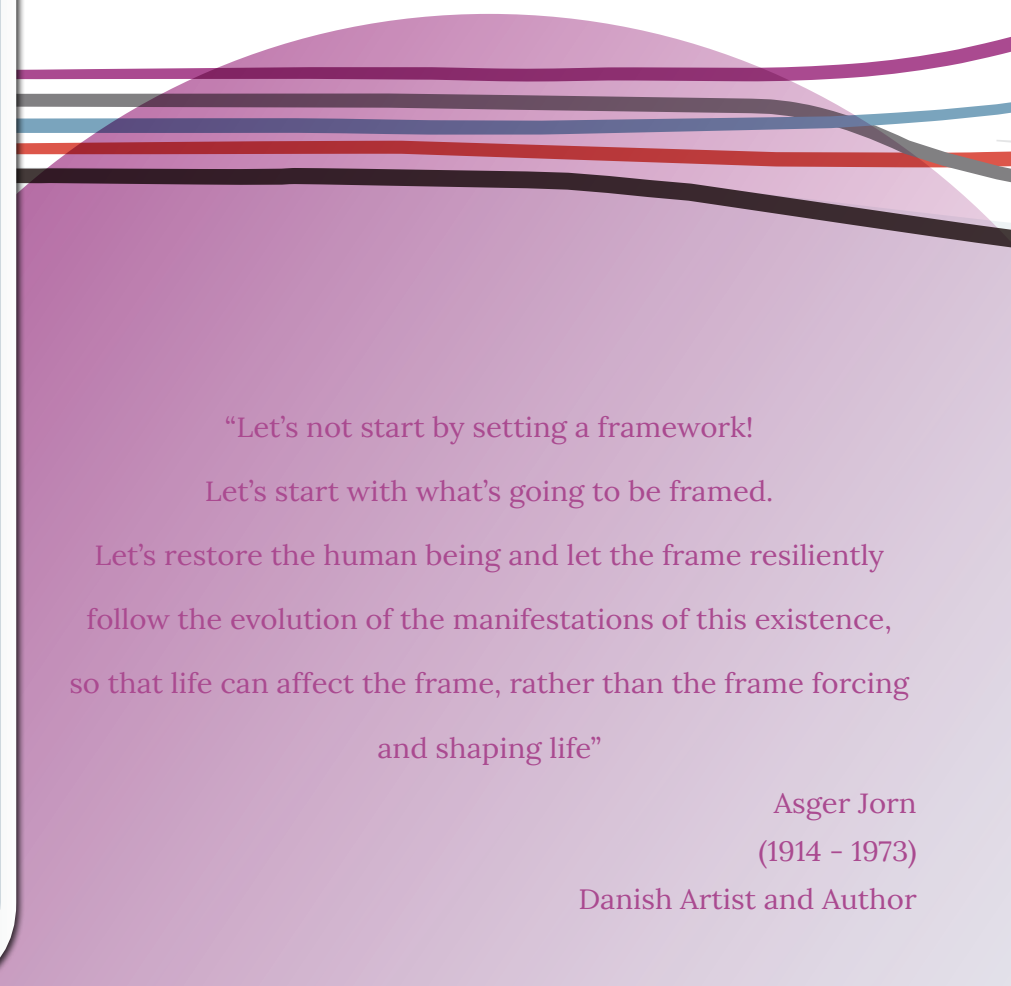


Different Buildings For Different Minds

A study of the specialised building design of homes & workplaces for individuals on the Autism Spectrum.

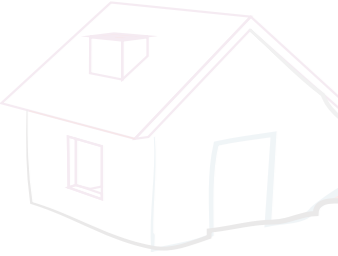
USA, Denmark, Netherlands, UK and France

A report by Michelle (Shelly) Dival – Churchill Fellow 2017
Winston Churchill Memorial Trust of Australia



“Let’s not start by setting a framework!
Let’s start with what’s going to be framed.
Let’s restore the human being and let the frame resiliently
follow the evolution of the manifestations of this existence,
so that life can affect the frame, rather than the frame forcing
and shaping life”

Asger Jorn
(1914 - 1973)
Danish Artist and Author



Personal Disclaimer

Under Western Australian law, I am not a registered Architect. The industry accepted term used for my professional title is Building Designer. In no way, by direct or indirect reference through the work in this report, do I imply that I am a registered Architect. While the words “architecture” or “architectural” (protected words, in some circumstances, under the Architects Act 2004) are used in this report, these words (and any other derivatives) are used as they are globally accepted terminology when referencing the built environment.



Michelle Dival with her Excellency Kerry Sanderson, Government House 2017

I understand that the Churchill Trust may publish this Report, either in hard copy or on the internet or both, and consent to such publication.

I indemnify the Churchill Trust against any loss, costs or damages it may suffer arising out of any claim or proceedings made against the Trust in respect of or arising out of the publication of any Report submitted to the Trust and which the Trust places on a website for access over the internet.

I also warrant that my Final Report is original and does not infringe the copyright of any person, or contain anything which is, or the incorporation of which into the Final Report is, actionable for defamation, a breach of any privacy law or obligation, breach of confidence, contempt of court, passing-off or contravention of any other private right or of any law.

Signed:

Praise for Different Buildings For Different Minds

“Occasionally you may find yourself in a built space with no unwanted noises or echoes, no glare or sharp-edged shadows, no cold or rough surfaces, no unpleasant draughts or odours. A place with fresh air, a pleasant outlook and comfort - where your senses are at ease.

We know and treasure these places when we find them, but we rarely call for them in a design brief - and they seem to be difficult to create.

For many people with autism, dementia or other neurological disorders, the built environment has a major impact on their well-being. People with Autism Spectrum Disorder represented 29% of all participants registered with the 2018 National Disability Insurance Scheme in Australia - and yet there are no design standards or guidelines for buildings for people with ASD.

Shelly Dival's Churchill Fellowship report "Different Buildings for Different Minds" provides an international overview of buildings designed for ASD - and an important literature review. It is a work that acknowledges the special sensitivities of people with ASD and helps us appreciate how to design buildings with a matching sensitivity - not just for those with disabilities, but also for the rest of us with a duller appreciation of the impact of the world around us. Shelly deserves substantial support to help put her knowledge and insights into practice far and wide - especially her vision for Australia to host the first International Symposium on Design for Autism, Dementia and other Neurological Disabilities".

ANDREW ABERCROMBY, MANAGING DIRECTOR, SERNEKE AUSTRALIA

“Insightful. Thought-provoking. A must-have resource for pioneers fueling a new wave of residential and work environment options for people with autism and other neuro-diversities. Thank you, Shelly, for connecting our passionate pursuits and global community through your inspired and neuro-inclusive work”.

DENISE D. RESNIK, FOUNDER, PRESIDENT/CEO FIRST PLACE AZ, CO-FOUNDER SOUTHWEST AUTISM RESEARCH & RESOURCE CENTER (SARRC) AND MATT'S MOM

“The more science has taught us about neurodiversity, the more we have revealed about our humanity. Communities are built upon these observations, and nurturing this diversity is critical to our future. Without a doubt, our community will best be served by having a built environment that can support the strengths and challenges of every individual. Shelly's pioneering research reveals how this might be achieved for those living on the autism spectrum. This work is unparalleled, and has the potential to transform how the autism community can interact with the built environment.”

ANDREW WHITEHOUSE, ANGELA WRIGHT BENNETT PROFESSOR OF AUTISM RESEARCH TELETHON KIDS INSTITUTE AND THE UNIVERSITY OF WESTERN AUSTRALIA

“Recognising and supporting the multiple and diverse ways in which people engage with their surroundings is a key feature of an inclusive environment.

While Australia's building codes and legislation help to define the physical accessibility requirements of our buildings, currently they do not consider the impact of neurodiversity on individuals and how they actually experience living in their homes, or how they participate in their educational settings or workplaces.

Shelly's research offers an opportunity to consider a more holistic view, particularly for professionals involved in the design, construction and management of these environments in offering more dignified, intuitive and equitable user experiences within these spaces, which should enhance the wellbeing of our community and ultimately be of benefit to us all”.

ERICA SCHURMANN, SENIOR ADVISOR, DIVERSITY & EQUITY (DISABILITY), ACCESSABILITY ADVISOR, CURTIN UNIVERSITY, WESTERN AUSTRALIA

“Necessity, history tells us, is the mother of invention. Never was this truer than when applied to the lived environment for people with autism. Not only is an enabling environment a necessity, it is a basic human right. Those of us without cognitive challenges take for granted the ease with which we are able to navigate, understand and assimilate information from unfamiliar environments. For people with autism, the world and the spaces in which they live can be a constant source of anxiety.

Shelly Dival has taken this challenge, this necessity, and has innovatively sourced solutions to the difficulties that people with autism encounter on a daily basis. She starts from a position of knowledgeable authority, both in terms of her professional understanding of the built environment and her personal passion in understanding autism. Creating a synergy between these two worlds is no mean feat. In striving to explore this synergy further, Shelly has gained knowledge, expertise and evidence from around the world with the benefit of the Churchill Fellowship. She has made exceptional use of the fellowship; planning an itinerary which saw her visit 5 countries on her mission to gather evidence. Having met Shelly during this tour, I can personally say she is one of the most dedicated practitioners I have met working in this field. She not only understands the challenges of living with autism, but truly appreciates how the built environment can impact upon or facilitate a person's function.

I, like Shelly, share the dream that we can one day live in a world which is truly inclusive. It will take energy, enthusiasm, tenacity and creativity to achieve this. Shelly has the qualities, knowledge and drive required to bring about change. She did not embark upon this journey in half measures; she embarked upon it to succeed and I believe that she is exactly what the world of autism and design needs”.

TERESA ATKINSON, SENIOR RESEARCH FELLOW ASSOCIATION FOR DEMENTIA STUDIES UNIVERSITY OF WORCESTER WORCESTER

“CliniKids is a clinical service for children 0 - 5 years who have delayed social communication skills and/or have been diagnosed with autism spectrum disorder. Lawrence Associates was appointed the Architectural lead for the design and construction project to fit out part of the Telethon Kids Institute's facility in Subiaco, Western Australia for CliniKids, and appointed Shelly Dival as the specialist design consultant for the project immediately following the return from the research trip for her Churchill Fellowship.

The injection of specialist design enterprise was exceptional and the feedback from the CliniKids operations in the new fit-out has been extremely positive. The design success encapsulates key issues relating to balance of sensory sensitive or sensory overload parameters relating to light source, colours, shape, symmetry, rhythm, etc etc. All design parameters must be considered to create the balance of sensory neutrality.

It is with great pleasure that I can praise Shelly Dival for the amazing contribution to the design for Telethon Kids Institute, CliniKids, for Autism Research which of all organisations, would have to be the most sensitive environment in our community dealing with the Autistic Spectrum experience.

As such, it is high praise indeed, for work completed and put into practice. It goes without saying that Shelly has both researched and practiced her research skill, while this report summarises her findings and as such is an important reference document, the success of CliniKids highlights the proven success in the application of those skills”.

GARRY LAWRENCE, MANAGING DIRECTOR, LAWRENCE ASSOCIATES

Contents

Executive Summary	2
Introduction	3
Autism spectrum disorder: A Brief Overview	
Why Design For Autism?	4
Timeline	5
The Australian Context	7
Neurological Diversity Representation In Laws and Regulations	7
Programs	8
Background	9
My Churchill Trust Fellowship	9
The Program	11
Themes	13
Influences	13
Branches of Design Theory	14
Architectural Considerations	17
Elements of Nature and External Spaces	19
Neuro-Diverse Design	21
Evidence And Research	22
Case Studies	25
Recommendations	41
Continuing Efforts	42
My Personal Thanks	43
Further Reading	44
Photoboard	45
Reference List	47

Tags: Autism spectrum disorder, architecture, design, neuro inclusive, assisted living, NDIS, dementia, disability, building, public spaces.

Executive Summary

Autism spectrum disorder is often considered a “hidden” disability. It can go undiagnosed, and it is not a condition recognisable by a person’s physical appearance. There are an estimated 1 in 70 people in Australia on the spectrum. It is a lifelong condition and there is no cure.

The research undertaken and presented in this report argues that specialised building design does provide support and positive benefits to individuals living on the spectrum. Specialised building design can provide benefits in educational, work and home settings.

An enabling built environment can support individuals who experience hyper or hypo sensory issues, who struggle with social choices and who experience issues relating to cognitive function. This support can be achieved through a variety of architectural methods including the building’s spatial arrangement, the specification of materials, finishes, fixtures and fittings and even colour selection.

This report outlines and explores several themes that influence architecture for autism, including design theory, methodologies to inform design outcomes and architectural considerations. It highlights the potential broader application of specialised design for other conditions and diseases, provides a discussion of current global research, and discusses how, as a global society, we should be directing further research.

Michelle (Shelly) Dival
Perth, Western Australia
+61 433 510 416
shelly.dival@enablingspaces.com.au
[linkedin.com/in/shellydival](https://www.linkedin.com/in/shellydival)
facebook - @autismfriendly
www.enablingspaces.com.au

My major recommendations are:

- That Australia be proactive in undertaking rigorous research into the effects of the built environment on those with autism to inform best practice guidelines.
- That Government and industry bodies work towards updating policy to include neurological access requirements within building codes and regulation.

Introduction

Autism spectrum disorder:

A Brief Overview

Autism spectrum disorder (ASD) is a term used for a variety of neurodevelopmental disorders, which are characterised (among other things) through challenges in communication, language and social interaction, along with specific repetitive behaviours and patterns (Whitehouse et. al. 2018, 2-3). While ASD encompasses a wide range of conditions and characteristics, it is something which often goes undiagnosed due to a range of diagnostic challenges and by nature, it presents in varying degrees of severity. As a result, there isn't consistent, global consensus on its prevalence. However, the World Health Organisation cites that "1 in 160 children has an autism spectrum disorder (ASD)" (2017). For comparison, Autism Spectrum Australia has revised its Australian prevalence estimate from 1 in 100, to 1 in 70 in 2018.

As ASD is a lifelong condition, individuals within this community often incur social, educational and economic challenges and discrimination which neurotypical individuals (or, those with no known neurological conditions) may not. ASD can impact many facets of a person's life, including the way a person relates to his or her environment.

The Oxford Dictionary describes the environment as "The surroundings or conditions in which a person, animal, or plant lives or operates." But what about the built environment?



(left to right) Thanks to Kellie and John for the beautiful photos of Logan, Lani & Jory
(Above) Jason

How do individuals on the spectrum live, operate and relate to the built environment?



Why Design For Autism?

*"Everyone deserves good architecture."
- Dr Christopher Henry*

As a single disability group, the numbers of people living with autism is not insignificant. In Australia, of the total number of participants of the National Disability Insurance Scheme (NDIS), people with autism (as their main disability) is the single largest group per disability to have active plans in place, accounting for 29% of participants (NDIA 2018, 40). As the scheme has yet to complete roll out in all states, the actual numbers of people in Australia with autism needing and accessing support will be higher than the numbers stated in the report. Add to those statistics parents, siblings, other family members, friends, carers, educators, and coworkers and the number of people affected by autism (either socially or financially) climbs significantly.

*"Are you enabling choice? If you are not enabling choice, then that's the problem."
- Steve Maslin*

With my own family and friends I have seen and experienced first hand the related stresses for parents, additional everyday expenses, cost of therapies, effects on siblings, challenges of education and learning, challenges when going to public places and events, and the concern and stress regarding housing and jobs as their children age. My family's story is not unusual. A casual survey of social media platforms will show a multitude of stories across every continent.

If the built environment can help support the individual with autism, then the flow on social and financial effects across the community would also be beneficial.

*"As Designers of environments we have to be ambitious for our audience, not just focusing on problems but providing opportunities for growth."
- Colum Lowe*

Evidence (both anecdotal and research-based) has shown that designing or adapting the built environment specifically with individuals on the spectrum and the challenges unique to their community in mind, has had positive effects on their lives (refer to "Research and Evidence" in this report). During an interview with Prof. Andrew Whitehouse, Head of the Autism Research Team at the Telethon Kids Institute in Perth (Aus), he expressed his concern that the effects of therapy was "blunted" as kids left the clinic and went into a neuro-typical world.

*"The anxieties are caused by the little things. If you can get them right, then caring for and supporting the person is a lot easier."
- Colin Low*

Theresa Atkinson (formerly Whitehurst) from the University of Worcester has undertaken research into the housing for the autism and dementia communities. Her experience shows that there are commonalities in cognitive impairment of the two groups and has found there are design features that benefit both communities. Throughout my experiences and interviews, my fellowship research leads me to believe that while designing for autism, some of the features in design will also be beneficial for people suffering from other neurological disorders such as epilepsy, migraines, anxiety and depression.

Perhaps this quote from Magda Mostafa, during my interview with her, sums up the reasons why we should design for autism,

"People with ASD have a right to good design and it's not asking for a lot, being tolerant that different people need different things and spaces. Until we can get to the point where we have codes, let's start with moral obligations."



AUTISM DIAGNOSIS TIMELINE

- 1943** Leo Kanner described a condition called “Kanner Condition” (later re-named “Early Infantile Autism”)
- 1980** Autism was added to the DSM3 diagnostic manual for diagnosis of a new disorder as “Infantile Autism”
- 1987** “Autistic Disorder” replaced Infantile Autism and gave more expansive explanation in the manual
- 1994** DSM4 was released, with diagnosis criteria changed leading to diagnosis of Autism in larger numbers
- 2013** DSM5 published
- 2018** Australian guidelines for DSM5 released

AUSTRALIAN ARCHITECTURE FOR AUTISM RESEARCH

- 2015** “Disabled Students Need More Than Just Ramps” Paul Hede, 2014 Sir James Gobbo AC CVO Fellow
- 2017** Ceridwen Owen & Damhart McCann :Transforming Home: parents’ experiences of caring for children on the autism spectrum in Tasmania, Housing Studies
- 2019** Different Building for Different Minds, Churchill Fellowship Report Michelle (Shelly) Dival, 2017 Churchill Fellow

GLOBAL ARCHITECTURE FOR AUTISM RESEARCH

- 2006** Teresa Whitehurst. “The Impact of Building Design on Children with Autistic Spectrum Disorders”
- 2008** Architect Magda Mostafa, Cairo. Undertakes and publishes the research project “An Architecture for Autism: Concepts of Design Intervention for the Autistic” acknowledged as pioneering research by an Architect
- 2009** “Opening Doors” A collaborate study, Urban Land Institute (ULI) Arizona, Southwest Autism Research & Resource Center (SARRC), the Arizona State University (ASU) Stardust Center for Affordable Homes & the Family and the ASU School of Architecture and Landscape Architecture
- 2010** “Living in the Community Housing Design for Adults with Autism” Andrew Brand and Helen Hamlyn Research Centre
- 2013** “Met Het Oog Op Autisme” (An Eye on Autism) Flip Schrameijer

** DSM - “Diagnostic and Statistical Manual of Mental Disorders,” a comprehensive classification of officially recognized psychiatric disorders, published by the American Psychiatric Association , for use by mental health professionals to ensure uniformity of diagnosis.*

*** global research examples are a snapshot only.*

The Australian Context

When I started researching architecture for autism, I struggled to find much mention of it in Australia. I tried different search terms, different devices and went 'incognito' in my search browser with little to show for it. I discovered work done by Paul Hede, an Architect in Melbourne who has designed several of the Autism Spectrum Australia (Aspect) Schools for autism. That was about it.

After contacting various service providers in Australia it became apparent that while many assist their clients to find housing, none of the housing provided is specifically designed with autism in mind. The Autism Association of WA is reputed to be one of the major housing providers in the country. A representative expressed their frustration at not knowing how to best solve or minimise recurring housing and maintenance issues and, until we met, they were not aware of the possibility of specific design methods for autism.

To my knowledge, there has been no research undertaken in Australia on the specific subject of architecture for autism. However, there is some research being conducted on other aspects of ASD. The Cooperative Research Centre for Living with Autism (Autism CRC) has undertaken research in regards to the impact of classroom acoustics in children with autism, which will inform design practices (see Further Research for more information). Current Australian research centres centred around the medical, therapeutic and social aspects of autism include Telethon Kids Institute (Western Australia), Autism CRC (Queensland), Curtin University (Western Australia) and La Trobe University (Victoria).

Neurological Diversity Representation in Laws and Regulations

Neurological disability is recognised in various equal rights and disability agreements internationally and nationally. The United Nations Convention of the Rights of Persons with Disability (UNCRPD) is a global convention, and Australian national and state agreements and laws, such as the National Disability Strategy, Disability Discrimination Act 1992 (Commonwealth) and Disability Services Act 1993 (WA) are all examples of such regulations. Despite this, there is a lack of reference to neurological conditions and disabilities within best practice models and guidelines for accessibility within architectural design.

The main provision for disability access in the National Construction Code (NCC) refers to physical disability access, vision impairment and some specifications for auditory impairment. Furthermore, the recommendations under the voluntary Livable Housing Design (LHD) Guidelines for universal design and requirements for LHD accreditation also concentrates on physical access (Livable Housing Australia 2017). Specialist Disability Accommodation (SDA) Rules 2016 under the National Disability Insurance Scheme (NDIS) references the various levels of the Livable Housing Guidelines as part of their requirements for housing providers. There is no reference to housing design requirements or guidelines to cater for the specific needs of those with autism spectrum disorder or other neurological conditions.



Programs

There are many training programs available to improve the home and work lives of people on the autism spectrum. While the programs, in many cases, provide skills and strategies to positively impact an individual's life, there is little emphasis on the built environment and the effects it can have on a day to day basis.

Large organisations such as Westpac, Bankwest and ANZ have specialised recruitment and internship programs which are designed specifically to support those with ASD in the workplace. The programs concentrate largely on how to participate in a work environment and build social skills, which are undeniably important aspects to a person's life. However, programs such as these don't address the challenges the built environment can cause the neurodiverse.

Programs within the public school system provide assistance to people with ASD and other special needs, in the form of additional staff for mainstream students, and special education units for those needing extra support. It appears that none of the programs include the requirement to adjust the built environment to provide an enabling learning environment.

Furthermore, nationally accredited training courses for disability and access also tend to concentrate on access for physical disabilities.

From my observations, there is a bias towards physical disability in the Building Codes, housing models and courses/programs available. Employment programs that focus on social and work

skills do not consider the built environment they operate in. The design of homes and shared public spaces also focus on physical disability. This focus could stem from a lack of knowledge in regards to neuro-enabling architecture, rather than from a conscious bias.



Background - Sir Winston Churchill Memorial Trust (Aust.)

When Sir Winston Churchill resigned as British Prime Minister in 1955 at the age of 80, he had served under 5 reigning monarchs, survived three wars, had been a writer, historian, journalist, adventurer and painter. Churchill was a man who readily believed that anything was possible if you put your mind to it, and that the greatest figures in history were those who made a contribution to public service and their fellow countrymen.

There was a widespread desire to honour him and capture the essence of his public service, inspiration, intellect and humour for generations to come. In Australia there was enthusiastic support, so when Prime Minister Menzies announced the news of Sir Winston's death to Australians in January 1965, he simultaneously announced a national fundraising event to establish The Winston Churchill Memorial Trust.

On Churchill Memorial Sunday, 28th February 1965 a door-to-door appeal was launched. Over 220,000 Australians participated as collectors, and more than 2.2 million pounds were raised – if indexed, it remains the largest public fundraising effort in Australian history. It is the only time in our history that the banks opened on a Sunday so the money could be deposited.

Sir Robert Menzies referred to the Churchill Trust as the “people’s Trust” – saying that every Churchill Fellow carried the aspirations of millions of Australians – past, present and future. The past who donated, the present being the annual Fellowship recipients, and the future being those who benefit from the contribution the Fellowship can make.

(Thanks to the Sir Winston Memorial Trust of Australia for these words.)



My Churchill Trust Fellowship

I have been blessed with six beautiful grandchildren. Jacson is my eldest grandson. He was born with Down Syndrome and, at the age of seven, was diagnosed with autism spectrum disorder. I didn't understand much about autism so, of course, I 'Googled'. It's then that I discovered the work being undertaken overseas on the relationship between architecture and autism. This intersection between them became my obsession. I learnt everything I could about how our built environment affects those with ASD. The more I learnt, the more I realised Australia has a virtually non-existent pool of expertise in this area, and that there are thousands of individuals and families living with autism that could benefit from a more positive interaction with their built environment. After 25 years as a Building Designer, my professional and personal lives were now firmly meshed together.

In 2017, I applied for a Churchill Fellowship, which would allow me the opportunity to travel overseas to interview global leaders in the field of autism and the built environment. I will be forever grateful to the Churchill Trust of Australia for not only believing in the importance of my project, but also believing that I was a worthy recipient. I travelled on my Fellowship from March - May 2018. The trip took me literally around the globe, meeting with wonderfully generous people willing to share their expertise and experience with me.

One of the things I discovered early in my fellowship is that while many of the people I spoke to had heard of, or sometimes actually met another person in the industry, very few had actually travelled to another country specifically to meet with others

in the field. Generally, people and organisations are working relatively independently. Even in this digital age, the publications and research in this field are hard to find as it is often kept within these independent 'cells'.

It seems that no-one, to the best of our knowledge, had journeyed on such a lengthy trip to investigate the work and research being undertaken globally. The Fellowship, therefore, has put me in a unique position and provides me with the opportunity to not only study my project, but to provide a link between these people worldwide. As a result, the individuals I interviewed were, therefore, very keen to see what I would uncover. It was interesting that the more the itinerary progressed and the more conversations I had, some main themes emerged. It is those themes that this report explores.

While my research project was about specific building design for autism, this report is not a “how to” manual for Architects and Designers. Rather, it's a commentary about the themes, discussions, challenges and successes as seen through the eyes of the people I met and the opinions I formed throughout the trip and since as I reviewed and collated the mountains of information gathered. The project became much more than design and construction detailing specifications.

I have deliberately kept the references to medical descriptions to a minimum, as I am not a medical, or autism expert, and the intricacies and nuances of autism in a medical sense heightens the probability that I would describe something incorrectly. Similarly, I have used “conditions” collectively to describe any related disease, disorder or the like.

My aim is that this report raises awareness and the level of understanding within Government and decision makers, services providers and families on how our built environment influences the lives of people living with autism.

I hope this report starts a conversation and, most of all, ignites action in developing different housing and workplace models and policy along with influencing Australian research in the field of “architecture for autism”



Photo by Jaz Hart

The Program

Denmark

Lars Aarup Jensen

Specialområde Autisme (Specialist Area Autism) ~ CEO
Hinnerup, Denmark

Sine Ahnfeldt Kjeldsen

Specialområde Autisme ~ Psychologist, Autismefokus
(consultant)
Aarhus, Denmark

Anny Led Aarup

Specialområde Autisme, Seniorhuset (Seniors House)
residential division ~ Head of Department (Seniorhuset,
Ådalen and Engstien)
Hinnerup, Denmark

Jeanette Rauff Hansen

Specialområde Autisme, AT Home ~ Unit Manager
Tørring, Denmark

Mette Wienberg

Wienberg Architects ~ Architect, Founder
Aarhus, Denmark

Mary Ann Brix

Specialområde Autisme ~ Head of Department -
Employment & Education (Randers Bagland & Hinnerup)
Hinnerup and Bagland, Denmark

Egypt

Magda Mostafa

The American University in Cairo ~ Magda Mostafa,
PhD, Associate Professor of Design, Associate Chaire of
Department of Architecture

USA

Debra Caudy, M.D.

29 Acres ~ President and Co-Founder
Dallas, Texas

Denise D. Resnik

First Place® AZ ~ Founder, President/CEO and Board
Member
Phoenix, Arizona

Dr Christopher N. Henry

Autism Design Consultants, VCU Medical Center ~
Researcher and Founder of Autism Design Consultants,
Resident at VCU Medical Center (Child Neurology)
Richmond, Virginia

The Netherlands

Dr Flip Schrameijer

Architecture for Autism ~ Sociologist, Writer, Researcher
and Founder of Architecture for Autism
Amsterdam, The Netherlands

Christine Kuysters

Stichting Papageno (Papageno Foundation), Papageno
Huis ~ Director
Laren, The Netherlands

Caro van Dijk

Caro van Dijk Architectuur ~ Architect, Researcher and
Founder
Amsterdam, The Netherlands

England

Steve Maslin

Building User Design Solutions (bud), Design Council,
Schumacher
Institute for Sustainable Systems ~ RIBA Chartered
Architect, Director at Building User Design Solutions
(bud), Built Environment Expert at Design Council CABE
and a Senior Research Fellow at the Schumacher Institute
for Sustainable Systems
Bristol, England

Dr Ute Leonards

University of Bristol, School of Experimental Psychology ~
Co-Director of the BVI Movement Laboratory
Bristol, England

Mark Ellerby

Mark Ellerby Architects ~ Architect and Owner
Bath area, England

Teresa Atkinson

Association for Dementia Studies, University of Worcester
~ Senior Research Fellow
Worcester, England

Colum Lowe

BEING ~ Founder and Lead Consultant
London, England

Chris Pike

National Autistic Society (NAS) ~ Autism Access Specialist
London, England

Scotland

Colin Low

Scottish Autism (at time of interview) ~ Property Business
Partner
Alloa, Scotland

Andrew Lester

Architect ~ Architect of New Struan School
Scotland

Ray Cherry

Scottish Boards Council ~ Architect

France

Emmanuel Negroni

Negroni Archivision ~ Architecte designer, Co-founder
Paris, France

Jean-Pierre Sanchis

Director The Scarabee

Pierre Denis

Mayor of Champcevrains, President of the Board of
Directors Awakening of the Scarabee

Helene Galopin, Adeline Poilvert & Antony Schuff

Chris Henry

*This interview made my head explode - in a good way!
It opened up thoughts and ideas and the pro's and
con's of different types of research and evidence based
architecture.*

Debra Caudy

*Thankyou for sharing your journey! Hearing about your
experiences and ideas for 29 Acres set the scene for my
research trip.*

Colin Low

*I love the way that you approach the work you do, thank
you for sharing your knowledge, and your box of tricks!
I know you make such a positive impact for all your
clients.*

Denise Resnik

*Just wow! The time, dedication, resources and knowledge
built up over 20 years to get First Place to this point is
amazing. Future leaders in this field will be ably assisted
by the knowledge base in Phoenix.*

Lars Aarup Jensen and staff

*You guys are amazing. Undertaking research and
innovation while providing the appropriate care and
respect in all your facilities is wonderful to see. Seeing
a government department pushing for, and delivering
innovation is amazing!*

Mette Wienburg

*Thank you for inviting us into your home, and sharing
your thoughts on design. Your "hippy" way of thinking
is amazing, and provided me with another level of
understanding.*

Flip Schrameijer

*Thank you! Your frank and insightful discussions added
to the conversation of my trip, and provided much
food for thought. I admire your dedication to keeping
the discussion going in the work you do. Thank you for
hosting us, and the sneaky tour of the aged care home!*

Andrew Lester

*As a Designer, I had a wonderful time hearing about
the good times, and the challenges of the design and
construction process of New Struan School. It is with
discussions such as this that design and building
professionals learn how to do it better. Thank you for
being so candid.*

Ray Cherry

*Thank you for sharing your experiences designing Leader
Valley School, other than design knowledge, it provided
further anecdotal evidence of success for children
through enabling architecture. So important for our kids!*

Steve Maslin

*Talking to you and Mark, was possibly the big "wow" day
of the trip, I was exhausted at the end of it. Thank you for
opening my mind to new concepts and ideas. It continues
to influence how I think, and is woven into the fabric of
this report.*

Mark Ellerby

*So much expertise! I constantly reference your work in
conversations, thank you for adding depth to my quest
for knowledge. Just give me any excuse to come back to
Bath and help with a project!*

Ute Leonards

*Just when the day was already "wow", you added to it
with your work with vision and the built environment.
Thank you for your trust in us by sharing your ideas. It's
one area that I'm keen to learn much more about.*

Theresa Atkinson

*What a combination! expertise in both autism and
dementia and designing environments. It widens the
application of my research, for which I'm grateful given
it can provide benefits for so many more people. Thank
you for sharing!*

Colum Lowe

*During our time together, you provided me with some
wonderful pearls of wisdom, which continues to shape
my thoughts. Thank you for sharing the resources you
developed, I shall definitely put them to good use.*

Emmanuel Negroni

*You are an inspiration! To pursue such excellence
and continue to promote this very important type of
architecture in a country with little empathy for it, and
language barriers making international collaboration a
challenge, I salute you! Thank you to you and everyone
at Le Scarabee for your hospitality, what a perfect day it
was for a drive in the country!*

Magda Mostafa

*It was an absolute pleasure to speak with you. Even after
2 months of interviews, you provided yet more depth to
my knowledge through your vast experience and insight,
from families to commercial considerations of public
spaces. Your experience and understanding across world
regions is incredibly valuable.*

Each person I interviewed during my fellowship was informed by their own experiences, background and expertise. This led to insightful, interesting and varied conversations. Visiting buildings first hand, talking to the Architect/Designer and meeting residents and staff was invaluable to fully understand not only the specific design of the building, but also to appreciate how the building was working for staff, and more importantly (and ultimately) the residents and carers. The more people I spoke to, the more common themes started to emerge, not just specific to design, but also associated topics that influence architecture for autism. I have identified these themes and have explored them in the following sections:

1. Influences
2. Branches of Design Theory
3. Architectural Considerations
4. Elements of Nature and External Spaces
5. Neuro-diverse Design
6. Evidence and Research

1. Influences

The ability of all stakeholders and contractors to accept and understand the needs of individuals with ASD is the root of the success of the project. If all stakeholders are not invested in the overall aim of the building and don't have a high level of acceptance of specific design features and fit out requirements, (particularly where there is an additional cost involved), it will be detrimental to the success of the project. There were several projects which highlighted the difficulty in dealing with builders, sub-contractors and suppliers that were not invested in, or understanding of the specialty of the build. The standard response of "but we've always done it this way" or "why would you do that?" hinders the successful build process, and is, therefore, damaging to the way architecture plays its role in supporting individuals with autism.

The demographic of the end user will also influence the design and specification of the building. For example, if the intended users are individuals needing a higher level of support, or have specific challenging behaviours, then a more robust specification for the fitout and surfaces is required, along with specialised facilities. However, if the building is intended to be an assisted living centre with a transitional facility (to ultimately lead to independent living), then the specification of the fitout, building features and space type can be different. An example of this is New Struan School in Scotland, where the design was carefully considered for a particular group of students in mind. Over time, the demographic of the students changed to those with more challenging behaviour than the original cohort. As a result, the use of the

space also changed, meaning items such as door hinges and wall surfaces were found to be regularly damaged and required regular replacement and maintenance.

The regional location of buildings and the local vernacular will impact the design of the building. While this is true of any piece of architecture, when building specifically for autism, I found organisations were very particular in choosing land with specific surrounding facilities. There were multiple examples throughout my fellowship that highlight the influences of the geographical area on the design. For comparison, First Place in Phoenix and 29 Acres in Dallas, are both supported housing options for adults which have transitional academies and life skills coaching facilities. First Place is a multi-storey building in Midtown, Phoenix which takes advantage of the local infrastructure, such as transport, and is a compact building design. On the other hand, 29 Acres is in a semi-rural setting and will consist of a variety of separate buildings to allow for various living configurations and a separate communal building. This site was also carefully chosen for its proximity to the city of Denton, with its university (both organisations partner with universities for ongoing research) and other essential services. Despite the similarities in services and intended users, the vision or aim for each residential complex is different, resulting in significant differences in building style and designs.

The type of building or facility will also influence the design for autism. For example, the design solution can be very specific for someone in a family home so their individual requirements can be met. Whereas when designing for a group,

the building will need to allow for changes in the needs of different residents, while also catering to the needs of the majority of the intended demographic or, individuals on the spectrum. In Denmark, Specialist Area Autism's Seniorhuset (Seniors House) not only meets the need of autism, but also the needs of aging in place. For example, wider doors were included to provide easy access to a hospital style bed if required. In a school setting, the building needs to be designed to support various activities, including those requiring concentration. In this instance, classroom design to allow natural lighting while simultaneously minimising distractions from external influences is important. However, there is also risk of being too restrictive of light, colour and sound, resulting in a stark, understimulating environment that no one is likely to find pleasant.

One of the major practical design influences clearly illustrated in The Netherlands was whether the facility was a new build or an existing building adapted for use. 'Papageno Huis' is an historically listed mansion in Laren, Netherlands, which has been converted to a centre of assisted living, with both day students and residential students. This project highlighted the difficulty of creating ideal environments for individuals on the spectrum in existing buildings, particularly in creating effective circulation spaces. As this is an historically listed, existing building, there were limitations in the changes that could be made to the building to suit its new purpose. On the other hand, Leo Kanner College in South Holland, is a multi-storey building due to the suburban setting and land area available but, due to the fact it was a new build the design had been able to include appropriate wide circulation spaces.

Generally budgets are not unlimited for any project. Building specifically for autism can be more costly per square metre than a "standard" build and examples of creative, exacting architecture and specification to create autism friendly buildings were seen throughout my fellowship. During several interviews, I noticed a common theme of strategically spending the budget in areas necessary for the comfort of the users and cost engineering in others to create the most cost-efficient build while still providing the best value for clients, and better outcomes for users. L'éveil du Scarabée in France, designed by Emmanuel Negroni, is cutting edge in architectural style. Equally impressively, the building was reported to be built within the original budget set by the developers, though with a longer payback period through designing features and systems that would provide cost benefits both in construction and in the running costs of the building.



Hardison / Downey Construction
First Place property nears completion, Phoenix.

2. Branches of Design Theory

"If your circuitry, your neural pathways are different, if you are wired differently, I don't think you can force people to conform"
- Teresa Atkinson

As the trend of design theories emerged during my research, I began to see three branches.

- Designing for the Senses
- Designing for the Mind
- Designing for the Human Factor

Designing For The Senses

Sensory challenges for people with autism encompass the five basic senses of taste, touch, smell, sight and hearing. Additional challenges relate to the vestibular (related to our perception of motion, balance and body position by information from receptors in our inner ears) and proprioceptive (relating to how our brain determines where our body is in space through receptors in the skin, muscles and joints) systems.

The challenges vary depending on which sense(s) a person is sensitive to, and if they are Hypo or Hyper-sensitive to an input. That is, an individual will either be seeking stimulation or are over stimulated by the sensory input, both cases having their own challenges for a person on the autism spectrum.



“sensory differences are one of the most disabling factors in autism, but also one of the easiest to deal within buildings to improve quality of life.” - Felix Munch, Autism Consultant, Specialområde Autisme

In regards to the built environment, other than taste, all senses have relevance. Designing for the senses includes not just the layout and form of the building, but also encompasses choices of systems (such as mechanical air conditioning and fridge choices) through to the specification of fixtures and fittings and choice of colours and patterns. The experience of the interviewees suggests that nothing can be chosen for aesthetic purposes alone or because it's the standard choice. Everything creates input to our senses, so Architects and Designers alike must be mindful of the possible repercussions of using a particular lightbulb or choosing a specific patterned carpet.

Designing for The Mind

Theory of Mind

The theory of mind is the set of skills that provide the ability for social skills and social interaction. It is often accepted that people on the autism spectrum have impaired theory of mind, making it difficult for them to read social cues and context (Baren-Cohen 2000, 181-182). Sine Ahnfeldt Kjeldsen, a psychologist who works with Specialist Area Autism, explains her experience: “I have not met anyone that didn't want friendships, but if you can't understand others, how do you know how to act and react to others?”

Therefore, architecture can support people

with autism by creating choice in their social interactions. Of the people I spoke to, it was common opinion that the design needs to provide that support while maintaining a feeling of safety and personal autonomy.

Another symptom of impaired theory of mind is that people on the autism spectrum can be very literal. This particular trait has implications for how items such as signage and directions are provided within the built environment, as it can have unintended consequences. For example, a fire alarm has a sign reading “break glass” intended for emergency situations. A person with autism may break the glass after reading it in a non-emergency situation and set off the fire alarm after not understanding the social customs for emergency signage.

Executive Function

Executive function is a term used to describe a range of cognition function skills that help regulate, control and manage thoughts and actions (Boucher 2009, 170). It includes planning, working memory, attention, problem-solving, verbal reasoning, inhibition, cognitive flexibility, initiation of actions and monitoring of actions.

“The brain ... is much like a conductor making sure the right things are activated, so the thing we get to in the end is beautiful music instead of just a little bit of violin, and a little bit of trumpet. Everything has to be at the right time.” - Sine Ahnfeldt Kjeldsen

Some of the signs of executive dysfunction are difficulties with planning, problem solving, working

memory, attention, initiation and inhibition, cognitive flexibility, reasoning and (lack of) inhibition. It's often linked to individuals on the autism spectrum. By considering issues such as safety and predictability through design, I saw how architecture can support individuals with autism who have challenges relating to executive function.



Thanks to Mark Ellerby, images Nightingdale Centre, Mark Rutherford School

Designing for the Human Factor

“We are all Humans first.” - Colum Lowe

Just as the wearing of a military uniform does not distinguish an individual's personality amongst the many others in the same uniform, quite often people do not see past an individual's disability to the person within.

During the site visits I undertook, invariably the conversations would be about meeting the needs of the residents. This includes not just the medically supportive or practical needs of their ASD diagnosis, but also the needs of the people as individuals.

While there is a commercial and operational need for building design, in some building types, to have elements of consistency and certain features, it is important to remember the person using the building.

Designing for the ability of people to furnish and decorate their space according to their own preferences and providing the option of personal choice, contributes to their personal wellbeing.

One example of this is the Specialområde Autisme AT Home project. It's an innovative housing project where individual units are flexible and modular in design. As part of the construction, built-in cabinets were provided in the living area and the window had a wide sill for seating, due to the assumption the features would be used in a certain way. In practice, each resident furnished and used the spaces differently according to their

own personalities and how they preferred to use their private apartments. In stage 2 of the project, it was decided not to provide the built-in units to allow the residents to furnish and utilise the space as they liked.

Most interviews and site visits throughout my fellowship highlighted the need for developers, care providers and designers to be cautious of presuming to know what the clients may like or

how a space will be used. Of course, this is further amplified when designing for people who are non-verbal due to the difficulty in communication and risk of misinterpretation. This is something I personally understand and have seen first-hand, as my grandson is non-verbal.

As Magda Mostafa said to me, “a 17 year old boy with autism is still a 17 year old boy”.



Photo by M Brezmen



3. Architectural Considerations

Architects and Designers around the world are taught the same principles of design. When I was a student, the “bible” of the architectural student was Neufert’s Architects’ Data. The book outlined the typical design requirements of many different types of buildings, from cow sheds to airports. It provided data on things such as the standard size of playing fields, to the storage required for a ladies hat. There are checklists, tables, sections, diagrams and planning data on just about anything. Theoretically, you could design anything by referencing this invaluable source of information.

What I have learnt since talking to the Architects and Designers I interviewed, is that there is no one global architectural design reference for designing for autism, as there is no one, definitive answer. Globally it was agreed that designing for autism is about the approach and being quite conscious in the specification of materials and finishes. I found different individuals and organisations took into account many similar items, however, they differed in their approach to similar situations and challenges.

When designing for autism the process, I believe, is informed by two main areas or ‘schools of thought’:

- The ideology behind the architecture resulting in design theory
- The practicality of the features of architectural design and specification

Anyone who lives with autism and those involved in the autism community will tell you that there is no black and white with ASD. There are many variables as everyone has different challenges at a different degree of severity. As with autism, there is also no black and white with Architecture; for every single design brief there are multiple solutions, and many choices of finishes and materials.

Everyone I interviewed agreed on what needs to be done, however, there were varied opinions as to how that could be achieved. While there were at times definitive answers to some of the issues around specification of materials and systems for a building, there are other challenges that require a case-by-case and creative approach, as finding solutions can be a case of trial and error. Colin Low, of Scottish Autism, suggests one approach is designing and implementing adaptable features into the construction to allow for easy modification to the building if required as in his experience, undertaking research to find the right material or fixture is a must, as sometimes it comes down to, quite literally, a different type of screw that can make the difference.

While there are many variables to take into account, I found common features across the globe that Designers were incorporating into their designs. Many individuals and organisations I spoke to had created documents outlining their ideas on how to approach the design aspect of a building. These documents varied in content and scope.

In a report such as this it is not possible to provide a detailed explanation of each item in regards to designing for autism. However, providing this

summary of these documents, illustrates many of the social and architectural techniques for designing for autism. The case studies within this report then provide examples of interpretation and application of these techniques.

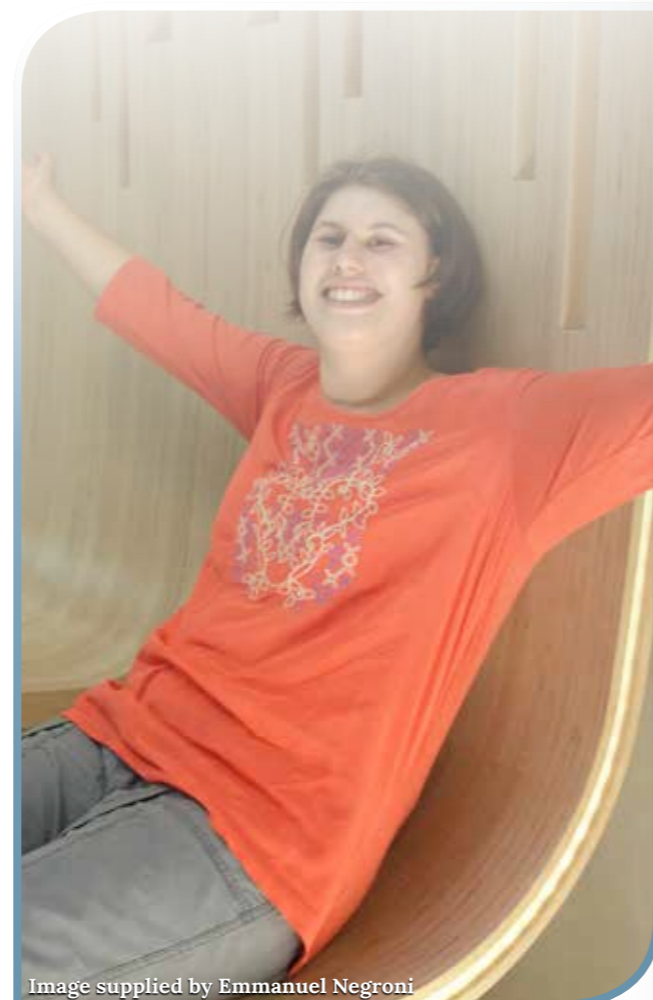


Image supplied by Emmanuel Negroni

The Autism ASPECTSS™ Design Index

ASPECTSS™ has been designed for use as both an assessment and design tool by Magda Mostafa, PhD., based on her PhD research (2008). It outlines the purpose for each criteria for an individual with autism and is based on the theory of adapting the environment to meet the sensory and other needs of the individual.

The index lists the following criteria:

- Acoustics
- Spatial Sequencing
- Escape Space
- Compartmentalisation
- Transitions
- Sensory Zoning
- Safety

It covers broad outlines of requirements, leaving the Designer to interpret the architectural details.

Autism Design Briefing Document

Directed by Colum Lowe and based on the 2010 Kingwood Trust research project “Living in the Community - Housing for Adults with Autism” authored by Andrew Brand (Colum was Kingwood’s Research Lead).

This document provides recommendations and considerations for the Architect or Designer covering some broad concepts in relation to planning and siting choices, through to specifics and practicalities for fixtures and fittings. The document is broken down into:

- Planning (location and building type)
- Massing and Layout
- Mechanical and Electrical
- Furniture, Fabric and Finishes
- Fixtures and Fittings

It provides particular emphasis to the robustness required of the building.

Re-Thinking the Residence Structures for People with Autism

Mette Wienberg, of Weinberg Architects, presented her thoughts to me on designing for autism as a “Toolbox for Autism Architecture”. The ideology of her ‘toolbox’ allows the interpretation into architectural elements. These elements were used in the design of the Seniors House in Hinnerup, Denmark and have shown to be very successful with improving the residents’ general health and wellbeing. The guide is broken into these areas:

- Empathy
- General and specific psychology of people
- Feeling safe
- Transitions zones
- Creating space
- The Green Element

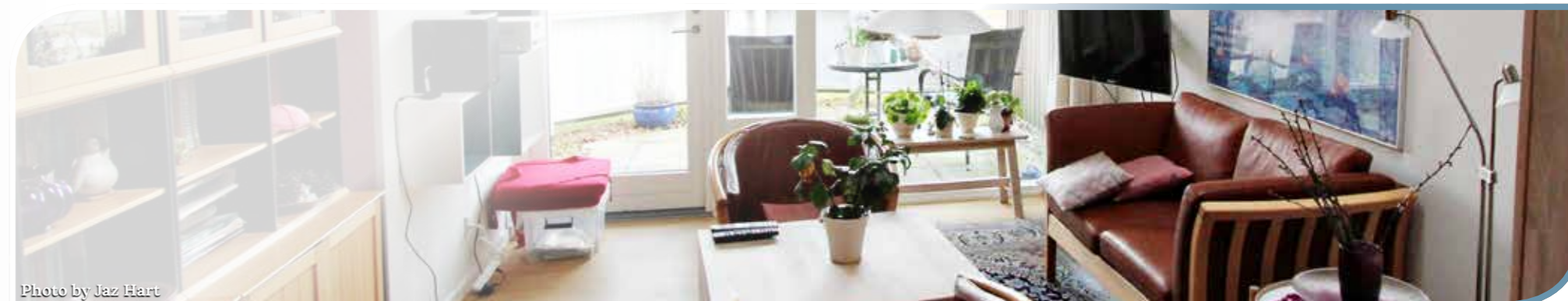


Photo by Jaz Hart

The Home Design: Goals and Guidelines

This guideline came out of the collaborative report entitled “Opening Doors: A Discussion of Residential Options for Adults Living with Autism and Related Disorders” (2009) produced by the Urban Land Institute Arizona, Southwest Autism Research and Resource Center & Arizona State University.

This document is individual centric. Developed through extensive research into housing models for adults on the spectrum, it provides both social and architectural guidelines, starting with desirables in terms of location and neighborhood. It continues to make suggestions and examples for each area of the home. It makes reference to these topics:

- Ensure Safety and Security
- Maximise Familiarity, Stability and Clarity
- Minimise Sensory Overload
- Allow Opportunities for Controlling Social Interaction and Privacy
- Provide Adequate Choice and Independence
- Foster Health and Wellness
- Enhance One’s Dignity
- Ensure Durability
- Achieve Affordability
- Ensure Accessibility and Support in the Surrounding Neighborhood

Met Het Oog Op Autisme

Dr Flip Schrameijer is the researcher and writer behind the 2013 publication ‘Met het oog op autisme’ (With an Eye on Autism), a project that discussed the way architecture and building structure can impact those on the spectrum. It was developed through the Dr Leo Kannerhuis Expertise and Treatment Center for Autism and provides information and suggestions for different types of buildings and situations. His website, Architecture For Autism (architecture-for-autism.org), is a comprehensive resource available in English and Dutch that builds upon the themes originally explored in the book in greater detail.

The research is organised into main areas of discussion, as shown below, with 30 specific subjects.

Contexts:

- Child’s Home
- School
- Independent Living
- Treatment and Long Stay Homes

Chapters:

- Location
- Garden / Outside
- Architectural Spaces
- Interior Design
- Installations and Appliances

4. Elements of Nature and External Spaces

As I saw more buildings and establishments, another design theme emerged: The integration of natural elements and nature into the design of facilities. Even those in urban areas integrated elements of nature for the building users.

There were several ways that natural elements were used:

- Through having visual and physical links to nature
- Using natural shapes and elements in furnishings and interior elements
- Using natural colours and materials in design, externally and internally
- Utilising external spaces for therapeutic, work and leisure activities
- Utilising technology to simulate nature

There is a large body of work globally, such as the research of Romm and Browning (1994) showing a positive link between environmental quality and worker productivity. Roger Ulrich (1984) compared recovery rates of patients with and without views to nature and Esther M. Sternberg M.D. (2009) details her research on healing and sense of place. This research supports the widely held view that Biophilic principles are beneficial to human health.

The elements of nature and external works I saw during my research showed the importance for individuals with autism in several areas:

- General health and well being through natural lighting and views to nature. All of the facilities visited had these design elements, highlighting the significance. Places such as 29 Acres (USA) and L’éveil du Scarabée (France) were positioned in rural areas and, therefore, have an abundance of natural elements. L’éveil du Scarabée utilised the theme throughout the building with the use of the tree in the “Village Centre” and artistic elements of nature through internal floral artwork. Seniorhuset (Denmark) was situated in a township but has strong elements of natural colour, lighting and indoor plants in its design.
- Providing a choice of activities to suit needs and wants. Outdoor therapy and fitness equipment within the grounds was a common feature at the establishments visited. A basketball court and bike/walking paths were common features and in a residential community in Tørring (Denmark), private courtyards were designed according to a person’s preferences. For example, one resident loves sand as a sensory experience so he had a sandpit in his courtyard. At First PlaceAZ™ (USA), a swimming pool provides an opportunity to both socialise and exercise.
- Education and life skills. While schools will always have outdoor areas and grass ovals for students, schools for children with autism also utilised outdoor spaces and the views to external areas as methods to provide children

with space to calm down when needed and provide space to move unhindered. However, it was noted that there is a point when too much visual access to the outside becomes overstimulating and a distraction to the children, although there was no universal consensus when that point was. FirstPlace®AZ (USA), through their vegetable garden, provides an example of the integration of natural elements and activities providing life skill lessons, as the produce is used in the teaching kitchen of the apartment complex.

- Work practices. In several of the locations, activities designed to provide purpose and work experience for residents were included in the landscape, examples of these consisted of activities such as garden waste mulching, recycling and gardening.
- Independence. A simple, yet effective idea is seen at a Specialområde Autisme residential village (Denmark) which fostered independence by placing “shopping drop boxes” around the grounds. These boxes were designed so residents could order groceries and other items online and have them delivered to their home. By placing these along the paths outside the building but within the grounds, it provided security and sense of safety for residents who have challenges with social interaction.



Photos by Jaz Hart



5. Neuro-Diverse Design

During my trip I met two researchers who broadened my understanding of the context and potential applications of designing environments for neurodiversity, rather than specifically for one disorder. Teresa Atkinson and Dr Ute Leonards provided interesting viewpoints and examples of how principles of designing for autism is an example of designing for neurodiversity. That is, designing with the brain in mind rather than a specific neurological condition and that the application can be extended and adapted for other situations.

Teresa believes there are numerous crossovers with supports and strategies for people with autism and people with Dementia. She believes this undoubtedly extends to the built environment, explaining that environments need to be enabling for everyone. For example, people with autism and dementia also have challenges with transitioning. There is significant crossover, for example, between individuals with dementia transitioning from home to hospital to higher care, and people with autism having difficult experiences moving into new or adjoining spaces. Teresa explains it's about "now and next" knowledge. People from both communities may not know where they are going and what they will find there, so they both need predictability and similar strategies for each group can be implemented.

Architecturally, it's about providing cues within a building, such as wayfinding and signage or floor layout to provide information on the purpose of a space. She believes we could future-proof buildings to cater to the aging by providing a world which

is accessible, understandable and enabling, and helps those with additional challenges, which also supports everyone.

Dr Ute Leonards also advocates for inclusive environments that are brain-friendly. She suggests that the societal idea of what 'disability' and 'impairment' is needs to change, as non brain-friendly visual environments have the ability to impair everyone. As human beings are free-moving, our body, brain and sensations are very closely linked. When we are healthy, movement is automatic, particularly in a natural environment as that is our ancestral habitat. When our body is not well or is tired, our brain works harder to get us from 'A' to 'B' safely, as it takes over from our automatic functions. Within a built environment, it gets harder to make the journey, particularly if there are patterns of shapes and at frequencies (spacings) that are not naturally occurring.

Ute suggests a space is brain friendly if an environment includes more natural elements and patterns to allow our brain to concentrate on tasks relevant to the person's activity, without added the fatigue on the brain caused by trying to make sense of the environment beforehand. Different conditions such as dementia, dyslexia, epilepsy, depression and autism can benefit from a built environment that has natural elements and patterns.



6. Evidence and Research

Overview

There is a body of research worldwide that supports the theory that an appropriate built environment that has positive benefits for people with autism spectrum disorder.

Research areas have included:

- Social setting and location of the building
- Social outcomes for the building users
- Physical outcomes such as sensory needs and sensitivities
- Mental wellbeing of the users
- Fostering independence

Both qualitative and quantitative methodologies have been used in autism related research, generally in the medical field. In regards to architecture, qualitative research is common, with research results requiring interpretation to create a design brief. Designers and Architects have then interpreted the needs of people with autism, creating buildings with specific detailing and characteristics to support these needs.

It is acknowledged by the people I interviewed that different settings require different solutions. That is, a school will be designed differently to a residential setting, even though the number of building users could be similar. Research from other industry sectors, such as neuroscience,

biophilic principles (using nature in design), visual and social research, has also been used and interpreted by Designers.

The effectiveness of the practical application of the research in building design has been assessed in a variety of ways, from the specific study as a part of continuing research to anecdotal and social proof.

The field of research specifically around architecture for autism was something I was particularly keen to understand. Over the course of my fellowship many things came to light including:

- Research of architecture for autism dates back some 20 years or more by several organisations and individuals.
- There has been both published and unpublished research relating to architecture for autism.
- Researchers, or commissioners of research, are from a variety of backgrounds, such as parents of children with autism, service providers, Designers/Architects, university based researchers and other related professional fields.
- While there has been instances of collaboration, generally speaking research has been undertaken independently. Quite often there is collaboration with other organisations and professionals within the same country or area.
- There is no mechanism for global collaboration on research.

- There is no one global organisation to facilitate ease of interaction and communication between professionals specifically in the area of architecture for autism.

Refer to Further Reading at the end of this report for more in-depth information about the readily available research.

There is no mechanism for global collaboration on research.

There is no one global organisation to facilitate ease of interaction and communication between professionals specifically in the area of architecture for autism.



Conversations

The volume of published research in this area, again from my observation, seems to vary over time.

Discussing this with my UK contacts, it seems research was dependant on commission and funding. Kingwood Trust, a private, non-profit service provider commissioned several research projects and, as with many organisations, funding priorities changed over time. The National Autistic Society in the UK has a reputation for basing their services on evidence-based principles, particularly their Autism Friendly Business Award. They were the first to hold specific conferences on autism and architecture.

sharing information in health care is really important, and we need to be systematic in how we create built environments.

Colum Low believes that *sharing information in health care is really important, and we need to be systematic in how we create built environments*. He believes it would be very beneficial to have a centre of excellence, similar to the Centre of Excellence in Stirling (Scotland) for dementia, where they collect a large majority of information from around the world in this area.

Teresa Atkinson, who now works within the field of researching environments for dementia, has experience with research with children with autism and believes that “the brain is the brain”

and collaboration between various research streams could benefit more people.

Dr Flip Schrameijer felt that in the Netherlands, a decline in research aligns with the timing of the effects of the global financial crisis of 2008, as organisations (such the Leo Kannerhuis Expertise and Treatment Center for Autism who commissioned their report) needed to concentrate on their core business rather than innovation. Flip’s frustration came from his belief that good and appropriate design can positively impact a person by 75% to 150%. Although he cannot prove it, Flip’s experience guides his views and he’s emphatic that the conversation has to continue.

a collaborative approach between professions will aid research as everyone can learn something from each other.

Lars Aarup Jenson and his colleagues at Specialområde Autisme believe *a collaborative approach between professions will aid research as everyone can learn something from each other*. They joined four Danish organisations to study aging and autism. From a three year study (2014 - 2017) they obtained new, practice-based knowledge. The research was undertaken to better understand the challenges of aging with autism and therefore, how professionals and carers can better support the individual. The research concentrated on three areas - health, daily living and social relationships. Both the AT Home and Seniors House projects have

been designed and built from evidence based and experimental ideas as part of continuing research (see Further Reading).

Magda Mostafa feels there is a gap in research around space and the dollar value. She believes the effects and impact of a poorly designed space need to somehow be measured against the operational costs. For example, consideration should be given to the human resource requirements of managing special needs children in a specifically designed space versus a mainstream classroom, and that we need to continue to test our (architectural) ideas and receive feedback on it.

there is a need to research the cost and produce reliable data to help support decision making

While there are those (herself included) that are passionate about making the world accessible to everyone on moral grounds, *there is a need to research the cost and produce reliable data to help support decision making* and promote the argument for making spaces available on a commercial scale in a larger setting in a commercial way.

Dr Christopher N. Henry suggests that generally Designers and Architects are not good at analysing the effectiveness of building design after occupation. There needs to be more discussion of what works and what doesn’t work, with careful

consideration of how one measures it. The critique of the building needs to be undertaken in an objective manner, clearly outlining what is to be tracked to ensure a reliable, peer-reviewed outcome. Christopher believes there are measurements of many building elements, but generally not related to human health. *How do we approach design if we don’t know what works?*

Christopher’s believes it’s okay to say “I don’t know”, but it’s important to be innovative, to try new approaches and test them to see what does work. Having a good relationship with a client and getting them onboard from the start to be part of the research process is one way to approach a project. Another suggestion is to create self-funded research by approaching the client to allocate a percentage of the building budget directly into research. Acknowledging that both autism and architecture have many variables, testing “small” before doing anything large scale could be beneficial. For example, everyone I encountered cited acoustics as the top of the list for factors to manage when it comes to the built environment. But how much acoustic controlling is too little? At what point does it become too much and not required? Factors like these impact the construction costs of buildings. Christopher suggests the hypothesis must be very specific to gain valuable insights.

First Place® AZ has three major components, each of which is the product of or part of continuing research. The opening of the First Place-Phoenix apartments in 2018 is the culmination of 20 years of research into housing options by the organisation and its research partners. The Transition Academy, while providing practical training in life skills,

is an integral part of continuing research and is housed at the apartments and it’s initial beta site, 29 Palms.

The Global Leadership Institute’s mission is to increase the housing options for individuals with ASD and other neuro-diverse conditions while developing a field of leaders to advance best practice. First Place’s sister organisation, the Southwest Autism Research and Research Center (SARRC) was established in 1997 and provides autism research, education, evidence-based treatment and community resources. It provides lifelong services to individuals and their families while undertaking research.

How do we approach design if we don’t know what works?



Image supplied by Emmanuel Negroni

Interview and site visit

The opening of the First Place-Phoenix residential and Transitional Academy in 2018 was the culmination of 20 years of research into housing options by First Place AZ and its research partners. The design of First Place-Phoenix was informed and influenced by “The Home Design: Goals and Guidelines” (see Urban Land Institute Arizona et al 2009 for further information), with the philosophy of creating autism friendly homes so that residents can be supported within their own homes and communities. When discussing First Place with Founder Denise D. Resnik, a major influence was the need for financial strength and commercial viability of the project, while simultaneously being affordable for the residents.

Specific design features of the apartments are:

- Four 4 bed Transition Academy residences
- Health and wellness centre
- Demonstration and training kitchen, with organic vegetable garden
- Community centre, with sports pool and cafe area
- Zen room
- Games room
- Fitness centre
- 3 studio units, 36 one bedroom suites and 12 two bedroom suites

- Leadership Academy offices

Support for the residents include a collection of amenities, community activities, life skills training and customised support, 24/7 staff support and concierge ensuring both security and autonomy for the residents.

First Place-Phoenix has been very carefully and purposefully designed. For example, provide areas for “parallel communities” through room layouts and specific furniture design offering choice without the pressures of social obligation.

The two-year Transition Academy, housed within First Place-Phoenix provide practical training in life skills through 32 semester-length courses in life, social and job skills and is an integral part of continuing research.

www.firstplaceaz.org/



Hardison/Downey Construction
Early stages of construction of First Place-Phoenix.

Take away

Attention to detail in development and apartment features was precise. Importance of situating the project close to transport and other communal areas to allow the residents easy access to their community. The dedication of the organisation to provide a quality, evidence based adult living environment is an excellent example for other organisations worldwide to emulate.



Sydnee Schwartz, ASU Walter Cronkite School of Journalism and Mass Communication student
Community leaders participate in the opening of First Place-Phoenix, a community built by community.
(Top left) A resident enjoys floating in the Thunderbirds Charities Sports Pool at First Place-Phoenix.

(Centre left) First Place-Phoenix staff help residents get ready for “Night to Shine,” a national prom event sponsored by the Tim Tebow Foundation.
(Below left) Residents cook and learn together in Sonia’s Culinary Teaching Kitchen at First Place-Phoenix.

Interview with Ray Cherry,

Scottish Borders Council Architect.

Brief: To design a primary school as a centre of excellence for children with autism. Leader Valley School was designed by Ray Cherry for the Scottish Borders Council. The school was designed for 20 students and was built adjoining a mainstream primary school to encourage interaction between the schools.

The design philosophy was to have a school that was fully accessible to all and to provide a sense of place which was not institutional in any way, but friendly.

There is a series of classrooms, administration areas and a life skills teaching area. During the design phase, Ray approached Andrew Lester (Architect, New Struan School) to undertake a peer review of the plans which led to a site visit of the New Struan School. The exchange of knowledge was beneficial to the design of Leader Valley, as New Struan had been operating for several years. Central ideas were ratified and items, such as specific door mechanisms, were included in the new design for Leader Valley School.

Significant features of Leader Valley School:

- Construction of concrete block work with hard plaster finishes to minimise sound transmission and reduce maintenance. Walls and Ceilings were also treated with baffles for acoustic control.

- A palette of just three colours were used internally: light green in the classrooms, light blue in administration areas and a pale neutral in other areas. The colours are used as part of a wayfinding strategy, as well as being muted and with reduced stimulation.

- Natural light was also a key factor in creating a sense of place and to assist the users with wayfinding.

- It was recognised that some children could take up to 10 to 15 minutes to transition from getting out of the car, to entering the building. So, verandahs have been used as a transition area to guide the students into the building.

- Similarly, a verandah outside of each classroom allows for undercover external space as well as transition to the classroom.

- The main design of the building includes a circular with no internal doors. Initially, teachers were concerned about the lack of doors and the difficulty preventing “runners” (or people with a tendency to run away, as is often the case with children with autism), but in effect the children run in a circle within the building quite safely.

Since its opening, the council has received very positive feedback from staff and parents. The staff enjoy being in the building and the teaching environment. Students have responded well to the design features, particularly the wayfinding and the circulation spaces. One success story tells of a boy who previously required very close supervision, yet within a week had settled into

the new environment and didn't require the same degree of supervision.

Take away

Relatively simple modern architectural styling can provide specialist, effective design for autism, while providing street appeal through colour and detailing.



Images by Scottish Borders Council

Specialområde Autisme, design by Mette Wienberg of Wienberg Architects

Site visit and interview

Seniorhuset (Seniors House) is Denmark's first specialist housing for elderly people with ASD. It was designed after observing the challenges of people with ASD and the aging. The building provides individual living units, with their own small kitchen, lounge and bed area, and ensuite. It has a communal lounge and kitchen where caterers and residents can prepare meals.

Significant features:

- The principles for the design were formulated through focus groups, including people with ASD. General building principles were found to be:

Having a kitchen window

Having dark, sheltered rooms

Wood materials

An abundance of vegetation

The colour green

- The design concept was to provide the best environment possible for the residents, mindful of "dignity, hope and protection."
- The design incorporates innovative and experimental design features, such as bench seats outside the units for intermediate transition spaces, and barn-style unit doors so that residents can open the top half of the door while maintaining "social safety" while viewing activity beyond.
- The residents are adults who have lived together for some time, as their parents jointly provided a group home for the adults years previously.
- The building's design is backed by research into aging with ASD.
- The building will contribute to future research into housing for the elderly with ASD.
- The building was designed with the needs of aging in place. For example, wider door widths enable hospital beds to be moved and mobile robes provide flexible room separation in the units.
- Ceilings of different heights provided areas that provide a safe and calming effect, while simultaneously providing emphasis on different 'zones' within the space.
- The colours and materials utilised blurred the lines between inside and out, creating an eased transition between spaces.
- Colours were also used to show a transition between spaces.
- Well lit internal areas with views to the external landscape and vegetation have also been incorporated.

www.sau.rm.dk/udvikling-og-projekter/motivation-og-formal/seniorhuset/

Take away

The importance of innovation informed by research when designing for autism. Implementing ideas through clear and simply detailed architecture can have positive impacts for residents. Staff provided some positive feedback, in that one resident would previously only socialise for approximately 2 minutes at a time. Now, with the support of choice and predictability through glazing and other detailing, he is more confident and socialises for around 20 minutes several times a day.



Photos by Jaz Hart

Site visit and interview

AT (Apart Together) Home is a residential concept where people have their own homes, yet are part of a community living side by side with others. The project I visited was in Tørring, Denmark and the homes were situated close to a larger multi-residential building. It gave the residents their independence while being close to others for both social and daily support.

AT Home is a project undertaken by Specialområde Autisme (Specialist Area Autism) and was developed through research and studies into housing preferences by people with autism and their families. The design brief was facilitated by architect Mette Wienberg, of Wienberg Architects. The design was selected from a public competition.

The key requirements of AT Home were:

- The units are able to obtain a permanent building permit, yet be transportable.
- Be part of a cluster with other AT Home residences or be associated with another facility.
- Be flexible in configuration, yet be modular.
- Designed with autism-friendly features.
- Use sustainable construction methods and materials.

AT Home employed a design strategy of orderly interiors, timber throughout living area, niches to create safe, cave-like spaces and transition

zones from inside to outside by utilising glazed panels and bench seats.

The project, while providing independent living to adults on the spectrum, is part of research into how the built environment can support people's rights in choosing where they live and their choice to live independently.

Lessons identified by Specialist Area Autism from Stage 1 of the project, through surveying residents and support workers:

- The built-in seat near the front of the unit is often used to hold a freezer. Many people buy groceries in bulk to limit their time going shopping (which can be quite stressful), and this wasn't taken into account in the original design.
- Built-in TV unit was an issue in the studio houses due to the limited space available. Residents could not individualise the layout of the unit to suit their preferences as it was built into the design.
- The kitchenette needs more preparation space given residents will quite often cook meals for a week at a time.
- The solar hot water unit has a 30 litre tank, which is not enough for some residents. In some instances, if an individual's routine for showering is interrupted they need to start over, due to the repetitive tendencies of individuals with autism.

Take away

AT Home provides adults with the ability to live independently in their own homes, though within a community with support services close by. It was the only model of this type of housing I saw.

www.sau.rm.dk/om-os/about-us/physical-framework/at-home/



Photos by Jaz Hart

Site visit

Papageno Huis is a residential and day facility for young adults and adults on the spectrum in the Netherlands. The centre is very much open to the public as there are on-site musical concerts and a restaurant. The kitchen provides work experience and a recognised training course for people who use the facility. The centre provides 24-hour onsite assistance for residents and is operated by staff and volunteers. The modifications undertaken by the organisation took into account the research Dr Flip Schrameijer had undertaken for the Leo Kannerhuis Expertise and Treatment Center for Autism, and various of his recommendations were implemented.

Significant features:

- The mansion is historically listed so the modifications needed to meet guidelines. It comprises of a restaurant and kitchen, administration and night staff facilities, and a theatre on the ground floor. Sports, craft and music activity areas are in the basement, along with other therapy/quiet rooms and a laundry. Upstairs are the residential rooms, with a resident-only communal kitchen and living room on the ground floor, which is an extension to the existing building.
- Yellow steps on the staircase provide a visual guide and define the resident-only area, which is separated by an acoustic door at the landing at the top of the staircase.
- The residential rooms are the same size but have different layouts. The residents' are able to

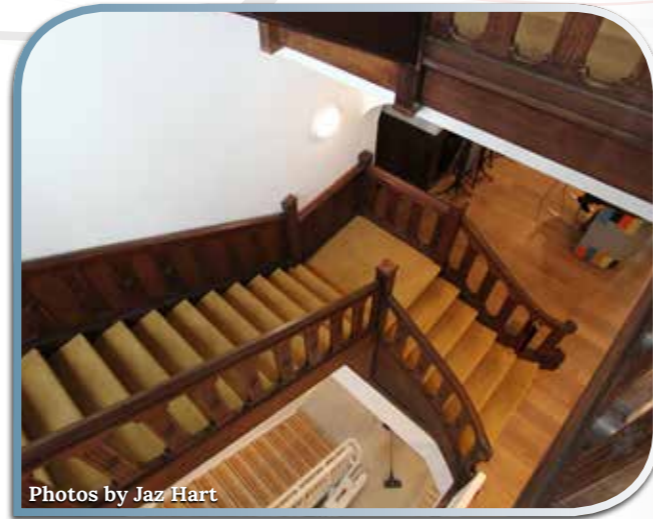
furnish their space as they wish with the help of family. The staff say this is a good insight into the personality of the residents and feel it's important that the residents' adult journey starts with their own choices.

- The kitchenette and bathrooms in the resident spaces are all built within accessibility guidelines.
- The residents' communal room is an extension to the original mansion and is designed with a very defined layout and good natural light. Being a new build, they were able to implement more features to suit designing for autism.

Some of the items that the staff have identified that don't work as well as hoped include:

- Openness of the lobby and staircase area, as the acoustics are not sufficient for a large space (the area covers three levels).
- The sports and music areas need more separation from other activity and office areas due to the noise from these activities.

www.papageno.nl and <http://architecture-for-autism.org/>



Photos by Jaz Hart

Take away

Designing specialist detailing for autism-friendly spaces in existing buildings can be challenging. It requires rigorous planning and attention to all elements of the building to create an effective environment.



Photos by Jaz Hart



Interview and site visit

Until the late 90s, the existing site for Struan School was housed in a Victorian style house, which over time had become unsuitable. A new school was supported by Clackmannan District Council and the Director of Education was also fully supportive. Land for the new school was gifted by the Council, in addition to the ground preparation. Andrew Lester, the project Architect, was a member of the school board until being commissioned for the project. This new project, New Struan School, is part of Scottish Autism which is the largest Scottish organisation providing autism-specific support for the community.

I was keen to visit the school as it is one of the earliest examples of a specifically designed school for children on the spectrum. I valued learning about the challenges and lessons gained from the build. Andrew was candid with the history of the project.

As part of the design process, Andrew and the project team visited other schools for reference. There were features of these schools which were deemed undesirable for New Struan School. Therefore, the project team started with what they felt was wrong, and formulated ideas on what not to do, and how they would do it differently. By talking to staff and learning to understand the children, they formulated some basic principles outlined below.

- Create a way for the children to see ahead to where they were to go.

- Understand how the children would transition between spaces.
- Have clear paths of communication for children for wayfinding, to assist how the children moved about the building.
- Create a building where the children could see outside, so they weren't just sitting at school but could see and learn about the real world.

Some specific design features include:

- A central hall or "street" with classrooms and other areas coming off this central spine.
- An internal "park", or space where children could wander from the "street" and be away from classrooms.
- Curved walls leading into classrooms and blurring the line of floor materials to aid transitions.
- An external courtyard, where in the case of runners (a term often used when children run away from situations), they hoped they would reach the external courtyard and not want to run any further. The thought was that carers and teachers needed to understand and work with the children and understand why they were running.
- The school has fences but not high security which the team had seen in other schools.
- Dealing with sensory issues by using muted

colours, underfloor heating for consistent temperature, the use of LED lights and acoustic control in all areas.

- Classrooms had natural ventilation and natural light as much as possible.

Complications during design and construction:

- A change in the design brief occurred when the project was advanced. The building was now to be a school, but with some community use areas, which led to a less than ideal spatial design.
- Conflict of building codes and design/instruction for children. For example, a fire door with "exit" signage can be misinterpreted by someone on the spectrum as an instruction, and therefore, children would often try to exit when they read the sign. It is quite common for people with ASD to be very literal in interpreting signs and social cues.
- Educating contractors, surveyors and building authorities to understand the specific requirements for autism design. Time was required on-site to explain that "we've always done it this way" wouldn't work on the project and that every specification must be followed through from design to the construction phase.
- Required to install smoke doors along corridors due to building codes, which led to transition challenges for some children.

Feedback and ongoing learning, since the school has been in operation for over 10 years includes:

- A shift in the demographic of students to a cohort with a higher degree of challenges has led to a review of initial specification of some items that were needing higher maintenance than previously expected.
- There are challenges with a multispace, dual use facility (general community and the intended students).
- Change of use for some areas. For example, the indoor "park" area no longer has the original purpose of providing the children an internal area to "wander into" and be away from classrooms
- Sensory rooms (which were in each classroom) were in the process of being pulled out at the time of my visit due to a school board decision. At the time of writing this report it remains to be confirmed if this was a good decision.
- Some feedback by teachers and carers has been received about "problems with design". As there has been a turnover of staff, we discussed the issue and wondered if it was a lack of understanding of the original design intent or whether there were overall issues? If it was a lack of understanding, how do you provide effective training to new staff on design intent and how the building works?

Take away

Even with thorough due diligence to meet project brief outcomes and the resulting design outcomes, changes in the demographic of the end user group and staff, as well as stakeholder management, can create situations leading to specific design features of buildings not being as effective for the end users as envisaged. Therefore, an easily adaptable design is desirable for buildings that will be used by different groups of the community over time.



Photos by Jaz Hart

Site visit and interview

L'éveil du Scarabée (Beetle Awakening) is a home for 20 adults on the autism spectrum. In 2006, Emmanuel Negroni was commissioned to continue the design of his competition-winning project concept.

The aim of the building was to provide an environment for a "good life with autism" for adults requiring a high level of care.

The architecture of the building is very modern and works around a "village square" concept. Communal areas are situated in a central spine, alongside medical and administrative areas. The residents' rooms come off the main area similar to "timber houses" coming off the village square. The kitchen and dining area are at one end of the village square and adjoin an external deck. Externally, a new building houses several exercise and activity rooms and an existing historical barn has been retained and will be restored to house animals.

The main concepts for the design were:

- Designing for the senses as a therapy.
- Use the architecture to create a homely, less medical feel, while maintaining the supports required.
- Utilise volume and differing heights throughout the residence to create both communal and private spaces.

- Create different areas for relaxation and activities for the residents.
- Use natural light and glazing on doors and windows strategically to allow a view of the external landscape.
- Use artificial lighting for chromotherapy during day and night and simultaneously utilise it as indicators for residents. For example, artificial lighting changes colours throughout the day to signify meal time.
- Use of colour to help with wayfinding Use colour to help with wayfinding and identifying areas. For example, the administration areas and medical areas are detailed with different accent colours, and residents are able to individualise their rooms as they like.
- Minimise reverberation of areas with acoustic treatment on walls and ceiling.

The sustainability of the building was also important for the stakeholders, therefore the buildings incorporate renewable energy through the use of solar panels for hot water, a ventilation system with a heat exchanger for energy recovery and floor heating through a geothermal energy system.

www.emmanuel-negroni-archivision.com
<https://m.facebook.com/autisme.autiste/>

Take away

With a high level of commitment and dedication from all stakeholders, a building with great architectural finesse and sustainability can be created to provide a home of excellence for a vulnerable group in society. Attention to detail can minimise the institutional look or feel of the facility, while incorporating necessary support services for the residents.



Images supplied by Emmanuel Negroni

I met with Chris Pike from the National Autistic Society (NAS) in London to discuss the Autism Friendly Business Award the organisation developed. One of the big challenges for individuals with autism is the public arena, where there is no control over the environment or stimulus. This can become debilitating for the individual and very stressful and upsetting for family and friends, as social outings can come to an end quite quickly. This leads to isolation as some people choose to not go into public places. Having spaces and places that are more autism friendly can immensely change a person's relationship with the general public and the Award seeks to promote this outcome

An example Chris shared that can have a hugely positive impact on those with autism and their families were the "relaxed performances" held for productions at London's West End. This means that lights and sound are adjusted, and quiet zones in each bar area are created to allow people to retreat when they need (one remains open as usual). Perhaps the biggest positive outcome of this was not so much the sensory adjustments, but the great response from patrons as they have a feeling of solidarity, knowing that meltdowns will not force them home and not feeling judged if a meltdown occurs. People can "reset" and then rejoin the show.

It's examples such as these that highlight the importance of the program that the NAS offer, as it provides some equality and normality to peoples' lives who are otherwise placed in a position of disadvantage. There are five categories on which business are assessed:

- Customer information
- Staff training
- The physical environment, design and quiet zones
- Customer feedback
- Promote the understanding of autism

The program is based on research undertaken by the NAS and, while they are strict on the requirements, they are also very proactive to help businesses obtain the award. The NAS works on the theory that no business is perfect all the time. While the program is in its first few years, the NAS already have high profile organisations and buildings with the award, such as Windsor Castle and Buckingham Palace, along with smaller businesses including hair salons and cafes. Airports are challenging environments to make autism-friendly as many of the divisions that make up the airport are outsourced and the shops are individually owned or managed. This means coordinating and making the whole experience, from entering the airport to stepping on the plane, can be challenging. So far Gatwick, Birmingham, Bristol and Edinburgh airports have received the Award.

www.autism.org.uk/



Photo by King's Church International

Conclusions

I have no doubt that designing spaces and places specifically to meet the needs of people with autism spectrum disorder is beneficial to individuals on the spectrum. Benefits range from sensory relief for an individual, to the ability of people to live independent lives.

In some ways, the complexity of this issue cannot be understated. Creating a supportive environment is a confusing and intricate issue due to the nature of both autism and architecture, the variations in our built environment and social situations and the needs of families, schools and workplaces. In other ways, it's very simple. Everyone does deserve good architecture, especially when that architecture provides opportunities for a better life.

While there has been research conducted over the last 20 years or so, it is globally acknowledged that there is a need for more. We have a moral responsibility to the ASD community and to the developers and families who construct the buildings, to design with an evidence-based approach while, at the same time, we continue to push on with innovation, try new methods, and continually monitor and test their effectiveness.

Specific housing models with appropriate support services, provide the opportunity for adults to choose where and how they want to live their lives.

- ♥ **Generally, themes and ideas for an appropriate built environment are agreed, but individual Designers & Architects interpret these ideas differently in the architectural detailing.**
- ♥ **To create a successful project, the importance of interprofessional and stakeholder long-term collaboration on projects cannot be understated for a successful project outcome.**
- ♥ **The specification of fixtures and fittings for a building needs to include robust items for logical use.**
- ♥ **The use of natural materials, colours and shapes are considered beneficial as they are "brain-friendly".**
- ♥ **Research has been undertaken globally by individuals and organisations, some for over 20 years, though there is generally no global collaborative research.**
- ♥ **There is no single depository for research relating to autism and the built environment.**
- ♥ **There is no singular global organisation for Designers, Architects and other professions to communicate and collaborate in this field.**
- ♥ **An appropriately designed built environment can actively assist and enhance other support services to positively benefit individuals with autism. The approach needs to be holistic for maximum benefit to both those on the spectrum and the wider community.**

Recommendations

- For Australia to prioritise research on the built environment and autism, such as:

- ▼ **Identify opportunities by analysing the extent of existing research.**

- ▼ **Identify areas where design solutions have been interpreted from social (or similar) industry research and test specific architectural features.**

- Encourage international collaboration and sharing of knowledge to create a global effort towards neuro-inclusive built environments.
- For Federal and State Governments to formulate and adopt policy regarding neurodiverse design requirements, particularly:

- ▼ **Departments of Education to formulate policy on appropriate built environments for learning, particularly in Special Education Units.**

- ▼ **The NDIS to recognise neurological needs for housing under the Specialist Disability Accommodation (SDA) Rules 2016 on an equal basis with physical needs for participants for housing and home modification funding.**

- ▼ **Departments of Housing to ensure neuro-diverse friendly design policies for all state-operated housing.**

- Private housing providers across Australia to adopt a policy for neuro-diverse housing models as part of accessible housing models.
- Private and government organisations to formulate policy for public buildings to be inclusive of those with autism and other neuro-diverse conditions.
- Create and continue discussion across government and industry bodies with the purpose of encouraging the inclusion of neuro-diversity requirements in codes and standards.
- Government and Industry to continue to assess, test, and refine housing models to provide accommodation choice for adults with autism and other neurological needs.

Continuing Efforts

As my research highlights, there is some general consensus on strategies and techniques that positively affect people on the autism spectrum, although there is a definite need for further research. What is clear to me, however, are some steps that need to be undertaken moving forward. Therefore, I will:

- Create strategies to publicise the benefits of an appropriately designed environment for people living with autism spectrum disorder.
- Lobby government and other decision-makers regarding the benefits of autism friendly design, and to start a discussion around policy to support these benefits.
- Create resources and publications to assist families and businesses who wish to make changes to their immediate built environment.
- Provide consultancy services to industry and developers to facilitate the design of new buildings.
- Facilitate the organisation of an Australian Neuro-diverse Design Conference to encourage multidisciplinary collaboration and the sharing of knowledge on an international scale.
- Continue to encourage and be involved in research in the area of autism friendly design.



About Michelle (Shelly) Dival

With over 20 years of experience in the design industry, Shelly's expertise in design has created special spaces and places for her clients who have included Local Government, businesses and families. Her design skills are supported by life skills ranging from a rural upbringing, being a mother of 2, nanna to 6 children, and working in various industries including earthmoving and mining. She has a long history of volunteering with school P & C, junior and senior sport, sporting and professional management committees, has been an elected mining safety representative and a volunteer firefighter.

After her grandson's diagnosis of autism, and her subsequent discovery of the work being undertaken overseas, she is passionate about setting a new standard for inclusive building design in Australia and now specialises in autism friendly environments. Shelly's work is informed by her own global research (which is the subject of this report), connecting with other researchers, her long career in building design, and her first-hand experience with her grandson, Jacson.

Shelly is an accredited BDAWA designer and is honoured to be a multiple award winner. She has given back to the industry through judging both state and national awards and mentoring young designers. Through her practice "Enabling Spaces", Shelly leads the way by working with individuals and organisations to help facilitate change to our built environment to be more appropriate for those with autism.

My Personal Thanks

Where do I start? The support I have had since the beginning of my Churchill Fellowship journey has been amazing.

I decided to apply for a Churchill Fellowship in 2016. I had realised that to really understand designing for autism, and to increase my knowledge in a meaningful way, it meant travelling overseas. When applications opened in 2017, I was going through some very difficult personal challenges, yet with the support of a core group of friends and my family, I managed to get my application submitted just before the due date. Getting through to an interview was pretty exciting and finding out I had been awarded a Fellowship was mind-blowing. Without the help of many people, I wouldn't be here now - on the cusp of being able to make a difference to people living with autism through an appropriate and enabling built environment.

Thank you to everyone who gave their time to speak with me.

Thank you to the University of Worcester for allowing me to attend the masterclass "Designing environments to support people living with dementia" and Teresa for delivering a great course. It provided valuable context around the possible application of designing for the neurodiverse.

Thank you Claire for getting Emmauel and I together.

Thank you, Axelle, my friend "the crazy French chick" for your brilliant translation services in France during my meeting with Emmanuel and the site visit to L'éveil du Scarabée and for your totally wonderful tour of Paris in Romeo.

Thank you to the Churchill Trust of Australia. From the bottom of my heart, I thank you! To the WA regional committee and the national board for believing in the importance of my research and for your confidence in me that I was worthy of undertaking it.

Thank you, Alison Davis, (then) CEO of Autism West, and Phil Ker, friend and fellow Building Designer for your glowing references, I know they made all the difference.

Thank you to my friends Amanda and Bryce for helping me clarify my initial thoughts and application strategy. Paula for all your help with the story and the pitch for both the application and my interview and Fleur for always having my back. My sister Kathy for editing and being a sounding board and my brother in law Brett for supplying me with food and wine, and generally putting up with me stressing.

How do I even start to thank my niece Jasmine? Having a travel companion/assistant was brilliant! Jaz had just finalised her Communications degree, so the timing was perfect. She provided interview and social media support, editing, suggestions and critic, airport directions, suitcase help, laughs and the odd argument (it was hot at Versailles, and the train strike didn't help). Her continued support since being home has been invaluable.

Thank you to my daughter Aleksandra, and her partner Nathan, for not only giving me my precious grandson but supporting and encouraging me in the work I do.

And finally, and yet most importantly, thank you

Jacson. You are my inspiration! I love your cheeky grin and your joy of life. You are growing into a gorgeous young man, we wouldn't change you for anything.



With Jacson

Further Reading

Madga Mostafa
<https://www.autism.archi/>

Teresa Atkinson
Research catalogue: <https://www.worcester.ac.uk/about/profiles/teresa-atkinson>
Whitehurst, Teresa. 2006. "The Impact of Building Design on Children with Autistic Spectrum Disorders". In *Good Autism Practice* Vol 7 (1) 31 - 38.

Dr Ute Leonards
Research catalogue: [https://research-information.bristol.ac.uk/en/persons/ute-b-leonards\(b593f2c3-6aba-4441-9eb3-3c127dd35f30\).html](https://research-information.bristol.ac.uk/en/persons/ute-b-leonards(b593f2c3-6aba-4441-9eb3-3c127dd35f30).html)

First Place AZ
Research catalogue: <https://www.firstplaceaz.org/resources/>

Southwest Autism Research & Research Center (SARRC)
Research catalogue: <https://autismcenter.org/>

Autism CRC
Autism CRC. 2019. *The Impact Of Improved Classroom Acoustics On Autistic Students*. <https://www.autismcrc.com.au/our-programs/impact-improved-classroom-acoustics-autistic-students>

Livable Housing Australia. 2017. Livable Housing Guidelines.
http://www.livablehousingaustralia.org.au/library/SLLHA_GuidelinesJuly2017FINAL4.pdf

Romm, Joseph J. and William D. Browning. 1994. "Greening The Building And The Bottom Line: Increasing productivity through energy-efficient design." *Snowmass, Colorado: Rocky Mountain Institute.*

Ulrich, Roger S. 1984. "View Through A Window May Influence Recovery From Surgery." In *Science*, 224 (4647): 420-1.



Behind the SMILE

In 2016, I founded SMILE Biscotti DFW with the goal to begin supporting myself with others with special abilities. My co-workers and I mix, bake, pack and label each biscotti by hand to ensure a high quality product. Together, we learn new skills, increase our work stamina and demonstrate that individuals like us can be productive, contributing members of our community.

Thank you for your support!
Smiles, Jon
www.SmileBiscottiDFW.com



Reference List

Autism Spectrum Australia. 2018. Autism Prevalence Rate Up By An Estimated 40% to 1 in 70 People. 11th July 2018. <https://www.autismspectrum.org.au/news/autism-prevalence-rate-estimated-40-1-70-people>

Baren-Cohen, Simon. 2000. "Autism and 'Theory of Mind.'" In *The Applied Psychologist*. 2nd ed. Edited by James Hartley and Alan Branthwaite, 181-194. Buckingham: Open University Press.

Boucher, Jill. 2009. "Explaining the Repetitive Behaviours and Lack of Imaginative Creativity." In *The Autistic Spectrum: Characteristics, Causes and Practical Issues*, 166 - 187. London: Sage Publications.

Brand, Andrew and Helen Hamlyn Research Centre. 2010. "Living in the Community Housing Design for Adults with Autism." <https://www.rca.ac.uk/research-innovation/helen-hamlyn-centre/research-projects/2010-projects/living-community-housing-design-adults-autism/>

National Disability Insurance Agency (NDIA). 2018. COAG Disability Reform Council Quarterly Report: 30 September 2018. <https://www.ndis.gov.au/about-us/publications/quarterly-reports/archived-quarterly-reports#st-quarterly-report-2018-19-q1>

Romm, Joseph J. and William D. Browning. 1994. "Greening The Building And The Bottom Line: Increasing productivity through energy-

efficient design." Snowmass, Colorado: Rocky Mountain Institute.

Schrameijer, Flip. 2019. *Architecture for Autism*. <http://architecture-for-autism.org/>

Schrameijer, Flip. 2013. *Met Het Oog Op Autisme: Bouwen & Inrichten Voor Mensen Met Autisme*. Dr. Leo Kannerhuis, Expertise- en Behandelcentrum voor Autisme, Doorwerth.

Sternberg, Esther M. 2009. *Healing Spaces: The science of place and well-being*. London: Harvard University Press.

Ulrich, Roger S. 1984. "View Through A Window May Influence Recovery From Surgery." In *Science*, 224 (4647): 420-1.

Urban Land Institute Arizona, Southwest Autism Research & Resource Center and Arizona State University. 2009. "Opening Doors: A Discussion Of Residential Options For Adults Living With Autism And Related Disorders." A Collaborative Report by the Urban Land Institute Arizona, Southwest Autism Research & Resource Center and Arizona State University.

World Health Organisation. 2017. *Autism spectrum disorders*. <https://www.who.int/en/news-room/fact-sheets/detail/autism-spectrum-disorders>

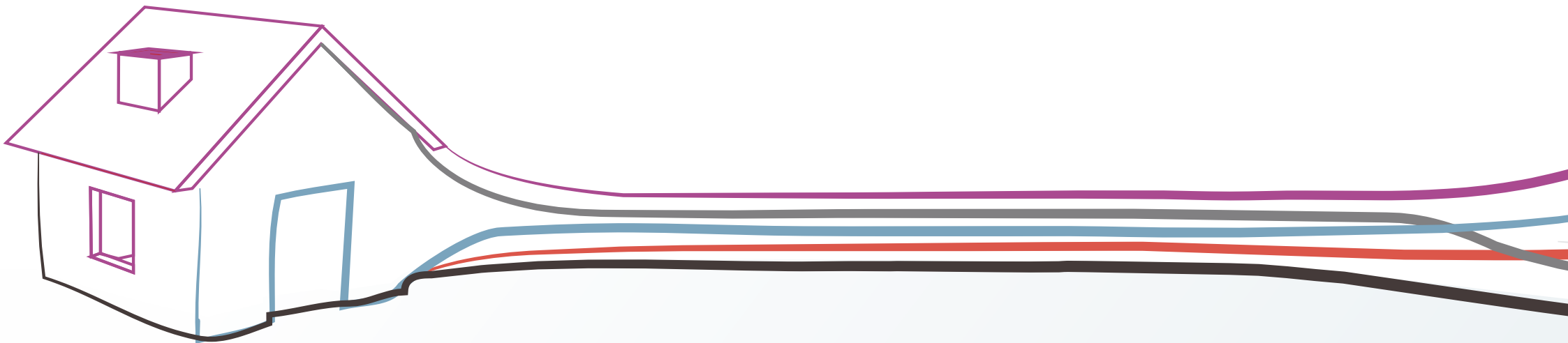
Whitehouse AJO, Evans K, Eapen V and J. Wray. 2018. *A National Guideline for the Assessment and Diagnosis of autism spectrum disorders in Australia*. Cooperative Research Centre for

Living with Autism. Brisbane. <https://www.autismcrc.com.au/knowledge-centre/resource/national-guideline>

Different Buildings For Different Minds

A report by Michelle (Shelly) Dival – Churchill Fellow 2017

Winston Churchill Memorial Trust of Australia



The Winston Churchill Memorial Trust of Australia

