and inside-outside

The 'tenth line' creates a vision of everyday experience of the 'greater-than-the-indoors-will-ever-be-outdoors'.<sup>211</sup> Elsewhere, Harris offers a more technically explicit explanation of the tenth line as 'the theory that encapsulated the act of visual perception of the image of a cube'.<sup>212</sup> Referring to the inspiration of the Greek and Roman atrium house for its architectural credibility, Troppo offered this theory to combat the unresponsive design of southern-style monolithic boxes in the tropical climate of the Top End. In it, the tenth line broke through the skins of solid boxes to reveal an inner edge (Figure 4.4.4a). It signified continuity between interior and exterior space. It symbolized the cubic space

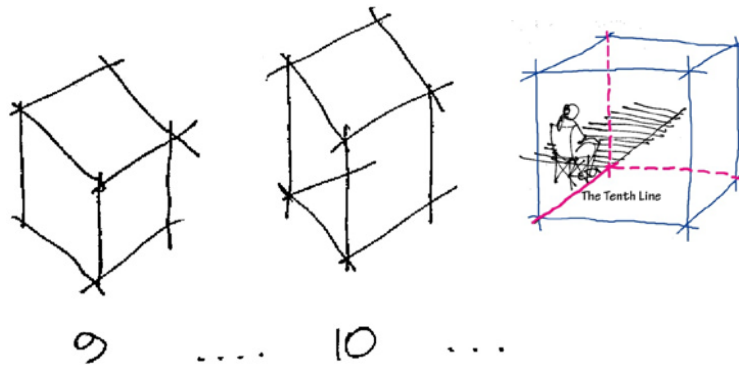
<sup>210</sup> Philip Drew, *Leaves of Iron: Murcutt, Glenn, Pioneer of an Australian Architectural Form* (North Ryde, New South Wales: Harper Collins Publishers, 1994), 102.

<sup>211</sup> This explanation of the 'tenth line' is given in another unpublished manuscript written by Harris and Welke in 1986. The original title on the cover page was "*The Troppo Method of Participation in the Climate and Thereby Creating an Architecture of Hedonist Attraction (Fun) Whilst Being Ideologically Sound*".

<sup>212</sup> Phil Harris, and Adrian Welke, "A Hedonist's Handbook for Full Enjoyment of the Elements: Part 1 Housed in the Top End", 8. Evidently, it was this source, as listed in the bibliography of the 1999 first edition of Philip Goad's *Troppo: Architecture for the Top End*, from which Goad derived his explanation of the 'tenth line' theory.

becoming 'extendable and adjustable' and thus gaining access to the 'Great Outdoors'.<sup>213</sup> As Harris states,

*"It is my belief that architects all too commonly only consider the potential of space in terms of 'encapsulated' space and as a solid to be viewed from outside, and so miss out on creating an architecture prompting a rapport with the Great Outdoors."*<sup>214</sup>



**Figure 4.4.4a** The tenth line breaks through the skins of a cube to reveal an internal edge between exterior and interior space (drawings on the left and in the middle by Harris and Welke). Date unknown. A man sits in a continuum space created by a tenth line looking out to nature (drawing on the right by the researcher of this study in July 2012).

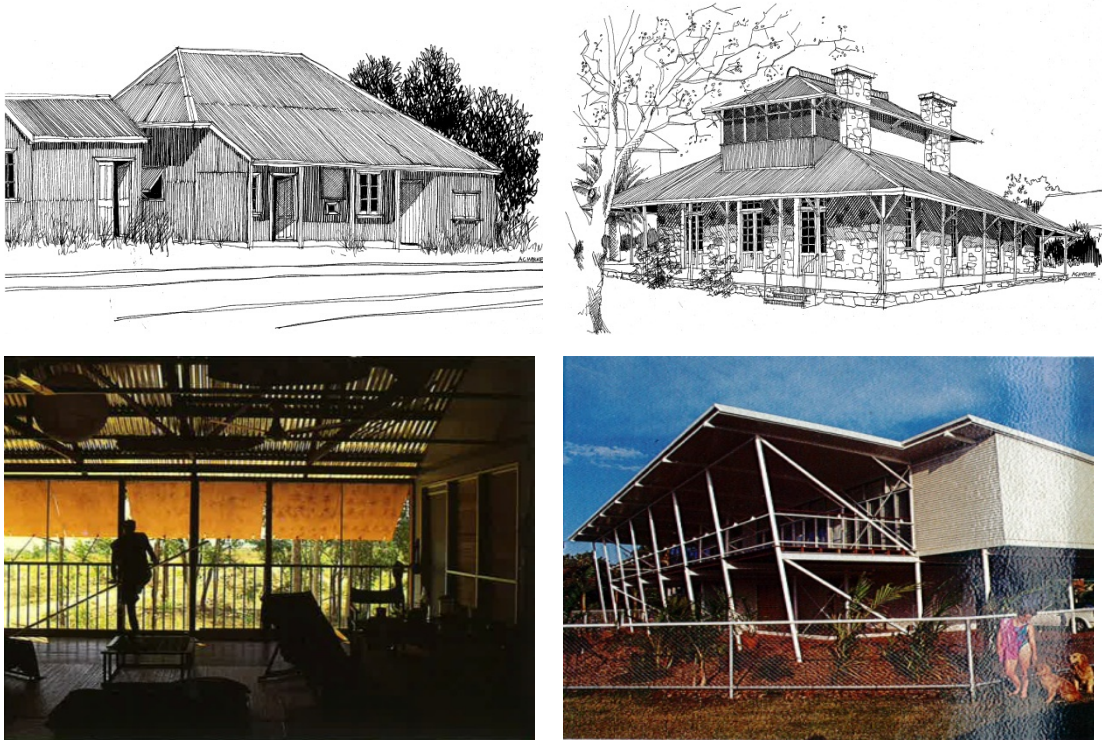
Tropo's tenth line created sensual experiences by enhancing transparency towards everyday living in the tropics. Visual satisfaction was achieved because 'a view through one will always include the other'.<sup>215</sup> The feeling of psychological belonging to the site was promoted by accessibility, through moving freely between the indoors and the outdoors, and enjoying constantly changing views and cool breezes. The tenth line embraced an Australian cultural symbol – verandahs – by creating thin, transparent and breathing exterior walls of houses. Because the line crossed a transitional space between inside and outside, it created a multi-functional living space for everyday activities (Figure 4.4.4b). Tropo transcended the typical 'sleeping verandah' to make this multi-functional space, a 'living

<sup>213</sup> Philp Goad, and Patrick Bingham-Hall, *Tropo: Architecture for the Top End*, 2<sup>nd</sup> Ed, (Sydney: Pesaro Publishing, 2005), 104. The tenth line was clearly stated and given a definition in both of Goad's books *Tropo: Architecture for the Top End* and *New Directions in Australian Architecture*.

<sup>214</sup> Phil Harris, and Adrian Welke, "A Hedonist's Handbook for Full Enjoyment of the Elements: Part 1 Houses in the Top End", 8.

<sup>215</sup> Phil Harris, and Adrian Welke, *A Hedonist's Handbook for Full Enjoyment of the Elements: Part 1 Housed in the Top End*, 8.

verandah' or simply a 'roofed outdoor space'<sup>216</sup> which was integrated as a vital part of everyday experience in Troppo Darwin houses.



**Figure 4.4.4b** Welke's sketches (Top left and right) of local residences built with a range of materials from corrugated iron cladding finish to a mix-use of stone, timber and corrugated iron roofs. Troppo's collection of 1980s photographs (Bottom left and right) of their early housing designs indicates their preferences for incorporating large verandahs as an outdoor-indoor living space in order to highlight this Australian cultural expression and reflect their understanding for the land, the local climate and a tropical lifestyle in the Top End. The tenth line was the means to create the living verandahs of Troppo houses.

Despite the conscious significance of this theory in their early work, it is interesting to note that in the context of the present research neither Harris nor Welke mentioned the 'tenth line' during their initial interviews. The only person who elaborated the significance of the tenth line in the design of houses was the director of Troppo Architects in Adelaide, Cary Duffield. This was during a conversation carried

<sup>216</sup> Justin Clark, Phil Harris and Adrian Welke, "Design gone Troppo: Justine Clark visited Adrian Welke in Troppo's Darwin office and Phil Harris in Adelaide to talk about their life and times as the Troppo team, and the projects that have put their brand of Top End Architecture on the map", *Houses*, (May 2002): 93 – 108. The online link for this article – <https://business.highbeam.com/482/article-1G1-86505234/design-gone-troppo-justine-clark-visited-adrian-welke>, was viewed on January 25, 2016.



out in an informal lunch-meeting with Duffield about his insights from working with Troppo in the day-to-day world of architectural design. He explained how the tenth line was taught implicitly as a key feature of any design. The potential quality of indoor-outdoor living verandahs, according to Duffield, depended on accessibility, arrangements and the juxtapositions of bedrooms, kitchen and living rooms with verandahs

#### 4.4.5 The improvisation of forms

'The architecture is really insignificant in the land' Harris claimed in his first interview, and this resonates with the Troppo conception for the designs of houses without a style. Style was an informal concept to Troppo, as Welke concurred with Harris in a separate interview.<sup>217</sup> Inspirations for designs of form and spatial planning were derived from a manoeuvre on site in response to the grandeur of the different settings of the landscape. To them, capturing the essence of a place was imperative and an immediate challenge as the conditions of site vary in accordance with climate, wind, sun paths, orientation and the constraints of surrounding contexts. In other words, the improvisation of forms was the design outcome of Troppo's second fundamental design principle – the interaction with the outdoors (Figure 4.4.5). They determined the designs of houses in form and floor planning based on identifying the place as the inspiration for 'where the mind touches the world'.<sup>218</sup> This impelled Troppo to shape their distinctive forms to capture the spirit of the place where they stood or moved through. In other words, each form was specially created as an individual interpretation for everyday experience of a site that highlighted Troppo's beliefs in 'caring for the surrounding residential environment – either actively or intellectually'.<sup>219</sup>

*'You just have to consider the environment first when you design a house for a client. You need to be familiar with the site by walking around and experiencing the space.'* (Interview with Harris in 2011)

<sup>217</sup> In their first separate interviews (conducted with Welke on the 11<sup>th</sup> of December, 2010 and with Harris on the 12<sup>th</sup> of February, 2011), both Welke and Harris were asked about the existence of any particular style that could represent the character of Troppo's projects. Both replied that the perception of style was an informal concept in their designs and they did not intend to design buildings with a fixed style, but rather to respond to the site and climatic conditions of each building.

<sup>218</sup> Simon Unwin, *Twenty Buildings Every Architect Should Understand* (London: Routledge, 2010), 9.

<sup>219</sup> Phil Harris, and Adrian Welke, *Punkahs & Pith Helmets: Good Principles of Tropical House Design*, 29.



**Figure 4.4.5** Harris' on-site sketches (Left) drawn in September 2000, the photo of the exposed timber framework of the house (Middle) taken in August 2002, and the photo of the completion of the Cape du Voltigeur House (Right) taken in December 2003 perched on a ledge of Kangaroo Island, South Australia.

#### 4.4.6 The instrumental ordering of spatial experiences

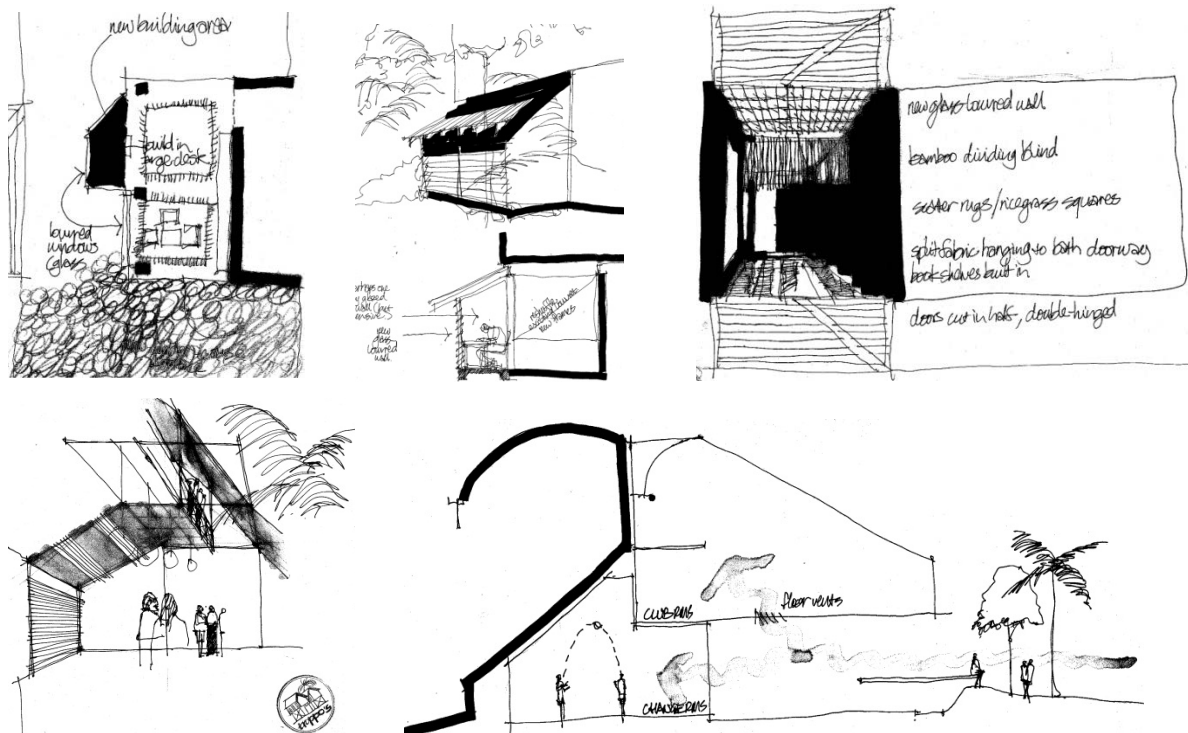
'Design from within and work out' (interview with Harris in 2011) was the tactic for creating the instrumental ordering of spatial experiences in the design of Troppo houses. Layout of spaces was initially created through the process of 'designing with sections' (Interview with Harris in 2016) which clearly explained Troppo's logic and beliefs in making building designs work from inside out. 'Designing with sections' was the source of their manifestos for a diversity of their creative work in tropical housing. The images in their sketches were presented in section. Simple details of steel and timber joints formed the responsive coherence and spatial experience between interior and exterior space, indoors and outdoors activities, and individuality and wholeness. Troppo's section drawings were the means to draw connections between the aesthetic of their improvisation of forms and the instrumental ordering of spatial experiences.

Section drawings for Troppo were the visual representation of their architecture, as they believed that these were the media to connect with reality. It has been said that 'Architecture exists, as a creative moment only in representations',<sup>220</sup> and Harris pointed out that he continued hand drafting to complete sets of working drawings until the early 1990s. To him, utilizing computer modelling to simulate spatial experiences created a disconnection between the magical creative moment and the real world

<sup>220</sup> Jorge Silvetti, "Representation and Creativity in Architecture: The Pregnant Moment," *Representation and Architecture*, Ed. Akin, Omer and Weinel, Eleanor (Silver Spring, Maryland: Information Dynamics, 1982), 184.



(interviews with Victor Cai in 2012 and 2014).<sup>221</sup> Through the sketching processes, Troppo connected themselves with the rhythms and movements of everyday activities, the flow of breezes, the penetration of sunlight and the exciting interaction with everything else in the vicinity of individual sites (Figure 4.4.6).



**Figure 4.4.6** Section drawings of a house extension (Top images) and of an office (Bottom images) represent innovative-thinking in action from ‘designing within and working out’. Sketches by Harris found in the Perth office. Date unknown.

Understanding specific construction methods adopted in Troppo practice offered ways to comprehend the importance of designing with sections. To Troppo, construction was ‘a means to an end’<sup>222</sup> rather than seeking specific ‘style’ or the necessity of ‘aesthetics’. Beauty and pleasure in a house was simply

<sup>221</sup> Victor Cai is an in-house architect of the Adelaide Troppo office, who is closely working with Harris in small and medium scale of residential and commercial projects as he is primarily reproducing his free-hand sketches to 3D computer models for clients and 2D working drawings for building approval and documentation. Harris refuses to produce any computer drawings as he firmly believes best designs are produced in eye-hand-mind design processes in a stress-free environment (lying in bed, on the couch, on the floor, in the café and in the airplane) on any available materials such as napkins, tissues, and scraps and recycled papers within research.

<sup>222</sup> Phil Harris, and Adrian Welke. *Punkahs & Pith Helmets: Good Principles of Tropical House Design*, 45.

achieved by simplicity of a working structure which gave 'personality' to the house.<sup>223</sup> Section drawings offered them a way to ensure a working structure during which they saw layers of detail and space in depth, possibilities for compositions of joints and visual satisfaction through materiality, texture, density and colour. The design sketches created a realm where Troppo could anticipate dynamics, interactions and experiences, from seeing them within the imaginary spaces and projecting them out onto the real world. The sense of scale, contrast, engagement and connection between human-made and natural entities in their drawings created meaning by presenting the instrumental ordering of spatial experiences in physical form as well as in the minds of individuals.

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<sup>223</sup> Phil Harris, and Adrian Welke. *Punkahs & Pith Helmets: Good Principles of Tropical House Design*, 45.

### 4.5 A Pattern Language for a *Gone Troppo* lifestyle

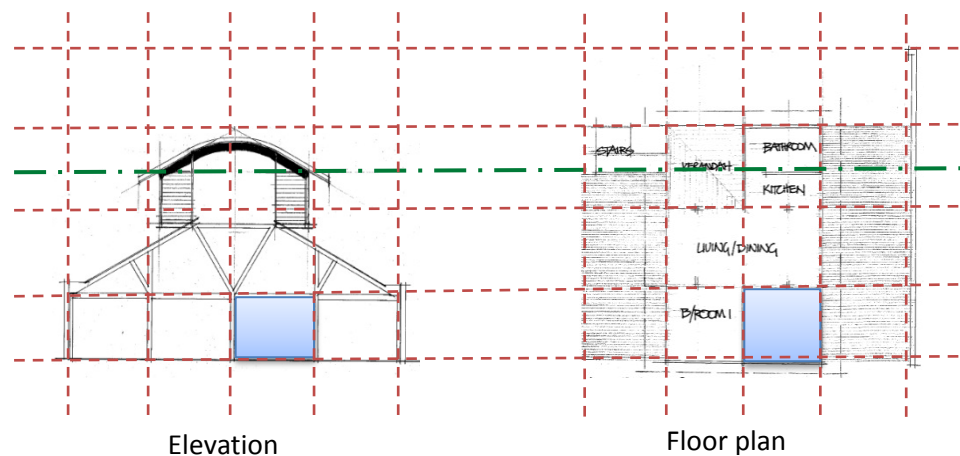
For the purpose of understanding the previous key aspects of the Troppo philosophy and gaining insights into the process of connecting forms and spatial experiences in Troppo's everyday architecture, twenty 1980s Darwin Troppo houses will be closely examined in this sub-section. These houses were selected with Welke's recommendation<sup>224</sup> for their merit in winning sustainable design awards, special architectural elements and features in form, or historical events (first client-commissioned project, first built project, first winning project, first time using new materials) representing their practice. Research materials were collected during the first visit to the Perth office in December, 2010. Data included working drawings, sketches and relevant articles about these houses. Pattern-forms were identified through the sketches recording Troppo's 'intuitions and impulses' derived at the site (interview with Harris in 2011) in relation to an everyday lifestyle which they imagined their clients would be living. Floor plans were examined through the lenses of geometry and rules of configurations for seeking an order in space organization through the concept of space syntax. Section drawings and on-site photographs of the houses were studied to draw connections between the intended qualities of physical spaces on paper and the real-life experiences of those spaces in response to climate, nature, the built environment and cultural contexts. Interviews with occupants related the pattern-forms to their feelings, values, and behaviours.

Shaping built forms is a significant action in design processes, and geometry has always been an important attribute in this process. For Harris and Welke, geometry provides a fundamental basis for their responsive architecture, as is clearly implied in their conference papers and newspaper articles. The twenty Darwin houses in the study are Troppo's very first unbuilt house design (Figure 4.5a), and the following nineteen houses: Coleman House, Lawler House, Green Can House, Butcher House, Draper House, Kaiplinger House, Pitt House, Spazzapan House, Gerovich House, Rossetto House, Rhodes House, Gettings House, Barkus House, Addison House, Lyne House, Hazeldine House, Kakadu Rangers House, Troppo Type Four, and Troppo Type Five House (Figure 4.5b). Troppo's first commissioned but unbuilt house was important and included because it demonstrated their early design

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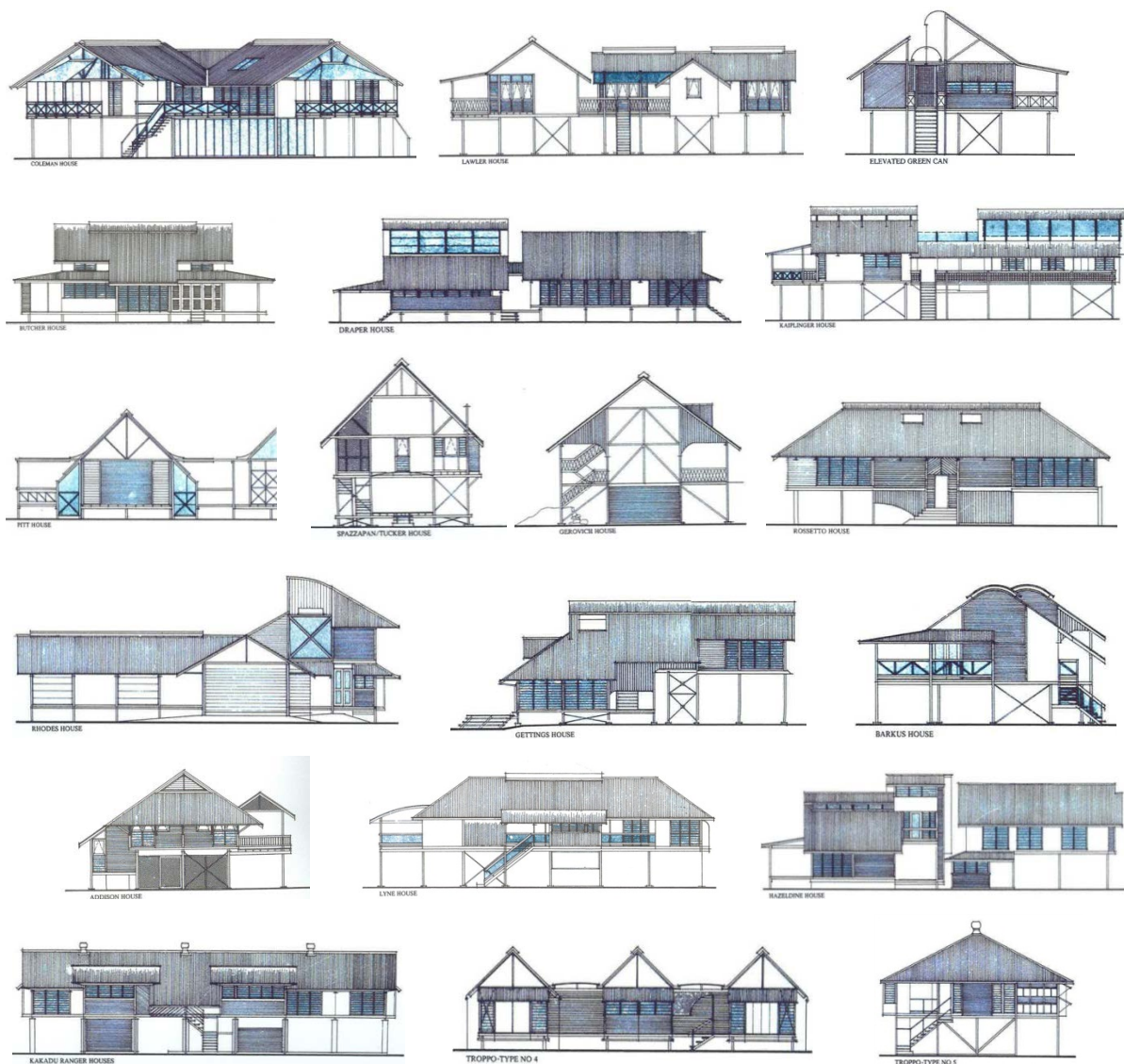
<sup>224</sup> Twenty 1980s Darwin Troppo houses were selected with Welke while conducting the first field work at the Perth office in 2010. Welke listed a list of distinctive 1980s Troppo houses in a 2-hour discussion.

approach characterised by a simple and stark geometry for economical affordability in construction as a response to the economic downturn in the Top End. The study focused on form-patterns from nineteen built Troppo houses. Interviews were conducted with both Troppo founders, former in-house architects, and those occupants and neighbours<sup>225</sup> who were available and willing to participate in the study at the time of the fieldtrip in 2011. The remaining houses were either visited externally or viewed in photographs, floor plans and section drawings provided by Troppo and Professor Antony Radford, who visited many of these houses and took photographs.



**Figure 4.5a** Troppo's first commissioned unbuilt house. The floor plan concept was characterized by geometry in form and formal system – square and symmetry (original sketches collected in the Perth office in 2010).

<sup>225</sup> There were some residents and neighbours of the occupants of the early Troppo houses voluntarily requesting an interview as they firmly believed their houses were one of the Troppo houses in the area.



**Figure 4.5b** Nineteen elevation designs of the early Darwin houses built in the first decade of Troppo houses chronologically demonstrating a sense of order in repetitive form and of simple geometry in symmetrical pattern with subtle nuances (drawings are not to scale and are taken from the Troppo poster).

Subtle nuances in symmetrical patterns were identified in the elevations of these houses. These are the following: addition of more windows (Coleman House, Lyne House and Troppo Type 5); subdivision of window frames (Butcher House, Pitt House, Spazzapan House and Troppo Type 4); timber lattice shading (Rossetto House); contrast between enclosure and open space (Lawler House, Butcher House, Addison House and Lyne House), and addition of new elements/modules to the house (Pitt House, Gerovich House, Addison House, Kakadu Ranger House, Troppo Type 4 and Type 5). These designs



break the traditional concept of architectural symmetry, reflecting Troppo's sense of playfulness (Figure 4.5c).



**Figure 4.5c** Design nuances were identified for breaking classical symmetrical appearance and creating an inventive asymmetry in these houses. They embraced the beauty of order and symmetry in geometry with a twist in contemporary expression.

Subtlety between symmetry and asymmetry was achieved by inserting new elements on elevations, floor levels and spatial entities (such as enclosure, semi-enclosure and open space). This subtlety created a pattern in the complexity and sophistication of tropical forms that deviated from the rigidity and formality of traditional geometry and architectural expression. Special roof features were particularly identified: the discrete gable roofs in the Coleman House, Lawler House, Barkus House and Troppo

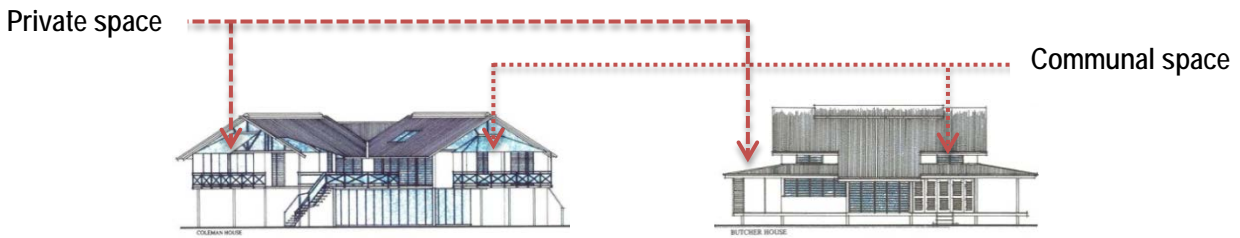
Type 4 House; the pull-apart and open roofs in the Green Can House, Draper House and Kaiplinger House; the combination of a gable roof and a mono-pitch roof in the Pitt House; the descending shape of the roof in the Gettings House; the cascading and mix-match-shaped roofs in the Rhodes House; and the pyramid roof in the Troppo Type 5 House. Each house design displayed a sense of originality and uniqueness to reflect the individuality of the occupants.

From the elevations, Troppo's early houses were distinctively characterised by robust materiality and elevated construction. The commonly used materials were corrugated iron sheets for roofs and external claddings, timber shutters, glass louvres, bi-folding doors, criss-cross patterns of timber balustrades, plasterboard internal wall finish, timber lattices, steel frames and steel-rod cross-bracing. Lightweight and elevated construction was the primary design theme of all these early Darwin houses. Post-and-beam construction was extensively used in all early Troppo houses, either a major steel frame with steel columns and beams as the primary structure with timber as infill or a major steel frame with steel columns as the primary structure with timber for floor joists and beams as the secondary structure and infill.

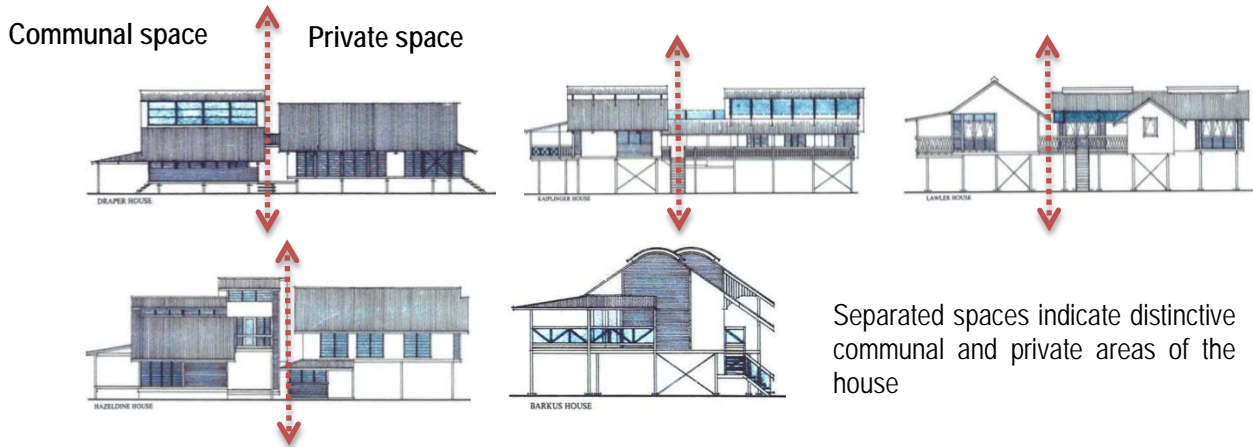
Distinctive zones for private and communal spaces are noticeable in some of the houses (Figure 4.5d). Other shared patterns that can be discerned in the elevation designs are as follows:

- the use of bi-folding doors and wall-length louvres/windows opening up to the outdoors;
- separating two spaces by breezeways, verandahs, and entrances to create a distinctive communal space for living, kitchen and dining areas, with private space for bedroom and bathroom/shower/toilet;
- repetitions of window designs indicating the position of bedrooms;
- communal and private spaces separated by levels.

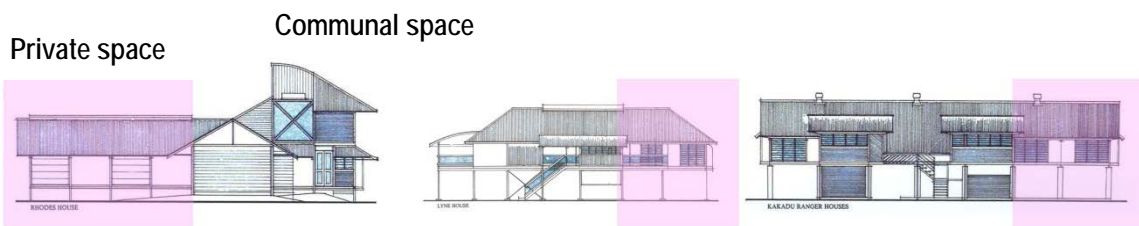




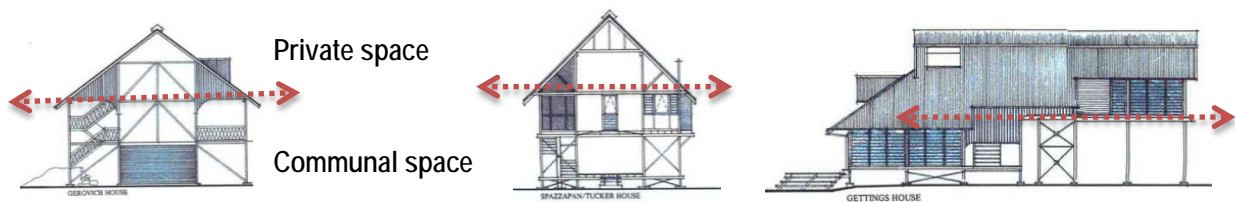
More wall-length louvres/ windows/doors indicate communal space such as living room, kitchen and dining



Separated spaces indicate distinctive communal and private areas of the house



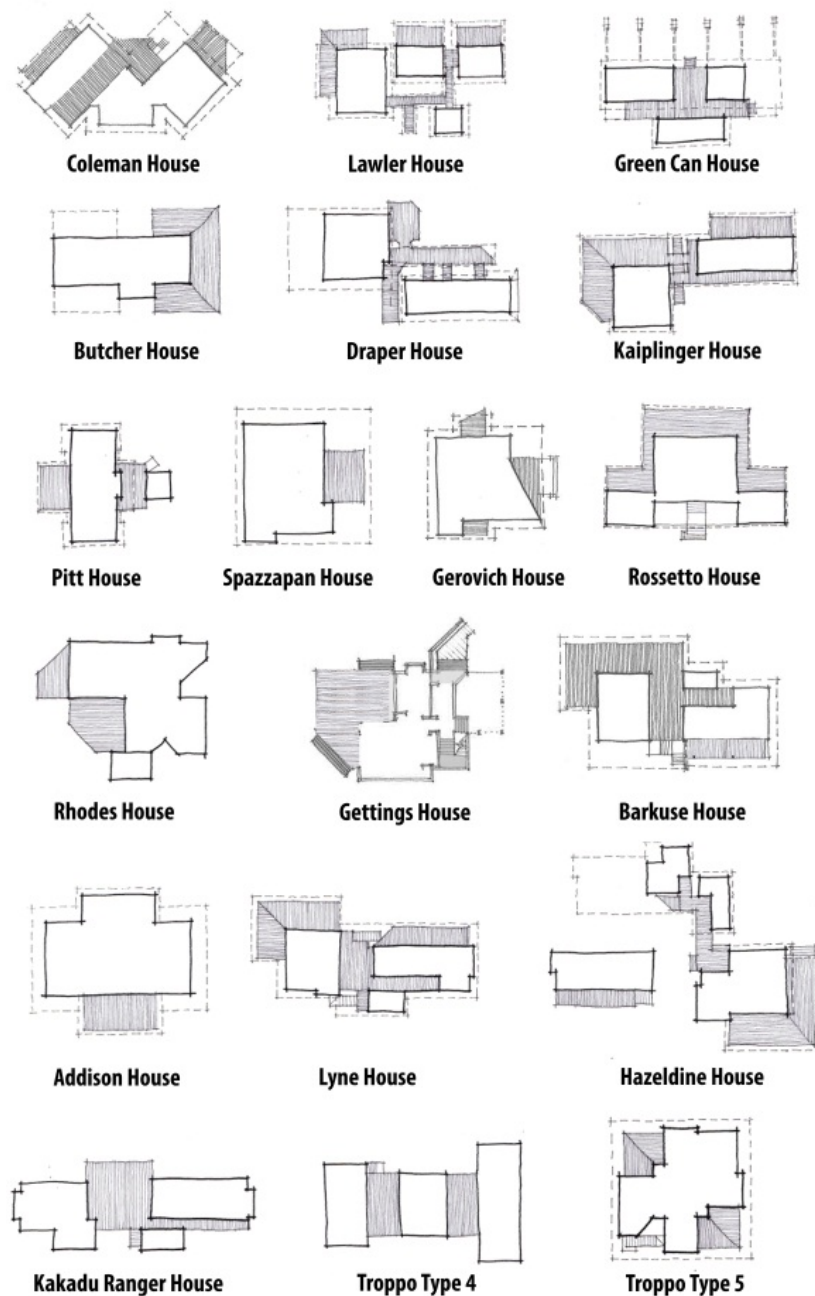
Repetitions of window designs instantly express the position of private areas for bedrooms with an attached form indicating the bathroom facility



Communal and private spaces are zoned by the levels of the house (public spaces below and private ones above)

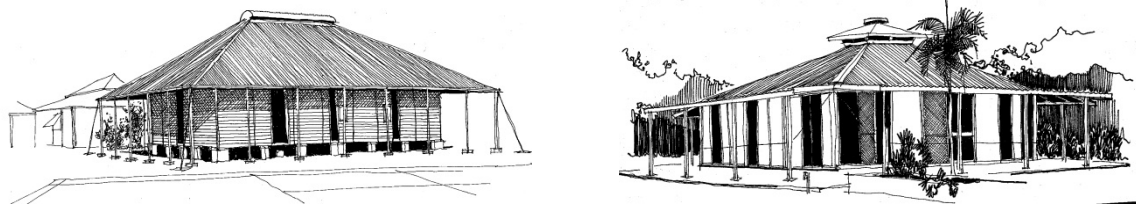
**Figure 4.5d** Shared patterns for the spatial designs of public and private spaces can be discerned in the nuances of window placements, separation of zones by open breezeways, entrances and verandahs, repetitions of window designs, and different levels.

The configurations of the floor plans offered another way to understand the Troppo's design thinking of these early houses. The irregular geometrical forms in Gerovich House, Rhodes House and Troppo Type 5, once again, reflects Troppo's playful attitude toward experimentation in design (Figure 4.5e).



**Figure 4.5e** Troppo focused on simple and economical geometry in creating various compositions of shapes for the floor plans of these nineteen tropical houses, displayed here in chronological order and not to scale (reproductions of the original working drawings).

Simple forms in geometry (square and rectangle) and compositions of stretched rectangular forms were used in these floor plan designs. There was a gradual increase in the complexity of the geometry within a single form from a simple square or rectilinear form to irregular, multi-angled and discrete forms. The space of verandahs was generously incorporated within the changing geometry to retain a visual wholeness in form. This was seen in the rectangular shape of Troppo's first commissioned unbuilt house (Figure 4.5a). Troppo utilised this simple rectangular shape to create an upside-down V-shape floor plan for the first built Coleman House in which they opened up the central volume of living spaces. The positions of verandahs thus played a significant role in creating surprising geometry. Transforming the traditional use of outdoor verandah (Figure 4.5f) into a part of indoor living spaces became Troppo's approach for new design ideas that will be illustrated with a series of shape transformations with the notion of their flirting with symmetry.



**Figure 4.5f** Verandahs of colonial farmhouses wrapped around the central living space to provide shading and protect the occupants of the house from rain, excessive sunlight and harsh heat in the tropics (Drawings by Welke on the left and Harris on the right). Dates unknown.

#### 4.5.1 Flirting with symmetry

The design of Troppo's first unbuilt commission (Figure 4.5a) offers compelling evidence that a simple cube was the creative starting point for the distinctive range of innovative forms that Troppo devised in these early house designs and, as described, for their fundamental design theory of the 'tenth line'. The form of the basic geometry was retained to express simplicity and cost-effectiveness. In analysing these nineteen early Darwin houses, a pattern was identified forming variations of spatial arrangements with a mathematical order of operations. Operational rules for order were used intuitively by adding subtracting, multiplying, dividing, and rotating a basic square to generate a new form. A simple form was transformed to become an irregular form in these early houses. Troppo began to explore simple geometry and symmetry in composition of spaces and design of elevations. They continuously adopted the simplicity of a grid system in developing diverse configurations of floor plans by manipulating simple geometric forms to create a variety of irregular forms and of compositions of separate spaces

connected by decks, bridges and verandahs. Moore points out that the 'psychic wholeness' only makes sense when the parts are seen as individuals yet all parts fit together to create a new and meaningful whole. Troppo's early houses resonated with Moore's concept of psychic wholeness through the progressive transformation of a square with a specific sequence of operations. The configurations of singular and multiple forms were created directly according to the conditions of sites, clients' wishes and the affordable budgets. (Figure 4.6.1a, b, c, d, e, f, g and h). In these transformations there is a clear indication of Troppo's developing endeavour in breaking the classical and simple geometry by articulating a basic shape with extended angles, layers, splits and add-ons. Unlike these, the forms of later house designs have become so much more complex that the order of operations cannot be identified, as they were guided by Troppo's diverse intuitions ('gut feelings') and life experiences in the late 1980s.

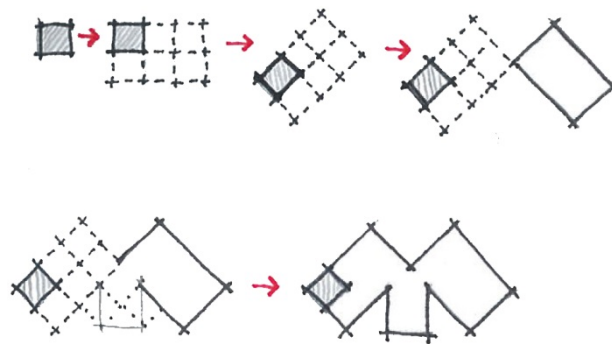


Figure 4.5.1a Transformations of forms of the Coleman House: multiplication, rotation, mirror, and extension.

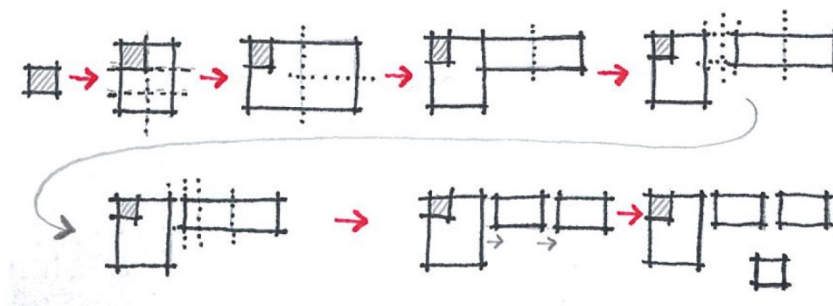


Figure 4.5.1b Transformations of forms of the Lawler House: multiplication, division, pulling and addition.

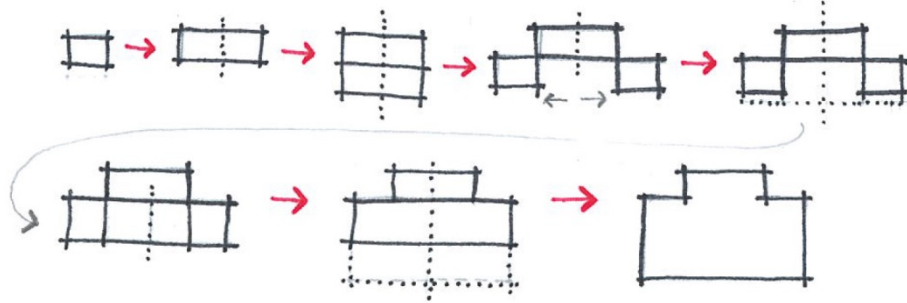


Figure 4.5.1c Transformations of forms of the Gettings House: multiplication, pulling, and scaling to a new form.

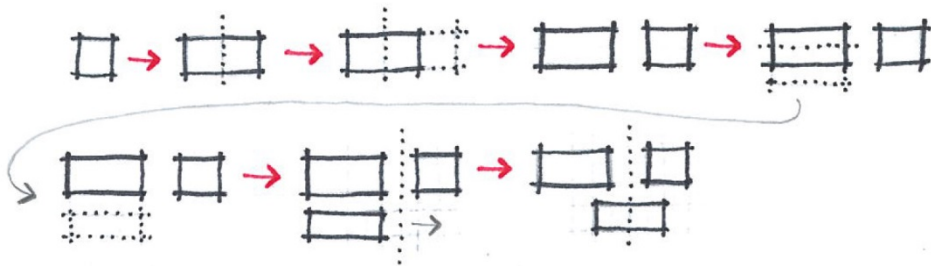


Figure 4.5.1d Transformations of forms of the Green Can House: multiplication, addition, division, mirror and shifting.

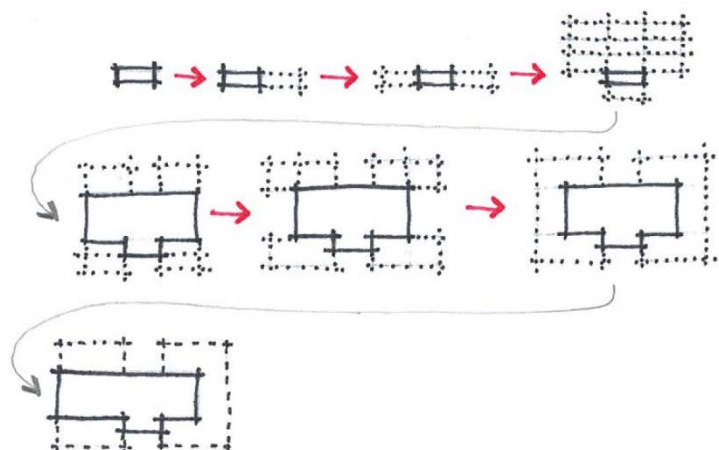


Figure 4.5.1e Transformations of forms of the Butcher House: multiplication, addition and extension (or can be seen as stretching to articulate the simple rectangular form).

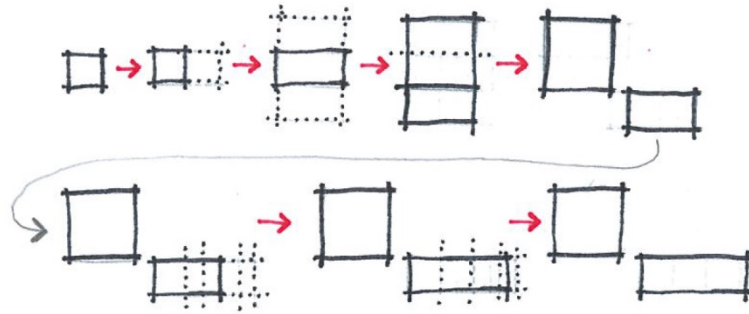


Figure 4.5.1f Transformations of forms of the Draper House: mirror, multiplication, division, pulling and extension.

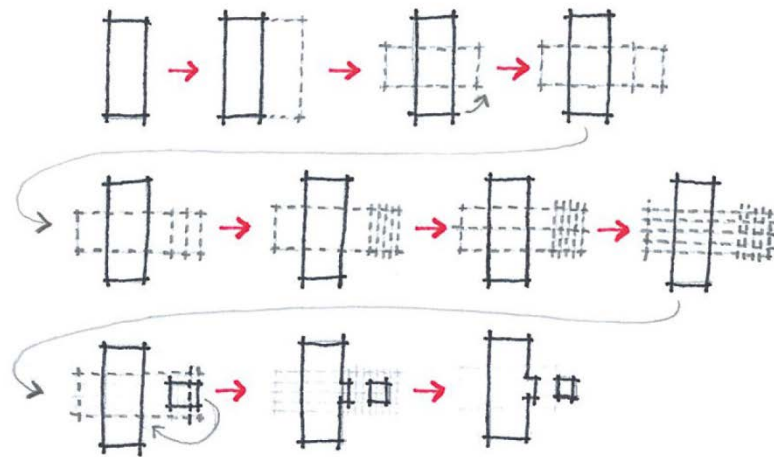


Figure 4.5.1g Transformations of forms of the Pitt House: mirror, rotating, division, pulling and addition.

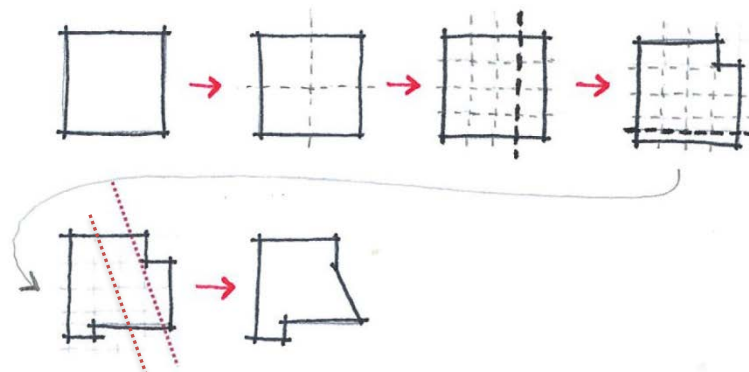
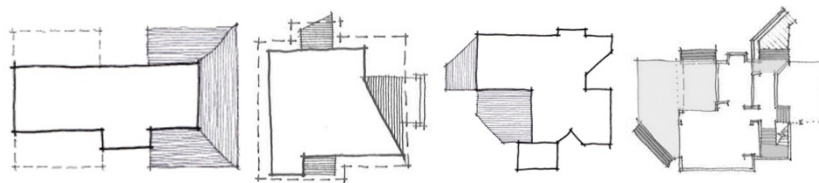


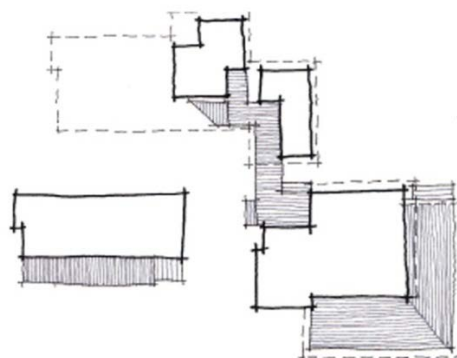
Figure 4.5.1h Transformations of forms of the Gerovich House: dividing, subtracting/cutting for creating an angled form. This was Troppo's first attempt to work on an angled design.



The final form of each Darwin house was intended to be innovative with a deliberate order of operations and responsiveness to the context of the individual site. The variation of forms analysed reveals Harris's and Welke's playful and adventurous spirit in exploring free forms while maintaining the architectural rigor of their academic discipline and training. Bending (articulating the form) and breaking (cutting out space to form angled-corners and multi-angled forms) rules were means to create opportunities and restate the regional expression of an authentic architecture in the Top End. Troppo initially articulated a simple rectangular form in the Butcher House; cut-away and created a sharp-finish corner in the Gerovich House; boldly cut away enclosed interior space to draw in malleable exterior space in the entrance, verandahs, stairs and decks of the Rhodes House and Gettings House; and pulled the main living space apart to create a central courtyard for a reversed lifestyle (spending more time in the outdoors) and open living experience – outdoor-indoor-outdoor continuum - in the Hazeldine House.



**Figure 4.5.1i** Troppo flirt with symmetry in the Butcher House, Gerovich House, Rhodes House and Gettings House in order from left to right. All have symmetrical or near-symmetrical parts, but the overall form is asymmetrical. Verandahs were used as outdoor-indoor living space in connecting with nature and the world.



**Figure 4.5.1j** Troppo adopted the Bali central courtyard concept for the Hazeldine House for the first time to emphasize the outdoor-indoor-outdoor spatial experiences in the daily activity of the occupants.



A new expression for tropical architecture evolved in the process of flirting with symmetry in the design of the 1980s Troppo houses. The dynamic and protruding free forms for the floor plans and roof designs were the precedents of Troppo's distinctive elements which marked their diverse architectural design as an expression for a contemporary regional architecture. The blurring of the interior space with special outdoor-indoor verandahs was created by zoning the living areas of the house between private and communal spaces, and this became characteristic of Troppo designs. Over ten years of tropical design practice, these early design concepts became the precedents for their award-winning houses in their later practice.

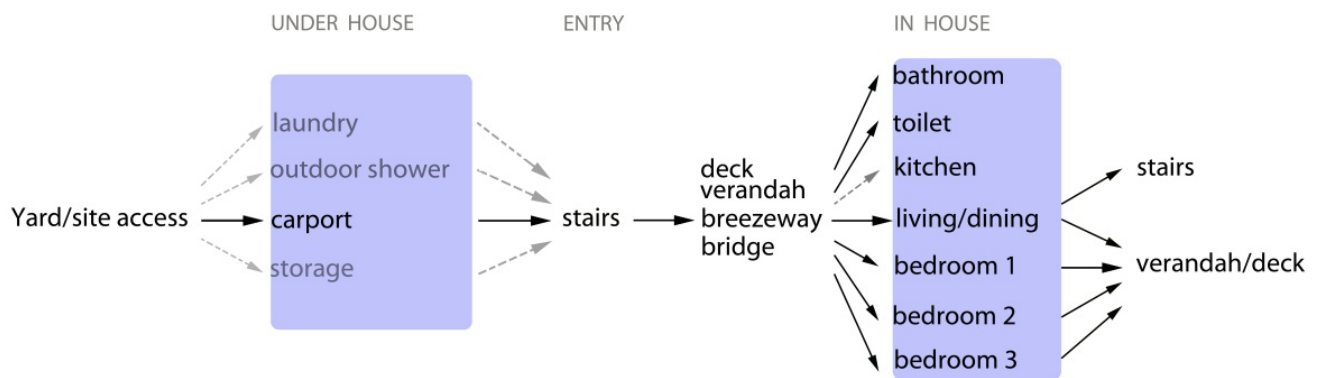
In order to unravel the design of early Darwin houses in detail, it is important to analyse the frequent and daily movement between physical spaces and verandahs. This is achieved in the following sections by studying these houses through re-drawn plans, original section drawings, some 3-dimensional computer models, photographs, personal site visits, interviews with occupants about their experiences of living in the houses, and interviews with Troppo about their concept of designing-in-action-with-intuition. Terms from Raban's *Soft City*, hard space and soft space, will be adopted to describe the arrangement of physical space (hard space) and the influences of psychological spaces (soft spaces) on the occupants. In particular, 'hard' space will describe the physical elements, space usage and functionality; 'soft' space will describe the impact of hard space on the occupants' feelings. By integrating the findings of both kinds of spaces, shared patterns will be identified for forming a pattern language for a *Gone Troppo* lifestyle in the Top End in the 1980s.

#### 4.5.2 Hard and soft space

The nineteen houses under consideration displayed geometric forms in elevations and floor plans. There was an order in semi-symmetrical elevations and punctuations of architectural elements such as positions of windows, a central flight of stairs, and entrance. Their indoor-outdoor movement extended not only between interior living spaces and the multi-purpose verandahs but also flowed to under-house car ports, outdoor showers, semi-open laundries and outdoor storage. Most spaces were designed with a fixed-functional use (kitchen for cooking, bedroom for sleeping) but with the possibility of adaptation for other uses, such as eating, dining, cooking, reading and sleeping in one space. Consequently, these

spaces in the early houses were often unnamed as an outdoor relaxing space could be used as a sleeping and napping space or a dining area or a study. Spaces were arranged to be open to catch the air-flow and sunlight in accordance with the specific conditions of individual sites.

A general connectivity graph was created by analysing the designs of the twenty floor plans and section drawings, following the approach of Bill Hillier's space syntax diagrams<sup>226</sup> for representing spatial hierarchies (Figure 4.5.2a). This general connectivity graph was important as it not only translated one of the ten design themes, 'The house is', to a graphic representation but also revealed the shared pattern of everyday experience in the spaces of the houses. The links in the connectivity graph reflected the daily activities of the occupants in the house, access to specific spaces, connections between indoor and outdoor spaces, 'a hierarchy of privacy.'<sup>227</sup> Six houses have small differences: the Spazzapan House, Gerovich House, Rhodes House and Gettings House have split levels to segregate communal and private areas in one enclosure; the Hazeldine House has a mixed-spatial arrangement of split levels and discrete zones with distinctive communal and private spaces scattered around a central courtyard; and the Troppo Type 5 House has a compact entrance connected with a flight of stairs, bathroom, toilet and one bedroom.



**Figure 4.5.2a** A general connectivity graph representing typical patterns of spatial arrangement in the houses.

<sup>226</sup> Bill Hillier, Adrian Leaman, Paul Stansall, and Michael Bedford, "Space syntax," *Environment and Planning B: Planning and Design* 3, no.2 (1976), 147-185, Bill Hillier, Richard Burdett, John Peponis, and Alan Penn, "Creating life: or does architecture determine anything?," *Architecture et Comportement/Architecture and Behaviour* 3, no.3 (1987), 233-250, Bill Hillier, "The hidden geometry of deformed grids: or, why space syntax works, when it looks as though it shouldn't," *Environment and Planning B: Planning and Design* 3, vol.26 (1999), 169-191, Bill Hillier, *Space is the Machine: A Configuration Theory of Architecture* (London: Space Syntax, 2007) is an electronic publication.

<sup>227</sup> Phil Harris, and Adrian Welke, *Punkahs & Pith Helmets: Good Principles of Tropical House Design*, 28.

During the analysis of these houses, more shared patterns of 'hard' space are identified in terms of *space and form, construction, and spatial arrangement*. They are as follows:

***In space and form:***

- Simple rectangular or square form is used for affordability through its technical simplicity and economical construction (Figure 4.5.2b);

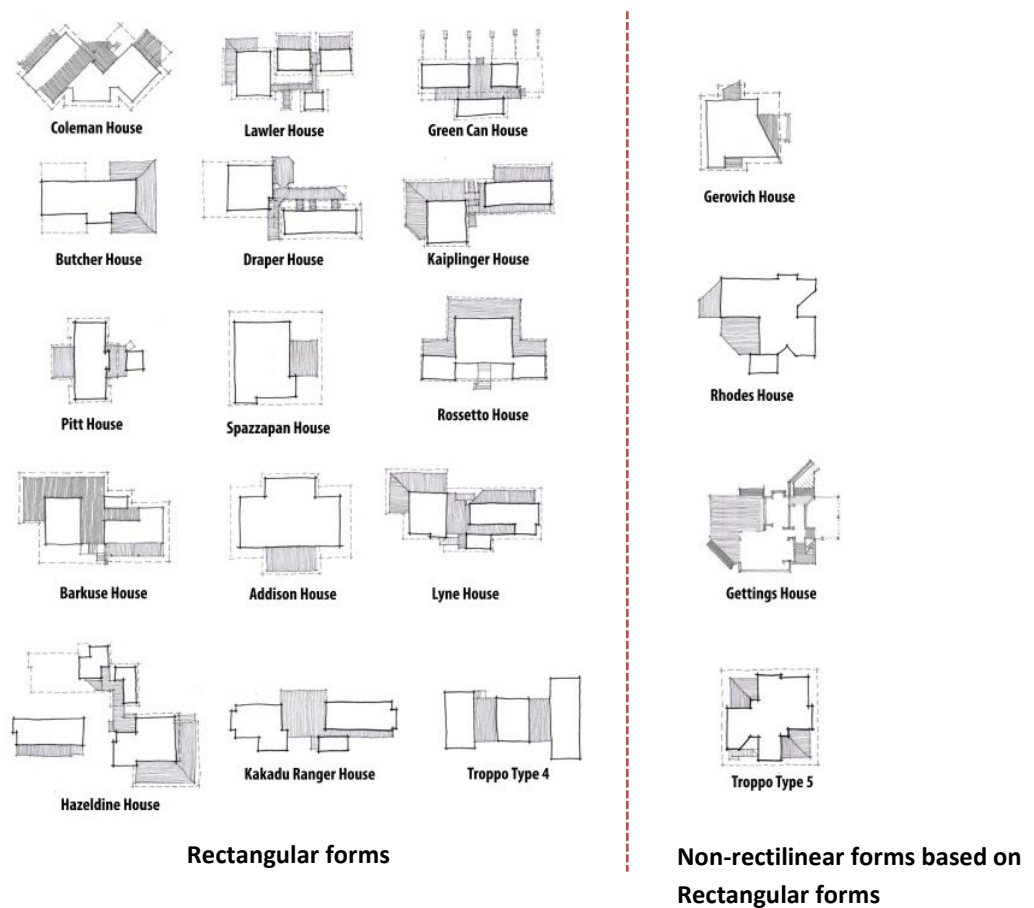


Figure 4.5.2b Rectangular and non-rectilinear forms in the group of 19 houses.

- There are additional bedroom verandahs for outdoor sleeping with privacy (Figure 4.5.2c);

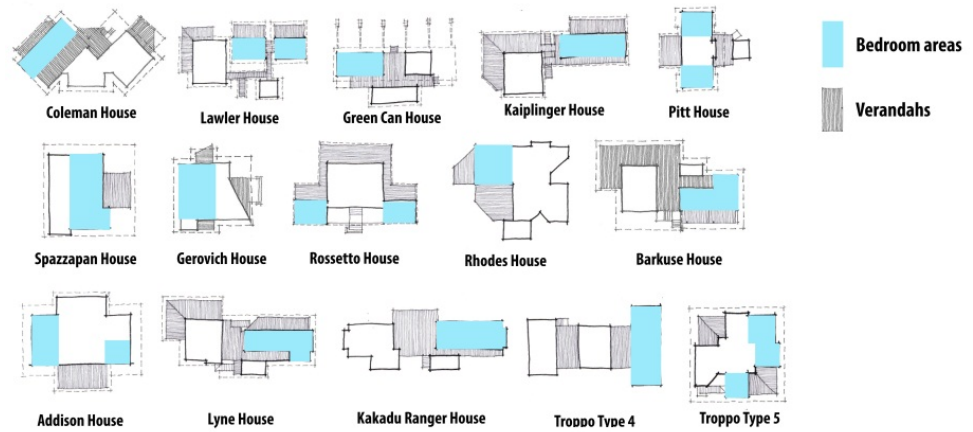


Figure 4.5.2c Additional bedroom verandahs for outdoor sleeping areas.

- The positions of verandahs/breezeways/walkways/bridges complement the wholeness of the geometry;
- There is an architectural order expressed in symmetrical forms, with eccentric expressions in asymmetrical forms and a hybrid design of combined symmetrical and asymmetrical forms (Figure 4.5.2d);

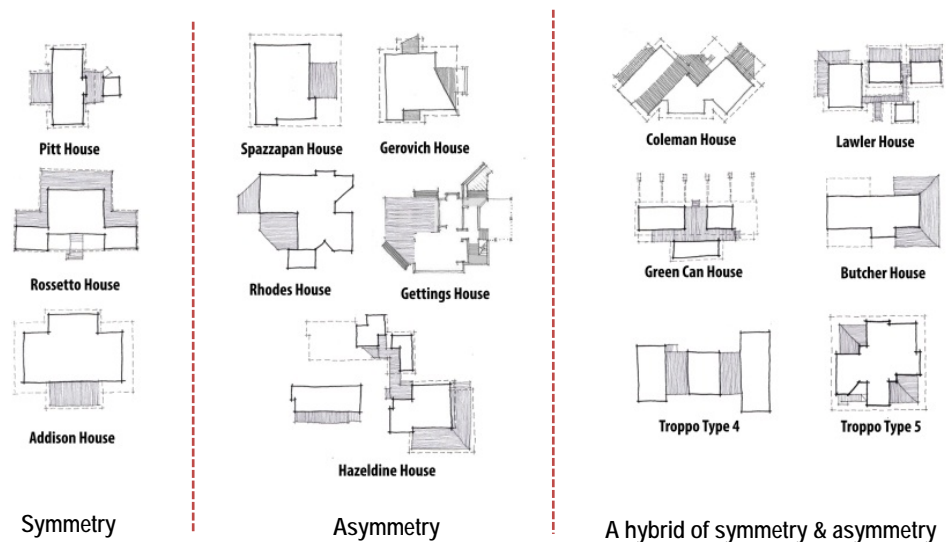
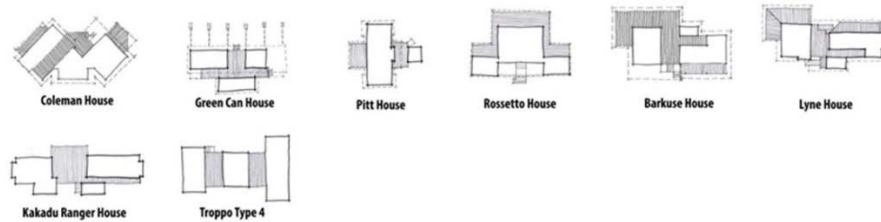


Figure 4.5.2d Three representations of symmetrical, asymmetrical and hybrid forms in geometry.

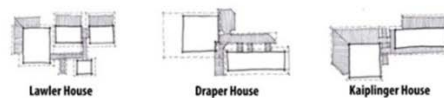
- The simple geometry of a whole is pulled apart (into parts) connected by verandahs to allow ventilation, sunlight and easy access to each space, facilitating response to the outdoors and additional uses for sleeping, dining and studying (Figure 4.5.2.e). Four floor types are identified in terms of the configuration of forms and connections with the outdoors. They are **Type A** (one integrated big space), **Type B** (separate spaces connected by bridges/passage ways), **Type C** (one central space connected with one or more verandahs), and **Type D** (central courtyard design with separate spaces connected by passage ways/bridges).

**TYPE A**

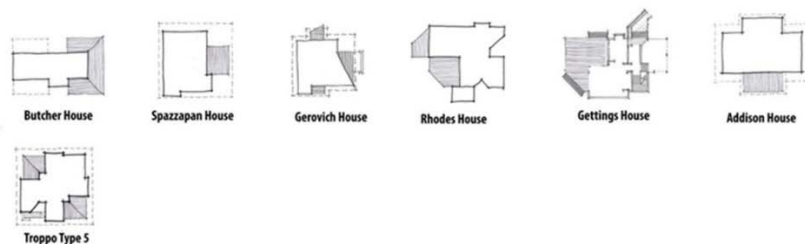
Separate spaces connected by wide verandah living spaces

**TYPE B**

Visually separate spaces connected by narrow bridges/passage ways

**TYPE C**

One central living space with one or more verandahs attached to or surrounding the living space

**TYPE D**

A central courtyard partially surrounded by separate spaces connected by bridges

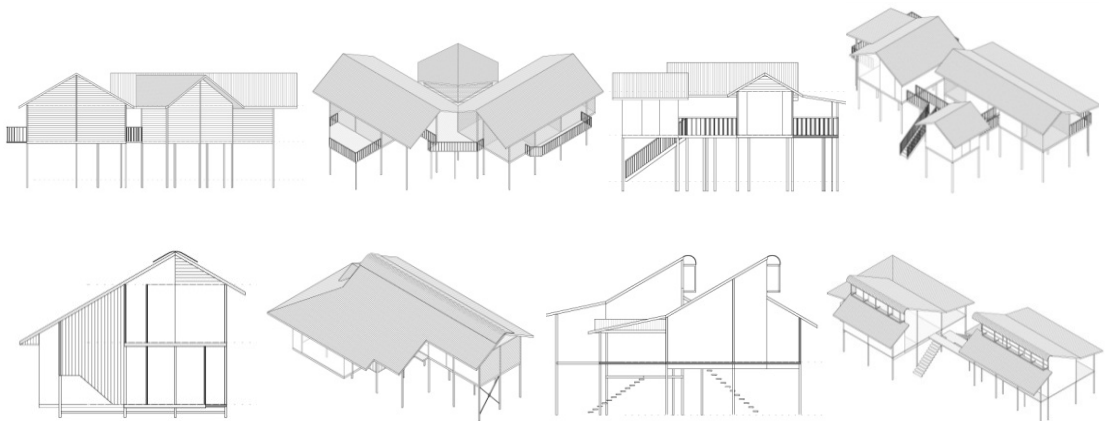


Figure 4.5.2e 4 types of floor plans (A, B, C and D<sup>228</sup>) are identified in terms of the configurations of spaces and their connection with nature through verandah, bridges and passage ways.

<sup>228</sup> Type D, a central courtyard design for Hazeldine House was the precedent for the iconic work of Troppo designs - Thiel House, Cullen Bay in Northern Territory in 1999.

***In construction:***

- A post-and-beam structure is extensively used in the design of the early Troppo houses, recognising the practicality of post-and-beam vernacular buildings as a response to regional climatic conditions. Steel is the primary element of this post-and-beam construction for the structural frame of all selected houses with timber as the secondary structure and infill. Its lightweight structure offers the functionality of portability, flexibility for openness of space and free-air movement, durability in inclement weather, lower indoor temperature, and reduction of physical damage to the built environments by minimising the footprint on the surface of the earth (Figure 4.5.2f);



**Figure 4.5.2f** Houses have simple volumes in most cases and post-and-beam structures with an elevated main floor, as in the Coleman House (Top left), Lawler House (Top right), Gettings House (Bottom left), and Kaiplinger House (Bottom right). (All 3-dimensional models were generated by Cai and Huang based on Troppo's 2D drawings.)

- The floors are elevated either above the ground or by a whole storey which offers usable and additional under-house liveable space for outdoor shower, storage, laundry, entertaining space and car-ports;
- A covered verandah and the under-house space are provided for outdoor living (sleeping, dining, reading and entertaining) in the Dry Season;
- A general 35 degree, steep pitched roof with openings is used for the balance of internal and external pressure to avoid suction between indoors and outdoors for cyclone reasons;

- Extensive long overhangs provide shade to walls (reducing direct heat from sunlight) and cope with heavy rainfalls and tropical storms;
- Whole interior volumes are open and exposed with ceilings following the roof slope and an exposed roof structure (purlins and rafters for open roof trusses). This gives a larger open volume for the temperature gradient with hot air collected and expelled at the highest level by the vents and banks of sky-windows or louvres;
- Internal partition walls stop short of the ceilings for reducing the obstruction of hot air-flows internally;
- Permeable outer walls have manually operable roof-high timber shutters and awnings, and glass louvres for ventilation, daylight and rain;
- A steel structural framework with hardwood sub-frame and cross-bracing rods is used for strength in a cyclone area, also offering extra open-living spaces and economy;
- Corrugated iron cladding is used for walls and roofs, which is economical and maintains the local building traditions.







**Figure 4.5.2g** The early Darwin houses demonstrated a sense of lightness, openness and transparency, with free air flow, sunlight and interactions with wild life coming in and out. Examples are seen in the Troppo House (Top left) Troppo Type 5 House (Top right), Kaiplinger House (Middle left), Green Can House (Middle right) and Hazeldine House (Bottom). Taken on-site in 2011, except the last one was taken by Antony Radford in 2008.

***In spatial arrangement:***

- There is a formal invitation to an entrance by a flight of stairs or a platform of verandah or deck space, which indicates a transitional space between public and private zones (Figure 4.5.2h);

- Communal and private spaces are separated and connected by a breezeway/verandah/walkway (bridge), making necessary daily transitions between interior and exterior spaces for occupants;
- There is an intermediate space, either a verandah or a breezeway or a bridge/walkway, between the flight of stairs for the entrance and the main living spaces. This intermediate space provides a transition between public entry and private spaces as a security check-point;
- Common additional uses of the under-house space are storage, car-ports, outdoor laundry, shower and entertaining rooms;
- A shared and semi-open bathroom and toilet are provided on the bedroom level (adjacent to the bedrooms as a separate space in most cases) for economy;
- An outdoor semi-open or open shower on the ground level (under-house) proves economical and offers a quick-refreshing outdoor activity in the Dry Season as a second shower,
- An outdoor laundry is located close to the outdoor clothes hanging areas and the outdoor shower.



**Figure 4.5.2h** These old photographs of early Darwin houses display a flight of stairs as a formal invitation and a transition between public entry and private spaces as seen in the Rossetto House (Left) and Troppo DHA Palmerston House (Right). Taken by Antony Radford in 2008.

## Soft space

The concept of soft space is used to understand an adaptation occurring between the houses and their occupants over the years. The significance of identifying soft space in the 1980s Troppo houses was to reveal how the occupants lived, experienced, altered and changed their perceptions of the uses of spaces. It was evidence of how they saw the quality of the living spaces (interior and exterior) and their emotional responses and psychological attachments to their houses. The site visits to the houses and interviews with the occupants confirmed the significance of this adaptation.

In the conversations with occupants a spectrum of emotional responses emerged. Twelve residents of six houses willingly participated in the interviews. Some occupants had privacy concerns and gave no responses during three visits in 2011, while others had concerns about potential trespass. The participants of the interviews were occupants of houses in what is known as 'TroppoVille', Coconut Grove. A significant number of the residents of the early Troppo houses refused to participate in interviews due to their past experiences of frequently unexpected visitors and requests by students and academics for interviews because of the popularity and promotion of Troppo's work in social media such as newspapers, magazines and national and international periodicals. They indicated their wishes to be left alone. Nevertheless, among the interviews conducted with occupants, the 'badge of honour' of a genuine Troppo house was felt strongly and shared by the community. In two instances neighbours sought to set up a time for an interview as they firmly believed their own houses were designed by Troppo, although they were not Troppo houses. In general, the Troppo house dwellers interviewed offered a warm welcome, an enthusiastic attitude and offers for a house tour, future visits and correspondence for further information.

According to the interviewees, the span of residency was between three and eighteen years. Two families had initially planned to stay only for a few years, an elderly couple who had originally moved from Adelaide to Darwin for a work contract and a single mother with a young adult son. With the growing emotional response and the psychological attachment they had developed

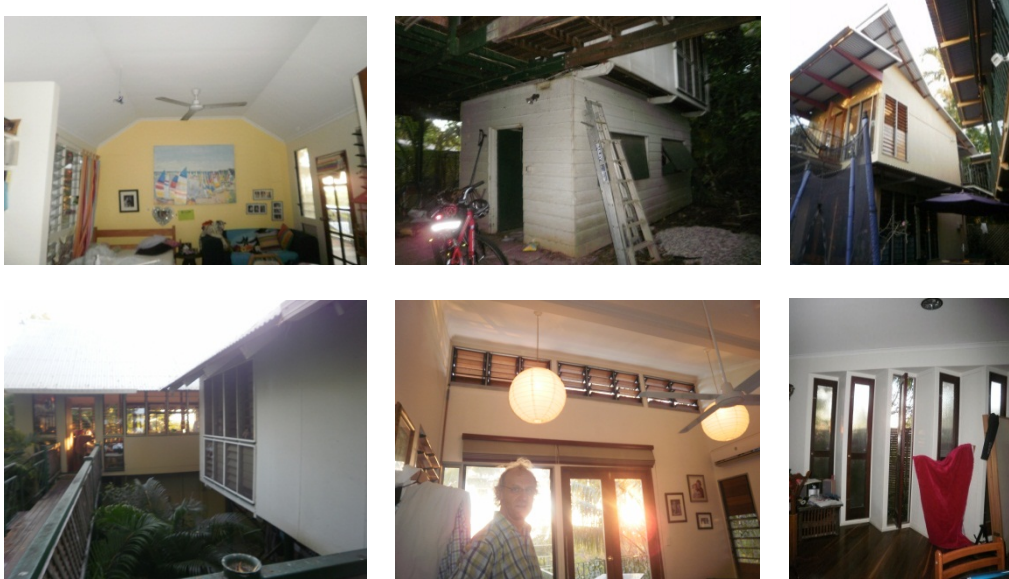
towards their house over the years, they had decided to live in them much longer than they had intended. They explained this as due to 'inseparable attachment', 'childhood memory', 'falling in love with the open spaces of the house, nature and the wildlife creatures', 'growing together' and having 'been through good and tough times together' at the time of the interviews (the occupants of the Green Can House had stayed for twelve years and those of the Kaiplinger House for eighteen years).

Building additions were made to the houses for additional family members or new occupants. According to Troppo's job records and the interviews, some of these were external and separate spaces for a storage/working shed, music room, master bedroom, spare bedroom/guest room and entertaining room. These separate spaces were either standing on their own or connected by an open walkway or a bridge. The Lawler House had the biggest building changes to its original design and renamed to Jarvis Lawler House in accordance with the request of the current owners of the residence. Formerly known as the Lawler House, the current male resident asked that it be renamed to acknowledge the new additions that Troppo had made to the house after the new owner, Jarvis and his partner<sup>229</sup> purchased it in the mid-2000s. This was the only house modified with an internal plasterboard finish and ceiling-height internal walls to accommodate new born children and his career as an academic and musician. Some glass louvres and timber shutter windows were replaced with solid timber-framed windows, shutters and doors. An enclosed under-house space with tiled floor finish was created as an additional family room for accommodating the frequent visits of extended family members from overseas. Apparent at the time of the site visit was a separate addition to the main house which had been designed and built in the late 2000s by Troppo's then director in Darwin, Greg McNamara. This was a 2-storey high addition without an internal stair case. It contained a music room on the ground floor and a master bedroom with an open bathroom on the first floor connected to the main house by a bridge (Figure 4.5.2i). The extension retains Troppo's simple rectangular form but adopts enclosed spaces with timber shutters and glass louvres to allow sunlight and ventilation. Enclosed and

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<sup>229</sup> Jarvis is a professional musician and an academic teaching at the local university. His partner is also a professional musician. Both enjoy perform music for family and friends on the weekends and special occasions.

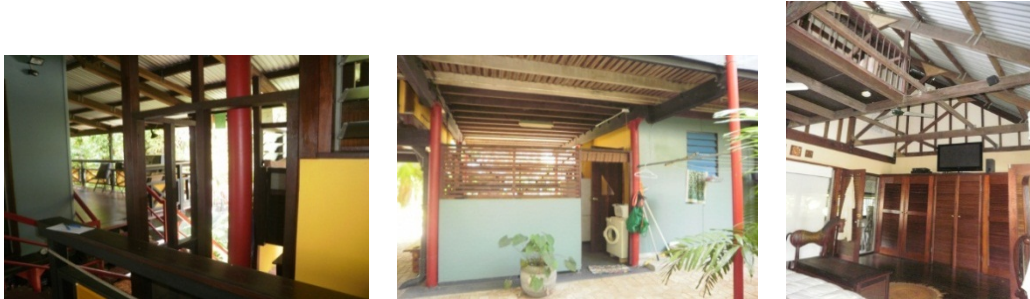
folded patterns of timber surfaces are the highlight of the extension with timber-framed windows and doors on the one external wall to create better acoustic and reverberant sound quality for family concerts. Air conditioning was installed in the extension for better thermal comfort and the care of the musical instruments.



**Figure 4.5.2i** Adaptations to the Jarvis Lawler house include internal sealed-walls in the children's bedroom (Top left), enclosed under-house space for storage (Top middle), and the master bedroom in the additional building connected by a bridge to the main house (Top right). Bridges connect all parts of the living units (Bottom left), with plasterboard-finish internal walls to the ceiling height (Bottom middle), and folded patterns on one external wall and timber-floor finish to the extension for better acoustics (Bottom right). Taken in 2011.

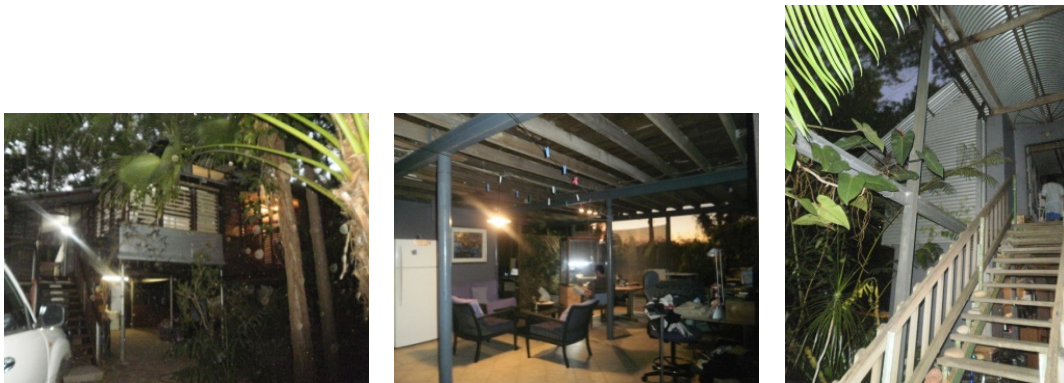
The Kaiplinger House was modified when a family member became ill as well as to provide a cooler and dryer space for entertainment. The internal walls of one guest bedroom were sealed for the installation of air-conditioning to provide cooler thermal comfort. A portion of the under-house space was enclosed for a semi-open laundry, a semi-open shower (with timber lattice seen in Figure 4.5.2j) and an entertaining room for reading, listening to music and watching television. Colours on the balustrade and posts were repainted a vibrant red with the consent of the former owners of the house (it was mentioned as part of the agreement for selling the house initially). The original muted range of browns was considered to be dull and out of date by the current occupants.





**Figure 4.5.2j** Adaptations to the Kaiplinger House include vibrant red posts (Left), enclosed under-house space for entertainment (Middle) and internal walls built to the ceiling height (Right) for the ill family member. Taken in 2011.

The under-house space of the Green Can House was turned into a completely open living space for a single mother and her young adult son, who had rented out much of the house for the financial support of her family in the late 2000s. This under-house has been used as a secondary home for them with semi-enclosed spaces for a bedroom, a bathroom and toilet. A completely open living space is in sight for living, studying, cooking, dining and laundry areas (Figure 4.5.2k).



**Figure 4.5.2k** The Green Can House now includes a flight of stairs to the main house for the sub-tenants, an open under house space for the single mother family (Left), an open living floor plan (Middle), and the transitional and open space of an entrance between public and private space (Right). Taken in 2011.

There are recurring patterns of soft space in the way the houses and their spaces are used. They can be characterised in terms of functionality and adaptability as follows:

- In all the houses, verandahs are not only used as outdoor sitting area but for cooking, dining, studying, and sleeping. (Figure 4.5.2l) There is an intimate connection between living space and the verandah and/or between the bedroom and the verandah/bridge/breezeway. As an extension of the indoor living space connected with the outdoors, the verandah is an extendable space of the interior living of a house.



**Figure 4.5.2l** Verandahs are used as open outdoor living spaces. They are extendable spaces of the living room and of the bedroom. Their multi-functional purposes are apparent in the Kaiplinger House (Left), Green Can House (Middle), and Troppo House (Right). Taken in 2011.

- With the exception of the Jarvis Lawler House with young children, bedrooms are not conventional private cells for sleeping. There are neither curtains nor fully enclosed partition walls separating a bedroom from other spaces. Thick and dense vegetation as high as the bedrooms in most of the houses provides visual privacy from the outside on the street front. The lack of acoustic privacy between the bedrooms and the sounds of the toilet was not a concern for the occupants after a period of time. They accepted its normality in daily living in a family. Sound had become a part of life.
- The multi-functions of the under-house space created by a high-elevated structure offer a variety of uses and alternative living spaces (Figure 4.5.2m). The Green Can House is an exemplar of this alternative living lifestyle in the owners of the house using the under house space as their main living space and renting out the main first floor space.





**Figure 4.5.2m** The under house space created by an elevated structure is used for parking, storage and an alternative way of outdoor living in the Lyne House (left), Kaiplinger House (middle) and Lyne House (right). Taken in 2011.

- The verandah, staircase and breezeway act as a transition zone and a point of security for these houses. Over time, the bushes and trees that have grown thick and tall around the houses have, according to the occupants, successfully conferred privacy and deterred unnecessary intruders such as architecture students, design professionals, tourists and other passers-by. However, with the decreasing visibility of both house and occupants from the street, security had become an issue. Occupants of three of these houses had experienced intruders (thefts and wandering people residing in the sacred land next to the area), who were spotted and left after being interrogated by neighbours. Intruders could also be easily seen, however, from the open entrance which is built with a flight of stairs that connects to a breezeway or verandahs (Figure 4.5.2n).



**Figure 4.5.n** Verandah, staircase and breezeway act as a transition zone and a point of security. Security doors and fences were built for the occupants who wished to have complete privacy in the Gerovich House (Middle left). The Addison House (Top left), Kaiplinger House (Top middle) and Lyne House (Top right), Gerovich House (Middle left), Jarvis Al Jarvis Lawler House (Left), Green Can House (Middle) and Kaiplinger House (Right) are early Troppo Houses in 'Troppoville', Coconut Grove, Darwin. Photographs were taken in 2012. The elevations were taken from the Troppo poster.

- Showering in a semi-open space in nature, with a three-quarter partition wall and lattice panels (which some occupants leave open), is an act of pleasure and enjoyment in the Dry Season. This was an inspiration for the design theme of an open Bali bathroom in Troppo's later practice.
- The under house space is often used as an alternative outdoor living space in the Dry Season as it is cooler than the main space of the house.

- An outdoor laundry near the outdoor shower adds a sense of outdoor fun to an ordinary household chore as the cross-bracing bars are used as clothes hangers.
- The occupants commented that the majority of the time they spend is on the outdoor verandahs and out in the gardens. Opening all windows and doors is the first priority as soon as the occupants come home from work or other activities. Louvres remain opened most of the time unless there is heavy rainfall with strong winds.
- The living outdoor-verandah is 30% or more of the total interior space of the houses. It demonstrates Troppo's intention of encouraging the occupants to spend more time in the open outdoors than in the enclosed indoors.
- The female occupants displayed much higher tolerance to the maintenance aspects of the interior spaces of the house as they are often the ones to open all windows and doors, and clean the droppings and cobwebs in the house.

Occupants described experiencing a progression from feeling irritated by inconvenience, uncomfortable, uneasy and insecure to resilient, comfortable, relaxed, content and secure. Female residents expressed similar emotional changes and growing attachments to the house from 'hate', 'dislike', and 'very insecure' emotions for the awkwardness of acoustic sounds from the 'open toilet' and conversations, to 'love', 'want to get home after being on holidays', 'being home is better than staying at a holiday resort', and 'living here forever'. (Interviews with the Troppo House, Green Can House, Jarvis Lawler House and Troppo Type 5 residents in 2011)

Affections, emotional responses and deep attachments these occupants had for their house grew stronger over time. These psychological feelings overcame their fear for flood, heavy rain, damage and mess after cyclones (the occupants of the Troppo Type 5 Houses, Kaiplinger House, and Jarvis Lawler House). Four recurring patterns in the responses emerge from the influences of soft space in and around the houses. These are: resilience to the tropical heat, rain and inconvenience, an acceptance of shared space, a change of attitudes and values; and an appreciation of the breathing skin and under house storage-space of the houses. Both male and female occupants gave comments about the physical and psychological boundaries for space and daily living becoming translucent and open.

The analysis sought responsively recurring patterns between the hard and soft spaces of house design and occupant values. They are as follows.

1. *Shared space: the means for tolerance and thinking of others.*

The Troppo house challenged traditional priorities of security and privacy, encouraging a mentality of sharing, openness, transparency and thinking of others. Occupants found that there was little sense of privacy as there were open conversations through openings in the internal walls and open roof structure. Most occupants adapted to the uneasiness by understanding Troppo's design in response to climate. Each house has a shared bathroom and toilet and their use had to be informally negotiated between the family members. It was a way Troppo met the tight budgetary constraint while achieving a high quality of living. Most importantly, the mentality of sharing went beyond human-human relationships to encompass human-creature and human-ecology relationships, with these also being flexible, tolerant, and adaptable. Occupants developed responsive awareness and concern for people, place, building, and a sustainable environment. This awareness was a vital influence on growing children.

2. *A change of attitudes to life: thinking outside the box*

These occupants required a strong mind to break through psychological boundaries in order to be resilient and leave themselves open to dealing with their initial discomforts. A common theme was how a change of attitudes was necessary in order to fully enjoy the 'hedonist' pleasures the houses offered. Some occupants referred to themselves as 'bogans' or 'feral' (commonly used terms for care-free Australians with connotations of wild, plebeian, and anti-authoritarian) to be able to live in a Troppo house. They commented on the sense that the building feels unfinished ('the house is never finished and we just love the way how it is'), or its being like a tree house to both the children and the adults themselves, as there were no solid partition walls between spaces. They believed that the design of their house had influenced their internal responsiveness to inconvenience in a dramatic way by offering them the experience of being with nature, and the sensation of cool breezes all year around. The couple in the Kaplinger House who said they had originally intended to stay for a few years would not now consider

moving out; they claimed that an unbreakable bond had developed with the house over time:

*"I find it hard to live on ground level after being living in the pole house [...] it is like heaven. It is like holiday living in this house [...] we don't like to live in an apartment. We just cannot do it anymore [...] it is a love-hate relationship we have had with the house over the years as this type of design isn't for everyone. We just love it even though you have to deal with bird poo everywhere and every day." (Interviews with the Kaiplinger House residents in 2011)*

### 3. *The breathing skin: being psychologically flexible*

In order to cope with heat in the Dry Season and humidity in the Wet Season, the houses have walls that breathe. The breathing quality of the walls challenged occupants' preconceptions of cleanliness and convenience. Moreover, residents had to go outside on to the verandah or bridge in order to re-enter the main living spaces. A feeling of belonging and identity was felt through this moving between inside and outside spaces, hearing the sounds of nature (rain and wind) and wildlife (frogs and birds), and seeing a glimpse of light beams through thick and weaving greenery moving in gentle breezes. Feelings of ease and a laid-back attitude gradually rejuvenated the minds of residents, and brought out feelings of contentment and nurtured a sense of forgiving harsh environment conditions: 'I just love hearing the rain drumming on the roof'; 'you just feel so relaxed to hear the rain and the sound of wildlife sitting in the outdoor space [the verandah]'. (Interviews with the Troppo House and Green Can House residents in 2011)

### 4. *Physical and psychological boundaries for space and life becoming translucent and open*

With neither curtains nor solid doors, there were many unexpected 'visitors from the wild' during day and night. Occupants came to appreciate the connection with animals and insects, and associated the spatial openness of the rooms with serenity, and a feeling of being immersed-in-nature. Over time, their conventional belief in the need for an enclosed living space dissolved. 'It depends where you draw that line [between interior and exterior spaces]'. (Interviews with the Green Can House residents in 2011) For most occupants, there were no physical or psychological boundaries for everyday spaces, daily activities, and life. Everyday spaces became fluid and transparent, blurring



with nature and surroundings, representing the metaphor of Troppo's tenth line for completely opening up the interior space outwards to exterior space. There were many expressions of delight in this dissolving of spatial boundaries. 'Waking up with a slithering sound of a snake on the pillow', 'stepping on birds' droppings', 'rescuing birds caught in the roof', 'chasing possums and squirrels', 'sharing the space with the wildlife', 'insects and birds [...] flying in and out when we open up the house every morning', 'running soaking-wet to go to the loo' [Australian informal term for toilet] and 'running between rooms on the bridge just like being in an open amusement park in the forest to children' are comments that project a life in which residents fell in love with living as one with their environment. The Troppo comment that 'a view through one will always include the other' was understood by residents who experienced first-hand these physical and psychological spatial boundaries as translucent and open edges for both living space and life itself. The intimate link that a home has between people, spirit, value, mind, and nature was enhanced.

For the occupants who were interviewed, the apparent inconveniences and discomfort of humidity and heat in the houses became a part of their daily living. Expressions of envy from family, friends and visitors came out in the conversations inquiring into the so-called inconvenience of living Troppo. Other often-used metaphors in the interviews described the house as 'a holiday resort', and 'a camping tent in the outback', confirming the relaxed, open and natural features of the *Gone Troppo* lifestyle.

## 4.6 Summary

Tropo's early Darwin houses demonstrated adaptability to the social changes and the people of the time. These houses have been adapted to their occupants and the occupants have adapted to the houses. The physical form of the house (hard space) offered the occupants the possibility for change in response to lifestyle change, growth in family and unexpected personal circumstances. The psychological space of the house (soft space) shifted the occupants' mindset from negative and socially imposed emotions to positive and appreciative attachments to their house. Numerous extensions to the early projects were the evidence of the occupants' trust and assurance in their alignment with Tropo's values and attitudes towards living like environmentally responsible hedonists.

Tropo's variation of innovative designs was built upon their understanding of vernacular architecture and of the quality of everyday living in the tropics. The innovative designs of the houses embraced the concept of responsive cohesion, that is, the ethics of adaptation in the design of parts and wholes to accommodate to each other and to mutually respond to the designs' tangible and intangible contexts. Most importantly, these designs were inventive and relevant to the climatic conditions, regional culture and local environment. Tropo's commitment to make everything work together was clear in this study of nineteen houses, with their design concept of the tenth line and 'designing from within and working out'. This fundamental concept conveyed a characteristically Australian essence of overtly optimistic enthusiasm for everyday living. Identifying the recurring patterns in these houses exhibits their responsive tropical design cohesion across many contexts. A significant finding was of the interplay between Tropo's hedonistic laid-back attitude and the rigor of their architectural discipline creating delightful and effective tropical shelter in a harsh environment. Their four fundamental design principles, theory and construction methods made the Tropo practice distinctive among other architects who were pursuing a similar climatic-design approach. Their work even became a model for imitations that became claimed by their occupants as genuine Tropo houses.<sup>230</sup>

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<sup>230</sup> An impromptu conversation was carried out over a coffee meeting with the Director of the Adelaide office, Cary Duffield who retold the story about Harris. He highlighted his observation about some architects who attempted to mimic Tropo's features by tweaking form, the design of verandahs, types of windows, and usage of shutters and louvres.



The form of the early Darwin houses reflects the presentation of place. The incentive of built form emerged from the feelings and immersion of the people and the house as a whole within the place. Welke himself described this wholeness as the process of 'opening out a building so that the interiors relate to outdoor areas'<sup>231</sup> and integrating 'wafting breezes and a sense of what's happening with the birds and the bees outside.'<sup>232</sup> The immersion with the place was described as 'It (the house) perches on its site and avoids the preoccupation with cut, fill and terrace.'<sup>233</sup> In his interview with the *Townsville Bulletin*, Harris mentioned, 'It's imperative to understand the place in the continuum of history. You don't have to slavishly regurgitate, but simply apply the right principles and develop those to suit contemporary practice, materials and lifestyle'.

However, this study shows that it is the attitudes of the occupants that were the crucial factor for making the design of Troppo houses work. These early Darwin houses would not succeed elsewhere, as their success depends on their location and on the attitudes of the occupants of the house. Troppo's embracing of 'the great outdoors' in a tropical lifestyle would only suit some particular people who appreciated the pleasure and human experience and fulfilment of life in the tropics, and were deeply acclimatised to the 'camping in the outback' lifestyle. This distinctive lifestyle lies behind the typology of Troppo houses with their set of expressively architectural symbols, simplicity of building detailing and recognizable Tropical features. The identified form patterns and distinctive characteristics were translated into a collective set of 16 design vocabulary elements of a Troppo language which encompassed '*banks of windows*', '*breathing and adjustable skin*', '*elevated structure*', '*simple geometry and forms*', '*lightweight structure*', '*symmetry flirting with asymmetry*', '*elegance in repetition*', '*living verandah*', '*shared space*', '*connecting with nature*', '*one exit*', '*transition space*', '*inside-out and outside-in experiences*', '*expandable spaces*', '*cross axis*' and '*hierarchy in spaces*'. Four types of floor plan of these early houses translated the Troppo language by giving the residents the 'greater-than-the-indoors-will-ever-be-outdoors' everyday experiences for a responsive hedonist lifestyle.

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<sup>231</sup> This quote was extracted from an article of the local Business magazine, *Territory Business*, which Troppo collected as a part of publication collections about their built work. Author and date were unknown.

<sup>232</sup> This quote was taken from a newspaper article by Peter Ward, *The Weekend Australian* (1998), July 31- August 1, p16.

<sup>233</sup> This quote was taken from *Architectural Steel Innovation* (2005). Author unknown.

In the following Chapter 5, the Troppo language identified in this chapter will be used as a basis to compare five contemporary Troppo houses. These houses will be looked at through the lenses of the recurring patterns; contingency, circumstances and situations that arose while expanding the first Darwin practice; the partnership of regional Troppo practices; the mindset of Troppo's wealthier clients and the typological conditions of the five regions – Northern Territory (Darwin), Queensland (Townsville), South Australia (Adelaide), New South Wales (Byron Bay) and Western Australia (Perth).

## Chapter 5

### Five Case Studies

The designs and form-patterns of Troppo houses changed with the addition of partners, in-house architects and regional offices to the Troppo practice over the years. Chapter Five is focused on how the practice responded to regional context, local socio-cultural structure, climatic conditions, and the different needs of a wider range of clients such as holiday-seekers and incoming retiree-investors as well as established local residents. This chapter describes five case studies from the five regions of the Troppo offices – Darwin, Townsville, Adelaide, Byron Bay and Perth in the chronological order of their establishment. The Troppo regional patterns are compared with the typical patterns of early Troppo practice in Darwin to discover the resemblances and changes in the pattern language as well as to reveal how contingencies were played out and effected Troppo's design philosophy, ethos and values in the regional practices.

## 5.1 Introduction

A commonality most of the regional Directors share is that they had several years of experiences as in-house architects with Troppo before becoming a partner, except the later Director of the Townsville office who had his own practice before joining Troppo. Presenting these case studies in chronological order helps understand the events and circumstances behind Troppo's expansion from Darwin to other regions. This order offers an insight into the initiatives of each branch practice and the transition of ownership. The five case studies then look at any significant influences that lead to different design approaches and business operations in regional offices. Subsequently, the ways in which these influences caused necessary changes to Troppo's early pattern language are discussed.

The analysis of each case study involved two steps. The first step was to identify the characteristics of Troppo's domestic projects on various scales – large houses, smaller residential houses, design collaboration with the developers of apartments and resorts – for each branch in order to draw out specific patterns which were not seen in the early Troppo patterns in Darwin. Posters of design projects, old and recent photographs of some built works, and sets of working drawings were collected whilst conducting the field work over the span of 18 months. One specific residence was nominated by each partner of a regional branch for its significance and representativeness of Troppo's characteristic form-patterns. The second step was to map the similarities and differences between each pattern and the early patterns in order to draw connections and have an insight into the process of pragmatically adapting a general pattern to the specific regional contingencies of climate, landscape and socio-cultural milieu.

The location of Troppo's regional offices was determined by the availability of commissioned projects and personal circumstances. In commissioned projects outside of northern Australia, Troppo and the regional directors were challenged to adapt the principles and methods they had developed for tropical house design for different climate zones. These projects provided them with opportunities to examine the practicality of their acclimatized design and develop their tropical-form patterns to be regional-responsive design. In an interview with Harris, he mentioned that the distraction of a formal office space works against the quality of a good design due to constant staff movement, noises from phone calls,

typing, photocopying, and group discussions, and other administration tasks<sup>234</sup>. A comfortable home space, by contrast, creates the sort of warm, peaceful and calm ambient atmosphere from which Harris draws the emphasis that home space is the place of innovative ideas.

A home-like working environment is set up in the offices of Darwin, Perth, Townsville, and Byron Bay, though not in the branch in Adelaide. The number of staff in those four offices ranges between 2 and 4 people. The small number of staff constrains the work of the practices and offers an opportunity to work collaboratively across the offices. The Adelaide office is the only office space that has to accommodate 10 full-time staff and some part-time staff (between 2 and 5 temporary staff – as contracted architects or internship architecture students) depending on the availability of incoming projects and the scale of commissioned projects by local or state governments.

Most former staff left Troppo's practice after a few years of working for Troppo. A few former staff established their own practice yet remain in contact with Troppo for large-scale design projects (Interviews with Duffield in 2011 and Cai in 2011). This trend was a key reason for the multiple small-size offices of the Troppo practice in recent years. The home-like office space elevates productive creativity, invigorates the in-house architects with brisk design ideas and easy communication, and establishes a dynamic collaboration between the offices for 'constantly bouncing off ideas' and having 'colleagues as the sounding boards and the source of ideas exchange' (Interview with Connolly 2012). Details of the processes of creating ideas and of collaboration between staff in different offices are discussed through interviews with the regional directors, senior and/or graduate architects, and former architects in each case study.

Troppo's approach for multiple offices offers an insight into the intended business model developed during their expansion in the 1990s. The challenges of passing on Troppo's ethos and design philosophy unfolded through the dynamics among the regional offices. During the process of Troppo's expansion, a pattern in partnership was sought that was based on a financially independent model with an intimate

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<sup>234</sup> Harris mentions a couple of times in interviews that he found the best place for being innovative on a project was on the living room floor, on the couch or in bed at home. A few award winning design ideas were even sketched on a napkin on the flight to the work destination.

relationship in design collaboration. There was a mixture of business-orientated arrangements established in 1995<sup>235</sup> and a mentoring tie for keeping in alignment with Troppo's climatically responsible practice, architectural ethos and design principles.<sup>236</sup> Other factors were found to change the dynamic of this relationship. These were unanticipated situations, legal responsibility, and the development of a mutually beneficial relationship. Unanticipated situations were encountered and these played a role in changing the dynamism of the mentoring tie in terms of the fallout of business arrangements and a change of design philosophy. These situations included the cancelling of a commissioned project, a health issue, the integration of different business models,<sup>237</sup> and personal reasons. Legal responsibilities involved the control of major decision-making for the final products of regional projects, the quality of newly recruited staff, the sources of projects, and financial accountability. A 'mutually beneficial relationship' referred to adaptation of Troppo's ethos for an ecologically sound design as a selling-factor across all offices to be known by the public for the simple, laid-back, and informal lifestyle Troppo had endeavoured to prompt since the 1980s. The factors and situations mentioned above were the crucial aspects of contingency that determined the divergence or the consistency of Troppo pattern-forms exhibited in the regional Director's design of contemporary Troppo houses. In the new relationships, the regional offices generated diverse business models through changing Directors and different design approaches for their survival in competitive contemporary practice.

The selected Darwin and Byron Bay case study houses were projects completed in each case by the regional Director. Those of Townsville, Adelaide and Perth were collaborative efforts between two architects (the regional Director and a project architect) who worked on different phases of the project.

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<sup>235</sup> According to former Director of Troppo Geoff Clark in Townsville, the regional branch of Troppo's practice in Townsville was the very first one set up in 1995.

<sup>236</sup> Clark mentioned that the turning point of his Troppo practice from an in-house architect to a Director was because of his willingness to stay in Townsville instead of returning to the Darwin branch when the divergent design issues occurred between their client DHA (Defence Housing Authority) and Troppo in late 1994. He was called to close down the operation of the development of the housing project in Townsville due to insufficient financial stability, lack of familiarity with local needs and differences, and the difficulties of the far-distant business management from Darwin. He decided to propose a business partnership to Harris for running a financially independent and yet coherent design practice registered under Troppo Architects' name. It was called Troppo Architects (Queensland). Hence the first regional Troppo branch in the Eastern coastal region established a totally financially independent business model in alignment with responsive design principles.

<sup>237</sup> Former Director Geoff Clark and current Director Terry O'Toole in the Townsville branch, as well as Manager Dan Connolly in Byron Bay, have mentioned these factors that contributed to the changes in the emergence of divergent Troppo practices.

The selection of each residential project as a case study was recommended by the regional Director, as in their view, the 'closest' representative example or the 'most' significant contribution to Troppo's regionally responsive design. The analysis of each case study was intended to identify the new form-patterns, different materials, and construction methods that were not seen in early Troppo patterns in Darwin. The general connectivity graph in Chapter 4 represented the characteristics of the early Troppo form-patterns (Figure 4.6.2a). The graph was used to compare the floor plans of contemporary Troppo houses in five case studies in order to identify any changes to the early Troppo patterns. Similarities and differences between the design of the early and contemporary houses were sought in terms of functional-spatial planning, design in forms and volumes, the use and availability of materials, advanced technology and building construction, the means to meet budget requirements, and different building regulations. Furthermore, the ways in which each contemporary house achieved responsive cohesion through the discovery of similarities and differences were sought and discussed at the end of each case study. Seeking these ways revealed the reasons for the necessity of change and the importance of persistence in the Troppo practice because of their understanding that 'architecture is subject to the contingency of its time and place'.<sup>238</sup>

The following subsection, 'The Expansion of Troppo Practice', elaborates the background, the transition to setting up a branch, and the networks of sharing information and design inputs amongst offices.

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<sup>238</sup> Antony Radford, Selen Morkoç and Amit Srivastava, *The Elements of Modern Architecture: Understanding Contemporary Buildings* (London: Thames and Hudson, 2014), 12.



## 5.2 The Expansion of Troppo practice

Troppo's regionally responsive design was advanced by Harris's and Welke's excitement<sup>239</sup> and confidence in designing tropical architecture in Darwin. Their design principles, theory and construction methods were developed with an understanding of Darwin's climatic conditions being 'the easiest climate for house design'<sup>240</sup> and in line with their observations on life and work patterns. Harris recalled that

*'Everyone is an outsider in Darwin. It is a multi-cultural city with lots of immigrants and workers from Asia and people like me from other states...People here come and go...[Laughing] It's an Aboriginals' lifestyle that expects you to do so – come and go.'* (Interview with Harris in 2011)

The opportunity for on-going government commissioned projects and personal circumstances were the motives for the Darwin office to branch out to four new offices. Troppo opted to operate a multi-branch practice as 'a shoestring operation.'<sup>241</sup> Troppo's climatically responsive design had progressed into regionally responsive design in five cities across Australia by the end of 2009.

The first expansion of the Troppo practice evolved from a project from the Defence Housing Authority (DHA) for a medium-density housing project in Townsville in 1994.<sup>242</sup> This was a great opportunity for an in-house architect, Geoff Clark, who later became the Director of a Troppo branch in Townsville between late 1995 and early 1996. Clark initially took on this opportunity because he was the only person in the office who was single without family or many friends in Darwin. He had only to adjust himself to the new environment. However, the process of negotiating with the DHA for the project did not go smoothly due to the fact that 'we couldn't see eye to eye' according to Clark. With very few sources of

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<sup>239</sup> In the interview with Welke in 2016, he pointed out that the success of their early practice in Darwin was built upon their realisation on accepting the climatic conditions of a place not working against it. 'We didn't have a particular environmental awareness but we did see the best place to live in the tropics was the best way to make uses of the climate not fight against it and then design buildings that did that for you... if you want to participate and enjoy the place, you have to be working with it and not against it! Therefore, you save lots of energy and also indulge yourself with materials, local craft and culture if you like.' (Interview with Welke in 2016)

<sup>240</sup> Both Harris and Welke mentioned this fact in the separately arranged interviews.

<sup>241</sup> Philip Goad, *Troppo Architects* (Sydney: Pesaro Press, 2005), 21.

<sup>242</sup> Geoff Clark, the former Director of the Troppo branch in Townsville spoke about the opportunity that was offered by Harris for him to be based in Townville in order to oversee the whole process of the commissioned project offered by the DHA.

projects from local and neighbouring regions, the financial stability of the Troppo practice in Townsville was in jeopardy. Clark was called to close the project and return to Darwin. A working business model for Townsville seemed to be foreign to both Harris and Welke due to the unfamiliarity of local social and cultural contexts. However, for Clark, it was a better location than Darwin as it was closer to major cities like Brisbane and his home city of Sydney. It was much easier for him to remain in contact with others. He was single and ready to take on challenges.<sup>243</sup> It was an opportunity to try something different, expand and test Troppo's design principles in the East Coastal region. He boldly proposed to Harris that he would take over the practice solo without financial liability from Darwin. In this way, with the necessary legal agreements, Troppo's first regional branch was set up in Townsville. It started with only owning a phone line in someone else's office in 1994 but went on to reach a peak in 2002 of operating as a practice with a group of 7 professional staff in an office in downtown Townsville.

Success and change in an architectural practice are importantly affected by unpredicted situations in relation to factors such as financial stability, family, and physical well-being. Due to declining health,<sup>244</sup> in 2008, Clark had to leave his heavy workload and found a potential new Director for the practice. Terry O'Toole, a local practitioner with twenty-five years of experience in the building industry, expressed an interest in a partnership with the Troppo practice and purchased the Townsville branch. At the time, he also ran a mixed commercial and residential architectural practice named *North Point*. O'Toole was well-known locally for his public projects such as offices, school facilities and other commercial buildings in the region of Townsville. Clark moved to an academic position in the University of Tasmania in Launceston, but has continued to have regular contact with both Harris in Adelaide and Welke in Perth as well as with O'Toole in Townsville for occasional cooperation in design projects. In 2012 he still considered himself a member of Troppo.<sup>245</sup> The work in the Townsville Troppo office gradually shifted under O'Toole from being predominately domestic to having a diverse mix of commercial and domestic projects with two independent practices: *North Point* and *Troppo Architects (Queensland)*. There were

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<sup>243</sup> A Skype online interview with Clark was conducted on December 14<sup>th</sup>, 2012.

<sup>244</sup> Clark was diagnosed with a serious illness and was strongly recommended to have a change of lifestyle.

<sup>245</sup> During the online interview with Clark in December 2012, he still identified himself as a Troppo architect in conference papers, public media and talks.

two distinct client groups and some clients were initially perplexed by the integration of the two practices in the same office (Interview with O'Toole in 2012).

Family reasons played a role for both founders in Troppo's expansion. After almost twenty years of practising architecture in the Top End, Harris and Welke both felt that it was time to return to their home cities. In late 1999, Harris decided to return home to Adelaide to set up a southern regional branch, *Troppo Architects (South Australia)*, seeking better education for his children and for other family reasons. It was the first branch located in a non-tropical climate zone and Welke fully supported Harris's decision as 'a brave call' that promoted the reputation and currency of the Troppo name nationwide, and their 'underpinning philosophy' (Interview with Welke in 2016). Repositioning Troppo's climate responsive design into the moderate climate of Adelaide and neighbouring states was the first priority for Harris to fulfil his 'succession plan' for their practice (Interview with Harris in 2016). He did several domestic projects before the official announcement of setting up a small studio-based Adelaide office.<sup>246</sup> Harris's and the in-house architects' simple, informal, and laid-back attitudes were well-received. A reputation was established with the intriguing slogan of 'no bow tie' at work and a daringly different design for suburban houses, with a hint of a tropical architecture with thermally appropriate materials, completely exposed structure, mono-pitch roof form, a combination of open and enclosed spaces with banks of high windows and large glass doors, verandahs and decks, and long overhangs. These features gradually became familiar to the southern clients who resonated with the colloquial slogan of *Going Troppo* as an expression of a hedonist lifestyle and their sustainable design.

Another important factor was Harris's 'greater interest in... getting a name' out, according to the interview with Dan Connolly in July 2012, the regional manager<sup>247</sup> of the Troppo branch in Byron Bay. 'Phil has

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<sup>246</sup> The first studio-office was located in the bustling retail zone of the Central Business District of Adelaide city. The studio-office was above a retail shop on Rundle Street that had accessibility to daily activities and events - working, studying, dining and shopping - and had the advantage of exposing Troppo's practice to the general public.

<sup>247</sup> During the second interview with Adrian Welke in early 2014, he stated Connolly's role in the operation of Troppo's architectural practice as the regional manager rather than the regional Director of the Byron Bay office.

*greater interests of getting the name [Troppo Architects] out of Darwin. He's got media to help him do so. He always focuses on looking for regional jobs.'* (Interview with Connolly in July 2012)

According to Goad,<sup>248</sup> the Byron Bay office had a 'soft start' in 2002 and was officially set up in 2003. Connolly started as a graduate architect in the Troppo Adelaide office in 1999. Then an opportunity was offered to Harris to design a group of ten distinctive beach houses in Byron Bay, New South Wales in 2002. This proposition of being offered a far-away medium-size housing project was similar to the one in Townsville back in 1994. Connolly was the project assistant to Harris and accompanied him to Byron Bay in 2002. During the on-going negotiations for the project, Connolly nominated himself to oversee its completion. He stayed as the first-point-of-contact in Byron Bay and remained a close design collaborator. He set up a financially-dependent office with Harris in Adelaide. Troppo Architects (New South Wales) was formally established as a fourth Troppo office in 2003.

The successful operation of an architectural practice in a new region depends on some 'local knowledge' of the socio-cultural background as well as of the needs of local residents and climatic conditions. For Connolly, the Troppo office in Byron Bay began with some promising projects such as various housing jobs, club houses and a spa facility building. As time went by, the number of staff declined due to the practice's remote location, with too few local clients from a small population, and restrictive planning codes that aimed to preserve the old building types and the natural environment of the region. According to an observation made by Connolly, many sole architects and practitioners had attempted to stay in Byron Bay but failed to survive after a couple of years. The coming and going of ambitious architects from interstate became a common feature of local practice. During this research field work in Byron Bay in July 2012, Connolly was working alone and struggling to have sufficient projects<sup>249</sup> to expand the practice. A new work-pattern for joint and collaborative design work was formed by requesting support

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<sup>248</sup> Philip Goad, *Troppo Architects* (Sydney: Pesaro Press, 2005), 85.

<sup>249</sup> The very first commissioned project for a medium-sized housing development was still under negotiation after ten years of settling the regional branch in Byron Bay, according to Connolly. With several ownership changes and other confidential business agreement, he was still requested to make time for meetings, negotiations for design proposals and any design-related and building permission associated meetings. At the time of interviewing, it was still an on-going and unforeseen-end-result project for Connolly.

from the Adelaide office from time to time with various kinds of assistance, such as a CAD technician and the involvement of senior staff, including Harris, for fresh and innovative design ideas. A network of information and resource sharing was gradually formed between regional offices. A closer relationship brought the exchange of creative ideas, regional knowledge, and the building of a steady cross-state work flow. Such design collaboration sharing human and information resources formed the core of Troppo's office culture and it became the means to retain Troppo's ethos over the years.

*'He (Harris) is a person who loves travelling and it makes sense. If you look at the Troppo blurb, that stuff we write about ourselves, that is the local knowledge factor and it is very important... So it is great to partner up with the local architect.'* (Interview with Connolly in July 2012)

The year 2003 was significant for Troppo as another regional branch was set up by Welke in Perth, later, but in the same year as Byron Bay. This was the fifth regional practice and the first located on the west coast of Australia. Interestingly, Troppo's regional practices were now almost evenly distributed around Australia – from far north Darwin, the Top End of the Northern Territory, to Townsville, on the eastern coast of the 'Sunshine State' of Queensland, to Byron Bay, on the eastern coast of New South Wales, to Adelaide, the capital city of the 'Festival State' of South Australia, – and finally to Perth, the capital city of Western Australia with its booming mining industry. There was no regional office in either Victoria or Tasmania at the time of this research.

Family reasons<sup>250</sup> were the motivation for Welke, to relocate from Darwin back to Perth. Once again, its socio-culture, climate, economic situation and the built environment shaped the practice in many ways as Welke varied the building design while keeping the same core principles<sup>251</sup>. The selection of materials, the methods of construction, and the passive design theory were developed by Welke in

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<sup>250</sup> Welke's family and his wife's are in Western Australia. They decided to move back home and settled the Troppo practice there for the same reasons that Harris had moved to Adelaide in 1999. Children's education and being close to family and friends in Perth were the first priority for him at that point. Welke set up the regional branch in the downtown city of Perth in late 2003 and in 2007 relocated his home and practice to Fremantle, the port of Perth and the second largest city in Western Australia. His wife, at that time, was interested in setting up her business in importing-and-exporting goods and ceramic merchandise from nearby countries like Indonesia, Malaysia, India and Thailand. Her workshop and retail shopfront were located in the same building as the Troppo branch in the mixed zone of an industrial, commercial and residential area in Fremantle.

<sup>251</sup> Heavy tilt-up concrete panel walls, enormous footprints of living areas, large portions of glass, and installation of evaporative air-conditioning have been commonly used components in the design of houses in this regional branch of Troppo practice in Perth/Fremantle.

response to local knowledge and the observation that local residents sought grander and more luxurious housing. Welke had to quickly settle in a state with a fast-growing population, a booming economy, Mediterranean climatic conditions, and a multi-faceted built environment with different and complex building codes.

In the following subsections, five contemporary houses in five states will be examined by looking at the spatial arrangement of each floor plan in comparison to the 1980s houses. By identifying differences and similarities in floor plan between the 1980s Troppo houses (Figure 4.6e) and each contemporary house, Troppo's ideas, values and attitudes are revealed. Comparing design elements and features investigates the consistency of Troppo's ethos and the departures of the regional practices, as well as the continuities of Troppo's environmental and climatic design principles.

The five regionally-distinct case studies of recently-designed Troppo houses are presented here in accordance with the historical sequence of establishment of Troppo's five regional offices – Darwin, Townsville, Adelaide, Byron Bay and Perth, respectively – rather than by date of construction. Each of them traces a different design response to the client's requirements at the time, the constraint of climate and site conditions, and the interpretation of regional culture, social structure and built environment.

### 5.3 Darwin: Mortlock Residence, Howard Springs, Northern Territory

A contingency of the Darwin office was the new partnership with Greg McNamara and his practice partner and wife, Lena Yali, because of the relocation of Harris from Darwin to Adelaide in 1999 and of Welke from Darwin to Perth in 2003. The success of the change of ownership was crucial to both Harris and Welke as the work of the Darwin office symbolized the core values of their ethos. Opportunities were emerged for a new phase of the Darwin practice by integrating innovative concepts of new design partners McNamara and Yali. Challenges were remained to Troppo when they ventured out to relocate two main operational offices in Adelaide and Perth while leaving their root behind. Mentoring McNamara in Troppo practice and culture and his respect for the significant work of Troppo in Darwin were the keys to a smooth transition.

In early 2000 following Harris' and Welke's planned departure from Darwin, appropriate new partners were needed for the Darwin office. By chance, Welke was in contact with Greg McNamara who was born in Darwin and graduated from The University of Sydney in 1992. After graduation McNamara worked in a medium-size firm in Sydney for ten years. In the late 1990s, there was an economic recession in Sydney and he felt it was time to return home to Darwin.<sup>252</sup> An opportunity presented itself as a job offer by Welke. After working and corresponding with him, Welke put forward the offer for McNamara to take over the key Darwin office in 2002. McNamara decided to accept Welke's proposal in 2003 and run the practice with his Co-Director and wife, Lena Yali, who was also a Sydney graduate. They became the Directors of the Darwin office in 2003. Both McNamara and Yali, sadly passed away in a motor accident in July, 2011.<sup>253</sup> At the time of writing (2014), the Troppo office is now run by the new Director, Jo Best, with the close assistance and support of Harris.

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<sup>252</sup> 'I was born in Darwin and I had the connection back in Darwin. We finished [architecture degrees] in 1992, that was a time when Sydney went through a recession. We bumped around and we quickly decided to move back to Darwin as it's a good place to start. As an architecture student, Troppo was out there - there were the architecture and the words what architecture really was.' (Interview with McNamara in 2011)

<sup>253</sup> Their significant contributions to Darwin architecture and their generous time and assistance in supporting this research are mentioned in detail in the acknowledgements before the body of this thesis.



2003 was a challenging year for both McNamara and Yali. Although McNamara was familiar with Troppo's ethos as an architecture student,<sup>254</sup> he had little chance to apply Troppo's underlying design principles into his projects while practising in Sydney as he mainly worked on a mix of commercial office buildings and contemporary suburban residential projects. Before taking up the role of Director, he put himself in a position in which he had to learn 'seeing through the process' (quoted by McNamara 2011) with Welke and Harris (mainly Welke as Harris was in the Adelaide branch unless there was a collaborative project), and to run the practice as a separate financial business. Through the process McNamara learned and observed Troppo's arrangement of 'hard' and the intent of 'soft' spaces in their Darwin house designs. The design of the indoor-outdoor living verandah was adapted to express McNamara's interpretation of *Going Troppo* for tropical lifestyles in Darwin. His perception of 'being more Darwin' embraces the Troppo concept of everyday spaces being more transparent with openness, lightness, sunlight, breezes, warm heat, monsoon rains and the coming-and-going of wild life.

*'They [Darwin buildings] are always a bit heavy and this is not quite Right, the sense of public isn't quite Right and the life of that space isn't quite Right.... The sustainable issues are intricate and [dealing with them makes the design of buildings] more Darwin.'* (Interview with McNamara in 2011)

According to McNamara, designing residential projects and doing them exceptionally well was the key to the Darwin practice's success over the years.<sup>255</sup> He continued with the goal of excelling in domestic projects exploring his interpretation of the nature of 'Darwin Architecture' with innovative variations of details (Figure 5.3a) in response to the availability of materials and up-to-date construction technology at the time of each project.<sup>256</sup> He used his experiences with an understanding of Troppo's values for a house to be 'what it wants to be, evolve and change over time' (Interview McNamara in June 2011). McNamara regards details as necessary but should not be excessive. 'One of our works is that we do it

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<sup>254</sup> McNamara mentioned that lecturers and tutors were very attracted and influenced by both Glenn Murcutt's and Troppo's fundamental principles for responsive design in regional contexts. However, he could see the imitations of some architects' work in which there were resemblances mimicking the characteristics of Troppo design. There was a hint of duplications that created fallacies and impersonal characteristics in their designs.

<sup>255</sup> 'Troppo is very good at what they do. This is because they insist on only working on residential projects but rarely anything else. I believe that this is the main reason behind their success in regional responsive design in houses' (Interview with McNamara in 2011).

<sup>256</sup> 'I think it has been a fantastic 10 years developing the nature tendency of materials and technology. You cannot repeat and constantly explore the details and materials and try to understand the climate.' (Interview with McNamara in 2011)

minimalist. We only put in what is necessary and don't put in things you don't need' (Interview with McNamara in 2011). He conceded that details were initially inspired by Troppo's basic beliefs in 'architecture appropriate for Australia' and the 'nature of architecture'. 'Seeing through the processes' in detailing was with the guidance of Welke before he moved to Perth in 2003'.



**Figure 5.3a** 3-dimensional physical models are the media McNamara used for expressing spatial experiences of form and visual aesthetics of detailing of a structure or a building. 3D model for the pavilion of the city mall in Darwin (Top left); the actual built pavilion (Top right) visited on the 11<sup>th</sup> of July, 2012; 3D model for the proposed gallery space (Bottom left); new location of the Troppo Darwin office with an additional outdoor kitchen and an open sitting area under a steep 6 metre long verandah (Bottom right). Taken in 2011.

The Mortlock Residence (2011) (Figure 5.3b) on a secluded site in the woods of Howard Springs, Northern Territory, was selected for the case study. McNamara strongly recommended this project as

the clients not only participated in the design process but also witnessed and were completely involved in the construction process because they built their dream house piece by piece over a period of 2 years.



**Figure 5.3b** Articulated space is created for experiencing the vibrancy of the spatial arrangement. A composition of different materials manifests a feel for the functionality of space and inner contentment for everyday life. A view looking into the entrance of the house (Top). A view looking into the rear of the house from a slightly sloping downhill (Bottom). Taken in 2011.



### 5.3.1 Troppo language in the Mortlock Residence

A wide open gesture and a gentle-step rise of cross-patterned timber floor mark a welcoming and visible entrance. The distinct and integrated wings for private indoor-and-outdoor living spaces intersect with the roofline and suggest intimate spatial experiences. A cross form presents two distinct axes for public and private access. Independence (in two wings), interaction (the intersection of the two wings) and interconnections (outdoor-natural and indoor-living spaces) are spatial features of the design of the Mortlock Residence.



**Figure 5.3.1a** Prominent roof line covers an open breezeway (Left) as an invitation. It expresses the horizontality and the continuity of the sky-line. A strip of translucent window (Right) intersects the horizontality of a visually continuous verandah with the subtlety of verticality creating the unity of the sky and the ground as a whole. Taken in 2011.

An intimate connection with nature is felt while walking through the breezeway directly beneath this long roofline (Figure 5.3.1a), linking the land, house, residents, wildlife, nature, and sky. A visual sensation is felt deeply as the interplay of feelings for personal and social space. These feelings are directly experienced through the constantly changing views through semi-open, translucent walls, glass windows and sliding doors, and through the open breezeway to outdoors giving access to a natural wildlife symphony.

McNamara's concept of a minimalist style can be seen in the walls and suspended cable rods for the eaves looking as though floating in the air.<sup>257</sup> Suspended steel posts fixed to the floor joists instead of to the ground is one way in which he denotes 'touch the earth lightly' by reducing the damage made by the footprints of the residents' inhabitable areas. Different patterns for the purlins of the long verandah show McNamara's playful mind for breaking the rules of an orderly roof structure<sup>258</sup> (Figure 5.3.1b). A visual impact is made by the layers of exposed and articulated external walls and verandah. A feel of excitement for the space is engendered by the vertical and angled slender steel posts, the orderly fashioned timber rafters with two formations of purlin arrangement and a composition of timber floor, wall and roof in various colours, different textures and compositions of patterns. An irregular roof form and the twist of an angle for the bedroom wings have given the conventional shape of a rectangular roof a playful appearance. A separate and suspended steel-post framework for overhangs demonstrates McNamara's interests in expressing innovative details and lightweight construction.



<sup>257</sup> McNamara describes his design of houses to be a 'minimalist' style. He only includes design elements and details which are necessary. He strips off excessive materials from walls and ceiling if they are not necessary.

<sup>258</sup> He mentions that it is difficult to come up with variations in the designs of houses. The only way to do this is to 'break the rules' for the need of change.



**Figure 5.3.1b** Compared with Troppo's 1980s Darwin houses, there are resemblances of design elements such as corrugated iron panels for walls and roof, glass louvres, timber deck, posts, and floor in the Mortlock Residence with a new feature – metal poles for supporting long timber structure overhangs (Top) which are connected to the main steel structural framework of the house (Bottom).

A natural element – water – is introduced (Figure 5.3.1c). The ripples and reflections around it soften a semi-enclosed space wrapped by man-made and naturally malleable materials (hard textual materials against the malleable space around). The combination of still water, natural timber, and corrugated iron cladding with adjustable timber louvres adds a feeling of reviving calmness and coolness for the space in the hot weather in the Top End.





**Figure 5.3.1c** Exclusively new design elements are the water box around the bathroom (Left), timber louvres, plastic translucent roof sheeting, angled posts, the steel cross-brassing on the windows, and minimum areas of construction materials meeting the ground. An element of nature – water – suggests a calm and peaceful place outside bustling urban city life of Darwin with a pool (Right).

### Patterns

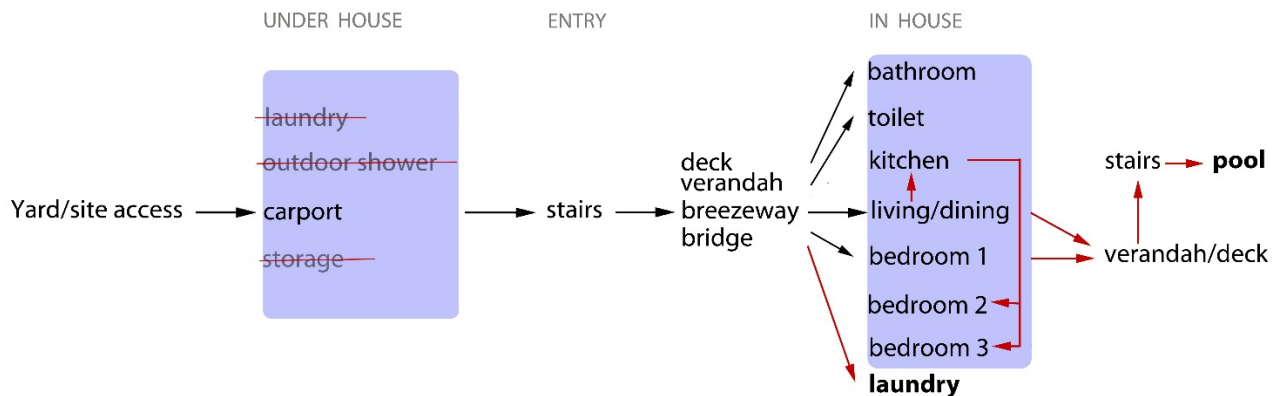
New patterns are identified through an analytical process of comparison with patterns found in the early Troppo houses. Here, and in each of the four other case studies that will follow, respective physical and qualitative aspects of these new patterns are then discerned and ultimately classified and examined through the lenses of ‘hard space’ and ‘soft space’.<sup>259</sup>

The connectivity graph of the Mortlock Residence (Figure 5.3.1d) offers a visual understanding of the circulation and movements of the residents between spaces. The graph also provides a spatial map to comprehend relations between indoor and outdoor as well as public and private spaces. The following

<sup>259</sup> As was established in the preceding analysis, in Chapter 4, of a cluster of the 1980s Troppo houses, ‘hard space’ will be used here to refer to physical spatial arrangements and the episodic ways in which space is laid out. ‘Soft space’ refers to feelings and behaviours that are affected by spatial experience such as hedonist/larrikin experience, or inside-outside experience, in a dynamic dialogue between residents, the house and nature, and gradually changing life patterns.



connectivity graph shows the sequence of moving through spaces of the Mortlock Residence, with the routes that follow the 1980s patterns indicated in black print and new routes indicated in red.



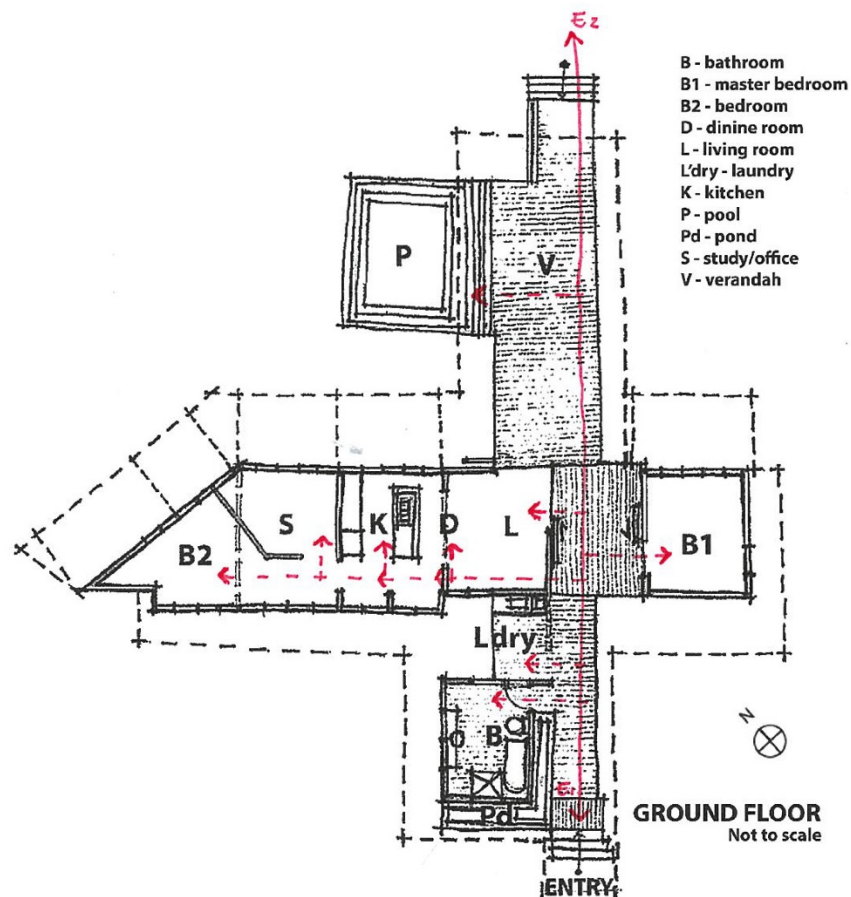
**Figure 5.3.1d** The connectivity graph shows internal links between private living spaces without access to the outdoors. Elements in the typical 1980s Troppo Darwin houses that are not present in the Mortlock Residence are shown as deletions.

### Episodic space

Breezeways are important features in the 1980s Troppo houses, serving as wind channels, circulation corridors, transitional zones between interior and exterior spaces, and intermediate areas between entry and rear parts of the houses. A breezeway is the primary axis of spatial planning for the early Troppo houses.

In the Mortlock Residence, a thirty meter long breezeway is the primary axis between the two wings. It connects the entry and the rear deck and is an outdoor-indoor living space for leisure and work, access, an open-air passage way, a transition zone, a playground and verandah all in one. This simple exposed post-and-beam structure creates a contrast with two distinctive patterns of timber battens and rafters for highlighting an extravagantly long mono-pitched roofline. Here, with an extensively long roof over this completely open-outdoor breezeway, a sense of the outdoors is experienced – a playground for adults to run free and wild, recalling fun times of childhood, and for children to have the opportunity to learn and be in nature. Inter-personal contact is also a priority in the design of the Mortlock Residence as master bedroom is separate from the other 2 bedrooms to ensure adults, children and guests have their

own intimacy and privacy in the house. This feeling creates the illusion of making a space look 'bigger', when coupled with the high roof of the runway-like breezeway (Figure 5.3.1e).



**Figure 5.3.1e** Concentration of one long breezeway also used as verandah is an innovative concept of the Mortlock Residence. Reproduction of the floor plan by the author.

*'... in our mind, the conventional mind, Greg turns it [the breezeway] into a single access to a multi-access house. It makes it [the house] look bigger. It is not a big house. It [the roof of the breezeway] goes up to quite high. It looks a very big house when the footprint isn't big and it is about 85 square metres. People would think 200 [square metres].'* (Interview with the Mortlock resident in 2012)

The distinguishing features in the design of Mortlock Residence in *form and space, construction and spatial arrangement* are as follows.

**In form and space:**

- Verandah space (in blue) is the spinal and predominated axis for the access of all internal spaces as well as the only passage way connecting the interior and exterior spaces (Figure 5.3.1f);

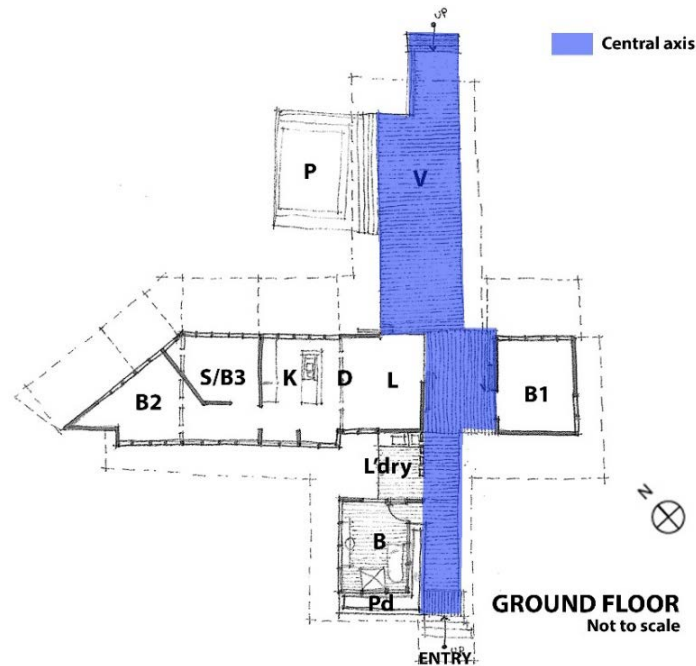


Figure 5.3.1f The central axis offers the residents easy access to the interior and exterior spaces.

- Bedroom spaces can be used as 'a nursery room or a home-office or even an entertaining room' (Interview with the Mortlock resident);
- Verandah space becomes the primary living space used most of the day as the residents prefer staying in the outdoors for daily activities and work;
- The ratio of Outdoor verandah space (85 square meters) to the indoor space (75 square meters) is 1.13 to 1;
- All spaces are shaded by the extensively long overhangs of the skillion roofs;

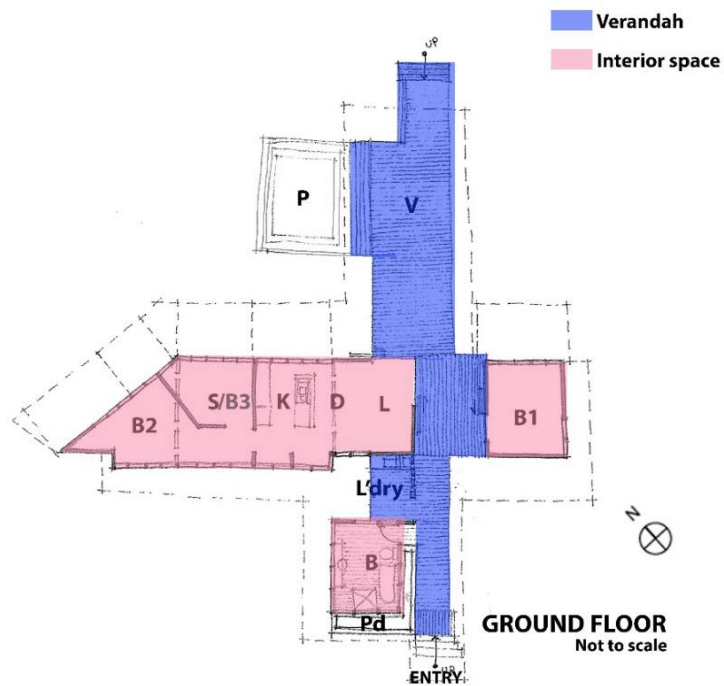
**In construction:**

- There is no front or back door as it is a design of a complete open plan to the outdoors;

- The roof of the bathroom lifts up from the external walls creating open space (Figure 5.3.1m) becoming a semi-open bathroom that allows the escape of hot air and steam of warm showers, and provides better ventilation of this wet area;
- There are no interior doors for bedroom 2 and 3 for a flexible planning of integrating both rooms to a nursery room in the left wing;

***In spatial arrangement:***

- Verandah space becomes one exclusive entry/exit;
- An outdoor laundry is located next to the semi-open bathroom;
- Verandah space is interlocking with the indoor living spaces (Figure 5.3.1g);
- Combined semi-open bathroom and a toilet with an open shower facility;
- The multi-functional outdoor decking area is the primary axis for the circulation of interior spaces as well as an open inside-outside space for dining, reading, working, napping and entertaining;
- An irregular shape breaks up a linear form;
- 2 separate skillions roofs with a two-story height and a steep angle;



**Figure 5.3.1g** The central verandah space interlocks with two wings of living spaces where privacy is given fully to the master bedroom as well as the opportunity of nurturing independent child as requested by the residents. The concept of hierarchy in spaces is clear in this spatial arrangement.

### Inside-outside spatial experiences



**Figure 5.3.1h** A glance to the outdoors immediately connects a visual association between man-made and natural spaces within the interior space of the Mortlock Residence. Taken in 2011.

Transparency, maximum openings, and the openness of the main structure of steel framework enhance the inside-outside experiences of the Mortlock Residence (Figure 5.3.1h). Translucent polycarbonate corrugated sheets are used instead of clear glass for the high windows to soften the intensity of harsh daylight and yet offer sufficient brightness and reflection from the smooth timber ceilings. Large areas of glass louvres in every room create a sense of the breathing, thin and light skin of the house and draw in the serenity of nature gardens – the landscape into the living spaces. The dryness of heat and the wetness of rains and moisture are magical elements. The structure of steel framework offers lightness for visual aesthetic and toughness for the stability and durability of the house construction and reassurance for the residents to not worry about cyclones. 'A special bond' is established between the residents and the house through visual, physical and mental sensualities. The residents' experiences are as follows:

- There is the feeling of affection and sentiment as well as a sense of belonging to its surroundings and seasonal climate;
- This open-up house offers the residents not only shelter but also a sense of security in a psychological state in which they feel immersed in and embraced by the bush instead of having fear for natural disasters such as floods and cyclones;

*'There is certainly a bond and connection with this house without a doubt. That probably is coming from having built this house... as you can see whilst sitting in here... It is pretty magical, gentle monsoon rains are absolutely beautiful... heavy cyclones are not worrying us at all but it is quite humid and moist here... We absolutely love it and enjoy living in it.'* (Interview with Mortlock in 2011)

It is through the immersion in and embracing of natural surroundings for an everyday life in the tropics that McNamara portrays his affirmative idea of a good building: 'It is that transparency and the beginning of a garden and the ability of architecture that can be closed and open' (Interview with McNamara in July 2011). The hard space of the Mortlock Residence reflects the image of the innermost world of Mortlocks and creates the invisible soft space in which Mortlock and his partner are deeply engaged. A psychological connection is established between the constant visual attraction to the outdoors and the delightful feelings of being embraced by light, breezes and sounds in the indoors as well as in the outdoors (Figure 5.3.1i). The good quality of everyday living that the Mortlock Residence offers is felt



and appreciated by Mortlock and his partner through the transmission of contentment and enjoyment from the hard space to the soft space.

*'I have always liked the older tropical elevated style of houses, lots of louvres, single width often... more for the outside than the inside. So I guess I had some ideas of what I wanted to feel and live in it. With those ideas and information to Greg, his spin takes on what we come up with in that respect.'* (Interview with the Mortlock resident in 2011)

*'There certainly wasn't any communication problem with Greg... We had lots of ideas overlapped...in a way Greg was the interpreter and mediator that he put everything together and the first drawing he did and we liked it...the finishing details and material variations changed during the process and basically Greg designed it.'* (Interview with the Mortlock resident in 2011)

*'Having grown up in Darwin, certainly around cyclone Tracy and then most of my life after that, the houses have always been very strong, very heavy concrete and double brick and minimal window spaces. So from that point of view, well, the strength is there I guess but the ventilation and the internal cooling wasn't. You become more reliant on staying on the outside in the huge verandah or in the air-conditioning. I guess, to an extent, this is how you live.'* (Interview with the Mortlock resident in 2011)



**Figure 5.3.1i** Physical experiences of outside-in and inside-out space are made through the transparency, the positions and extensive areas of windows in this house. Taken in 2011.

### Hedonist experience

Ceiling fans are practical architectural elements with economic benefits for tropical climates. To make good use of fans, McNamara offers generous ceiling heights, creates irregular-form openings on the internal partition walls, and minimizes the areas of solid external walls with large sliding doors, louvres and timber strips (Figure 5.3.1j). The visual transparency of clear glass louvers and translucent glass sliding doors offer a sense of lightness and openness combined with fresh air, sufficient sunlight and shade. Double-height volumes in each wing create a sense of awe. Experiencing the in-between and semi-open spaces of the house cultivates the deep feelings of the residents in relation to visual aesthetics, physical comfort and psychological peace. *'With a cool beer in one hand cruising between indoor spacious space and outdoor open nature in a hot summer in the Top End'* (a casual conversation with a Mortlock resident before the interview).

*'We are very happy and very privileged. It's quite an exciting residence to live in for sure. (Interview with the Mortlock resident in 2011)*

*'We are glad we have something that does respond to our environment and the place we live and it isn't what everyone else has. It is one of its kind. (Interview with the Mortlock resident in 2011)*



**Figure 5.3.1j** The double-height spaces in the verandah (Top) and living room (Bottom) give a sense of awe and spaciousness. The transparency of living areas is given by minimizing the solid external walls with large sliding doors, glass louvres and timber strips.

The absence of a formal front door and lack of obvious security are features of the Mortlock Residence. The house demonstrates a sense of trust, security and belonging to the land due to its location in a rural area which is relatively close to Darwin, in contrast to proximity to other capital cities in Australia. There is no window furnishing, curtain or blind needed in this house. Here exposure of the residents' daily activities is not a problem as there is 'less chance of anyone walking past' and they would be 'obvious' and likely to be seen in any circumstances.

*'I think the rural area is probably the safer areas to be in in the first place. I think, generally speaking, less chance of anyone going past. If there were any strangers like that, they probably would be more obvious to yourself or neighbours as well. So from that point of view, we are already in front. There is no curtain and blind, and details of what can be seen are minimal... it is a very private house.... It is so far [from the main road] and the detail of you to be seen is quite minimal'* (Interview with the Mortlock resident in 2011).

*'Having grown up in Darwin, the tropical elevated Darwin housing has always been a house to live in after living in the conventional post-cyclone Tracy house for years. You are always longing to stay in the outdoors as the feelings of heavy concrete material, minimal window areas and enclosed space are too much for a climate like this'* (Interview with the Mortlock resident in 2011).

*'We will spend time absolutely outside. I think the way the house is set up and designed will reflect that [there is] more outside space if you look at the decking, the breeze and the entrance, and then there is an internal space (pointing at the master bedroom) that can be closed up... That pretty much reflects how we intend to use and how we want to use [the spaces of the house] as you saw and looked around and that 1/3 of the internal space that we don't really need'* (Interview with the Mortlock in 2011).

*'We use all of the spaces and it depends who we have around... It is much nicer to sit outside here [verandah]... I tend to bring the computer to sit outside and work.'* (Interview with the Mortlock in 2011)

Hedonist experience was felt and then described by the resident through their spatial experiences with the spaces of the house, its surroundings and the comparison of a lifestyle between urban and rural areas as follows:

- The resident indicated his and his partner's preferences in a complete outdoor living and displayed their feelings about the excessive internal spaces that were unused and unnecessary;
- They also displayed their desires for a natural and minimalist lifestyle that the house was the sanctuary for escaping from the hectic and busy Darwin city living and 'an observatory for wildlife' (Interview with the Mortlock in 2011) in the naturally undisturbed bushland;
- The residents were captivated by the semi-enclosure of the house, surrounded by the tranquillity of wild nature in this remote area. A modern version of a hedonist in the outback is being recreated by McNamara's 'breaking the rules' of a 'normal' house by creating a small abode with more verandah space than interior space (Figure 5.3.1k).





**Figure 5.3.1k** A view to the front (Top) from the intersection zone of the house shows the long and high verandah which cuts a horizontal wing into two separate wings – one solely for the master bedroom on the left and another for a collective living spaces on the right (living room, kitchen, dining and other bedrooms). A view to the rear (Bottom) from the same position of the house offers a view connecting the verandah, the breezeway, the indoor-outdoor living spaces and a pool. There is a sense of scale, height, spatial experiences, and open surroundings.



Space with few physical boundaries, modern technology and open views providing security from intruders is the contemporary interpretation by McNamara of a hedonist's house in the tropics of Australia (Figure 5.3.1l).



**Figure 5.3.1l** The Mortlock Residence displays itself as an open nature 'observatory for wildlife'. A safe distance is retained between the residents and the animals that live nearby due to their nature of timidity and fear of humans. It also offers privacy from strangers and neighbours. Taken in 2011.

### Gradually changing life patterns

Mortlock and his partner feel the house slowly but surely changes their ways of doing things and their prioritizing of the natural episodes of life. Their daily activities – such as taking a bath or a semi-outdoor shower, working on the deck, swimming in the bushland, dining on a stage accompanied by a naturally composed symphony, and entertaining family and friends – are re-formed.

Feelings of being simultaneously inside and outside with its humid and moist climate are a delight of living for Mortlock and his partner (Figure 5.3.1m). He expresses his preferences for and enjoyment of a lot more working from home, dining, entertaining, socializing or just 'simply sitting out for a beer to chill

out on the breezeway deck' on a pleasant evening after work (Interview with Mortlock in 2011), or enjoying that peaceful and calm sensation brought by the variations of sounds of insects and wildlife, heavy raindrops on the roofs, warm-dry breezes and sticky-humid moist sensation in this open space. It is a spiritual connection and communication between the quality of hard space and the enchantment of soft space that Mortlock and his partner have by means of the house. They sense all the tangible and non-tangible elements of a desirable lifestyle when all the separate elements unite into the wholeness of their daily living. There is no differentiation or barriers between interior and exterior living experiences but a continuous peaceful immersion into a way of life.



**Figure 5.3.1m** With a laidback and surrendering attitude to bush land, showering and bathing for Mortlock and his partner is a pleasure to enjoy this care-free lifestyle as a means to a happy life.

*'The house definitely changes me without a doubt... I guess there has been the progression of a conventional post-cyclone house, to make a house look modern and tropical but not really be tropical, to seeking and speaking and dealing with Troppo to get a tropically designed house. It has changed me and I am a lot more aware of minimizing the impact ... of my building practices, the materials I use to create the house. Absolutely it changes me.'* (Interview with the Mortlock resident in 2011)

*'We prepared to live different however it is that feeling of being outside and it is how you feel inside [mentally] and continue to feel once you are in the house. How you feel outside is exactly how you feel inside.'* (Interview with the Mortlock resident in 2011)

### Ethical values versus material culture

The male resident expresses his wake-up call in relation to an awareness of the built environment by having the opportunity to build this house mostly on his own with some assistance from his family and friends, as well as the continuous support of McNamara.<sup>260</sup> Coming from a different business background, he learned to read the working drawings and occasionally came across some difficulties in understanding the construction details. With McNamara's continuous support in explaining those construction details, he came to realize that the significance of appreciating life is to understand the values of living simply with less material.

*'I have become a lot more aware of what materials and construction methods bring minimal impact to the environment and the place we live, after this house I created and built.'* (Interview with the Mortlock resident in 2011)

By living in the space he physically created himself, a bond was naturally formed through the long process of spatial creation and extensive communication of what he wanted the house to be for both him and his partner. The change in Mortlock's mentality is seen in his being 'sceptical' about not using air-conditioning for a tropical house to positively believing in achieving the best result by natural cross-ventilation after his own life experience of living in such a house. It is the belief that there is 'absolutely no need for air-conditioning in this house as you get cool breezes all the time' (Interview the Mortlock resident in 2011). The attitude and value that McNamara asserts and educates his clients about are the possibilities of responsible-hedonist living by believing in a life inspired by the awareness of 'less is more' (Interview with McNamara in 2011 and the Gold Medal Talk by Troppo in 2014) together with responsibility for the built environment.

*'Until this house, [you] absolutely [have] no need for air-conditioning in this house as you get cool breezes all the time... basically, it is virtually impossible for others but I love it. I would've been sceptical about it prior to living in this house. But now, I can see there is absolutely no need and requirements to have an AC in this house.'* (Interview with the Mortlock resident in 2011)

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<sup>260</sup> Mortlock mentioned his gratitude towards McNamara's continuous support and free consultation meetings whenever he called him for assistance and responses to his enquiries, even after the completion of the house. He highly praised McNamara's passion for design, his professionalism for work ethics, the quality of design details and services.

### Feeling versus desire and power

Easy access to work, education facilities, and entertainment, and the convenience of obtaining daily necessities are the prime reasons for living closer to the centre in most cities. For Mortlock and his partner, they value their lifestyle over easy access and convenience, yet consider themselves 'lucky' with the location of their residence in comparison to other major cities in Australia. To them, it is a 'win-win situation' (Interview with Mortlock in 2011) for them to be in a piece of their own bush-land and yet close enough to the centre of Darwin for work and the availability of daily necessities, which is different from other major cities. This residence offers them set-free mentality in life after their retreat from the fast pace of city life. The priority of seeking feelings of 'happiness' and 'contentment' is high in something truly of their own in total privacy and without disturbance in a rural area. That sense of 'sacrifice' and 'preparing to live differently' is indicated clearly by Mortlock, as is his personal yearning to 'have a bit of space' for him and his partner.

*'By Darwin standards, we probably need half an hour to the city... Distance will be the norm and that's how you are given...you have to travel just to stay in suburbia.'* (Interview with the Mortlock resident in 2011)

*'There are more pluses than there are negatives. I guess to live in a house like this, you have to be quite happy and prepared to make sacrifices a little bit.'* (Interview with the Mortlock resident in 2011)

The attraction of city culture and modern entertainment are less important to Mortlock and his partner than the tranquillity of a quiet and contemporary lifestyle that exists in an open rural area rather than the bustling centre of Darwin city (Figure 5.3.1n).

*'Living in a rural area has always been what we wanted. We have a little bush nobody can touch and it is a nice feeling...if you are given that situation in other major cities, we have the benefits to be close to Darwin and have a bit of space.'* (Interview with the Mortlock resident in 2011)





**Figure 5.3.1n** Mortlock's and his partner's feelings are appreciative of the simple life by which they live. A house that responds to them and all the elements around them offers them a contemporary lifestyle for leisure and seeking peace of mind after the fast pace of work in the bustling city.

### Simple gestures versus advanced technology

'Camping with the permanent structure over your head whether it is cool and dry, or wet and green, that's how you feel inside the house' (Interview with Mortlock in 2011). Other simple noticeable gestures are the locally sourced timber deck, floors, partial external walls, and lattice internal walls, the lightweight steel framework for posts and rods, skillion roofs and multi-pitched roofs, semi-elevated structure, and single depth rooms. These simple gestures are complimented by the bold and visually connected mono-pitched high roofs to create a special welcome gesture in this cross-axis residence. No fancy technology is needed to achieve a desirable ambience for human comfort and aesthetic appeal but simple ceiling fans and fine details with nuts and bolts. In the view of Mortlock, 'every Aussie should be able to pitch a tent in the outback.' (Interview with Mortlock in 2011)

*'From our point of view, the design is simple and straightforward. We liked Greg's hand drawings for the house design ... he did interpret what I wanted as I didn't have the mental pictures in my head but he configured what I wanted in his drawings. They are unique and that's why they make Greg special.'* (Interview with the Mortlock resident in 2011)

*'We like the skillion roofs, the multi mono-pitched roofs, semi-elevated structure and single width of space... conventional in our minds, this is always what we wanted...turning from a single axis house to cross-axis house that Greg's flairs take over the design.'* (Interview with the Mortlock resident in 2011)

There is an intimate relationship between the occupants, the house, and the surrounding landscape. Freedom, delight and belonging are the qualities that the Mortlock Residence has to offer to the residents. Mortlock and his partner can work, dine, read, entertain, socialize and take a short nap or even just chill out listening to the sounds of nature all under the verandah (Figure 5.3.10). There is affection and a natural bond that Mortlock, McNamara and the house established during the design and construction processes. Appreciation for a natural way of living is the quality of the Mortlock Residence that both McNamara and Mortlock establish in the forming of soft space.







**Figure 5.3.1o** There is a subtle and harmonious relationship among people, place, the building, its natural surroundings and other living things. The architect's value for everyday living is transformed into the design of the Mortlock house.

### 5.3.2 Conclusion

McNamara sought to encapsulate the Troppo 'feeling' and 'sense' through materials, details, construction methods, spatial experiences, and forms. The Troppo 'feeling' was of the heat, breeze and rain in different seasons, of the rich diversity of regional contexts in the Top End, and of the excitement and surprises of the wildlife in daily living. The Troppo 'sense' combines the value of the basic commodities of life, the visual appreciation of aesthetic appearance, and the application of social, cultural and economic judgement. Here McNamara immerses himself in the Troppo 'feeling' and 'sense' to speak their language fluently by perpetuating the idea of no AC and living with whatever nature has to offer in an open indoor-roofed verandah living. He contrives his vocabulary in the Troppo language to be liberal and contemporary with an innovative and exciting irregular form in plan, compact private living spaces, one alternative living space accommodated by a large verandah, no interior doors between spaces and double-height volumes in rooms. A subtle hint of a McNamara Troppo language is created through his intricate construction details. The following table 5.3.2 displays a comparative analysis of

the 1980s Darwin houses and the Mortlock Residence. The design of Mortlock house exhibits the continuity of Troppo's design principles, as well as the McNamara and residents' resonance with Troppo's philosophy for a sustainable and simple lifestyle.

		Typical 1980s Troppo Houses Suburbs of Darwin	Mortlock Residence, 2009 Howard Springs, Darwin
Hard space	Similarities	<ul style="list-style-type: none"> <li>• Natural ventilation by opening louvres, bi-fold doors and windows;</li> <li>• Lightweight elevated structure, construction details and materials;</li> <li>• Extensive long overhangs for verandah spaces;</li> <li>• Post-and-beam construction in steel and timber;</li> <li>• Exposed roof structure;</li> <li>• Timber decking and floors;</li> <li>• A mixed use of glass and timber louvres;</li> <li>• Slatted external walls;</li> <li>• A flight of stairs to get to the entrance of the house;</li> <li>• Fans and no AC installation;</li> <li>• Shared bathroom and semi-outdoor shower.</li> </ul>	
	Differences	<ul style="list-style-type: none"> <li>• Open carport underneath the house;</li> <li>• Open storage space;</li> <li>• Semi-open shower underneath the house;</li> <li>• Semi-open bathroom among living spaces;</li> <li>• Separated verandah for bedrooms and a breezeway between main living spaces and bedrooms;</li> <li>• 4200mm high ceiling for most of the spaces;</li> <li>• The main structure for supporting the verandah is fixed to the ground.</li> </ul>	<ul style="list-style-type: none"> <li>• No under-house space for storage and cars/boats;</li> <li>• Semi-open shower;</li> <li>• One extensive long breezeway/verandah is created to connect both main living spaces and bedrooms;</li> <li>• 6000mm high ceiling for better ventilation for hot air rising;</li> <li>• Cantilever structure for supporting the verandah and roof;</li> <li>• No verandah or outdoor spaces for secondary bedrooms.</li> </ul>
Soft space	Similarities	<ul style="list-style-type: none"> <li>• Enjoying doing daily activities in verandah and outdoor spaces;</li> <li>• Expressing delightful sensual experiences moving through indoor and outdoor spaces;</li> <li>• Opening doors and windows for enjoying breezes while at home;</li> <li>• Showing a high level of tolerance to rain, heat, bugs and wildlife animals moving through and/or being in the house;</li> <li>• Less or very little anxiety about the accumulation of dust and cobwebs;</li> <li>• Enjoying having showers in a semi-open bathroom without worrying intrusion of privacy;</li> <li>• Enjoying doing laundry in the outdoors.</li> </ul>	
	Differences	<ul style="list-style-type: none"> <li>• None.</li> </ul>	

**Table 5.3.2** This table shows differences and similarities of hard and soft spaces between the design of the Mortlock Residence and the 1980s Darwin houses.

## 5.4 Townsville: Connell Residence, Magnetic Island, Queensland

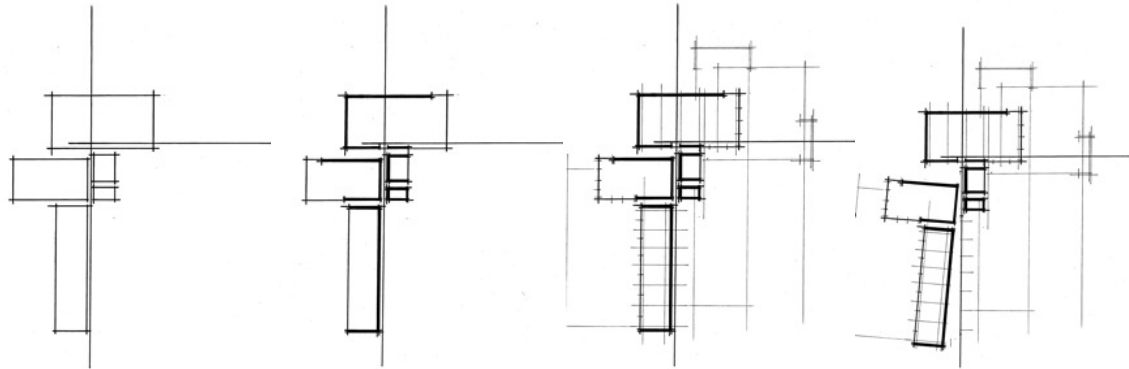
Contingency is a vital factor in the changes in Troppo's design approach, the business operations, and the form-patterns of Troppo language. In the case of the Troppo practice in Townsville, contingency offered the former Director, Geoff Clark, an opportunity to seek a different lifestyle as a Senior Lecturer in the University of Tasmania in 2007 (Interview with Clark on Skype in 2012) and the current Director Terry O'Toole an opportunity to integrate both residential and commercial practices. The shift in values and characteristics of design projects was evident in distinguishably different features and elements in the projects built under O'Toole's ownership of the Troppo office after the departure of former in-house architect Zammi Rohan who had worked with Clark.<sup>261</sup>

1986 was the year Troppo set up this first branch in Townsville. Over the years, Clark worked as the first point of contact dealing with a number of projects commissioned by the Defence Housing Authority (DHA) and private clients in the region: 'On occasion for various key dates and events' (communication with Clark via emails in 2014), Phil Harris, Michael Wells and Richard Layton came down from the Darwin office to Townville. With Clark's admiration for Troppo's founding partners, 'mutual respect' (Interview with Clark on Skype in 2013) was the key for design collaboration and independence between the two financially independent offices when he became the Director of the Troppo Townsville practice in 1994. He maintained Troppo's concepts for climatically responsive design with a touch of his own personalised design vocabulary and 'a whole-of-site' approach (Interview with Clark on Skype in 2013).

'Cruciform' was Clark's personal design strategy for 'a primary circulation path through space' and 'a head start' (Interview with Clark on Skype in 2013). In his view, cruciform axes for circulation offered 'more interesting' outcomes in spatial arrangement and energy efficiency (Figure 5.4a). The concept of cruciform became the keystone of versatile house designs in the Townsville practice.

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<sup>261</sup> Zammi Rohan, a former in-house architect, worked with the former Director Geoff Clark from 2007 and then Terry O'Toole from 2008. He left the Troppo practice in 2011 and established his own practice called *9Point9 Architects* in Townsville.



**Figure 5.4a.** Sketches were specially drawn by Clark for this research to explain his personalised vocabulary of ‘cruciform’ as the primary design theme for domestic design projects (Interview with Clark on Skype in 2013).

Compositions of textures, interplay of asymmetrical and symmetrical geometry in roof-form and elevation, and a mixed use of heavy and light materials for external walls were also characteristics of Clark’s design for interpreting tropical housing styles in Townsville (Figure 5.4b).

**tropo**

**ATTESON HOUSE**  
 12 SANCTUARY DRIVE FARRFIELD WATERS TOWNSVILLE NORTH QUEENSLAND 4811

Structural Engineer: Steve M. Kenzie  
 Building Contractor: Andrew Patterson, Quality Built Homes  
 Location of Work Performed: Townsville  
 Date of Project Completion: 2010

**SITE DESCRIPTION**  
 The house is a development in the town centre. The site is a 1.5 acre plot of land, with a view of the sea and the town centre. The house is a 3 bedroom house with a large living area and a large outdoor area.

**CONCEPTUAL INTENT**  
 The house is a development in the town centre. The site is a 1.5 acre plot of land, with a view of the sea and the town centre. The house is a 3 bedroom house with a large living area and a large outdoor area.

**STRUCTURAL/CONSTRUCTIONAL CONSIDERATIONS**  
 The house is a development in the town centre. The site is a 1.5 acre plot of land, with a view of the sea and the town centre. The house is a 3 bedroom house with a large living area and a large outdoor area.

ARCHITECTS (QLD) P.O. BOX 965 TOWNSVILLE 4810 PH:47714308 FAX:47714301 tropoqld@bigpond.com.au

**tropo**

**GOMAZ BEACH HUT - RICHARDSON ORFORD HOUSE**  
 WATERVIEW DRIVE BUSHLAND BEACH

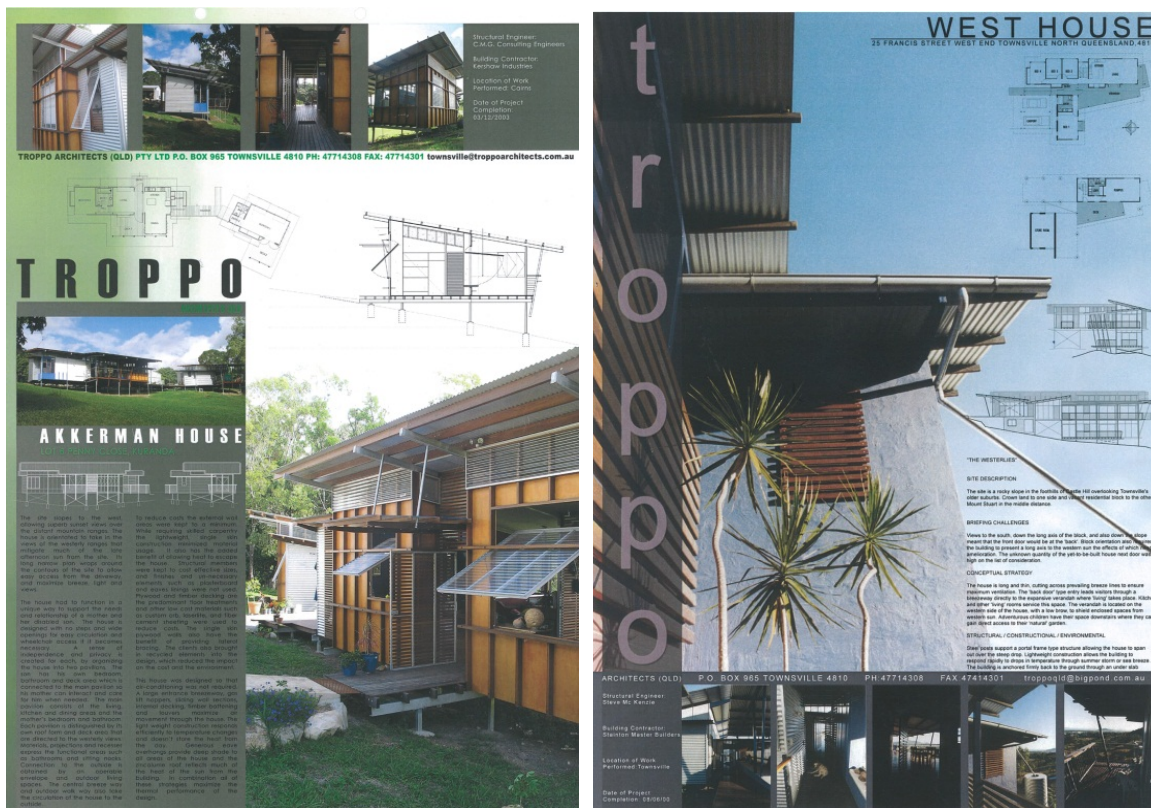
Structural Engineer: Steve McKenzie  
 Building Contractor: Andrew Patterson, Quality Built Homes  
 Date of Project Completion: October 2001

**CONCEPTUAL INTENT**  
 The house is a development in the town centre. The site is a 1.5 acre plot of land, with a view of the sea and the town centre. The house is a 3 bedroom house with a large living area and a large outdoor area.

**STRUCTURAL/CONSTRUCTIONAL CONSIDERATIONS**  
 The house is a development in the town centre. The site is a 1.5 acre plot of land, with a view of the sea and the town centre. The house is a 3 bedroom house with a large living area and a large outdoor area.

TROPIC PROJECTS (QLD) PTY LTD P.O. BOX 965 TOWNSVILLE 4810 PH:47714308 FAX:47714301 tropoqld@bigpond.com.au



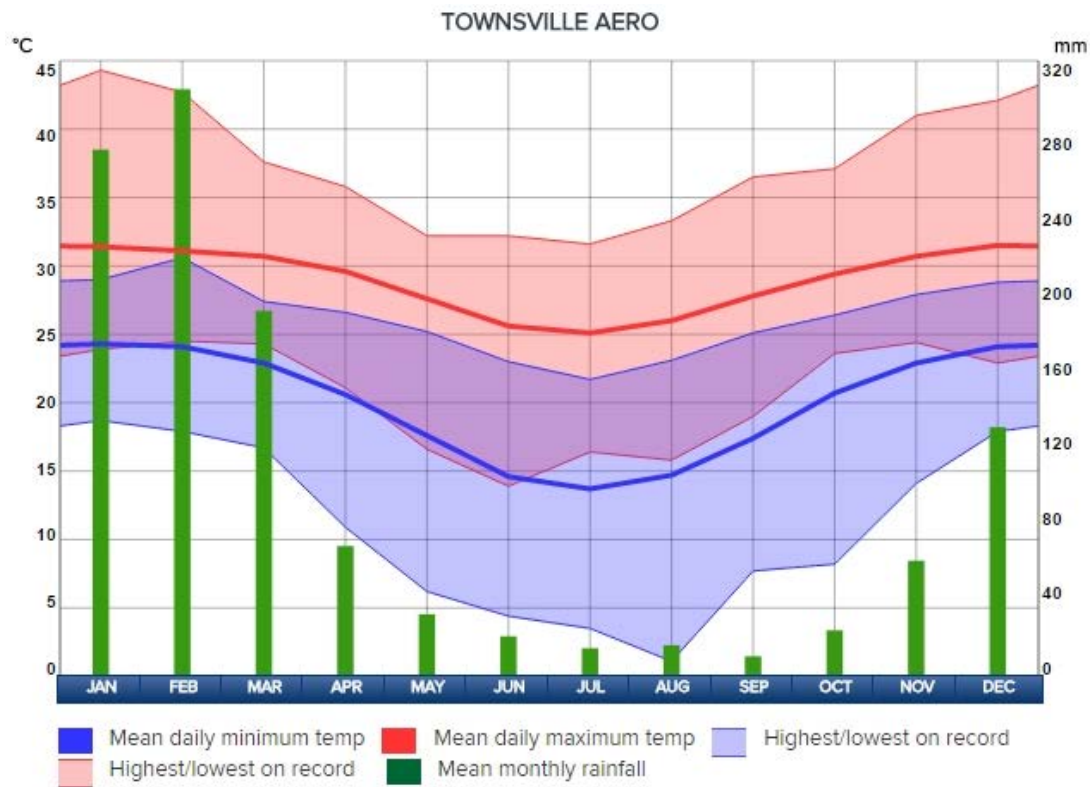


**Figure 5.4b** Posters of Clark's version of contemporary Troppo houses in the Townsville practice (dates unknown). These posters were produced as part of the Townsville office portfolio to promote their practice when new clients approached them for a house design. Prints of the posters were found in the Townsville office in 2012.

The distinctive characteristics of the 1980s Troppo houses in Darwin remained in Clark's Townsville Troppo houses in many architectural elements: layers of details; breathing thin skin of corrugated steel external walls; exposed structural elements; gable roofs, glass; polycarbonate and glass louvers; timber shutters; full-wall length bi-folding or sliding doors; elevated or semi-elevated steel-frame structure; linear form and single-room width, with extravagant length of overhangs over a spacious verandah. These features were remained in Clark's design for his understanding about the tropical climate of Townsville where there were 300 days of sunshine per year<sup>262</sup> with the average temperatures range between 24 degrees in summer to 13 degrees in winter (Figure 5.4c).

<sup>262</sup> The information of Townsville climate and average temperatures was taken from Queensland Government website online link <https://www.health.qld.gov.au/townsville/About/townsville.asp>, viewed on April 14, 2016 and the diagram was





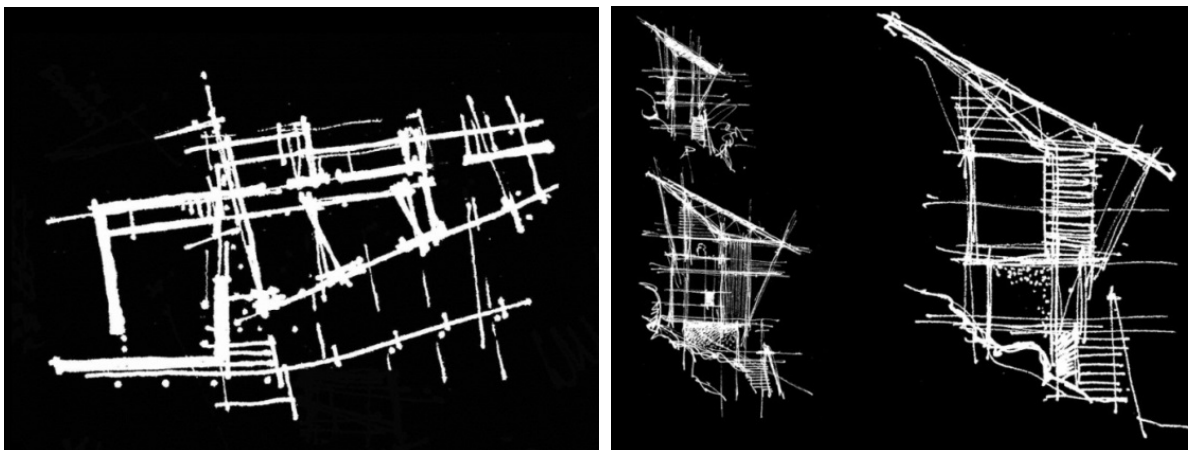
**Figure 5.4c** The diagram shows the Townsville annual temperatures and rainfall.

A significant feature was the moderate length of overhangs for living spaces. Two Troppo houses designed by Clark and Rohan preserved the primary tropical features of the early Darwin Troppo houses in style. These features were evident in the designs of two residences in Horseshoe Bay on the northern side of Magnetic Island (Figure 5.4d).

taken from the Weatherzone.com website online link <http://www.weatherzone.com.au/climate/station.jsp>, viewed on April 14, 2016.



**Figure 5.4d** Two Horseshoe Bay residences were built on Magnetic Island between 2006 and 2010. They display the characteristics of an elevated lightweight structure, complete exposure and openness to nature through windows, doors, louvers and translucent polycarbonate cladding sheeting (Top Left and Right photos taken by Huang, July 2012. Bottom Left and Right photos taken from the website of Australia Institute of Architects for competitions in 2010).



**Figure 5.4e** Clark's preliminary sketches of a floor plan for a family in Townsville (Left), elevations and a section sketches for a house for a couple living on Magnetic Island (Right). These images are the slides of the Clark's lecture for a second-year design course in 2012.

The new design features were an angled floor plan and an irregular shape of breezeway rather than Troppo's typical layers of mono-pitched roof and a rectilinear floor plan with straight-line breezeways (Figure 5.4e).

Marrying two distinctive design genres of commercial and residential practices signified possibilities and challenges to O'Toole, the current Director. The challenges of integrating his own established practice with Troppo's passive design principles and distinctive building detailing were presented by the evidence of most of O'Toole's built projects which displayed his preferences in thermal-mass material, commercial construction methods, standardised architectural elements and use of active air-conditioning and heating systems.

*'I had a practice of my own and a lot of things I was doing in my practice [North Point]. It was similar and correlated to the Troppo's ethos that I was trying to do. It is a different environment here to Darwin and we try to bring the Troppo style here as their practice is well known.'* (Interview with O'Toole in 2012)

There were two challenges for O'Toole. One challenge was to marry two distinctive practices. The constraints for each practice were different in terms of the use and availability of local resources, budget, the needs and desired lifestyles of clients, scale and type of projects, and response to regional climate conditions. The second challenge was to integrate two different design principles, as O'Toole had a different design approach in respect to cluster spatial planning, the composition of geometry and pattern-form, the punctuation of openings, thermal-mass materials (concrete panels, raked blockwork and bricks) and industrial construction methods (tilt-up concrete and in-situ). His design principles were developed primarily for local and southern clients who preferred traditional building types for safety and security reasons (Figure 5.4f). His principles were unlike the northern tropical design of Troppo houses which offered openness, transparency, lightweight form and easy-access.

*'Here clients know their [Troppo's] ethos but not all the houses here can incorporate their principles into their [the clients'] house as there are budget constraints and other factors like clients are a bit more conservative. So we try to gradually bring the clients into the Troppo's ethos and we'd also try to bring the Troppo's ethos into the commercial buildings. We've had some success in that but four years is not long enough... it takes a long time.'* (Interview with O'Toole in 2012)



**FRYER STREET HOUSE NORTH WARD, QLD**

**TROPPO ARCHITECTS [QLD]**

**The Existing House:**  
 The old but not old house. The original house was built in 1920. As a result of a number of renovations, the original house was in a state of disrepair. The house was in a state of disrepair. The house was in a state of disrepair. The house was in a state of disrepair. The house was in a state of disrepair.

**The New House:**  
 A new open-plan level and finished rooftop represented the starting point for a new design and renovation project of design and documentation. The first objective was to renovate rather than remove, with the aim of retaining the original structure and character.

**Design Intent:**  
 Design intent focused around retaining the identified fabric with the existing building primarily consisting of a timber frame, asbestos roof and an external wall of masonry and plaster. The design intent was to retain the original structure and character of the house while providing a modern living and dining area.

**The result is a house that encourages integration between indoor spaces and outdoor spaces. This is achieved through the use of large glass walls and a covered outdoor area that is integrated with the existing building. The house now provides a modern living and dining area that is integrated with the existing building. The house now provides a modern living and dining area that is integrated with the existing building.**

**The house features a large storage space that is integrated with the existing building. The house features a large storage space that is integrated with the existing building. The house features a large storage space that is integrated with the existing building.**

**The house has a high and being considered an early with the great architectural design, maximum ventilation, reflective surfaces and use of natural light. The house has a high and being considered an early with the great architectural design, maximum ventilation, reflective surfaces and use of natural light.**

**Architect:** TROPPO ARCHITECTS [QLD] PTY LTD  
**Structural Engineer:** STP CONSULTANTS  
**Building Contractor:** CENTRAL RESTORATIONS  
**Location of Work:** NORTH WARD, TOWNVILLE, QLD  
**Date of Completion:** DECEMBER 2007

**THEN 2007**

**NOW 2007-1**

A poster of a house extension



**Figure 5.4f** A house extension (Top) and a proposed house design (Bottom) represent O’Toole design concepts with complex elevations, irregular forms, various roof designs and composition of different volumes in various scales and layouts. O’Toole’s design approaches differ from Clark’s design concepts for simplicity.

O’Toole adopted Troppo’s ethos for sustainable design in commercial, institutional and government projects after 2008.<sup>263</sup> With the source of projects mainly commissioned by the Queensland Government, meeting budgets had become the primary factor for O’Toole in operating both practices. Efficiency for the completion of a project was the key to deliver the completion of work, satisfy the requirements of the building approvals, and the social requests of public demand.<sup>264</sup> Time control associated with budget management became the trigger to adopt advanced tilt-up concrete construction

<sup>263</sup> O’Toole had 15 years of architectural practice in 2 private firms and the local government sector before he purchased the Queensland branch of Troppo Architects in 2008. During that period of 15 years, he worked as a Queensland Government architect for five years, and then started his own practice, *North Point*, in 2003.

<sup>264</sup> O’Toole emphasized that budgets given by the Government was the predominant reason for choosing the tilt-up concrete construction method for its cheaper costs in labour, time efficiency and locally availability.

methods and prefabricated standard fittings for windows, doors, shutters and louvers in fixed sizes in commercial and residential projects.

*'Since 2008, I took over the Queensland studio so to speak and we tried to collaborate with the head office to win some institutional projects in Queensland, international and north Queensland Government projects. So far, we haven't been very successful at all. Most of our work will be commercial and secondary homes for southern people who build holiday homes in the surrounding countryside.'* (Interview with O'Toole in 2012)

O'Toole's design concepts were derived from a business-oriented operation (Interview with Rohan in 2014) involving more commercial projects.<sup>265</sup> His motivation was to keep both practices with steady profits. The nature of Townsville was as a small industrial 'working' and typical 'suburban housing' city (Interview with O'Toole in 2012). For this study, the Townsville office character limited the availability of a residential project for the case study.<sup>266</sup> There were few Troppo houses designed by O'Toole over a decade. Most of his clients were from Melbourne and some local residents with business associations in Townsville. They approached him to build holiday homes for investment or retreat as a result of the local reputations of his *North Point* practice and his association with Troppo. These clients had good financial stability and looked for a relaxing lifestyle or to secure their retirement in later life.

The following table shows how Clark and O'Toole understood the Troppo ethos and design philosophy through design projects in the Townsville practice. There is divergence in the design features and principles that Clark and O'Toole applied both in their design approaches and the operation of the Townsville office. Clark adopted most of the distinctive features of the 1980s Darwin houses in his design projects and created a design pattern for spatial planning, which he called cruciform. O'Toole focused on designs that met client's requirements, comply with building regulations and respond to the regional social context – the character of the industrial town of Townsville without the same background inside Troppo's Darwin practice (Table 5.4). There is continuity in the form-patterns of the language in Clark's practice but not in O'Toole's practice.

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<sup>265</sup> O'Toole pointed out some reasons for not taking on residential projects: time consumption with demanding clients, small budget, different beliefs on design principles from clients, and some clients even approaching them with a builder's plan from a magazine or a floor plan of a friend's house as the base plan for their own house design.

<sup>266</sup> In order to keep both the Troppo residential practice and the *North Point* commercial practice going, the majority O'Toole's projects were public buildings commissioned by the government due to his close relationship with the local government.

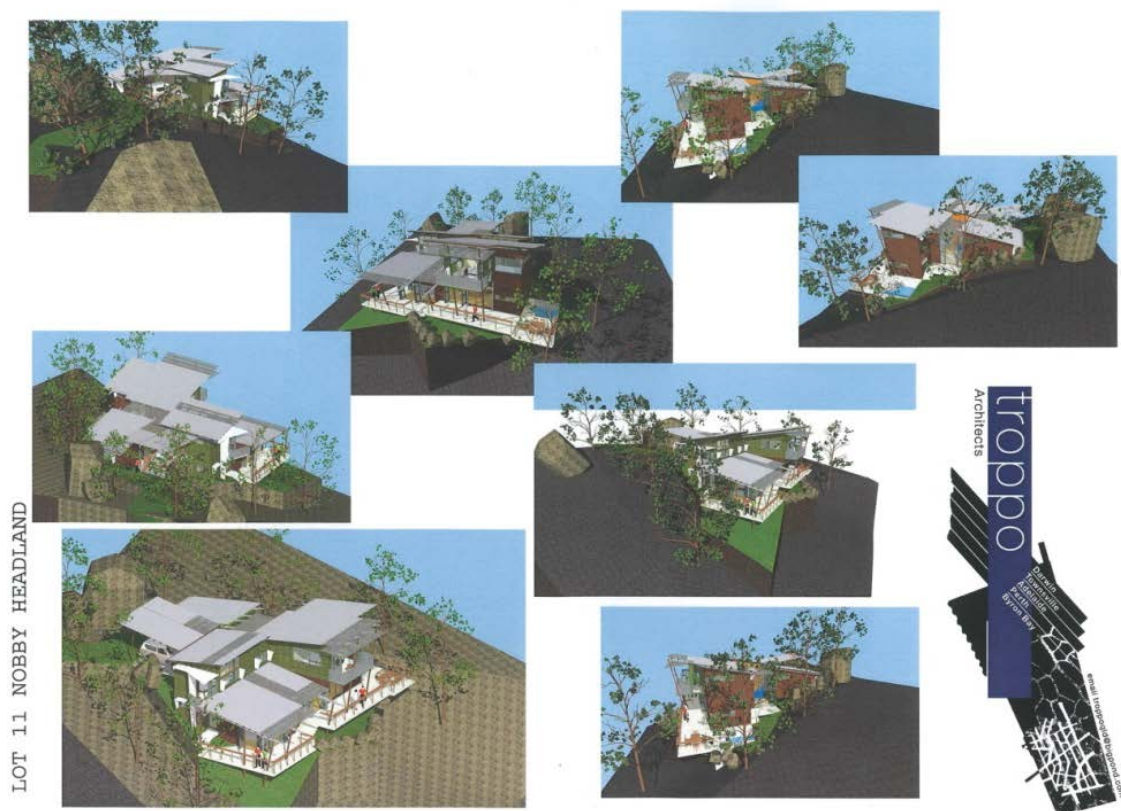


	Hard space Physical and visual elements		Soft space Added-on facilities and appliances in space to influence the quality of space and the behaviour of the residents	
	Clark	O'Toole	Clark	O'Toole
<b>The characteristics of Troppo houses in Townsville</b>	<ul style="list-style-type: none"> <li>• Cruciform for circulation paths</li> <li>• Breezeways and verandah</li> <li>• Exposed roof structures and sufficient length overhangs</li> <li>• Layers of detailing with various materials to show structural designs and articulated elevations</li> <li>• Single width zoning</li> <li>• Mono-pitched roof form or gable roofs</li> <li>• Distinctive feature elements as a signature for individual troppo house (titled and uneven shape of roofs; masonry retaining walls)</li> <li>• Reduced window size and quantity with more detailing</li> <li>• Elevated structure for verandah</li> </ul>	<ul style="list-style-type: none"> <li>• Cluster floor planning</li> <li>• Fixed-size and minimally detailed windows</li> <li>• Spacious verandah for dining and living space</li> <li>• Layered and overlapping roofs</li> <li>• Irregular-shape for floor plans and roof-forms</li> <li>• Elevated structure for verandah</li> </ul>	<ul style="list-style-type: none"> <li>• Enjoying natural ventilation and open semi-outdoor spaces indoors</li> <li>• Residents movements between indoor and outdoor spaces considered by outlooks, breezes and energy consumptions</li> <li>• Prompting natural air and engagement with outdoor spaces</li> <li>• Sufficient space for outdoor activities</li> <li>• A relaxing and laid-back lifestyle with sufficient outdoor verandah spaces</li> </ul>	<ul style="list-style-type: none"> <li>• Offering choices for either operating fans, opening windows for cross-ventilation, and spending more time outdoors or moderately using AC when the weather is too harsh to bear</li> <li>• Providing a sense of security for avoiding damage caused by cyclones</li> </ul>
<b>Similarities</b>  Between Clark's and O'Toole's design	<ul style="list-style-type: none"> <li>• Mono-pitched roofs</li> <li>• Exposed some structural elements in verandah and overhangs</li> <li>• Outdoor verandah for dining, living spaces and bedrooms</li> <li>• Elevated structure for verandah</li> </ul>		<ul style="list-style-type: none"> <li>• The use of fans</li> <li>• Connections between indoor and outdoor living with the use of verandahs and balcony</li> </ul>	
<b>Differences</b>  In O'Toole's design	<ul style="list-style-type: none"> <li>• Covered roof structure</li> <li>• Reduced window size and quantity</li> <li>• No indoor-outdoor verandah or breezeways</li> <li>• Heavy materials and less openings</li> </ul>		<ul style="list-style-type: none"> <li>• Encouragement of the use of AC</li> <li>• Standard overhang length</li> <li>• No open or semi-open showers/bathrooms</li> <li>• Commercial construction</li> <li>• A cluster or compact of spatial arrangement for floor plans rather than Troppo's typical long-thin plans</li> </ul>	

		<ul style="list-style-type: none"> <li>• The use of standard sizes of windows and doors in O'Toole's designs</li> <li>• More indoor rooms, central and circular indoor movements in O'Toole's designs</li> </ul>
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**Table 5.4** Different design approaches Clark and O'Toole took in operating the Townsville office.

The Connell Residence was recommended by O'Toole as the second case study. It was built on Magnetic Island in 2011. It was first designed by the in-house architect Aftab Khamisa who joined the branch in 2009 immediately after he graduated from a Master's degree in Architecture at the University of Sydney. The clients' strong preference for the Southern housing style was indicated by their rejecting of a couple of early design concepts for a house floating 'in the air' instead of being grounded 'to the site' (Figure 5.4g).



**Figure 5.4g** 3D CAD models for the first preliminary design of the Connell Residence were drawn by Khamisa.

*'We had the interview with this architect [Khamisa] and a site visit and talked about the details of what we wanted..... They drew a plan but we didn't like it. We have dealt with something similar before so we weren't novice in this process. O'Toole came up with something, we didn't want it. Everything seemed to be floating in the air. We come from Melbourne and houses are built on the site. There is a sense of feeling secured and safe when the house is built on the ground.'* (Interview with Connells in 2013)

The final design of the Connell Residence was a combined effort between O'Toole and Khamisa. Khamisa oversaw the design processes and construction phases with the supervision and assistance of O'Toole. Several new features expressing O'Toole's interpretations of the Troppo language are identified in the Connell Residence, and these made the house clearly distinguishable from the early Troppo houses of Clark in Townsville and the ones in Darwin.

#### 5.4.1 Troppo language in the Connell Residence

An emphasis on time control and budget management is evident in O'Toole's work. Time control is predominantly determined by building construction methods, the accessibility of building materials, the level of design and detailing complexity, and the location of the building site. These factors affect the budget management of a project as they impact on the quality of tradesmen, building materials and craftsmanship, and the feasibility of building completion on time. The crucial factor amongst these is the accessibility of building materials, which played an influential part in the change of Troppo language in the Townsville practice under O'Toole's management.

In Townsville, sourcing two primary materials of archetypal Troppo houses, timber and steel, was a challenge because of its geographical location (Interview with O'Toole in 2012). O'Toole expresses his preferences in applying commercial construction in both residential and commercial projects to reflect the impression of Townsville being an industrial town. Consequently, heavy, conventional suburban housing design has been the norm for the community as there has been resistance amongst the local residents in accepting lightweight construction due to the fear of frequent cyclones.

*'Most of the houses in Townsville are built with masonry blocks or concrete panels for cyclone resistance between May and October each year. Most houses in a way have to be built like a*

*'bunker' as the majority of local residents are cautious of the damage cyclones could do to their houses' (Interview with O'Toole in 2012).*

The Connells longed for a tropical house as their holiday getaway home<sup>267</sup> which was specially designed to offer them a relaxed and alternative lifestyle that was different from the fast pace of their daily living in Melbourne. Minimizing potential cyclone damage was their main request.<sup>268</sup> The mixed feeling of a relaxing lifestyle within a fortress was intended in the design of this house.

The Connell Residence is a 'bunker' version of a contemporary Troppo house in the tropics. It is built of thermal-mass materials such as concrete blocks for external walls, with timber cladding and Bondek slab,<sup>269</sup> a specialised commercial and industrial material, for floor construction. The house provokes ambivalent perceptions in that it consolidates its structure by internally anchoring its foundation to the ground with an attempt to mimic the 'touch the earth lightly' principle of the Troppo language in the lightness of the timber cladding. The primary axis of the house echoes the natural fall of the steep rocky cliff with the horizontal span of spacious verandahs offering spectacular outlooks to the surrounding beach and the ocean (Figure 5.4.1a).

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<sup>267</sup> The Connell resident mentioned that the original plan was to build this house as a collection of holiday inns for renting out to tourists due to its accessibility to the beach. It is a trend in the local area where many residential buildings have been renovated to become a holiday home or a homestead.

<sup>268</sup> O'Toole mentioned that awareness for reducing any possible damage was the first priority in the first meeting when the clients approached him for the design of their house. Solid and heavy building materials were requested because the clients were afraid of encountering seasonal cyclones while being away from this holiday home and back to Melbourne.

<sup>269</sup> Bondek slab is a type of concrete floor slab construction on permanently structural steel formwork that has good performance in strength and construction efficiency. It is often used in industrial and commercial office buildings. O'Toole and Khamisa used it for this residential project for its construction time and cost effectiveness.



**Figure 5.4.1a** The Connell Residence is situated on the rocky cliff side of Northern Magnetic Island (original photographs taken by Khamisa after the completion of Connell Residence in 2012).

### Patterns

The natural setting of the Connell Residence is the main factor in determining its hard space for spatial arrangement and form. This setting was quite unlike most of the 1980s Troppo Houses, which were built on the flat ground of bushy sites. This coastal site gives a lot more restrictions and difficulties as a result of its geographical setting, orientation, and height. The Connell Residence sits right at the Southern edge of Magnetic Island where large boulders and rocky steep hills set a challenge for O'Toole and Khamisa to express the Troppo language.

O'Toole's approach for the design of this Troppo house is identified here in 'promoting the use of air-conditioning in each room of the house' (Interview with Connells in 2013), heavy concrete materials, fixed-size windows and doors, smaller openings, less use of louvers, a distinct separation between the internal living spaces and an external outdoor space, and an enclosed-circulating living space. The following connectivity graph reveals the circulation and daily movement mainly taking place in indoor

spaces. The concept of the 1980s Troppo house patterns in spatial arrangement is neither achieved nor applied in the design of the Connell Residence. The segregation of indoor and outdoor spaces is explicit in this particular floor layout. An intensely internal movement is taking place in the cluster design of O'Toole's spatial arrangement (Figure 5.4.1b) due to the segregation of bedrooms and complex zoning for private and communal spaces. The connectivity graph clearly shows that an indoor-living lifestyle is encouraged.

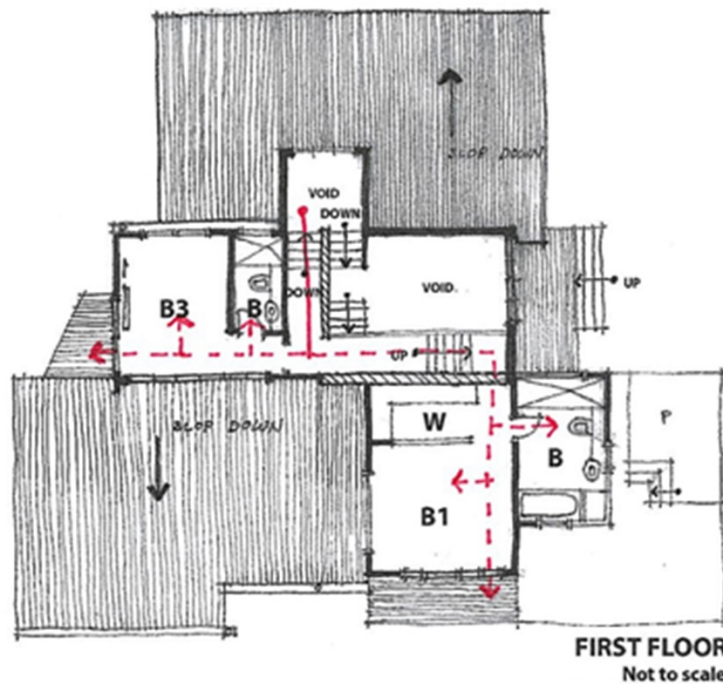
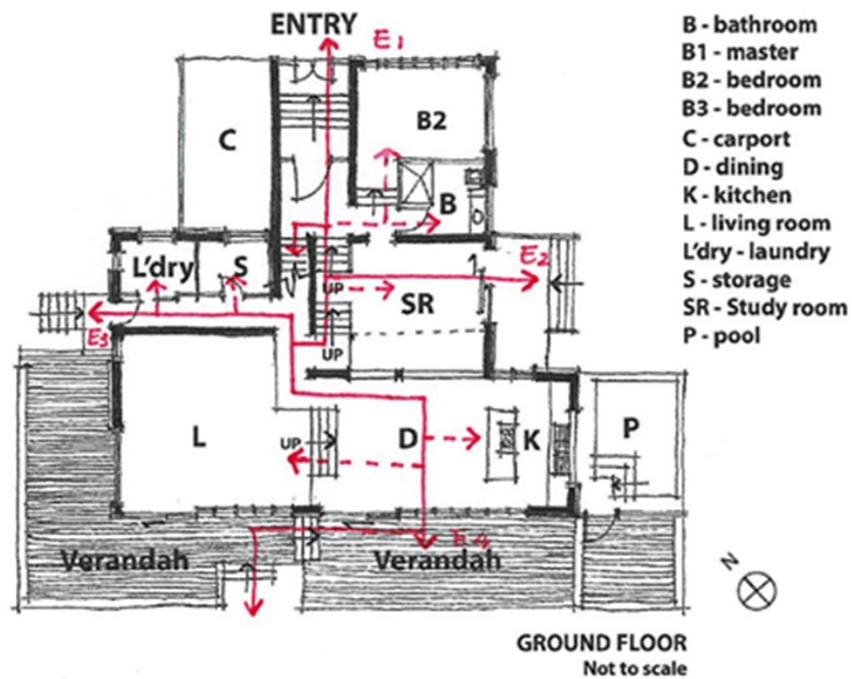


**Figure 5.4.1b** This connectivity graph shows the cluster design through the use of interior stairs. Private and communal spaces are explicit in the design of the Connell Residence.

### Episodic space

The dynamic of daily movement is controlled by the interior stairs. There is little sense of episodic space as there is no continuum between indoor and outdoor spaces but explicit separation between a cluster of interior living spaces and a large area of exterior verandahs. Multiple exits are identified by three sets of outdoor stairs from the recess area of the study, the laundry and verandahs (Figure 5.4.1c). A distinctive feature of the 1980s Troppo houses was that there was no exit through a backdoor. Here, there are multiple exits. The split-levels of two large verandahs and limited outdoor verandah/deck for bedrooms are different from the 1980s Troppo houses, except for one balcony for the second bedroom on the first floor.





**Figure 5.4.1c** There is complete internal circulation in O'Toole's cluster design of the Connell Residence. Reproduction of the floor plan by the author.

The distinguishing features in the design of Connell Residence in *form and space, construction and spatial arrangement* are as follows.

***In form and space:***

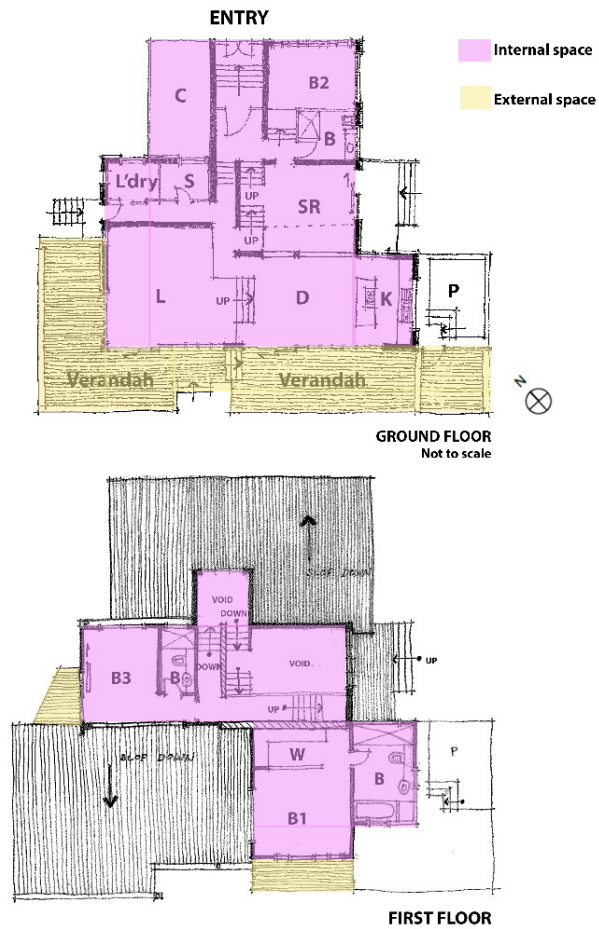
- The configuration of plan is no longer a linear but clustered form;
- There are three stepped levels of interior space on the ground floor plan;
- There is high visual asymmetry in form and space;
- a sense of secured enclosed space for privacy and protection with minimal openings on façade of the house;
- discontinuous and separate openings (windows and doors) in the primary living spaces to the verandah;
- There are three en-suite bedrooms (Figure 5.4.1c);
- The construction framework is mainly concrete (slabs and brick walls) to sit firmly onto the rocky steep cliff;
- There are no banks of windows looking out to the sky;
- separate and covered roofs with soffit and fascia to highlight the cascading level of this house in complimentary of the surrounding landscapes;

***In construction:***

- Two bedrooms have exclusive balconies for privacy;
- The structure of the house descends along the steep cliff of the site on ground;
- fixed-glass windows for the bedrooms, dining room, kitchen and living room with one movable aluminium glass sliding door to the verandah;
- the use of aluminium fixed-window and door frames throughout the house;
- various sizes, lengths, shapes and positions of separate windows;
- covered overhangs and verandahs without the exposed structural elements;

***In spatial arrangement:***

- The absence of the distinct dry and wet zones is clear in spatial planning;
- Four exits to the outdoors (Figure 5.4.1c) ;
- The distinctively separate interior and exterior spaces (the verandah space has been exclusively arranged to be the outdoor space with a central axis for the circulation of the internal spaces) (Figure 5.4.1d);



**Figure 5.4.1d** Distinctive zoning between internal (in pink) and external (in yellow) spaces is explicit in spatial arrangement.

- the arrangement of bedrooms to disperse to three zones for privacy (Figure 5.4.1e);

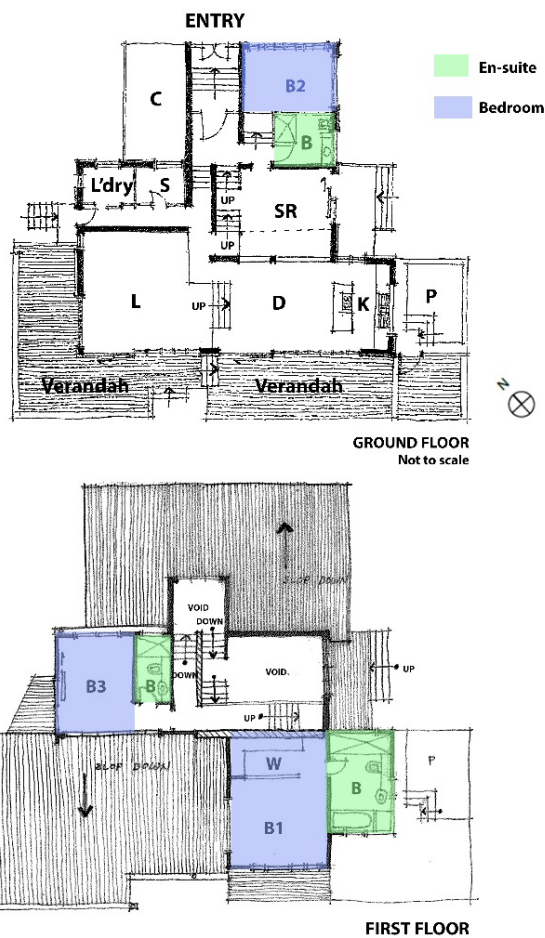


Figure 5.4.1e Privacy for individual living space is overtly important for the residents.

### Inside-outside spatial experiences

Inside-outside experiences were not directly mentioned in the interview with the Connell residents. However, an explicit outside experience was expressed in the activities of sitting, reading and dining on the large verandahs. The female resident's passion for cooking suggested that much of her time was spent inside the house, while spending their holidays in the house. The residents would go for a walk on the beach or a swim in the early morning and then retreat indoors while opening the front and back windows and doors for natural sea breezes in both winter and summer (Figure 5.4.1f). The experiences of the residents are as follows:

- There is the feel of 'being on holidays' in spending a lot of time doing indoor activities with personal pleasure and enjoyment;

- The house offers the residents the feel of being in their 'sanctuary' for peace of mind where they can escape from their hectic urban city life in Melbourne;
- The house also offers the residents choices of being in the indoor for relaxation or in the outdoors for health benefits;



**Figure 5.4.1f** The large verandah space offers the residents' different inside-outside experiences during the day or at night.



*'We use verandahs the whole time. We read books and have doors open all the time. We eat outside when it is not too hot.... In winter, I walk for two hours a day. I go to the sea and swim in winter and I swim everyday. I love cooking and you have to be very smart spending lots of time doing that and don't get bored in the house. Summer time, we slow down and we do more reading and get a bit of a walk.'* (Interview with the Connells in 2013)

### Hedonist/larrikin experience

Residents' daily experiences, behaviours and movements in the contained space defined the desirable lifestyle they sought in the soft space of the house. Its compact living-space layout was specifically designed to suit a private, secure, and undisturbed holiday-like living by the residents (Figure 5.4.1g). 'The fear for the damage to the house by cyclone' (Interview with the Connells in 2013) overrides the potential enjoyment of a more open house.



**Figure 5.4.1g** Small and narrow aluminium fixed-frame windows to the bedrooms implicitly indicate a sense of fear of cyclones and the need for security and privacy.



### A dynamic dialogue with nature and other living things

There is a hidden trail to the site of the house. This indicates the residents' preference for privacy and a sense of exclusion from the world. Their purpose is clear by having built their getaway holiday house among thick vegetation and large boulders. There is an intimate and peaceful dialogue between the house, nature and wildlife (Figure 5.4.1h).



**Figure 5.4.1h** The hidden trail, tall trees and boulders offer a sense of privacy within nature.

*'We've spent six months to look for a block of land for building this holiday home... the location of this land is perfect for what we have always wanted... quiet, private and peaceful that is different from the lifestyle we have in Melbourne. We feel connected to nature and wildlife. We enjoy the view of looking out to the sea right in front of our house. We like to spend time here as much as we possibly can.'* (Interview with the Connells in 2013)

### Gradually changing life patterns

A switch of mentality between exuberant activity and quiet contentment is deliberately constructed by the landscape of the house. Its self-contained envelope subtly indicates a neat, simple and elegant lifestyle that reflects the residents' attitudes and values for keeping a good quality of living in the

presence of material culture (the fine building materials and air-conditioning). Environmental concerns are expressed through their ecological awareness of greenhouse effects by operating fans and only moderately using air-conditioning for 15 minutes in harsh weather. They recognized their gradually changing everyday actions and behaviour towards an energy-efficient way of life when the pace of their daily routines slowed down in the context of this coastal landscape.

*'We have fans and air-conditioning in all rooms... but we hardly use it [air-conditioning]... The cross-ventilation fans work... oh yes! We put AC on for 15 minutes before we go to bed when the weather is really hot! It's different from the way we live in Melbourne. We need to turn it on for a long period of time when we are home.'* (Interview with the Connells in 2013)

### **Ethical values versus material culture**

Three bedrooms with an exclusive en-suite, a large footprint of indoor living space, and the installation of air-conditioning in every room indicate the residents' desire for the living comfort and convenience that modern technology can offer. Initially, the house was designed for a holiday home for tourists as an investment after their retirement. They changed their mind after the completion of the house and decided to use the house as their personal retreat and holiday home (interview with the Connells in 2013). They offer hospitality to family and friends around the world with the delights of holiday-inn type accommodation. Durable building materials (aluminium, steel, marble floor, Red Ironbark polished hard wood) are used to avoid weathering issues and maintain the desired quality of modern living (Figure 5.4.1i). Most importantly, they express their belief in 'recycling materials in the house as much as we possibly can' to bring a small but important reduction of impact on the environment (interview with the Connells in 2013). Recycling materials and saving energy are their way of demonstrating their ethical values for sustainable living.



Figure 5.4.1i Covered timber ceiling with soffit and fascia (Top), polished concrete floor and aluminium fixed-framed windows (Bottom).

*'I care about the building that it won't deteriorate and make carbon emissions. I switch off the lights... and recycle all the materials to the best of my ability.'* (Interview with the Connells in 2013)

### Feelings versus desire and power

The residents wanted to feel control in their living spaces and secure in the house. With minimal operable windows and shutters, the Connells do not mention in the interview the visual connections and spatial engagements between indoor experiences and outlooks to the surroundings (Figure 5.4.1j). They feel happier in concealed indoor spaces in which they can still experience some sensory experiences, such as the smell of the sea, the sounds of waves, drizzling or heavy rains, and the viewing of endless ocean and landscape. There is an impression of human-controlled everyday living spaces with defined functionality in every room of this house regardless of the low frequency in usage of the bedrooms and bathrooms. There is no sign of flexibility in better utilizing spaces, such as transforming the study room to a guest room. Every room has a fixed purpose and remains unused for much of the year, except when family and friends visit.







**Figure 5.4.1j** An en-suite bathroom on the first floor has a view to the Coral Sea through a large fixed-frame window (Top). The same window design is used for the bedroom on the ground floor where an outlook is to boulders and thick trees (Bottom).

### Simple gestures versus advanced technology

A sophisticated modern lifestyle is demonstrated through a feeling of 'bunker' with the plasterboard smooth-finish interior, marble and bamboo polished floor, concealed overhangs and roof structure, and reversible air-conditioning in all rooms installed, by O'Toole's recommendation (Figure 5.4.1k). Simple gestures similar to those in the 1980s Troppo houses are also seen in this house, such as ceiling fans, sliding doors to a large verandah space connecting to the outdoors, to offer the residents the opportunity of living naturally. An air-conditioning unit installed in every space indicates the architect's preference for using technology to create a modern and convenient lifestyle in line with the clients' Melbourne city life. The consciousness of energy-efficient living is not prioritised, with a focus more on human comfort.

*'We didn't want to install AC in all rooms but Terry recommended us to do so.'* (Interview with the Connells in 2013)



**Figure 5.4.1k** The Connell Residence has the static effect of looking at framed views of the world from the confined spaces of the house instead of having a visually more open outlook interacting with the surroundings. The absence of banks of high windows differentiates the design of Connell Residence from the 1980s Troppo houses.



The relationship between the values of the architect and the Connell Residence is evident in its design of form and the architect's interpretation of a Troppo style in an isolated offshore island. Here a new language for daily living is created through an internal activity space wrapped around by a spacious outdoor verandah. An intimate and yet cautious space is in place for being connected with the outside world.

### 5.4.2 Conclusion

Differences that the Connell Residence exhibits in comparison to the early Troppo houses were identified as resulting from O'Toole's long years of professional commercial experience and the two design practice genres with the Troppo ethos. A new kind of Troppo practice integrating commercial and residential practices was created. In this context, the ways in which locals and visitors perceive their ideal way of life and their understanding of sustainable house design are very different from the Top End tropical region.

'Go with the flow' was the everyday life attitude of the occupants of the 1980s Troppo Houses, and this clearly differs from the Connell residents' preference for building a 'safe' house in relation to the fear of cyclones, their secure urban lifestyle in Melbourne and the nature of this holiday resort home. The Connells were aligned with O'Toole's design ideology and concepts in favour of minimizing the risks and damage of natural disasters. They were more concerned about possible discomfort and inconvenience in the aftermath of cyclones and less interested in exploring the full potential of Troppo's hedonist lifestyle.

Business viability and the demands of clients are two factors that dominate the design of houses. The ways architects respond to these factors can be seen in the final product of the house. The differences in design elements clearly display O'Toole's divergent practice in Townsville in comparison to Troppo's early Darwin practice (Table 5.4.2).

		Typical 1980s Troppo Houses Suburbs of Darwin	Connell Residence, 2011 Townsville
Hard space	Similarities	<ul style="list-style-type: none"> <li>• The use of large glass sliding doors, shutters and louvers;</li> <li>• The use of fans;</li> <li>• Spacious verandah spaces.</li> </ul>	
	Differences	<ul style="list-style-type: none"> <li>• Timber and steel lightweight materials;</li> <li>• Banks of windows;</li> <li>• Elevated structure and timber suspended floor system;</li> <li>• Lightweight timber or steel cladding;</li> <li>• No air-conditioning in main living space but in bedrooms for some houses as required for the elderly, sick family members and infants on extremely hot days;</li> <li>• On-level living spaces ie under-house or in-house;</li> <li>• Steel post-and-beam and lightweight suspended floor construction;</li> <li>• No AC.</li> </ul>	<ul style="list-style-type: none"> <li>• Concrete and thermal-mass materials;</li> <li>• One skylight;</li> <li>• A mix of heavy and lightweight cladding;</li> <li>• Infill foundation to the natural ground with partial deck off the ground;</li> <li>• Aluminium fixed-framed windows for minimal opening and sunlight;</li> <li>• Separate small balconies for bedrooms;</li> <li>• A series of split levels and circular movements;</li> <li>• Semi-enclosed kitchen for dining space and living space;</li> <li>• 3 en-suite bedrooms;</li> <li>• Concrete construction and concrete slabs.</li> <li>• AC for better indoor comfort;</li> <li>• Mono-pitched roofs with corrugated iron.</li> </ul>
Soft space	Similarities	<ul style="list-style-type: none"> <li>• Consciousness about energy saving.</li> </ul>	
	Differences	<ul style="list-style-type: none"> <li>• Regular use of verandah spaces for daily activities;</li> <li>• Little concern about the accumulation of dust, and cobwebs;</li> <li>• Very little anxiety about damage to the house by cyclones;</li> <li>• Enjoying spending time in the outdoor spaces;</li> <li>• A higher level of tolerance to rain, heat and company of wildlife animals in the house.</li> </ul>	<ul style="list-style-type: none"> <li>• Occasional use of verandah spaces for reading and breakfast but not dinner (mosquitos);</li> <li>• More privacy needed in having an en-suite to each bedroom;</li> <li>• Concern about the accumulation of dust, and cobwebs;</li> <li>• Anxiety about damage to the house by cyclones;</li> <li>• Less tolerance to rain, heat and company of wildlife animals in the house.</li> <li>• Prefer conducting daily activities such as cooking and laundry indoors with more comfort.</li> </ul>

**Table 5.4.2** This table shows differences and similarities of hard and soft spaces between the design of the Connell Residence and the 1980s Darwin houses.

### 5.5 Adelaide: Russell Residence, Torrens Park, South Australia

Contingency intervened when Harris felt the need in the late 1990s to prioritize the education of his growing children and reunite with family in South Australia. But this didn't just happen overnight. Prior to the official establishment of the fourth regional branch of the Troppo practice in Adelaide in late 1999, Harris had prepared for his return by setting up a studio-based practice. Harris kept this Rundle Street atelier low key throughout the three-year transition process. Through family and friends, Harris had also been renewing his local social network and developing new connections by word of mouth locally and through a window display advertisement above a retail shop.

Despite these careful preparations, new challenges awaited Harris as he now needed to re-examine and apply the distinctive Troppo principles to the moderate climate of the southern regions. A major adaptation of the tropical features of Troppo houses was needed for the colder (in winter), drier and hotter (in summer) climate of South Australia. Changes to the distinctive Troppo elements were made by using thermal-mass materials, adopting local construction methods, creating new joint details, and accommodating the substantially different needs and life-styles of a new set of local clients. Another timely and significant change was methodological, as the new branch began to use CAD and other digital media (Auto-CAD for drafting, and Form-Z for 3D computer-modelling) to develop designs and produce contract documentation. These new tools and methods, which were to revolutionize the dynamics of the Troppo practice across all of the growing network of offices, were first introduced into the new Adelaide practice by a younger generation of graduate architects that Harris employed, primarily from his former alma-mater, The University of Adelaide, where he had also begun to teach by this time. These computational techniques facilitated a different operation in the interactions between Harris and in-house architects in relation to the design processes, the production and the time management of a project.

The year 1999 was a significant year for the productive operation of design collaboration across four Troppo offices as a whole. As noted by a senior in-house and independent-practice architect, Andrew O'Loughlin (Interview with O'Loughlin in 2010), the introduction of 3D computer-modelling for communicating concepts to clients and between staff changed the way that the four Troppo offices

(except Townsville office) could collaborate with time efficiency in the design processes. The use of computing software transformed the senior staff's traditional way of producing drawings and documentation by hand to a systematically data-based and computational production. There were new flows of effective communication and exchanges of ideas, which these new tools enabled between the senior architects' preliminary sketches of design concepts and the junior architects' 3D computer models and the final working drawing sets, as a joint effort.<sup>270</sup> These computer-enabled efficiencies and enhancements of the collaborative design process offered Troppo an opportunity to expand their practice from its initial focus on small residential projects to a much more diverse and versatile scope of work (encompassing residential, educational, recreational, community-based, and government-commissioned, as well as retail buildings).

At the time of writing in 2016, Phil Harris and Cary Duffield are the Directors of the Adelaide Troppo office. Duffield graduated from the School of Architecture at The University of Adelaide, in 1997.<sup>271</sup> After a decade of working with Harris as an in-house architect, Duffield was invited to join the partnership of the practice becoming the Co-Director of the Adelaide office in 2007. Harris accorded trust, freedom and respect to Duffield in that all design work was evenly distributed between them with full design responsibility and independence. In this way, he maintained and passed on the Troppo ethos for sustainable design. Duffield played his part in revitalising the Troppo language by creating articulated forms and volumes, imparting new ideas, and shaping the new characteristics of Troppo houses with Harris and in-house architects to reflect 'the climate' and 'the environment' of the southern regions of Australia (Interview with Duffield in 2012).

The Russell Residence was one of many significant residential projects in which Duffield has taken the lead. The design of the house was the reflection of his personalized design style for architectural

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<sup>270</sup> Interestingly, Harris has continued to show strong resistance to use a computer himself for the production of working drawings until the present day.

<sup>271</sup> In the 1990s, two architecture programs, Bachelor of Architectural Studies and Bachelor of Architecture, were offered by the Department of Architecture at The University of Adelaide. It did not become a 'School' until late 1998, the Department of Architecture became the School of Architecture, Landscape Architecture and Urban Design. In 2013, the School of Architecture, Landscape Architecture and Urban Design was renamed the School of Architecture and Built Environment.

elements and forms, and his interpretation of the Troppo language. This residence was recommended by him at the time of the second interview in 2011 and it subsequently won the South Australia AIA Residential Architecture Award in 2012. The house is situated in the garden-suburb of Torrens Park and it visually complements its moderate climate through the interplay between Troppo's tropical housing features and thermal-mass materials, coupled with articulated elevations.

*'One part of the success of Troppo Architects is to bring someone along to the projects and let them impart their design and [express] what Troppo [ethos] is and how each project evolves.'* (Interview with Duffield in 2012)

*'We are looking at where the site is, where the location is, and how to best design in the environment..... We like to design an evocative form that responds to the climate.'* (Interview with Duffield in 2012)

Duffield's aspiration to interpret Troppo language with a hint of Southern style is clear in the design of the house through textures, juxtapositions, colours, patterns and the visual sensations of building materials. In this house, there is visual interplay between smoothness and roughness, horizontality and verticality, grid and stripes, and heaviness and lightness from the composition of sandstone, concrete panels and timber cladding, large glass and steel framed windows and sliding doors.

The Russell Residence is located on a corner site, bounded by a national conservation park and no-through roads in the South-Eastern suburbs of Adelaide where Adelaide climate varies from hot and dry in the inland, to mild and wet in the south and coastal regions<sup>272</sup>. Adelaide has a Mediterranean climate, with mild winters with moderate rainfall, and warm to hot and dry summers with very little rainfall. It is regarded as the driest of all the Australian capital cities and its average temperatures range between 36.9 degrees in summers to 13.3 degrees in winters (Figure 5.5a).

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<sup>272</sup> The information of Adelaide climate was taken from official Australian tourism website online link <http://www.australia.com/en/facts/weather/adelaide-weather.html>, viewed on April 14, 2016. The diagram was taken from the Weatherzone.com website online link <http://www.weatherzone.com.au/climate/station.jsp>, viewed on April 14, 2016.

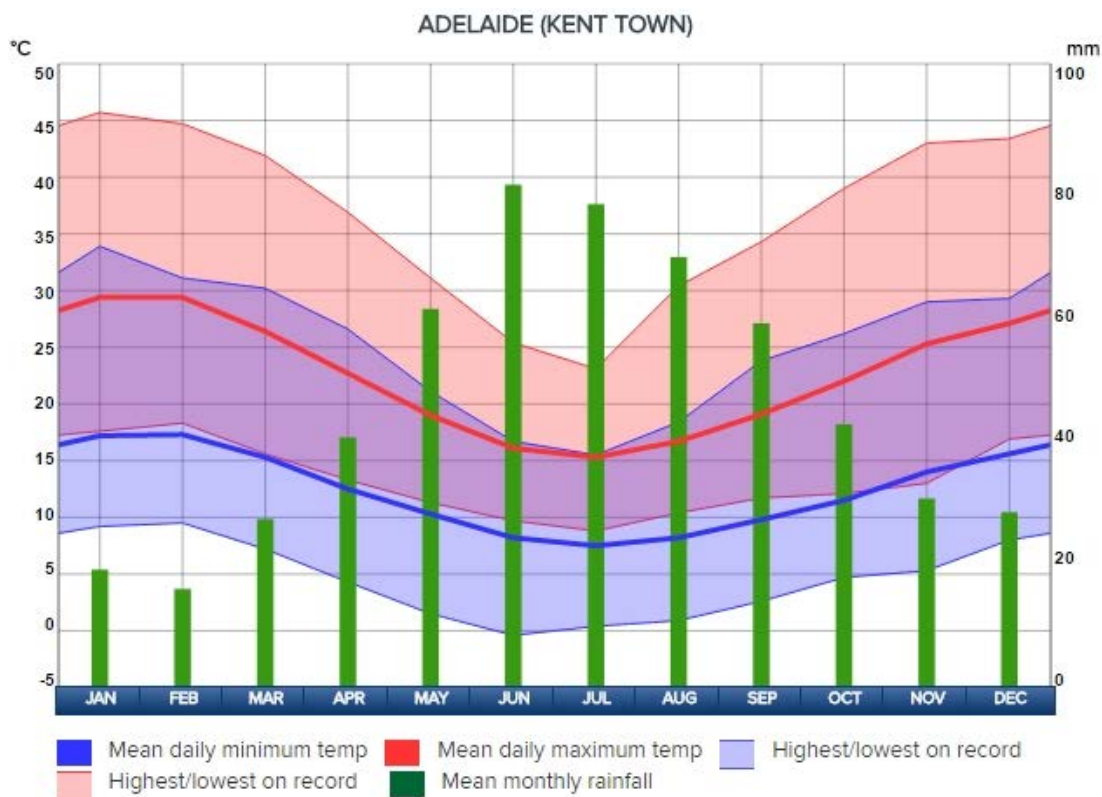


Figure 5.5a The diagram shows the Adelaide annual temperatures and rainfall.

The house is a make-over of a pre-existing brick house built on the existing concrete slab, and although this was specifically in fulfilment of local council requirements, it offered Duffield the opportunity to explore an interesting spatial arrangement and express a sense of lightweight construction by elevating the house<sup>273</sup> (Figure 5.5b). The foundation of the demolished old house has left a permanent mark of its historical existence. Its L-shaped concrete slab remained as the basic form for the floor planning of the new house which sits quietly on this landscape of the sloping site. The site partially connects with a wildlife conservation park next door. This house is surrounded by big trees, native low-maintenance bushes and plants, wild animals and insects as well as a quiet pedestrian walkway to the park. Discrete

<sup>273</sup> In the interview with Duffield, he mentioned that concrete slab and brick veneer construction with the mindset of passive design principles are two major concepts for suburban residential projects in the Southern regions of Australia. Pitched roofs that rise to the north to have sunlight in and full views to the sky are also a feature in the design of Troppo Houses in Southern regions. Elevated houses are not commonly seen or considered, as a concrete slab works better for storing heat in a cold winter climate such as that in Adelaide metropolitan city.



and levelled pitched rooflines suggest a sequence of connected spaces that explicitly denote the functionality of each space.



**Figure 5.5b** The existing concrete slabs (Left) defined the configuration of the floor plan of Russell Residence. The house is surrounded by bushes and trees of the adjoining national parklands. (Right)

Each roof is designed as a complementary skyline with an articulated form and the specific functionality of space beneath the roof. The gradually increasing height of the roofs displays a sense of ease and the appreciation of the open landscape. Straightforward planning is arranged by cross-axes as the primary circulation scheme. An L-shaped form gives the notion of easy daily movements and creates the experience of 'the circulation spaces being part of the living spaces' (Interview with Duffield in 2012). A private outdoor-living space is naturally formed and defined by four distinctive volumes highlighted by four roof forms (Figure 5.5c).



Within the conservation park



Four distinctive roofs and volumes



A corner view to the front entry deck



An enclosure of outdoor living spaces

**Figure 5.5c** The configuration of the Russell Residence shows the L-shaped floor plan that offered Duffield an opportunity to explore roofs, volumes, materiality, and heights.

### 5.5.1 Troppo language in the Russell Residence

Some distinctive characteristics of the Troppo language are displayed in the design of the Russell Residence by variations of architectural elements, open accessibility, singular forms and elevations. These are the exposed roof structures, the large proportions of windows, the use of sliding doors and decks, and the use of post-and-beam steel structural framework and corrugated roofs. What are not seen in this design are spacious verandahs, extended overhangs, the use of a large quantity of louvers and shutters, external corrugated claddings, and articulated details. New features incorporated in the

Russell Residence are articulated elevations with an extruding box volume, a composition of materials in different textures, open view to a private courtyard, and multiple-access to the outdoor areas. The simplicity of a humble gesture for an entry is created by the extension of an elevated timber deck from the pedestrian path. The sense of lightness of this house is depicted by the large glass high level windows between the top of the external walls and the pitched roofs. Framed views between inside living and the outside world are enhanced by lifting four roofs to lightly rest on large glass windows. A full view to the sky and nature creates intimate experiences among the residents, the house, wildlife and the landscape for fostering transparent everyday living.

*'What is on the outside is restricted by conventional flat roof form by its height. You know, the maximum of a 2.4 metres high ceiling and 2.7 if you are lucky, and the better production of the space in 3 [metres].'* (Interview with Duffield in 2012)

A metaphoric expression for the key design concept of the Russell Residence is 'Moonlight' with a modern nickname, 'Creek Chic' (Interview with Duffield in 2012). Duffield creates an open illusion by lifting the skillion roofs off the walls. Large and minimal-framed glass windows are best, according to him, for creating the 'romantic feelings of the landscape on the darkest nights' (Interview with Duffield in 2012). Duffield uses those glass windows as the means to achieve his interpretation of Australian culture by capturing the unique experience of camping under a million stars in the backyard of the Russell Residence. The residents 'spiritual feelings' (Interview with Russells in 2012) grew over time while being inside the house, through an easy glance connecting with the outside world. His intent is clear, to express the secondary meaning of the Troppo language – the continuity of care-free everyday living experienced as outside in (Figure 5.5.1a).

*'It is the creation of spaces that take the outside in. There are lots of skillion roofs. They tend to open up the form to the North and let the sun in and also offer the person inside have the full view of the sky.'* (Interview with Duffield in 2012)





Figure 5.5.1a Bringing outside in as an everyday living experience is felt in the living spaces.

### Patterns

As in Darwin, responding to 'the climate' and 'the site' (Interview with Duffield in 2012) are starting points for the contemporary Troppo houses 'down south'. Open-plan spaces, living on the verandahs, and natural breezes are controversial for a traditional building envelope in the moderate climate of the Southern regions. Thermal mass is the key to achieving a passive design for houses: it acts to store heat in winter, and compensate overheating in conjunction with shading devices and the use of air-conditioning in summer. Duffield's approach is manifested in his changes to this conventional view and his creation of a hybrid Troppo design by integrating passive design principles and a hint of the Troppo distinctive features. The hedonist spirit that results is embraced fully by the Russell residents who enjoy the heat on summer days with minimal air-conditioning, and the coolness of winter nights with full view of the moonlight and the stars. It is their way of celebrating their desires and dreams of living differently with conscious action towards residing in a suburb in an open and environmental-friendly way.

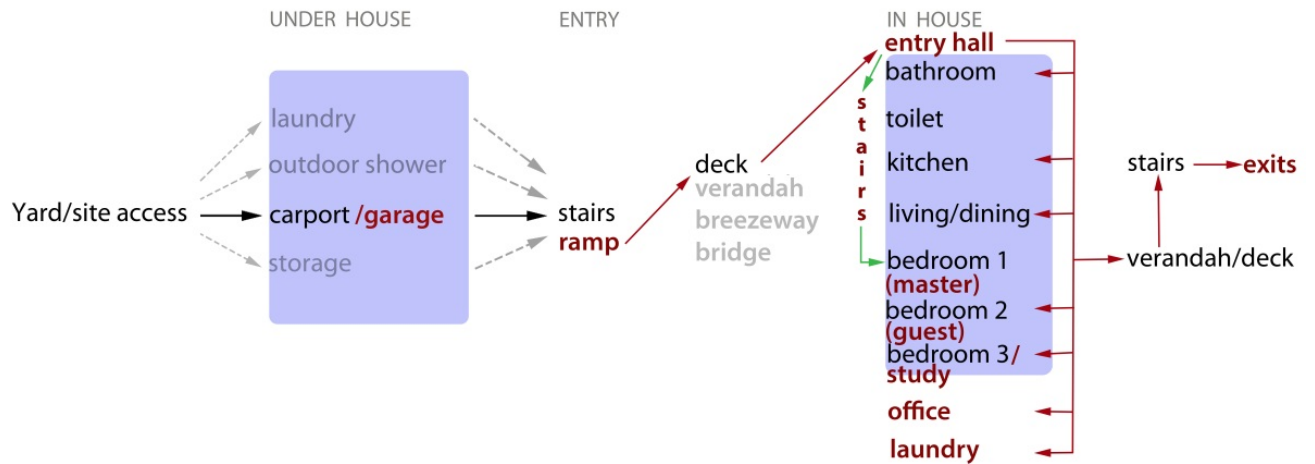
*'Passive design principles are basic... everything we do here.'* (Interview with Duffield in 2012)

*'Some years before, we'd stayed with some friends in Broome and I visited a house up there that was open and had a wonderful feel to it. And ever since then, I always wanted to experience living like that. Troppo architecture was very much in sympathy with that. For me, it's just another reason to go with someone such as them.'* (Interview with the Russells in 2011)

Contemporary southern houses, particularly those designed by developers and building companies, are often the results of mass productions of a two-storey monolithic box building with minimal windows and painted fibre-cement external walls. Their popularity is driven by affordable and cheap construction costs and design fees, and short completion time. Thermal mass materials and double-brick constructions are not often seen in contemporary buildings due to the general prioritising of construction time efficiency and cost effectiveness. Minimizing openings coupled with thermal mass materials on the west facades is the strategy for reducing overheating in summer and preventing heat loss in winter. Facing north and getting the sun determines the design pattern of the hard space of Troppo houses. It defies the popularity of monolithic boxed houses, and allows breezes, light, and views all year round.

*'The sun is what everyone looks for, where is north and how you get the sun in when you want it and how you keep it out when you don't want it. How you get the breeze through, how you get shelter, and how you orientate the house make the most of it.'* (Interview with Duffield in 2012)

New patterns in form and space, construction and spatial arrangement in Troppo Adelaide practice are sought in order to accommodate the 'best design in the environment' down south (Interview with Duffield in 2012). New features (architectural elements and building materials) indicate the realization of differences in the 'conditions' of each site and 'they are the changes that change the design philosophy' of Troppo houses (Interview with Duffield in 2012) in the colder climate. These changes result in a different connectivity graph (Figure 5.5.1b) but abide the Troppo's design principles and philosophy for a simple and sustainable everyday living. The straightforward and linear circulation demonstrates Duffield's understandings of the Troppo ethos in the following connectivity graph for the design of the Russell Residence (Figure 5.5.1b).



**Figure 5.5.1b** This connectivity graph shows the breezeway of the Russell Residence as a transitional area between private and communal living zones in the indoor spaces.

### Episodic space

The design of the Russell Residence is aligned with the residents' wishes for their love of, and sympathy and connection with natural environment (Interview with the Russells in 2011). Being encouraged by their son's work experience with Troppo<sup>274</sup> and their long research span into built work, the Russells sought a design for their residence that was a combination of Duffield's interpretations of their planning for desired hard space and their interest in sustainability and connection with the conditions of the site and its environment.

<sup>274</sup> After the Russells' son graduated from his Masters degrees in Architecture, he did some work experience with Troppo and strongly recommended his parents to look at the early work of Troppo in Darwin. They bought Goad's book (1999/2005) to study and fell in love with Troppo's work (Interview with the Russells in 2011).



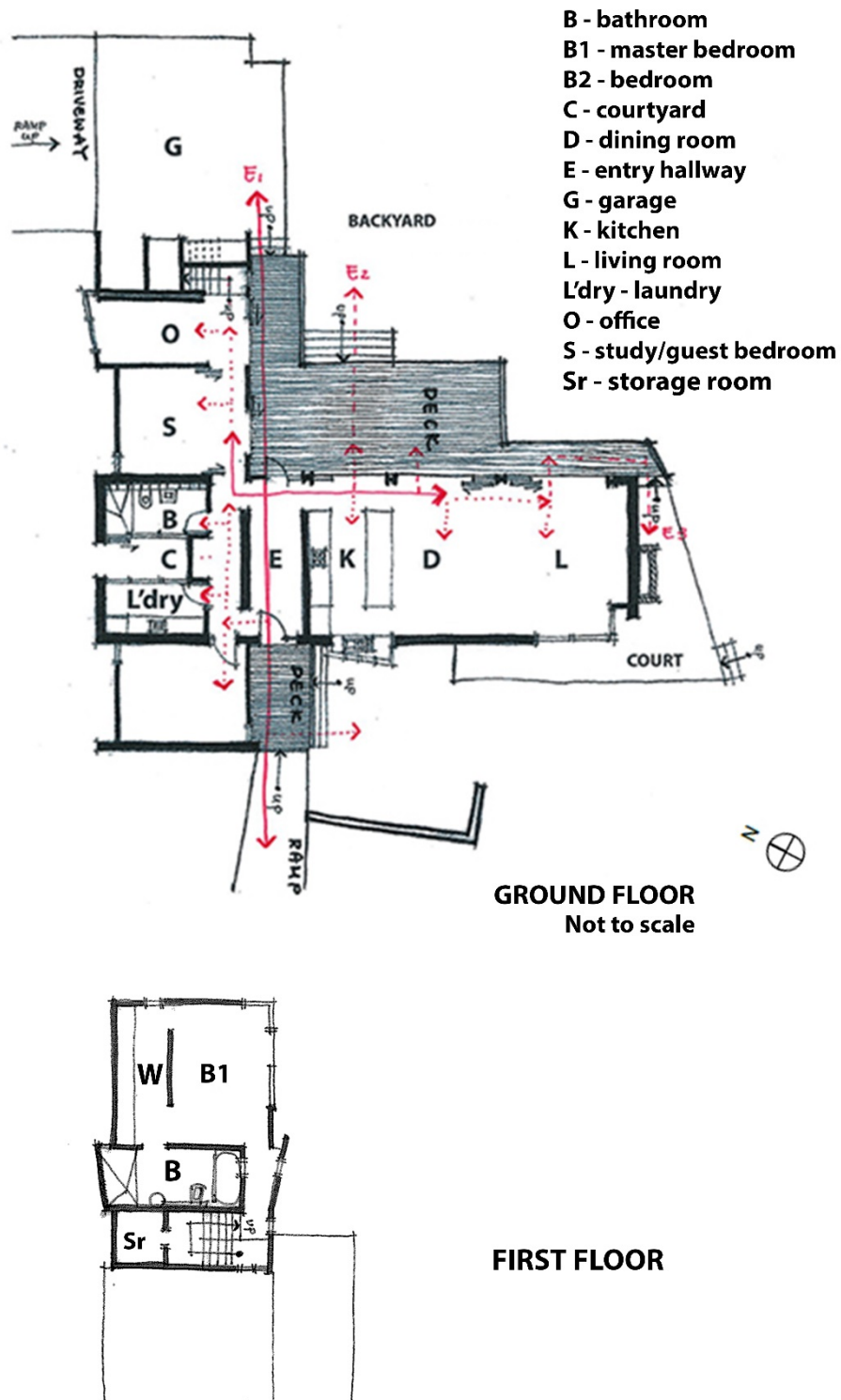
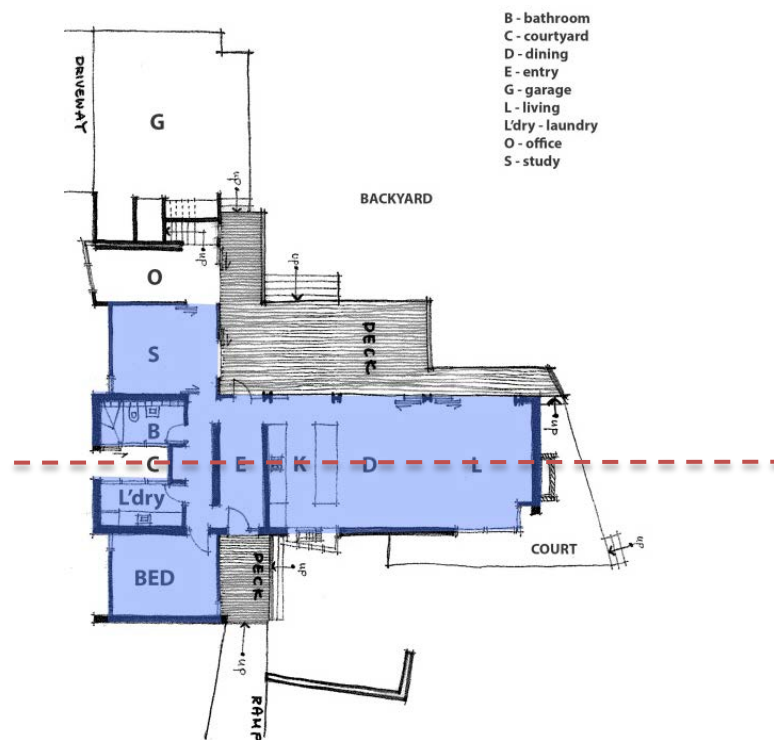


Figure 5.5.1c Multiple exits and secondary access are part of the indoor living spaces. Cross-axes do not only indicate primary circulation paths but also offer transitional spaces between indoor and outdoor spaces. Reproduction of the floor plan by the author.

The distinguishing features in the design of Russell Residence in *form and space*, *construction* and *spatial arrangement* are as follows.

**In form and space:**

- The qualities of openness are achieved through its composition of two major single-width wings: the symmetrical-form wing indicates communal spaces with north-south aspects and the irregular-form wing indicates private living spaces with east-west aspects;
- The irregular-form wing for private living spaces consists of four distinctive space modules on two levels;
- There is implicit symmetrical form in blue embedded in the two wings (Figure 5.5.1d);



**Figure 5.5.1d** The design of form exhibited a combined geometry of symmetrical and asymmetrical shapes for the spatial planning of the house.

- The study can be transformed into a private guest room where the corridor can be closed off and open to the outdoor decking area (Figure 5.5.1e);

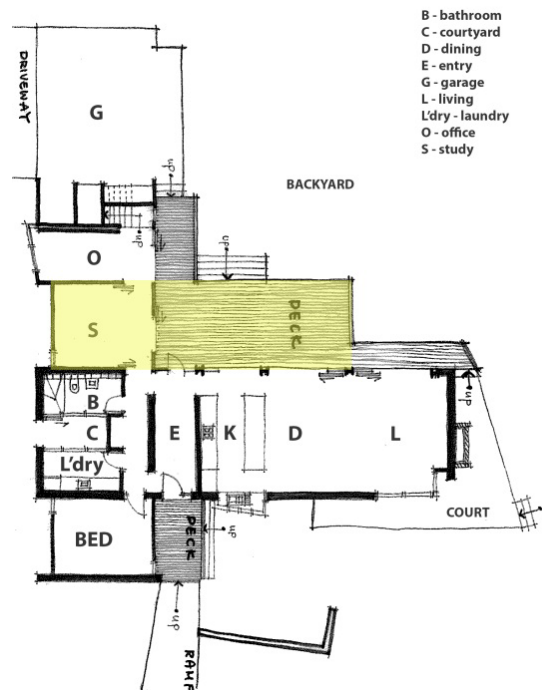


Figure 5.5.1e The concept of private and shared space is introduced with the elements of double sliding doors to create the choice of freedom for the usage of the room (study or guest room with a private deck for a guest family) in accordance with the needs of activities and the family size of guests throughout the year.

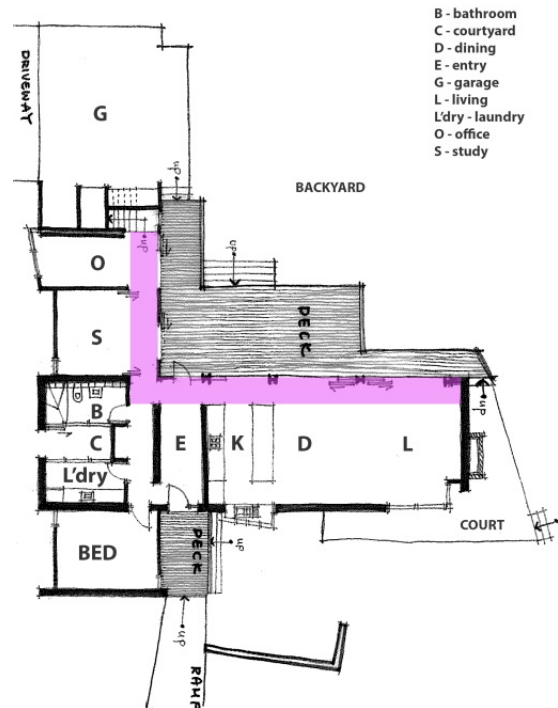
#### *In construction:*

- The ramp and the long entry decking offer the residents visual security and create a welcome feel to visitors;
- There are narrow wall-high windows for framed views and sufficient sunlight for the bedrooms, with completely open and high windows in the living areas shaded by the long overhangs of the skillion roofs;
- A mix of lightweight (steel and timber) and thermal-mass materials (sandstone) and construction methods (post-and-beam structure) are used;

#### *In spatial arrangement:*

- There are three exits (Figure 5.5.1c);
- The L-circulation path indicates transitional spaces between indoor living spaces and outdoor decking areas;

- The L-circulation path in pink in Figure 5.5.1f is integrated as the part of the open private and communal living spaces which are different from a conventionally enclosed passage way or a corridor;



**Figure 5.5.1f** The L-circulation path is designed in a way that the path is inclusive in every zone of the house and there is no waste of space in spatial planning.

- There is the semi-enclosure of a courtyard between the bathroom and the laundry; the courtyard not only connects both spaces with the designed landscape but also provides sufficient daylight yet privacy with a timber screen;
- The multi-functional outdoor decking area is a dining, reading and entertaining space;
- The entry hall performs as a transitional space between indoor and outdoor, and a connection space between private living areas, a semi-outside-in decking area and communal living areas (Figure 5.5.1g).



**Figure 5.5.1g** A view from the kitchen space to the entry deck is a way to connect with people and daily street activities. A confined entry hall is defined by a door-high rammed earth wall and a ceiling-high wall.

### Inside-outside spatial experiences

Duffield endeavoured to integrate tangible and non-tangible elements to create everyday living experiences for the Russell residents. Moon, stars, sky, trees, frogs, birds, insects, and creek are tangible elements which provide visual enlightenment to invigorate the residents' sensual experiences – viewing, smelling, touching and hearing. Non-tangible elements are shade and light, the temperatures and changing views all year round, and the sounds of wildlife and running creek in winter. The residents experience the 'expanding' space<sup>275</sup> by enjoying the delightful feel that both elements have to offer them. These experiences are as follows:

- There is the feel of 'camping in an indoor tent'<sup>276</sup> in the house;

<sup>275</sup> The female resident loves the idea of being able to be constantly exposed to nature and engage her spirit with the landscape and wildlife outdoors. In the interview she constantly mentioned the words 'beautiful', 'joy' and 'calm' that described her feelings in every room of the house. She was drawn to the changing colours and phenomena of the outside world while moving through her home.

<sup>276</sup> She used this phrase to describe her personal feel for living in this house.

- The house offers the residents ‘the sense of a whole world in the palm of a hand’<sup>277</sup>;
- All indoor spaces create a strong visual link to the outdoor decking areas through the large glass windows and sliding doors facing to the backyard, especially the entry hallway which offers the residents a direct path and view to the outdoor areas.

*‘One word that comes into mind, it is expand... When you sit in it [the house], all your views are expanded... when you sit there, there is no ceiling above you... there is a fantastic feeling that you are drawn by the beauty of the world that is on the outside... normally you couldn’t have that feeling when you are in the shelter of the house.’ (First interview with the Russells in 2011)*

*‘When we sleep up-stairs, we open the front door listening to the frogs and creek running... up to the roof, there was a full moon. That night [first night] was so exciting and we looked at the moon... it was the experience of the whole environment from the inside instead of the outside. I enjoy every minute in and I don’t have to turn the light on when the sun goes down... you feel like camping at home.’ (First interview with the Russells in 2011)*

The quality of the soft space in the Russell Residence has promoted a change in the Russells’ attitude in terms of their perspective on using spaces. A space is no longer an enclosure for serving a function or an activity. Each space is ‘interacting and communicating’ with them ‘spiritually’. (Interview with the Russells in 2012) Each space has no specific ‘name’<sup>278</sup> but also gives out feelings, sentiment, and a positive mindset for their desired everyday experiences.

### Hedonist experience

- The residents displayed their strong feelings about the positive energy from the living environment and the outside world that contributes to the aliveness of each interior space, and energizing indoor activities on the outdoor decking (Figure 5.5.1h);
- The placement of furniture, the setting of artefacts, the light, and air movement, even the warmth or coolness of each space draw out the inner peace of the residents so that their feeling of delight is ‘raw in a way that cannot be elaborated’ (Interview with the Russells in 2012);

<sup>277</sup> This is the emotion she feels the house communicates with her since they moved in 2011.

<sup>278</sup> Duffield points out that initially, the Russell Residence was to be a 3-bedroom house as requested. However, along with some negotiations and explanations, the concept of multi-purpose space was well accepted by the Russells. The reading room can be a family room or a guest room for their grown-up children visiting home. The guest bedroom can be used as the master bedroom when the Russells age and mobility seems to be an issue for them in the future. In other words, the master bedroom can also be used as the guest room for family and friends in the mode of a simple holiday retreat.



- enjoyment, satisfaction and healthy well-being are generated in their beliefs in living a Troppo like-minded hedonist lifestyle through an 'outside-in' everyday living experience;
- No regrets<sup>279</sup> for living a 'light, open and natural' retirement life with minimal use of the evaporated air-conditioning and heating duct system to achieve their indoor thermal comfort in cold and hot weather.

*'We went outside to listen to it and it's amazing in this urban environment to hear an owl and I think it is very special. Owls, frogs, birds you name it... and water... babbling water!'* (Interview with the Russells in 2012)



**Figure 5.5.1h** Two distinctively seasonal landscapes are formed with the dry and quiet creek in summer (Left), and the vibrant and lively creek in winter (Right).

<sup>279</sup> The Russells gave appraisals to many aspects of this house, Duffield and another in-house architect who oversaw the completion of the constructions. They pointed out the learning curves and their appreciations of the meaning of all the intricate details of the house. They noted that the final cost of the house was way over the initial budget they had in mind (it was 50% more than their budget). This was the only negative factor that they were concerned about during the process.

### A dynamic dialogue with nature and other living things

'It (The house) was a dream come true' (Interview with the Russells in 2012) expressed the residents' wishes to live in nature after their children left home for studies and work. The residents indicated their desires to spend much time in the garden planting or sitting in a corner reading a book or just simply appreciating the nature symphony in the wild while enjoying cool breezes in the warm afternoon under shade. They intentionally selected plants that required minimal water to fulfil the water restrictions in summer of Adelaide or to survive with sufficient rainfalls during the time when they travel in winter. They were the residents who displayed the foremost enthusiasm in enunciated their constant engagement with nature and living creatures in the outdoors in dynamic dialogues. Every dialogue was in the making in every moment and in every glance to the sky, the trees, the rocks, the wild and the composition of natural and man-made landscape in their backyard.

### Gradually changing life patterns

The Russells confirmed their gradually changing patterns towards seeking more outdoor daily movements and activities due to the transparency of the external walls of their residence. This feature completely changes the way they live in comparison to their life patterns in their previous residence.<sup>280</sup> They were able to move on quickly with 'no sentimental value for the old house' as the space of that house was just more of 'a physical space'. (Interview with the Russells in 2012)

- An L-shaped open passage way gives free access for movement, and directly traveling between indoor and outdoor spaces offers visual and psychological impact on the residents' conventional perceptions about enclosed passage way/corridor spaces;
- The use of the passage way can be transferred from access to providing a living space by closing up two sliding doors to make a private enclosure;<sup>281</sup>
- The design is flexible in that the master bedroom on the first floor becomes an independent guestroom by closing the end passage way with a sliding door and the guestroom on the

<sup>280</sup> For twenty-eight years they used to reside in a house that was a mixture of Federation and villa style with a small window per room.

<sup>281</sup> There are sliding doors between the entry and the big open space of kitchen, dining and lounge, study, office and passage. The use of a space is controlled by the contingent need of the Russells in any desired circumstance.

ground floor becomes the master bedroom with its own bathroom when they are 80 years old as they've planned.

*'We've talked about it and we plan to stay here for twenty years and review it when we are eighty..... We planned the house so that the master bedroom can be downstairs. The second bedroom can become the master bedroom and the family bathroom will become our bathroom and then we will have the guest wing upstairs... When we are older, we will reverse it.'* (Interview with the Russells in 2012)

### Ethical values versus material culture

There are architectural elements in the Russell Residence giving the residents 'a sense of spiritual' and 'mystery' (Interview with the Russells in 2012). They are 'natural world' elements such as rammed earth, timber and logs for the fireplace (Figure 5.5.1i) which contribute to their feelings and their values that reflect their sympathy for a sustainable and living environment.

*'As we are sitting here, and I'm looking at the rammed earth walls, when we look at the texture like that, the wall of the house is made of the natural material that immediately invites the person inside the house to be relating with the living material. So in that way, the form of the house does provide a different experience than an artificial wall would. **So there is a living feeling inside the house** and that fireplace which we took a long time to find. It means that we can burn timber, a really long piece of timber, and create the most incredible feel sitting above the floor. The element of fire, which again, when people were coming in the evening and it's cold, that fire will evoke such strong emotions and that's mesmerizing and powerful. It's got a sense of [the] spiritual to it, you know the mystery. I think there are elements in the house which contribute to this feeling that is in the house of inside and outside that really put in a value into the living world.'* (Interview with the Russells in 2012)



**Figure 5.5.1i** Fireplace, rammed earth walls and timber floor play significant roles in stimulating the residents' sense of a 'beautiful warm feeling' through the house in winter.

### Feelings versus desire and power

The Russells articulately express the various feelings they have about the house. These are:

- a very peaceful feeling when they walk inside the house;
- a reflective feeling as they are able to be taken out of their own thoughts into the beauty of the natural landscape and the sky around the them;
- a feeling of the pleasure of achieving their vision, in that they are pleased with the outcomes of the quality of the design coming into fruition;
- a feeling of relaxation in the house with the freedom of being in various sizes of spaces in relation to their specific needs, activities and functions for individuals and groups of family and friends;

- a feeling of being very fortunate to be close to the natural world so that they have the opportunity to hear wild animals calling by day and night.

*'There are many feelings about the house. There is certainly a very peaceful feeling when you walk inside the house... you're actually surrounded by the sky and the trees and the amount of space gives you a peaceful feeling and it is a reflective feeling as well because you are taken out of your own thoughts into the beauty of the trees and the sky around you... There is a feeling of being very pleased with the vision that we had for have coming into fruition. And we are very pleased with the result... There is also a feeling of relaxation in the house because there are different spaces you can go in the house.... And being out in the garden down by the creek when the creek is running, the reeds we are growing and we can hear the frogs... That is a different feeling all together. That is the feeling of being very fortunate so close to the natural world.'* (Interview with the Russells in 2012).

### Simple gestures versus advanced technology

Creating physical comfort and views are simple gestures that the house offers to the residents. A specially designed hydraulic heating system, evaporative air conditioning and water tanks (Figure 5.5.1j) are installed and used accordingly<sup>282</sup>, with a mindset showing a combination of environmental concern and moderate self-indulgence. There is a sense of timing control in the easy accessibility of heating and cooling devices for creating 'a very beautiful warm feeling through the house' in winter and keeping 'the cool air on the warm nights' in summer. (Interview with the Russells in 2012)

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<sup>282</sup> The Russells spoke about their awareness of Greenhouse Gas Emissions and global warming issues in the interview. They emphasized the fact that they don't turn on AC or heating system unless the temperature reaches 40 degrees in hot summer days and below 10 degrees in cold winter days in Adelaide. They would only turn on air conditioning for 2 -3 hours in the afternoon of extreme hot summer days and central heating for the same length of time before sleeping at night in cold winter days.





**Figure 5.5.1j** The hydraulic heating is installed under the floor by heated water pipes coming under the slab (Left) and water tanks (Right) as design features of this contemporary Troppo housing for the moderate climate of Adelaide

'There was no sentimental value for the old house but we are in love with this house' (Interview with Russells in 2012). The residents express how 'quickly and surprisingly' they were able to move on when they moved out of the old house and yet have built strong bonds and connections with the Russell Residence in the short span of two years. They attributed little value to the old house in which they resided for over twenty-years as there were no special bonds or profound memories, except the beautiful ornaments and architectural features of the Federation style of the house. The female resident emphasized the darkness and small windows of each room that left them with no special feelings attached to the house. The house purely accommodated the residents by providing functional living space. By contrast, here they expressed much more emotional attachment to the corner of the open garage as a quiet reading space, the view to the sky from the living room, the nature and wildlife around them, and the sound of the natural symphony of the creek in winter or after a heavy rain. Through their tones of voice, they demonstrated the particularly intimate relationship they have with the house by



connecting themselves psychologically to the volumes of the spaces, the textures of materials, the special design of the stairs (a hidden cabinet on the wall), as well as to the fine detail of the simple joints of the house. They displayed high values and profound feelings from their short-term living in the Russell Residence in comparison to their long-term living in the old one. In this case study, the residents' value for the house is measured by their everyday living experience and the quality of space, rather than the length of time they were there.

### 5.5.2 Conclusion

The distinctive characteristics of the Troppo language were clearly displayed through the design of the Russell Residence with its linear form, elevated construction, the interplay of timber and corrugated iron claddings, louvres, decks, extravagant overhangs, exposed roof structures, mono-pitched roofs, banks of openings, an open-outward verandah and an informal welcoming entrance. The adaptability of the language was demonstrated here by the use of water tanks, hydraulic heating system and split AC units, movable sliding doors, polycarbonate corrugated roof cladding and rammed-earth walls in response to the moderate climate of this southern state of Australia, the surroundings of the site, the location of the house and the social interactions they created with neighbours, visitors and pedestrians in this bustling community.

The design Duffield created for the residents not only cultivated their feelings and attachment to a sustainable living environment but also enhanced their everyday living experience and their senses by connecting them to everything around them – natural elements (land, wind, rain, creek, the sun, the moon, and stars), living and non-living things, plants, artefacts (furniture and fireplace) and the space of the world. Being over-budget was the only setback for the residents, and yet their emotions and affections grew deeper as they became increasingly involved in both the design and construction processes so that they had to continue to see the final product of their dream home. The Russells recalled the 'priceless' lessons from actively engaging with Duffield and the project architect right from the beginning of this project (Interview with the Russells in 2012). They started perplexed and frustrated by the high costs of construction for, in their eyes, a 'simple' structure. The more they became deeply involved in the design process, the more they understood the fact that the value of Troppo's hedonist-

way of living philosophy for simplicity and sustainability was the reason for the expensive and exclusive Troppo design. They frequently repeated their 'treasured and cherished feeling', affection for the house and awareness for living a sustainable lifestyle by very little use of central heating and air conditioning. They indicated that the house responded to them with a sense of immersion and belonging. The interactions they have had with the house explicitly resonate with Troppo's initiatives, values and attitudes for an everyday lifestyle – being 'home'. These interactions can be seen and understood as similarities in the house designs between the 1980s Darwin houses and this contemporary Troppo house in a suburban zone of Adelaide (Table 5.5.2).

		Typical 1980s Troppo Houses Suburbs of Darwin	Russell Residence, 2011 Adelaide
Hard space	Similarities	<ul style="list-style-type: none"> <li>• Completely open kitchen space for dining and main living space;</li> <li>• Elevated structure;</li> <li>• Banks of windows;</li> <li>• A linear form and simple geometry;</li> <li>• Shared and multi-functional spaces;</li> <li>• A transitional space connecting indoor and outdoor spaces;</li> <li>• Spacious timber decking/verandahs for dining and other social activities;</li> <li>• Breezeway and hallway as indoor-outdoor living areas;</li> <li>• Exposed roof structure;</li> <li>• Extensive overhangs;</li> <li>• Ceiling fans in all rooms.</li> </ul>	
	Differences	<ul style="list-style-type: none"> <li>• Steel post-and-beam construction and lightweight cladding;</li> <li>• Timber suspended floor;</li> <li>• One roof form;</li> <li>• Semi-open bathroom or outdoor shower;</li> <li>• Fans but no AC or heating systems.</li> </ul>	<ul style="list-style-type: none"> <li>• A combination of lightweight and thermal mass materials and construction;</li> <li>• Concrete slabs;</li> <li>• Discrete mono-pitched roofs for indicating areas of functional spaces;</li> <li>• Divisional spaces with sliding doors for privacy reasons (an office space for a temporary guest room);</li> <li>• Upward verandahs for maximizing sky views and sunlight instead of downward for protection from heavy rains;</li> <li>• Polycarbonate corrugated roofing;</li> <li>• Cantilevered structure;</li> <li>• Indoor bathrooms;</li> <li>• AC and hydraulic heating systems.</li> <li>• Water tanks for collecting rain water.</li> </ul>
Soft space	Similarities	<ul style="list-style-type: none"> <li>• Consciousness for energy saving;</li> <li>• Enjoying doing daily activities in verandah and outdoor spaces;</li> <li>• Delight in the sensual experience of moving through indoor and outdoor spaces;</li> <li>• Opening doors and windows for enjoying breezes inside the home;</li> <li>• Low anxiety about the accumulation of dust and cobwebs;</li> <li>• Enjoying doing laundry in the outdoors.</li> </ul>	
	Differences	<ul style="list-style-type: none"> <li>• Enjoying having showers in a semi-open bathroom;</li> <li>• Showing a high level of tolerance to rain, heat, bugs and wildlife animals moving through and/or being in the house.</li> </ul>	<ul style="list-style-type: none"> <li>• Concern about less privacy taking a shower in a semi-open bathroom;</li> <li>• Showing a moderate level of tolerance to rain and wildlife animals moving through and/or being in the house;</li> <li>• Minding little about heat, but no tolerance to cold in winter.</li> </ul>

**Table 5.5.2** This table shows differences and similarities of hard and soft spaces between the design of the Russell Residence and the 1980s Darwin houses.

## 5.6 Byron Bay: Hutchinson Residence, New Brighton, New South Wales

A privately commissioned project for a resort in Byron Bay, a small town on the North-East New South Wales coast popular with surfers and tourists, appeared as an interruption to Troppo's busy practice at the time (Interview with Harris in 2011). Particular challenges were a lack of local staff and difficulties with the changing business management practices of the client groups (Interview with Connolly in 2012). However, what had initially been a potentially disruptive contingency turned into another opportunity for expanding Troppo's practice.

An Adelaide graduate in 1999, Dan Connolly was the Project Manager<sup>283</sup> and the first point of contact for Troppo in the Byron Bay office in 2013. With Harris's assistance he set up the office in the central area of Byron Bay. Its built environments, natural contexts, and regional culture are highly preserved and protected by the local council for the important values of local heritage and natural resources. Connolly (interview in 2012) commented that planning and building regulations were rigid and challenging for new housing design and development, and constantly changing to prevent overblown new projects by outsiders. Complying with changing regulations became a key to Connolly's adaptation of Troppo language in a sub-tropical coastal style (Interview with Connolly in 2012) which responds to the climate and built environment, as well as the social and cultural contexts of Byron Bay.

*'The development is highly controlled by council, the height control is no more than 3-storeys high and it generates the character of the place.... in the residential areas, the highest point of the highest level is 4.5 metres above the ground. Not only that, every development is hard to get approved.'* (Interview with Connolly in 2012)

The location of his first office in the central area of Byron Bay offered Connolly easy access to the construction sites for many years. Later, due to downsizing, he relocated to Bangalow, NSW, amongst heritage and cottage style houses in a landscape that recalls English farmland hills, and he built a home office from there so that he could manage both business and family simultaneously. In 2011, his home

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<sup>283</sup> This is the description given by Welke in an interview in 2014.

office (Figure 5.6a) was completed and the Troppo practice continued along with an ambition for his own practice – *Beach Architect*.



**Figure 5.6a** Connolly's home office in Bangalow is designed to examine the practicality of Troppo's design principles and theory in response to climate; the façade (Top) and the glimpse of the house from the backyard (Bottom).

Connolly learned from this process that general passive design theory does not work well with unexpected and extreme hot weather conditions. He argued that following general passive design rules such as facing north, having lots of openings, and shading devices and specific building materials, works in regions where there are cool air movements and thick vegetation on site. Challenges exist when there are extreme hot and dry winds, still air, and no natural shade from nearby trees. More doubled-glazed windows and louvers as described in the illustrations of architectural design books would not then make 'a world of difference' in reducing the indoor temperature of a house. (Interview with Connolly in 2012)

Connolly's home office showed the need to develop the Troppo language in combination with active design principles such as the appropriate use of technology. Evaporative ducted air-conditioning and an understanding of the strength of the individual site can overcome unpredictable situations. The 'local knowledge factor' derived from living in 'real everyday life' is a reflection of this 'low-key profile in an under-developed but very expensive' coastal town. (Interview with Connolly in 2012) This recognition has translated into the urban design of contemporary Troppo houses in Byron Bay.

*'You can tow away the whole building and that is the example of how far the council would go. It is very strange control over the housing development. The basic rule is that all buildings have to be removable.'* (Interview with Connolly in 2012)

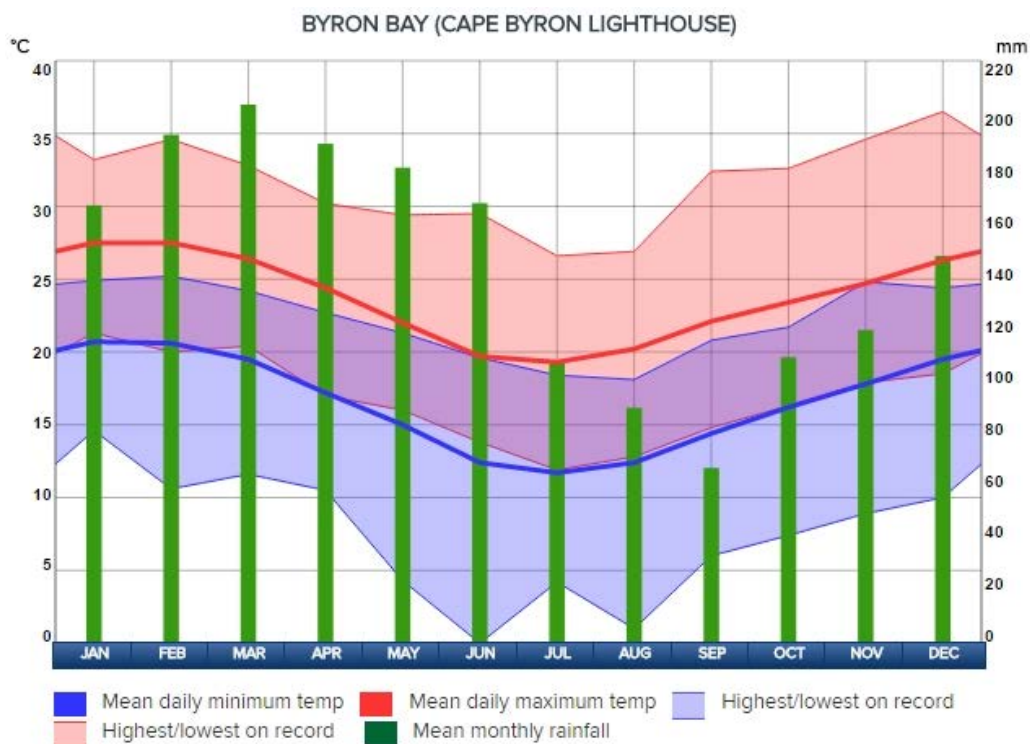
*'Clients in Byron Bay have very different and various ideas for finishing up their houses. They are very different from the clients in Adelaide as they have a strong sense of what they want when they approach Troppo here.'* (Interview with Connolly in 2012)

*'All the people who live here are quite wealthy and fancy and that's why they like bringing in their fancy ideas into the house. That's why they make it [the design process] all difficult.'* (Interview with Connolly in 2012)

The contemporary expression of Troppo language is characterised here by the elegance and lightness of cantilevered structures, various roof types (gable, skillion mono-pitched and flat roofs), compositions of different textured materials and simple detailing of joints. Connolly's intentions were to compose a mix of impressions by creating intimate connections between nature and land form, with the subtle



imagery of a modern lifestyle in response to the coastal beach climate. Byron Bay has a sub-tropical climate with warm summers and mild winters<sup>284</sup>. Its average temperatures range is between 24.5 degrees in summers and 17.2 degrees in winters (Figure 5.6 b). It is regarded as an ideal place to holiday and a paradise for surfing. Connolly introduces elegant features of lightweight construction and cladding, as well as singular mono-pitched roof forms mimics the early Troppo houses with a twist of contemporary beach-house elements for Byron Bay's sub-tropical contexts (Figure 5.6c). These new features exhibit Connolly's everyday experience that modernity is social status, surfing is lifestyle and leisure for the locals, as well as for visitors and wealthy residents from interstate. Visually, it is the Connolly beach style with the 'blub'<sup>285</sup> of Troppo language. (Interview with Connolly in 2012)



**Figure 5.6b** The diagram shows Byron Bay annual temperatures and rainfall.

<sup>284</sup> The information of Byron Bay climate and average temperatures was taken from Government website online link [http://www.bom.gov.au/climate/averages/tables/cw\\_058009.shtml](http://www.bom.gov.au/climate/averages/tables/cw_058009.shtml), viewed on April 14, 2016 and the diagram was taken from the Weatherzone.com website online link <http://www.weatherzone.com.au/climate/station.jsp>, viewed on April 14, 2016.

<sup>285</sup> Connolly described Troppo's design principles as 'blub' in his interview, showing the easy, casual, and straightforward side of his everyday attitudes. He revealed his disciplinary passion for an architecturally rigorous design yet a hint of a 'go-with-the-flow' philosophy of life was reflected in his simple and informal descriptions of his perspective on Troppo pattern language and contemporary architecture. The contingency of architecture was sought in the way in which he firmly believed in arriving at a good design in response to place, people, socio-cultural background and the built environment.



**Figure 5.6c** The contemporary Troppo language in grouped townhouse (Top) designed by Troppo's Byron Bay office in the 2011 and a mixed-use accommodation and retail building (Bottom) collaboratively designed by both Troppo's Byron Bay and Adelaide offices in the central area of Byron Bay. This mixed use building was built in 2004 and received the Grand Winner and Award for Excellence for Northern Rivers Urban Design Awards in 2008.

### 5.6.1 Troppo language in the Hutchinson Residence

There were new design features in Connolly's Troppo style for townhouse projects, commercial buildings, and residential houses. These were juxtaposing different textures and colours, creating articulated layers and patterns on external walls with fibre-cement and weatherboard cladding, and introducing modern materials such as aluminium panels and stainless steel for roof systems, reflecting the local building types and the preferred contemporary character of the regional culture of Byron Bay. Noticeable features were cantilevered small balconies, symmetrical steel-framed sliding windows, standard length overhangs, shading devices in timber battens, garages, and concealed and subtle-sloped pitched roofs. There was no sign of Troppo's typical construction in the post and beam system, elevated structures, corrugated-iron roofs, banks of glass windows and doors, indoor-outdoor verandahs, louvers and shutters. Troppo's distinctive feature of open space single-linear form was retained but adapted by Connolly with lower-angle mono-pitched roofs, standardised overhang length of 300mm and/or 600mm, fixed-size openings, contemporary wall finishes, an installation of shading devices, and earthy-tone colours, textures and materials (Figure 5.6.1a). These new form patterns indicated Connolly's knowledge and experience in meeting the client's budget, as well as the requirements of a small-size young family and the prevailing regulations for local development.



**Figure 5.6.1a** Contemporary Troppo houses in Byron Bay convey a modern urban lifestyle with bright and earthy colours, smooth external wall finishes, moderate overhangs, timber shading devices, garages, and discrete volumes attached.

Connolly briefly explained his general ideas for townhouse design and planning in Byron Bay during the 2012 interview. Due to the prestigious location of Byron Bay, certain lifestyles are cultivated by its climate, geographical setting and natural resources. A tendency towards a good mix of different family types and sizes has been generating locally. More families from interstate have moved in permanently for it is seen as a paradise for retirement or for a getaway holiday retreat. The style and design of townhouses here has to be flexible to accommodate the needs of a young family of four or an elderly couple of two. The versatility of a space to be multi-functional is crucial. The appeal of design form to be stylish for wealthier 'upper class' clients from Melbourne and Sydney is imperative for developers from the business point of view. Connolly (Interview in 2012) has been heavily involved in many residential projects with local developers on various scales of a project. 'Upper class' clients are often the target group for townhouses.

Manifestations of form-patterns are also driven by the needs of clients for their family lifestyle, type, size and financial status. For Connolly, the 'poetry of architecture' is conveyed through the visual stimulations of colours and textural patterns which display a distinctive urban rhythm in his contemporary design. Interestingly, for the Troppo house of this case study – the Hutchinson Residence in Byron Bay – he discarded his common practice of contemporary urban expression but created a hybrid Troppo house which combines the key features of the 1980s Troppo houses with the characteristics of a contemporary urban lifestyle on the beach front (Figure 5.6.1b).





**Figure 5.6.1b** The Hutchinson Residence exhibits a hybrid style of Troppo house with key features of the 1980s Troppo houses and a symbolic expression of modern living

The Hutchinson Residence was recommended by Connolly as the case study because it was 'very much the closest design to Troppo's style' (Interview with Connolly in 2012). This house is located in New Brighton, 30 km north of Byron Bay. The residents approached Connolly in 2008 and the house was completed in late 2009. This house was specially built to recall Hutchinson's 'childhood memory' (Interview with the female resident in 2012). The Hutchinson family lived nearby to witness the whole process of construction from laying the foundation to finishing the front timber path.

### Patterns

The Troppo language in the Hutchinson Residence is immediately recognisable in the simple linear form, lightweight building materials, corrugated roofs, exposed skillion roof structures, indoor-outdoor verandah, adjustable glass louvers, and an array of skylight windows. Latticed timber external claddings

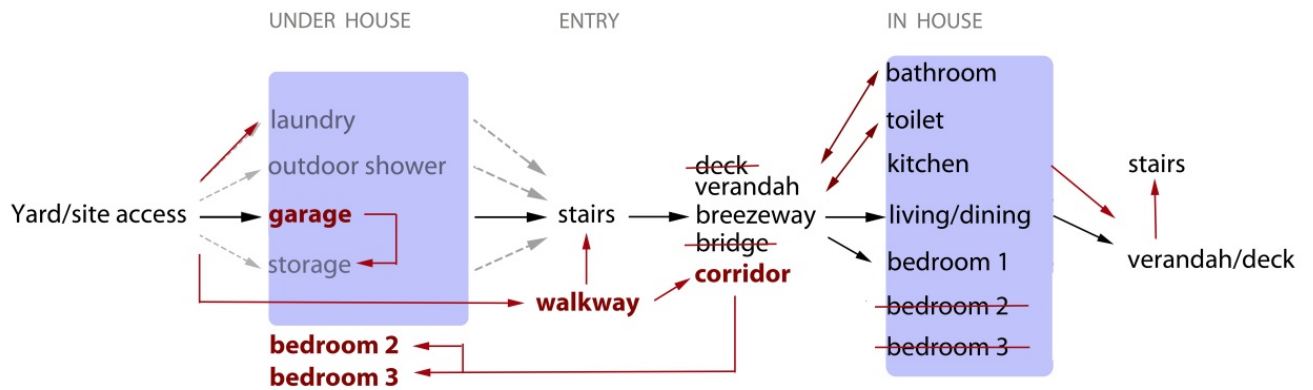
create a constantly changing pattern of shadows on the interior of the entry walkway. Visual and physical experiences of seeing and being seen, and being outdoors and indoors are created.



**Figure 5.6.1c** Sensual experiences are of the interplay of shadows and light (Left), inside and outside, cool breezes and warm sunlight moving through semi-open spaces (Right).

Features that are not typical of the Troppo language are the entry walkway, single entry/exit from each floor, under-house semi-open garage, an enclosed corridor, the segregation of bedrooms, and semi-enclosed stairways as transition space between ground and first floors (Figure 5.6.1c). The shared bathroom and the separation of private living spaces were requested by the clients to encourage their children to be independent, free, sharing, and secure. Mostly importantly, the concept of separating adult and children's living spaces from the shared spaces was to teach them to be independent, think for others and enjoy relaxed beach living (Figure 5.6.1d).

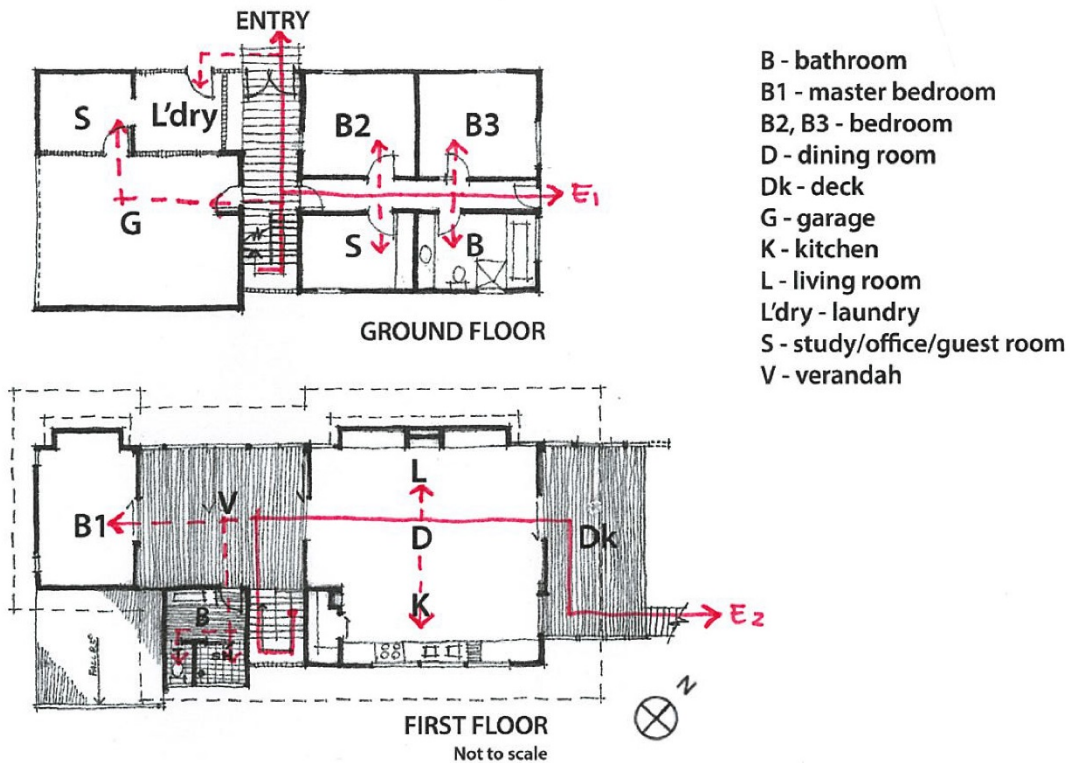




**Figure 5.6.1d** This connectivity graph shows Connolly's interpretation of Troppo language in response to the Hutchinsons' requests for a relaxed beach lifestyle.

### Episodic space

Easy accessibility between indoor and outdoor space is experienced in the Hutchinson residence. It is the most appealing feature as one approaches the house with the welcoming feel of a timber-paved path to the entry. There are several new features that are different from the design of the 1980s Troppo houses. However, the core design concept of great outdoor living space is identified with sequences of outdoor-indoor movements for the residents' daily activities (Figure 5.6.1e).



**Figure 5.6.1e** Distinctive features are identified with the enclosed under-house spaces and two exits which connect the front yard and the beach at the back as well as offer air passages for better natural ventilation. Reproduction of the floor plan by the author.

The distinguishing features in the design of Hutchinson Residence in *form and space, construction* and *spatial arrangement* are as follows.

**In form and space:**

- A clear sequence of indoor-outdoor movements is identified with an outdoor-indoor verandah between private living (bedrooms) and communal (toilet, bathroom, kitchen and dining) spaces in the house; and the walkway and entry as semi-open outdoor space divides private living (bedrooms) and communal (laundry, garage, and storage) spaces under house (Figure 5.6.1f);
- There are two exits to the outdoors;

- The semi-open hallway and open verandah were the main axis to divide the linear plan into two distinctive zones for open and enclosed, as well as indoor and outdoor spaces.

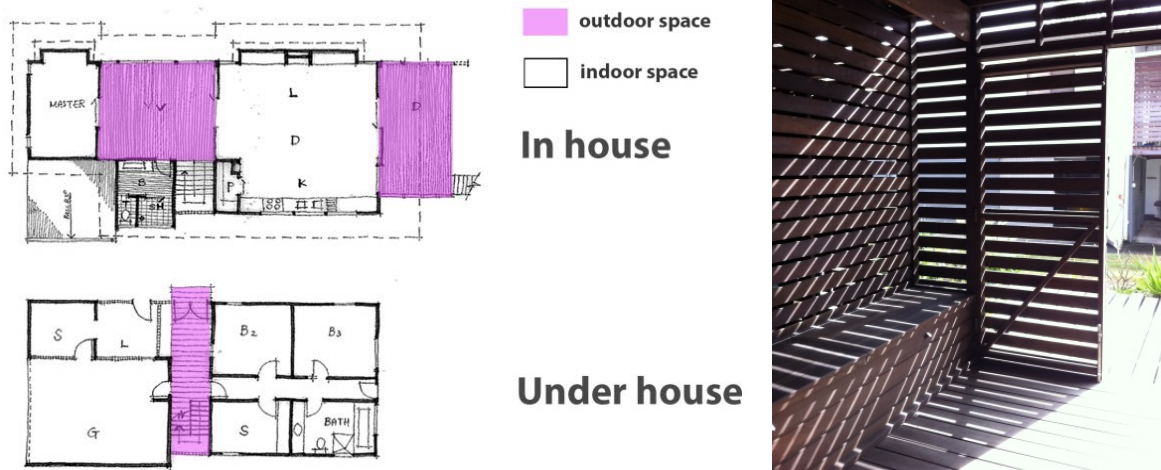


Figure 5.6.1f The pattern is of sequential movement through the indoor and outdoor spaces in the design (Left). The walkway/entry is a semi-open transitional space from communal spaces to private living spaces (Right) under house.

- There is a repetition in geometry form and symmetrical configuration (Figure 5.6.1g).

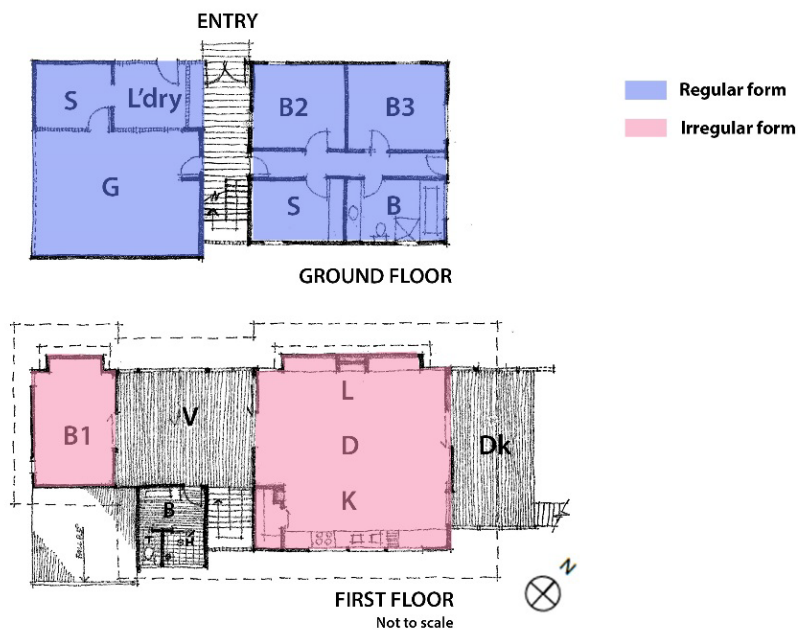


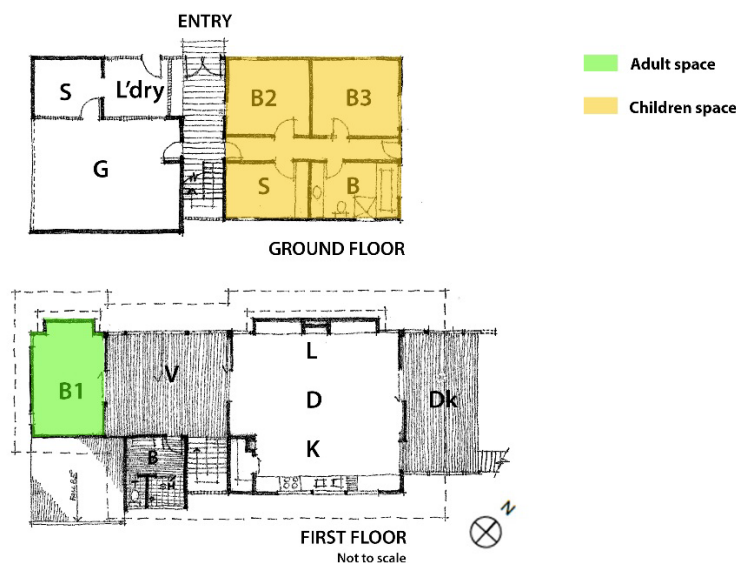
Figure 5.6.1g Two sets of geometry forms are distinguishable in colour that they also express various design concepts such as symmetry, repetition, scale and rhythm.

**In construction:**

- Polycarbonate corrugated cladding sheets are used for the verandah;
- There are gaps in external timber wall cladding (Figure 5.6.1f) for the primary and central circulation zone so that sunlight, shade and breezes are all present.

**In spatial arrangement:**

- Under-house spaces are divided by a combined entry and stairs in a semi-open passage hall;
- Enclosed under-house spaces are highlighted with off-white weather-board for external wall claddings for garage (a car and a boat), laundry, bedrooms and a corridor which offers direct accessibility to the beach;
- The circulation design offers the occupants free movements between interior and exterior spaces with an open axis connecting the front yard and the beach at the back;
- Independent zoning for children on the ground floor is clearly identified (Figure 5.6.1h);



**Figure 5.6.1h** Two distinctive zones for adults and children clearly indicates the residents' wishes for the privacy of their own as well as for raising children with independence and freedom. The concept of hierarchy in spaces is shown in the design of the floor plan.

- Two exits, one on the ground floor and the other one on the first floor, open up the interior spaces as breezeways for better natural ventilation.

- The stairway is located in a semi-open area that the residents are able to feel the breezes and lookout to the outdoors and yet privacy and security is offered to the residents;

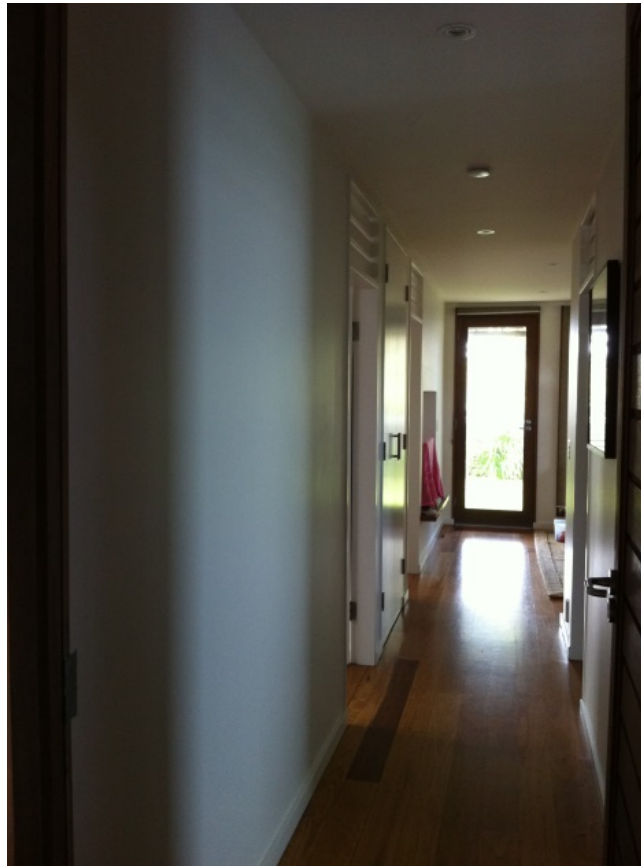
### Inside-outside spatial experiences

The inside-outside spatial experiences for the occupants are identified as follows:

- The monolithic box design offers a strong visual impression of complete inside and outside spatial experiences and yet the latticed timber cladding for walls and roofs breaks up the internal enclosure to create dynamics for fluid spaces, free air movements, and changing light-shadow patterns (Figure 5.6.1i);







**Figure 5.6.1i** A view is taken from the living/dining areas to the indoor-outdoor verandah (Top) to show the way in which the occupants move through spaces. The enclosed corridor (Bottom) connects semi-open walkway, bedrooms, a bathroom and an exit to the beach.

- A small footprint gives the occupants an opportunity to connect themselves with the outdoor spaces frequently as they move through and in-between open inside and outside spaces;<sup>286</sup>
- Getting wet while traveling between the main bedroom and the toilet or the bathroom when it rains offers the occupants the delightful feel of a ‘tree house’ living experience (Interview with Hutchinson in 2012);

<sup>286</sup> According to Connolly, there is a restricted footprint buildable area for this particular zone of beachfront houses. The built area on ground cannot exceed a 120 square metre footprint. For Connolly, the indoor-living space in the outdoor verandah was the best solution to adding in family room without it being included as indoor living space. This complete open-air space offers the Hutchinsons tranquillity, a new experience and the excitement of experiencing rain while walking and running in the indoor space.



- No blinds and curtains are installed in either private or communal spaces, so the occupants can enjoy the seasonally changing views of natural surroundings all year round;
- The occupants experience the inside-outside space by reading, dining and chatting with neighbours freely on the outdoor-indoor verandah (Figure 5.6.1j).





**Figure 5.6.1j** The transparent and inside-outside spaces offer the occupants open-to-nature lifestyle experiences.

### Hedonist experience

The adult residents expressed their everyday experience with their daily activities, their interactions with neighbours and visitors, and the ways they use the space of the house. The feeling of their hedonist experience is identified as follows:

- Spending most of day time on the verandah having random conversations with neighbours, reading newspaper and books, taking a short nap, enjoying sunbathing and entertaining family and friends;
- Walking and playing on the beach, surfing, and having an outdoor shower before entering the house in summer reflects a stress-free beach lifestyle;
- The adults feel the safety of their children playing alone or with friends on the beach as the part of their private (Figure 5.6.1k) backyard; the children have a sense of trust and freedom from the adults while having a delightful play space and can stay under house space without the adults' supervision;

- The visually and physically open plan offers the occupants a feel of fluid spaces with the indoor-outdoor verandah, lots of windows and large glass-timber-framed sliding doors. In this way, a small living space (55 square metres footprint) is felt larger than its actual physical space as they perceive an open view connecting with the beach, the surroundings and a full view of the sky;
- The residents feel much less stress and uptightness. They can perform their daily activities at an easy pace; daily routines seem pleasurable instead of compulsive and forceful;
- Surfers from nearby holiday homes have easy access through the site of the house to the beach during holiday seasons. The residents feel relaxed about seeing and conversing casually with them;
- The design of the house has helped the residents 'become more relaxed in order to be able to live there' (Interview with a Hutchinson in 2012);
- The space of the house is transparent and exposed to visitors from the holiday houses nearby and yet the residents have a sense of security, privacy and comfort.

*'There is always a relaxed feel about it [the house] and you feel very comfortable on the weekend even if we have people coming over. We are surrounded by holiday homes and you get people coming for surfing. We do have privacy and feel secure even when they use the path next to the house.'* (Interview with a Hutchinson family member in 2012)



**Figure 5.6.1k** Feeling part of the natural environment and having easy access to the beach for a walk, swim and surf anytime, the residents gradually build a strong connection with the house and themselves.

### **A dynamic dialogue with nature and other living things**

The absence of a back fence and an open trail leading to the beach offered the residents and their young children freedom to be connected to the site, the landscape and the entire area of the beach as a part of their backyard. The contour of the site gradually rises higher and different plantings (Figure 5.6.1l) to form a gentle hill that provides a natural lookout for the safe-keeping of the young and a scenery-viewing platform for the adults. The whole family were constantly engaged with nature and other living things such as birds and sea creatures as they read books or do sunbath on the beach, enjoy beach walks, build sandcastles and play in the ocean as one part of their daily routines all year round, except cyclone seasons. Dynamics of interactive dialogues was created between the surroundings of the site, the house and the residents through easy access, fun activities and visual connections with the outdoors that there was a strong bond and the sense of belonging to the site as well as to this peaceful and tranquil community.





**Figure 5.6.1I** The contour and the plants of this physical setting offered the residents privacy and safety through the change of natural contexts (lawn and sand trails) and elements (big trees and small beach shrubs).

### Gradually changing life patterns

There was a clear shift in the residents' lifestyle from convenient and bustling urban living in Sydney and Melbourne to a peaceful and laid-back community in this coastal town, New Brighton. There were significant changing attitudes the residents described in the interview as follows:

- Living in this quiet and small beach community, the residents love the setting so much that they sold their city home to build and live there;
- For the female resident, having a part-time job, full-time parenting and having time to enjoy her favourite activity, cooking, has justified leaving the convenience of Sydney city life;
- Having lower expectations for physical conditions in the house is reflected in the residents' reducing their standards for maintenance, welcoming the aging effects on the external finishes, and accepting rusting materials, mould in the cupboards and out-of-order

electronic appliances due to the corrosion of sea salt and moisture near the ocean (interview with Hutchinsons in 2012);

- The house also makes the residents 'more accepting' (interview with the Hutchinsons in 2012) in terms of their fear of experiencing the strong winds, heavy rains, shaking of the windows and doors, and loud noise caused by cyclones;
- The design of under-house and in-house spaces allows the residents to have two separate private living spaces, adults' and children's spaces, where they are free to do their own activities in their own space, and congregating when there are social and family activities taking place on the verandah or the decking area.

The lifestyle that the design of the Hutchinson Residence offers to the residents is simple, slow-paced, easy and low-maintenance. The location of the house set an amicable and peaceful context for Connolly to marry the residents' wish to live in the simple childhood dream with privacy and empathy for an environmentally responsible lifestyle with less. The architectural appeal of its box form with a striking long and irregular-shaped mono-pitched roof and a variety of the textured surfaces evokes the lightness of the 1980s Troppo Darwin houses' design on a contrastingly elevated structure. The house achieves responsive cohesion between the meaning of form in response to the site, and the relationships between the occupants, and the social dynamics of the local cultural community, and the environmental contexts (Figure 5.6.1m) Mutual connections among the residents, the house and their relationships are created through the colours of white sand and earthy-brown timber, easily-accessible materials and the intention of living low-maintenance.





The location of the Hutchinson Residence fulfils the residents' wishes for privacy as the house is well screened from the main road (view from the main road)



The colour scheme of white for beach sand and earthy-brown for local flora expresses a relaxed coastal lifestyle (view from minor access road to the neighbouring houses)

**Figure 5.6.1m** The minimal visibility of the Hutchinson Residence in this neighbourhood demonstrates the high level of privacy and peacefulness they requested for the safety of their young children, and an undisturbed and easy 'lifestyle with less' and simplicity.

### Ethical values versus material culture

Unpolished recycled and hardwood timber, perimeter blockwork, glass and custom orb corrugated iron sheeting are the easily accessible materials used for the house to demonstrate the residents' values for

casual, private and environmentally-responsible living. There are no modern new building products or innovative constructions to be seen in detailing and joints. A reflection of simple and private everyday living is visually presented with the tucked-away location of the house from the main street, and the casual interactions the residents have had on the balcony with seasonally passing surfers and neighbours. Despite the residents' backgrounds in the vibrant city lifestyles of Melbourne and Sydney, there were no desires and requirements by them for complicated forms and lavish materials.

### **Feelings versus desire and power**

The residents' feelings were mutual and they were content with their 'life-changing' decision (Interview with Hutchinson in 2012) to reside in this quiet and small coastal town. There was a significant shift in the choice of lifestyle for the female resident as she was struggling and uncertain about being able to adapt and have a happy life in this small community. However, after a few holiday visits, she became certain and was delighted to have made the 'right decision' to raise her young family there 'in tune locally' and with positive feelings for being 'much exposed and being part of the environment.' (Interview with Hutchinson in 2012)

### **Simple gestures versus advanced technology**

The residents had the chance to enjoy their privacy and do activities in their own private space as well as gathering in the 'focused' and 'congregating' spaces. (Interview with the Hutchinsons in 2012) These congregating spaces were the outdoor verandah as a location for mini-concerts and doing homework for the children, a social gathering venue, a chatting forum with neighbours and random visitors/surfers, and a reading retreat space; the outdoor decking area was used for weekend breakfasts and family barbeque dinners 5 times a week in summer. The indoor and outdoor spaces of the house were felt to be 'pretty much the same space' as the residents enjoyed hosting entertainment with family and friends as either indoor living, or on the outdoor deck or verandah depending on seasons, the times of the visits and the weather conditions. They lived this way all year round, even without their broken reverse-cycle air-conditioning system which had remained unfixed for a couple of years. The house had 'got to have a beautiful feel' (Interview with the Hutchinsons in 2012) so there was no need for advanced technology to achieve the delights of everyday living for the residents.

The residents' sense of belonging to the site and the community defy the impacts of their fear of anticipated cyclones and the random movements of strangers, visitors and surfers, and the dynamic momentum of their daily activities. In the interview, the word 'feeling' was constantly mentioned with the positive connotations of 'relaxed', 'beautiful' and 'comfortable', highlighting the residents' values and the good quality of the actual conditions of their everyday life offered by the design of the house. In this respect, Connolly and the residents exhibit like-minded desire for a responsible, tolerant and adaptable lifestyle. A hint of hedonist attitude is expressed through the transparency, openness and connections between interior and exterior spaces of the house with the natural environment, neighbouring houses, and the people of the local community. The design of the Hutchinson Residence makes the residents find their roots and 'feel at home' with their most inner worlds settled in this small beach town at last.

### 5.6.2 Conclusion

The values and requirements of clients were a key factor in changing the form patterns of Troppo language in the contemporary design of Troppo houses in Byron Bay. Changing Troppo's design features from banks of openings, elevated stilt-on-post structures and spacious outdoor-indoor verandah spaces was necessary for most of Connolly's housing projects in Byron Bay and nearby regions, in order to comply with building regulations, match the building types and scales, and meet the needs and the budget of local small families and seasonal-residents from interstate. For the younger families the coastal-town lifestyle in Byron Bay indicated less time staying in the house and more time outside surfing and enjoying sunbathing on the beach. In order to reflect the coastal lifestyle and satisfy the young Hutchinson family's request for a simple design, he specifically emphasized the closest representative characteristics of the 1980s Troppo houses in the design of the Hutchinson Residence (Table 5.6.2). It is notable that the use of verandah space as a multi-functional entertaining and living space had diminished significantly in the design of contemporary Troppo houses in Byron Bay where there was little need for enjoyment and comfort to be offered to the local and short-term-holiday residents other than lying on the beach with cool sea breezes and surfing on the ocean waves. This Troppo verandah was restored in the Hutchinson residence with resounding success.

		Typical 1980s Troppo Houses Suburbs of Darwin	Hutchinson Residence, 2009 Byron Bay
Hard space	Similarities	<ul style="list-style-type: none"> <li>• Lightweight construction, building materials and cladding;</li> <li>• Banks of windows;</li> <li>• Large sliding doors to verandah and decking areas, glass louvers;</li> <li>• No curtains and blinds for privacy reasons;</li> <li>• A linear and/or vertical movement between indoor and outdoor spaces;</li> <li>• A shared bathroom;</li> <li>• Fans in all rooms.</li> </ul>	
	Differences	<ul style="list-style-type: none"> <li>• Elevated structure with an open under-house spaces;</li> <li>• No AC and fans in rooms.</li> </ul>	<ul style="list-style-type: none"> <li>• Outdoor-indoor verandah is the transitional space in between communal (dining, kitchen, bathroom and toilet) and private spaces (bedrooms);</li> <li>• Enclosed under-house spaces with slatted-timber and fibre-cement cladding for semi-open garage, bedrooms, laundry and a storage room;</li> <li>• An enclosed corridor and multiple exits to the beach at the back of the house;</li> <li>• A timber-slat paving as entrance;</li> <li>• A monolithic-box form;</li> <li>• Irregular shape of one large mono-pitched roof;</li> <li>• Two distinctive external wall finishes by materials, textures, and colours;</li> <li>• A mix of polycarbonate and corrugated iron roof sheeting for maximizing sunlight into the verandah, entry/stair walk way.</li> <li>• One AC in the living room.</li> </ul>
Soft space	Similarities	<ul style="list-style-type: none"> <li>• Consciousness for energy saving;</li> <li>• Enjoying doing daily activities in verandah and outdoor spaces;</li> <li>• Delight in the sensual experience of moving through indoor and outdoor spaces;</li> <li>• Opening doors and windows for enjoying breezes inside the home;</li> <li>• Low anxiety about the accumulation of dust and cobwebs;</li> <li>• Enjoying having showers in a semi-open bathroom without worrying intrusion of privacy;</li> <li>• Enjoying doing laundry in the outdoors.</li> </ul>	
	Differences	<ul style="list-style-type: none"> <li>• Needing some privacy for personal possessions in the house ie cars and boats.</li> </ul>	

**Table 5.6.2** This table shows differences and similarities of hard and soft spaces between the design of the Hutchinson Residence and the 1980s Darwin houses.

## 5.7 Perth: Howell Residence, Applecross, Western Australia

The emergence of contingencies was often driven by personal and family reasons in the expansion of the Troppo practice in the last two decades. As Adrian Welke has explained, there is a close connection between the Troppo partnership's development and the way they highly value their relationships with family, staff, and friends, as well as the end-users of their designs, especially the indigenous peoples with whom they had worked in various remote areas of Australia who were disadvantaged by insufficient resources and financial support (Interviews with Welke in 2010 and 2016). There was an emotional currency that Troppo invested in each regional office by encouraging in-house architects to grow with the practice as the basis of its design principles and ethos. Perth was the home city of one home-sick in-house architect in the Darwin office as well as the capital city nearest to Welke's family and friends. Assisted by the younger staff member who had shifted ahead of time to prepare for the move, Welke finally followed Harris's earlier decision to move his part of the practice homeward, successfully setting up the fifth Troppo office in Perth in 2003. Under Welke, this new Western Australian branch of the practice would now be the primary office for Troppo's government commissioned projects for indigenous people and conservation architectural work in remote areas around Australia.

The survival of an architectural practice is determined by the balance of all the expenses incurred in the running of an office. This is no exception for Troppo. Running an informal and relaxing home-based practice is one way of reducing expenses in exchange for having a formal office-based practice in the CBD of a city for greater exposure of the practice. (Interview with Welke in 2010, O'Toole in 2012, and Connolly in 2013) The relocation of Welke's Perth office was to cope with the unaffordable rent of the city office due to the high costs caused by the boom in the mining industry and the increasing number of workers, job-seekers and their families flooding into the nearby suburbs of Perth. (Interview with Welke in 2010) In 2009 he relocated and set up a mixed-use building for home, office and artefact shop for his wife's importing business from south-west Asian countries. The new building is situated in a mixed residential, industrial and manufacturing area of Fremantle, which is a major port city, nineteen kilometres south-west of Perth. It consists of two semi-connected wings: the business wing accommodates the shop and the office; and an open-plan living wing which is designed for Welke's family and is perpendicular and partially connected to the end of the business wing (Figure 5.7a). A



semi-enclosed courtyard with one bamboo fence is created to give the Troppo office a pleasant entry to greet clients, and offers privacy and convenience to Welke and his wife so as to maintain the balance of work and family life with the affordable and relaxing lifestyle they desire.



**Figure 5.7a** The scattered pots and Balinese artefacts offer a welcoming gesture for customers. Troppo's office is accessed through the open gate with an artistic sign hung above the microwave as their mailbox. The warehouse office and the factory indicate a mixed-use zone of industrial business, retail and residential housing (a Google image).

In order to survive in the competitive local market, Welke monitors the size of the firm, exerts constant efforts in search of the availability of design projects and like-minded staff, and offers the architectural services that satisfy the clients' needs. The size of the Perth office remains small (between 2 and 4 in-house architects, including Welke himself). In this way, Welke is capable of positioning Troppo's practice in the local context, expanding the client cohort in a steady progress, and finding ways to reconfigure the Troppo tropical design features to fit the client's requirements. On the other hand, Troppo's ethos for sustainable living and climatically-responsive design principles with a hint of tropical architecture is challenged by local firms with better associations and connections with members of the community, as well as greater affinity with the mentality of wealthier clients for creating a design that offers them a comfortable and modern lifestyle. The request to install an air-conditioning unit is often seen as a must for better human comfort in the house, and this indicates that local clients generally hold a different



mindset from Troppo's responsively natural way of living with passive design concepts. (Interview with Welke in 2010) The contemporary design of Troppo houses in Perth has evolved not only in response to its Mediterranean climate but also to Welke's desire for a niche to maintain Troppo's core values and philosophy for an environmentally sustainable way of living in the socio-cultural, economic and environmental contexts of different regions (Figure 5.7b). The form patterns of Troppo language are manifested by Welke's understanding of adaptability in materiality, as well as using both passive and active design principles and accommodating the client's needs and requirements for better comfort and more privacy.<sup>287</sup> At times, the survival of a Troppo practice overrules and defies the core of Troppo's design philosophy, values and beliefs in relation to building energy-efficient and space-efficient houses for cost-effective and environmentally friendly living.

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<sup>287</sup> In the interview, Welke initially recommended a different recently completed project shown with the pictures of the house as Figure 5.7b, but then he became concerned about privacy issues and the long process of dealing with the clients' enquiries about the intention of an interview and house visit.



A slit entry is defined by rammed earth walls



An open deck offers an outdoor-living experience



**Figure 5.7b** This house was initially chosen for the final case study of Troppo house in Perth but replaced due to some foreseen difficulties. Nevertheless, an open plan offers a natural air-flow with the assistance of ceiling fans and glass louvers. The post-and-beam steel frame, an open indoor-courtyard, and exposed corrugated-iron roofs retrospect the early design of Darwin Troppo houses. Thick rammed earth walls and cool marble floors are used in response to Perth's winter.

### 5.7.1 Troppo language in the Howell Residence

Understanding the climate in Perth is the key to identify changes made in the design of contemporary Troppo houses in the western region of Australia. Perth has a mixture of the Californian and Mediterranean climates, with hot dry summers and mild winters (Figure 5.7.1a). It is regarded as the sunniest capital city in Australia<sup>288</sup> where the delightful climate has been translated into the interplay of lightness and heaviness in building materials and construction details, as is the visual impression of the Howell Residence (2010). Some special architectural features of this house were the reason it was recommended as the case study dwelling for the Troppo Perth office. The lightness is given by the overlaying mono-pitched roofs with corrugated iron and extravagant long overhangs with translucent polycarbonate, steel framework and many glass windows opening up to the sky. Thermal mass is given by the concrete flooring system and the use of rendered double-brick external walls and fences, which are visually observed from the street view (Figure 5.7.1b). Compared with the early designs of the Darwin Troppo houses, there are other distinguishable features the Howell Residence shows, such as multi-storey height, full-length partition walls, sealed ceilings, the use of reverse cycle air-conditioning, the installation of a lift, and a private and formal entry. Here a contrasting interpretation of the Troppo language emerges anew with modern materiality, tectonics and an impression. This visual impression is created at the request of the residents who wished to present the 'best quality of building materials' in the design of the house and keep the 'resale value of the property' when they decided to downsize their lifestyle for the future. (Interview with the Howells in 2014)

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<sup>288</sup> The information of Perth climate was taken from the official Australian tourism website online link <http://www.australia.com/en/facts/weather/adelaide-weather.html>, viewed on April 14, 2016. The diagram was taken from the Weatherzone.com website online link <http://www.weatherzone.com.au/climate/station.jsp>, viewed on April 14, 2016

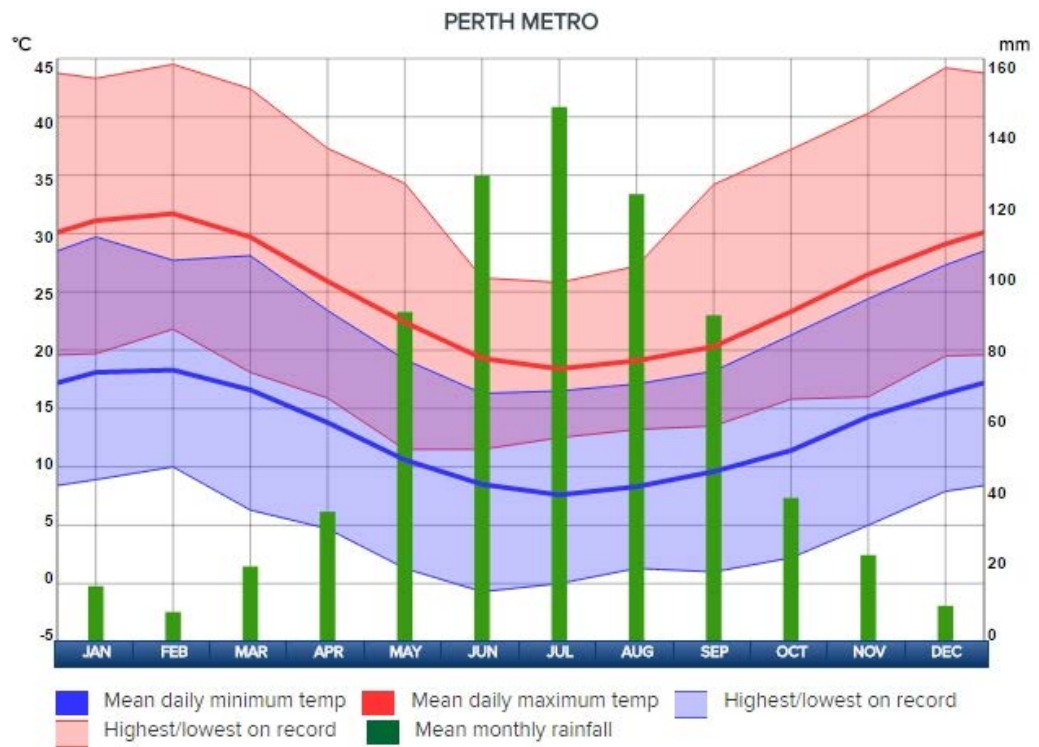


Figure 5.7.1a The diagram shows Perth annual temperatures and rainfall.

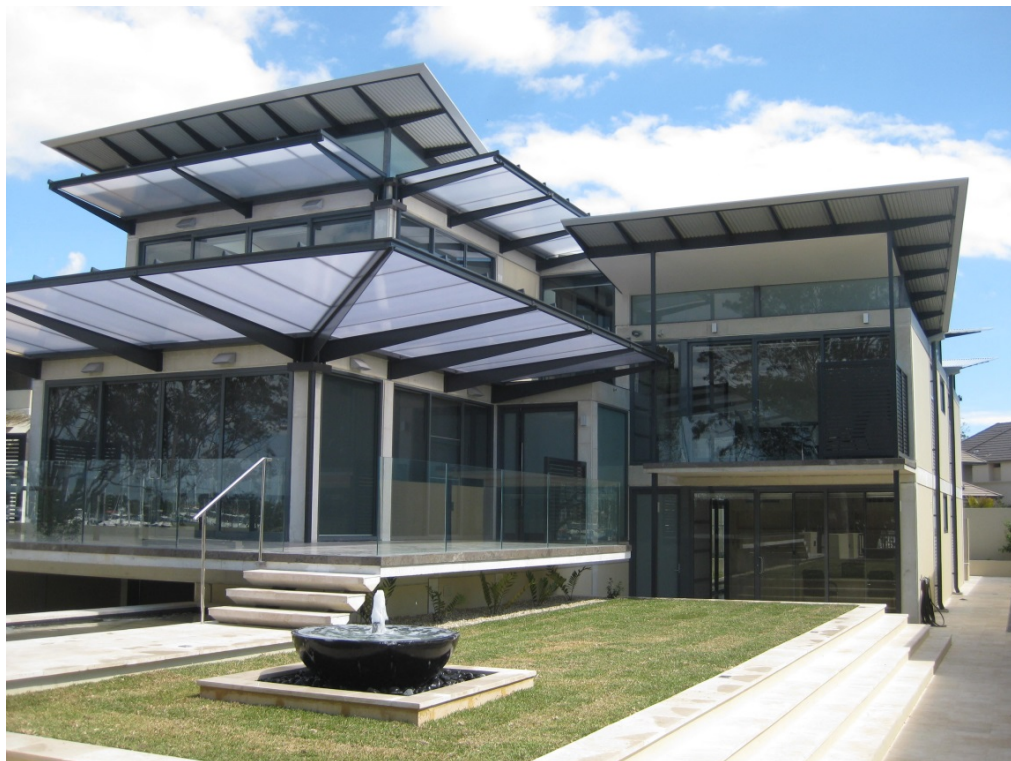


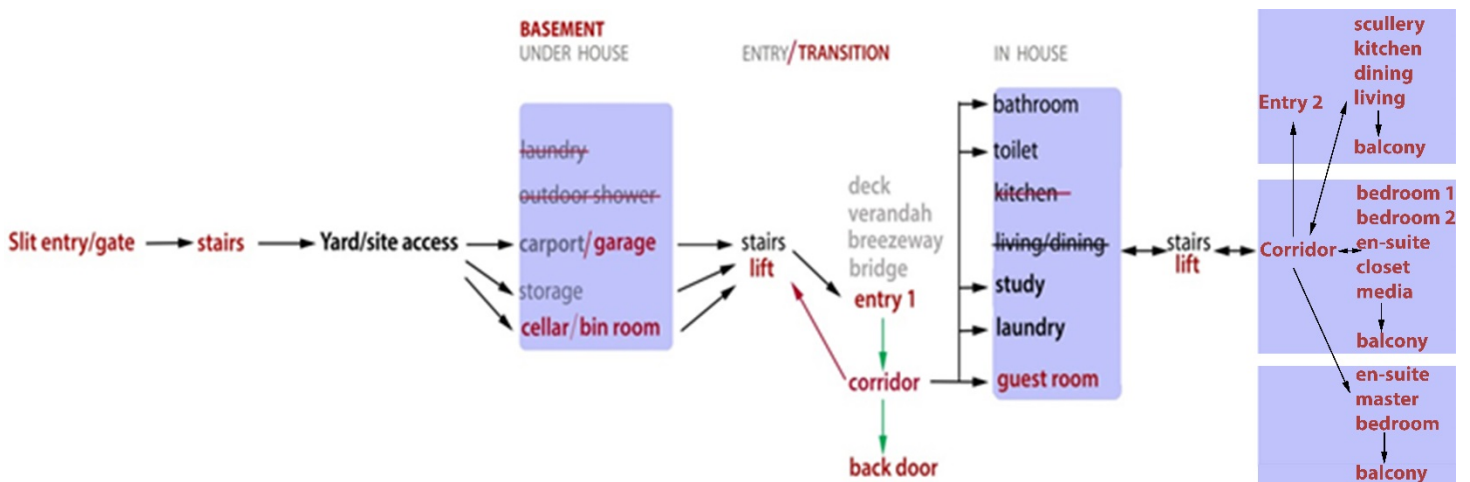
Figure 5.7.1b The Howell Residence presents a preference for a modern and wealthy lifestyle.



## Patterns

In the design of the Howell Residence, the clients' desire for the 'visual best' shift the shaping of the form patterns of Troppo language in volume, materiality and point of view in respect to Troppo's values for sustainable living. This notion of 'visual best' displays a different design approach that is quite distinct from the other four contemporary Troppo houses in Darwin, Townsville, Adelaide and Byron Bay. Form patterns in the hard space have retained the same straightforward and simple geometry of rectangular and linear form in volume. The volume of the house is compact in five split levels and in the enclosed levels of two separate wings of the house. Both wings are connected with a central passageway as the primary axis of the circulation through indoor living spaces. Shifting space vertically creates a notion of the functionality of zoning in terms of private and communal spaces. The basement is an equipped area used for general public services such as garage, storage, cellar, a plant room and bin areas. The ground floor is used as a guest area. The first floor is an open space for the communal purposes of dining, kitchen, living room, laundry, and a large glass-balustrade balcony. The second floor accommodates visiting family and friends with two bedrooms with en-suite bathrooms, and a media room as an office equipped with computing technology and media systems. The third floor is the master bedroom with en-suite bathroom. A lift is needed for mobility and a unique feature is the multiple flights of stairs extending for every half of a floor height, 1500mm. The marble flooring, concrete-blockwork walls, masonry stairs and fences, and concrete paving create contrast to the design principles of Troppo houses with their lightweight construction, openness, low-cost, and connection to the outdoors and nature as the basic patterns of Troppo language.

The impact of the soft space of the Howell Residence on the residents is implicit in their preference for a comfortable, financially appropriate, and 'time-to-enjoy-the-best' lifestyle (Interview with Howells in 2014) which conflicts with the Troppo philosophical approach for multi-functional spaces, and an economical and energy efficient way of outdoor-indoor living. The connectivity graph shows the differences in movement and space planning between the 1980s Troppo Darwin houses and the Howell Residence (Figure 5.7.1c). The residents' requirement for 'visual best' displays an invisible force, shifting Troppo's values for a passive and sustainable dwelling to a more financial-investment-driven home.



**Figure 5.7.1c** The connectivity graph shows Welke's design approach for new patterns (in red) in satisfying the residents' requirements for a lifestyle with the 'visual best' design of a Troppo house. Multiple entries (in green) display multiple connections to the outdoors, which is different from the early Darwin Troppo houses.

An 'open budget' brief was offered to Welke to achieve these residents' ideally 'visual best' dwelling because of the resident's work background in the building industry and his association with Welke. He had been Welke's builder for twenty years on all his government commissioned projects in the Northern Territory and the remote areas of South Australia for Australian Indigenous people. (Interview with the Howells in 2014) An architecturally designed house with Troppo's 'sustainable design concepts' was the primary requirement given to Welke for 'the best quality', matching in scale to neighbouring houses (Figure 5.7.1d) in material and contemporary architectural appeal. In this respect the Howells display a different level of empathy with Troppo's values and attitudes in connecting them openly to nature, the outdoors, breezes and wildlife. Easy maintenance, transparency, human comfort, sumptuousness, and privacy are the new patterns for the Howell Residence's 'visual best' that is exhibited in the Troppo language.





**Figure 5.7.1d** The large scale of the neighbouring houses indicates a luxury lifestyle for its exclusive location. (A Google image)

Welke sought new and appropriate form patterns for the house is to display the contextual fit of a contemporary Troppo house achieving responsive cohesion in scale, distinctive built form, and materiality in this riverside suburb of Perth, Applecross, bounded by the Swan River and the Canning Highway. Layers of exposed overhangs, shading devices and prominent verandah roofs match the upper-market value of lands and homes in this exclusive and attractive riverside area, as there are on-going housing development projects nearby the house. Large scale and architecturally designed houses in long narrow building lots are seen from the street view with their modern architectural features such as curved walls and colonnade balconies, articulated facades with layers and extruded stacked volumes, compositions of geometrical forms in the display of texture finishes and materials, and rich and vibrantly bright colours in a variety of architectural styles – contemporary, traditional with gable roofs, chimney and lattice balustrades, Spanish style and so on. Some houses seek to create appeal with no specific architectural elements except for one vast building volume indicating a monolithic-box housing design (Figure 5.7.1e). Many vacant lots are available and sub-divided to accommodate market demand. In order to fit in the character of neighbouring houses, the Howell Residence patterns are a slit entry (narrowed space with a defined gate), the gate, double-layer-glass walls and solid fences for privacy, formality and more security. The residents also expressed their desire for easy maintenance and transparency, which resulted in their specific request for a change to a marble floor for the entire house<sup>289</sup> and ‘lots of glass windows’ for maximising sunlight for warmth in winter. (Interview with the

<sup>289</sup> The resident changed the initial proposal of tiled floors to marble floors due to their requests for using the best quality of all building materials, easy maintenance and contemporary appearance. An increased budget was agreed.

Howells in 2014) A basic architectural element of Troppo houses – the glass louver – is not used in order to ‘reduc[e] dust from the nearby highway.’ (Interview with the Howells in 2014) Reducing dust is the main reason for the noticeable design changes in outdoor-indoor living spaces and the evolution of form patterns in the Troppo language. There is complexity and a sense of controlled movement in space and form patterns that are not seen either in the design of 1980s Troppo houses, or in the design of contemporary Troppo houses in other regional practices.



On-going housing projects under development (a Google street view taken in April 2014)



A mix of architectural-style and monolithic-box design of multi-storey houses

**Figure 5.7.1e** The scale, multi-storey height, the layout and variety of housing design exhibit the social, cultural and economic status of neighbouring residents, as well as the high value of lands and houses in this exclusive riverside residential zone.

### **Episodic space**

A central vertical circulation core allows the spatial arrangement of the house to cohere as a series of compact and enclosed volumes (Figure 5.7.1f). Enclosed glass hallways and the elevator are key elements for the horizontal and vertical movements of the residents that also provide primary access and connection between internal and external spaces, whereas the occupants of most other houses in the area are confined to indoor living.

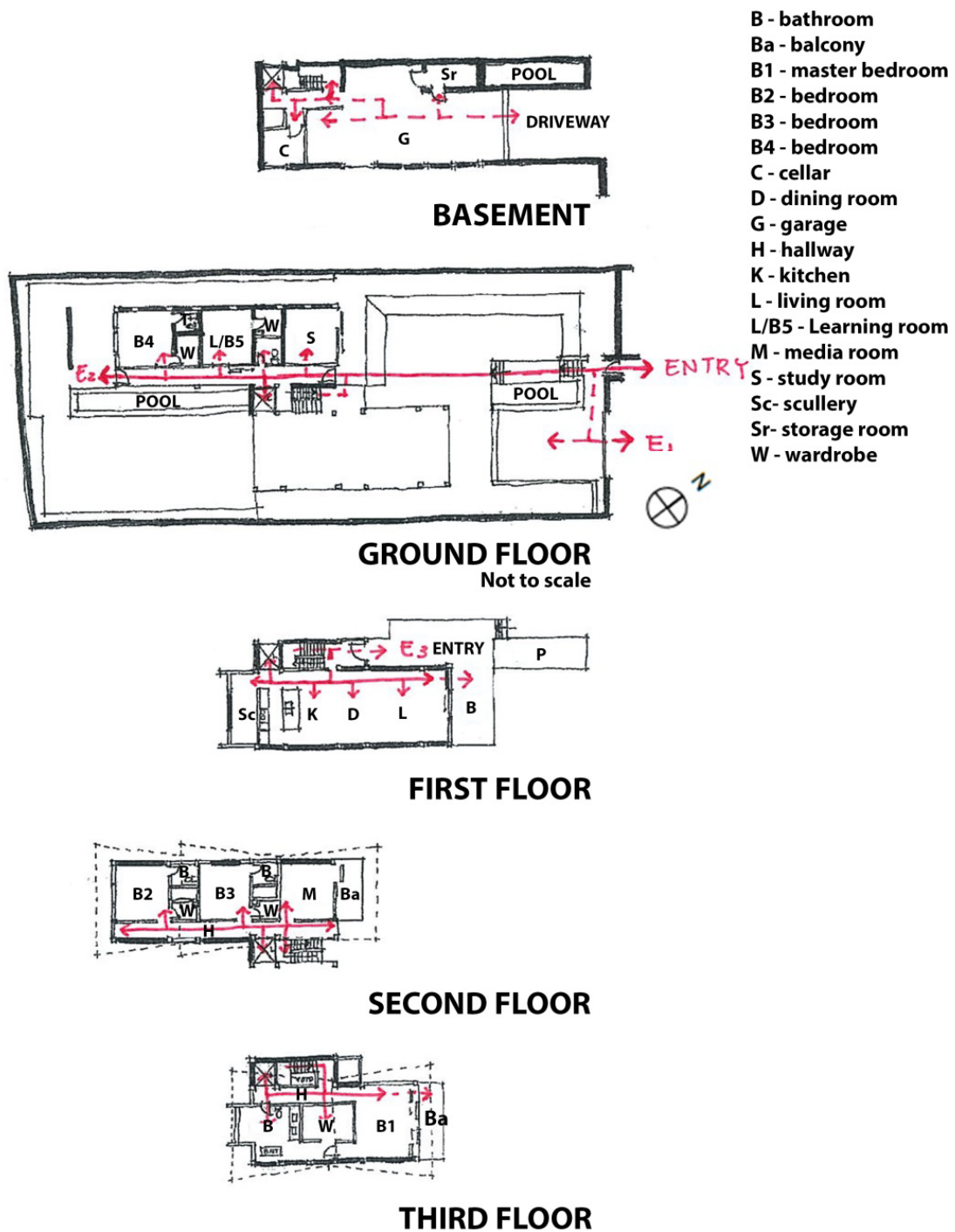


Figure 5.7.1f Controlled circulation is displayed through the design of an enclosed but an open-ended space – a corridor – as a central axis connecting functionally specific zones such as communal, service and private living spaces to each other and the exterior. Reproduction of the floor plan by the author.

The distinguishing features in the design of Howells Residence in *form and space*, *construction* and *spatial arrangement* are as follows.

**In form and space:**

- There is a formal slit entry defined by the physical boundary of masonry fence walls which visually separates privately owned and general communal spaces;
- There are three exits in this two-wing, five-storey high house (Figure 5.7.1e);
- Most interior living spaces are in collective and linear compact form;
- There is a distinct shape for each roof form to highlight levels and two separate wings;
- There are four bedrooms with en-suite bathrooms and a walking-in wardrobe space;
- The five stepped-levels of interior space offers individuals privacy and specifically task-oriented space such as a media room filled with advanced technologies (projectors, computer and audio units) for entertaining and an office room for work;

**In construction:**

- There is a lift;
- Marble is used in flooring system for easy maintenance and its classic and elegance appearance;
- The structural framework of the house uses thermal-mass materials like concrete slabs and double-brick walls;
- The exposed structure of verandah is replaced by a simple and cantilever steel-frame with polycarbonate corrugated sheeting;
- Extensive and wide overhangs to highlight its multi-level design;

**In spatial arrangement:**

- There is cross-direction circulation within the house; the central corridor (in pink) offers horizontal access and the lift and stairs offer vertical access, which gives a sense of controlled accessibility and mobility in space rather than providing the residents with freedom of movement (Figure 5.7.1g);

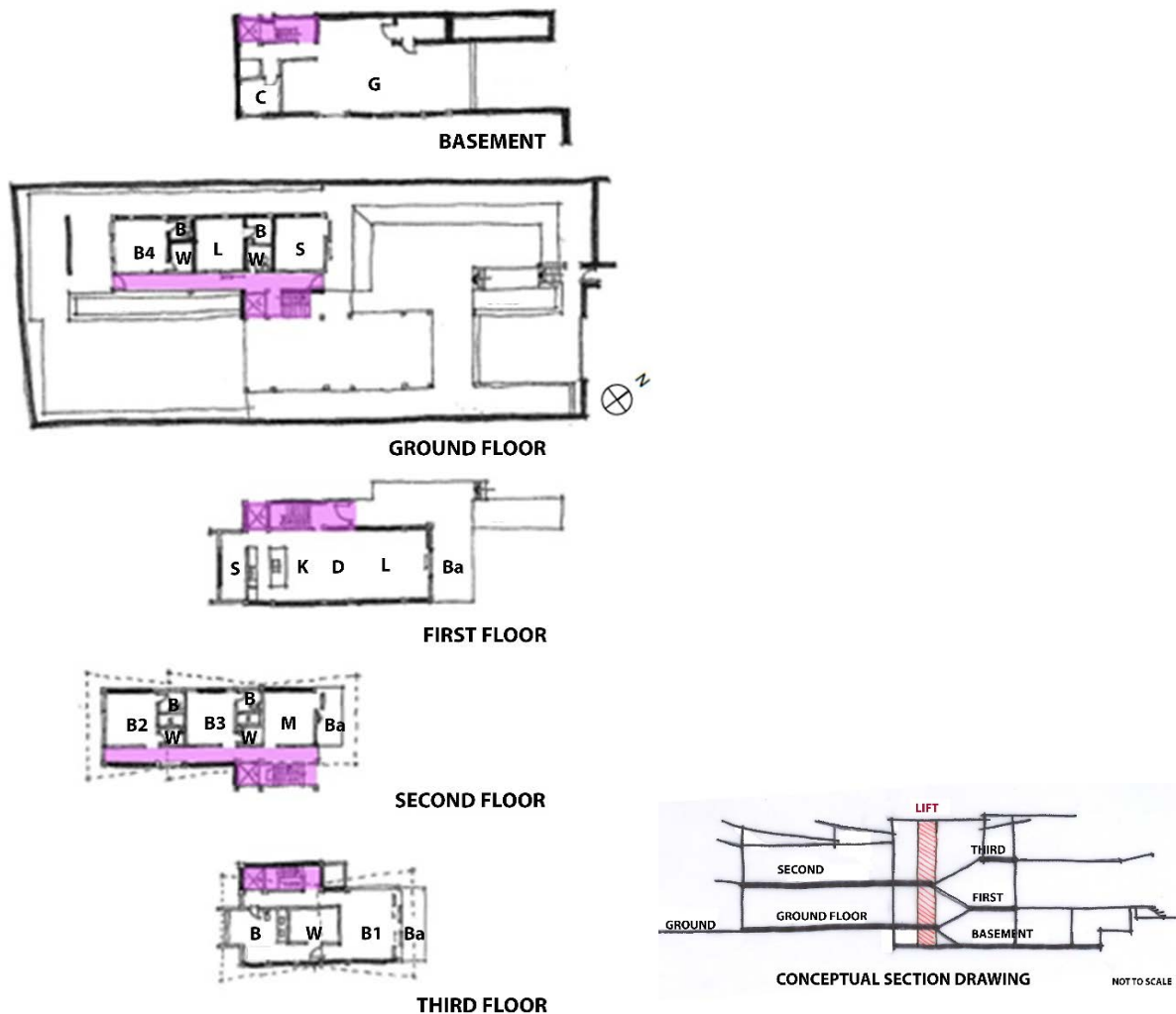
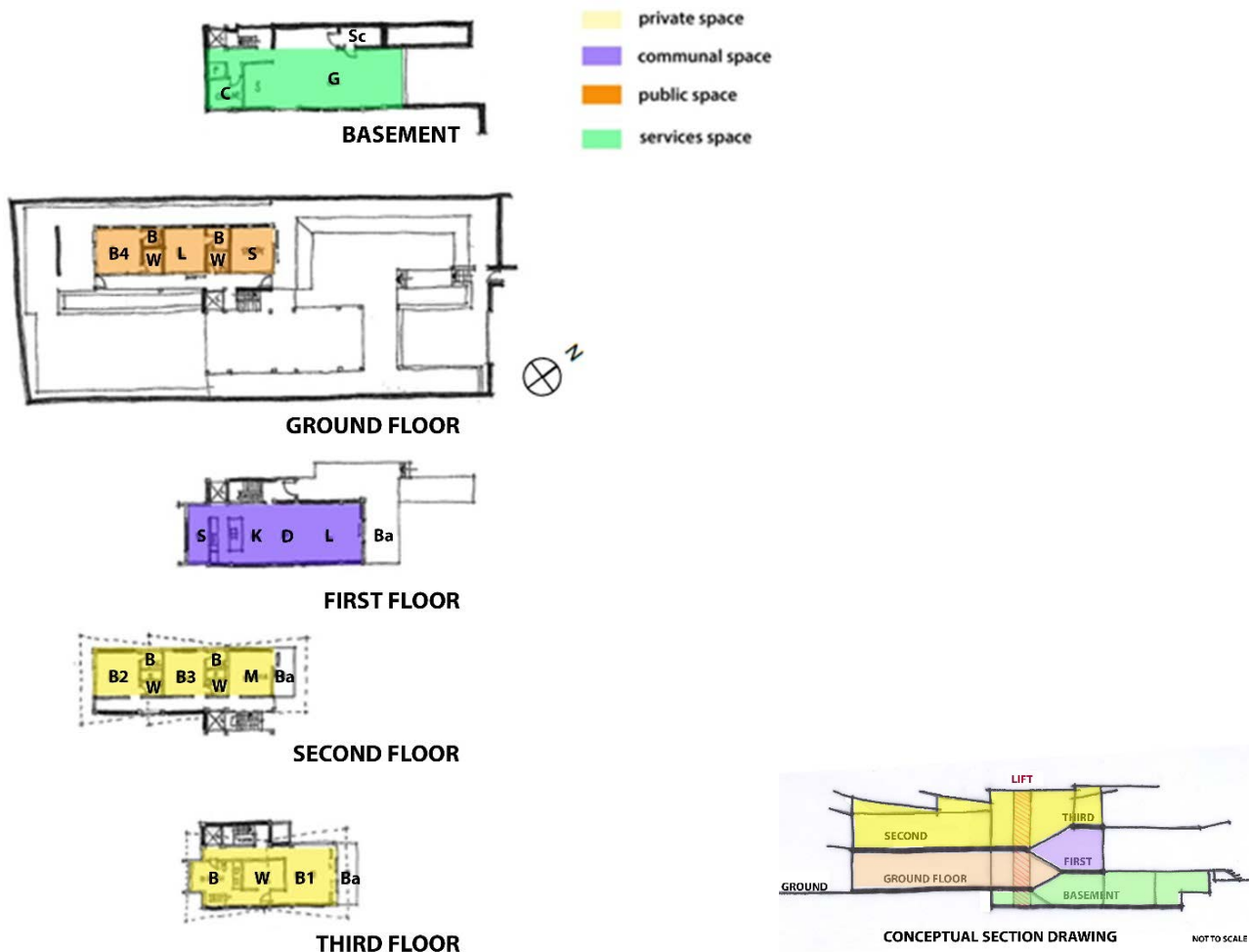


Figure 5.7.1g Controlled circulation is created with the design of a central corridor, a lift and flights of stairs along with three exits. For key see Figure 5.7.1e.

- There are specific function zonings (indicated in colour code in Figure 5.7.1h) showing a level of privacy, dynamism, and social-private interactions between floors as the floor goes higher. There is a sense of spatial hierarchy from the most public spaces such as the basement to the most private spaces such as the master bedroom on the fifth floor.





**Figure 5.7.1h** There is a spatial program for the specific function of each floor with a hierarchy of privacy characterised by public and private interactions between the residents and others (family, friends, and visitors). The services space in the basement in green is generally accessible and used for all activities; semi-public space on the ground floor in orange is used for guests, daily chores, work and general indoor-outdoor access; communal space on the first floor in purple is used for family-and-friend social and everyday activities; private space on the second and third floors in yellow is used for private living areas only. The hierarchy in spaces was shown in the design of split levels. For key see Figure 5.7.1e.

### Inside-outside spatial experiences

There were not many inside-outside spatial experiences mentioned in the interviews with the residents. They pointed out their major concern about dust from the highway nearby so that the windows and doors remain closed for most of their time indoors for 'easy maintenance for cleaning the floor and the furniture.' (Interview with the Howells in 2014) The availability of space in the house is generous for a

couple, and they pointed out that the fact of having 4 en-suites, a media/office and a study room in a big house was to obtain a good resale value for the house to match its exclusive riverside location.

*'Just my wife and I live in the house. The reason to build such a big house is for the resale of the house. We were very fortunate here, the value of the land itself is 3 million [dollars] and it capitalises on the investment of the land.'* (Interview with the Howells in 2014)

### **Hedonist experience**

Enjoyment derived from a hedonist lifestyle is never referred to by the residents in the interviews about their outdoor experiences or their engagement with nature and the surrounding contexts. They mentioned fun experiences, going on boat trips in summer and doing indoor activities in the outdoor spaces. A minimal amount of small plant-life and no natural ground is seen at the site. Concrete paving, masonry stairs, two shallow pools as water features, and two patches of grass in both front and backyards are the primary outdoor features of the house (Figure 5.7.1i). There are no significant big trees providing natural shading for the house. There is outlook delight to open riverfront views from the indoor living areas and the balconies at the front. Visual connections are built between the residents and the outside world through a large number of glass windows and doors in the spaces between corridors, media room, study, dining and family rooms (Figure 5.7.1i). There are limited views from the rooms at the back of the house as this overlooks neighbouring backyards and homes.



**Figure 5.7.1i** The view of the front yard (Top) and the view down to the backyard (Bottom) from the scullery on the first floor give a sense of orderly planned garden for easy maintenance. Photographs were taken by the Howells in 2014. The minimal architectural hedonism is seen in the design of completely enclosed indoor spaces.

### A dynamic dialogue with nature and other living things

Transparency was the key architectural feature for the design of the Howells residence. Arrays of large fixed-steel frame and full ceiling height windows (Figure 5.7.1j) offered the residents visual engagement with the surrounding landscape and sufficient sunlight. These arrays of large fixed windows became glass walls for the primary living areas on the south-east side of the first floor and glass certain walls for the passage hallways on the north-west of the ground and the second floors. The residents indicated their preferences for staying indoors much of the day, except for minimal-time outside for gardening and hanging clothes. 'Maximizing sandstone paving with the elegant design of landscaping and minimal planting areas' (Figure 5.7.1k) was desired to suit their lifestyle (Interview with the Howells in 2014). There was little chance for physical experiences to engage the residents an interactive dialogue with nature and living things while they were able to perceive the 'panorama views' (Interview with the Howells in 2014) of the scenery such as the streets, nearby parks and the river.





**Figure 5.7.1j** A view is taken from the front yard to the corridors of the first and third floors (Top); the open space of the living and dining areas of the house (Bottom) looks out to the front yard and the riverside. All photographs were taken by the Howells in 2014. An alternative hedonist lifestyle is visually experienced through transparency.

### Gradually changing life patterns

The Howells prefer order, spotlessness and the controllable human comfort offered by the house over delight, relaxation and contentment. They have less enjoyment of natural breezes and the outdoor-indoor living experience but more of the pressure of 'keeping the house clean without dust', even though they are familiar with Troppo's slogan, 'bringing the outdoors in', because of their work relationships with Welke in numerous Australian Aboriginal housing projects in the Northern Territory and the remote areas of South Australia. (Interview with the Howells in 2014)

### Ethical values versus material culture

There is more appreciation of material culture than overt consciousness of environmental concerns as indoor comfort, visual aesthetics and controllable interior temperature is the residents' first priority. The design of the Howell Residence is like a big double-layered 'glass box'. The north and north-east facing elevations are constructed with floor to ceiling sliding glass doors for the rooms and fixed glass windows for the corridors. The second layer of sliding frosted glass doors is installed to provide privacy for the



living spaces such as bedrooms and guest rooms on the first and third floors which are facing the neighbouring house (Figure 5.7.1k). The residents are pleased with the choice of the expensive marble floor and a large amount of glass as the house is surprisingly warm in winter because of the marble floor. However, the hot summer sun heats up the marble floor through the exposed and transparent façade, hot air is trapped inside the house as well as still hot air outdoor to cause unpleasant and poor indoor comfort. This is the main reason for a sealed interior space with fully operational AC for better indoor comfort without the typical Troppo design features of louvers, shutters, sliding doors and semi-open bathrooms for natural ventilation.







**Figure 5.7.1k** An entire marble floor system, plus glass, steel and masonry work demonstrate the residents' preferences for presenting their desired lifestyle through the visual presentation of material culture. Photographs were taken by the Howells in 2014.

### **Feelings versus desire and power**

The feelings that emerge from a careful study of these photographs of the house and conversations with the residents are of living in a contemporary suburban house. Hard surfaces, modern materiality, distinctive roof structures and forms, and minimal nature (Figure 5.7.1l) visually interpret the residents' desire and power to bring their economic capability to the grand scale of this five-storey house in a prestige area.



**Figure 5.7.11** Modern urban lifestyle is supported both practically (Top), and aesthetically through the minimalist detailing of the ordered landscaping, and steel and glass architecture (Bottom). Photographs were taken by the Howells in 2014.

### Simple gestures versus advanced technology

Four en-suites and many indoor entertaining spaces exhibit the residents' wishes for social activities and gatherings with visitors, family and friends. The use of advanced technology is required to provide a pleasurable ambience and a controllable indoor temperature for them on special occasions. (Interview with the Howells in 2014) Ceiling fans and reverse-cycle air-conditioning units (Figure 5.7.1m) are always used and switched on to 'cool down the indoor temperature from zone to zone wherever it is needed in summer' as they feel hot from the large amount of glass in windows and doors. (Interview with the Howells in 2014)





**Figure 5.7.1m** A fan and a reverse-cycle air-conditioning unit are installed in every room (Top) and the two controlled systems are placed in and covered by a corrugated and shuttered box (Bottom). Photographs were taken by the Howells in 2014.

The design of the Howell Residence is based on the residents' concerns for the house's monetary value, a reflection of their wealth and work background, and their desired lifestyle for modern living. The materiality, the scale and the appeal of the house are in the physical values, which resulted in the residents' request to Welke that some changes in design be made during the design and construction process. The divergence of values for everyday spaces between the residents and those of the 1980s Darwin houses is revealed in the sophistication of architectural forms, the costly elements, details in design and what the residents perceive to be an ideal way of everyday living. The residents' perception demonstrates their mindset for designing the interior spaces for comfort and convenience to foster their peace and enjoyment. The physical appeal of the house determines the complex relationships among the residents' values and perceptions for a socially constructed world and their beliefs about the use of everyday spaces, together with their attitudes to Troppo's core ethical values – a responsible hedonist way of living which is light, informal and laidback, with awareness for the built environment and responsibility for minimal footprint and physical damage. The mindset of these residents is very different

from Troppo's philosophy of enjoying the freedom and fulfilment of moving through and living in outdoor-indoor spaces, and physically and visually connecting with the outside world.

### 5.7.2 Conclusion

A personal relationship with clients and the survival of the practice are the determinants that influenced Welke's design decisions and defied Troppo's ethos and principles in the design of the Howell Residence. Satisfying the residents' needs and wishes were the priorities in deciding the physical form (hard space), the spatial planning, the materials and the construction of the house in order to fit the scale and the grand appearance of its design in this exclusive residential area, for a good resale value in the future. Troppo's distinctive features and numerous awards potentially consolidate the market value of the house with their well-known reputation for 'their best design [in] the Government's housing projects' (Interview with the Howells in 2014). With Welke's resistance to some changes, the residents still insisted on 'the best quality' finishes for the house (Interview with Welke in 2014). The Howells indicate their satisfaction for using marble floors for the entire house to achieve a 'pleasantly warm and comfortable winter' (Interview with the Howells in 2014). They also indicate their satisfaction in the aesthetics of the building design, the great outlooks and views to the riverside, the sky and the stars, the unexpectedly low energy consumption for winter heating, easy maintenance and its effective building performance, despite the fact of the house does get unpleasantly hot in summer. In response they would spend most of the summer time in their boat out in the ocean (Interview with the Howells in 2014). The design of the Howell Residence suggests the design of a contemporary Troppo house with a 'client's-need-dominated' decision-making process, even though the clients indicated a basic level of understanding of their design principles (Table 5.7). The coherence of Troppo language in form patterns is only demonstrated through the client's initial approach with Troppo's like-minded stimuli for a responsible and sustainable way of everyday living – a 'living verandah' lifestyle which they did not finally seek to achieve.

		Typical 1980s Troppo Houses Suburbs of Darwin	Howell Residence, 2010 Perth
Hard space	Similarities	<ul style="list-style-type: none"> <li>• Large exposed overhangs and verandah structure;</li> <li>• The design of verandahs for providing an alternative space for dining area.</li> </ul>	
	Differences	<ul style="list-style-type: none"> <li>• Steel post-and-beam construction and lightweight materials and cladding;</li> <li>• Openable windows, glass louvers and shutters;</li> <li>• No AC.</li> </ul>	<ul style="list-style-type: none"> <li>• Concrete blockwork and masonry are main construction materials, and thermal-mass construction and cladding;</li> <li>• Full-wall height tinted and fixed glass and aluminium-frame windows and doors for sunlight;</li> <li>• Translucent glass sliding doors for dividing spaces between communal and private spaces;</li> <li>• Masonry paved paths and driveway to the basement;</li> <li>• Irregular shapes of roof forms to identify the positions of floors;</li> <li>• All bedrooms with en-suite and closet;</li> <li>• Concrete slabs with marble finish for the flooring system;</li> <li>• Polycarbonate corrugated roofs with custom made steel awning structure for verandah and balcony</li> <li>• A lift and 1500 mm rise of flights of stairs for splitting the liveable spaces to five-floor high;</li> <li>• Specific zoning spaces for different everyday activities;</li> <li>• A central controlled circulation by the corridors, the lift and the stairs for mobility and accessibility;</li> <li>• Multiple entries, exits and split-levels.</li> </ul>
Soft space	Similarities	<ul style="list-style-type: none"> <li>• Occasional use of verandah spaces for dining experiences when there are guests in the house.</li> </ul>	
	Differences	<ul style="list-style-type: none"> <li>• Consciousness for energy saving;</li> <li>• Enjoying doing daily activities in verandah and outdoor spaces;</li> <li>• Expressing delightful sensual experiences moving through indoor and outdoor spaces;</li> <li>• Opening doors and windows always for enjoying breezes while being home;</li> </ul>	<ul style="list-style-type: none"> <li>• Low consciousness for energy saving;</li> <li>• Delight in seeing experience in the indoor spaces to the surroundings but low desires to be in the outdoors;</li> <li>• A high level of anxiety about the accumulation of dust and cobwebs;</li> <li>• Concern about the noise from the traffic on the freeway nearby that doors and windows remain closed;</li> </ul>



		<ul style="list-style-type: none"> <li>• Low anxiety about the accumulation of dust and cobwebs;</li> <li>• Enjoying having showers in a semi-open bathroom without worrying intrusion of privacy;</li> <li>• Enjoying doing laundry in the outdoors.</li> </ul>	<ul style="list-style-type: none"> <li>• No desire to do daily activities outdoors unless the female resident has to go out and hang clothes on the clotheslines;</li> <li>• A high level of privacy by having an en-suite to everyday bedroom, extra rooms for entertaining, a working office and 3 unused guest rooms.</li> </ul>
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**Table 5.7.2** This table shows differences and similarities of hard and soft spaces between the design of the Howell Residence and the 1980s Darwin houses.

## 5.8 Summary

This chapter encompasses the analysis of five case studies of houses designed by the director of the Troppo regional offices in Darwin, Townsville, Adelaide, Byron Bay and Perth. Through the lenses of time and place, the understanding of architecture has been extended to not only examine the aesthetics of its physical form, visual appearance and functionality of space, but also see through them in order to celebrate the discovery of the relationships between architecture, people, contingency and lifestyle. Contingencies were the key for shaping the Troppo language of the early practice. The occurrence of every contingency was the establishment of a regional office that asserted the force to the evolvement and adaptability of the language with resemblances and necessary changes. The discovery of the resemblances and changes to the language was highlighted with the connectivity graphs for the layout of the five contemporary Troppo houses, new design features identified in three categories in *form and space*, *construction* and *spatial arrangement*, the analysis of the interview contents with the directors and the residents, as well as the tables which showed differences between the early and the contemporary houses in design in terms of building material, functionality and architectural elements. These resemblances and changes also demonstrated the affirmation of Troppo's and the regional director's responses and attempts to achieve responsive cohesion in their work. Analysing resemblances and changes to the language offered an insight to the dynamics and relationships between the offices which will be discussed in detail in the following Chapter 6.

Architecture is the mirror of the contemporary culture, and economic and political status of a society or a place. It is always subject to change in order to reflect the social construction and the history of its time as well as denoting the socio-political, socio-cultural and socio-economic conditions of a place. Through construction techniques and building technologies, and availability of trade skills for newly invented materials, it can also fulfil people's aspiration for a desirable lifestyle, give expression to cultural identity, and attempt to sustain deteriorating built environments.

Some important findings were how the design of the houses appealed to the residents psychologically through the emphasis on feelings, emotions, memories and their involvement during the design and construction processes. Descriptions about spaces, sunlight, breezes, rain, maintenance, views to the outdoors, inside-outside movement, their routines of daily living and their gradually changing thinking

and behaviour revealed the level of their resonance and understanding about Troppo's underpinning philosophy. One important note about the conversations with the residents was of very little emphasis on the visual appearance of the design, but only quick references to the admiration and attraction their visitors or bypassing pedestrians or curious strangers had for the strikingly visual exterior of the houses in the streetscape in comparison to the neighbouring houses. The intensity of most of the residents' growing feelings towards the quality of space and their engagement with the outdoors is a key finding of these case studies.

## Chapter 6

### Tropo Language, Contingency and Responsive Cohesion

In Chapter Five, case studies presented analyses of five contemporary Troppo houses. They offered an insight into how regional Directors (or former Directors) and in-house architects have responded to the complexity of regional cultural and environmental contexts, different clients' needs and requirements, different construction techniques, different local industries and circumstances, as well as struggles in practice. This chapter will discuss the individuality and independence of Troppo's regional practices, and interpret the findings with reference to the concepts of pattern, contingency, and responsive cohesion in architecture introduced earlier, considering in what ways, therefore, the findings contribute to knowledge that may be relevant to both architectural research and professional practice. Tables will be used to illustrate variations in the regional versions of a common Troppo design language. The physical/visual (hard space) and psychological (soft space) responses will be examined for their stance, connections with architects' ethical values, attitudes and actions, and with clients' expectations. The potential value of Troppo's experience to current professional practice will then be examined.

## 6.1 Overview

The following sub-sections offer a detailed discussion of the connections between the case study houses and three research themes – patterns, contingency, and responsive cohesion. Section 6.2, *Patterns of response to place*, will discuss and interpret the regional director's perspectives, approaches and design tactics in response to the site, as well as to regional ecological and socio-cultural issues (place), the means to fulfil the clients' wishes (people), and regional building regulations (technology). Section 6.3, *Contingency in response to issues*, will discuss the key factors that triggered changes in the evolving form of Troppo language. These factors will be interpreted with reference to the discourse on sustainable design associated with construction traditions, social organization, cultural expression, economic structure and environmental concerns that has become an increasingly mainstream concern of the contemporary Australian architectural profession over Troppo's three decades of practice. Section 6.4, *Like-minded values and attitudes*, will discuss the interpersonal relationships between Troppo's regional directors, in-house architects, and their clients. This section will highlight the impact of struggles in mentoring and the business viability and survival of Troppo's architectural goals in the reality of architectural practice. Section 6.5, *Value and attitude by effect and experience*, will discuss how the particular dynamics of their cultural practice achieve responsive cohesion in different contexts. Finally, Section 6.6 draws some conclusions on the ways in which space and form in a Troppo house embrace a 'living verandah' lifestyle.

## 6.2 Patterns of response to place

In 1980s Darwin, Troppo's expertise, knowledge and experience were locally appreciated as a 'backyard architecture' that was an architectural interpretation of their 'love of the informal' in the land of Australia in the Top End (Interview with Harris in 2016). They developed the ten important thematic constants discussed in Chapter 4. They were 'a constantly evolving set of general guidelines' as Goad described them in his books *Troppo* and *New Directions in Australian Architecture*. The 'tenth line' theory was most important as every tenth line created a volumetric space where interior and exterior, man-made and nature, enclosed and open, opaque and transparent spatial experiences began. Physical forms and visual appearance were never the priority in the design of the 1980s Troppo houses. The priority was the experiences the residents of a house had in space, whether it was between buildings or underneath the building, in the transition spaces, the courtyard, or the enclosed rooms. The design of the 1980s Troppo houses was about 'making the building work from inside out', finding 'best use of the whole site' and creating the connection the residents had to the building and its surroundings (Interview with Harris in 2016). Troppo houses was all 'about a lifestyle, about being part of a country'<sup>290</sup> that has been overlooked in most architectural discourses and publications about the work of Troppo. Troppo endeavoured to reinvigorate an 'Australian informal' lifestyle in response to conditions of the site, concerns for ecological issues, the meaning of rural places, clients with small budgets, and limited building resources. Form-patterns have now been identified for their linear-space configurations, which came to characterise the distinctive designs of Troppo houses. Over time, however, a shift inevitably emerged in the simple and economical practice of Troppo's backyard architecture because 'traditions in construction change over time' regardless of practice location (Interview with Harris in 2016).

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<sup>290</sup> An interview was carried out between Justine Clark, Welke and Harris and the content of this interview was transcribed and published as an article for the magazine, *Houses* in May 2002. Justine Clark, Phil Harris and Adrian Welke, "Design gone Troppo: Justine Clark visited Adrian Welke in Troppo's Darwin office and Phil Harris in Adelaide to talk about their life and times as the Troppo team, and the projects that have put their brand of Top End Architecture on the map", *Houses*, (May 2002): 93 – 108. The online link for this article – <https://business.highbeam.com/482/article-1G1-86505234/design-gone-troppo-justine-clark-visited-adrian-welke>, was viewed on January 25, 2016.



### 6.2.1 Place: the expansion of practice

Making sense of place is vital in understanding the pattern-forms for the typical 1980s Troppo houses as connections among these patterns represent how human experience and daily routines are created. The sense-making of place was apparent in floor plans, and section drawings of each house and their connectivity diagrams. An open elevated floor plan on site was the typical response to the contrasting seasons of wet and dry with the conditions of tropical heat, humidity, breezes, cyclones and flood. The position of the house among thick vegetation was their way of utilizing natural resources for cooling, shading, shielding, security and privacy. Troppo's design responses to the Top End were sensible, economical and practical in both environmental and cultural contexts. They were feasible patterns for a delightful hedonist lifestyle – easy coming and going, laid-back freedom – in the tropical regions at the time. Every 1980s Troppo house was a visual experiment for a hybrid vernacular architecture – Islander architecture, Indigenous Australian humpies, early English settlements and post-war architecture – which draws on history and context for a mixed-socially and culturally constructed world in the Top End of Australia.

Troppo's gestures were high-pitched gable roofs for hot-air rises and relief of pressure with banks of open windows when cyclones hit, extending outdoor verandahs for sleeping and entertaining, an open plan for cross ventilation, and an elevated and lightweight structure for floods. These responses were adaptable because of possible variations in the interplay of symmetry and asymmetry, formality and informality, open and enclosed, simplicity and complexity, and of connection and discreteness in spatial planning. The occupants of the 1980s Troppo houses perceived their versatile and dynamic spaces as a means to being regional larrikins – in their words, 'feral' and 'bogans'- living in the backyard as 'campers' in the outback (Interview with the residents of the 1980s Troppo houses in Troppoville, Coconut Grove, Darwin in 2011). They felt like 'children' once more in a tree house or 'tourists' on exotic holidays in a tropical resort with cool beers in hand.<sup>291</sup> However, this experience was not mentioned by the residents of the regional houses. They described a more urban and semi-formal residential living

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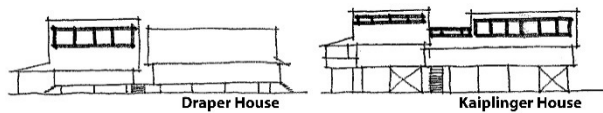
<sup>291</sup> They were the impression of a lifestyle the residents of the 1980s Troppo houses described in the interviews conducted in 2011.

experience with desirable comfort in a confined and private lifestyle. The sense of place has become more formalised and restricted by the surrounding contexts, the local construction norms and the residents' preferences in the case study houses of Townsville, Adelaide, Byron Bay and Perth.

Nevertheless, these urban and semi-informal residential experiences attracted new clients to Troppo over time and in different places. Troppo sought to awaken spontaneous and natural feelings for their sites in these new clients (Interview with Harris in 2012). In this process, a sense of belonging and dwelling in place to fit the neighbouring contexts was then transformed into a spatial arrangement for movements and functions depending on how regional directors interpreted their clients' wishes.

In this way, clients' wishes continued to play a significant role in the evolving form patterns with new materials, advanced construction techniques and craftsmanships in response to clients' financial and social positions as well as their desired lifestyle. The Howell Residence in Applecross, Perth, modified the typical 1980s singular linear form by extruding its volume vertically. The Connell Residence, Magnetic Island, Townsville, doubled its size horizontally, sitting firm on the ground in the rocky-cliff side. The clients for both houses were semi-retired and retired older couples (between 65 and 73-years-old) with financial stability. They indicated their desires to enjoy their wealth with a comfortable, secure, relaxing and private lifestyle as well as a mind for future investment to maintain their comfortable lifestyle when they later downgraded to a smaller home as they got older. Their perceptions were different from the younger clients for the Mortlock Residence in Howard Springs, Darwin, and the Hutchinson Residence in Brighton, Byron Bay. These occupants resonated with Troppo's ethical values of energy-efficiency, environmental concern, and raising a family to enjoy nature. All of them expressed their 'love of Australian's informal' way of living. However, the interpretation of the Australian's informality of everyday living was different as some residents requested to have more indoor rooms. Nevertheless, age and wealth were not necessarily the key to any specific attitudes. The clients for the Russell Residence, Torrens Park, Adelaide, were a semi-retired older couple with a sound financial background, but they wanted to live like a responsible hedonist, using less energy and with lots of opening-up indoor spaces connected with the outdoors.

The summaries of the 16 design themes and visual interpretation of each theme recap the form patterns of the 1980s Darwin houses as characterised in Chapter 4 – *Identifying Patterns*. The vocabulary elements of the Troppo language at that time were: ‘banks of windows’, ‘breathing and adjustable skin’, ‘elevated structure’, ‘simple geometry and forms’, ‘lightweight structure’, ‘symmetry flirting with asymmetry’, ‘elegance in repetition’, ‘living verandah’, ‘shared space’, ‘connecting with nature’, ‘one exit’, ‘transition space’, ‘inside-out and outside-in experiences’, ‘expandable spaces’, ‘cross axis’ and ‘hierarchy in spaces’. The language evident here offers a visual ‘baseline’ for making sense of the following discussions and findings in the following tables (Table 6.2.1a).



#### **Banks of windows**

outlooks to the sky, sufficient sunlight



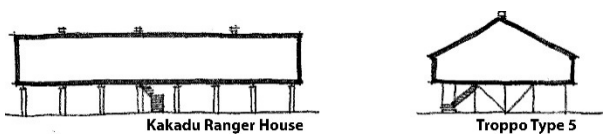
#### **Breathing and adjustable skin**

louvers and shutters for better cross ventilation



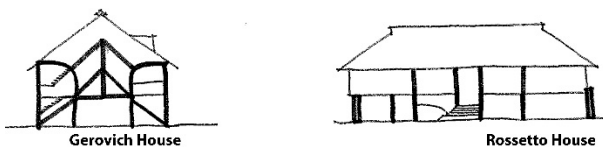
#### **Elevated structure**

cooler, under-the-house storage, outdoor laundry, alternative living space in the Dry season



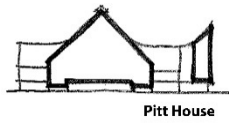
#### **Simple geometry and form**

modular units, easy construction, transportable and low construction cost

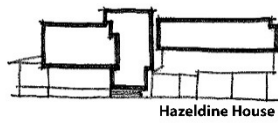


#### **Lightweight structure**

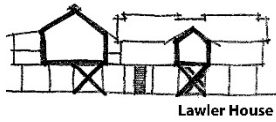
recycle materials (timber and steel), less physical damage to the site, less costs for transportation as its light and easy



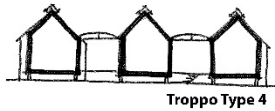
Pitt House



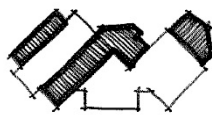
Hazeldine House



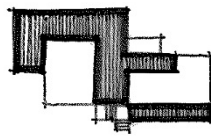
Lawler House



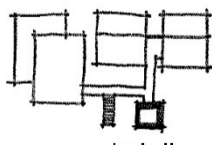
Troppo Type 4



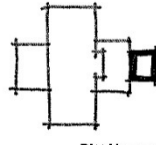
Coleman House



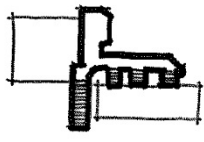
Barkuse House



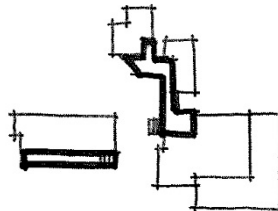
Lawler House



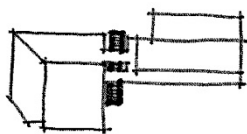
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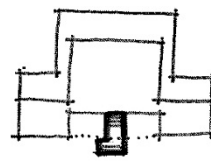
Draper House



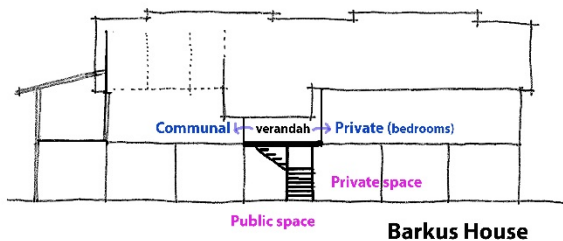
Hazeldine House



Kaiplinger House



Rossetto House



Barkus House

### Symmetry flirting with asymmetry

avant-garde, innovative and distinctive design characteristics with a classical architectural expression

### Elegance in repetition

visual aesthetics achieved by simplicity and rigorous architectural elements with a hint of formality

### Living verandah

outdoor-indoor living (for private and communal space), a hedonist lifestyle, the love of Australian informality

### Shared space

less is more, shared bathroom and toilet not only utilize less material resources and cost effective but also educate people with a mindset for living simple and efficient

### Connecting with nature

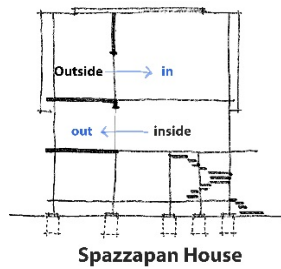
more time being in the outdoors, less energy consumptions, more chances to enjoy breeze, sound of nature and sunlight, physical and mental health benefits, outdoor shower/Bali bathroom

### One exit

visually secured passage way for safety, controlled access to the property

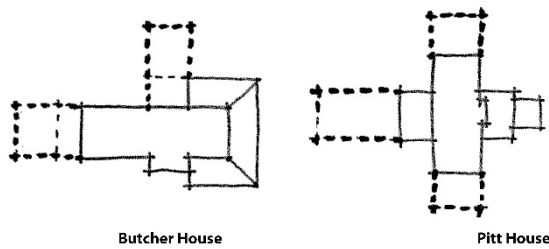
### Transition space

a flight of stairs offers residence transition space between public and private spaces; verandah, passageway and bridge is also transition space between communal and private spaces



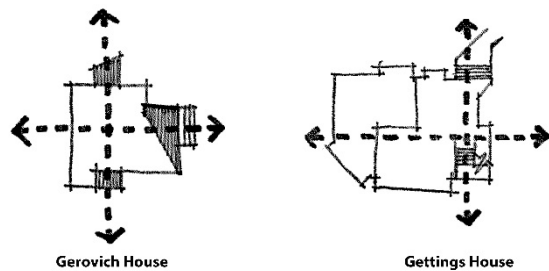
**Inside-out and outside-in experiences**

comfortable and enjoyable feeling of being outdoor in the indoor space and vice-versa



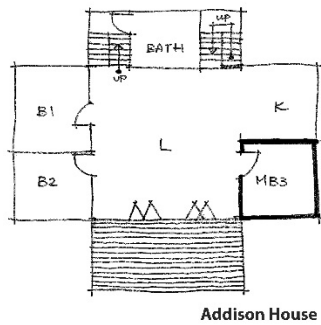
**Expandable spaces**

spaces are designed in separate zones that additional spaces can be independently added to grow with the family size of the residents or put in place a different life plan such as renting rooms/spaces out when downsizing



**Cross axes**

A primary axis for circulation movement is straight in a linear line with a secondary axis for entering a particular room



**Hierarchy in spaces**

Privacy, intimacy and inter-personal contact for adults and children is considered in spatial arrangement

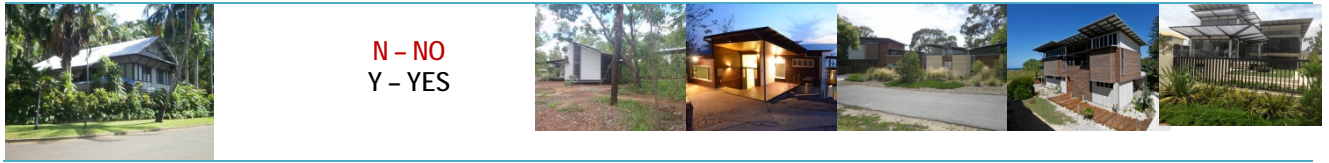
**Figure 6.2.1a** These drawings are a visual representation of the vocabulary of the Troppo language which was used as a matrix to compare the 'hard space' design of five contemporary Troppo houses.

Identifying the different physical features between five contemporary Troppo houses and the cluster of the 1980s Troppo houses was to highlight Harris and Welke's emphasis in the 'natural revolutionary' change in the visual appearance of the 'hard space' design (Separate interviews with Harris and Welke

in 2016). The presence of subtle differences was clear when the 4 types of typical 1980s Troppo houses design and 16 design vocabulary elements of the Troppo language were compared with the visual appearance of the 'hard space' design (elevations and floor plans) of five contemporary Troppo houses (Table 6.2.1a).

Darwin Typical 1980s Troppo houses		Darwin Mortlock Residence	Townsville Connell Residence	Adelaide Russell Residence	Byron Bay Hutchinson Residence	Perth Howell Residence
A, B, C & D	<b>Floor types</b>	A	C	A	C	A
High windows between roofs and external walls	<b>Banks of windows</b>	Y	N	Y	Y	Y
Lightweight cladding, louvers and shutters	<b>Breathing &amp; adjustable skin</b>	Y	N	Partial	Y	N
Post-and-beam	<b>Elevated structure</b>	Y	Partial	Partial	N	N
Rectangle & square	<b>Simple geometry &amp; forms</b>	Y	N	Y	Y	Y
Steel and timber	<b>Lightweight structure</b>	Y	N	Partial	Y	N
Elevation & layout	<b>Symmetry flirting with asymmetry</b>	Y	N	Y	Y	Y
Elevation & layout	<b>Elegance in repetition</b>	N	N	Y	Y	Y
Verandahs	<b>Living verandah</b>	Y	Partial	Y	Y	Partial
Bathrooms	<b>Shared space</b>	Y	N	N	N	N
Hall ways/bridges/passage ways to the outdoors	<b>Connecting with nature</b>	Y	N	Y	Y	N
Access to the outdoors	<b>One exit</b>	Y	N	N	N	N
Stairs/verandahs	<b>Transition space</b>	Y	Y	Y	Y (paving)	Y (gate)
Openable indoor spaces to the outdoors	<b>Outside-in &amp; inside-out experiences</b>	Y	N	Y	Y	N
Flexibility in expanding or dividing spaces	<b>Expandable spaces</b>	Y	N	Y	Y	N
Two axes for circulation	<b>Cross axis</b>	Y	N	Y	Y	Y
Privacy for inter-personal contact and intimacy	<b>Hierarchy in spaces</b>	Y	Partial	Y	Y	Y











**Table 6.2.1a** The table shows differences between the typical 1980s Troppo and five contemporary Troppo houses by using 16 design vocabulary elements of the language.

The challenges of continuing the design of typical 1980s Troppo-style houses in different geographical regions were clear and are shown in Table 6.2.1a. These differences were apparent due to the regional directors' understandings and personal preferences for appropriate designs in response to different climatic conditions, social and cultural contexts, and natural settings of the site, local construction techniques, and availability of building materials and trade skills, and bureaucratic constraints (Table 6.2.1b). The Russell Residence in Adelaide displayed most features of the Troppo language, despite of its colder climate and different construction practice in the southern region where traditional construction norms were heavy thermal-mass materials and building techniques. The design of Russell Residence encapsulated most of the spirit of the typical 1980s Troppo houses with some exciting sparks. On the other hand, Connell Residence in Townsville displayed the least features of the language, despite the location of the house being in the tropics. This result indicated that the level of the regional director's understanding about and commitment to Troppo's design principles, philosophy and ethos was crucial because it determined the unity and continuity of Troppo practice. It was clear that Troppo's design principles of 'contextual responsive cohesion' was neither always achieved nor consistently applied in the design of Connell Residence and Howell Residence for its second least responses to Troppo's hedonist practice.

Darwin 1980s Troppo houses		Darwin Mortlock Residence	Townsville Connell Residence	Adelaide Russell Residence	Byron Bay Hutchinson Residence	Perth Howell Residence
Residential and public housing areas scattering across Darwin	<b>Location of the house</b>	In the middle of bushland	Edge of a rocky beach on an island	Next to conservation park; over a creek	Beach front	Along inner city riverside
A mix of tropical housing styles on stilts and monolithic brick houses on ground	<b>Neighbouring contexts and housing style</b>	Ranches, bushland and farmhouses	A mix of privately owned or holiday let-out two-storey or three-storey beach houses	One-storey federation and gable houses	Long-established and highly controlled area for two-storey and one storey beach houses	High-profile development lot for multiple-storey mansions
suburbia	<b>Local community</b>	Rural suburb	Holiday and tourist resort island	Inner-city suburb	Beach holiday and tourist town	Capital city
Satellite developing residential areas	<b>Region</b>	A mix of commercial, military-based and scattered low-income housing in the city	Industrial and booming city in mining industry	Well-developed metropolitan city with a planned city vision	Holiday town with scarce resources	Resale-value-driven idea initiated by the demand of city wealthy residents for an investment purpose
1. post-and-beam steel structure; 2. corrugated roof and wall claddings; 3. a flight of stairs to an open entrance; 4. verandahs to bedrooms, bathrooms and living/dining/kitchen; 5. glass and timber louvers and shutters; 6. banks of openings; 7. long-thin rectangular and singular plan; 8. unfinished internal walls; 9. exposed roof trusses and overhangs; 10. under-house living space; 11. outdoor bathroom and laundry; 12. outside-inside-outside space sequence	<b>Add-on features</b>	1. Pond and pool 2. Random angled posts at entrance 3. Angled post bolted to the floor joists 3. Verandah is used as a circulation path and for daily activities 4. Double-height interior spaces 5. Exposed skillion roofs	1. Angled posts for verandahs 2. Several split levels with flights in 2 directions on one floor 3. Pool 4. Aluminium louvers 5. Compact living spaces and double-room width 6. Multiple exits 7. Covered skillion roofs	1. Angled posts for roofs 2. Cantilevered boxes 3. Circulation being part of living space 4. Sliding doors as movable partition walls for creating private living areas for guests 5. Multiple exits 6. Exposed skillion roofs	1. Angled posts for roofs 2. Cantilevered boxes 3. Monolithic-box form 4. Enclosed corridor 5. Timber screen wall for walkway/entry 6. No formal entry 7. Segregated adult and child bedrooms 8. Multiple exits 9. Exposed skillion roofs	1. Two ponds and an orderly and controlled landscape 2. Double-layer glass walls along corridors 3. Extensive roofs without supports 4. Lift 5. Glass balustrades 6. Aluminium screens 7. Marble floor 8. Five storey high with 1500mm split level in between 9. Multiple exits 10. Exposed skillion roofs
Timber, glass, steel, corrugated iron sheeting and plasterboard	<b>Introduced materials</b>		1. Concrete panels, slabs, cladding and floor 2. Marble entrance stairs 3. Pebbled finish paving	1. Rammed earth walls 2. Polycarbonate roof sheeting 3. Concrete panels and slab	1. Polycarbonate roof sheeting 2. Concrete slab	1. Marble floor 2. Double-brick walls with paint finish 3. Frosted glasses for windows and shading device 4. Concrete slab 5. Tiled terrace

Pitched roof, pyramid roof and rounded-pitch roof	<b>Roof forms</b>	2 Mono-pitched roofs	A mix of mono-pitched and butterfly roofs	A mix of mono-pitched and butterfly roofs	Mono-pitched roof	A mix of mono-pitched and butterfly roofs
Verandahs & under-house	<b>Outdoor living space</b>	Verandahs	1.Verandahs 2.Deck 3.Balcony	1. Verandahs 2.Deck	1.Verandahs	1.Terrace 2.Deck 3.Balcony
	<b>Features</b>					

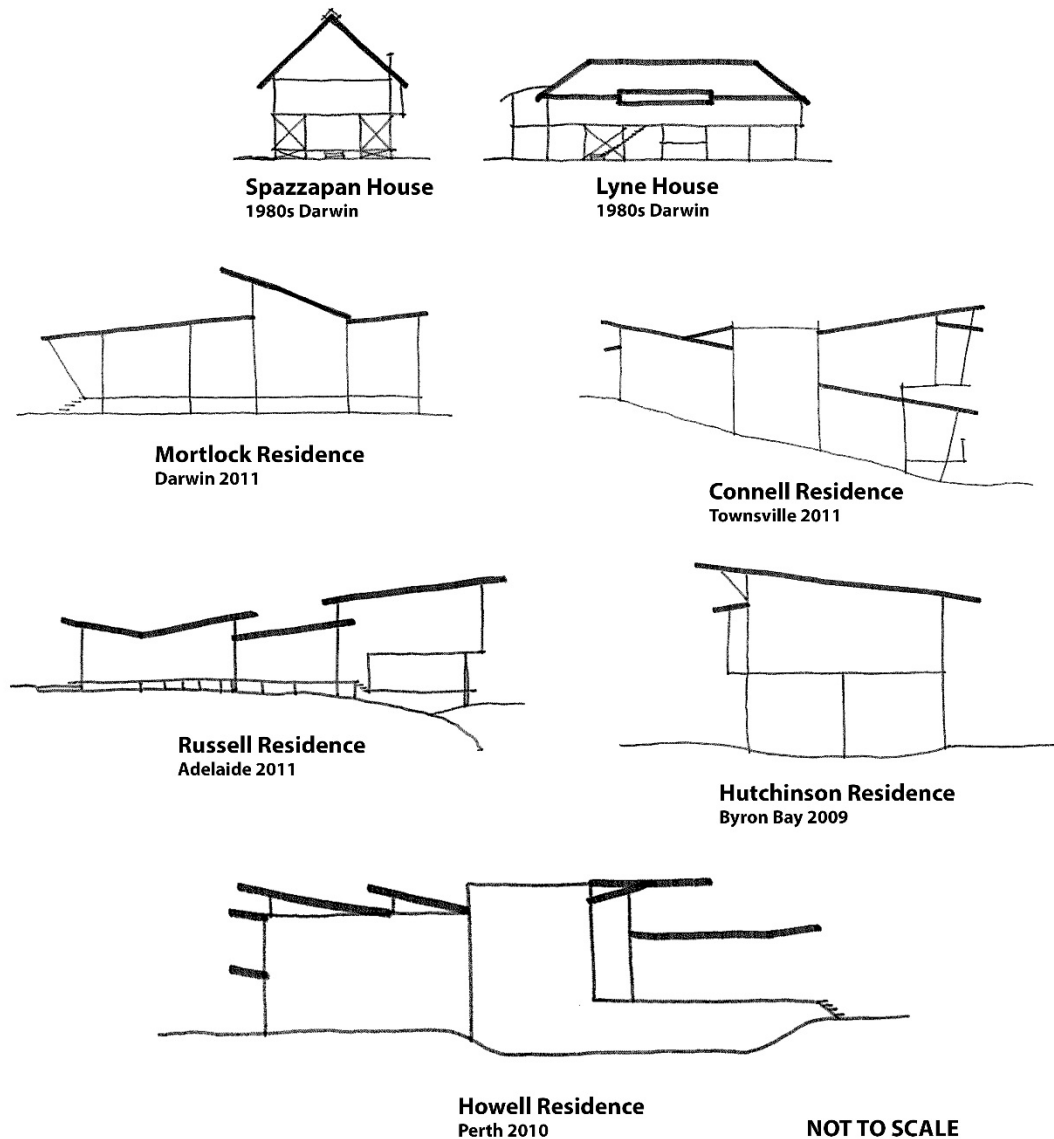
**Table 6.2.1b** This table shows comparisons in design and contexts between the 1980s Troppo houses and the five contemporary Troppo houses.

Both Harris and Welke affirmed that the fundamental design principles, philosophy and ethos were the same for all regional offices (Separate interviews with Harris and Welke in 2016). Most divergence was detected through the analysis of the design of the floor plan and connectivity graph of the Connell Residence, Townsville and the interview with O’Toole, the regional director of Troppo office in Townsville.

Distinctive characteristics of the 1980s Troppo houses that appear in the five contemporary Troppo houses included living verandahs, decks, corrugated iron skillion roofs, lightweight and adjustable external wall cladding, extensive overhangs, arrays of openings (windows and doors), elevated and exposed roof structures as the key features. These key features have become distinguishable ‘Troppo icons’ that the clients were able to identify as ‘Troppo Style’, despite the renouncement of Troppo of such an intention. The expansion of the Troppo practice, changing building regulations, requirements and expectations of wealthier clients, environmental and cultural constraints of regional community, advancements in the construction industry, techniques and building materials were crucial factors for the evolvment and adaptation of the Troppo pattern language leading to new Troppo features such as use of polycarbonate corrugated sheets as roofing and external wall materials for sunlight, thermal-mass construction methods and materials for a colder climate. However, setbacks were inevitable in the

process of evolving their pattern-forms to be more versatile. Some new features diverged from their fundamental principles for sustainable design with their emphasis in simplicity, adaptability, lightweight, low-cost and energy-efficiency. Some new features tended towards designing for more enclosed indoor living, infrequently used en-suites bedrooms, spare bedrooms and fixed-name functional rooms, and large houses for fewer occupants in the Connell residence, Townsville and the Howell residence, Perth. Along with the wealth and wishes of clients for a desired lifestyle with a higher level of comfort, the important Troppo design concepts of shared space and of living verandah lifestyle diminished.

Water elements such as ponds and pools are new features. They were used to soften the landscape of the Mortlock Residence, as a modern living feature for the Connell Residence, and an orderly, man-made landscape for the Howell Residence. A cantilever structure, free-support balcony, angled posts showcasing innovative detailing and the articulation of elevations complemented neighbouring housing styles in a visually-explicit Troppo house (as mentioned by Duffield, Connolly, McNamara, and O'Toole). Thermal mass materials such as rammed earth blocks, concrete blockwork, masonry walls and paving, and marble floors were added for colder climatic conditions. A signature Troppo element – steep skillion roofs – was adapted and transformed to mono-pitched roofs (Figure 6.2.1b) for opening up interior spaces and extending an outlook to the sky. Reductions in verandah space and roof pitch were sought to be harmonious to local streetscape, to comply with the regional building regulations, and meet clients' budgets. Discrete smaller balconies attached to bedrooms, and an open decking area were ways the regional directors sought to retain Troppo's 'living verandah' concept.



**Figure 6.2.1b** Schematic sketches of skillion roofs as a distinctive expression of contemporary Troppo houses in the later practices.

Budgets were important influences on the addition of new architectural features, particularly in relation to the quantity of requested functional spaces, the quality, the variety and the sources of materials, the speed of construction, and the ways in which individual regional directors' responses to local construction techniques, availability of trades and building regulations in parallel with the underpinning philosophy of Troppo practice. Meeting the client's budgets was also a factor in not retaining Troppo

features such as extensive and exposed overhangs, large outdoor-living verandahs for bedrooms, and recycled materials. In the Russell residence, not having outdoor-living verandahs for bedrooms was decided on to lower the building costs to meet the initial budget. Nevertheless, the clients reported that the house met all their requirements for functionality and comfort. The open linear plans of the Mortlock, Russell and Hutchinson Residences validated the pragmatism of Troppo's fundamental principles for passive design – natural cross ventilation and sunlight with well positioned verandah space between the private bedroom space and the communal living spaces. A central axis as an internal breezeway worked in the Connell Residence, as the entry was connected to a large verandah at the rear for cross-ventilation sea breezes in summer. The five houses all adopted reverse cycle ducted air-conditioning to cope with extremes of weather and to provide more interior comfort for older residents. Solar panels were installed in the Hutchinson and Howell Residences. The absence of solar panels in the other houses was explained by aesthetic appeal for the Russell residents and lack of necessity for the Mortlock and Connell residents, who used little energy for their lifestyle (work for the Mortlocks and holiday for the Connells).

The Connell Residence in Townsville has an irregular form in an internal split-level volume due to the clients' request, in contrast to Rohan's initial proposal for a more typical Troppo elevated, long linear form with an appearance of floating light in the air. (Figure 6.2.1c) O'Toole's mixed approach in the final design adapts Troppo's design principles to his local experience of more traditional design for enclosed and secure indoor living. Climate was not the primary issue for reducing the banks of windows and the size of openings in this house. They result from O'Toole's background in responding to clients' requests for their desired lifestyle, reducing costs, fitting in with the neighbouring style, and for safety and privacy. In contrast, for the Russell Residence in Adelaide and the Howell Residence in Perth banks of windows and large openings were requested by the clients.





**Figure 6.2.1c.** The features of a long and linear form, banks of windows and large size of openings of a Darwin Troppo house (Left) were not adopted in the design of the Connell Residence, Townsville (Right).

Form patterns were adapted to use thermal-mass materials in response to the moderate and cooler climates of the southern contexts. The availability of ‘materials, trade skills and construction methodology of the day’ were also important factors for the change of the design of contemporary Troppo houses. As Harris simply said ‘We are designing for today not yesterday, so we have to adapt.’ (Interview with Harris in 2016) Integrating thermal-mass materials into the Troppo language was a challenge to Duffield in Adelaide and Welke in Perth as there were visual conflicts between the heaviness of the thermal-mass materials and the lightness of an archetypal Troppo house on stilts. In the design of the Russell Residence in Adelaide, the combination of masonry, timber and corrugated-iron external walls on the public streetscape was chosen in line with neighbouring housing designs. On the private living side, double-glazing and wall-height glass windows responded to the residents’ wishes for an up-close-and-personal experience of the outdoors, including the sounds of nature, a glimpse of sky, changing day and night views, wildlife, and feelings of cool breezes. The visual lightness achieved by living on stilts in Darwin was replaced by subtly uplifting the roofs to view the sky, with corresponding psychological feelings of lightness to suit Adelaideans (a local term for people who reside in the metropolitan area of greater Adelaide City). In Perth, the Howells’ priorities were indoor comfort and an easily-maintained house with abundant outlooks to the riverside out front. Welke also sought to respond to the neighbouring houses in its mass and materiality. The delightfulness of everyday living was enhanced through the visual warmth of thermal mass rammed earth, earthy coloured masonry, the lightness of polycarbonate and corrugated claddings and steel elements. The Howells reported that the

house encouraged a tranquil state of mind with easy visual connections to the outside world (Interview with the Howells in 2014).

The regional directors' design concepts derived from clients' wishes. The creation of spaces and forms of the house became meaningful when they responded to the site, climatic conditions and low environmental-impact living. The differences among them can be summarised as follows.

- Some design ideas recognise human desires, needs and requirements that are divergent from Troppo's initial inner responses. The five Troppo houses offer a spectrum of visual stimuli from lightness to heaviness, from an airy, simplicity to a sumptuous-grandeur, and from compact to spreading;
- The location of the project predetermines the type of clients who approach Troppo;
- In a wealthy suburb or holiday resort area, Troppo's visual features become more of a 'blue ribbon'<sup>292</sup> tag than a metaphor for a simple way of everyday living;
- Although Troppo's design principles may be known to most of the like-minded clients who approach Troppo, they may decline to incorporate them in practice due to their preference for a higher standard of comfort and desire for a more 'solid' appearance.

### 6.2.2 People: directorships, additions of in-house architects and wealthy clients

The precedents of works by some prominent Australian architects have inspired Troppo as mentors for creativity and originality. The foundational design principles of Troppo's climatically responsive design was initially influenced by the prominent Northern Territory government Architect Beni-Carr Glynn (BCG) Burnett who shaped the architectural landscape with a unique mix of traditional with the English colonial architecture of the Straits Settlements seen in Malaysia. Troppo adapted Burnett's inventive elevated Anglo-Indian style and learned from a series of Anglo-Asian styles of government houses designed and

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<sup>292</sup> The term 'blue ribbon' was mentioned by Welke in the first interview when he was asked about the mentality and perceptions of wealthy clients on the work of Troppo as well as the reasons that they approached the Troppo to design their house after Harris and Welke had gained reputations by winning numerous awards nationwide.

built by the Department of Works between the 1950s and early 1970s in the Northern Territory<sup>293</sup>. The tropical house design of the early Troppo houses also resonated with Glenn Murcutt's preference for a long and narrow plan together with his representation of the Australian landscape and the means of authentic everyday living learned from Aboriginal people in the outback. Bowali Visitor Centre, designed by Murcutt and Troppo in association, has just such a long and open plan.

A belief in learning architecture by working along with the master to see and understand how space works highlighted the significance of mentoring in shaping Troppo's practice culture in several ways. Mentoring of directors and in-house architects is an important aspect of the expansion of the practice. Both Harris and Welke firmly believed the success of a practice depends on the collective work of collaborative individuals who, while respecting the elders, can 'grow' in the architectural profession (Separate interviews with Harris and Welke in 2016).

Harris and Welke, regional directors and in-house architects inserted a culture of trust in and mutual respect for individual talents and capability. That trust has assisted to build a bond between Troppo, their directors and newly-recruited young graduate architects with their own interests and ambitions. Sharing knowledge and utilizing an individual's talents and design capability were seen in Troppo's over one thousand design projects of various scales and types, evidenced by a combination of design collaboration, innovative concepts, interesting details and efficient computing production. Troppo's distinctive design characteristics and individualities were passed on to the regional directors who had mostly been in-house architects with Troppo for several years, with support efforts between in-house architects' learning and Troppo's teaching in the mentoring process. The exception to this is O'Toole in the Townsville office. The Connell Residence shows the divergence of O'Toole's design approach which is quite different from that of the other regional offices.

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<sup>293</sup> David Bridgman, *The Anglo-Asian Bungalow*, PhD thesis (Melbourne: RMIT University, 2006).

Understanding how Troppo's practice culture worked in the five offices is important. It offers an insight into the significance of the unseen processes of learning, negotiation, and mastering Troppo's skills and knowledge through oral conversations and visual illustrations in order to resolve design issues in practice. Understanding the mentoring process holds the key to unlock the unseen factors that changed the Troppo language over time. A mentoring process was naturally developed within the vibrant learning-at-work environment of Troppo practice culture. It was learning by seeing, listening and comprehending through verbal explanations and visual conversations with the sketches on papers or 'napkins' or 'serviettes'<sup>294</sup> (interview with Harris in 2010 and Duffield in 2012).

*'[A] young person who works closely with the seniors.'* (Interview with Duffield in 2011)

*'Adrian and Phil won't ram anything down your throat, you cannot fake it and quickly you can immerse yourself in it. We did ask lots of questions, and they explained and helped us to see whether we were on the right track.'* (Interview with McNamara in 2011)

*'Since 1999, Phil has been a mentor to me, still is.'* (Interview with Connolly in 2012)

Ways of design thinking and developing problem-solving skills took place in brainstorming sessions with visual and oral discussions as Troppo's practice culture spread. In Townsville, former director Clark carried out Troppo's culture by passing it on to former in-house architect Rohan (2004 – 2010) who was inculcated into the Troppo language's distinctive features. Rohan highlighted his artistry with an award winning project – Horseshoe Bay House in 2010. Following Rohan's resignation in 2010, the presence of these features lessened in the design of residential projects, with an increasing number of commercial projects being undertaken in Townsville at the time of the field trip in 2012. O'Toole had commercially-based design experience rather than Troppo's residential-based design experience.

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<sup>294</sup> Harris mentioned that many important and interesting design concepts and ideas for elevations, solutions for detail constructions and spatial planning were created on napkins in the airplane or serviettes over a lunch or dinner in bed, lying on the floor, sitting at home or out dining (Interviews and casual conversations in 2010 and 2011). Duffield carried the same habit for creating ideas by sketching on napkins and serviettes (interviews and several continuous conversations between 2010 and 2012). Then they would deliver and transcribe their sketches to in-house architects to draft them up to scale by computer program for working drawings for clients or building approvals. The set of design concepts for 'Rozak House' was created over the kitchen bench by Welke and a former in-house architect Joanna Reese in one afternoon.

The influence of the relationship between Troppo’s experience and that of the regional director prior to joining Troppo’s practice is significant, as seen in the following table 6.2.2a.

	Darwin	Townsville	Adelaide	Byron Bay	Perth
Director	McNamara	O’Toole Clark (Former Director)	Harris Duffield (Co-Director)	Connolly	Welke
Experiences prior joining/becoming a director	1. A senior architect with 10 years experiences working in a medium firm in Sydney 2. Then in-house architect for Troppo for 2 years and with Welke’s assistance for another 2 years after independent work as a director in practice	20 years of commercial practice in Townsville	Troppo founder	With Troppo for 12 years in Adelaide	Troppo founder
		With Troppo for 4 years in Darwin	With Troppo for 12 years in Adelaide		
In-house architect once	yes	no	n/a	yes	n/a
		yes	yes		
Collaboration design	yes	no	yes	yes	yes

**Table 6.2.2a** the cultural dynamics between Troppo and the regional directors in practice, including experiences prior to joining Troppo, and current engagement in collaborative design projects.

The mentoring drew an important link between the level of understanding of the Troppo language and the adaptability of that language to the priorities of directors and in-house architects in other regional offices. The elements of the language were simple and direct in visual forms but the key issue lay in the thinking of how individuals responded to the site in planning the movement and good use of everyday space in the house. In the interviews with Harris and Welke, when they discussed their concepts and principles in design it was response to the site that was the only response every time. The importance of feelings for the site and design in response to the site was also emphasised in the conversations with the former and current directors and in-house architects, except the regional director O’Toole who

focused more on meeting the clients' requirements for the visual aesthetics of the house, the use of spaces, the number of rooms, budgets and construction time. It was apparent that Troppo implicitly imparted the importance of a building responding to the contextual aspects (the whole site) as the first priority to the regional directors, except O'Toole whose design emphasised the internal aspects (the residents' requirements). The informed concept of responsive cohesion for making the design of houses was inevitably only passed on to the directors and in-house architects who worked closely with Troppo in the mentoring process.

These were key elements informing the mentoring, that is, to draw meaningful connections between visual (hard) and psychological (soft) spaces in the designs of houses (Table 6.2.2a). Learning to speak this language fluently required practice, the endeavour to learn and paying attention to its secondary meanings – that is, the details and compositions of elements that worked together both visually and psychologically. The findings revealed a manifold language for contemporary Troppo design which can be summarised as the following:

- The flexibility and adaptability of the Troppo language, with Troppo's aptitude for acceptance of new information, respecting individuality, knowledge and skills, being open minded to explore new materials and construction methods and approaches to resolving problems with regards to specific cultural and environmental issues;
- The divergence and segregation amongst regional offices was observed in terms of different design principles, personal goals, methods and attitudes to resolving issues, consistency in design and construction processes, and values in everyday practice.
- The prior experiences, cultural backgrounds and level of acceptance of Troppo's main focus on residential practice were crucial factors in creating a new vocabulary which resonated with Troppo's characteristic features of the language.
- Troppo, the regional directors and in-house architects persistently negotiated in 'good faith' a path between bending and breaking the rules of the early Troppo patterns. The 'good faith' they keep is the manifesto for their belief in the inheritance of a responsible hedonist attitude.



The client's levels of understanding of Troppo's ethos shaped the quality of the everyday spaces of the houses. The clients had the power to lead regional directors to produce an innovative version of a dream Troppo house. The more familiar the clients were with Troppo's fundamental principles and ethical values for the design and use of everyday spaces, the closer the design of the house was in alignment with Troppo's ethos for a hedonistic lifestyle and sustainable and harmonious everyday living as they were able to proactively articulate their desires. The wealthier clients requested higher levels of comfort, convenience and quality in the indoor spaces they desired for their lifestyle, sometimes with less understanding of Troppo's outdoor living verandahs as means to achieve responsive cohesion between lifestyle, house and natural setting.

There were links between how the design of contemporary Troppo houses achieved responsive cohesion, clients' familiarity with Troppo's work, and their personal relationships with Troppo professionals. Most of the clients who approached the Troppo offices had a fair impression of Troppo's work through publications, work associations and word of mouth from family and friends. The Connell residents had not been aware of Troppo's work before they approached O'Toole, as the practice had been recommended by the land developers of this holiday resort property development in 2008. They were Melbourne city residents who had searched for a suitable property for building a holiday and retirement retreat for many years. At the time, O'Toole was engaged in the property development and management of the sub-division of land on Magnetic Island. In contrast, the Howell resident had had a work association with Welke for twenty years. However, there was surprisingly little difference between the Connell and Howell residents with regard to their requests for houses to be designed with heavy-thermal materials and associated construction techniques; expectations that suggested little understanding or appreciation of Troppo's philosophy regarding the design of lightweight houses and sustainable environmental design and lifestyles more generally.

Because O'Toole's clients were unfamiliar with Troppo's work, he made most of the design decisions in respect to spatial arrangement, visual elements, finish quality and the functionality of the house. This

resulted in the non-linear and box-shape of spatial arrangement for the design of the Connell Residence which indicated the divergence of design principles and values between the Townsville office and other offices. By contrast, the loose work relationship that Welke had with the clients gave them much more influence in decisions (Table 6.2.2b). Internal responsive cohesion was only achieved when there was a mutual understanding between the architect and the clients for the final design decisions. It was then that the contextual responsive cohesion could be accomplished between the people, the design of house, and its contexts.

	Darwin	Townsville	Adelaide	Byron Bay	Perth
Designers	McNamara	O'Toole Khasmina	Duffield	Connolly	Welke
Age group (status)	30 ~40 year old directors, a young couple	50 ~ 60 year old married couple ready for retirement	50 ~ 60 year old married couple ready for retirement	30 ~40 year old married couple with 2 young children	60 ~ 75 year old married couple retired
Familiarity & media	1. Word of mouth through friends and family; 2. Visiting Troppo's early design of houses; 3. Reading magazines about their award winning projects	1. Recommended by land developer of the purchased lot	1. Their son who had work experience with Troppo branch in Adelaide; 2. Word of mouth through friends and family; 3. Visiting one Troppo house on Kangaroo Island; 3. Reading magazines and internet search about their award winning projects;	1. Word of mouth through friends and family; 2. Reading magazines and internet search for their previous work	1. Welke's builder for numerous projects in Northern Territories and other interstates for almost 20 years
Reasons for choosing Troppo	1. Like-minded clients for their sustainable design and its openness and engagement with the outdoor space and wildlife; 2. Their design style and living verandahs for a relaxed lifestyle after work	1. Their engagement with the land development; 2. A retirement retreat	1. Like-minded clients for their sustainable design and its openness and engagement with the outdoor space and wildlife; 2. Their design principles for sustainability and its elegant, open and simple feel;	1. Like-minded clients for their sustainable design and its openness and engagement with the outdoor space; 2. The feeling of lightweight and informality 3. Their simple design style	1. Familiar with and liking Troppo's work; 2. An investment property in the future when it is time to downgrade at older age later in life

Absent elements			3. Seeking a different and a more relaxed lifestyle for their retirement	suitable for raising the family	
		1. Multi-functional space 2. Indoor-outdoor movement 3. Outdoor/open 'Bali bathroom' 4. Sharing bathroom	1. Verandahs to bedrooms (included and agreed but had to be rejected due to high costs) 2. Outdoor/open 'Bali bathroom' (rejected due to privacy issues)	1. Multi-functional space	1. Multi-functional space 2. Verandahs to living room and kitchen 3. Indoor-outdoor movement 4. Outdoor/open 'Bali bathroom' 5. Sharing bathroom

**Table 6.2.2.b** The relationships between the clients and the regional directors, the level of clients' familiarity with Troppo's work and reasons for approaching Troppo.

Good communication between the client and the director or in-house architect was a vital aspect in achieving internal cohesion as it effected the outcomes of the final design for the house. Clients were generally positive about the director's and in-house architect's personality, dynamics and the durations of meetings. Most clients were satisfied with the quality and completion of the house as well as the engagement with Troppo staff during the design and construction process. Typical comments during the interviews were 'happy', 'enjoyable', 'understanding the needs', 'fun in learning and chatting over ideas and sketches', 'patient in resolving design issues', 'prompt actions in resolving construction problems', 'positive interactions and smooth conversations with builders and engineers', and 'good interactions and connections with us (clients).' (Table 6.2.2c) For the Connell Residence, communications between the clients, design team, and builders were not as close as others during the construction process with a need to resolve issues on site, such as challenging accessibility to the building site on the island and construction issues (Interview with the Connells in 2012). Nevertheless, the clients showed satisfaction in relation to the quality of living spaces and the desired lifestyle they always wanted because of the location of the site on the island.

	Darwin			Townsville			Adelaide			Byron Bay			Perth		
	S	R	D	S	R	D	S	R	D	S	R	D	S	R	D
Design processes	+			+			+			+			+		
Conversations	+			+			+			+			+		
Dynamics	+			+			+			+			+		
Construction processes	+			+			+			+			+		
Attitudes	+			+			+			+			+		
Services (on-going)	+			+			+			+			+		
Satisfaction of product	+			+			+			+			+		
Affiliated practice	none			North Point (commercial practice)			none			Beach Architect (residential practice)			none		
Conflicts				over budget but the higher costs were accepted through communications- difficulties arose over accessibility and bad weather for construction issues			over budget but the higher costs were accepted through communications			over budget but the higher costs were accepted through communications and resolved with a slight change in reducing footprint of the building and selecting different materials			No budget required		
Budgets	on (built himself with assistance from friends and relatives)			over			over			over			over		

S – Satisfactory (happy, enjoyable and delightful process) R – Reasonable (standard) D – Dilemma (unresolved issues)

Table 6.2.2c The dynamics between the regional director and their clients.

This analysis sought links among the level of like-mindedness in clients of Troppo, their interactions with the regional directors, and the closure of the inner world of the clients in relation to their dream home. These links offered an understanding for the connections between the importance of inner cohesion and contextual cohesion, and the design of the house. The findings were as follows.

- The 'advanced level' of like-minded clients had explored more of Troppo's early work in media, publications and physical visits. The 'starter level' clients had general and basic understanding of Troppo's fundamental principles and theory in climate-responsive design regardless of the length of time knowing Troppo. There is a difference between what they knew of Troppo's values and goals in design and what they wanted for the product;
- Clients with sufficient financial resources continued the construction processes even with concerns about building costs as they were deeply involved with the architect right from the preliminary design process and they wanted to see the final product in the end;
- Prompt responses to the clients' requests and concerns (oral and email) determined the level of smoothness or difficulty during the design and construction processes. They contributed to satisfaction, happiness and emotional involvement with the architects. This created an impression of Troppo's professionalism and their personal relationships with the associated stakeholders of the project for word of mouth recommendations in the future;
- In most cases there was a challenge for the architects in meeting the clients' budgets (one client wanted an ideal house with no budget specified). Positive interactions, prompt responses to resolve design and construction problems, and long meetings with clients offered them reassurance about the quality and integrity of their home, as well as its value in terms of the needs, comfort, confidence and convenience that the clients had requested when they had initially approached Troppo. Compromises were reached with patience.
- The design language is simple for like-minded individuals to understand at a 'starter' level. Yet the richness of the language is concealed from the 'starters' unless they proceed a further step by speaking with people who reside in a Troppo house, are familiar with their work, are associated with them personally or through work, and research their work via books, magazines, online websites and site visits. By doing this, they have an opportunity

to grasp Troppo's fundamental values for creating a relaxed lifestyle by engaging with the outside world and the underlying meaning of their designs – achieving a sense of contentment, openness, delight and happiness with minimal physical harm to the built environment;

- 'Starter' clients had basic knowledge about Troppo's climate-responsive-design in theory. Mentoring about a 'responsible but hedonistic' lifestyle, sharing of environmental concerns, mutual respect and understanding were needed between the architect and the clients to achieve a product with both the quality and integrity of a Troppo house with its formal language;
- A continuing friendship between clients and architects was often established at the end of the project.

One important finding was how the relationship between internal and external cohesion determined the residents' satisfaction with the quality and functionality of the house, the smoothness of the overall design and construction processes, and how well the design of the house responded to the site and its neighbouring areas.

### 6.2.3 Construction technology and building regulations

A shift in construction techniques was inevitable over time in the same place and in different regions. Harris pointed out that 'each place responds to time, there is no singular tradition in construction that endured in one particular place.' (Interview with Harris in 2016) A higher level of aesthetic sophistication in simple and elegant joints played an important role in the designs of contemporary houses. Troppo collaborated with Bligh Voller Nield Architects in 2002 on a medium-density award-winning project in Lavarack Barracks Defence Housing Australia (DHA), Townsville. For this project a 'kit-of-parts'<sup>295</sup> was developed to meet budget requirements by the clients (DHA). This offered an aesthetic of attached elements – stairwells, roofs, sun shading devices and bathrooms – which were prefabricated before

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<sup>295</sup> 'Kit-of-parts' construction method is described in the article of 'Lavarack Barracks', *Architecture Australia*, vol 91, no. 2 (2002) online publication. (Accessed online on May, 2012)



they were clipped onto the precast floors and tilt-up concrete panels. Understanding the building industry, construction techniques and trade skills to best work with the availability of materials was required to keep Troppo's 'collective philosophy' and ethos alive and unchanged (Separate interviews with Harris and Welke in 2016). Design had to 'translate different climates' and recognise 'different ways how building industry operates', with the knowledge of building sciences needed to make design work. Most importantly, it had to work the way 'in which bureaucracy works around the buildings for people and communities.' (Interview with Harris in 2016).

Change in the Troppo language became unavoidable because of changing building regulations as time progressed in the regions of Australia. Complying with building regulations was always a challenge, and yet an opportunity to test the practicality and adaptability of the language.

*'Regulated rules want to seal everything up and they make it impossible for us to build our houses.'*  
(Interview with McNamara in 2011)

*'[To] get it built you have to make the house removable in the event of a tsunami. All of the buildings have to be transportable at any time...they really don't want any development there.... They put very strange controls over there to stop development but people still would like to build it there.... Every development is hard to get approved.'* (Interview with Connolly in 2012)

Building regulations limited Troppo's ability to retain their ethos for passive design only without active systems. They have imposed rules that control the building approval for achieving energy-efficiency (Table 6.2.3a). For instance, in Darwin air-conditioning (AC) has become a commodity for residents to cope with tropical heat and current building regulations require that newly built houses are appropriate for air-conditioning. These building regulations also promote concrete and/or cavity brick-wall houses as a way to minimize damage caused by unpredictable cyclones. This has increased problems making it almost impossible to build houses like the 1980s Troppo houses, according to McNamara. As a result of these regulations, approval of several residential projects without the installation of AC has been rejected which McNamara pointed out suppressed the originality of the Troppo ethos and affected the survival of the practice.

Darwin 1980s Troppo Houses		Darwin Mortlock Residence	Townsville Connell Residence	Adelaide Russell Residence	Byron Bay Hutchinson Residence	Perth Howell Residence
Tropical savannah climate (Wet and Dry seasons)	<b>Climate</b>	Tropical savannah climate (Wet and Dry seasons)	Tropical climate (rainfalls not as high as other regions in tropics)	Hot Mediterranean (mild wet winters and hot dry summers)	Sub-tropical Climate (cool dry winters and hot rainy summers)	A mixture of Californian and Mediterranean (hot dry summers and mild wet winters)
Ceiling fans in all bedrooms (most houses)	<b>Devices</b>	1. Ceiling fans in all rooms and outdoor verandahs 2.1 split AC in master bedroom	1. Ceiling fans in all rooms; 2. 5 split AC in all rooms	1. Ceiling fans in living room; 2. Evaporated AC; 3. Hydraulic heating system (HHS)	1. Ceiling fans in living room and outdoor verandahs; 2.1 split AC in one open space - living/dining room and kitchen	1. Split air-conditioning 2. Heating system 3. Ceiling fans in all rooms, even laundry
Turn on ceiling fans whenever at home	<b>Frequency of use of AC</b>	Extreme hot or humid days	Extreme hot days	Turning on AC/HHS for a couple of hours before bed or during daytime on extreme hot/cold days	Extreme humid days	Extreme hot days but seldom turn on heater in winter
Open up all windows, louvers and sliding doors all years round except heavy rains	<b>Daily activities</b>	Open up all windows, louvers and sliding doors when at home	Open up sliding doors at rear when at home	Open up windows in the bedrooms, sliding doors in the living room, kitchen when at home	Open up all windows, louvers and sliding doors when at home	Open up some windows
Natural breezes and rains, enjoy natural warm air, sunlight and rains	<b>Preferences</b>	Natural breezes, don't mind warm hot air at times	Natural breezes	Natural breezes	Natural breezes, don't mind warm air at times unless high humidity	Natural breezes

**Table 6.2.3a** the relationships between climate, availability of technology, clients' daily activities and preferred ways of using devices.

The Troppo offices responded to these regulations by accommodating them into design considerations. A transitional process can be seen where passive-energy design strategies evolved into active-passive

design strategies. The design language was adapted to comply with the regulations by adopting concrete blocks and floors, Hebel panels and rammed earth walls, and installing air-conditioning and heating systems, smooth wall and ceiling finishes, water tanks, as well as creating enclosure with outlooks through walls of full-wall-length glass and corrugated polycarbonate sheeting. These add-on hard features (materials and technology) seemed to contradict the 'connotations of Australian shed tradition'<sup>296</sup> that had characterised the earlier houses, yet designs continued to recognise clients' general preferences for opening windows and doors to manage the internal climate instead of relying primarily on technology (Table 6.2.3a). The design response has been to allow both passive and active strategies, and to achieve as much as possible through passive design rather than active heating and cooling.

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<sup>296</sup> Stephanie Pearson, "Troppo in Esperance: Long-established as the pre-eminent architects of Australia's top end, Troppo architects have brought their principle of 'participating in the climate' to a seaside house in Esperance, Western Australia," *Houses*, August, (2000).

### 6.3 Contingency in response to issues

Contingency has given Troppo's practice a chance to turn interruptions and difficulties into success in the expansion of their practice, even though they 'never knew where the next job was coming from.' (Interview with Harris in 2016) A positive attitude remained one of Troppo's and the regional directors' strengths. They consistently aimed to keep 'good faith' (inner response) in 'bending rules' and in 'breaking rules'<sup>297</sup> (visual response) as well as proactively seeking all sorts of opportunities by keeping 'doors open' and 'a breadth of areas' in diverse types of architectural work at different scales<sup>298</sup> (Separate interview with Harris and Welke in 2016). There have been difficulties in confronting of contingent events, for example, in the way McNamara endeavoured to maintain the spirit of the 1980s Troppo houses in the contemporary Darwin context with being at the edge of shutting down the Darwin operation due to the constant failures of building approvals for his non-air-conditioning designs.<sup>299</sup> Nevertheless, their responsive hedonism was manifested out of these adversities. With patience and perseverance, they maintained enthusiasm for the informality of their practice culture and sustained the Troppo philosophy of 'no bow tie' at work as well as their positive thinking in creating 'little projects' such as portable buildings and pods (modular buildings) to keep their practice going (Interview with Harris in 2016).

Family first also reflects how Troppo think highly of family values in seeking everyday living that suits different families, the surroundings of the site and their desired lifestyle. The deep feeling and the significance of family values are exhibited in the Troppo priority of putting the emotional needs of a family into the spatial and functional design of a house. The design of Troppo houses intends to accommodate a good quality of family lifestyle through shared, communal and multi-functional spaces. However, Troppo's understanding of family needs in relation to quality of housing design does not always promote

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<sup>297</sup> McNamara pointed out that the rigidity of regulations does not give room for architects' innovative design. As he put it 'regulated policy (in Darwin currently) doesn't take vegetation into design' and 'breaking the rule is a good thing'. This interview was conducted with him on his designed open platform-decking elevated in the backyard of his house.

<sup>298</sup> Harris and Welke mentioned the importance of working proactively in interior design, project managements, small scaled projects such as pods and indigenous housing projects in the remote areas.

<sup>299</sup> This refers to the struggle of McNamara fighting for the survival of the Darwin practice and following passive design without AC installation against the recommendation of building regulations for AC uses. He pointed out that these rigid regulations had caused difficulties of getting building approvals for his projects over the years. This problem had made him lose clients and face fewer incoming projects. The Darwin branch at times encountered insufficient finance in keeping the practice operating for him and his co-director, his wife.

the successful running of a regional practice. Instead, its success is determined by a fine balance between quality and the financial survival of the regional practice. This is shown by the relocation and downsizing of their offices and becomes especially evident in the case of the Darwin, Townsville, Byron Bay and Perth offices.

Harris mentioned the key of turning interruptions or difficulties to success was to 'always work at the cheap end of town doing little projects for people with inadequate budgets or doing proactive projects such as portable and flat-pad buildings (pods and modular houses)... it is not a good way for running a practice financially and those proactive projects in fact drain resources hugely and you are not getting paid when you establish those things. I guess they are investments in a longer term in a bigger picture there for the future... if you do good work and any architect can tell you that you can only live by your work and you are only as good as your next job. Well, you just need to keep producing them and you can keep a practice going.' (Interview with Harris in Adelaide in 2016)

A set of rituals in consolidating the unity of Troppo practice among offices was developed by Troppo's beliefs in involving conservation architecture in the Territory and Western Australia, the remote regions of Australia and developing countries overseas (Separate interviews with Harris and Welke in 2016). It was developed with a rigor for resolving design issues in group dialogues, communicating ideas and concepts over free-hand sketches, and sharing up-to-date information with camaraderie among offices. Through the process of mentoring, in-house architects were able to carry Troppo's 'collective philosophy' (Interview with Welke in 2016) with them and assist Troppo by seeking the door of an opportunity by voluntarily relocating to a new location for commissioned projects or home place for proactively making Troppo practice 'grow'. Through these constant dialogues and dynamic interactions between Troppo and the regional offices, except the Townsville office<sup>300</sup>, contingency has transcended into 'a succession plan' for them, in that the Troppo language has been used to celebrate Troppo's collective philosophy by creating new forms and design patterns with their understanding of the 'history of architecture and uses of building

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<sup>300</sup> Both Harris and Welke pointed out the separate business operations and different design principles that the Townsville office was and is running the practice as a franchise rather than a branch of Troppo practice in the interviews in 2016.

in a place and the matter of how bureaucracy operates in that place.’ (Interview with Harris in 2016) They held the keys enabling the expansion of Troppo practice to achieve responsive cohesion at social, cultural and environmental levels. The following sections address how new forms and design patterns in the regional offices were adapted to achieve responsive cohesion through social organization, cultural expression, economic structure and sustainable design.

### 6.3.1 Social organization

Understanding the local social organization of each project was a point of reference for the regional offices. It assisted them in integrating an adequate level of understanding in the physical characteristics of a place, as well as the intensity of its regional development, and patterns of social life. The physical characteristics of a place influence the unfolding of the clients’ purpose behind the design, their personal preferences for forming patterns of daily routines around the house, and the social dynamic they achieve with others (family, friends, visitors and strangers) in the area (Table 6.3.1a).

Darwin 1980s Troppo Houses		Darwin Mortlock Residence	Townsville Connell Residence	Adelaide Russell Residence	Byron Bay Hutchinson Residence	Perth Howell Residence
Developing urbanized suburbs and low-cost housing development areas	<b>Intensity of development</b>	Rural area in outback bushland	Holiday and resort development on an island	Highly urbanised suburb	A low-density holiday suburb for beach houses	High-profile new development area along riverbanks
	<b>Purposes behind the design</b>	A retreat for peace and contentment after busy work	A retreat and a place 'to get away' * Initially the house was built for let like nearby houses, but clients changed their mind after completion to private use	A retreat and a place for retirement	A beach house for raising children and recalling childhood memory	A place for retirement and an investment property for the future
Set back and semi-visible from the road with thick vegetation	<b>Visibility</b>	Set well back and semi-visible from the road	Set well back and not visible from the road so that the house is immersed in surrounding trees and boulders	Regulated set back and highly visible from the road	Set well back and not visible from the road as the house is located in a hidden lot between a	Set well back but highly visible from the street because of its height



<p>Selected interactions with strangers (tourists and students) due to nature of the house as a Troppo house (fences were built in to avoid unnecessary disturbance and intrusion)</p>	<p><b>Social dynamic</b></p>	<p>Quiet and only family and friends, no fences</p>	<p>Highly interactive with family and friends from interstate and overseas, no fences</p>	<p>Highly interactive with family, friends and strangers, no fences</p>	<p>Quiet and only family and friends, no fences</p>	<p>Quiet and only family and friends, masonry fences</p>
<p>Relaxation, open-free, delight and enjoyment with minimal privacy</p>	<p><b>Desired lifestyle</b></p>	<p>Privacy, contentment and stress-free lifestyle in a remote and natural landscape area after a busy day</p>	<p>Privacy, relaxation and a slow-paced lifestyle for doing more outdoor activities such as walking on the beach and reading on the deck looking out to the ocean.</p>	<p>Privacy and engagement with nature and external interactions (conversations with pedestrians and visitors to the park), contentment and open-free lifestyle when retired</p>	<p>Privacy and safety for raising offspring surrounded by nature, open space, fresh ocean breezes and quietness</p>	<p>Privacy and relaxation and a modern lifestyle to enjoy life with outdoor leisure and scheduled holidays</p>

**Table 6.3.1a** the relationships between intensity of development, the intent and the visibility of the house, and the social dynamic of the clients with neighbouring houses in the area.

Connections can be made between time, evolving patterns, changing social organization, and regionally fixed lifestyles. These connections are as follows.

- The physical site offered both physical and psychological amenities. Physical amenities were characteristics such as easy access to walk on a beach, jog, swim in the ocean or read on a veranda/deck with privacy, ambient breezes and daylight. Psychological amenities were senses of privacy, hiddenness of the site away from public access, retreat for stress-free relaxation or engagement with the world.
- Design forms and patterns were adapted to respond to the clients’ stages of life, and the purposes of the house, i.e. a stress-free get away and in-touch-with-the-outback camp house (Darwin), a holiday and resort retreat (Townsville), retirement and outside-in house (Adelaide), a family nest that recalls childhood memory and raising family (Byron Bay), and an investment property to secure a comfortable and prosperous lifestyle later in life when downsizing to a smaller home (Perth).

- There were motivations for houses to be larger than seem initially necessary or desirable. The Connell and Howell Residences are four-bedroom houses for couples who like to accommodate visiting family and friends. The Howell Residence is located in a holiday and resort area of Magnetic Island where houses often become serviced bed-and-breakfast or self-catering holiday houses. The Mortlock, Russell and Hutchinson residences are three-bedroom houses accommodating a couple or a family of four who enjoy family-orientated lifestyles. Bigger houses are a particular selling point in high-profile developing areas in Perth.
- There were patterns from the 1980s Darwin houses that were missing in these residences, such as shared space (bathroom), unfinished walls with limited privacy, and the concept of a breathing skin (exposed walls and transitions between inside and outside space). The 'soft' space concept has been replaced with more privacy and comfort due to the conventional desires and awkwardness of some clients. The need to physically move between inside and outside spaces has been reduced, the enjoyment of this experience replaced by increased convenience.

### 6.3.2 Cultural expression

Chapter 4 included a 'thick' description of cultural elements in the 1980s Darwin Troppo houses, such as being on stilts, the use of on-site natural or locally resource materials, and the form of the cultural symbol of the traditional Australian shed. The houses displayed foreign influences in the regional architecture of Darwin, as well as the acceptance of hybrid-design building types, and the dynamic progression of reinvigorating innovative designs to reflect the 'exotic and exciting' character for its 'diverse cultures, political dynamics environment and socio-economics position' at a given period of time in history (Interview with Welke in 2016). Troppo envisaged the potential of adapting some of the features of Darwin's vernacular architecture to create a Troppo 'hybrid' version of contemporary tropical features with steel cross-bracing as decoration and structural support. The use of steel elements with

engineered floor structures<sup>301</sup> (Figure 6.3.2) was adopted to ensure stability and durability for long-life building performance. These architectural features of the Darwin houses at the time indicated Troppo's values for preserving the cultural uniqueness of Top End architecture and they became distinguishable characteristics of a Troppo house design at the time.



**Figure 6.3.2.** The elevations of the 1980s Darwin houses show steel cross-bracing members. The photographs show the intentional short-span of floor joists, bigger size circular hollow sections (CHS) and I-Beams, and unseen deeper footings (on the bottom row) as 'over-engineering' structures for assuring the occupants of the structural durability and stability in case of any cyclones and flood.

Subtle differences between the 1980s and contemporary designs of houses were identified through materiality, compositions of forms, volumes, and local building industry in response to time, cultural differences, and advancement of construction techniques. Changes reflected the director's local knowledge and experience (Interview with Connolly in 2012) for making sense of a place for each region,

<sup>301</sup> The 'over-engineering' of structure was mentioned by the residents of early houses as a family friend of Kaplinger residents was a structural engineer who mentioned the rigidity of floor and post structures of the house whilst visiting. There were more floor joists, larger sizes of circular-hollow-section and I-beams and thicker footings. This feature was necessary to consolidate the durability of Troppo houses to reassure the local community about the safety of their design.

such as concrete block work to reflect the industrial nature of Townsville, thermal rammed earth walls to respond to the colder climate of Adelaide, and lavish marble to fit in the exclusive river area of the mining boom city of Perth (Table 6.3.2a).

Darwin 1980s Tropo Houses	Darwin Mortlock Residence	Townsville Connell Residence	Adelaide Russell Residence	Byron Bay Hutchinson Residence	Perth Howell Residence	
<b>Steel, timber, glass, corrugated iron sheets, and plasterboard cladding</b>	<b>Materials</b>	Steel, timber, glass, metal rods, plasterboards, aluminium sliding door frames, polycarbonate corrugated sheets, corrugated iron sheets	Steel, glass, concrete block and slabs, timber, plasterboards, corrugated iron sheets, polycarbonate corrugated sheets	Steel, glass, concrete slabs, rammed earth bricks, concrete panels, timber, plasterboards, corrugated iron and polycarbonate corrugated sheets	Steel, timber, glass, weatherboards, plasterboards, polycarbonate corrugated sheets, corrugated iron sheets	Steel, aluminium window, door frames and balustrade rails, plasterboards, glass, marble, concrete block work and slabs, corrugated iron sheets, and masonry
<b>Post-and-beam construction, timber slatted walls, lightweight suspended timber floor and corrugated iron cladding systems</b>	<b>Construction techniques</b>	Post-and-beam construction, painted plasterboards for internal cladding and a mix of metal and timber cladding for external walls, suspended timber floor, timber ceiling finish, lightweight corrugated iron cladding and roofing systems	High thermal-mass and prefabricated construction with concrete block work and slabs, a mix of timber and fibre-cement cladding with rendered finish, painted plasterboard for internal walls, standardised window and door frames, cantilevered balcony and corrugated iron roofing system	A combined high thermal-mass construction with a mix of timber, rammed earth, and concrete cladding systems, rammed-earth walls for hallway, wet areas (bathroom & laundry) and fireplace, painted plasterboard for internal walls, and suspended concrete floor system and post-and-beam construction for the structural framework of the house plus corrugated iron roofing system	Post-and-beam construction, a mix of weatherboards and painted fibre-cement cladding systems, painted plasterboard for internal walls, suspended timber floor, extruding-box spaces for master bedroom, and corrugated iron roofing system	A high thermal-mass construction with concrete block, slabs and walls with fibre-cement cladding system finish, painted plasterboard for internal walls, cantilevered steel-framed eaves and balcony, corrugated iron roofing system
<b>High thermal-mass construction with concrete block and brick work with concrete slabs, and brick, or concrete cladding with corrugated iron roofing system</b>	<b>Local construction norms</b>	A mix of high of thermal-mass construction with concrete block and brick-veneer and lightweight post-and-beam steel construction, weatherboards, or fibre-cement cladding systems, elevated structure, corrugated iron roofing system	High thermal-mass construction with concrete floor slabs, concrete block or brick-veneer walls often rendered, standardised window and door frames, corrugated steel or concrete or terracotta roofing system <b>New techniques include</b> fibre-	A mix of high thermal-mass construction such as double-brick, brick-veneer or reverse brick-veneer rendered, concrete slabs, corrugated iron or terracotta roofing system <b>New techniques include</b> lightweight steel construction, hebel construction, and fibre-cement,	Brick-veneer or reverse brick-veneer construction with fibre-cement, weatherboards, timber cladding systems, lightweight steel construction, elevated structure, corrugated iron or terracotta roofing system	High thermal-mass and prefabricated construction with concrete block and brick-veneer walls rendered, stone, double-brick, and mostly terracotta roofing system and flat roofs <b>New techniques include</b> lightweight steel construction, structural Insulated

after Cyclone Tracy in 1974	New techniques include fibre-cement, in-situ concrete, stone and timber cladding systems with concrete tile roofing	cement and in-situ concrete cladding systems with concrete tile roofing	stone, rammed earth and in-situ concrete cladding systems with concrete tile roofing or flat metal roofs	New techniques include concrete, insulated vinyl (thermal boards) and fibre-cement cladding systems	Panels (SIP), External Insulated Finish System (EIFS), fibre-cement, , and in-situ concrete cladding systems with concrete tile roofing or flat metal roofs
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**Table 6.3.2a** This table shows the materials and construction techniques used in the design of the five contemporary Troppo houses in comparison to the availability of local construction methods.

Best use of local construction materials, trades and techniques demonstrated the adaptability of the continuity of Troppo's practice regionally.

*'But we won't just pick up Darwin's designs and take them to Queensland....There is a Queensland approach. It's about looking for the appropriate housing for Townsville – its climate and its history.'* (Welke, interviewed by Territory Business, undated)

*'The local knowledge factor is very important, and it's a great idea to visit a place to take some ideas. It is important to team up with local architects.'* (Interview with Connolly in 2012)

*'We [general public] always like to build brick veneer housing [conventional building method in Adelaide]...The three-little-pigs-syndrome...[so this is] a reverse brick veneer house... it gets insulated ... to turn the other way is against the tradition... we try to use it when it is needed... get the most benefits out of it [from a climate point of view].'* (Interview with Duffield in 2012)

### 6.3.3 Economic structure

The affordability of a house lies between the fulfilment of 'the practice of art' and the realization of 'the making of businesses in competitive professional practices (Interview with Welke in 2011 and Harris in 2016). 'Practice is business and keeping that running is important' (Interview with Harris in 2016) and is regarded as a continuing challenge to Troppo. The designs of the five regional contemporary houses were direct responses to the residents' budgets and their expected standard of living. Costs (in three cases over AUD \$800,000) were above the average costs of housing construction in Australia. Nevertheless, most of the residents accepted running over budgets in return for the quality of spaces of their houses.

In this study the adapted patterns were understood by perceiving the directors' intentions for utilizing appropriate materials for different climatic conditions, accommodating the needs of clients and regional social patterns for a preferred lifestyle in the local economy (especially the distributions of housing zones associated with land values, and types and scales of housing). Fast and efficient construction methods, modern equipped rooms and extra unused spaces were Troppo's compromises with the clients to maintain good relationships with them and sustain the business vitality of the regional offices. A mutual respect was the driving force for the production of integrated design outputs and for the quality of the designs of satisfactory houses.

#### 6.3.4 Sustainable design

Troppo have built a reputation for being pioneers of Ecologically Sustainable Design (ESD) with both Harris and Welke being reluctant to describe their design as a defined style.<sup>302</sup> Rather than having a fixed style to their work, they took feelings they gathered on site as their inspirations for design forms, lessons learned from Murcutt's 'design in section' (Interview with Harris in 2011 and 2016), and they adopted the ways in which Indigenous Australians live naturally with less, evoking their sensitivity and awareness of the fragility of built environments. Physical form was never the priority in the design of Troppo houses but 'the use of whole site' and 'all corners of a site' by best making use of the tree, the space around or beneath it and how a building then responding to that... You never design an object and you don't care what it looks like.' (Interview with Harris in 2016) The wings of an eagle, the tail of a whale and the form of a tree house were not intentional metaphors but abstract design concepts for Troppo to capture the geographical setting of the site. The abstraction of built forms emphasized Troppo's third fundamental principle for 'interacting with the outdoors'. Troppo's inspirations taken from nature recount Alexander's perception of the adaptability and of a pattern language to be transparent, dynamic, connected, and free.

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<sup>302</sup> Troppo do not use metaphors, unlike Australian renowned architect, Glenn Murcutt, who has described his design as a form of 'canopy'. Both thought of their design as derived from a feeling of 'being at the site' and denied any intentional symbolic expression of sea creatures, bird forms or movements.



There were two groups among the regional offices in adopting this feeling-driven, free-form, on-site approach. Design forms derived from feelings emerging on site in the transparency and free-movement of everyday spaces were seen in the playful long-runway of the Mortlock residence, as well as in the moonlight house of the Russell residence, the sailing boat of the Hutchinson Residence. The design idea of the Connell residence and the Howell Residence did not encapsulate the spirit of the site but rather followed the traditional vision of distinctive indoor and outdoor spaces according to the clients' wishes. The design form of the Howell Residence and the Connell residence showed a level of disconnection to nature but focused more on the comfort and personalised social needs of indoor spaces, and on convenience. The Troppo ethos for adaptability and lightweight construction, low-energy consumption, and multi-functional spaces for fewer interior rooms as sustainable design is less apparent in both houses.

*'It's completely functional....one quality of our work is that we do it minimalist and we only put in what is necessary and don't put in things [walls or materials] that you don't need....screens and walls and getting rid of solidness. ...Building on a stick...Form making is not the first priority, the site is first. (Interview with McNamara in 2011)*

*'...as an environmental architect, we are trying to design houses to respond to the site. Some people come to us [Troppo offices] because of the style or people who come to work with us based on the fundamental concepts.' (Interview with Duffield in 2012)*

The advocacy of practising sustainable design can be seen in the footprint of houses, in the detailed sections, material selections, and particular jointing methods evident in the regional office practices. Through the final product of the houses, the value of sustainable design to the regional director, and its coherence with Troppo principles can be understood (Interviews with Harris in 2011, McNamara in 2011, Duffield in 2012, and Connolly in 2012). Nevertheless, there are external factors and circumstances that Troppo and the directors unanimously agreed upon that need to be examined in a consideration of sustainable design. They are

- The seeking of a dynamic equilibrium – responsive cohesion – between architects, residents, environmental contexts, human basic needs and the advanced technologies in benefiting everyday life. For example, an active cooling system is used when the human-

factor needs to be a priority, such as in suffering from the extreme heat, with having a new born baby, ill family members, and the elderly

- The inside-out design tactic for achieving a good sustainable design – designing from ‘sections and details’ to visualize sufficient spaces, and the treatment of potential barriers (internal and external walls) to come up with effective spatial relationships between indoor and outdoor spaces for natural ventilation, human movements, and interactions with the outdoors.

## 6.4 Like-minded values and attitudes

Working collaboratively together, learning from each other, respecting elders and being refreshed by young architects sharing similar values were crucial factors in operating a smooth project for Troppo and the regional offices (Separate interviews with Harris and Welke in 2016). Both parties (architect and client) embraced productivity and positivity not only in design and construction processes but also in final outcomes. Sharing similar value systems made design processes and negotiations smooth by compromising differences and seeking a satisfactory outcome in a mutually respectful relationship. Mentoring was found to be essential in those processes as it was a means for consolidating trust and the continuity of Troppo's ethos in their regional practice culture.

The five case studies, the contents of interviews with the directors and in-house architects unfolded the significance of this mentoring. Troppo's 'walk the talk' was a strategy of cultivating the mentoring process through informal discussions and meetings with a range of considerations - sketches for preliminary design ideas and concepts in response to climatic and site conditions, the clients' requirements, anticipated views and movements, and building codes. The process of this mentoring extended to directors, in-house architects and clients. The form patterns of the Troppo language were used as the means to identify feature differences between the 1980s Troppo houses and contemporary Troppo houses shown in table 6.2.1a. These differences were important as indicators to highlight the regional directors' emphasis in either achieving internal relations or contextual relations or seeking a balance between the two in order to achieve responsive cohesion in the design of contemporary Troppo houses.

The reality of business viability was an acute and unequivocal dilemma observed during investigations of the unfamiliar Troppo design features in the Connell residence in Townsville and the sumptuous design of the Howell Residence in Perth. There was a constant struggle in all offices to seek a balance between making a work of art, having consciousness, sympathy and responsibility for natural and built

environments, and the economic survival of a responsive practice. 'Understanding local ways and building little regional things right, 'accepting differences between places' and 'connecting with people in different places and building knowledge from each other', as well as 'being connected through the digital age... participating in the community and understanding of how those things operate in a place' (Interview with Harris in 2016) were the key points of Troppo's mentoring new recruits with new ways to learn and build social networks in achieving responsive cohesion in their projects and their ways in keeping the practice growing.

#### 6.4.1 Mentoring versus survival

The design outcomes and commercial construction of the Connell Residence indicated the disconnection between the Townsville practice and the other four regional practices. Although there was some architectural resemblance to Troppo characteristics exhibited in the Connell design, the standardised and ordered modules for windows and doors and the enclosure-structural framework reflected the fast pace and economics-driven image of the local tourist culture in the industrialised town of Townsville. With little mentoring in the Townsville office practice, O'Toole and the in-house architect had limited knowledge about the connections between Troppo's hedonistic attitudes, design methods and core values. Other regional directors and in-house architects could relate Troppo's design principles and ethos to their hedonistic attitudes, ethics values and underpinning philosophy for their regionally and climatically responsive design with the image of 'drinking man's architects' (Figure 6.4.1) and reasons for their constant involvement in the indigenous housing projects at the rural areas. They recalled the full attention of their learning in the mentoring with Troppo was built on the variations of simple forms and climatic-practicality of early Darwin houses, and their teaching for shaping a cohesive architectural response and 'the love of Australian informal' (Interview with Harris in 2016). The cultivation of fun designs was implicitly taught to them through their laid-back working after-hours with some drinks, party invitations for opening offices, and semi-formally community-based architectural talks. (Interview with Welke in 2010 and Harris in 2011) The design of the Connell Residence has some Troppo distinctive features but less of Troppo's hedonism in the experience of everyday space, the

emphasis on delight in the rain, the sunlight, the breezes, the heat, the wild and the house's natural surroundings, in particular, Troppo's love affair in making Australian' informal spaces.

**LIFESTYLE**



A house is not a tree, nor just a shelter...

## ‘Green Can’ rattles Top End lifestyles

**By HELEN CHRYSIDES**

WHO said architecture was dull? Take two enterprising young men, keen and enthusiastic with a zest for life and a spirit of adventure. Place them in the isolation of the Top End and wait.

These days “going troppo” can have more than one meaning in Darwin, as architects Phil Harris and Adrian Welke can vouch.

Their firm, Troppo's, was established some three years ago with the intention of providing good-quality tropical housing suitable for the climate, an area they feel has been sadly neglected in the far north.

“People are reluctant to accept what they are not used to,” explains Phil, “and in architectural terms in Australia today, the norm appears to be a quarter-acre block comprising a brick house with at least three fronts, preferably a Spanish arch linking to the side fence, a double carport and so on.

“Therefore the population boom in the Top End, which has generated an increase in housing construction, has meant that the majority of these are uniform, box-like dwellings identical to those down south.



Troppo's — “drinking man's architects”

**Figure 6.4.1** The design of Green Can describes Troppo's hedonistic attitudes for their image of being 'drinking man's architects'. (*The Northern Territory News*, date unknown)

During the interviews with the regional directors, struggles were observed between affordable housing design with sound sustainability characteristics and the survival of their practice in the third decade. They found that concentrating on passive-design theory for achieving sustainability was a challenge, with difficulties imposed by changing regulation policy (in Byron Bay and Darwin in particular) and many competitors, lower demand and tight budgets for residential projects in Townsville,<sup>303</sup> Perth and Adelaide.<sup>304</sup> The early perception of low-cost and affordable Troppo housing was challenged as a result of scarce resources, expensive fees for transporting recycled materials from interstate, custom-made steel and timber beams, and higher labour fees for exquisite hand-craft detailing. Keeping hedonism as a design principle for a Troppo house came with a high cost for those clients who shared a similar desire for a laid-back attitude to life and pleasure in 'the great outdoors. Clients who were like-minded were reluctant to take the risks required to experience the full delight a Troppo house can offer.

*'Here clients know their ethos but not all the houses here can incorporate their principles into their house as there are budget constraints and other factors like clients are a bit more conservative'* (Interview with O'Toole in 2012).

Affordability has become the greatest challenge to most of the regional offices with the tendency towards increasingly expensive and exclusive design projects. The priority of mentoring was shifted to getting the design projects done. There were frustrations in achieving budgets by making compromises, such as having fewer Troppo features, accepting less financially-affordable residential projects, accommodating wealthy clients with preferences for more indoor-living spaces and bathrooms, and running independent practices with a different business model (a shift from a residential-focus to a commercial-focus). At the time of collecting data in the field trips, in Townsville O'Toole runs the Troppo office alongside his own commercial company – *North Point*. In Byron Bay, Connolly has a separate

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<sup>303</sup> O'Toole recalled the situation of merging his commercial practice 'North Point' with Troppo's residential practice in the Townsville branch: *'Previous director Geoff Clark was semi-retiring as he had an illness and was financially stress related and he didn't say. He wanted to get out of the day-to-day running of the business. He loved his architecture but he struggled with the business side of it like collecting bills and getting people to pay and just running the office generally.'* (Interview with O'Toole in 2012)

<sup>304</sup> Duffield discussed possibilities for trying a larger scale project based on a realistic perspective for architectural business model practice. *'Troppo practice was always like scouts projects like when they were in Darwin doing the defence housing. It was a substantial project. We'd like to do more of this from [tropical house design with open structure] for the architectural business model practice as it is always better to try a larger scale project. There are a few of those [large scale projects] gradually coming through but it is a hard market to get.'* (Interview with Duffield in 2012)



sole practice – Beach Architect – and follows his own architectural style without any strings attached to Troppo’s ethos. (Interview with Connolly in 2012) In both O’Toole’s and Connolly’s separate practices, there is a clear difference in the designs of houses that is driven by clients’ design preferences and building approvals, and fewer environmental considerations. Larger footprints of indoor-living spaces (more bedrooms and bathrooms), increasing use of air-conditioning and standardised architectural components (windows and doors), and shorter construction time were implemented to meet clients’ wishes, aiming to minimize production time, easily get building approvals and avoid constructability issues by having fewer costly design forms and details. There are no single ‘shared space’ bathrooms and less transitional outdoor space (verandahs, breezeways and decks) between the inside and outside of the house (Table 6.4.1).

*‘An evocative form that responds to the climate.’* (Interview with Duffield in 2012)

*‘They are particular to its region, [and] material. You can quite see it when the art and culture are from connecting to the soul and the place.’* (Interview with McNamara in 2011)

*‘They apply that to the climate and give attention to different regions.’* (Interview with Connolly in 2012)

*‘The first word that springs into my head will be responsive. It is evident in the work.’* (Interview with Clark in 2013)

	Darwin 1980s Troppo houses	Darwin Mortlock Residence	Townsville Connell Residence	Adelaide Russell Residence	Byron Bay Hutchinson Residence	Perth Howells Residence
3+	<b>Number of bedrooms</b>	1+ 2 (open space with no doors)	3+1 (study)	2+1 (study/guest)	3	3+3 (media/study/guest)
1 +1 (outdoor bathroom + outdoor open shower)	<b>Number of bathrooms</b>	1 (outdoor)	3	2	1 + 1 (outdoor bathroom + outdoor open shower)	5
Verandahs/corridors/a flight of stairs/deck/breezeways	<b>Transitional outdoor space (outside-inside)</b>	Extensively long verandahs/breeze way	-	Indoor entry	Verandahs/deck	Indoor hallways

**Table 6.4.1** There is a connection to comfort, convenience, contemporary lifestyles, and an increasing number of bedrooms, indoor bathrooms, and missing Troppo elements of outdoor shower and a shared bathroom, and spaces.

### 6.4.2 Interconnection and disconnection in design collaboration

Disconnections and the absence of mentoring were also factors that led to recognizable changes in the Troppo language. They were apparent in O'Toole's accent on applying the cost-effectiveness and time-efficiency of commercial projects<sup>305</sup> to residential projects, such as tilt-up concrete construction. (Interview with Khasmina in 2012) 'Time consuming' was the reason given for the Townsville office to replace conventional residential construction with fast-effective commercial construction for housing projects. The struggles and experiences of Troppo's early Darwin practice had little influence on the commercially-focused practice of the Townsville office. Accepting fewer residential projects in favour of more commercial and large scale projects was necessary to 'maintain a steady-income' as the average time spent on the design and construction processes of a residential project is longer than on those of a commercial project (interview with Khasmina and O'Toole in 2012). Very little design collaboration between Townsville and the other offices was sought.

*'Most of our work will be commercial and secondary homes for Southern people who build holiday homes in the surrounding countryside... From a Troppo point of view, there is more about the business side of things than the design in the Townsville branch.'* (Interview with O'Toole in 2012).

*'Accessible materials are predominately masonry blocks... We have tried different things and saving money here... tilt-up concrete for instance... But there is a high cost in steel and timber and Troppo houses are more expensive here... Lots of clients want a bunker and lots of clients want to build a cyclone resistant house predominantly as holiday home when they come... a block frame and shut up for the cyclone seasons.'* (Interview with O'Toole in 2012).

*'It will be interesting to see how we are going to marry Troppo style into the commercial buildings.'*<sup>306</sup> (Interview with O'Toole in 2012)

*'We have little design collaborations with the Townsville branch as they work differently. We mainly collaborate in design projects with other offices when they are in need of human resources and information sharing.'* (Interview with Duffield in 2012)

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<sup>305</sup> Khasmina pointed out that O'Toole and he believed that encountering financial difficulties in running the Townsville branch was due to working on more time consuming and less profitable residential projects over the years: *'It takes a similar amount of time to do a commercial project when profits are greater with time efficiency in the completion of a building from a business point of view in practice.'* (Interview with Khasmina in 2012)

<sup>306</sup> O'Toole expressed an explicit initiative in marrying Troppo style into the design of commercial buildings. He mentioned that several attempts had been made in recent commercial projects like office buildings, government public buildings, extensions of hospitals and a University dormitory.

## 6.5 Value and attitude by effect and experience

Tropo present their values and attitudes through the design process of communicating design ideas, producing sketches and dialogues between the directors, in-house architects, and clients. Individuals can understand Tropo's design features together with their environmental concerns for sustainable living and their aspirations to be responsible hedonists through verbal discussions and graphic sketches. These are the media used for transferring their features into floor plans, construction details, and section plans. Studying these sketches alongside the interview materials showed that Tropo articulated a priority ordering of design decisions for what they considered to be the best solutions for achieving their conceptual responsive cohesion between form, people and the house. The connectivity graphs of the five contemporary Tropo houses showed how much the regional directors understood and resonated with Tropo's values.

There is a place-people connection which has clearly affected Tropo's, directors' and in-house architects' attitudes. O'Toole's commercial design has been established as a result on his life experience living in Townsville; Harris and Welke set up home-city based practices with their family commitments in Adelaide and Perth; Connolly has chased a life adventure with the challenges of Byron Bay, and McNamara wished to return-home to Darwin for a better opportunity. These factors may have seemed irrelevant to the changes to the design language. However, on the contrary, they created profound architectural effects on the designs of houses that reflect their richness of local knowledge and their understanding of an everyday life which the members of the community can live.

The experience of an everyday life often consists of a mix of memories of institutional learning, home and work. Darwin and Townsville were the birthplaces of McNamara and of O'Toole respectively. Their core values were fostered by their understanding of their regional culture gained from childhood memory. McNamara's values were expressed in an open design of a house which offered a care-free lifestyle in

the tropics reminding him profoundly of his childhood.<sup>307</sup> On the other hand, O'Toole's values were seen through monolithic 'bunker houses' (Interview with O'Toole in 2012) reflecting images from his childhood in an industrial town followed by twenty years of experience in a commercial 'suburbia city'. Townsville to him was an industrial town with a majority of conservative-minded local residents who preferred an enclosed living space with privacy and security, rather than an open-living lifestyle. This explained the reason the Connells, Melbourne-based urban residents, rejected Rohan's initial design concepts which were aligned with Troppo's design principles but accepted O'Toole's ideas for a more enclosed and secured internally living space. While O'Toole has demonstrated his understanding of Troppo's climatically responsive design through spacious verandah spaces, the use of ceiling fans and pitched-roofs, McNamara's emphasised contextual responses by a simple and open plan and O'Toole's emphasised internal responses by a complex internal circulation plan. Comparison of their spatial arrangement (the Mortlock Residence's connectivity graph on page 163 and the Connell Residence's connectivity graph on page 196) differentiates the two seemingly Troppo-like-minded designs of contemporary Troppo houses and reveals their differences in continuing Troppo's values and attitudes in practice.

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<sup>307</sup> McNamara claimed that an important factor for working with Troppo was their elevated and lightweight design of houses which reminded him of his meaningful childhood. For him, running Troppo's practice is a way to restore and build the feel of simple open-plan houses with functionality and aesthetic appearance.

## 6.6 Summary

With the overview of the expansion of their practice and the narrative of the regional directors, this chapter has revealed connections between the evolving form patterns in the Troppo language and people, place and time. This discussion has also made sense of the connections between Troppo's shared philosophies about sustainable and climate-responsive design and the relative diversity of the five regional offices. Mentoring cultivated 'Troppo's brand' currency to people and disseminated the love of Australian's informal living lifestyle, as well as maintaining their high spirit in making 'a succession plan', as Harris pointed out, to continue their 'goes Troppo' journey. (Interview with Harris in 2016)

Analysing the evolving form patterns in the Troppo design language offers an understanding of the adaptability of their housing from being Darwin-responsive to regional-responsive. Through the process, a shift in design decision-making processes and a development of Troppo's practice culture were identified after their expansion to multiple offices. Design changes in architectural form, materials, details, tectonics, and construction methods were distinguishable for expressing the climatic differences, as well as sensitivity to different regional cultures, different social organizations, and built environments. Some of Troppo's most recognizable features were modified to respond to site, local community, advancement and availability of construction techniques and materials, requirements of wealthier clients, and changing building regulations. These changes were inevitable to reflect the uniqueness of cultural contexts and the social-patterns of contemporary lifestyles for everyday living. Two of the case-study house sites were situated in apparently pristine outback settings, another was in a wealthy city suburb, one in a less wealthy city suburb and one in a holiday resort which is also an exclusive residential zone. In all of them residents were engaged with confined or open living spaces, their daily routine, the surrounding landscape and the neighbouring houses in profound ways. A regionally responsive way of everyday living for Troppo-like hedonists has been accomplished with different levels of satisfaction but common reporting of delight-filled experiences.

The focus of analysing the five case studies on the contemporary Troppo houses with the comparison of the 1980s Troppo houses was not aimed at seeking a set of design rules or of graphic configurations

for generalizing Troppo's design principles in diagrams, but rather to explore the meaning of their design by drawing connections between form patterns of their language, their values, attitudes, and contingent events. The interviews with Harris and Welke, the other regional directors (former and current), in-house architects (former and current) and residents helped to understand the underlying constituents for the continuity of the Troppo practice over thirty-five years. Through the lens of residents who are residing in the 1980s houses and in the contemporary houses, the coherence of Troppo's philosophy in promoting a responsible hedonist lifestyle is apparent. Through the lens of the regional directors and in-house architects, the consistency and persistence of Troppo's endeavours in pursuing building that is responsive to nature and sustainability can be seen.

Troppo's hedonist attitude all started with the heat, rain and a little madness in the tropics. As time went by, it has transcended into an optimistic and go-with-the-flow attitude that Troppo used to turn contingent life events and interruptions into opportunities for establishing regional offices at various stages of their practice. Their thinking-for-others attitude resonated with Fox's general ethical value for 'things' (a non-living thing such as a design work on a small scale or a living thing like a community on a large scale) and for a thinking process. This is the Troppo attitude to make the design of houses and buildings work from 'inside out'. With this attitude a balance of internal and contextual relations was sought in their work, with compromises and understanding for the world we live in. There is the process of making-sense of design essentials that occurred between Troppo, the directors, in-house architects, and their clients. Good architect-client relationships determined the viability and prosperity of the regional practice (internal relations) and the expansion of Troppo's design ideologies in response to climate, history, and care for fragile environments (contextual relations).

The findings have also exposed the divergence of Troppo practice culture, the impact on design decisions and the Troppo language by the wealthy clients, changing building codes and social contexts of place in response to time and circumstances. They have thrown light on the repositioning of Troppo's regionally responsive practice with its changing socio-economic demography. It was apparent that designing an affordable and low-energy contemporary Troppo house was still Troppo's goal, but difficult to achieve in the current housing market with its costs and expectations of space and comfort.



The quality and delightful experience of everyday space can only be felt by the residents through connections to their desired lifestyles that suit their daily routines. Some profound memories are made while the residents deeply engage with family and friends with every turn and corner of the house. These memories encompass the life goals and objectives of each family, such as raising a young family, better retirement living, a retreat to a childhood memory, and a change to an open, care-free and living-in-nature lifestyle. The Troppo regional offices endeavour to deliver them a personalised Troppo house which offers a sense of belonging. A Troppo house is not just a shelter that responds to climate, reflects regional culture and achieves sustainability, but a core part of a day-to-day lifestyle for people who know what they want and enjoy at any stage of their lives. A Troppo house, after all, is all about accommodating a lifestyle valid for its time and place.

An apparent exception that, perhaps, demonstrates the flexibility of this rule in the Troppo practice is a small forest retreat that Troppo designed in 2002 at Cape Otway on Victoria's cool-temperate southern coast. This is a post-and-beam steel structure that was required to be prefabricated off site, according to the client's brief, but to be delivered in small frames and panels light enough for two people to carry over 2 kms into the bush from the nearest road,<sup>308</sup> Whilst situated as far from the tropics of the Top-End as it could possibly be in continental Australia, the semi-transparent materials and aesthetic of this contemporary lightweight building appear to have continued the ideals and the formal and technical patterns of the earlier Darwin houses more faithfully than any of the five contemporary case-studies that were proposed for examination in this study by the Troppo partners themselves. But, faithful first and foremost to the clients' conservation-driven ethic to 'touch the earth lightly' with their nature-loving lifestyle, regardless of their own thermal comfort, even this incongruously 'light' house seems to support the overarching observation of these regional case studies that when all the various determinants align in the design of a Troppo house, 'responsive cohesion' is achieved.

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<sup>308</sup> Ball Turnball, Cape Otway, Vic, 2002, Official Troppo website. Viewed, 12/03/2017 at: <http://www.troppo.com.au/ball-turnball>

## Chapter 7

### Conclusions

This study of Troppo houses has sought to contribute substantively to understanding of the relationships between lived everyday space, human behaviour and decision-making about the ways people may choose to live, and to design the spaces they inhabit, despite the messiness of the unexpected circumstances and challenging situations imposed upon us. As the multi-faceted analysis of both the 'hard' and the 'soft' spatial qualities and experience of these houses has revealed, they illustrate the power of architecture to shape not only the physical world we live in, but our attitudes towards it; they remind us how significant the impact of the built environment can be on everyday life.

The description and interpretation of Troppo's design language over three decades of development and diffusion has contributed to our knowledge of how architects' understandings, experiences and attitudes about place, the land, history, people and the world can be captured in form-patterns that enable designs to be adapted coherently to diverse contexts. Assertions about the responsible nature of Troppo's practice, which have been critically cross-examined in this research, are substantively supported by the deeper understanding this has revealed of their responsible hedonist ethos, and its influence on the ethics of the practice. The experience of Troppo in Darwin and then in the five Troppo regional offices has offered rich and substantive evidence that in contingent practice spirit, persistence, acceptance and adaptation can make the design of houses work to enhance the lives of their occupants and evolve over time to meet changed circumstances.

The theoretical framework through which this longitudinal and comparative analysis of the development of the Troppo language and practice was interpreted comprised three themes – patterns, contingency, and responsive cohesion – with reference to which I will now briefly articulate, the final conclusions of this thesis.

## 7.1 Coherent form-patterns

To make sense of Troppo's design principles, theory and methods, it is essential to understand that 'responding to the site' has always been their foremost design priority. In the extensive independently conducted interviews that underpinned this study, 'responding to the site' was the only response in common that both Harris and Welke emphasized in discussions about form-making, construction technique, and spatial planning. From one project to the next, this priority was the design constant from which the coherent form-patterns of their architectural language emerged, and the distinctive space, form, materiality and volume of the early Troppo houses in particular. As the preceding graphic analyses of those 1980s houses has shown, together with the original drawings and construction details, the characteristic patterns and coherence of that original 1980s language were clear. Through the interviews with Troppo and the residents of the 1980s Darwin houses, moreover, the voice of the residents affirmed their affection for and belief in Troppo's fundamental principles: embracing the climate, the site and its environment and not working against it; and making ambiguous the experience of where outside ends and inside begins through a series of visual patterns in space and sensual connections between house and landscape.

Identifying the general connectivity diagram from typical 1980s Troppo Darwin houses was a crucial link in understanding Troppo's versatile spatial patterns, and their endeavour to enhance the everyday experience of a tropical lifestyle in the Top End at the time. In marked contrast to most other houses of the time, 1980s Troppo houses were characterised by simple and recognizably tropical features such as inside-outside circulation, roofed-verandah living spaces, part-height internal walls, houses on stilts, lightweight cladding, adjustable and breathing skins, and high pitched corrugated iron roofs coupled with articulated elevations and volumetric semi-open enclosures. Troppo's hedonist attitudes – light-hearted, laid-back, cordial and amicable – were shown in the interactions with their clients, who recounted their delightful communications with Troppo while integrating their ideas with Troppo's version of everyday space with content, excitement, happiness, and a mindset for sustainable living. Clients commented that engaging themselves fully in both design and construction processes had been educational, that they consciously and constantly thought about living with less daily energy consumption, less use of the heating and cooling systems, and spending more time outdoors. There was a significant change of living

behaviour with less caring about built-up cobwebs and dusty interiors because they enjoyed the connection and openness with the outdoors.

The making of this lifestyle took place through a design process that resonated with Alexander's concept of a pattern language. Notably, the patterns of the Troppo language not only connect people to the space, place and things around them to consolidate the internal relations of responsive cohesion, but these patterns also serve to achieve the responsive cohesion between the houses and their environmental contexts. They show how people change their thinking, behaviour and actions towards a more sustainable way of living through spatial experience and interaction with nature and the world they live in, by constantly responding to and engaging with the site for their same love of Australian informality.

## 7.2 Effect of the differences and similarities

The 1980s Troppo design language was evident in the distinctive characteristics of their houses, despite their claims that the work was an expression of their love of Australian's informal way of living, with no particular design style. This language was inherently rooted in the essential regional vernaculars and social pattern of ways of living in the tropics – live above the ground in the Wet hot season to keep dry, and live underneath the house in the Dry hot season to keep cool.

Troppo's visually distinctive construction methods — steel post-and-beam and exposed structures, simple details and joints, and houses on stilts coupled with louvers, shutters and large areas of verandah – constituted the iconic architectural expression of a Troppo house for the tropics. It was later translated to other climates, regional cultures, and built environments. The modified design features in the language were Troppo's adaptations in response to different times, places, rapidly advancing technologies in the building industry and changing building regulations, and client attitudes. Outside Darwin, changes were evident in the patterns of soft space, such as the reduced use of shared space (bathroom and toilet), more desire for privacy, cleanliness and control (resulting in the sealing of rooms for privacy and keeping out insects, dust and breezes, more use of air-conditioning and heaters, less use of banks of operable openings), less performing of daily activities in outdoor spaces (laundry, storage and outdoor shower). The similarities were in the remaining patterns of hard space such as living verandahs, exposed roof structures, corrugated iron roof cladding, post-and-beam structure, and deep overhangs created to resemble Troppo's 'no-particular' style. Overall, there was a clear message that the changes indicated a decreasing value of sustainable design and a simple way of life, and the similarities indicated the increasing artefact value of the aesthetic appearance of a Troppo house. 'Soft space' for the occupant's well-being, care-free spirit, and enjoyment was replaced with more internal enclosure, privacy, security, comfort and convenience in contemporary living in ways that indicated a shift away from tolerance and environmental concerns for sustainability. Occupants in the later house designs<sup>309</sup>, missed the delight of moving between the inside and outside spaces of the house. The full

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<sup>309</sup> The 'later' refers to houses designed in the regional offices after the 1980s Darwin period.



delight of a responsible hedonist way of living has been lost in some of the houses along with the absence of certain typical Troppo design features.

The explicit shift that derived from these changes to the Troppo language signified the way Troppo dealt with contingency. They created opportunities and maintained business viability in the uncertain success or failure of their expansion, the diversity of emerging new practices, and the pressure of the economic market in different regions. The dominant image of Troppo's simple and economically-based practice of backyard architecture has gradually been substituted by the image of an award-winning practice with avant-garde and innovative architectural features. Now Troppo's architectural features have become a 'blue-ribbon' tag for 'rich white fellows', as Welke pointed out (Interview with Welke in 2016), for wealthy clients rather than a meaningful expression of an everyday lifestyle for ordinary people. The exclusivity of the design of everyday Troppo house developed since 2005, indicated a mismatch between the ethos and combat reality<sup>310</sup> of their practice. A Troppo house is no longer an affordable house which is available to clients who wish to live a hedonist life but with insufficient budgets. A Troppo house with an Australian informal lifestyle comes with a high price tag. Today, the cost of a contemporary Troppo house is above the average affordable housing prices<sup>311</sup>. A Troppo house has become an expensive and exclusive social status symbol for a prestigious and luxury holiday or high-profile residential location.

The effect of changing codes was another factor influencing the changes in the language. Some building codes were rigid because they intended to provide inhabitants with a human-centred-comfortable and fear-free living environment, despite the fact that they were climatically unresponsive and inappropriate

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<sup>310</sup> In recent years, Troppo has shown their endeavours in rekindling their philosophy of affordable housing design. Whitmore Square Affordable Eco-Housing in the CBD of Adelaide was Troppo's revival for low-cost and low-energy everyday lifestyle with considerably shared communal spaces, articulated façade design, robust and lightweight materials (steel, timber and corrugated iron and polycarbonate roofs), working cross-ventilation, sufficient sunlight, solar panels as eaves as well as their signature design of exposed roofing structure and extensive overhangs for balconies. The housing apartments sought to express the qualities of Australian Urban living with informality in a changing urban landscape and a contemporary modern lifestyle. This complex of Eco-housing apartments was complete in 2011 and received its recognition by winning Australia Institute of Architects SA state awards Commendation for both Multi-Residential and Sustainability Awards in the same year.

<sup>311</sup> The measures of housing prices ranges from \$487,000 in capital cities to \$319,000 in regional areas. This information was taken from the paper by Ryan Fox and Richard Finlay, 'Dwelling prices and household income', Reserve Bank of Australia Bulletin, December Quarter 2012, available at: <http://www.rba.gov.au/publications/bulletin/2012/dec/pdf/bu-1212-2.pdf>. This paper was included in an overview, *An Affordable Housing Reform Agenda: Goals and Recommendations for Reform* for Community Housing Federation of Australia, Homelessness Australia, National Association for Tenants' Organisations and National Shelter in March 2015.

in the sense of pragmatic practice. These rigid regulations imposed changes on Troppo house designs. Troppo's original incentive for passive design for energy efficiency was compromised by being forced to integrate both active and passive designs. For instance, in Darwin air-conditioning (AC) has become such a routine commodity for residents to cope with the heat that current building regulations require that newly built houses are appropriate for AC. Similarly, in Perth design to suit the installation of AC has been recommended for achieving higher energy-efficient measurement (equivalent to Green-star rating) for a building approval. This energy-efficient measurement has been commonly used as a means to ensure better living standards for human comfort and quality of indoor spaces. Thus, it has become impossible to build houses like the 1980s Darwin houses because obtaining building approvals for such house designs has become more difficult and even rejected. This issue became a major challenge to the continuity of the 1980s Darwin house designs and subsequent attempts by others to design Troppo-like houses by following the generalised patterns in the contexts of the building codes, with a clear resistance of building codes to passive designs without the aids of modern facilities in both regions to ensure indoor comfort. This may change. With Troppo's continuous efforts in promoting designs embracing natural environments and the awareness of global warming, Harris was invited to be the chair for the Domestic Building Code Review Group in the Northern Territory in 2015. This is a significant step towards shaping a pragmatic practice with sustainability and simplicity where houses are not just shelter for people but home as a beautiful 'place' for expressing the love and a sense of belonging of their lives in the land of informal Australia.

### 7.3 Troppo values and attitudes

Troppo values and attitudes are clearly seen in the presence of client-architect relationships and mentoring. There are two groups of clients that describe client-architect relationships in the Troppo regional offices – the starter and sophisticated levels of Troppo like-minded clients. The sophisticated clients express more interest in exploring Troppo's early work in the media, publications and physical visits in general. The designs of their houses resemble the 1980s Darwin houses in form and everyday experience. The starter clients have a general and basic understanding of Troppo's fundamental principles and theory of climatically responsive design, regardless of the length of time of knowing Troppo. There is a distinctive difference between what they know of Troppo values and objectives in design, and what they want for their product. Troppo's fundamental principles are familiar on a conceptual level among most of the starter and advanced clients. However, the starter clients have generally declined to incorporate all of them in the design of their house due to their desire for a more luxurious, comfortable, and convenient lifestyle for their retirement or for the better resale value of the house. These clients displayed less understanding of Troppo's incentives to achieve sufficient everyday spaces and an energy-efficient lifestyle as a means to accomplish their vision of responsive cohesion.

Mentorship is another key for understanding the nature of Troppo values and attitudes. A particular Troppo practice culture was initially developed among the regional offices through design collaboration, resource sharing, exchanges of design ideas and concepts, and senior staff-support in production. Mentorship was all about 'learning by seeing, listening, and comprehending' through a continuous process of verbal explanation and visual communication with sketches. Troppo's interactive mentoring was naturally developed in a learning-at-work and relaxed environment. The importance of mentoring in this can be understood through the unfamiliar design features in the Connell Residence by the Townsville office. Here there was a clear disconnection between the Townsville office and the other regional offices with little design collaboration. A marked divergence in values and attitudes was displayed, and this had an effect in the extension of the mentoring to the clients in the design processes and communication.

Across the board, seeking ways to keep business viability in the regional offices was a challenge, with indications of clients' frustrations for achieving budgets requiring the compromises of designing with fewer Troppo features, accepting fewer financially affordable residential projects, and accommodating wealthy clients with larger footprint house designs. There was a shift from a design-for-site-and-low-cost-focused practice to a commercial-reality-focused practice. This trend was seen in O'Toole's commercial practice and Connolly's separate practice aspiring to the identity of a personalised architectural style. In Perth, Welke needed to accommodate the desires and wishes of wealthy clients.

Troppo houses are dwellings for responsible hedonists. They are here characterised as a metaphor for life. They can be theorised as a way of everyday living by understanding Troppo's intrinsic value of a responsive cohesive way by which we should live, as suggested by Fox. Troppo houses are exemplars for understanding the relationship between a whole (people, place, living and non-living things, events, activities and contexts), and its parts, in the largest dimension of the bio-physical world. Embracing this understanding gives us reassurance in realizing the importance of being an individual, existing as a part that fits well in our sophisticated physical world.

## 7.4 The Journey from 1980 to 2014

The primary research question of this thesis was *How do the designs of houses from Troppo Architects' five regional offices in the decade up to 2014 relate to the ideas and values Harris and Welke espoused in their first decade of practice in Darwin from 1980?* The answer to this question lies within the journey of Troppo's five regional offices. This answer is not found only in the final design product of the 1980s Darwin houses and of the five contemporary houses, but also in a series of events, dialogues, and life incidents that were revealed in the process of drawing connections between these two sets of Troppo house designs. To say it explicitly, both Troppo's products (the houses) and their processes offer lessons that may be useful to architecture students and professionals. Their work and experience demonstrate the following:

### Adaptability and sustainability

- Architectural design based on simple geometry is a pragmatic strategy for adaptability;
- Flexibility and freedom is offered by spaces that are not limited to fixed functions, size and number of spaces in the design of houses;
- Sustainable designs can be achieved through effective spatial planning combined with simple but adequate technology;
- Adding active systems to supplement basic passive design is a responsible strategy to comply with changing building codes, coping with extreme weather, and satisfying clients' needs and expectations, but there is compromise because the volumes and construction best suited to passive design is not the same as for active systems;
- Changes in building codes can have unintended effects on design;
- A design pattern language is not static but continuously evolving; it has to respond to contingencies of time, place and needs of individuals for desirable everyday living with conscious sustainability.

### Housing design and lifestyle

- Living well in a house involves a balance between intensity of delight and continuity of physical comfort;

- Efficient and transparent indoor-outdoor spaces can enhance both the physical health and psychological well-being of the occupants by connecting them with nature for a deeper and stronger bond;
- Satisfaction with everyday living can be achieved by creating a sense of 'home' with intimate personal spaces (reading corners and living verandahs) and emotions such as delight, contentment and freedom in both indoor and outdoor spaces;
- If the climate permits, outdoor alternatives for activities usually accommodated indoors can reduce building costs and offer an enhanced experience. For example, an outdoor shower and outdoor laundry can be installed in a semi-enclosed outdoor space.

### **Communication and mentoring**

- Effective and frequent communication and encouragement of the clients' involvement in design and construction processes can resolve design conflict and issues (costs, construction and design alterations) between architects and clients;
- Through the process of mentoring, architects can develop their clients' environmental concerns, educate them about the importance of tolerance by embracing what nature has to offer;
- Mutual respect between directors, staff and their clients underlies the survival of multi-branch regional practices;
- Sensible and responsible design decisions can be made jointly by architect and clients through conversation and sketches to achieve the desired comfort and lifestyle and reduce the impacts of house designs on the environment;
- Ethics must be embraced in design processes as well as design products to achieve sustainable outcomes.

Harris and Welke, the regional directors, and the in-house architects display their perseverance by persistently operating with 'good faith' between the boundaries of their own design language, bending or amending its rules to meet local and changing conditions as needed. This 'good faith' they keep is a testament to their belief in climatically and regionally/culturally-responsive design coupled with the



playfulness of Troppo's responsible-hedonist attitude that has been the anchor all along for a practice that continues to expand and grow in all regions of Australia.<sup>312</sup>

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<sup>312</sup> In 2016, Troppo opened two new regional offices, with the newly appointed director Greg Norman operating from Sydney, and the former in-house architect and director in the Townsville office, Geoff Clark, now based in Launceston as the director of the new Tasmanian office.

## Appendix A

### Journal Article

This journal article focuses on houses designed by Troppo Architects in Darwin, northern Australia, in the 1980s. They are exemplary in demonstrating responsive cohesion between their form and local environmental and cultural contexts, including the idea of hedonism as a design principle.

Huang, J. & Radford, A. (2013). Houses for responsible hedonists: Troppo Architects in the North of Australia, 1980–1990.  
*Architectural Research Quarterly*, 17(3-4), 217-226.

NOTE:

This publication is included on pages 366 - 377 in the print copy of the thesis held in the University of Adelaide Library.

It is also available online to authorised users at:

<http://dx.doi.org/10.1017/S1359135514000049>

## Appendix B

### Interview Questions

Appendix B consists of three sets of interview questions. The first set of interview questions is designed for the founders of Troppo Architects; the second set is designed for the regional directors, former and current in-house architects; and the final set is designed for the occupants of the 1980s Darwin Troppo houses and the clients of the five regional contemporary houses. These questions are semi-constructed questions to provide guidance and prompts to interviewees in order to complete each interview in a fixed timeframe.

## Interview questions for the founders of Troppo Architects

### Aims and objectives of interviews

Stage one of this study seeks to identify a 'pattern' of design forms in the early work of Troppo Architects in the 1980s, and get an insight into the expansion of their regional offices in the 1990s. Interview questions are framed to understand the design process of Troppo Architects in response to place, people, sustainability and built environments. The interview questions focus on unfolding the process of the development of their design principles and ethos for their first Darwin operation. It will be crucial to extract the relevant activities, events, important design projects and people who brought influences and shaped their design ideas. These questions are also designed to unravel their attitudes and values for good housing design to obtain a desired lifestyle.

### The first decade – between 1980 and 1990

#### *Q1) Why did you choose Darwin as the base of your professional practice?*

- What was the motivation for practicing tropical architecture?
- What were you trying to establish when you first started in Darwin? And why?

#### *Q2) What was the primary concern when you started practicing this so-called Top End architecture when you were an outsider?*

- What were the general perceptions and visions of tropical architecture you had in your practice at that time? (Relationships with local residents and architects)
- How did you get your first project?
- Was there a different culture in the Top End?
- What were the needs of the local community?
- How long did it take the local community to accept your practice? What was the key ?
- Perceptions and visions of tropical architecture in your practice

#### *Q3) What were your design principles?*

- How did you come up with these principles?
- Climatic considerations
- Any awareness of environmental issues
- A sense of place – site surroundings
- A broad concern for the built environment (after Tracy Cyclone)
- Any economic issues
- Diversity of socio-cultural aspects
- Any specific choices of materials
- Building techniques and innovations
- Any thoughts derived from space, form and aesthetics of architecture in practice

- Whose work has influenced you the most in your early professional practice?

**Q4) How would you initiate a design project? What was your process of design?**

- Responses and approaches to spatial arrangements
- Compositions of forms and detailings
- Relevant tangible design ideas such as environmental, social, cultural and economic aspects

**The second decade – between 1990 and 2000**

**Q5) How did your design principles and concepts change and/or develop in the second decade of your practice?**

- What changed your design principles?
- Why did you changed them?

**Q6) What issues or concerns arised during the process of developing your design principles?**

- Ecological/Environmental issues
- Social issues
- Cultural issues
- Economic issues
- Status of clients (domestic clients and government clients)

**Q7) What were you trying to express through your architecture?**

- The visual expressions
- How did you express your architecture?
- Was there an architectural language that you were trying to speak metaphorically?

**Q8) What were the key reasons for expanding you Darwin practice to Townsville and Adelaide in 1995 and 1999 respectively?**

- Job requirements and convenience
- Personal preferences (family reasons etc)
- A different mindset for denoting the architecture of Troppo Architects

**Q9) (If nor answered in response to the previous questions) How do you think your style change during these twenty years?**

- Building form (roofs, walls, structure, access, connections between spaces, etc)
- Materials
- Details and ways of joints



## Interview questions for regional directors and in-house architects

### Aims and objectives of interviews

Conducting interviews with Troppo Architects' design partners and in-house architects is the way to unfold their views for the design process of houses, their motivation and dynamics with other architects and clients, design considerations, design constraints, as well as their understanding for relationships between the physical building and its cultural, economic and environmental contexts. Interviews will be conducted by telephone calls or personal contacts. The availability of each interviewee will be confirmed by emails for their convenient times and dates. Interview will be recorded with the consent of interviewees.

Interviews with architects who have deep associations with the founders of Troppo Architects will provide an insight into the early history of the development and changes of the work of Troppo Architects. Interviews will focus on the following topics:

- The relationship with Troppo Architects (years of practice and the role);
- Understandings on key principles and design theory embedded in designs of the work of Troppo Architects at the early practice;
- Significant buildings at the early practice and reasons behind the scene;
- A specific point of time during the process of design when cultural, social, economic and environmental aspects were considered; and
- The most difficult aspects during the process of the design in practice and methods of overcoming problems.
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Interviews questions will address the followings:

- The relationship with Troppo Architects (selected building and the role);
- The dynamic and interactive relationships with Troppo Architects in the process of designing buildings;
- Their perception of the language/style of Troppo Architects in relation to sustainability, place and culture; and
- Emotional feelings towards selected buildings in relation to senses of belonging (only applicable to clients/occupants) and comfort.

*Q1) What is your role in the firm of Troppo Architects? How do you interact with others in a collaborative design project?*

- What are your specific job requirements in the firm?
- Preliminary design stage, design principles development and computing technical support in composition of space, form and materials, and construction methods

- Collaborative design interactions among the colleagues of the same office and from other offices

*Q2) How long have you been working for Troppo Architects? What is your understanding of design principles for Troppo Architects' practice?*

- What do you think of the distinctive characteristics of Troppo's work that are different from the other architects' work?
- What are the ecological and environmental strategies embedded in Troppo's design?
- What are socio-cultural, economics, ethical and building technological factors influencing the design of houses by Troppo?

*Q3) How much do you understand Troppo ethos and their design principles? How do you integrate the design principles of Troppo practice with your own ideal architectural practice?*

- How do you create an innovative design with a combined image of Troppo style and your personal expression?
- Was there a moment that your ideas are not explicitly expressing the characteristics of Troppo style?

*Q4) How is the Troppo practice different, from your understanding, from one firm to another?*

- Comparison to the Troppo practice in Darwin, Perth, Byron Bay and Townsville
- Climate considerations, sources of material, specific requirements for new constructions, budget and other tangible factors such as socio, cultural, ethical and the environmental issues

*Q5) What is the design media that you use in producing ideas? Why?*

- Conventional design techniques such as sketches and quick 3D models
- Computing aided design tools such as Sketch-up, Revit and other CAD programs
- Combination of the two techniques

*Q6) What is the process of design if you were given a project?*

- The thinking process of a new project.

## Interview questions for occupants and clients

### Aims and objectives of interviews

Ten research questions are designed for the occupants of the 1980s Darwin houses and the clients of five regional houses. The focus of this set of questions is to encourage them to express their feelings and their daily experience with the space of their Troppo house. These questions also aim to identify any changes in the occupants' and clients' attitude and perceptions for everyday living.

*Q1) Were you familiar with the work of Troppo Architects?*

- Social media;
- Publications;
- family and friends

*Q2) How long have you been living in this Troppo house?*

*Q3) Why did you choose to buy a Troppo house?*

- The experience of the previous house
- Personal and work reasons

*Q4) What was the first meeting like with Troppo and their staff?*

- Their attitudes, professionalism and service;
- Any involvement in design process;
- Interactions and dynamics with Troppo and staff

*Q5) What's your feeling and experience of the house?*

*Q6) Do you think the house communicates with you?*

- The useage of space;
- A special corner for reading or a specific view to the outdoors;
- Interactions between the house and outdoor spaces

*Q7) Do you think the house has changed you in some way?*

*Q8) Is it easy to maintain the house?*

*Q9) Are you satisfied with the house? Why?*

*Q10) Can you run through your daily routine in the house?*

## Final interview questions for the founders of Troppo Architects

There are specific questions on construction traditions, contingency and change of Troppo practice over the years. I'd also like to hear more about your personal reflections on Troppo practice over the past 35 years. They are as follows.

### Construction traditions:

*Q1) I'd like to understand more about the relationship between local construction techniques and the local building industry on Troppo's design and differences in Darwin, Adelaide, Perth and other offices. Can you comment on this?*

### Contingency:

*Q2) One of the themes of my thesis is the way the Troppo practice and the expansion of its work has responded to opportunities and constraints, such as your own move to Adelaide/Perth as well as competitions and government commissioned projects. Are there other events where what could have been interruptions or difficulties have been turned into opportunities and success to the Troppo practice?*

### Change:

*Q3) Can you comment, please, on any significant changes in emphasis in Troppo's design principles and ethos over these years? What were the factors that brought about these changes?*

### Personal reflections:

*Q4) What is your personal reflection on the success/shortcomings of the expansion of the Troppo practice over the past 35 years?*

*Q5) What is your hope for the practice in the context of the contemporary architectural profession?*

*Q6) How do you envisage the future evolution of the Troppo practice in another 20 years?*

*Q7) Where would you position the work of Troppo practice in the social, cultural and environment contexts at both local and global levels?*

## Appendix C

### Interviews

Appendix C provides a table for the numbers of the interviews with Phil Harris, Adrian Welke, the former and current regional Directors, the former and current in-house architects, and the occupants of the 1980s Troppo Darwin houses and of the five contemporary Troppo houses in Darwin, Townsville, Adelaide, Byron Bay and Perth respectively. Due to privacy and the request made by most of the occupants of the 1980s and contemporary houses, their full names were not included but only referred to them as residents in general in this thesis.

Name	Relation to Troppo practice	Interview date	Interview place	Interview method
Phil Harris	Founder	<ul style="list-style-type: none"> <li>February 12, 2011;</li> <li>March 18, 2013;</li> <li>March 1, 2016</li> </ul>	Adelaide office	In person
Adrian Welke	Founder	<ul style="list-style-type: none"> <li>December 11, 2010</li> <li>April 5, 2014</li> <li>March 2, 2016</li> </ul>	<ul style="list-style-type: none"> <li>Perth office</li> <li>The researcher's office</li> <li>The researcher's office</li> </ul>	<ul style="list-style-type: none"> <li>In person</li> <li>Office phone</li> <li>Office phone</li> </ul>
Greg McNamara	Regional former Director of Darwin office	July 11 & 12, 2011	His house, his car and Darwin office	In person
Joanna Rees	Former in-house architect	July 12, 2011	Rees' house	In person
Terry O'Toole	Regional Director of Townsville office	May 11, 2012	Townsville office	In person
Geoff Clark	Regional former Director of Townsville office	December 14, 2012	The researcher's office	Video-conference on Skype and email exchanges
Aftab Khasmina	Regional in-house architect of Townsville office	May 12, 2012	Townsville office	In person
Zammi Rohan	Regional former in-house architect of Townsville office	September 26, 2014	The researcher's office	Email exchanges
Cary Duffield	Regional Director of Adelaide office	April 15, 2011	Cafe	In person
Andrew O'Loughlin	Regional in-house associate of Adelaide office	June 6, 2010	Cafe	In person
Victor Ci	Regional in-house architect of Adelaide office	June 18, 2010	The researcher's office	In person
Dan Connolly	Regional Manager of Byron Bay office	July 11, 2012	Home-office	In person
Residents of Kaiplinger House	Occupants of the house (family of 2)	July 11, 2011	Their house	In person
Residents of Jarvis Lawler House	Clients of McNamara for new extension and occupants of the Lawler House (family of 4)	July 13, 2011	Their house	In person



Residents of Elevated Green Can House	Occupants of the house (single mum and son)	July 12, 2011	Their house	In person
Residents of Troppo House	Occupants of the house (2 single men and a family of 3)	July 13, 2011	Their house	In person
Residents of Spazappan House	Occupants of the house (family of 4)	July 12, 2011	Their house	In person
Residents of Troppo Type 5 House	Occupants of the house (family of 3)	July 13, 2011	Their house	In person
Residents of Coconut Grove, Darwin	Neighbours who believe their houses are Troppo houses (singles and families)	July 12, 13 and 14, 2011	Their houses	In person
Residents of Mortlock Residence, Darwin	Clients of McNamara (in partnership)	July 13, 2011	Their house	In person
Residents of Connell Residence, Townsville	Clients of O'Toole (family of 2)	May 13, 2012	Their house	In person
Residents of Russell Residence, Adelaide	Clients of Duffield (family of 2)	June 5, 2012 & December 12, 2012 (requested by clients)	Their house	In person
Residents of Hutchinson Residence, Byron Bay	Clients of Connolly (family of 4)	July 13, 2012	Their house	In person
Residents of Howell Residence, Perth	Clients of Welke (family of 2)	May 5, 2013	The researcher's office	Office phone

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