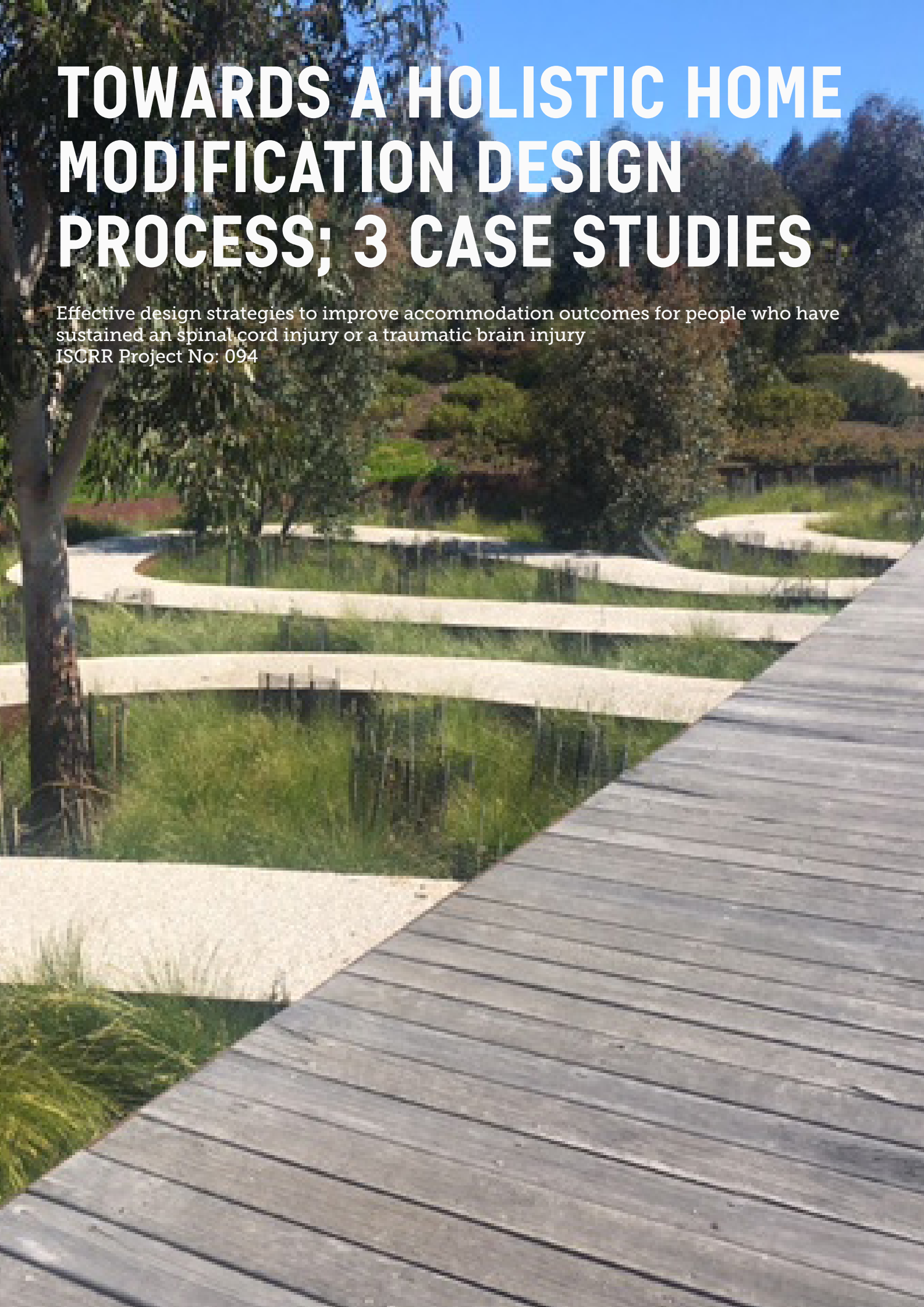


TOWARDS A HOLISTIC HOME MODIFICATION DESIGN PROCESS; 3 CASE STUDIES

Effective design strategies to improve accommodation outcomes for people who have sustained an spinal cord injury or a traumatic brain injury

ISCRR Project No: 094



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AUTHORS

Nigel Bertram
Helena Harry
Holly Board

The Monash Architecture Studio (MAS) is a architectural practice-based research unit located within the Department of Architecture at Monash University. The design explorations of MAS are based on such issues as rapid population growth, changing household demographics and supported living environments. The research focus is on the design of intensive and sustainable development models within established urban areas. Such models aim to enable cities to grow in a more sustainable and liveable way, with corresponding high amenity.

ACKNOWLEDGEMENTS

The authors would like to sincerely thank all the participants of this study and their families for their generous giving of time, opening their home to us and sharing their stories which have been so inspiring and informative for our research. Without them, we would not be in a position to do this work and we are sincerely grateful.

We would also like to thank the occupational therapists who have generously given their knowledgeable and helpful feedback both in providing technical advice as well as their insights into the complications and restrictions of the process of undertaking home modifications.

SCIS Building and Access Consultant, Steve Vandenberg has also generously offered his time, advice and enthusiasm for our research.

This second stage required considerable assistance from many research liaison officers and an army of occupational therapists who helped so much during the ethics approval process, and the locating of suitable participants. We continue to be grateful for their input, which was tireless and fruitful.

Thanks also to the Transport Accident Commission (TAC) and the Institute for Safety and Recovery Research (ISCRR) for their continued support for this research work. In particular we would like to thank Sarah Mizzi who has given considerable administrative support and been a great advocate for this second stage of work.

EXECUTIVE SUMMARY

Background

This report forms Stage 2 of our research to look at how holistic and analytic design-led strategies can inform the home modification process for people who have sustained a spinal cord injury (SCI) or an acquired brain injury (ABI). In the first stage we developed design principles by looking at best practice assisted living design examples worldwide – the results of this study were published in the report: *Best Practice Discussion Paper*, November 7, 2014. In Stage 2, we have applied those principles, working with three participants with an ABI or SCI and their primary carers / family members.

Research Approach

In order to undertake this second stage research work, ethics approvals were granted to allow us to work participants with people who have sustained either a SCI or ABI. The ethics protocol required participants to be over 18, own their own home (or live in the family home), live within the state of Victoria, and in need of major modifications to their homes. All participants needed to be of sound mind to take part in this study.

Three participants were recruited. All three participants were already living in their homes when we commenced our work with them. One had a SCI from an injury that occurred 20 years ago. Another was a recently injured woman with a SCI and the last was a gentleman who had suffered a stroke recently, resulting in an ABI. All participants were wheelchair bound.

Originally, it was intended that the participants be TAC compensable, and that our research team work in parallel with the TAC Home Modifications team. That work would have been done whilst participants were still in rehabilitation. As it was not possible to find suitable candidates within the timeframe of this research, it was agreed that we should work instead with non-TAC compensable participants. As it transpired, working with participants already in the community was a positive thing, as these people had had time to adjust to their new situations and learn what was and wasn't working for them in their homes.

Our work with the three participants took place between October 2016 and January 2017. The small number of participants included in this study is a result of time restrictions.

The research team visited the candidates in their homes where a semi-structured interview of the key participant and their relevant family members/primary carers was recorded, generally for a maximum of 2 - 2.5 hours. Their homes were also photographed, analysed and measured where relevant. If any existing home modifications had been undertaken, we were provided with drawings or took photographs and made observations.

Proposals for holistic design strategies were developed which took into account the individual interests and values and future hopes of the participants and the specific difficulties of their environments posed for them. We returned to the participants' homes and presented our design ideas and took on board their feedback. In one case this presentation took place with the participant's occupational therapist (OT) present. In the other two participants' cases, we met with or spoke with the OT separately.

Final proposal drawings have been given to the participants for their use as they see fit. All feedback from participants and OTs has been included here.

Finally we have drawn conclusions from our work, which seeks to assist future approaches for the home modification process for the TAC in their work with people who have a SCI or an ABI.

Findings

- 1a. **MASTERPLANNING FOR KEY FIRST DECISIONS:** A high-level masterplanning design exercise which identifies possible synergies between user priorities and latent site-wide potential – can help people envisage their future, and hence make more effective decisions about where and how they might live long term. Fundamental decisions such as whether or not to continue living in one's existing home can be enabled by this process, which in turn can help to make decisions about the first stages of home modifications and avoid abortive work.
- 1b. **BROAD BRUSH OPTIONS:** Illustration and discussion of broad schematic design options – ie quick sketches of lateral alternative solutions– can help to clarify user priorities. This is a 'brainstorming' type activity that is fast and efficient, but based on careful spatial analysis of existing site attributes. It needs to include an understanding of how things might be built, but without getting bogged down in the details or minutiae of regulations. These sketch design options focus on the 'big picture' and the way different approaches might enable or enhance different life scenarios for the occupant.
- 2. **TIME FOR REFLECTION AND PROCESSING:** Allowing time for users to process their new situation and experience living back in their house can lead to better long-term decisions based on a clearer understanding of needs and opportunities in situ. It may be that temporary or removable modifications should be undertaken at first, to allow time for this consideration to take place before deciding on permanent changes. The design process can take place during this period of reflection, and can benefit from more meaningful user input.
- 3. **EMPOWERING USERS:** Participation in the design process can be empowering people with a SCI or an ABI, enabling greater control and ownership of the decisions made, supported by an 'envisaging' masterplanning process that is focussed on positive opportunities. This is especially important for patients with a SCI or an ABI where so much control has been removed by injury.
- 4. **USER SPECIFIC REHABILITATION** activities with a deep connection to residents' interests and background (such as participation in gardening, family gatherings and physical exercise) can and should be factored in as key criteria when deciding on how to proceed with even basic home modifications.
- 5. **NO ONE SIZE FITS ALL:** Each user is an individual with different cultural values and interests.

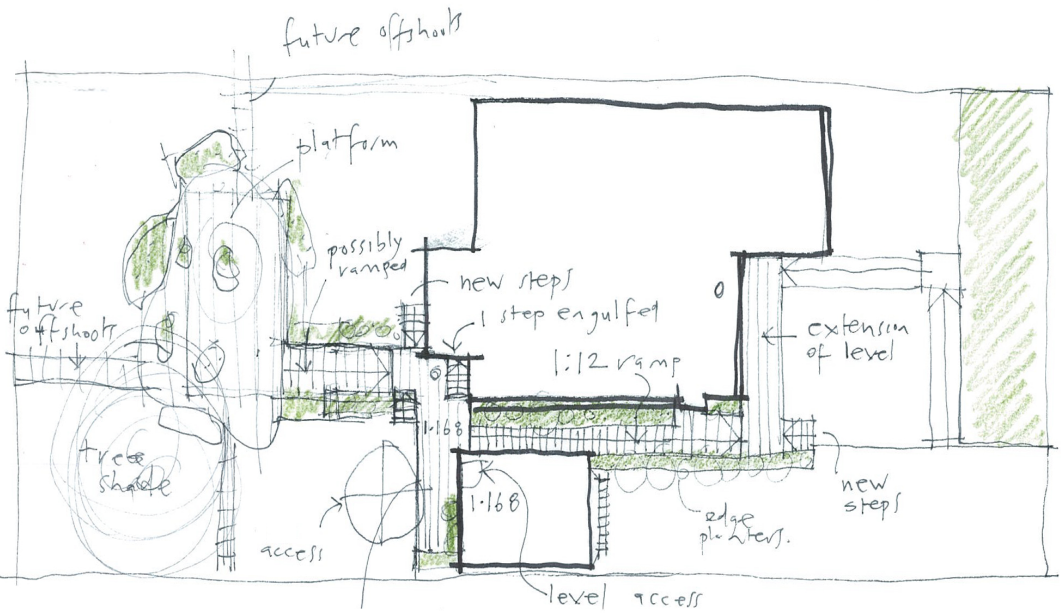
INTRODUCTION

- 6. **BALANCING THE NEEDS OF THE USER, CARER AND FAMILY:** Taking other family members and carers into account is key to a happy household; careful consideration of their needs and values will also help people with a SCI / ABI in the long term. Home modification decisions that find a careful balance between user needs and other household pressures/requirements will be more likely to succeed.
- 7. **MAXIMISE OPPORTUNITIES FOR CONNECTIONS:** Decisions around access and function can also maximise opportunities for connections with gardens, with outside spaces, with neighbours and the wider community, responding to the opportunities afforded by the specific site conditions.
- 8. **MORE THAN ONE PURPOSE:** Each element of modification work can serve more than one purpose if considered carefully and in a holistic manner.

Recommendations:

Of the 8 lessons derived from this study, listed above, all are underpinned by the importance of an analytical masterplanning exercise. This exercise might raise fears about user expectations for funding. Perhaps a solution to this can be found by separating an analytic masterplanning exercise from the purely fundable built projects exercise. None of the participants who took part in this study had any problem understanding that it was a theoretical process only which may or may not benefit them, and that it's purpose was to look at the big picture. We recommend that this process be further tested within the TAC Home Modifications Team process, to further understand the benefits that the two-staged design approach could have.

We recommend that the work we commenced with Frank and Yvette to develop an accessible garden be continued. This work has potential to lead to garden designs which would benefit the wider SCI community - an opportunity to realise results that demonstrate many of the key principles pinpointed in this research.



This report is the second stage of the research project Effective Design Strategies to Improve Accommodation Outcomes for people who have acquired a SCI or an ABI which is funded by the Transport Accident Commission through the Institute for Safety, Compensation and Recovery Research. The research seeks to better understand whether holistic design thinking can expand the scope of 'universal design' principles and the manner in which these are usually applied when prescribing home modifications for acquired brain injury and spinal cord injury people requiring a change in their home environment.

Each year the TAC and other groups undertake home modifications for clients who have, through accident or otherwise suffered a SCI or ABI. Although not always large in physical size, such modifications are fraught with difficulties relating to the specifics of the injuries or disabilities involved and also to the idiosyncrasies of existing structures and specific site conditions. Because accidents and injury are by definition unplanned events, the need to act is always urgent. The works are undertaken under considerable time pressures, often within tight budget constraints, with clients residing in hospitals or makeshift rented accommodation while their homes are being modified before they can move back home again. It is within this context, with scope identified for expanding the ambition, impact and effectiveness of current processes and approaches to home modifications, that our research work has taken place.

The first stage of this research looked at best practice case studies of supported living models in Australia and abroad that demonstrate how architectural and urban design strategies can influence the quality and performance of dwellings that are occupied by people with disabilities. The findings from analysis of those exemplary projects were distilled into ten principles for good design for assisted living, published in the report: *Best Practice Discussion Paper*, November 7, 2014.

This second stage has been a hands-on exercise, working with real people who have a SCI or an ABI and who require modifications to their homes, applying the principles unravelled in the Best Practice paper. Three participants took part in this research. Each participant is very different; their living situations, injuries, cultural background, values and interests are unique. Although there are overlaps in that all three are currently confined to wheelchairs, their life background, current needs and the context of their physical environments tell very different stories. Two of the participants' conditions were recent; the third, Daniel*, had been wheelchair bound for twenty years. Daniel's story is therefore quite different from norm, however there were useful applicable issues that emerged none-the-less.

The first participant had recent home modifications undertaken prior to our involvement and now requires secondary modifications. Another participant has had drawings for modifications undertaken and a wish list for other changes, and the last participant had only temporary equipment in place while they considered options for permanent changes. Funding wise, the three participants situations are also different. None are TAC compensable, however one is seeking NDIS funding. Two of the participants are totally self-funded, however our proposals for all three sought to consider possibilities in a broad brush way that could be implemented over time, according to their own budgets, and from different funding sources.

The design proposals developed, presented and discussed with the participants and their OTs will not necessarily be built. The aim of our work here is to articulate future

*NOTE: All names in this report have been changed to protect the privacy of participants.

possibilities for these individuals, through the design process. Through analysis of the participants' interests and values, as well as an analysis of their site context and family structure, we sought to develop a 'masterplan' overview to uncover relevant latent potential within their living environment, providing them with possible future scenarios for their life and their environment. Any small immediate home modifications that are undertaken can therefore be done within the context of these future potential scenarios.

This research uses the design process to develop helpful lessons for the future of home modification design. It is therefore not the specific design proposals that are most relevant here, but the approach, methodology and tactics developed.

CHAPTER 1

PARTICIPANT'S STORY AND SITE CONTEXT

1

Participant 1:
Yvette & Frank,
Eastern Suburb,
Melbourne

Prior to her accident, Yvette was an unusually active 68 year-old who started each day with a trip to the gym or the swimming pool. Home by 9.30am, she would spend the majority of her time in her large and plentiful fruit and vegetable garden with her husband, Frank, or pursue one of her many interests - Tai Chi, piano playing, singing and writing. Frank and Yvette organised their retired life to enable them to travel for 4-6 months of every year. Having lived in the same house for 34 years, Yvette and Frank have strong connections with the place, and with many of their neighbours who willingly helped to look after the garden whenever they were away.

On a recent trip aboard, a car accident resulted in Yvette's spinal cord injuries. Recovering in the Royal Talbot after the initial emergency operation abroad, Frank and Yvette had to decide where their future life would be. Frank explained how hard this decision was, as the two of them initially had very different views on what they should do.

"We spent a long time looking at all the options. It's not just renovations; suddenly you go from being totally independent to really not knowing what your future is going to be, so we went through a lot of "Do we stay here?" "Do we re-build here?" "Should we move?" So all that took some time. In the end we had three weeks all of a sudden [prior to Yvette being discharged], to decide."

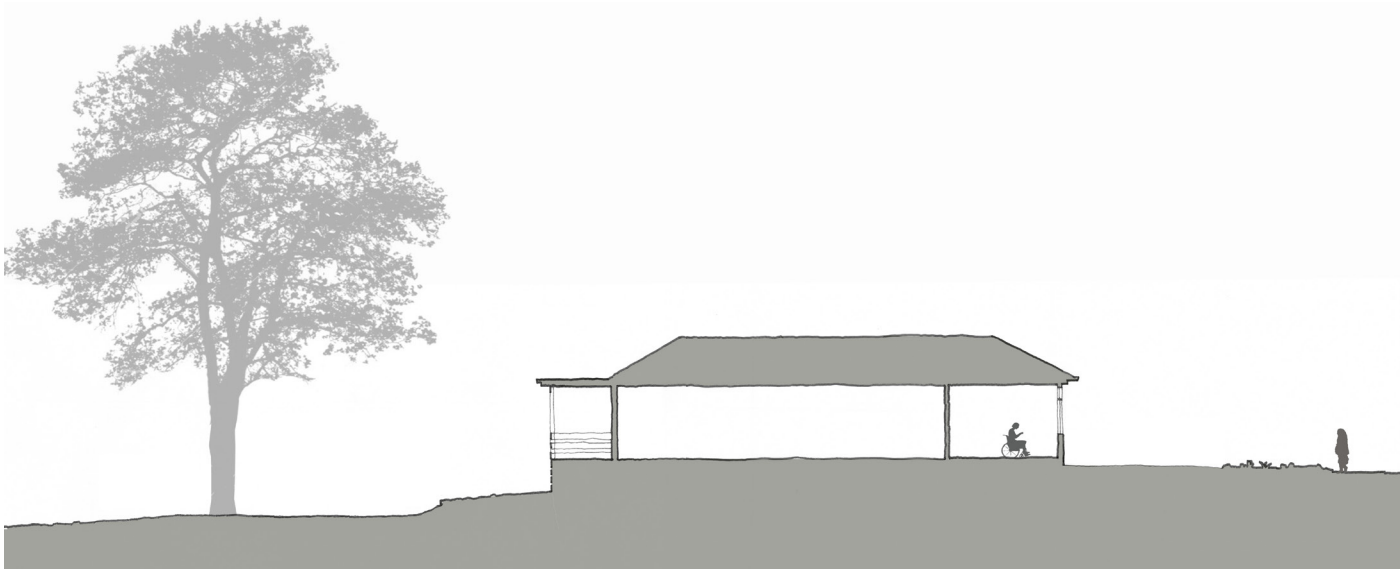
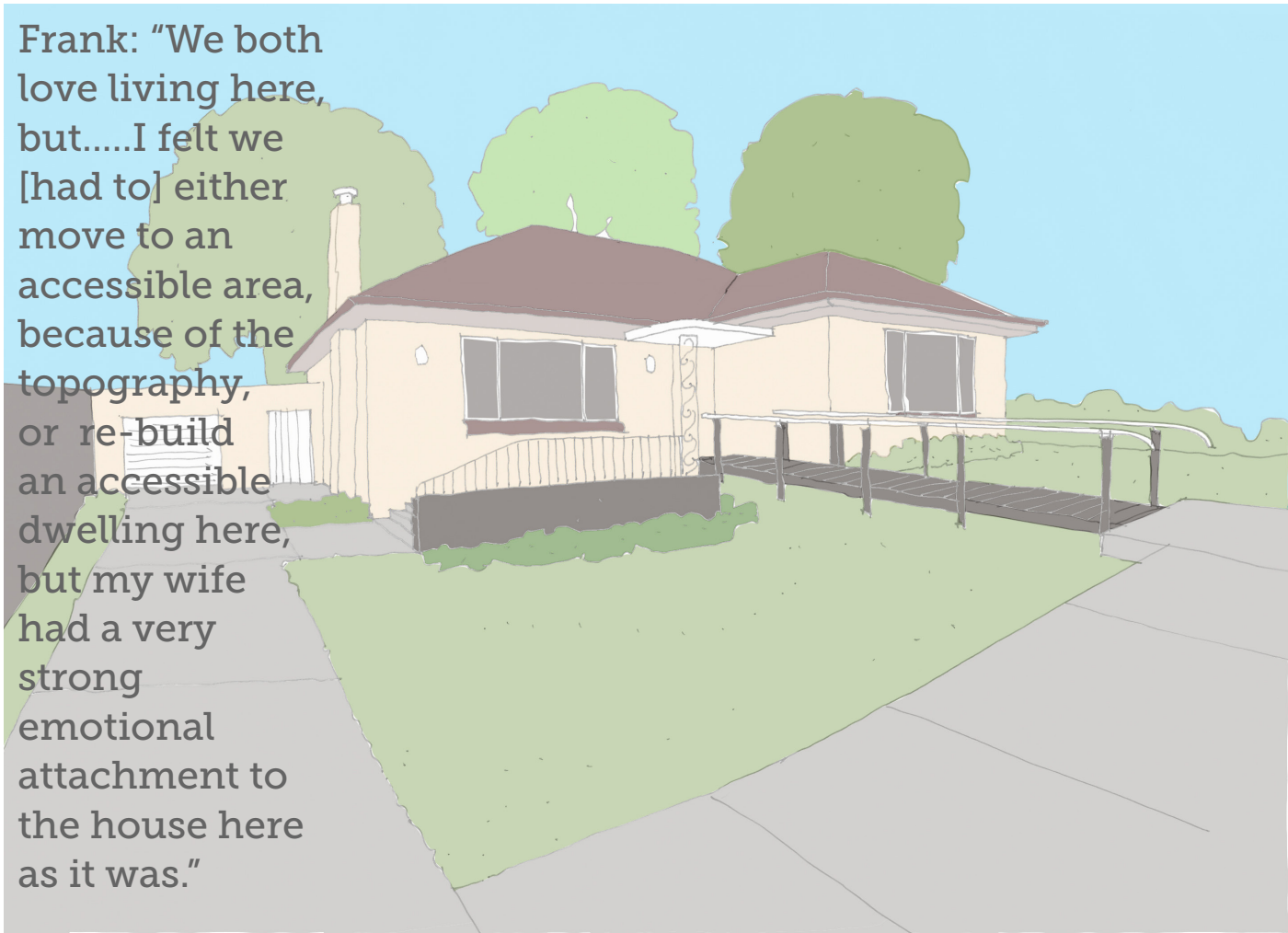
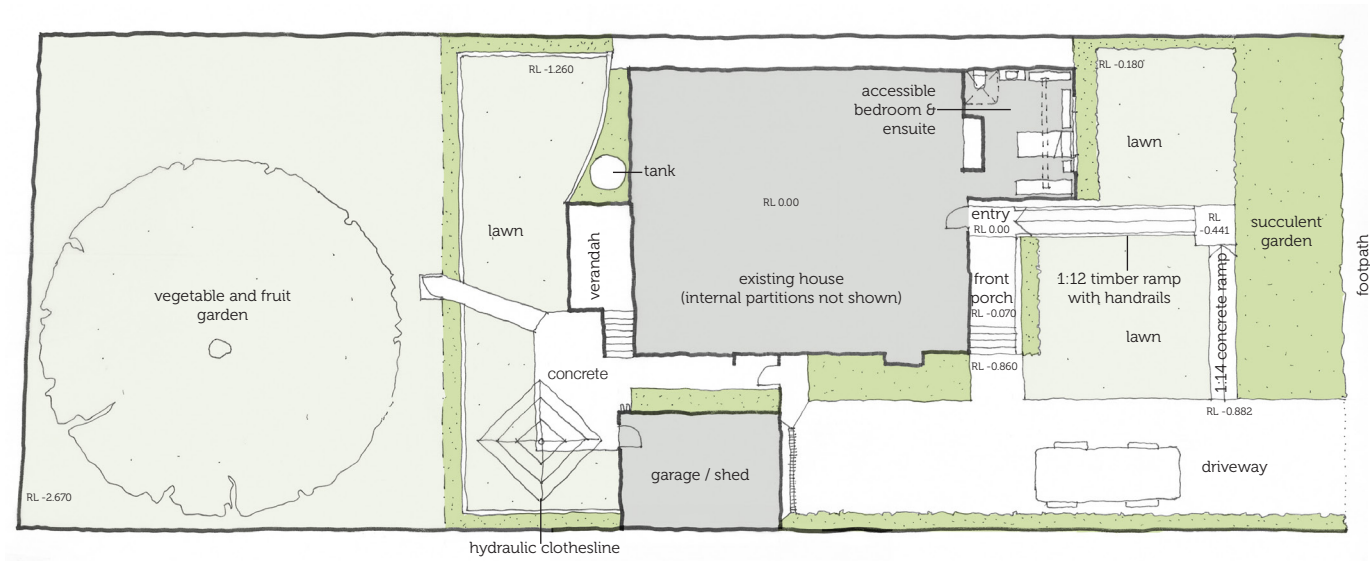
Yvette felt very emotionally attached to the existing 1950s cream brick house and garden, where their two children had grown up and where they have strong connections to their surrounding community. Frank, on the other hand, could not see how they would be able to stay where they were, as the site is very steep, making access issues very difficult.

Frank: "Well, we had very different views. We both love living here, but I felt we [had to] either move to an accessible area, partly because of the land - the topography, or re-build an accessible dwelling here, but my wife had a very strong emotional attachment to the house here as it was."

Right: Sketch of front of house showing existing home modification - accessible concrete and timber ramps leading up to front door

Right Below: Existing long section through site

Below: Site plan of existing house and garden with ramps and accessible bedroom



“It’s not just renovations; suddenly you go from being totally independent to really not knowing what your future is going to be. We went through a lot of “ Do we stay here?” “Do we re-build?” “Should we move?” All that took some time.”

MODIFICATIONS PREVIOUSLY UNDERTAKEN

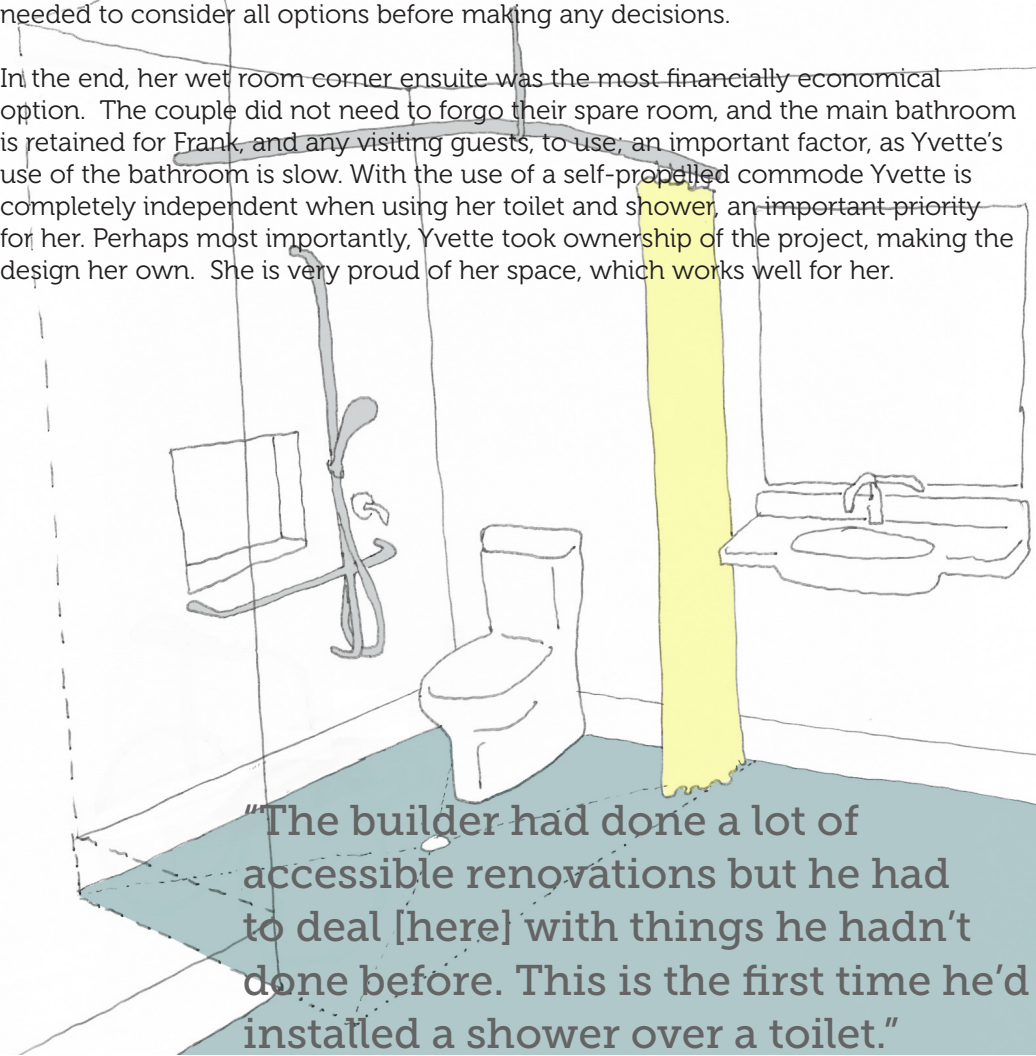
With assistance from The Royal Talbot’s Spinal Cord Injury Services (SCIS), Frank and Yvette planned the modifications that had to occur prior to her return home. The SCIS team produced drawings for a ramped entrance at the front of the house, as well as modifications to the front bedroom to incorporate a wet room bathroom corner. Frank also arranged to replace the existing carpet with more easily traversable linoleum.

Yvette’s accessible bedroom was the original master bedroom; Frank has moved to a bedroom at the rear of the house. On first viewing, Yvette’s room is aesthetically very clinical and hospital-like, with a hoist over a single hospital bed that has it’s back to the window. The wet room corner ensuite is remarkably efficient space wise. It resulted from many conversations between SCIS, Yvette, Frank, the occupational therapist and the builders.

SCIS worked up three schemes. They explained that this project took three times longer than the usual process. There was pressure from all parties to find a solution prior to Yvette’s discharge; temporary portable shower units were considered as well as permanent modifications. Yvette rejected SCIS’s initial schemes to convert the adjacent spare bedroom to become a new accessible bathroom, or to refurbish the existing bathroom. She felt she didn’t need that much space and didn’t want the expense. It was her idea to have an open plan arrangement within her bedroom by demolishing the existing 1970s shower cubicle in the corner to become an accessible ensuite with the shower directly over the WC. Yvette’s personality is such that she needed to consider all options before making any decisions.

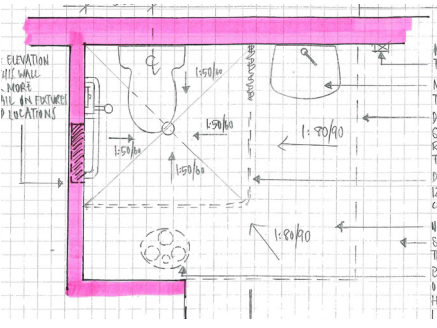
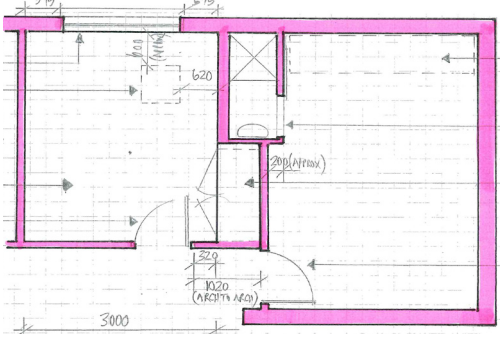
In the end, her wet room corner ensuite was the most financially economical option. The couple did not need to forgo their spare room, and the main bathroom is retained for Frank, and any visiting guests, to use; an important factor, as Yvette’s use of the bathroom is slow. With the use of a self-propelled commode Yvette is completely independent when using her toilet and shower, an important priority for her. Perhaps most importantly, Yvette took ownership of the project, making the design her own. She is very proud of her space, which works well for her.

Right Sketch showing the resulting final wetroom corner ensuite. Whilst the result is quite ‘hospital like’ in appearance, it functions efficiently and allows Yvette to independantly undertake her morning rituals with ease.



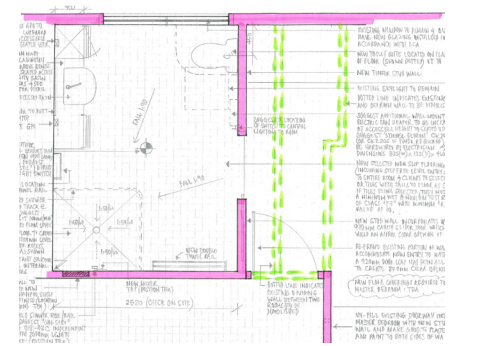
“The builder had done a lot of accessible renovations but he had to deal [here] with things he hadn’t done before. This is the first time he’d installed a shower over a toilet.”

Top left: Drawing of the existing two bedrooms. Right room: Yvette’s bedroom. The left bedroom is the existing spare bedroom which SCIS initially intended to convert to an accessible ensuite

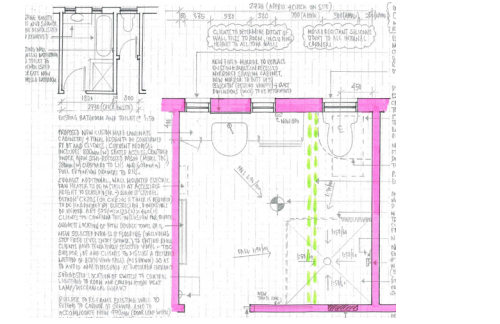


Above: Final drawing of Yvette’s ensuite which occupies a small corner of her bedroom (previously a shower room). This corner becomes an open plan ‘wetroom’ corner. The shower is located directly over the wc. Yvette came up with the idea herself and the SCIS team and Frank discussed the arrangement with builders and the OT to make it work.

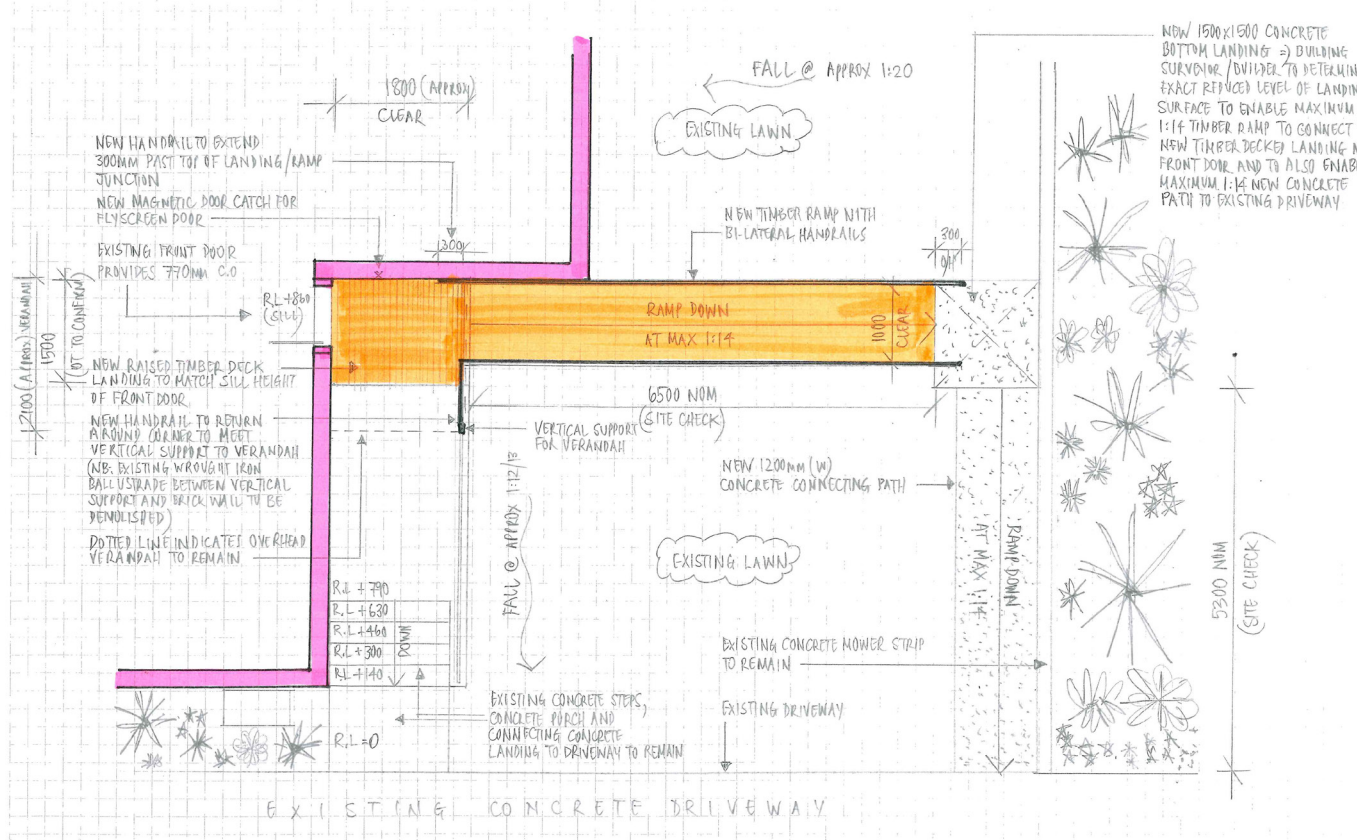
Right: SCIS team Design no. 1 - converting the adjacent spare bedroom into an accessible ensuite



Right: SCIS team design no. 2 - converting the existing main bathroom into an accessible bathroom. This room is down the hall from Yvette’s accessible bedroom and would have been a lot less convenient for her to use



Below: Sketch showing the new entry ramps to the front garden at Participant 1’s house, including a 1:14 concrete ramp and a 1:14 timber decked ramp with handrails



ISSUES TO BE RESOLVED

Following these initial home modifications, Frank and Yvette’s main concern was enabling Yvette to be able to access her beloved garden again, which is where she had previously spent a large portion of her time – and which they consider to be an important part of her long-term rehabilitation, and mental and physical well-being.

When we first interviewed them, the couple were in the midst of considering the installation of a hydraulic elevator at the rear of the house to enable Yvette to travel from the existing back porch down to rear garden level. This solution was generally considered by all to be the best way forward, as the large back garden is 1.3 metres lower than the internal floor level.

SCIS had helpfully found a second hand lift that could be modified to work at Yvette and Frank’s house. Even so, it transpired that the cost of installing the lift would be at the very least \$22,000.00, taking into account the required concrete base and verandah modifications.

Not to dismiss this option, we felt it would be good to look at other options that might be considered either instead of, or alongside the elevator idea.

Frank and Yvette’s house has two beautiful aspects - at the front and rear of the house. The front garden,

facing east, is primarily comprised of two areas of lawn, divided down the middle by the new L-shaped ramp, which provides access to the front door. Between the lawn and the footpath there is no fence; a wide succulent garden with some shading trees separates their private area from the public footpath.

Frank: **“Yvette is probably known by most people who walk [in the area]. And the [succulent garden] plants represent plants from gardens all around [here]. People stop to chat and say: “Oh I’ve got that, but a different coloured one”.** The couple love chatting to their neighbours and people from further afield who come to view the gardens along their street.

Frank and Yvette had already solved a lot of the internal accessibility issues. Better connectivity to the garden, and a solution to the heights and accessibility of plants would make a huge difference to their new way of living.

The Viking terrain wheelchair (below) was one initial idea discussed- an option of looking at mobile equipment, which could traverse stairs as well as the steep pathway across the lawn to the vegetable garden for half the price of the lift. This particular proposal was rejected however, partly due to the angle of the staircase at the rear of the house.



Right:
Diagram of existing plan of house and garden with design solutions broken down into 5 discreet areas

Left: The Viking 4 x 4 terrain wheelchair. Capable of traversing various terrains - sand, mud, grass. It can climb a 36 degree angle an the seat automatically adjusts to remain in a vertical position. It can climb steps up to 110mm in height and 150mm

In considering options for enabling a good connectivity between the house and the garden for Yvette and Frank, we choose to look at the front as well as the back garden areas. All opportunities to allow Yvette to spend time in the garden in a constructive way would be both therapeutic and uplifting for her, providing her with purpose and a return to her old pursuit. Our proposals kept in mind that the lift option would cost \$22,000.00, and even then, would not solve the issue of Yvette being able to reach the plants. Yvette wanted to be able to get her hands into the soil. Either a retaining wall arrangement would need to be built with accessible pathways alongside (clearly expensive), or the plants moved into accessible planters.

The front lawn area directly in front of Yvette’s accessible bedroom was therefore the first area we considered (**Area 1**), as the terrain was more aligned to the internal levels of the house. Being lawn currently, it is not wheelchair friendly, nor is the perimeter garden bed accessible for Yvette.

Area 2 involved looking at the existing ramp installation to see if it could be adapted to become more than just a ramp. We also wanted to look at allowing Yvette’s wheelchair to access the front porch, which is 70mm lower than the final landing portion of decked

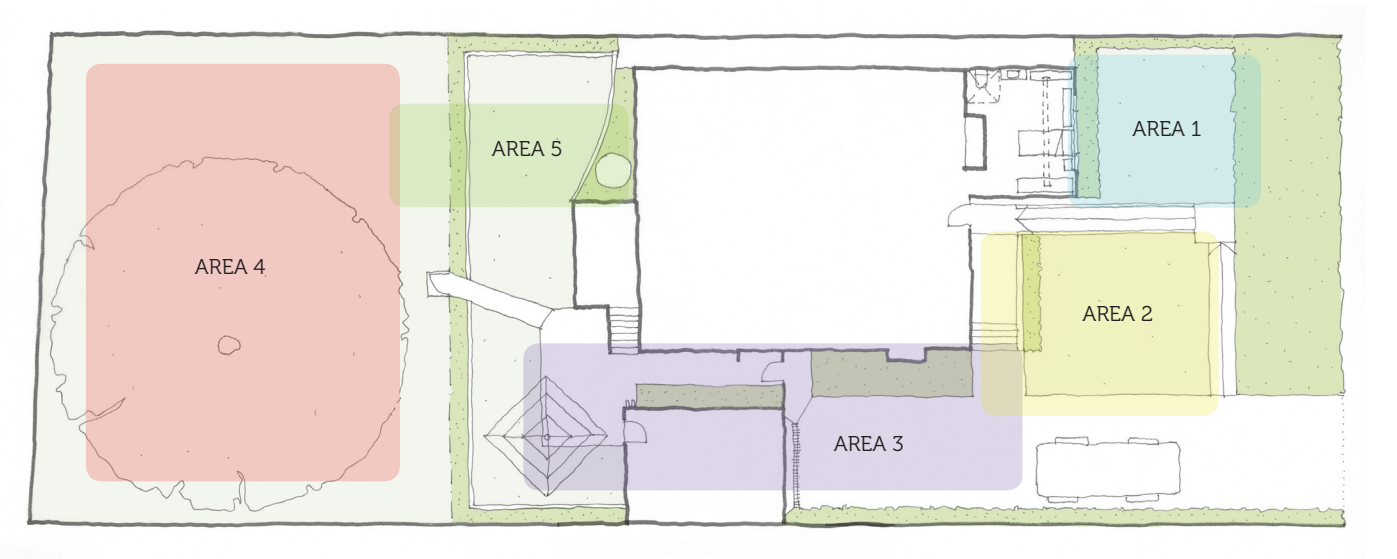
ramp. Yvette’s chance of incidental contact with her neighbours has been lessened since her accident, as she does not access the front garden except to get to the car. In addition, Frank explained that accessing the car is currently awkward as there is not adequate space on the concrete drive alongside the car for easy transfer from wheelchair to car seat.

Area 3 looks at any level adjustments necessary to allow Yvette to travel down to the back garden on her own from the front of the house. In addition, we looked at providing access to the rear of the garage/ shed, where Yvette currently houses her gardening tools. This provided an opportunity to also raise the level of the paving under the hydraulic clothesline, to allow one side of it to be accessible from a wheelchair.

Area 4 provides a more comprehensive solution for the existing back vegetable garden.

Area 5 returned to Frank and Yvette’s initial desire to install an elevator, to see how this might best be done.

The first activity we undertook, however, was to research exemplary existing precedents of accessible garden designs around the world.



RESEARCHING ACCESSIBLE GARDEN PRECEDENTS

Approaches to accessible gardening are many and varied. To enable a wheelchair user to reach the soil level, raised planters with space underneath for legs is the most comfortable option. If the planter height and depth is just right, no twisting of the spine is necessary. On these pages we illustrate just some approaches - wall mounted pots, hanging pots, long lengths of terraced planters, raised 'table' formation planters, sloped sided planters, a 'lazy-Susan' turntable planter, and a product developed in France which includes a plastic moulded side allowing the wheelchair to slide in.



Far Right Bottom images:
Developed in France this is a
PVC moulded plastic form c is
called Terraform - for use with
raised planter beds, allowing
people with spinal cord
injuries easy access for their
legs and wheels under.

Other images: vertical
gardens, hanging pots, lazy-
susan turntable planter and
raised table planters

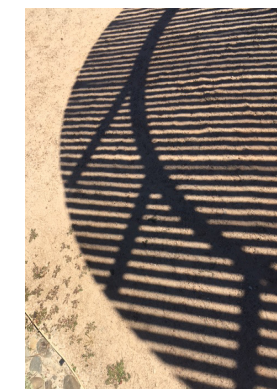




The Royal Botanical Gardens at Cranbourne, an indigenous Australian landscape design, provides inspiration for pathway surfaces meandering through the vegetation that are relevant for a wheelchair user. The colours of bound gravel coloured concrete and naturally weathered timber-decking blend beautifully with the colours of the vegetation.

Hard surfaces such as concrete are easier for wheelchair use, but not ideal for the environment. Individual wheelchair skills also vary from user to user, so the gardens are a useful place for aspiring wheelchair gardeners to test their skills and take inspiration, both for hard landscaping as well as for low maintenance planting ideas.

Yvette and Frank visited Cranbourne following our first presentation to them and took inspiration from the ideas presented there.



Left page and this page: Cranbourne Royal Botanic Gardens pathways, ramps, materials and surfaces

DESIGN SOLUTIONS - AREA 1: BRINGING THE GARDEN TO THE PARTICPANT

This first proposal sought to turn the key question on its head. Rather than going to extreme lengths to take Yvette to the garden, why not bring the garden to her?

This first proposal sought to turn the key question on its head. Rather than going to extreme lengths to take Yvette to the garden, why not bring the garden to her?

Yvette’s new accessible bedroom was arranged with the bed’s back to the window. Not an ideal arrangement, this was a result of circulation considerations. Yvette’s morning ritual involves transferring to the commode (on one side of the bed) prior to moving over to the wet corner ensuite. When she is finished with the bathroom, Yvette transfers back onto the bed to dress, from where she transfers to her wheelchair, on the other side of the bed.

Our first proposal looked at re-arranging the bed location to be at right angles to the window. We then proposed installing glazed doors opening out to a raised deck area outside, accessed directly from her bedroom, level with the internal floor finish. The perimeter of the deck would be lined with raised accessible planters, and through the centre of it, Yvette’s expressed desire for cherry trees could be planted. A relatively small project, this would give Yvette a better outlook from her bed, as well as a totally accessible garden area in a location at the front of the house, with the added benefit of allowing incidental neighbour interaction to occur. It would in effect create an ‘outdoor room’ which would add value to the house, creating good connectivity between inside and out.

The existing hoist location was such that moving the bed meant moving the hoist as well. We therefore looked at another option that retains the current bed location and installs one openable glazed door, still allowing access to the front decked area, but not improving the aspect from the bed.

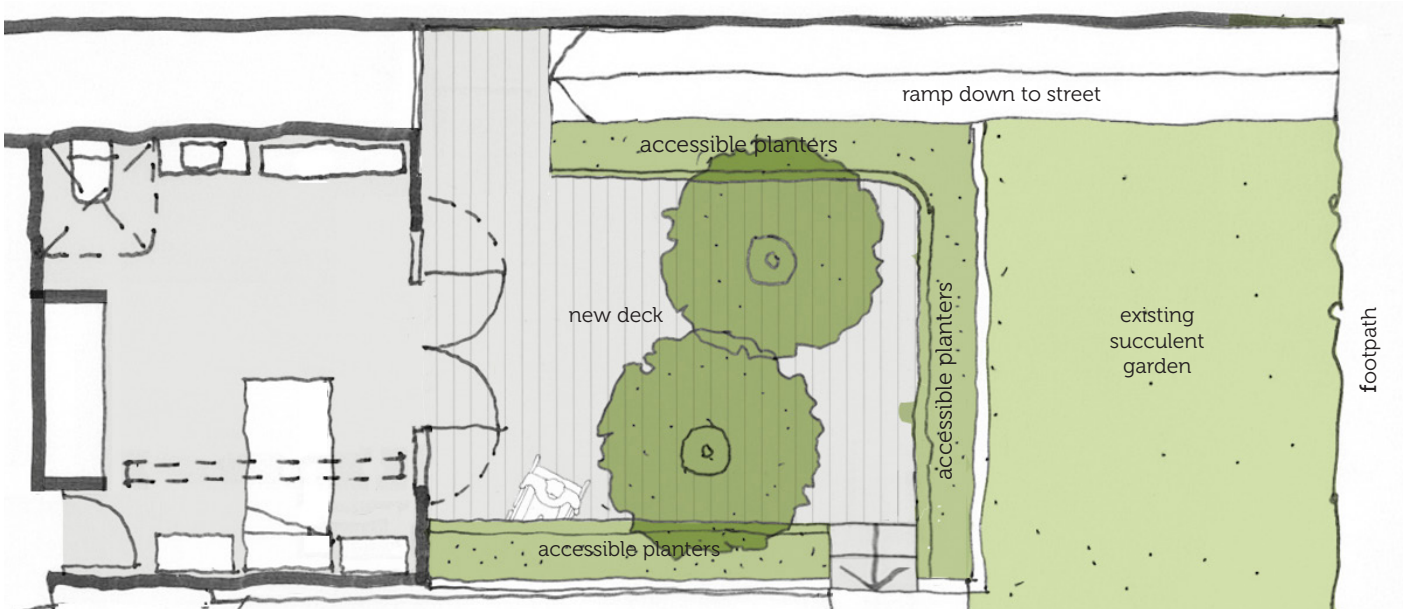
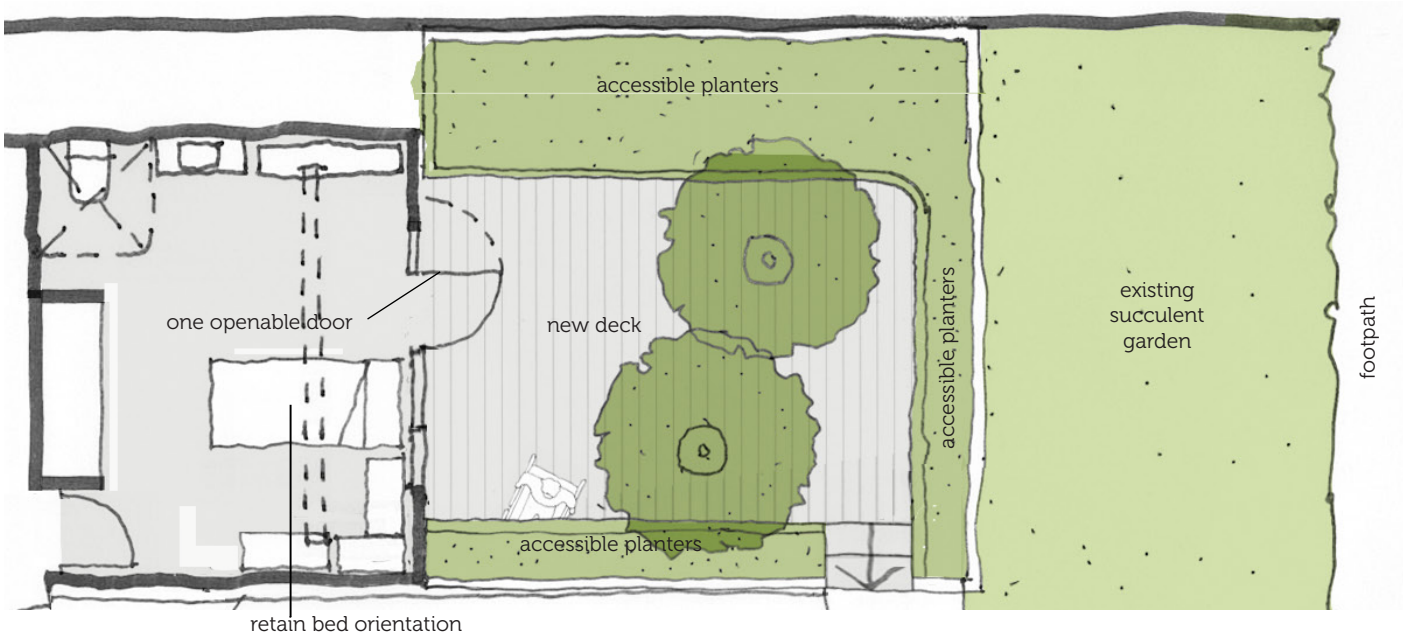
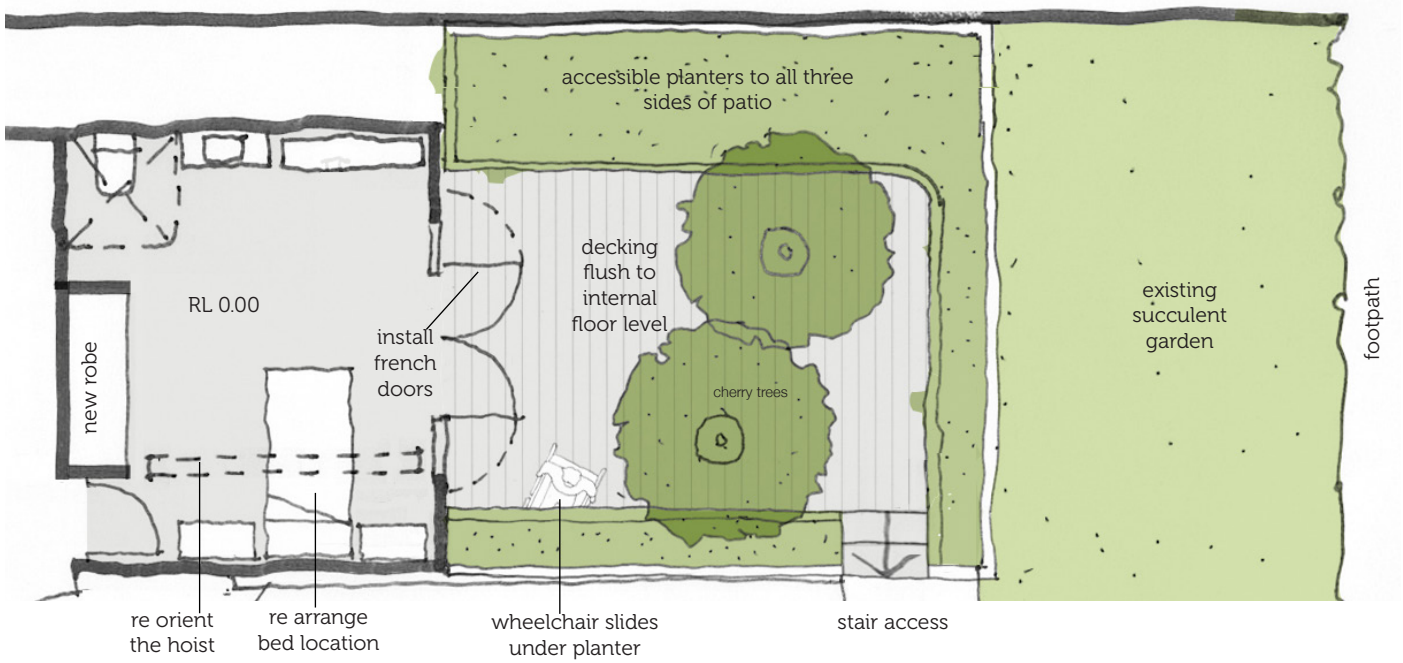
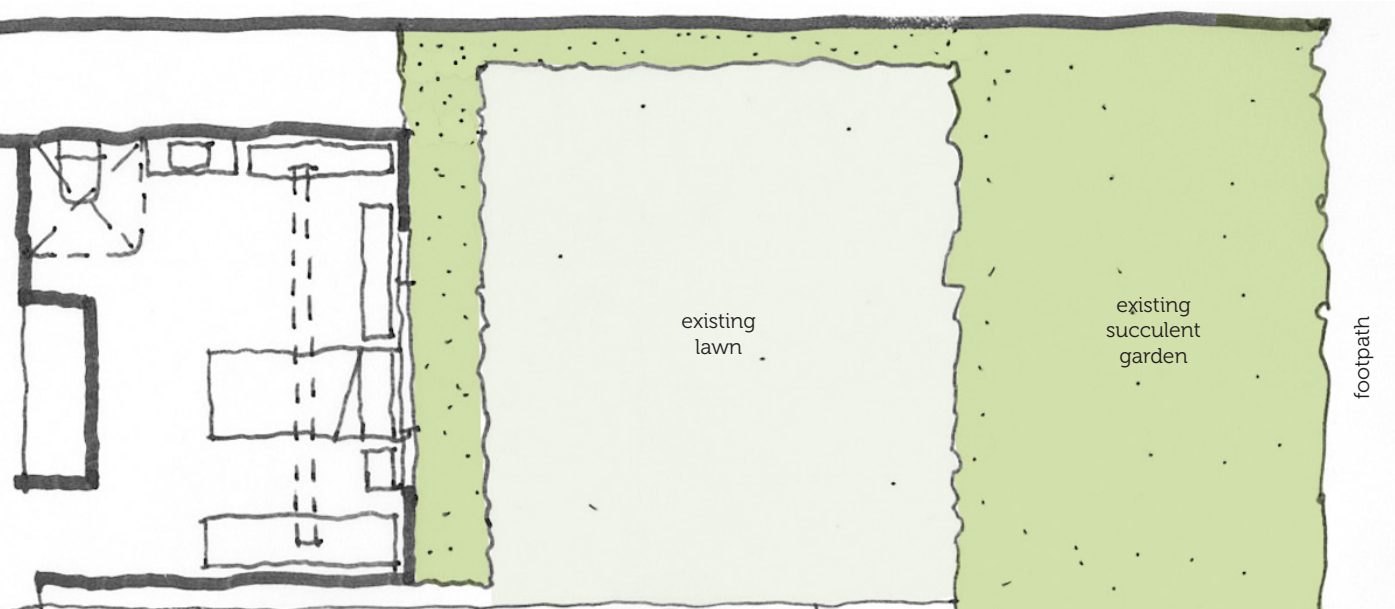
Finally we also looked at an option that includes a ramp or pathway down to the street from the new decked area, as a secondary means of escape for Yvette.

This page below: Plan of existing accessible bedroom and front garden

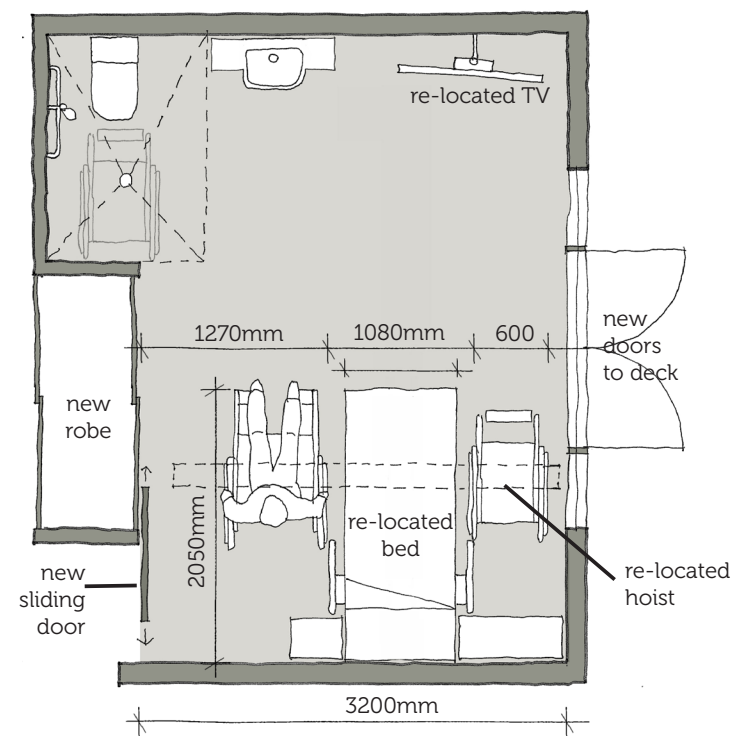
Far right top: Proposed plan - Area 1, option 1

Far right middle: Area 1, option 2, showing the bed orientation retained

Far right bottom: Area 1, option 3, which includes a pathway/ramp down to the footpath



Yvette: "I never thought about making the front area an accessible garden before. It helped so much to break it down into areas; before you showed us that I just felt overwhelmed".

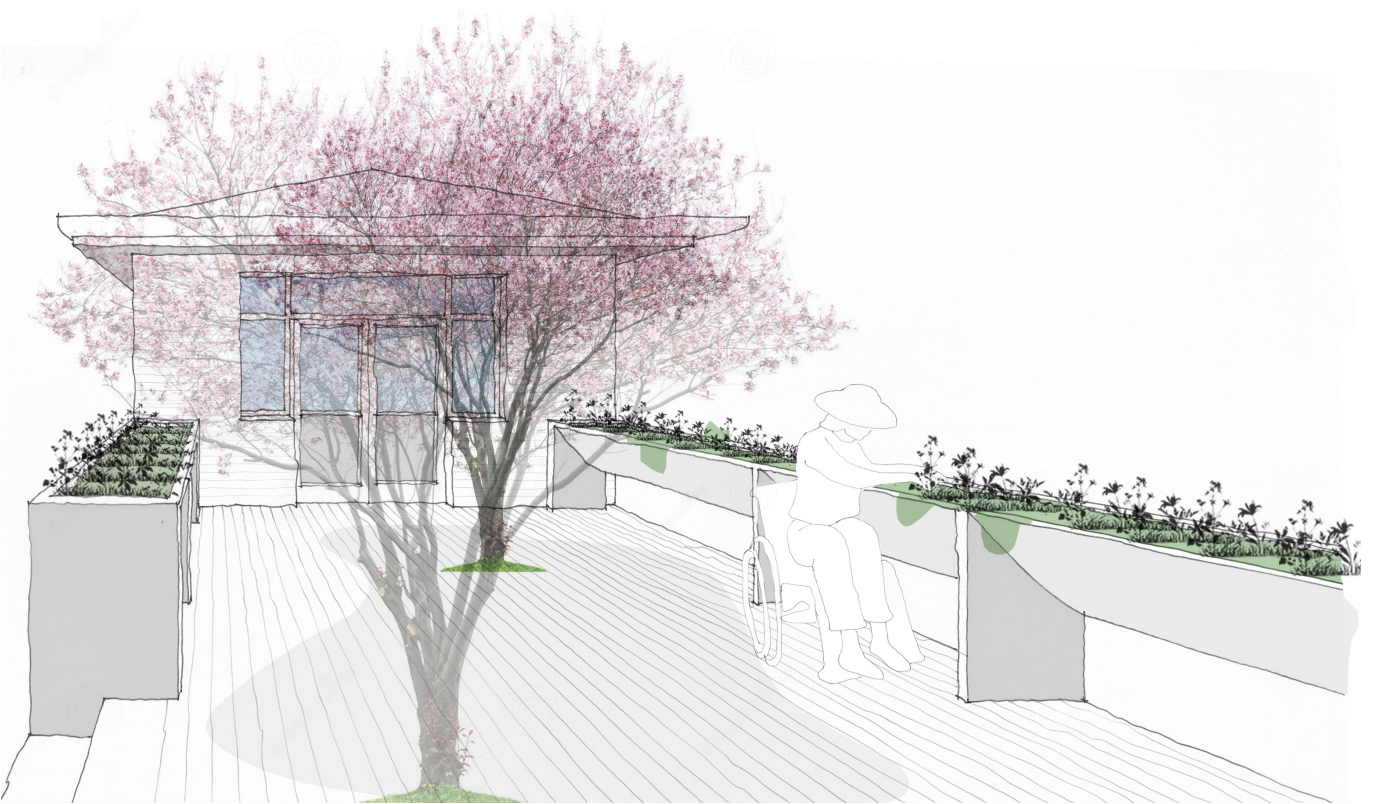
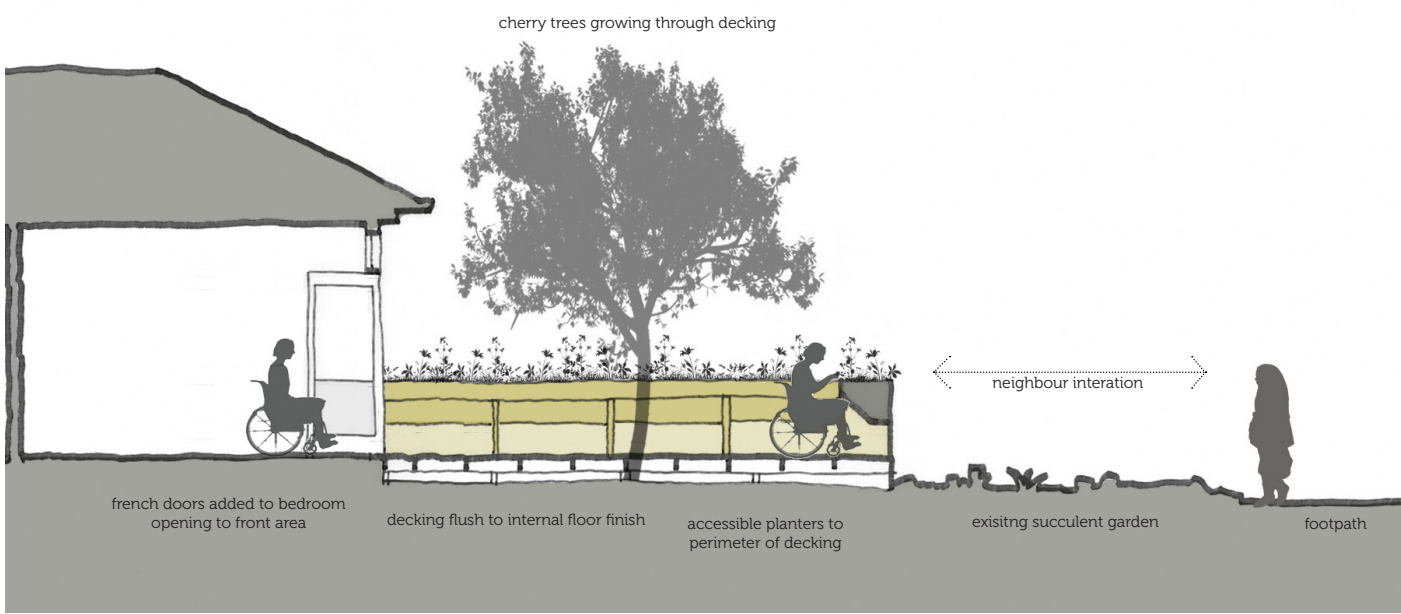


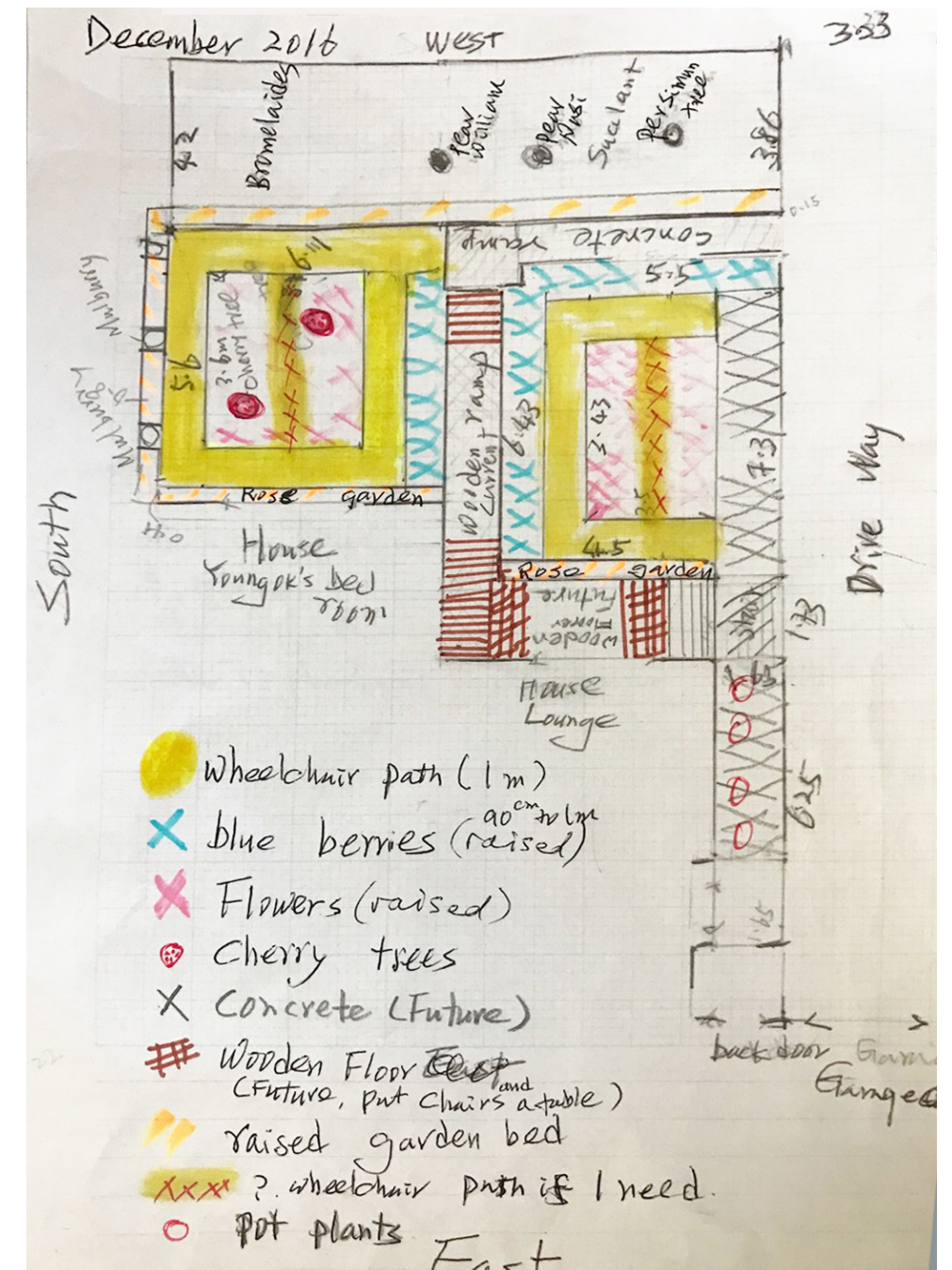
Right: Developed in France, this PVC plastic moulded form which allows wheelchair users to slide their legs underneath is a product called Terraform

Below: Sketch perspective of Area 1 design solution: bringing the garden to the participant

Left: Detailed plan of option 1 bedroom layout

Below Left: Section through Area 1, showing the connection between inside and out, as well as between the accessible garden and the passing neighbours





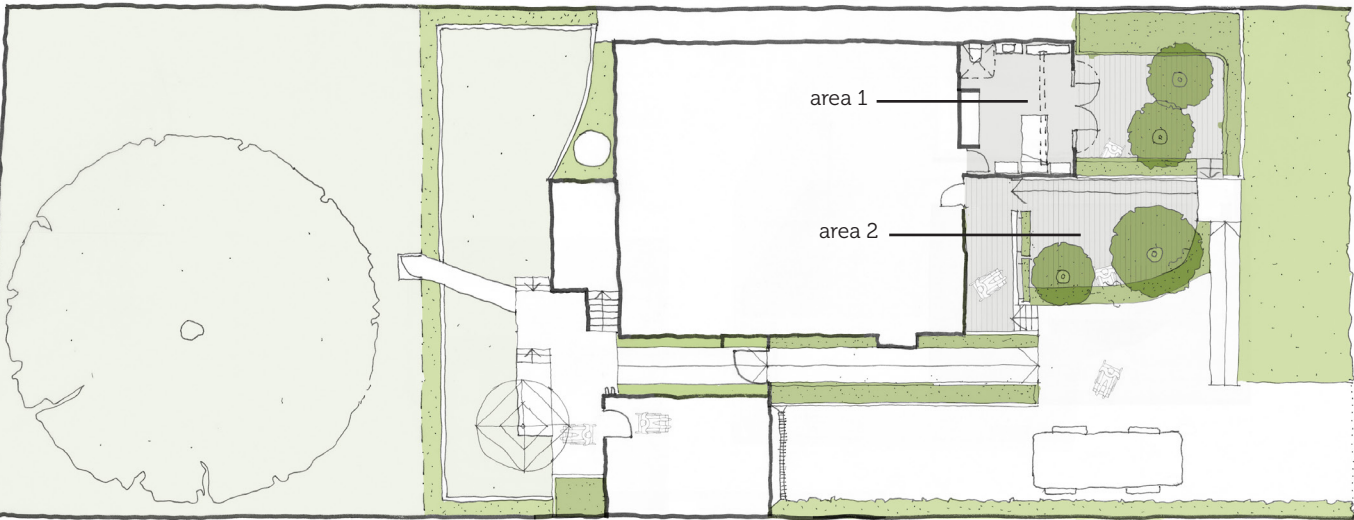
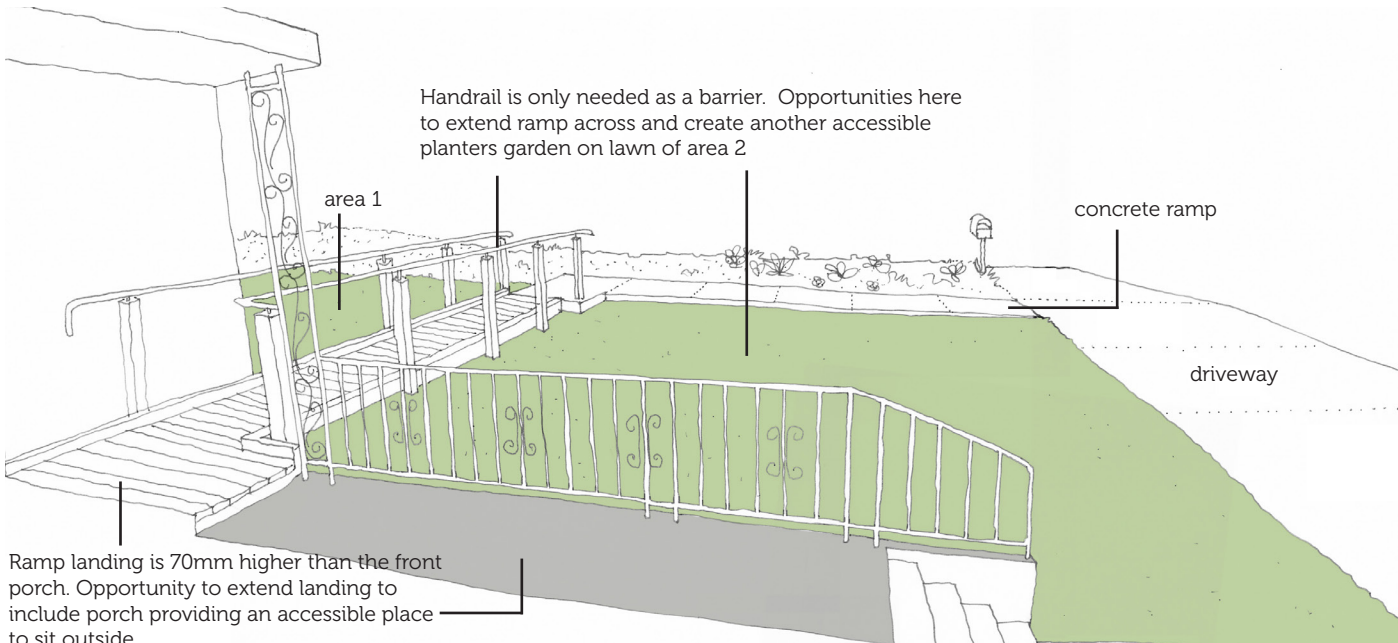
DESIGN SOLUTIONS - AREA 2: MORE THAN JUST A RAMP

The initial home modifications for the entrance solution for Yvette involved an L-shaped ramp that allows her to travel from the driveway to the front door of the house.

In looking at Area 2, we considered two aspects of the ramp that could be modified to give Yvette an opportunity to spend time outside the house. The first is to extend the level decking from the landing in front of the front door across to include the front porch area, which is currently 70mm lower than the ramp. The front porch could also be filled with pot plants - wall mounted or balustrade mounted, which would be accessible for Yvette. It also provides a place for Yvette

and Frank to sit and watch the world go past.

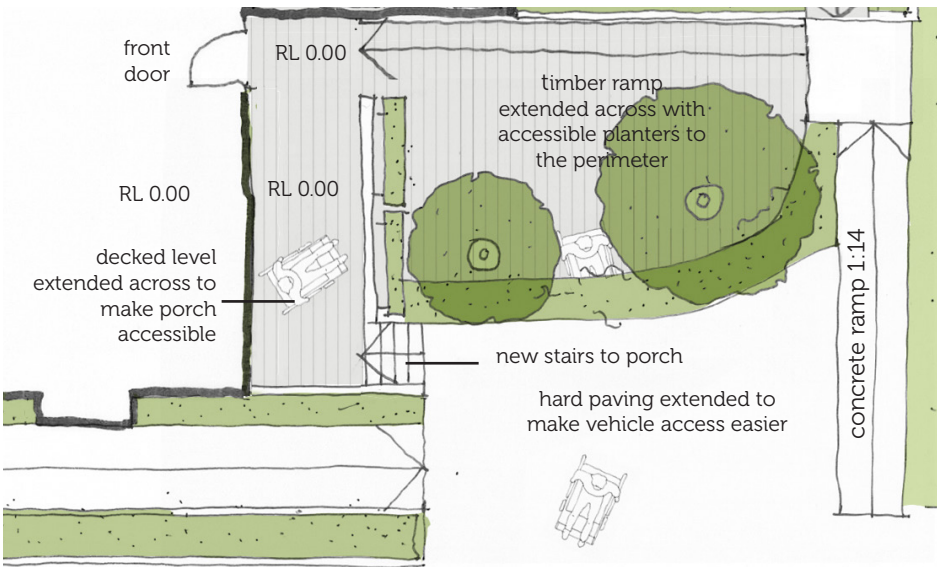
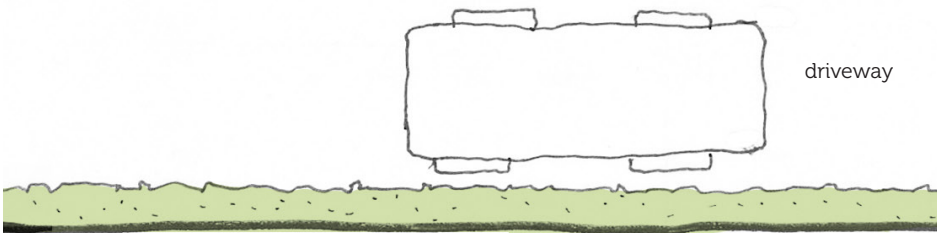
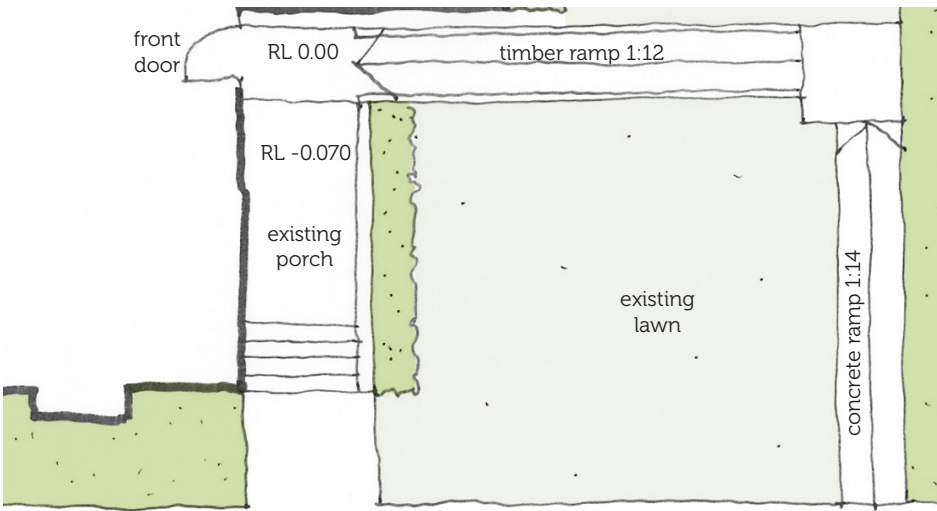
We also noted that the handrail on the side of the ramp leading up to the front door is just a barrier to prevent wheelchair falls and is not required to function as a handrail as such. For this reason we looked at extending that ramp across to become a sloped decked surface which could be lined with accessible planters and could have trees or plants growing through it. We introduced new stairs up the veranda from an extended concreted area adjacent to the driveway, to enable easier transfer into the vehicle.



FEEDBACK FROM THE PARTICIPANT, SCIS AND THE OT

Yvette and Frank as well as the OT and SCIS felt that extending the ramp across to include the front porch area is a good idea, which they will proceed with. The OT was not confident that Yvette would be able to tend to planters from a sloped surface, so she was wary of the extended ramp idea.

Yvette has been re drawing the area, designing a series of flat pathways with planters to either side, which would involve building retaining walls.



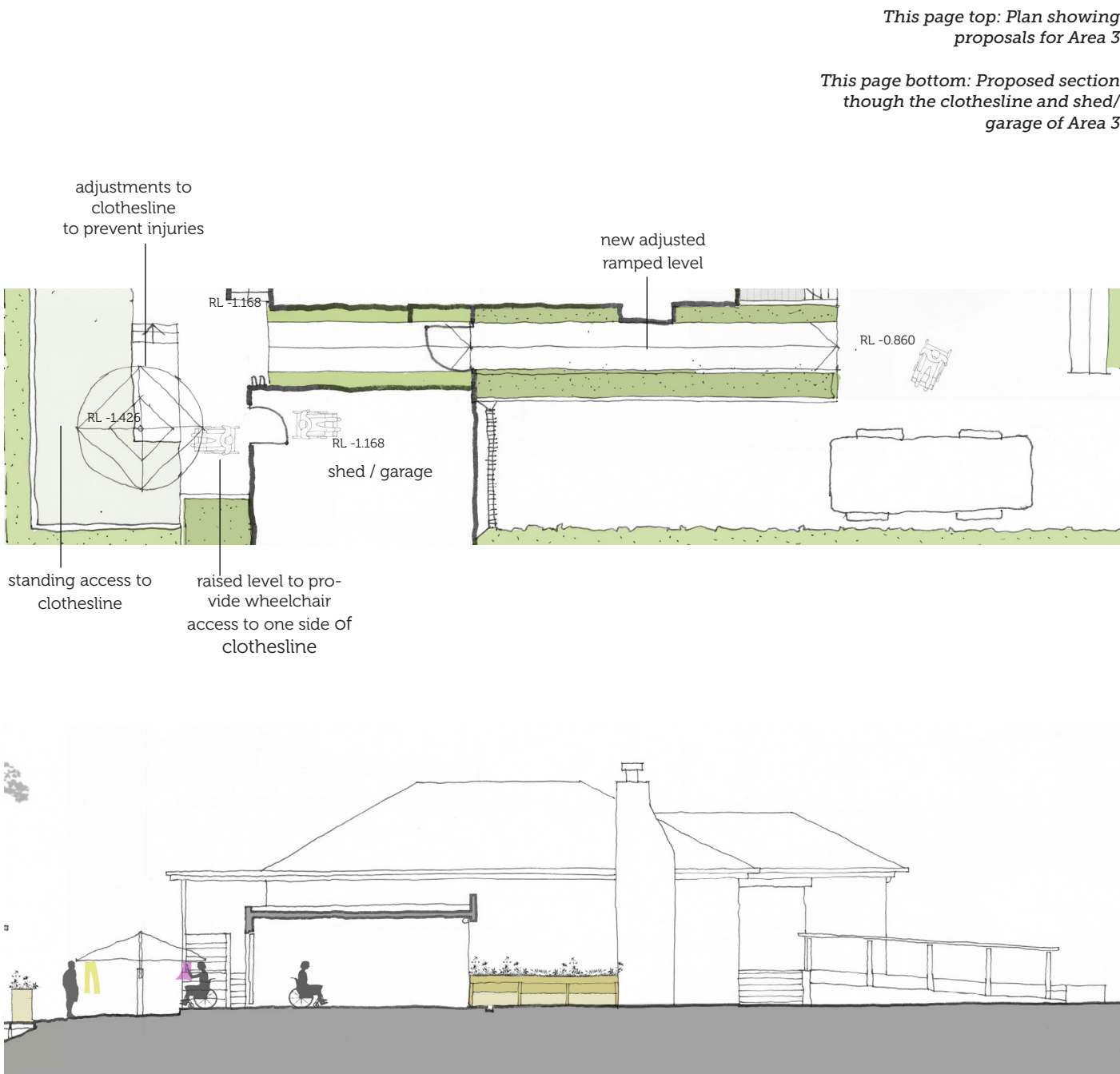
Top Left: Sketch of Area 2 showing existing ramps

Bottom Left: Plan of proposals for Areas 1 and Area 2

Top Right: Existing plan of Area 2

Bottom Right: Proposed plan of Area 2

DESIGN SOLUTIONS - AREA 3: ACCESSING MULTIPLE AREAS



Left: Blundell Residence, New Zealand. Ramped pathway with accessible planters to one side.

Below: Enlarged proposed section through the clothesline and shed/garage of Area 3

FEEDBACK FROM THE PARTICIPANT, SCIS AND THE OT

Area 3 involves removing some of the existing wide planter beds at the side of the house to make way for a more easily traversable, smoothly ramped pathway down to the back garden, with planters to either side of this pathway. Currently there is a step up from the paving around the clothesline to the inside of the garage/shed, where Yvette keeps her gardening tools. Our design proposal raises this area to allow level access to the shed. This higher level then also gives Yvette access to one side of the clothesline. A comfortable standing height access to the clothesline happens on the other side, from the unpaved area.

This design proposal was felt by all to be workable for Yvette, especially as it has multiple uses.

Since first meeting with Yvette in November, her wheelchair skills have improved and therefore she feels that she may be able to cope with the existing sloped path levels as they are. She does however like the idea of lining the path with accessible planters, and accessing the clothesline and shed, so she and Frank will consider this area once they have worked on Areas 1 and 2.



DESIGN SOLUTIONS - AREA 4: PLATFORM GARDEN

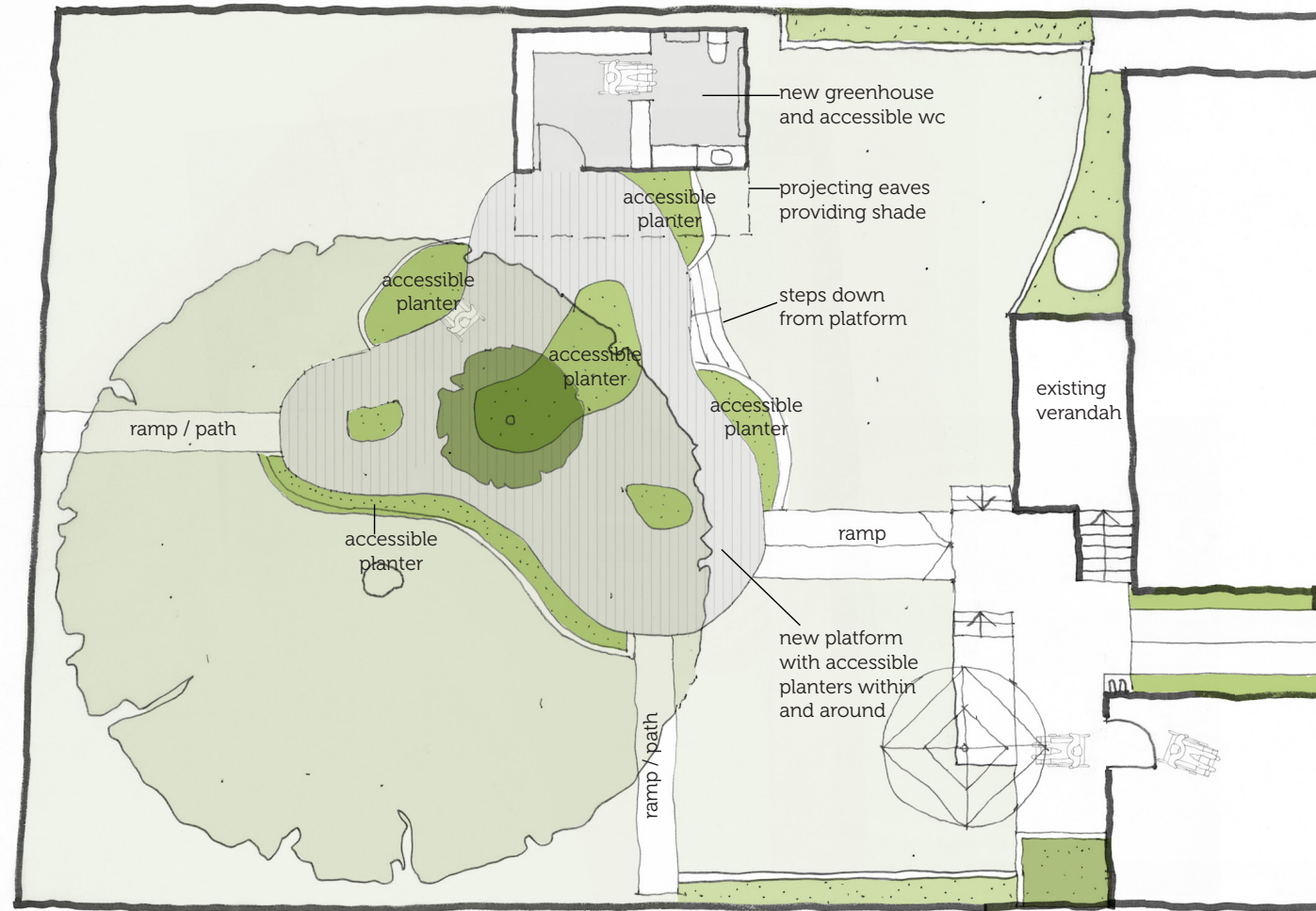
Yvette and Frank’s back garden is very large, steeply sloped and has mature trees. Ducks and chickens roam freely and there is a pond at the far end. To make the entire area accessible would be a huge and considerably expensive job. Our design proposal for this area comprises a simple organically shaped floating platform that hugs existing mature trees and plant life that Yvette and Frank want to leave in situ. It is placed fairly centrally, to benefit from the shade of the largest mature tree. The platform is lined with perimeter accessible planter constructions to house the vegetables. Cut outs in the platform allows low level planting, or small fruit trees to penetrate, creating more interest and variation. We suggested that future ramps could be added running to other areas of the garden as required. We explained to Frank and Yvette that

this proposal is a concept only and could be shaped differently, and become smaller or larger.

When we met with Yvette for the first time, she had mentioned a plan to build a greenhouse along the south wall of the garden. We therefore included an indicative greenhouse structure in this proposal, and suggested that it could have two additional functions. A projecting roofline could provide additional shade along that edge of the platform. Internally, a disabled WC has been included to one side, as it is a long way for Yvette to travel back to her accessible ensuite at the front of the house. The platform itself would be a relatively inexpensive way for Yvette to have an accessible space in her existing garden, as it is lightweight and easy to build.

Opposite page: Plan showing proposed design solution for Area 4

Below: Enlarged proposed section through the floating platform of Area 4

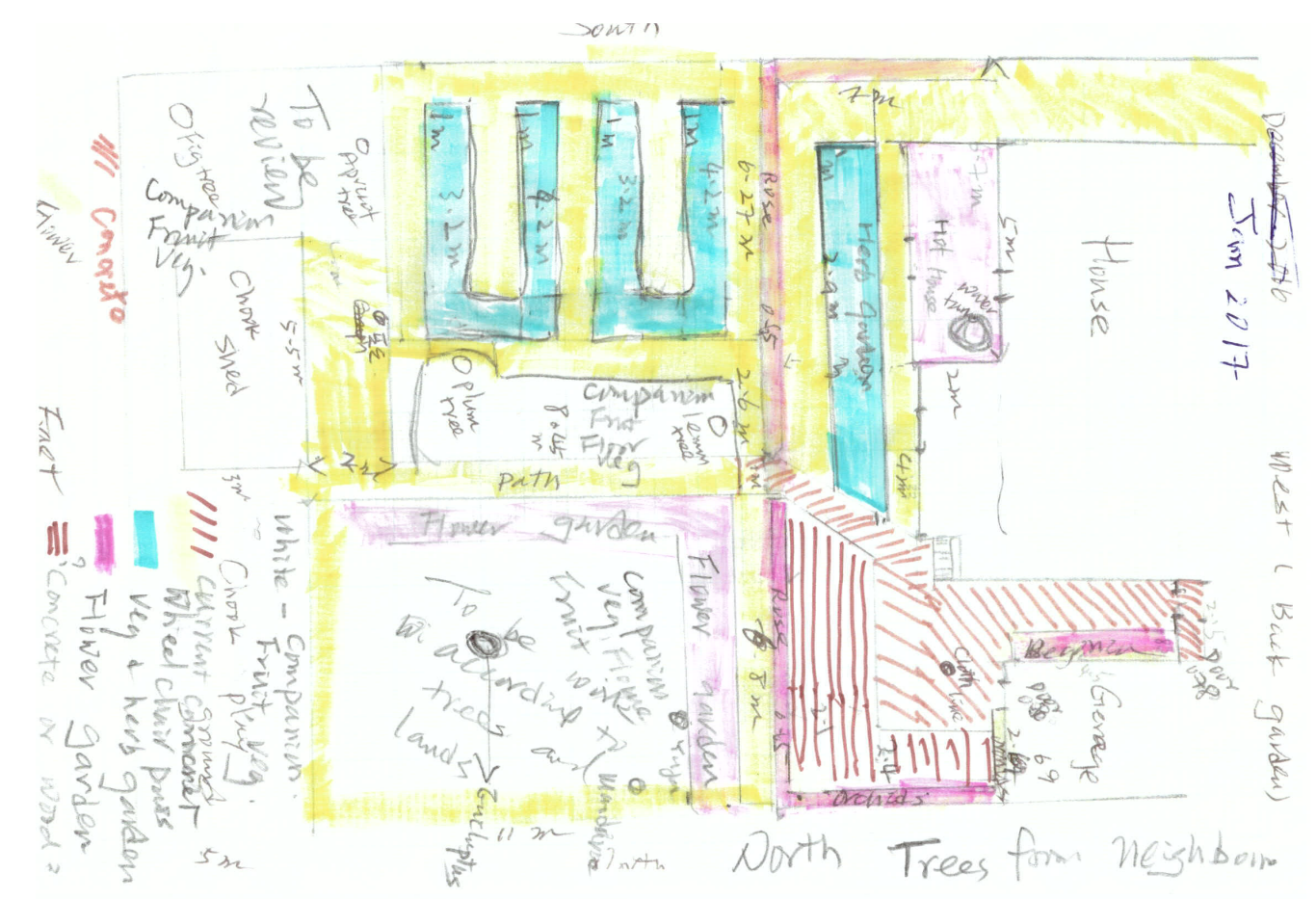
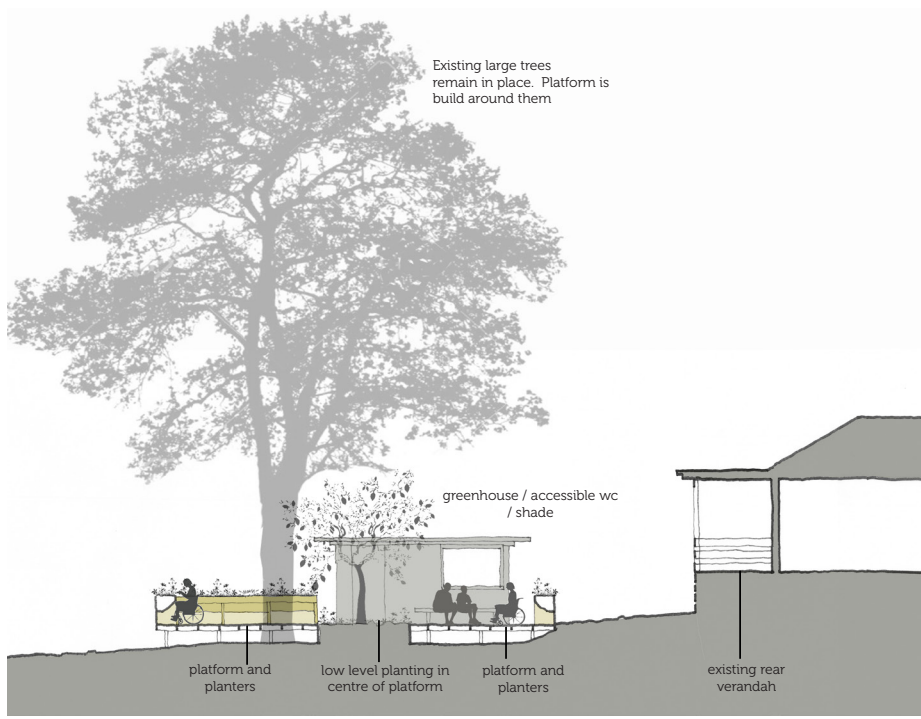


FEEDBACK FROM THE PARTICIPANT, SCIS AND THE OT

As with Area 1, Yvette has been busy drawing up options for Area 4, which they will not tackle until they have experimented with Area 1.

Yvette’s designs for Area 4 are vastly different from ours. She has incorporated paths rather than a platform and at this point is more concerned with what she will be able to grow.

SCIS were disappointed that we will not be able to continue working with Frank and Yvette to help them refine the designs. In an ideal world we would, however we do feel, as stated earlier, the momentum has begun, and Frank and Yvette will now experiment and find a way forward. The important thing is that Yvette is taking ownership of the project.



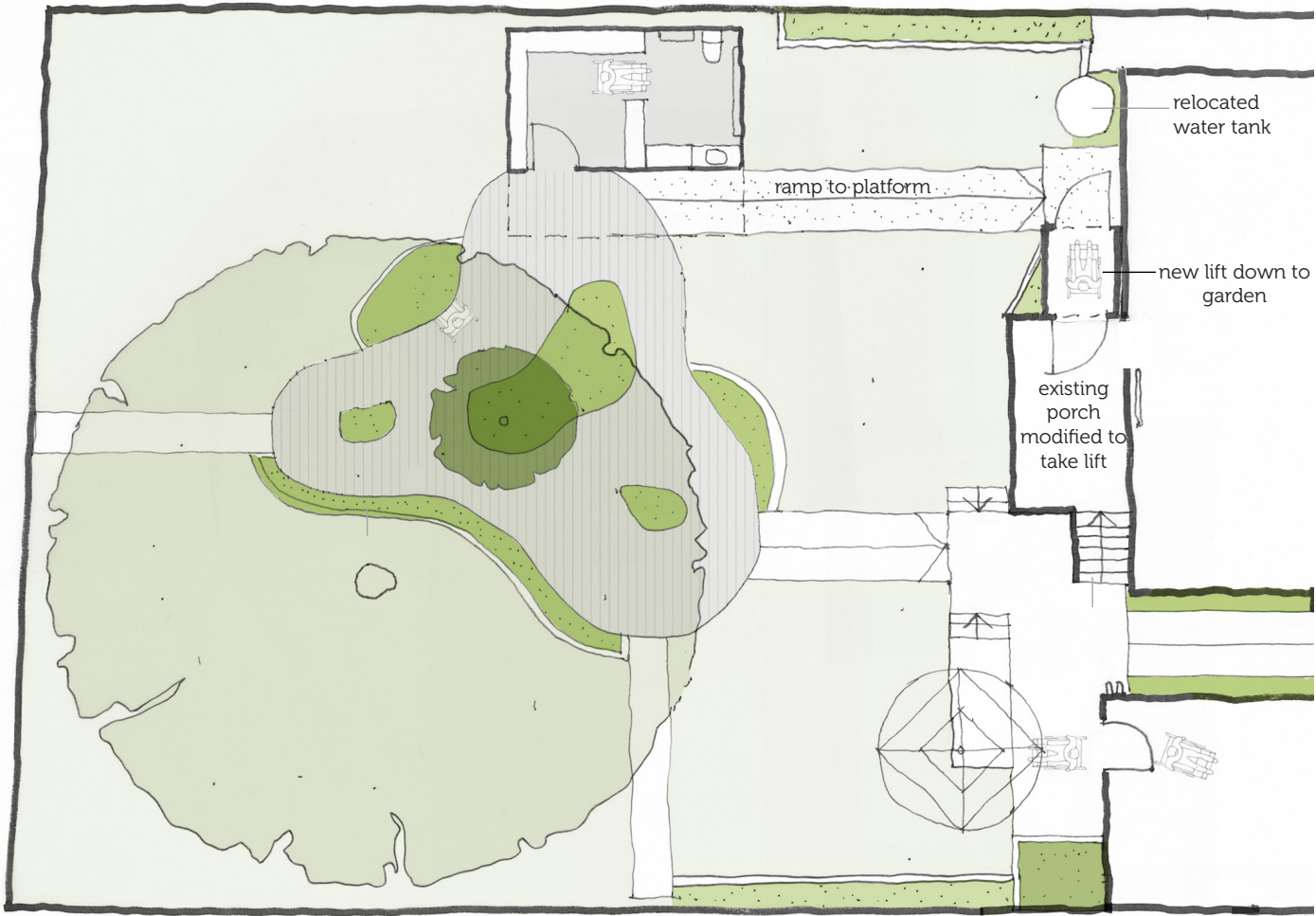
DESIGN SOLUTIONS - AREA 5: ELEVATOR OPTION

Area 5 incorporates the elevator that Yvette and Frank had themselves been looking into prior to our meeting them. Originally, their conversations with the lift installer discussed placing the lift directly in front of the verandah, which we felt would not be ideal as it would block the view of the garden from the verandah

and would be a prominent visual blockage from the sunroom behind. We therefore proposed an option to relocate the existing water tank two metres to the south in order that the lift could be located to one side of the verandah, which we all agreed would be a more discreet location.

Below: Plan of Area 5 showing new disabled lift and ramp from lift to garden platform

Right: Image of the lift model that was being considered initially



FEEDBACK FROM THE PARTICIPANT, SCIS AND THE OT

“The situation is changing all the time” Frank explained, “ We’re learning what we need. Yvette’s wheelchair skills are improving. She can reach so much further than she could a few months ago, so it’s important not to rush into things. What might have been good at the beginning wouldn’t be necessary now”.

Yvette and Frank have decided not to install the elevator, as they feel that it is an expensive option that isn’t really necessary. As Yvette says “I have plenty of time and I can go around from the front - I’d prefer to spend the money on the paths and the planters”.

This was the first option that was discussed with them by SCIS and the OT. It felt to them like a reasonable option at the time, but Yvette explained that her wheelchair skills have been improving daily, as she has been swimming and working on her core muscle strength, so she now feels very happy to travel around to the back garden via the pathways.



CONCLUSIONS AND NEXT STEPS

In working on this research project with Yvette and Frank, one of the key interesting findings that have emerged for the research team is that they have needed time to process their new situation. Time was needed to consider all options but also just to understand exactly what the future held. They are both very motivated people, but they have found every aspect of their new life challenging. Having said that, certain home modifications did need to take place prior to Yvette's discharge, and many of those modifications have been very successful. SCIS's patient and caring work, alongside Frank and Yvette's own involvement has paid off. This is clearly very tricky process, fraught with potential difficulties. Yvette was determined not to have to go into a temporary nursing home. Frank and Yvette were on very different pages in their thinking about where they would live long term. SCIS explained that the temporary portable bathroom proposal was not viable as Yvette wanted a self propelled commode, which would not fit into the portable shower unit. We do not want to over-simplify the difficulties for all parties involved in this process. It is clear, however, that time is required to process what has happened, and what the future holds for these individuals.

Yvette explained how difficult she found that period, as her future was so uncertain. They viewed fully accessible houses in other areas, which they could see would make their life easier in many ways, but in other ways they would be giving up their existing quality of life - the local amenities, the local community as well as the views of beautiful greenery in both directions from their house.

The master-planning ideas that we developed with them have helped Frank and Yvette to make a commitment to staying in their existing home and have given them realisable and affordable projects to move forward with. The iterative design process of proposing and refining ideas has also enabled

them to see new opportunities within their existing environment. As a result, they have a clearer picture of what the future holds.

The design process therefore has a role to play in helping people with recent SCI and ABIs to see the long term potential of their homes; in doing so, a future life is envisaged which is so important to a sense of wellbeing. To be able to do this, the funded buildable projects process would need to be separated from a master planning, site potential design process. It might be that a decision is made not to stay in the existing home, in which case, time and money spent on initial home modifications is not wasted. In the process, the participant and their primary carer feels listened to, understood and valued; at this traumatic time of their life, this is surely as important to their wellbeing as straightforward issues of accessibility.

An interesting finding in this case was that Yvette needs to take ownership of all aspects of the modifications before they can be successfully implemented, just as she did for her ensuite solution. Again time is required for her to consider all options and discuss them with designers and builders until a suitable solution can be reached.

Yvette explained that the garden design project has given her back her happiness and her enthusiasm for life. Since the accident, Yvette and Frank have met many other wheelchair users who are keen gardeners. They have expressed a desire to work towards a point where their garden will become an example for other wheelchair gardeners, at which point they want to make it regularly open for viewing for this community, as a learning tool. Since first meeting them in October 2016, Yvette's demeanour has altered dramatically. Not only has she become physically stronger, but also emotionally she seems full of enthusiasm for her garden project and for the possibilities the future holds.

Yvette explained that the garden design project has given her back her enthusiasm for life. Since the accident, Yvette and Frank have met many other wheelchair users who are keen gardeners. They have expressed a desire to work towards a point where their garden will become an example for other wheelchair gardeners, at which point they want to make it regularly open for viewing for this community, as a learning tool.



Right: A gardener who has a SCI, working with a vertical stepped garden planters

CHAPTER 2

PARTICIPANT'S STORY AND SITE CONTEXT

2

Participant 2:
Daniel & family
Northern
Suburb,
Melbourne

Daniel is a 31 year old man has lived with his spinal cord injury since the age of 11, when he was hit by shrapnel during a civil war incident in his homeland in South Asia. Daniel is married and lives with his wife Annalise and extended family in a 1970s developed area in the Northern suburbs of Melbourne.

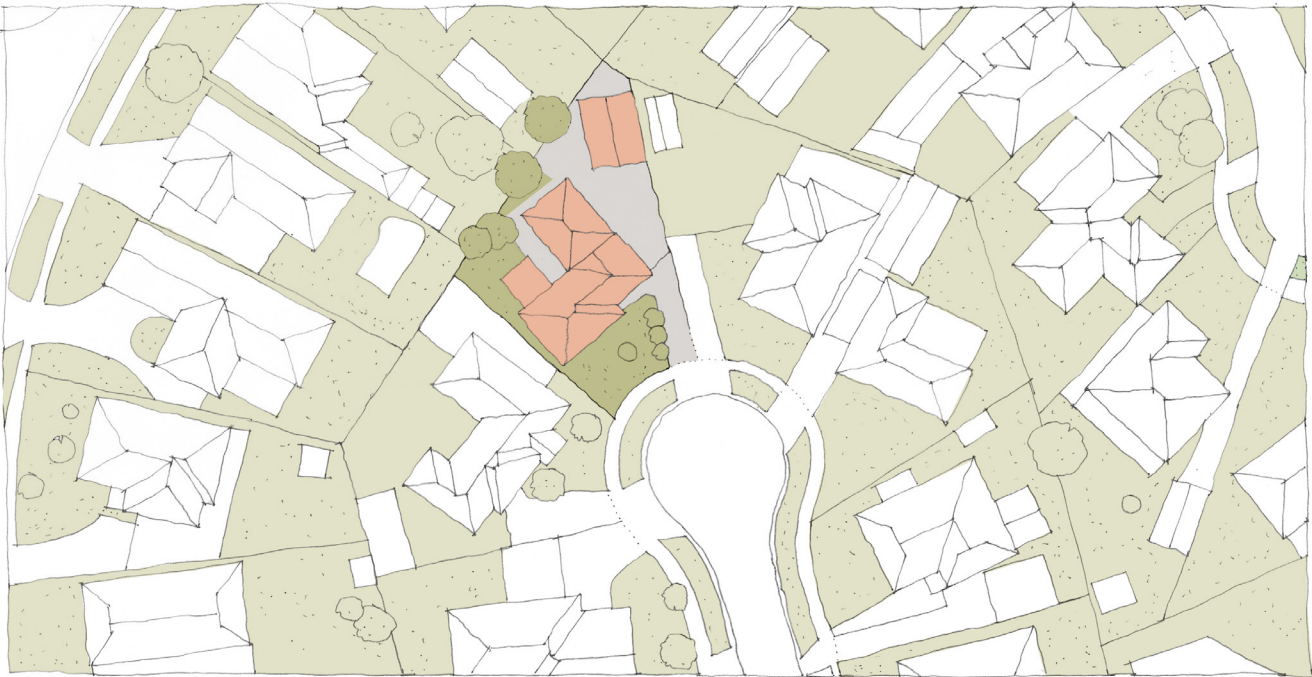
Having lived with his injury for 20 years, Daniel is very fit and able in his upper body, participating in a variety of sports on a daily basis. He is currently hoping to take part in the 2020 Paralympics. He works full time, commuting to work each day by car and train and is also very involved in community activities, participating in a scheme with which he visits schools and hospitals to talk to the public about the realities of living with a spinal cord injury.

Daniel and his family moved to Australia in 1998, two years after his injury. His parents, who are in their 60s, occupy an upstairs bedroom with ensuite. Currently Daniel's brother still lives there too, but he is due to move out in the next year or so. Other siblings and cousins also live nearby, regularly joining the family for social gatherings and meals.

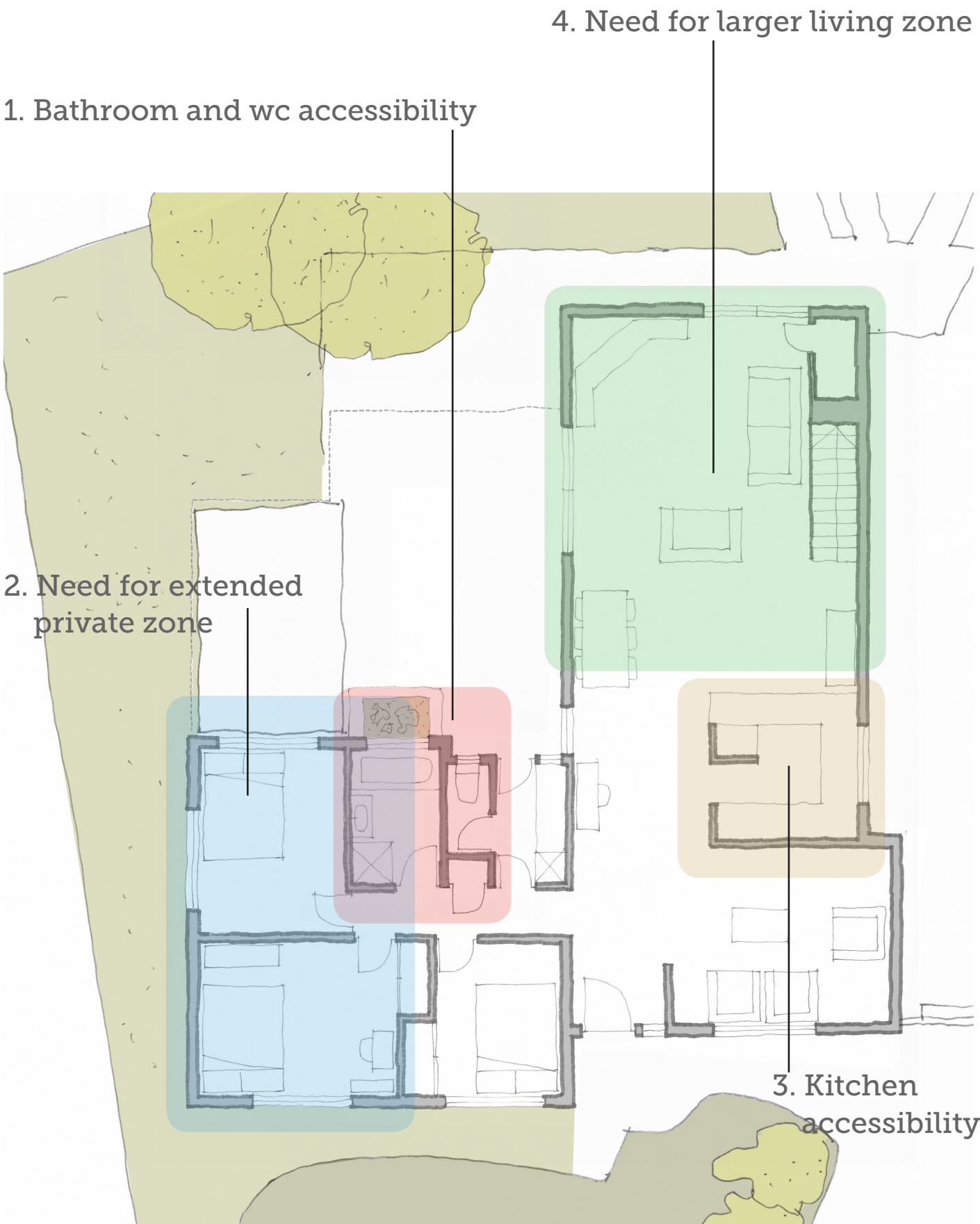
Daniel explained that he and his family chose this particular five-bedroom house when they came to Australia, as it was on a relatively flat site and the circulation inside the house was suitable for his wheelchair. The flooring is ceramic tile throughout, providing a good hard surface that is easy to move about on. He felt that the house offered the bare minimum he needed to function; beyond that, there have been no modifications undertaken to accommodate his wheelchair. The bathroom is not an accessible one, although he manages to make it work, as he is unusually strong. The toilet is a small separate cubicle, which is accessed via the laundry. "As long as it has a lock" he says, "what happens in there is no-one's business."

Below: Roof plan of Daniel's house showing surrounding context

Far right: Existing house plan showing room locations



ISSUES TO BE RESOLVED



Daniel’s Occupational Therapist has been working with him to help secure funding for home modifications. The bathroom and wc are clearly the most essential areas requiring modification. Daniel feels that, whilst he is currently able to cope with the bathroom and WC, he will not always be able to, as he grows older. Daniel and his OT have had designs for the bathroom drawn up by Archicentre, when they were still funded by the government, and he has been waiting to secure funding from the NDIS.

Daniel and Annalise are currently hoping to have children. For this reason, Daniel feels he will need to be able participate in kitchen activities, to help his wife and mother with the cooking, which he cannot currently, as the kitchen is not accessible for a wheelchair user. The kitchen is open plan, overlooking the living room. Daniel explained that his mother finds that the kitchen is not adequately ventilated for Asian cooking methods and therefore she often uses a separate barbecue cooker in the garage to do the heavy frying.

Daniel explained that in his culture it is normal for the husband’s parents to live with them, and this arrangement is something he takes for granted and is happy with. Having said that, he expressed a desire to increase the private living space that he and his wife have, away from the rest of the family. Their current

Below left: Sketch of existing kitchen

Below right: sketch of existing bathroom



bedroom is very cramped, with the bed pushed up into the corner for wheelchair circulation reasons.

In addition the family would ideally like a larger living room space.

Daniel’s OT explained that the NDIS have said they are happy to fund the works for the bathroom modifications now. They are also willing to provide funds to modify the kitchen, however they would like to wait a year before doing so, to give Daniel time to consider whether this house is one he and his family plan to stay in long-term.

So whilst some of the ‘issues to be resolved’ presented here are not what would normally be considered required home modifications for a wheelchair user, our aim in this study is to look at the bigger picture, helping participants to see the site potential of their homes. In this case, Daniel and his family need to know if this house can meet their long term needs as an extended family, as well as the specific needs of a wheelchair user. As the NDIS have stipulated, there is no point spending money on kitchen modifications if the family decide they have outgrown the house in a year or two. Daniel is aware that there is a limit to the amount the NDIS will fund, and that he will probably need to pay for various elements of the future work himself.



MODIFICATION DESIGNS PREVIOUSLY UNDERTAKEN

Below far Left: Plan of the existing bathroom and WC

Below centre: Archicentre's layout Option 1 for the bathroom modifications

Below far right: Archicentre's layout Option 2 for the bathroom modifications following Daniel's feedback

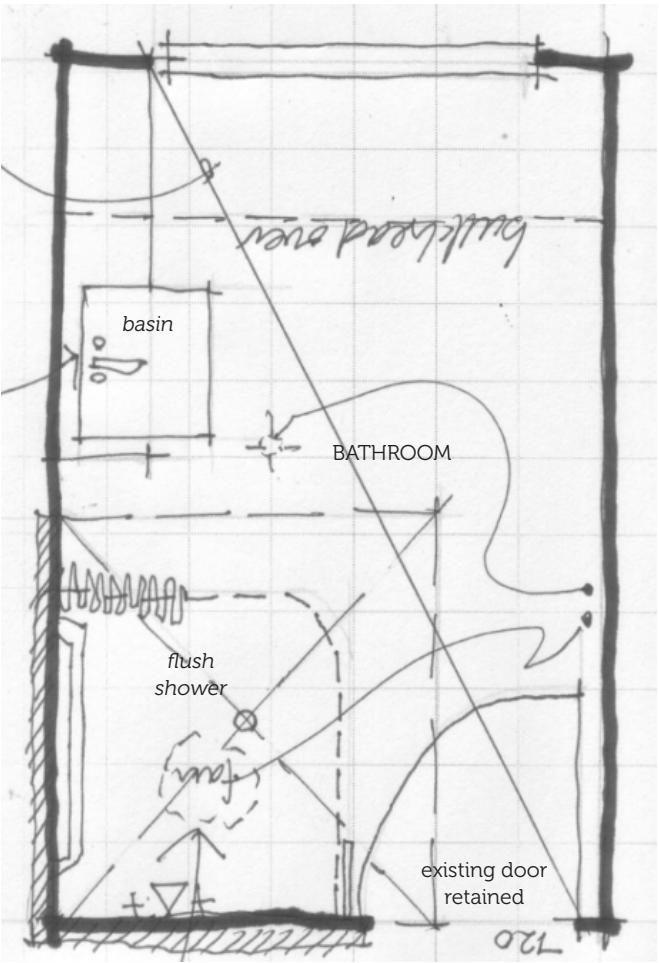
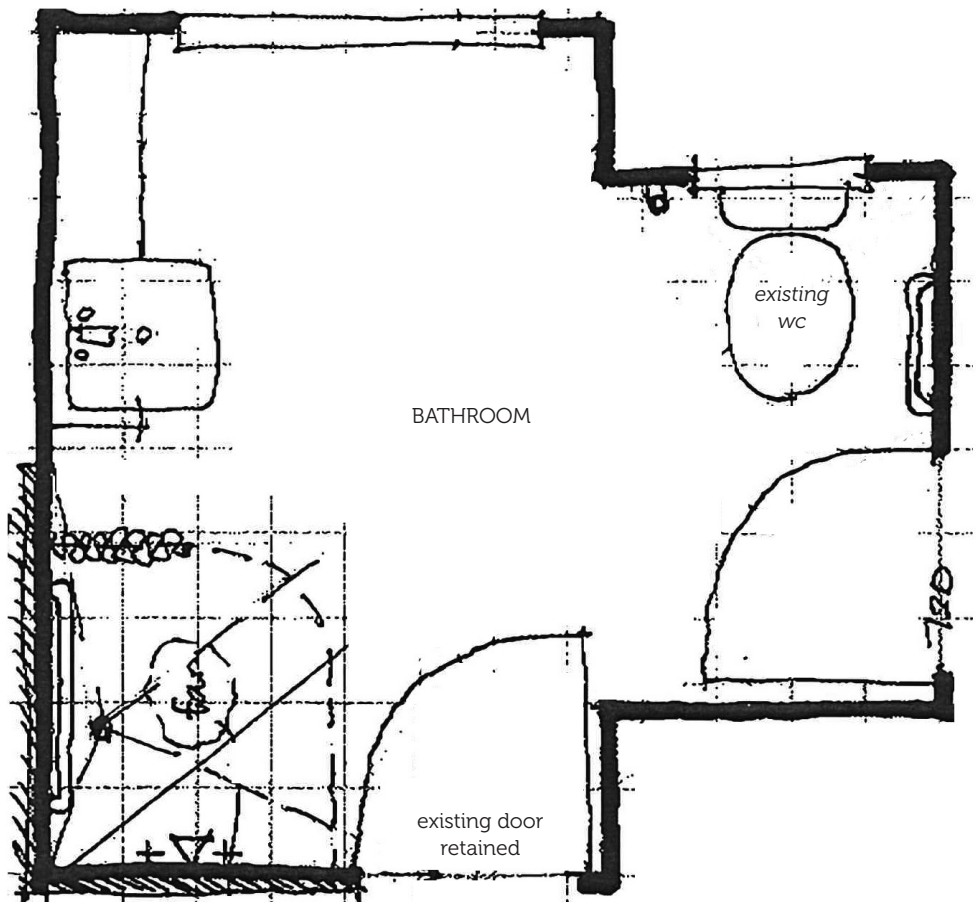
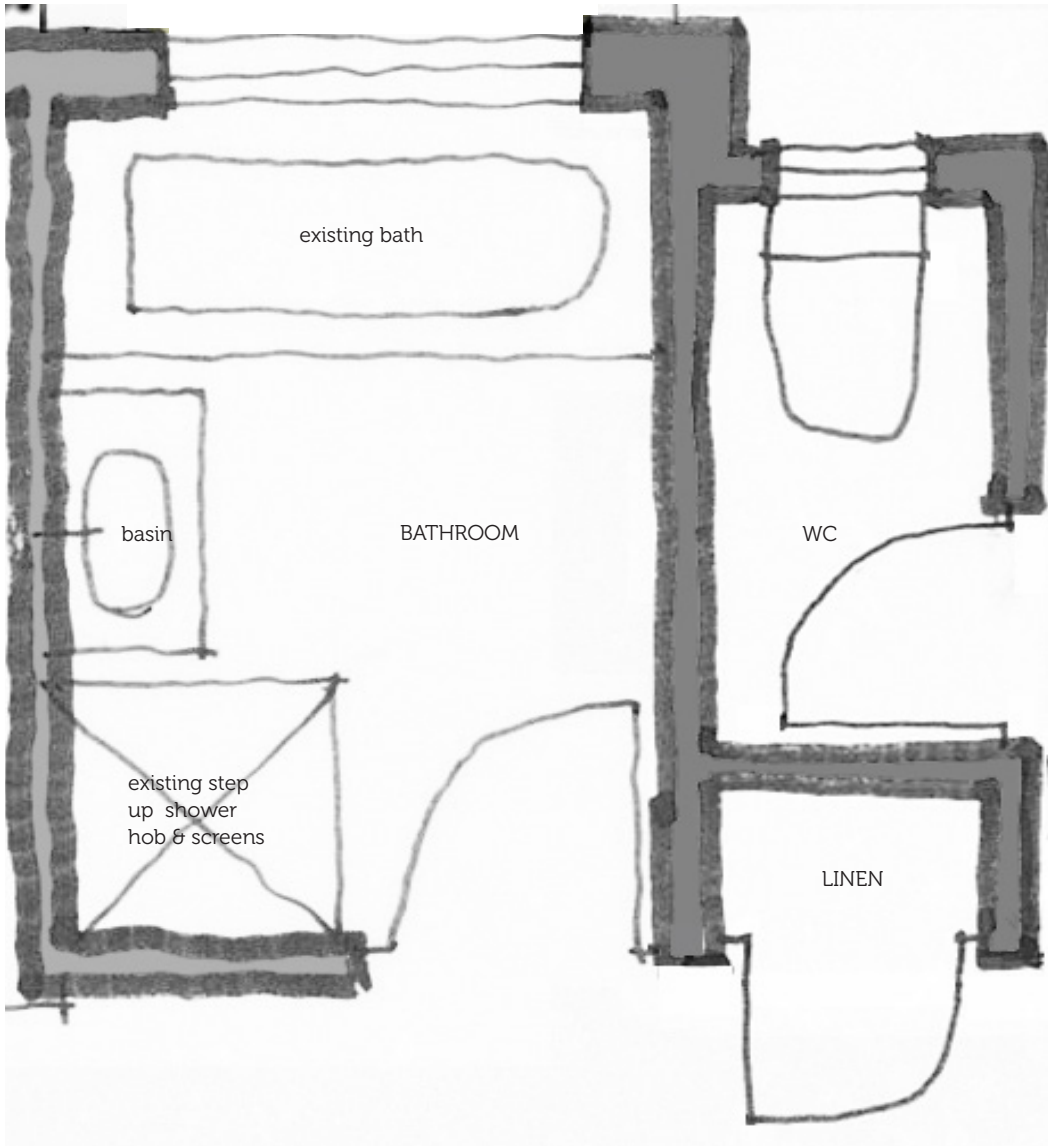
Archicentre and Daniel's OT worked with him to develop two options for his bathroom. The first option proposed removing the wall between the existing WC and bathroom so that Daniel would be able to access the toilet more easily. It retained the current shower location, but stripped out the existing conventional shower tray and screens and sloped the floor to create an accessible flush threshold. As the drain is located in the same place as the existing outlet, the design minimised the costs associated with the plumbing work. In an attempt to avoid water leaking out into the hallway, a narrow glass screen is located between the door and the shower. The design also retained the existing basin point, but removed the bath, creating better circulation.

Daniel's response to this first option was concern that the rest of the family would not be able access a downstairs WC when he was in the bathroom. The NDIS explained that they would not, in their consideration of funding, take the needs of the rest of the family into account. For this reason, Daniel decided to ask Archicentre to develop a second option that kept the existing WC as it is, and only modified the bathroom layout.

Our discussion with Daniel opened up this conversation again. As we began to look at the long term potential for the house, we discussed options for further bathroom layouts with Daniel, to ensure that he and his family had arrived at the best solution, given that it is possible they may stay in this house for a many years to come.

Interestingly, Daniel's OT expressed her dismay that Archicentre are no longer funded. She said: **"Archicentre are great as they work within the limits of the funding budgets. Now [that they are no longer funded] I'm going to have to work with architects. To be quite frank, working with architects is a nightmare. All you guys want to do is make things pretty."**

We listened to the problems that she is up against in trying to help her patient secure the best possible result within a very busy work schedule. Her fears were that our involvement might make things worse rather than better. It's easy to see how she might feel that way, as her focus is on purely what is fundable. Our purpose, by contrast, was to undertake an exercise in standing back to look at the bigger picture and work out if this house is in fact where Daniel wants to live long term, what his priorities are and what he would be prepared to fund himself. The two exercises do not necessarily need to be in conflict, although it's true that in this case, the masterplanning would ideally have taken place prior to the Archicentre work.



DESIGN SOLUTIONS: BATHROOM AND TOILET ACCESSIBILITY
+ FEEDBACK FROM THE PARTICIPANT AND THE OT

Our first option for the bathroom looked to open up the wall between the bathroom and the WC again, whilst still retaining the option to separate the two spaces. Transfer to the WC is not as easy in the arrangement as Archicentre's first option, however it is still preferable to the current situation, and also allows the family to use the WC when Daniel is in the shower. We looked at placing the shower niche at the far end of the room against the window to maximise the size of the shower cubicle.

Both the new shower and the new basin could use existing plumbing points, to keep costs down.

A window inside a shower is unusual but not impossible, as long as it is properly waterproofed and detailed. With the added benefit of increasing the size of the shower and helping ease the circulation space around the door, we felt that it was worth discussing this option. The large window could either have an opaque film applied, for privacy, or a external privacy screen could be erected around the existing planter outside the window. The bathroom benefits from maximising natural light input.

Daniel and his OT explained that the builders they have been dealing with (connected to the funding) said they would not be prepared to construct the shower against the window. It became clear that Daniel did not want to contribute to the funding of the works to the bathroom modifications. We therefore moved onto other options for the bathroom.



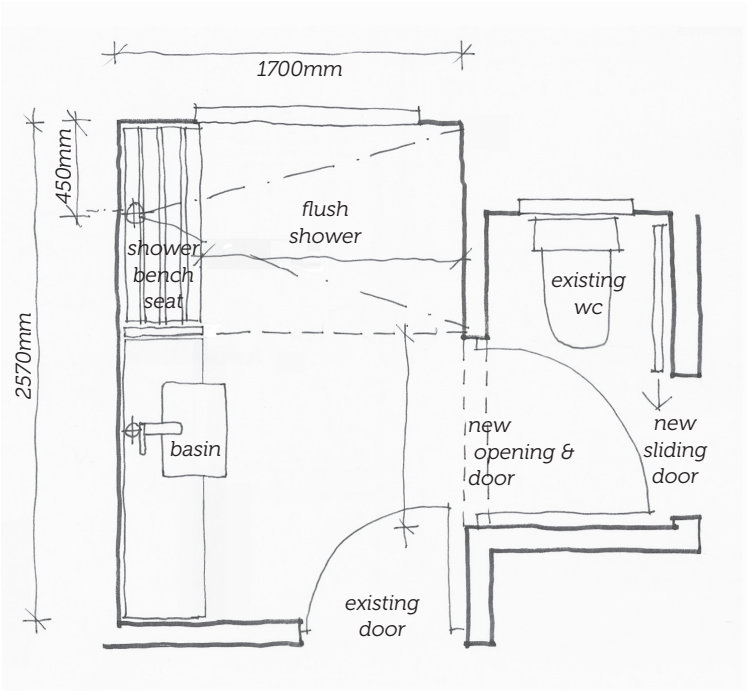
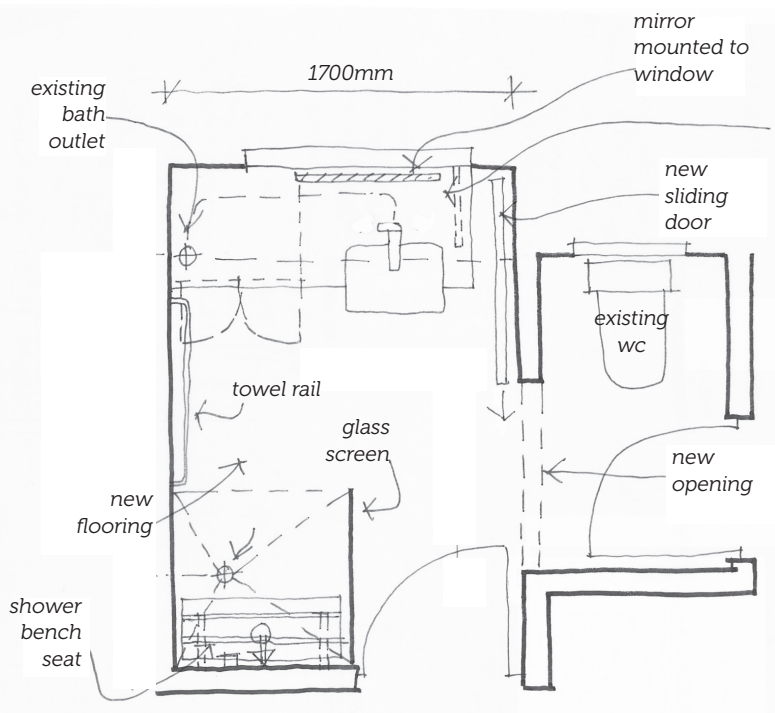
The next option we considered was similar to Archicentre's first option, except that it included a sliding door to close off the WC from the bathroom. We placed the basin against the window wall to provide better natural light and outlook for the vanity unit (using the existing bath outlet for waste to minimise plumbing work.) We had concerns about the shower drainage being so close to the internal door so we increased the size of the glass screen to one side.

Daniel's OT advised that the larger glass screen would make circulation very difficult. In addition she explained that Daniel currently uses a folding plastic chair in the shower, as it's size and sloped back make it safer when transferring from a wheelchair. The chair is placed at an angle and this also helps the transferring process.

Daniel's response was to request if we could find a way to include a second wc in the bathroom, as he felt that the house would, in any case, benefit from having two toilets on the ground floor.

The final layout therefore places a new WC against the wall close to the window. The existing concrete slab would need to be drilled out to accommodate the new length of sewerage pipe. We removed the long glass screen, replacing it with the shorter one and also removed the built in shower bench. A new sliding door is installed to ease the circulation internally.

This proposal meets all of Daniel's needs without inconveniencing the rest of the family. It also increases the value of the house, as it would now comprise two toilets on the ground floor. Daniel is working with his OT to approach the NDIS for a response on funding.



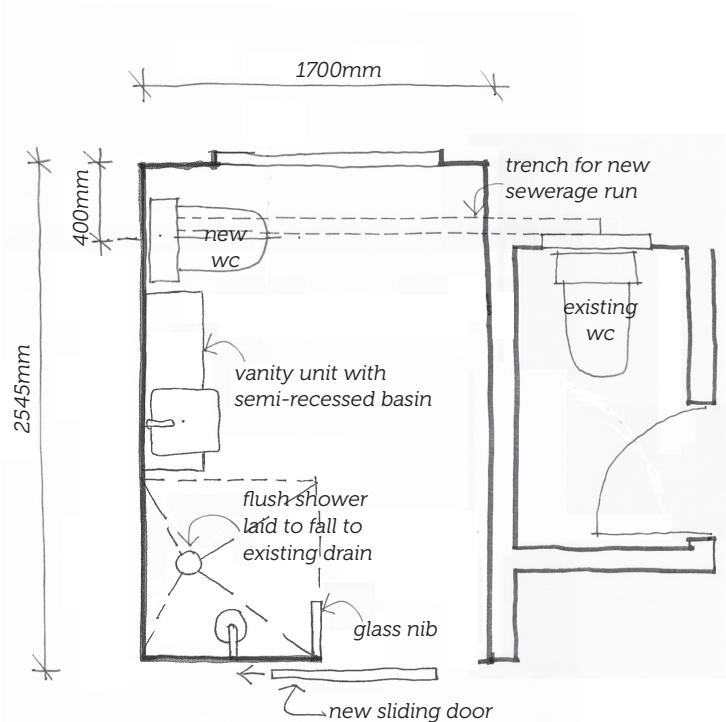
Above Left: Brett Tuer Architect - bathroom at Glenhuntley residence showing a full height window in a shower

Far Left: Sketch perspective of our option 1 for the bathroom and WC

Left: Plan layout for our option 1 for the bathroom and WC

Top right: Plan layout of our option 2 for the bathroom and WC

Right: Final layout for the bathroom. The existing WC remains as it is.



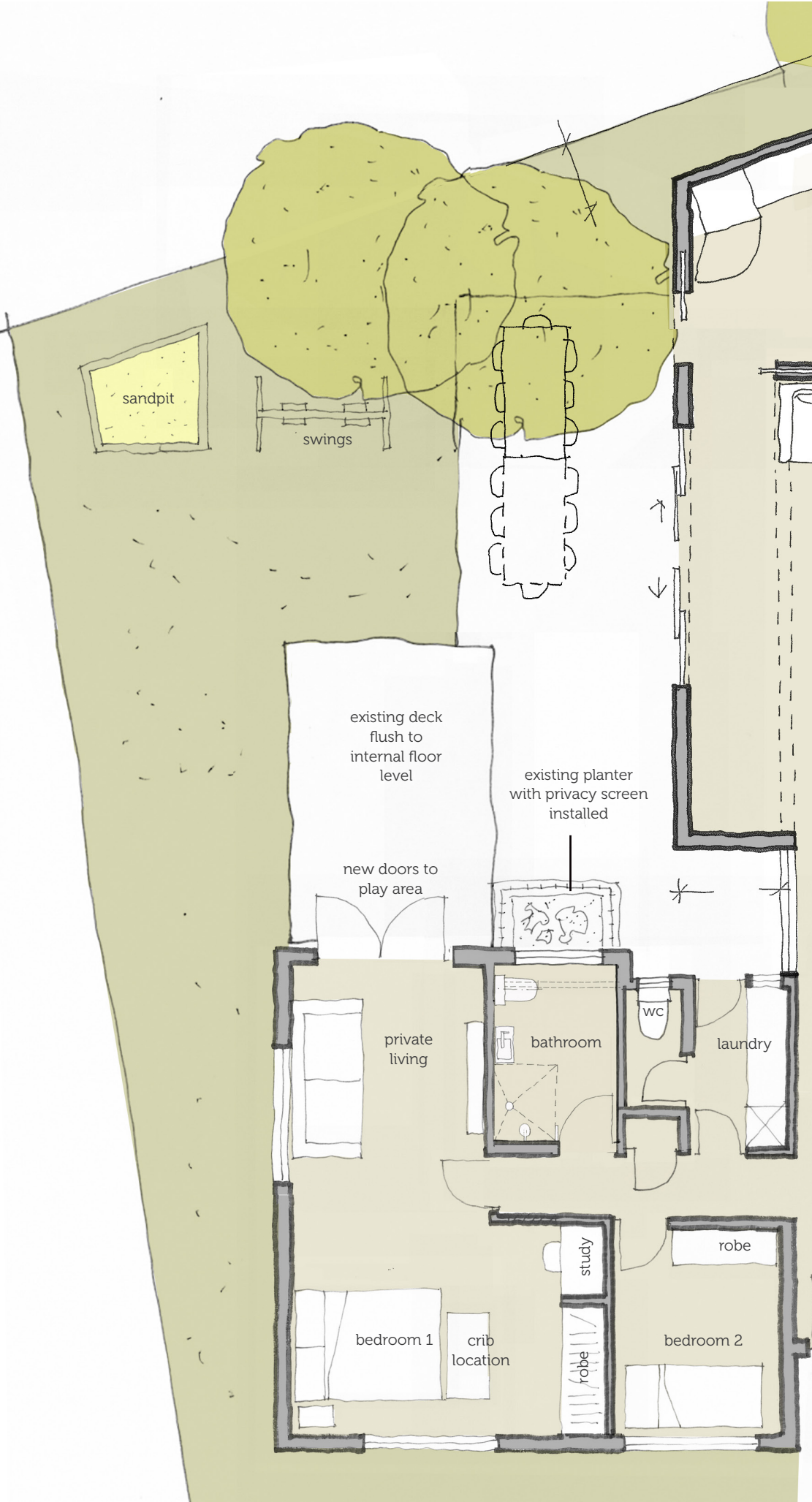
DESIGN SOLUTION 2: NEED FOR AN EXTENDED PRIVATE ZONE

Daniel himself suggested the idea of removing the wall between bedroom 1 (Daniel and Annalise's room) and bedroom 3, which is currently used as a study/spare room. At the moment, Daniel's younger brother occupies bedroom 2, however as explained earlier, he is due to move out in the next year or so.

With possible future children in mind, we drew up a scheme to combine the two rooms, improving the location of the bed. Daniel himself would need to transfer onto the bed from the side closest to the door. The new extended zone becomes a sitting room. We suggested that they might like to include French doors out to the existing external deck as well, as a play area for the children, and helping to increase the feel of the room size and play area. The existing deck in this area is already flush to the internal finished floor level. By opening the combined rooms out to the garden, the private zone is extended and maximised.

We re-configured the robes between bedroom 1 and 2, to create a study niche inside bedroom one, replacing the existing freestanding desk so as to create better circulation. Bedroom 2 would be used for the future children, once they are old enough, and could therefore be fitted with a single bed or bunk beds. A freestanding robe or drawers would fit against the adjacent wall.

Both Daniel and his OT were happy with the layout for the extended private zone. There was discussion about whether this work could be funded. It was felt that it wouldn't be, so this is something Daniel and Annalise would need to undertake themselves. At this point it is unsure whether they will proceed with the work, however it has provided them with ideas for what is possible.



Right: Plan layout for the extended private zone

DESIGN SOLUTION FOR KITCHEN ACCESSIBILITY: OPTION 1

In considering whether to stay in their current home long term or not, this growing family need to consider all options from minor alterations at one end, to selling up and moving elsewhere at the other.

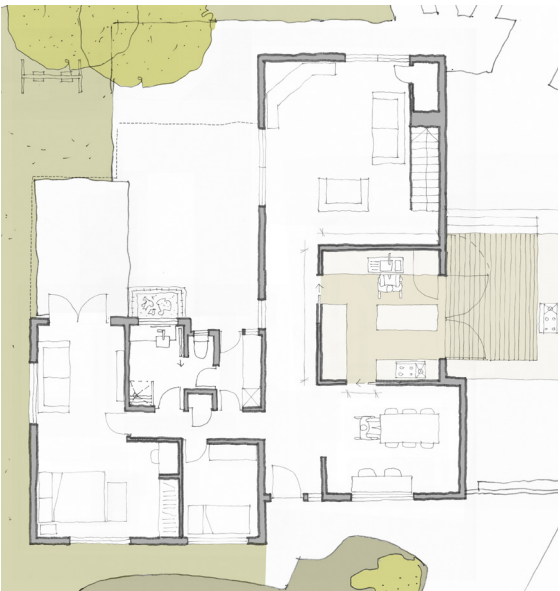
With this in mind we drew up four options for the kitchen design, taking into account the expressed desire to separate the smells of Asian cooking from the rest of the house. The existing kitchen is very tight, so the accessibility issues included circulation difficulties as well as bench heights and undersides. Two of the options presented here retain the current kitchen location and two relocate it. Whilst all of these options would no doubt cost more than the funding that the NDIS would provide to make the existing kitchen accessible, the aim here is to demonstrate to the family, the site potential of their existing home, within reason. It may be that they decide to do quite minor alterations to their existing kitchen in the end, but that decision is made with full knowledge of all the options that are possible.

Our first proposal extends the kitchen by moving internal walls and benches only. The south wall location is retained, while the north and west walls are moved out. The proposal encloses the kitchen, separating the kitchen smells from the living room end, however it opens out the room to the east external wall, with open-able doors to allow good ventilation. These doors open out onto an optional lightweight deck external area, which is flush to the internal floor level, and which could be set up with additional barbecue cooking facilities.

There are three runs of bench space and a kitchen island internally. The island and one bench run is lower and open underneath, to allow wheelchair use. A new sliding door in the south wall connects the kitchen to the existing reception room, which we suggested could be set up as a dining room space with a study table at the window.

DESIGN SOLUTION FOR KITCHEN ACCESSIBILITY: OPTION 2

Option 2 extends the kitchen to the east as well as the north and west. There is no external decked barbecue area in this option. The kitchen opens out to the yard with a door, again to assist ventilation. As the kitchen is larger in this option, a portion of the west wall is given over to become a study niche. Again the reception room becomes a dining room and is connected to the kitchen directly with a new sliding door in the south wall.

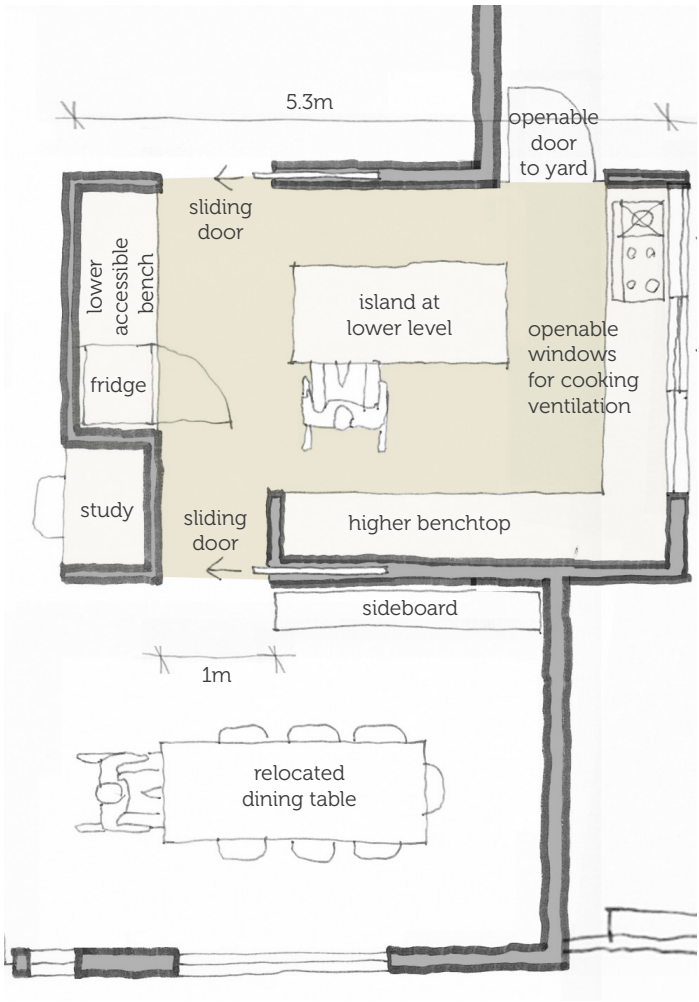
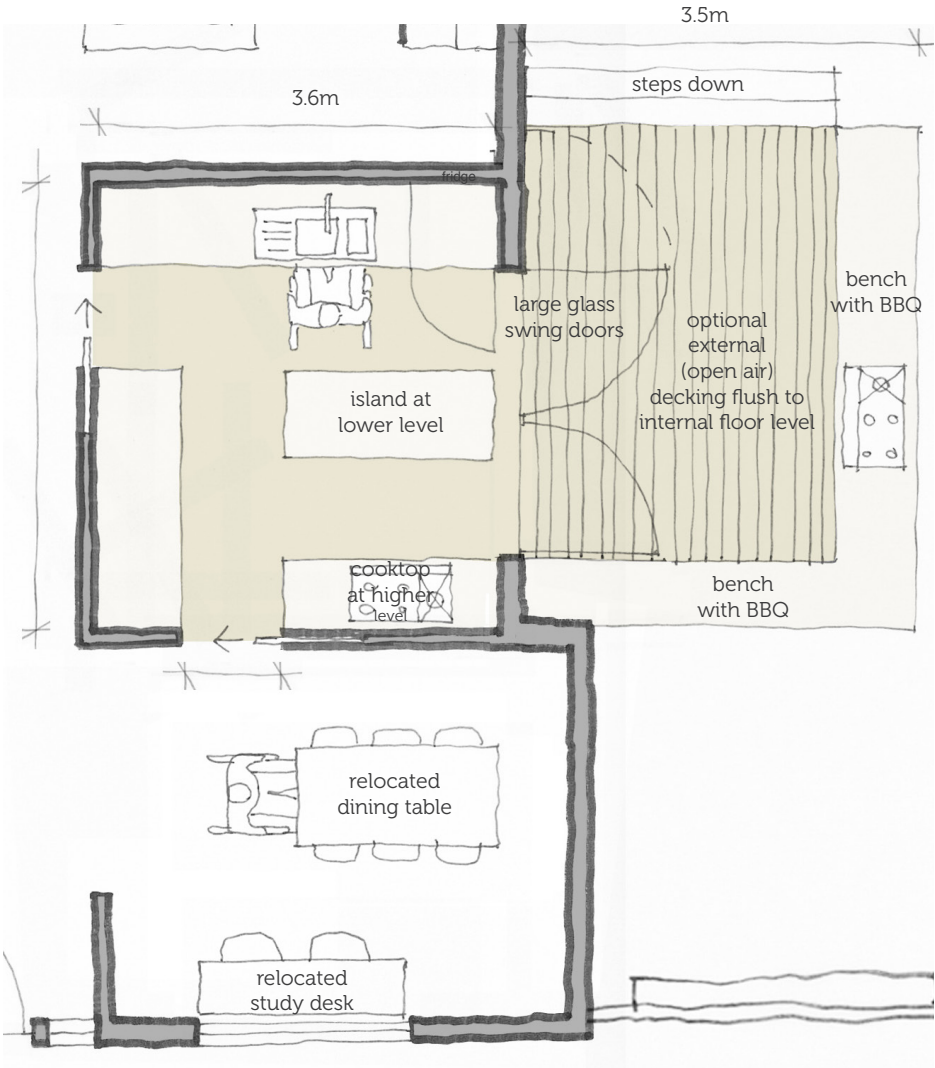
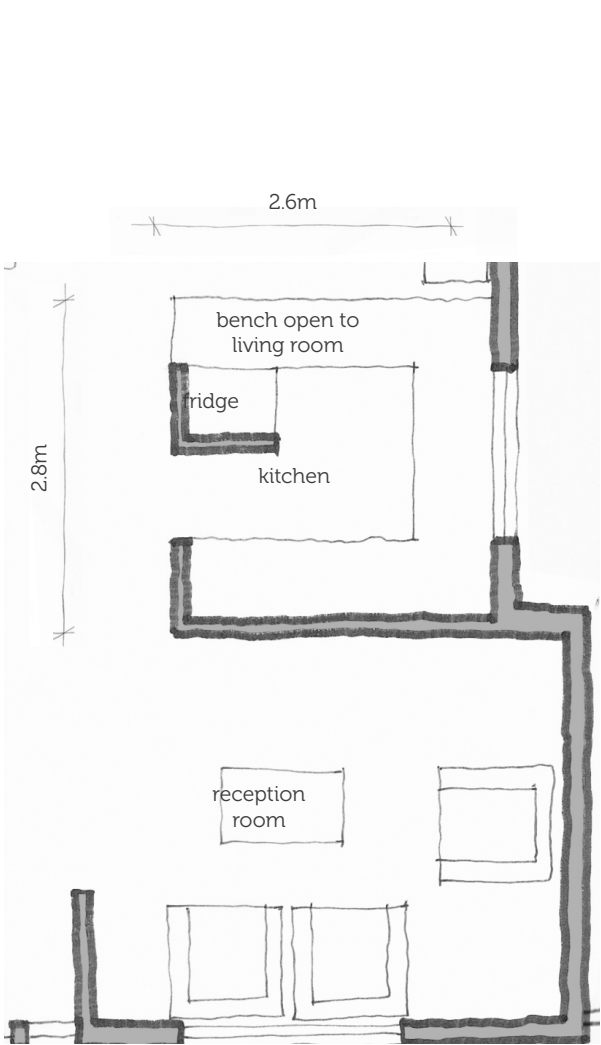


Above: image of an outdoor Asian kitchen

Right: Plan of existing kitchen

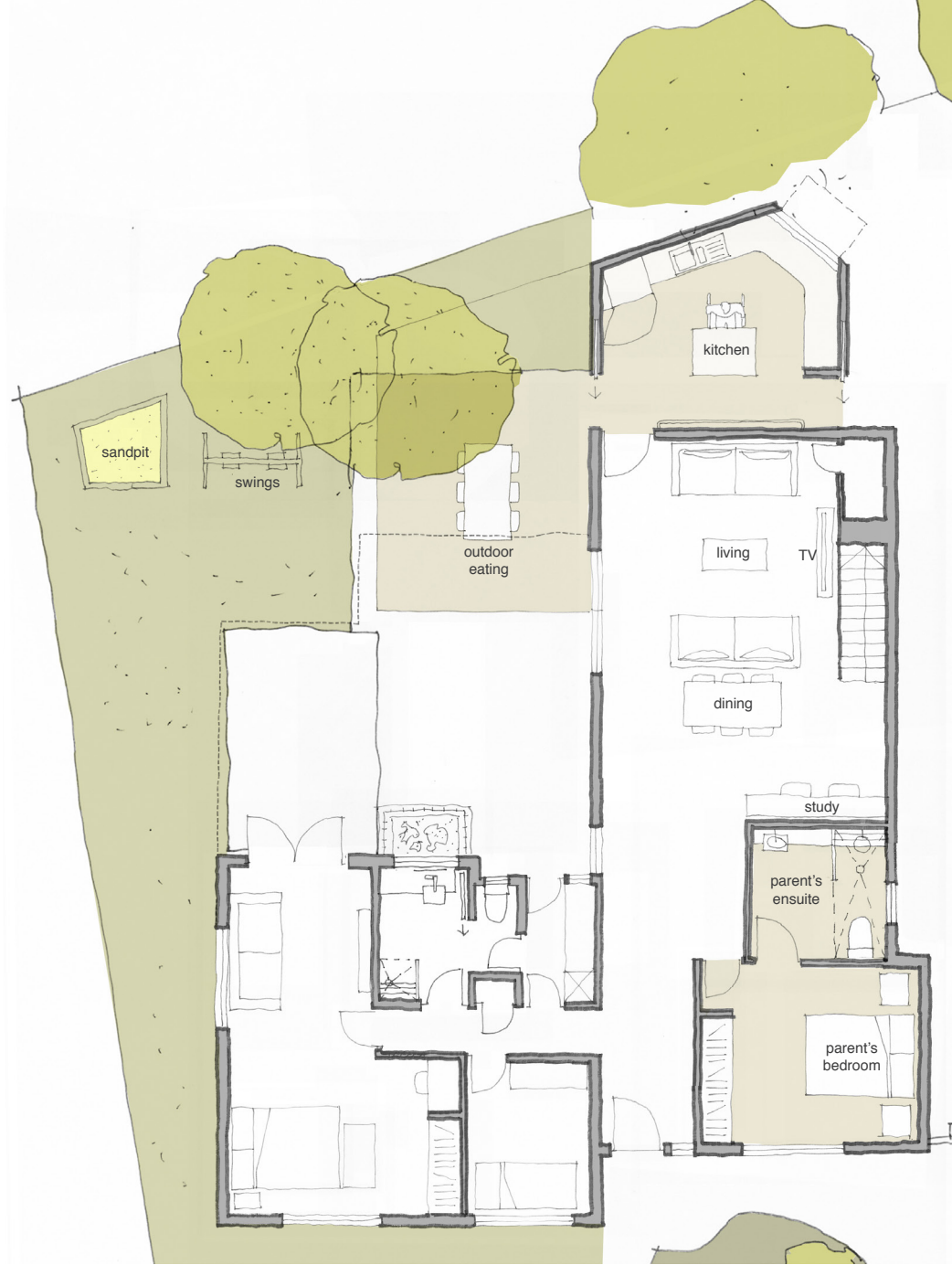
Centre right: Option 1 for an extended kitchen with accessible benches, and opening out onto an optional outdoor decked area for heavy frying. The dining table and study desk are relocated to the existing reception room and the new kitchen opens to this dining area.

Far Right: Option 2 extends the external wall to the east.



DESIGN SOLUTION FOR KITCHEN ACCESSIBILITY: OPTION 3

Option 3 looked at relocating the kitchen to the north end of the site, extending to the north within 1 metre of the site boundary. By taking the existing kitchen out from the centre of the house, the area used for living room can be extended. We looked, in this option, at another potential idea - to add another bedroom and ensuite where the existing reception room and kitchen are currently located. Our thinking was to look forward to a time when Daniel's parents might not wish to or be able to climb the stairs to their bedroom and ensuite. At this point in time, Daniel and Annalise's children would be old enough to occupy the upstairs bedrooms.



Right: Option 3 relocates the kitchen to the north end of the site, extending the building to 1m from the site boundary

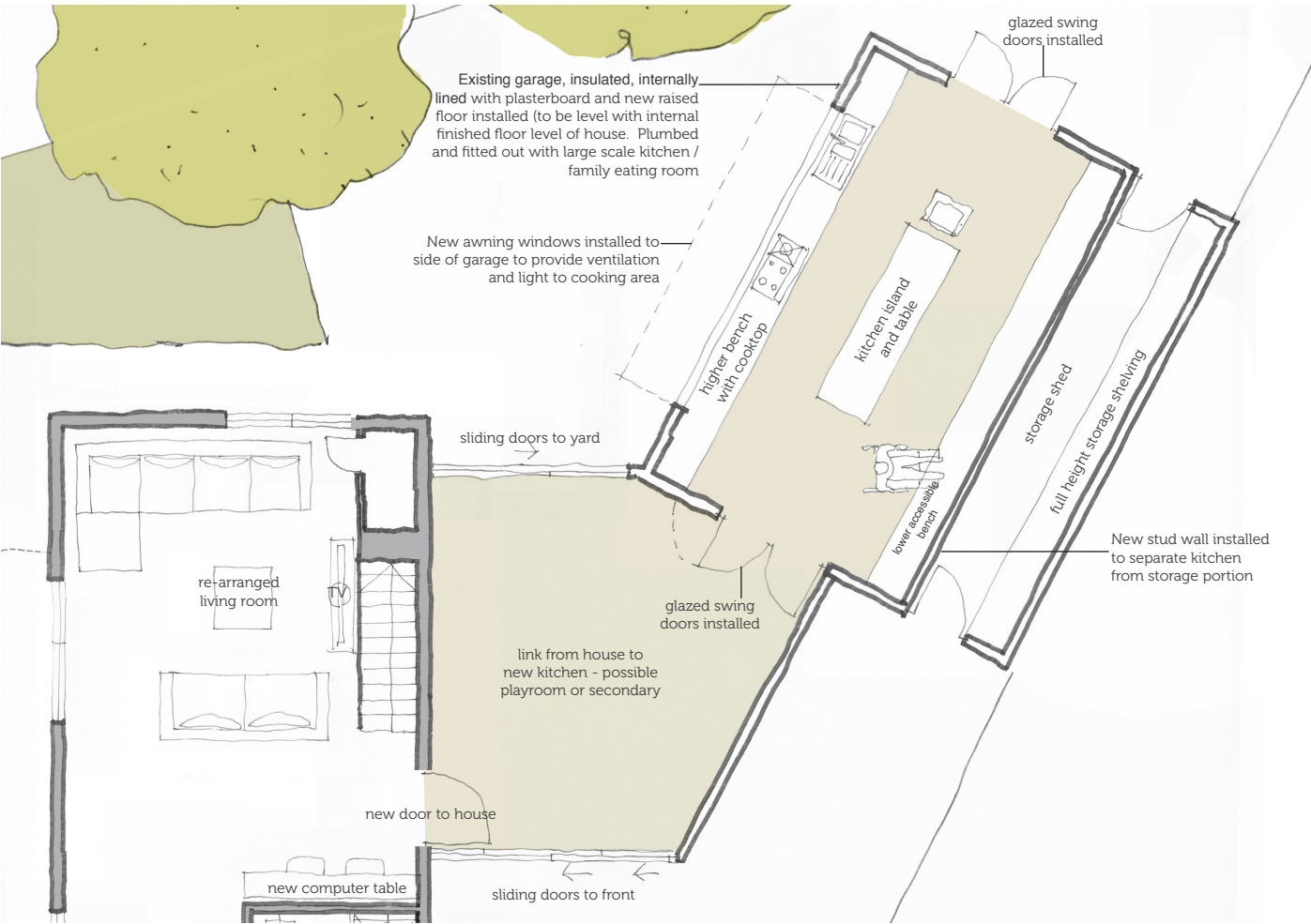
Far right: Option 4 relocates the kitchen to the existing garage building, creating a link between the house and the garage.

DESIGN SOLUTION FOR KITCHEN ACCESSIBILITY: OPTION 4

Option 4 looked at converting the existing garage building to become a large kitchen space, linked to the main house with a new link building. By lining the lightweight structure internally with insulation and plasterboard and including a raised floor, the large garage could become a much more spacious kitchen and eating room which would have none of the difficulties of the existing kitchen. Areas of bench space could be set at a good height for Daniel's wheelchair.

Right: Examples of very low budget conversions of shed buildings.

Top two images: Barabool Victoria by Baracco and Wright Architects. Bottom two images Maldon Barn conversion by Helena Harry Design



FEEDBACK FROM THE PARTICIPANT, AND THE OCCUPATIONAL THERAPIST

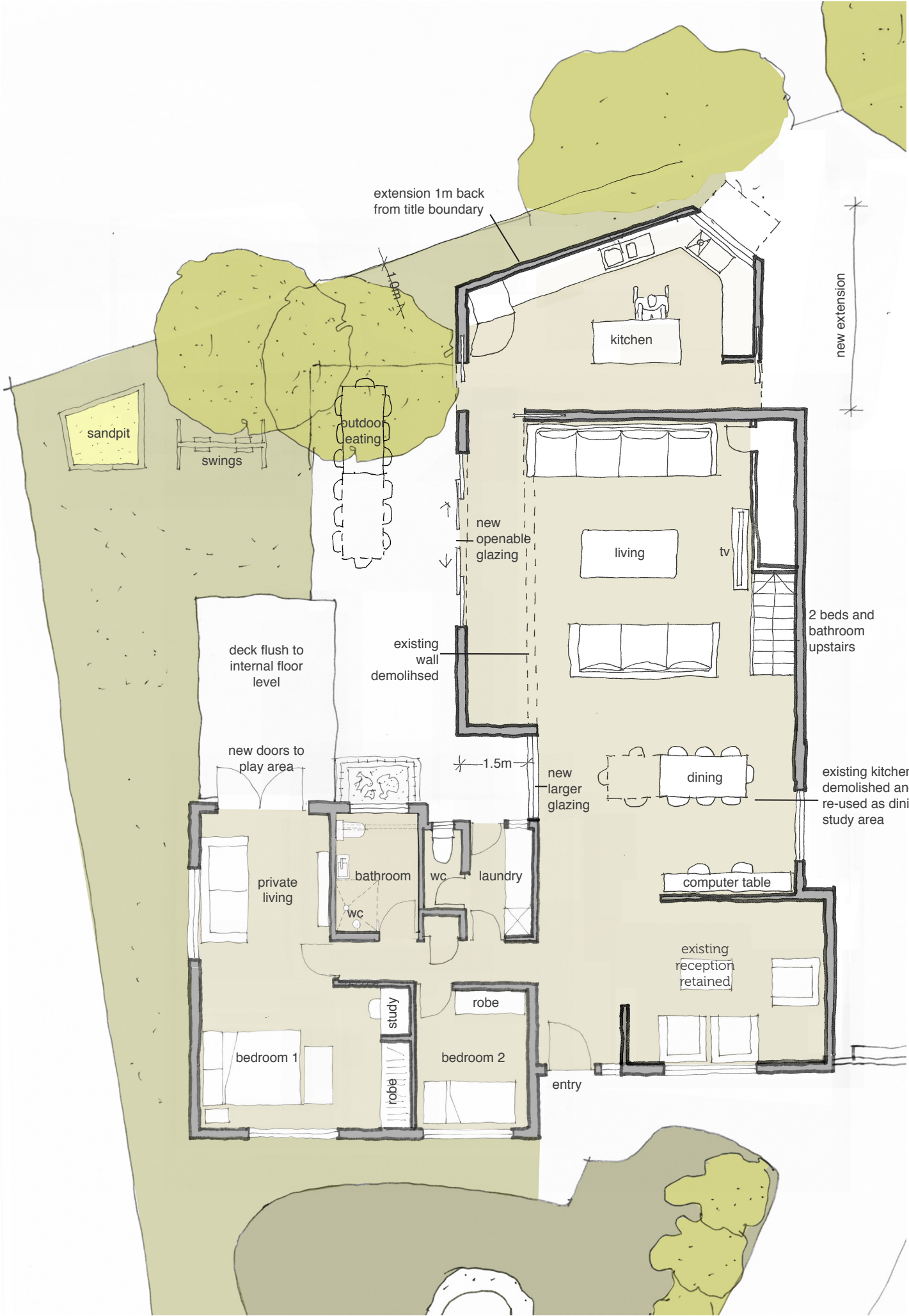
While Daniel quite liked the first two options for the kitchen modifications, he explained that the reception room has always been an important place to entertain guests in his culture (on both occasions that we visited the house, we met with Daniel in this room). He and his family went through all the proposals and explained that they were keen on the idea of the extension to the north of the site. They liked the relationship between this location for the kitchen and the landscaped garden area on the west side of the house, which is where they are more likely to gather the extended family and have outdoor eating.

Daniel was exited about the possibilities for the living room space by re arranging the TV location and the sofa positions. He expressed a desire to replace the

existing glazing with larger opening doors and felt that it would benefit by extending to the west. The added advantage of removing the existing kitchen from the plan is that the dining room can have a permanent position (without having to pull it out from the wall). The computer desk is also relocated in order to retain good circulation down the entrance 'corridor' area.

We therefore drew up this last option, which shows all the proposals on one plan forming the overall master plan for the house.

NOTE: The bathroom option shown here is not the final option.



CONCLUSIONS AND NEXT STEPS

Much of our work with Daniel and Annalise was a process of working out where their priorities lay as a family, culturally and long-term. For bathroom modifications, they were mostly concerned with practical issues, and the convenience of the rest of the family, as well as the long-term saleability of the house. Aesthetics, insofar as it involved spending more than the NDIS funding, was fairly low on the priority list for this area.

The opening out of their personal space was accepted as one they will probably go ahead with. Whether they include the French doors to the outside deck will be decided once they have had the scheme priced.

The reception room, often unused, is kept formal, which to some ways of thinking might seem a waste of space - considering other areas are so tight, for such a large family. Culturally however, this space is very important to them so has been retained.

When it came to the kitchen and living room areas however, Daniel's family are more ambitious. In this area they were very concerned with aesthetics, quality of light and the size of the openings to the garden. Their values are all about the extended family - group gatherings and creating a space that will enable those

gatherings to be as comfortable and enjoyable as the house will allow.

How do these issues affect the funding and home modifications processes? In this instance, the NDIS have left Daniel to spend some time thinking about whether the family will be able to stay in this existing house in the coming years, or whether they will eventually need to sell up and move on. In doing so they want to avoid wasting money on kitchen modifications if they are not for the long term.

Daniel and his family now need to work out whether the house extension ideas we discussed with them are affordable for them. They are looking at these costs, alongside the option of finding a larger accessible house elsewhere or even building a new house, to see which is the most cost effective and desirable option. Given that they have extended family living nearby, they are unlikely to move far from this location, so their options will be limited to other houses in the near vicinity. Unlike Chapter 1, the masterplanning process here is not so much a therapeutic process (given that Daniel's injury occurred many years ago) as a simple matter of establishing site potential for a large family living together with specific cultural requirements.



CHAPTER 3 PARTICIPANTS' STORY AND SITE CONTEXT

3

Participant 3: David & Janette Country Victoria

David and Janette recently returned to their large house in country Victoria after having lived interstate for three years, when David's stroke occurred. The couple bought the house fourteen years ago, choosing it because of its beautiful semi rural outlooks and spaciousness, the schools in the area for their two children, and the nearby train line, giving them convenient and fast access to Melbourne.

David is 62 and was very active in his field of medicine prior to his stroke, working locally as well as in Melbourne. His ambition now is to be able to return to work again after a period of intense rehabilitation. Prior to his stroke, David was also very physically active; cycling, swimming and running on a daily basis and participating in ironman events.

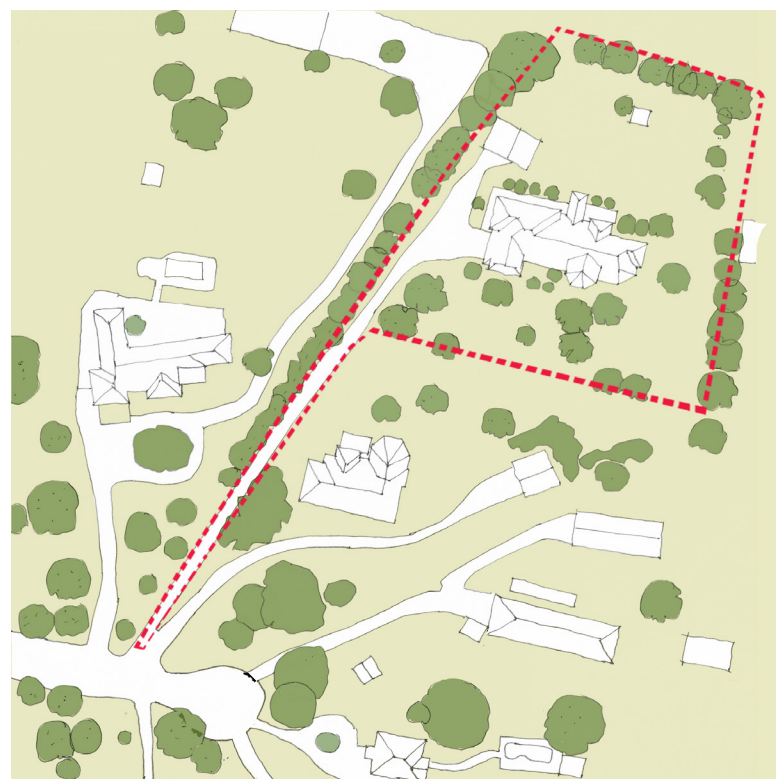
The stroke has resulted in reduced sensation and power on David's left side and a small blind spot on his right side. He has left side neglect, which is a perceptual problem; although he can see things on his left side, his brain doesn't necessarily register them as significant. Although he can stand, he is mostly wheelchair bound at present, and reliant on his wife Janette to help with most activities, including showering and frequent toilet visits.

David and Janette's house is very large - comprising five bedrooms, two living rooms and a double garage. It is set on a beautiful site that slopes fifteen metres from the back of the site to the bottom of the long driveway. There is a large garden at the front as well as at the back and views to surrounding rural hills from the front area. The couple had considered downsizing at one point, as both their children are grown up, living in Melbourne. They decided to stay, prior to the stroke, as one of Janette's retirement plans was to develop the garden into a large vegetable and fruit garden, with an aim to become self sufficient. The stroke hasn't changed their desire to stay where they are, although Janette's retirement plans have been put on hold.

"Even though we've got too many bedrooms, we like living here. Anyway, We've moved so many times, I don't want to ever move again."

Far Right: Part plan of the existing house showing the rooms that David accesses.

Right: Arial views of the property in context



PARTICIPANTS' STORY AND SITE CONTEXT

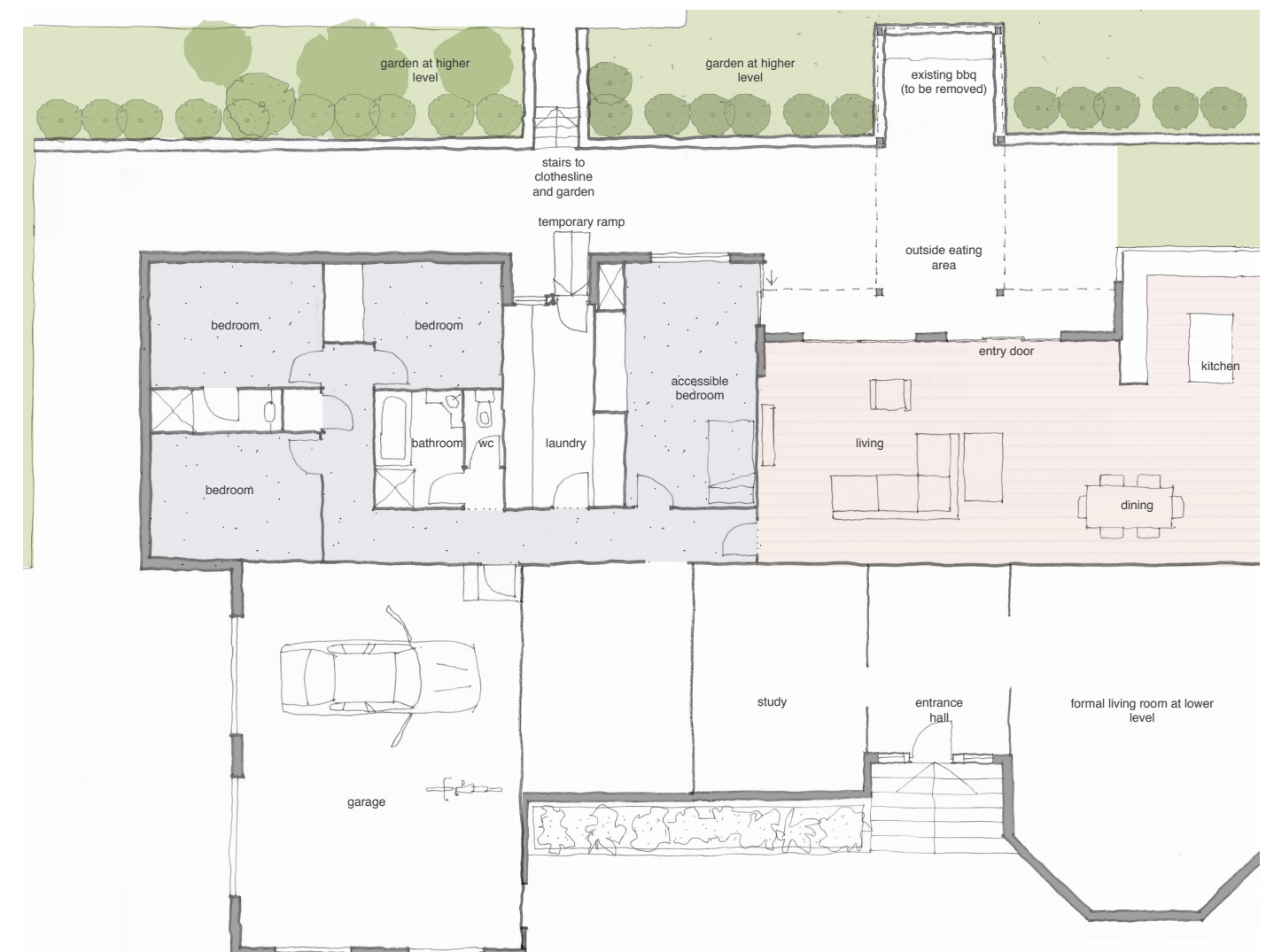
The couple were advised not to rush into having any permanent home modifications prior to having lived with the disability for a while. They were therefore living with hire equipment as an interim measure when we visited them, prior to deciding what permanent changes to make. A temporary ramp was located at the laundry entrance to the rear of the property. Entrance via the front door involves climbing five steps therefore this was not an option. At the rear, there are three possible entry points: the sliding door to the living room, another sliding door entrance to David's temporary bedroom and the laundry door. The laundry door was the best option for the temporary ramp as the other two doors have columns located at awkward points nearby. David cannot manoeuvre his wheelchair up the short steep ramp into the laundry without Janette's assistance.

David's use of the main bathroom and WC also requires

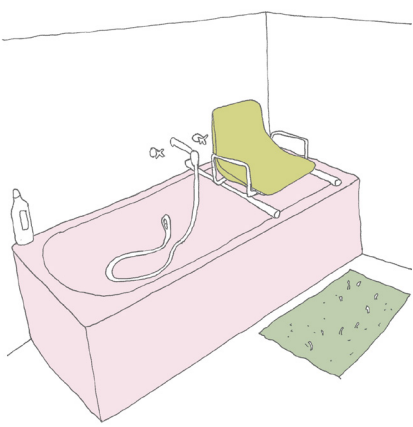
Janette's assistance. The existing bath has a temporary plastic shower seat balanced over it and showering takes place with a hand held shower rail attachment. The WC is a separate narrow cubicle, making transfer with Janette's help very tricky.

The house itself is very spacious, and would be easy for David to move around in, except that many doors only have a 780mm clear opening and the thick carpet pile is difficult for David to negotiate in his manual wheelchair.

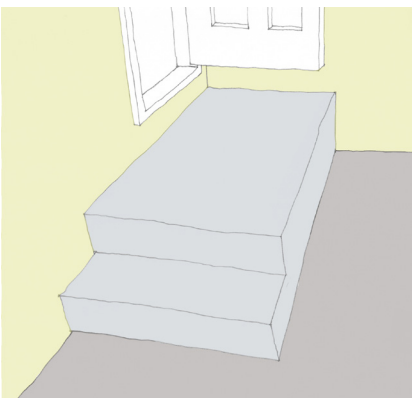
In chapter 1 we suggested that participants need time to process their situation and decide what their future holds before making too many modifications. In David and Janette's case, this is exactly what they are doing. The disadvantages for them are that it is very tiring for Janette, with David being so reliant on her, and also that the bathroom and WC temporary arrangement is actually quite dangerous.



ISSUES TO BE RESOLVED



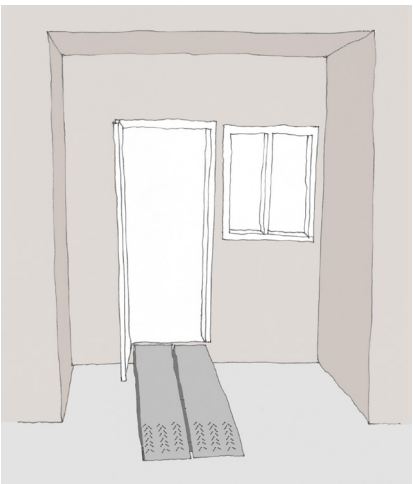
David and Janette agreed that the highest priority home modification to be resolved is the bathroom. There are a number of bathrooms in the house, but not as many as you might expect in a five bedroom house. The master bedroom, which is accessed via two stairs, has it's own ensuite. Another bedroom at the far west end of the house has it's own shower and basin. The main bathroom and separate WC is therefore the only viable option for David's use in his current wheelchair bound state. Janette agreed it is the priority. She explained: **"To me, the toileting [is the priority] because, something in David's brain is telling him he needs to use the bathroom all the time and he doesn't, so, that is so frustrating, that's when I lose it".** The existing bathroom is also very dark and feels cramped.



The second priority is to find a permanent solution for the entry arrangement, so that David can manage entry in and out of the house on his own. In addition, David, being an outdoor person prior to his stroke, likes to sit and look at the garden: **"We've got a nice garden area, so you can sit and watch all the birds and rabbits eating Janette's veggies".** When asked if he would like to be able to get access to the top part of the garden himself, David said this wasn't a priority, though he does like to sit outside and said he was toying with the idea of having an ornamental bonsai garden in raised planters.

The third issue is the flooring as the current thick cut pile carpet often results in David getting stuck somewhere along the hallway where he waits for Janette to come and help him move the wheelchair.

The current narrow door widths are also an issue. Because of his blind spot, David finds himself bumping into doors frames on a regular basis.



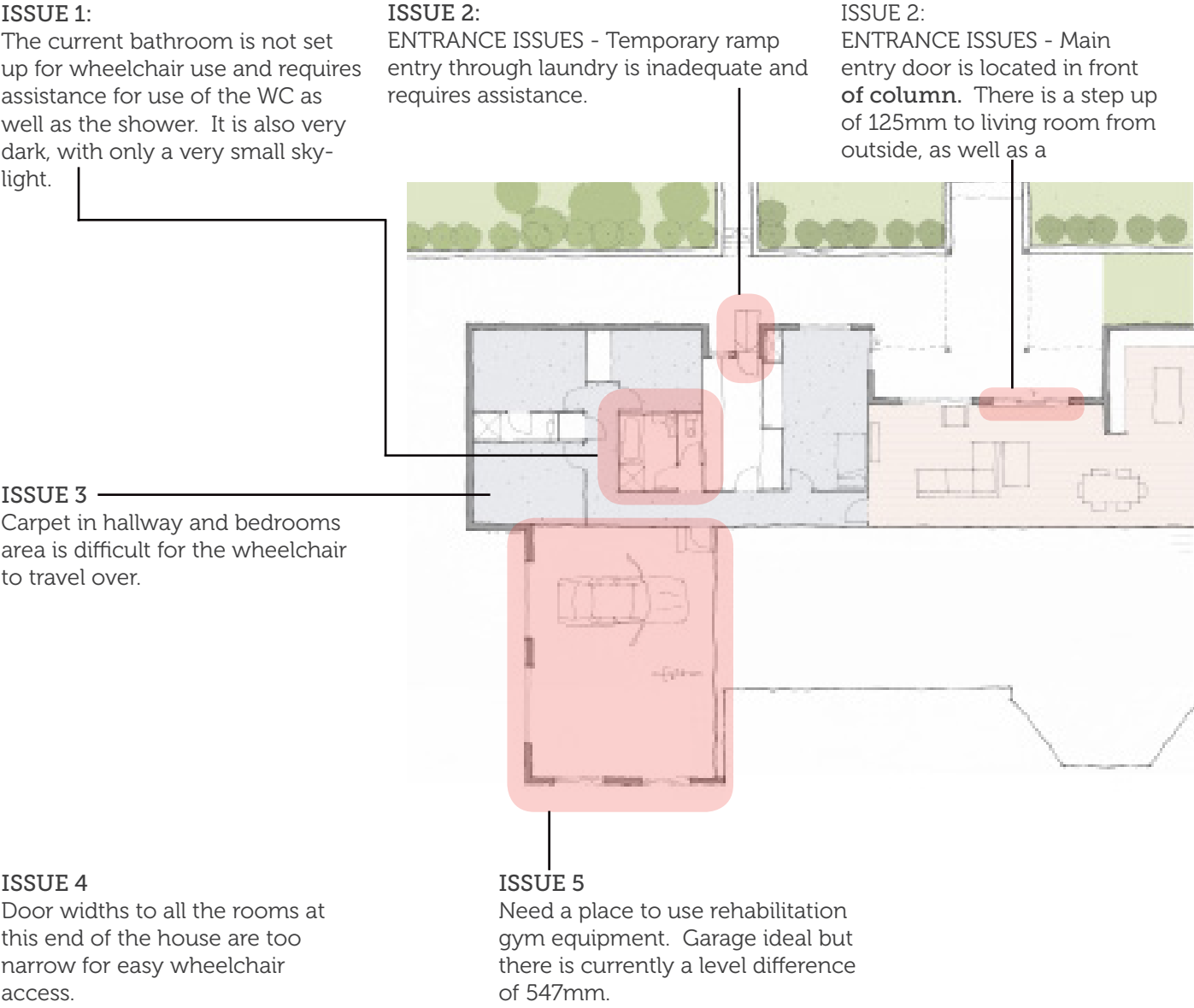
Lastly, in discussing David's ambition to return to his work, it became clear that this first year is crucial for his recovery, as this is when the rehabilitation work will have the most effect long term. As David was such a keen and motivated sportsman prior to his stroke, it is also a big change in his life that he is now spending so much time indoors and not exercising. A shed on the property (higher on site behind the house) is full of David's home gym equipment. Janette explained: **"We're doing regular physio at the moment and we're organising pilates. We want to set up the gym equipment somewhere.... it might be better to have some of that stuff inside. We're quite open-minded to having it inside".** The slope up to the shed is too steep even for Janette to push David's wheelchair up.

Top: Existing temporary shower

Middle: Existing steps down from hall to garage

Bottom: Existing temporary ramp entrance at laundry door

ISSUES TO BE RESOLVED



DESIGN SOLUTION FOR BATHROOM ACCESSIBILITY

In discussing ideas for the bathroom modifications with Janette and David it became clear that Janette would like the bathroom to add value to the house and be modernised and aesthetically pleasing. Janette also mentioned that they have long needed another WC in the house, as there is only one toilet for general use, if you discount the master bedroom ensuite. We looked at two options for the accessible bathroom.

The first option converted a portion of the existing very large (and mostly unused) laundry into a wet-room bathroom which could be accessed directly form David's bedroom, as well as from the corridor. The glass door and window in the laundry bring natural light and views of the garden into the space. The main

bathroom and WC would be untouched in this version. The house would benefit from having two bathrooms and toilets.

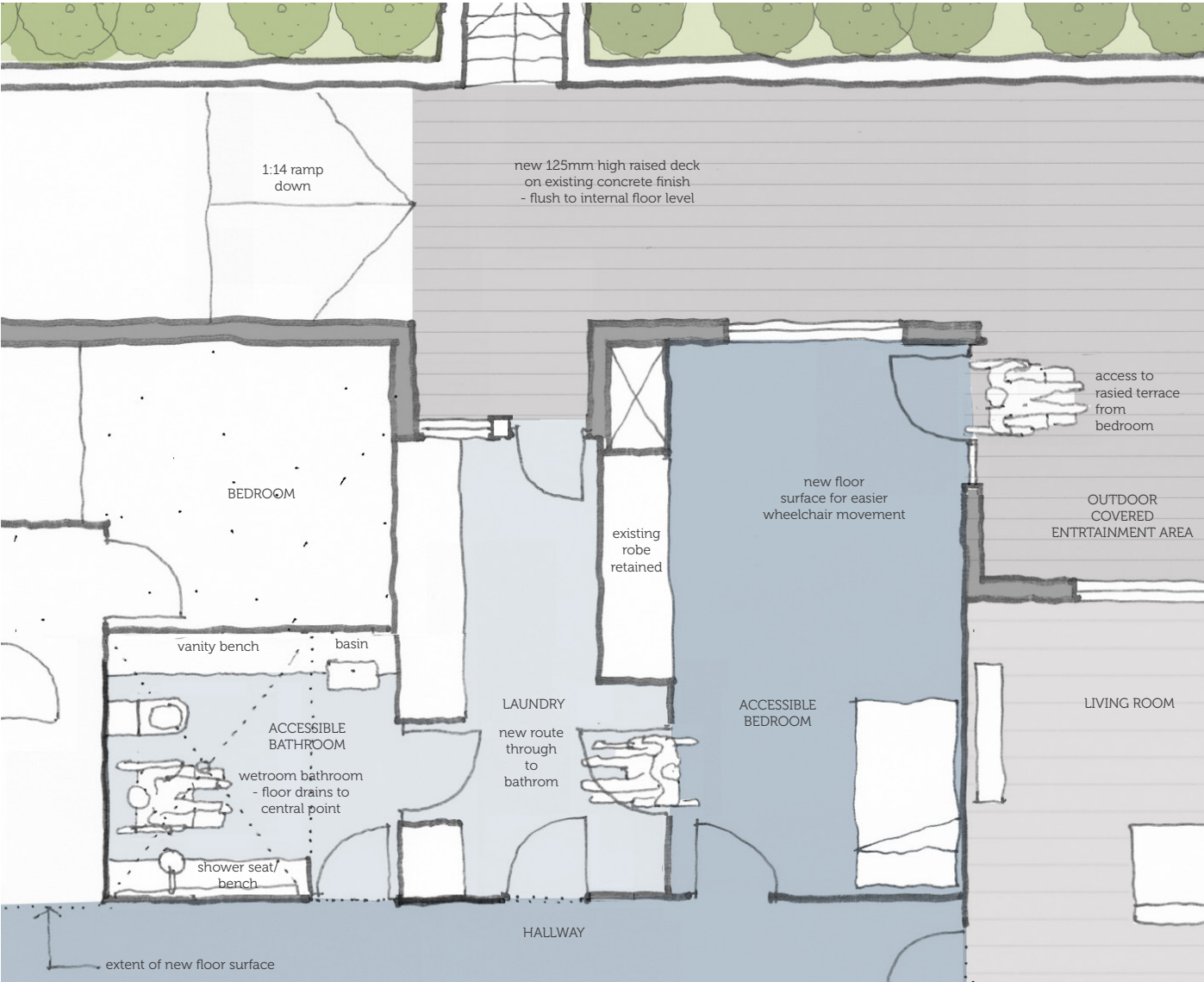
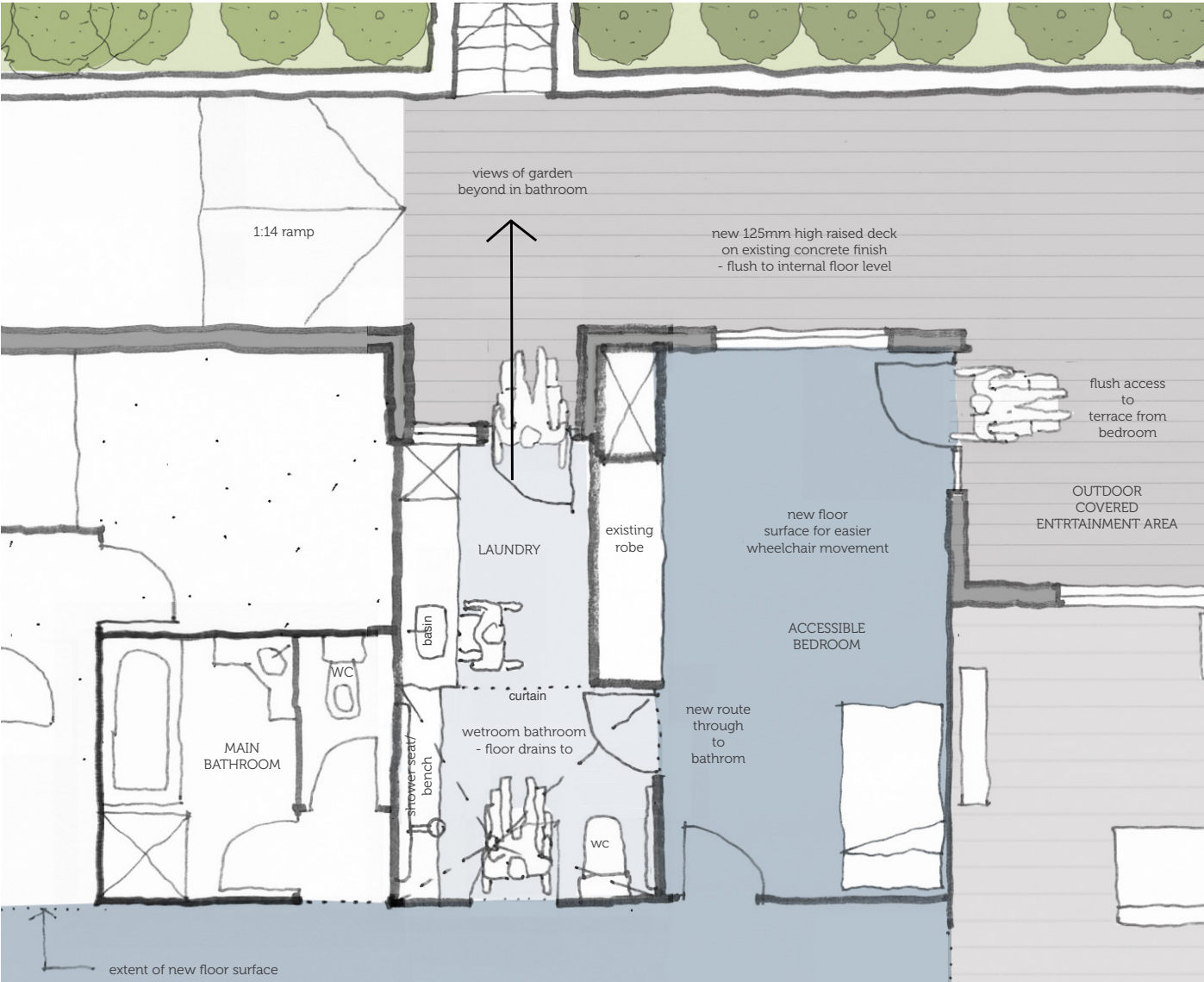
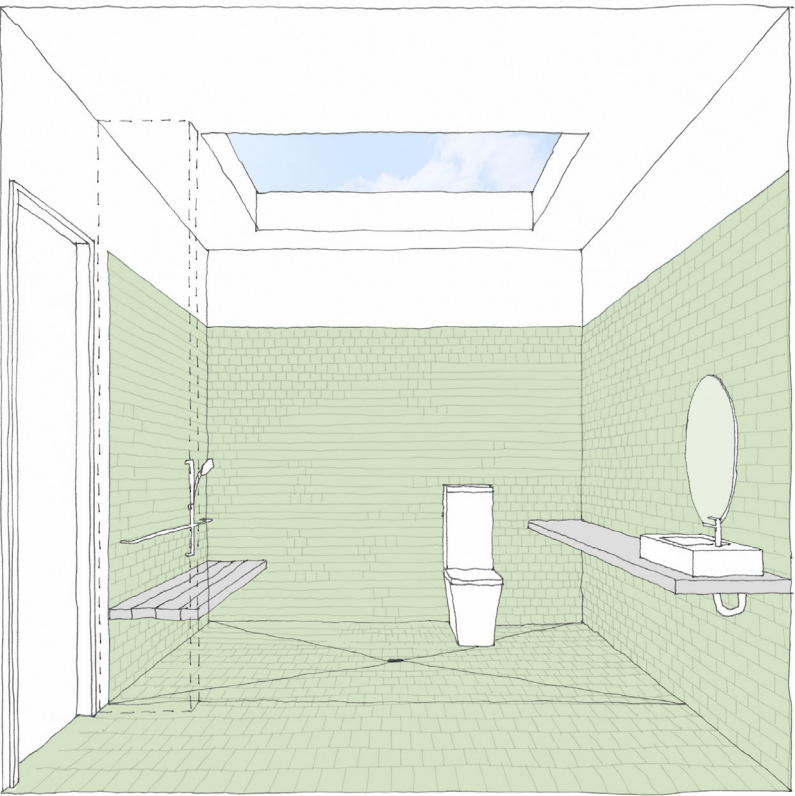
The second option looked at stripping out the existing bathroom and WC, removing the wall between the two rooms. This option proposes a wet room with a shower bench running along one side and a vanity bench along the other side. This scheme proposes replacing the existing skylight with a large one bring good natural light and ventilation into the space.

A route through the existing laundry is created to give David direct access to the bathroom from his bedroom, without having to go around via the hall.

Right: perspective sketch of option 2 bathroom refurbishment.

Bottom left: Option 1 for the accessible bathroom - remodelling a part of the laundry to become an accessible wetroom bathroom.

Bottom right: Option 2 for the accessible bathroom - combining the existing bathroom and wc to become one large accessible wetroom



**FEEDBACK FROM THE PARTICIPANT,
AND THE OCCUPATIONAL THERAPIST**

David and Janette preferred the second option to refurbish the existing bathroom and WC and they very much liked the idea of the route through from David's bedroom. "In the future, when David can return to the master bedroom, [which is not accessible for a wheelchair] we will use this room as a television room. We like the idea of the bathroom being easy to get to from the future TV room and from the outdoor eating area, for guests' use".

The couple had two issues with this proposal. The layout didn't allow right hand transfer (David's weaker left side means he needs to use his right side to take his weight). Janette also mentioned that she would still like a second WC to be located somewhere.

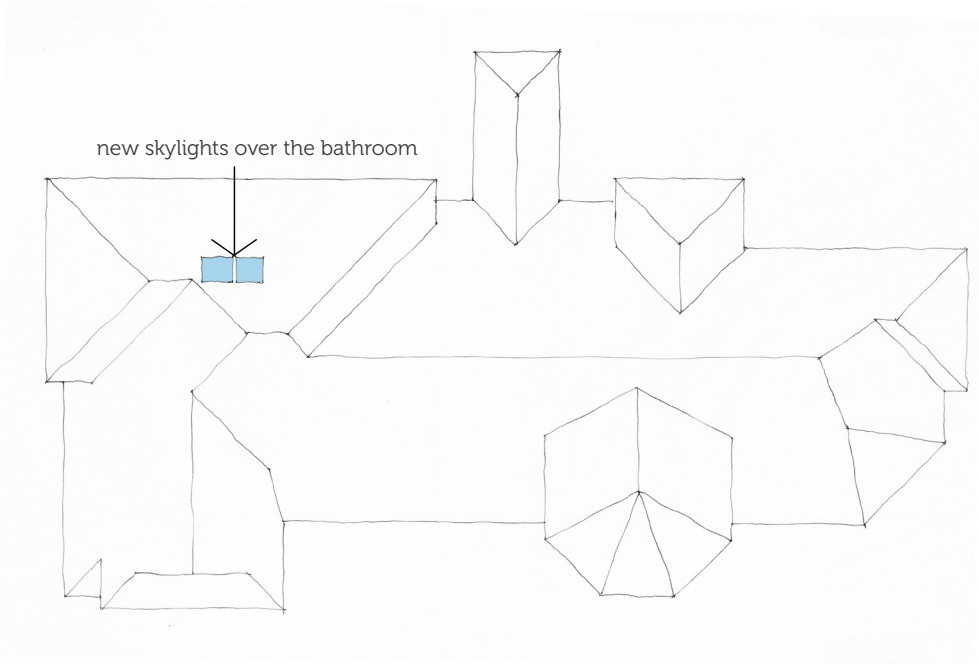
We therefore spoke to David's OT to talk through the transfer details and developed a plan that could work for him. We also placed a second WC in the laundry. The route through from the accessible bedroom was

retained. In addition, we examined the roofline further, and worked out a more realistic location for the new skylight - now divided into two segments.

David expressed a desire to have a bookshelf / music shelf within reach of the toilet. As there is ample space in the bathroom, we located a shelf to the right hand side of the WC.

David and Janette loved the plan and said they have been speaking about possibly making some of their spare rooms available for rent on AirBnb - advertising the space as wheelchair friendly.

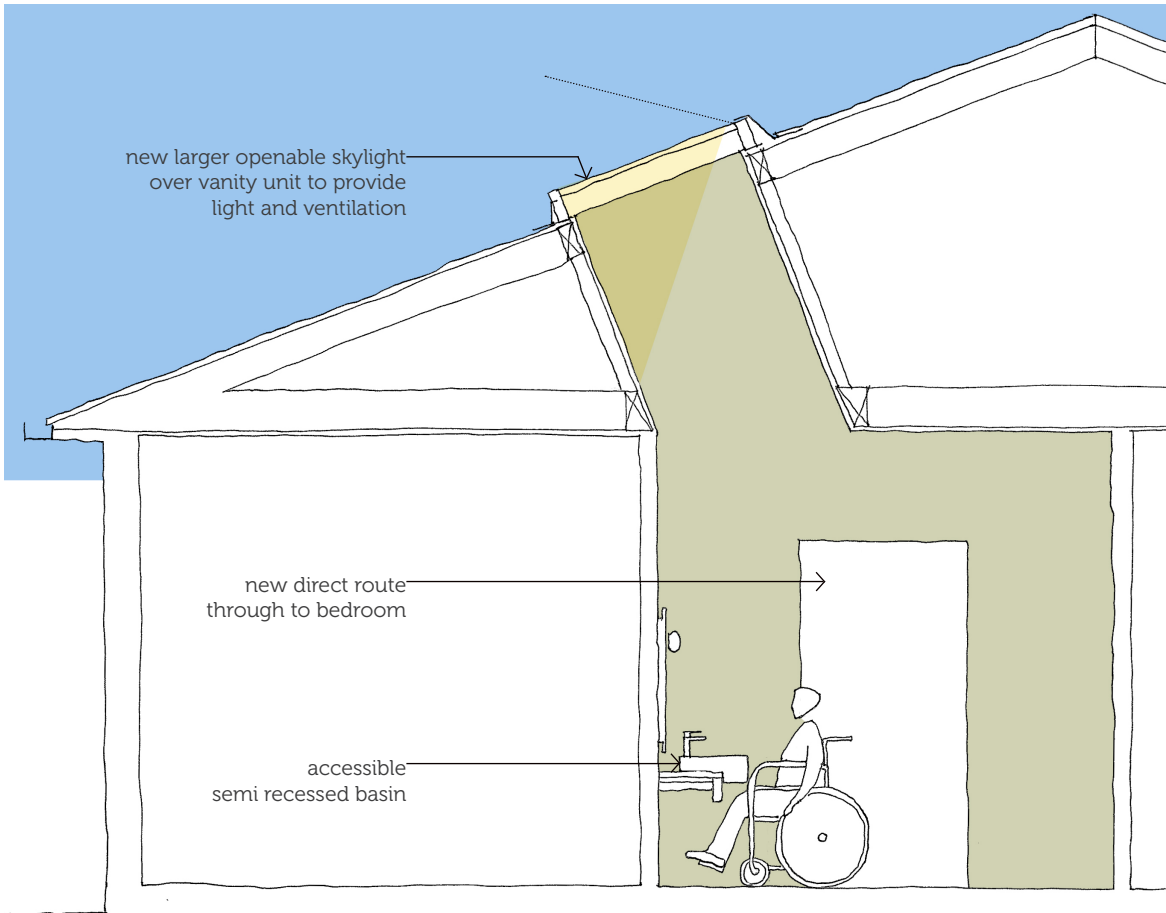
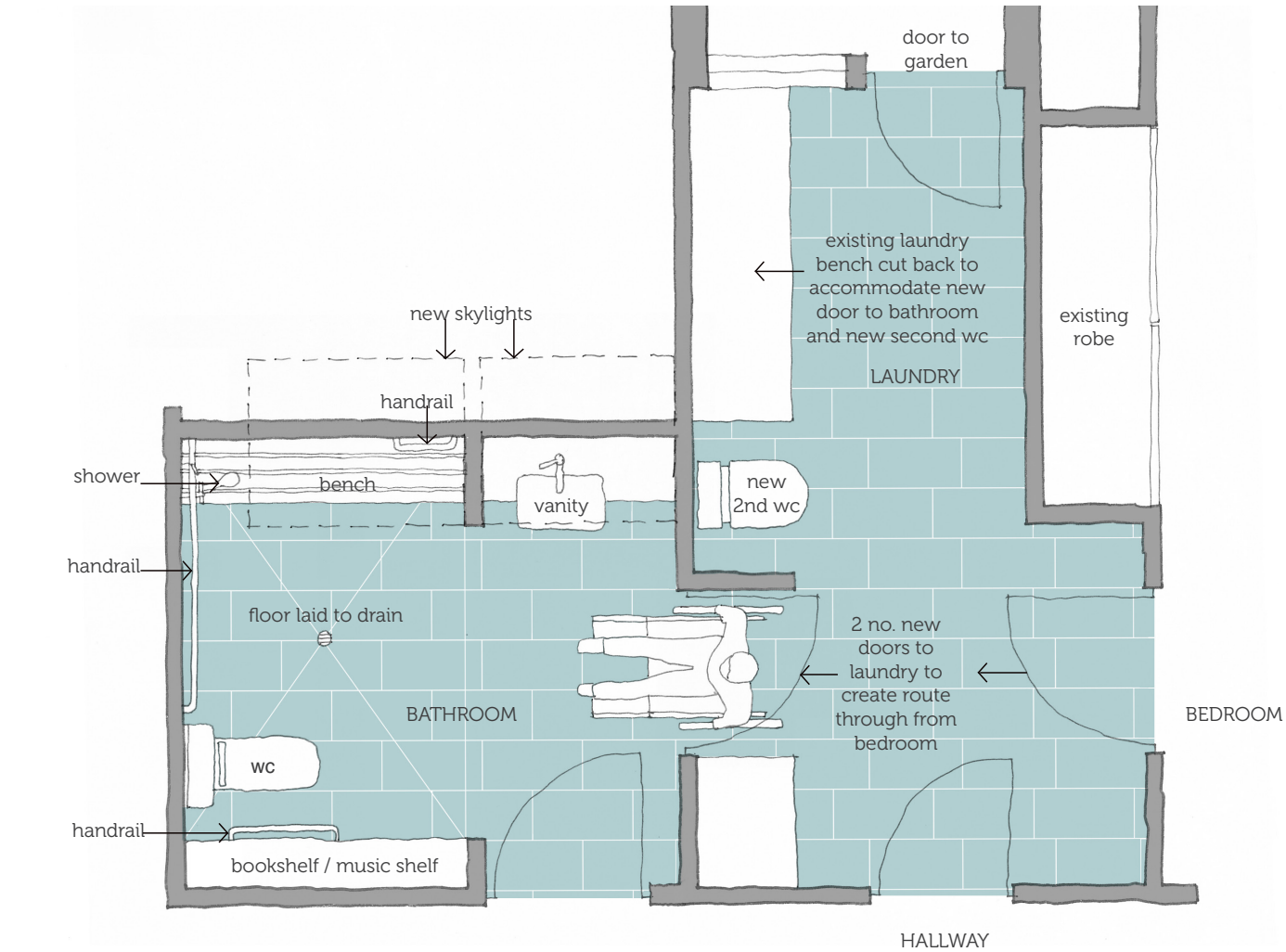
David's OT was also very positive about the bathroom layout, once we had resolved the transfer issues. She suggested that David should test out the transferring with his local community OT prior to commencing work.

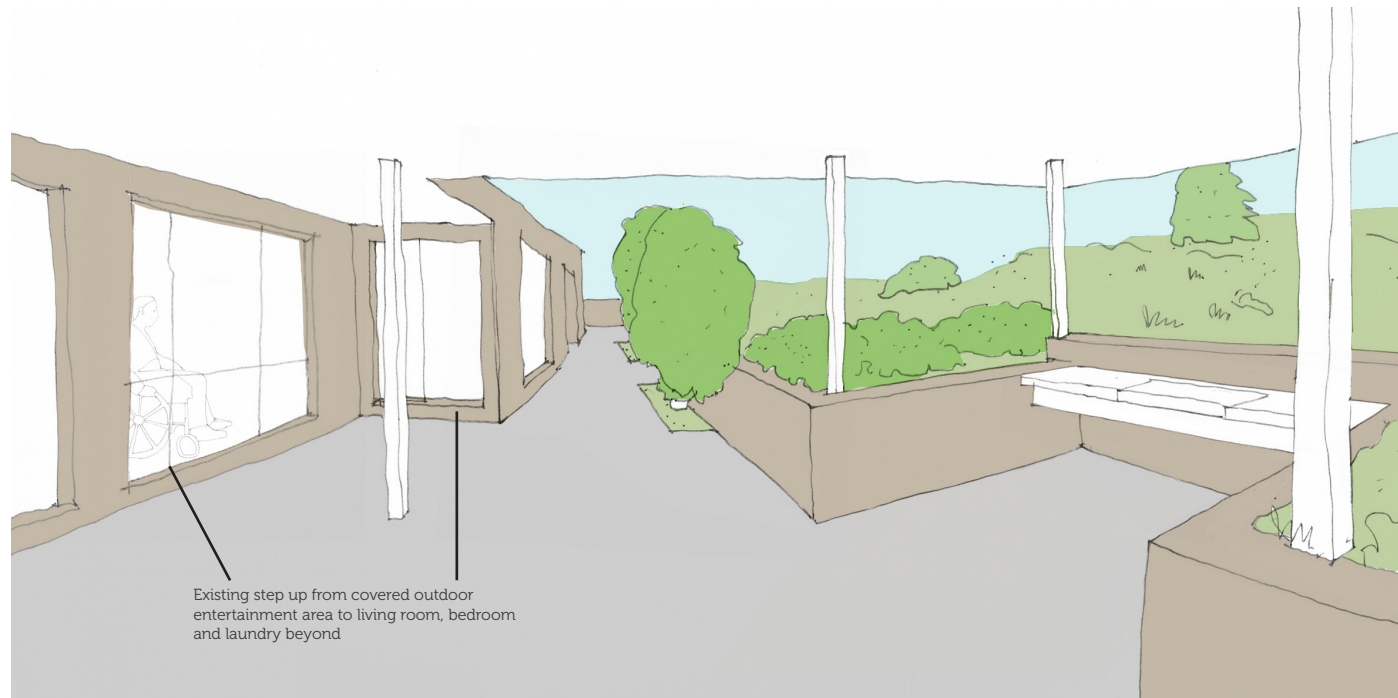


Left below: Final plan of bathroom and laundry modifications

Right top: roof plan showing new skylights located over the bathroom

Right bottom: Section through the bathroom showing the skylight and accessible vanity unit





DESIGN SOLUTION FOR AN ACCESSIBLE ENTRANCE

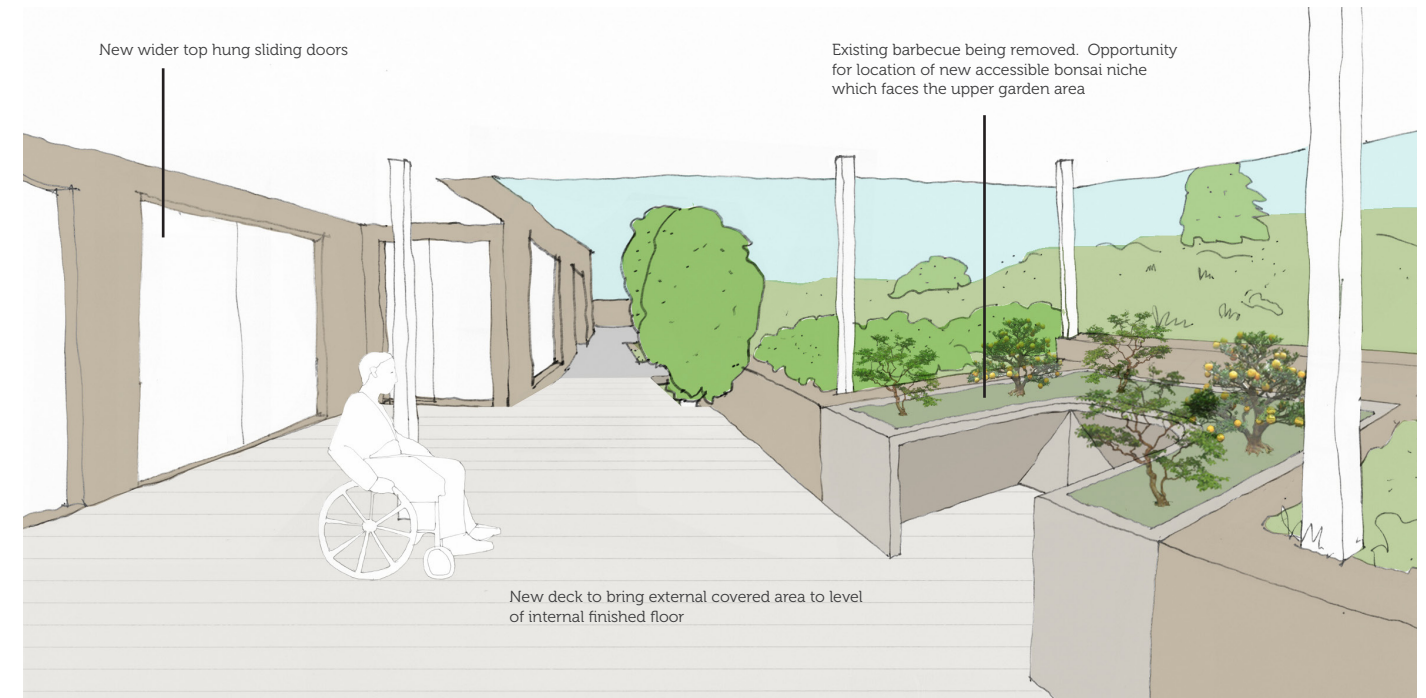
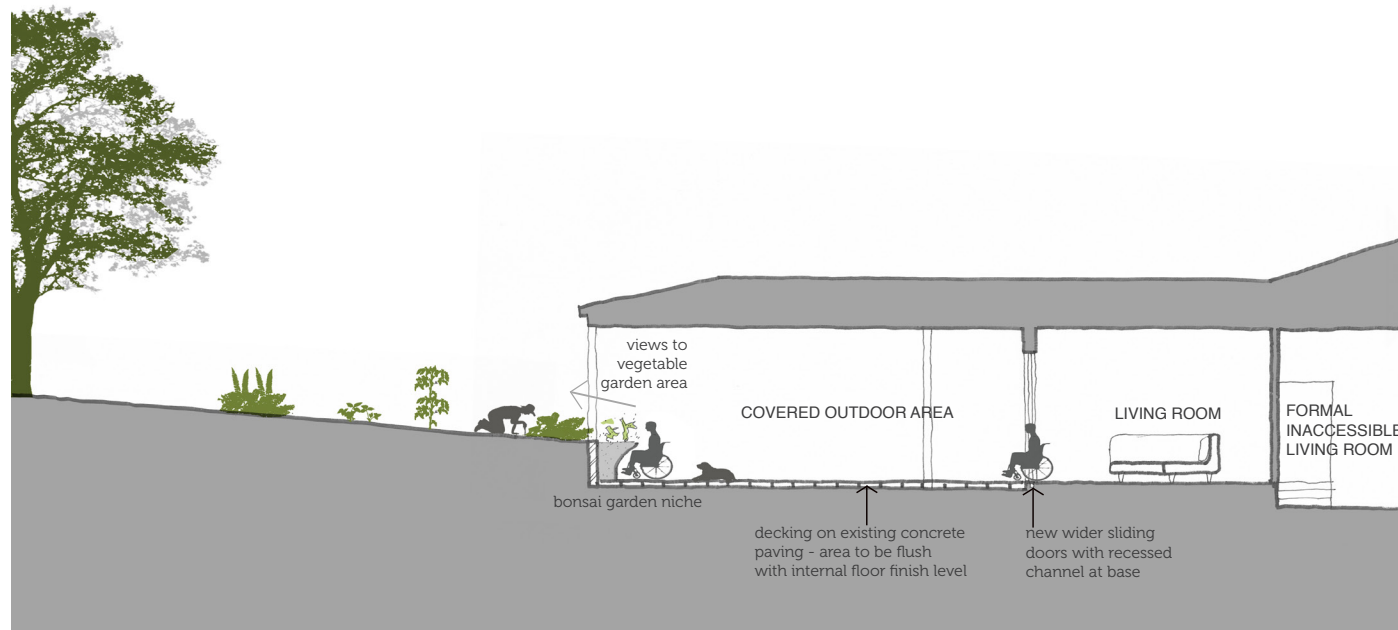
David and Janette's rear entrance is accessed from a covered outdoor entertainment area, which is 125mm lower than the internal floor finish. A projecting niche housed an old 1970s barbecue that Janette explained they were throwing out. A table and chair setting sits in the space with lovely views of the garden beyond.

Rather than proposing a ramped entrance, we looked at a simple scheme to raise the whole covered outdoor area 125mm with timber decking. Being flush to the internal floor level, David could then easily travel in and out from his bedroom, the living room and the laundry. The deck would become an accessible covered outdoor room for him to sit and read, look at the garden or entertain guests. The proposal replaces the

existing narrow sliding door to the living room with two wider panels with a recessed channel at the base, as the existing doors had a projecting track that is difficult to cross in the wheelchair.

In addition, we suggested that the projecting barbecue niche might become a bonsai garden niche - lining it on three sides with raised planter beds. As the niche faces the main garden, David could watch and chat with Janette in her vegetable garden as he tends his own bonsai plants.

A 1:14 ramp would need to be built along the pathway west of the decked area in order to access the garage.



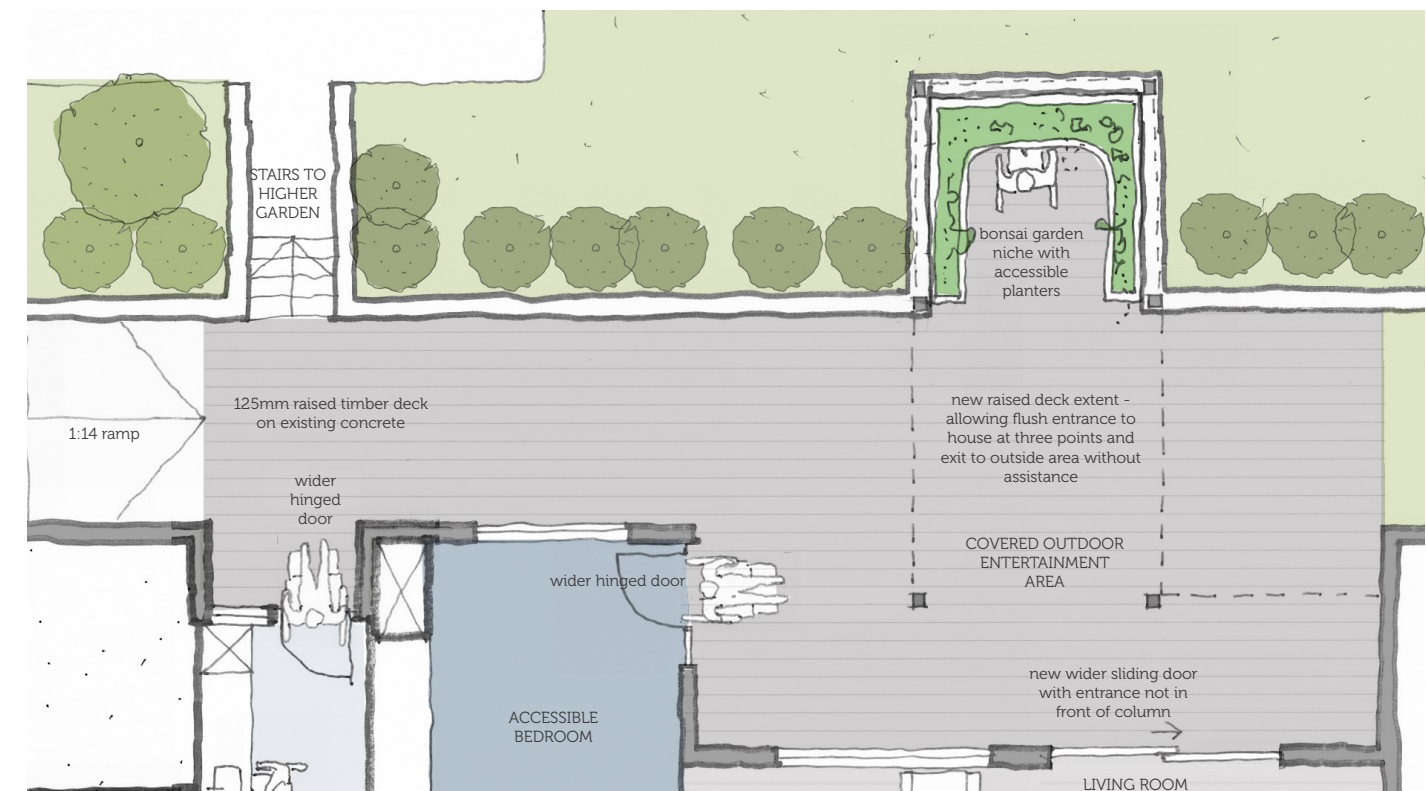
Above left: Sketch showing the existing barbecue niche and covered outdoor area

Above: Sketch showing new raised platform, new sliding doors and accessible bonsai garden

Left below: Section through the proposed external decked area and bonsai garden niche

Below: Plan of proposed external deck area and bonsai niche

Rather than proposing a ramped entrance, we looked at a simple scheme to raise the whole covered outdoor area 125mm with timber decking. Prior to his stroke, David spent a great deal of time out of doors pursuing various sport activities. This new deck area provides three benefits: easy independent entry in and out of the house, a place to sit and look at the garden and an accessible bonsai garden niche with full view of the garden beyond.



DESIGN SOLUTION FOR THE REHABILITATION GYM EQUIPMENT AND FEEDBACK FROM PARTICIPANT AND OT

David aspires to recover from his stroke well enough to be able to return to work via the train to Melbourne, even if this is still in a wheelchair. **"We want to move more towards David being independent, because he actually does want to go back to work. He's still got it all up there. His memory is excellent, his knowledge of his work is excellent."**

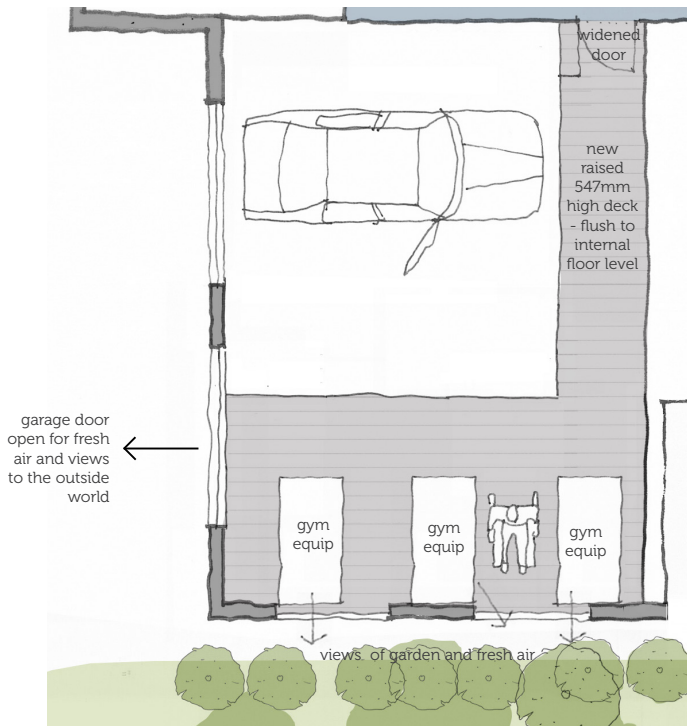
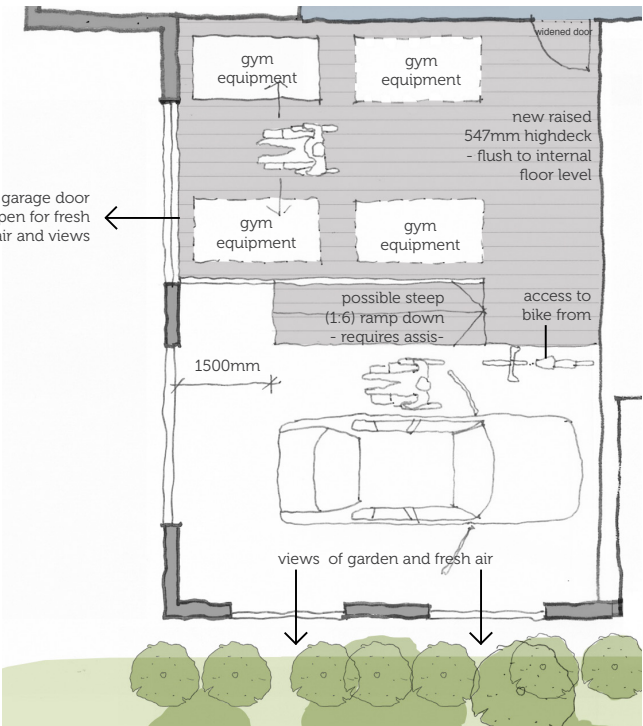
This next twelve months is a crucial time for David to focus on rehabilitation. Apart from the physiotherapy that is undertaken away from the home, David would like to be in a position to use his existing gym equipment, which is currently lying dormant in the shed.

Accessible from the end of an internal corridor, David and Janette's double garage has windows with views of the front garden and distant hills. As they only have one car, half of the garage is currently used as storage

which could be re-housed in the upper shed where his gym equipment is currently kept. The garage is 547mm lower than the corridor and is accessed via three steps.

We therefore proposed using this space for setting up David's rehabilitation gym with a 547mm high-decked platform to half the space. Option 1 placed the platform closest to the entrance point and included a steep ramp down to the car. Option 2 placed the ramp at the far end, closest to the windows with views.

David's OT advised that the equipment needs to be laid out with a handrail to the front edge in order for David to stand up from his wheelchair and swing his right leg onto the equipment. She also advised that the ramp down to the garage was too steep. She was however, very enthusiastic about the concept of the easily accessed rehabilitation gym for David, especially as it benefits from views of the landscape.



Far Left: Option A for the garage platform, creating an accessible gym rehabilitation area. In this version the gym is immediately inside the door and includes a ramp down to the garage

Left: Option B for the gym rehabilitation area. This version places the platform at the far end of the garage. to benefit from direct views of the garden from the windows

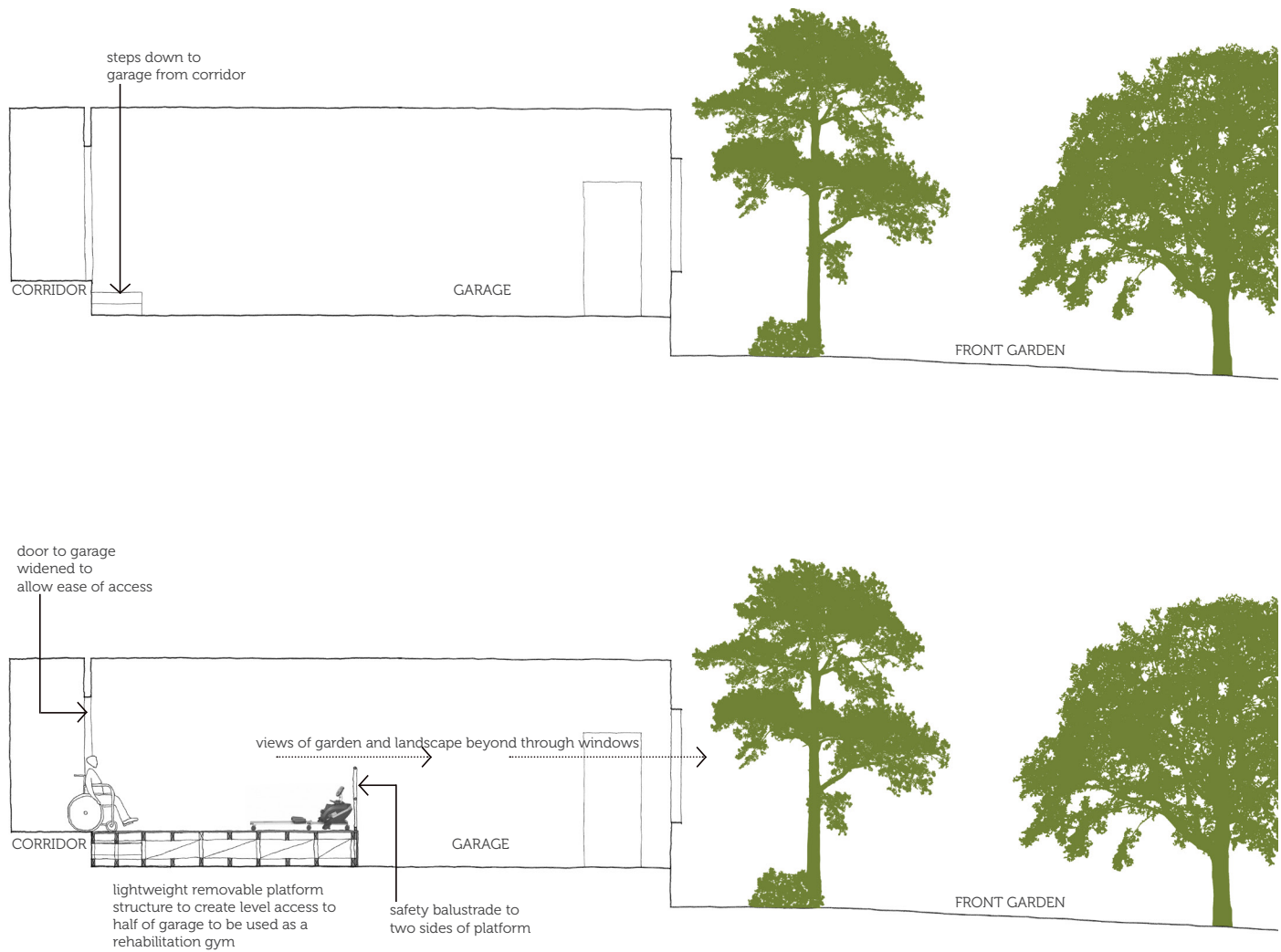
Below Top: Section through the existing garage and adjacent corridor

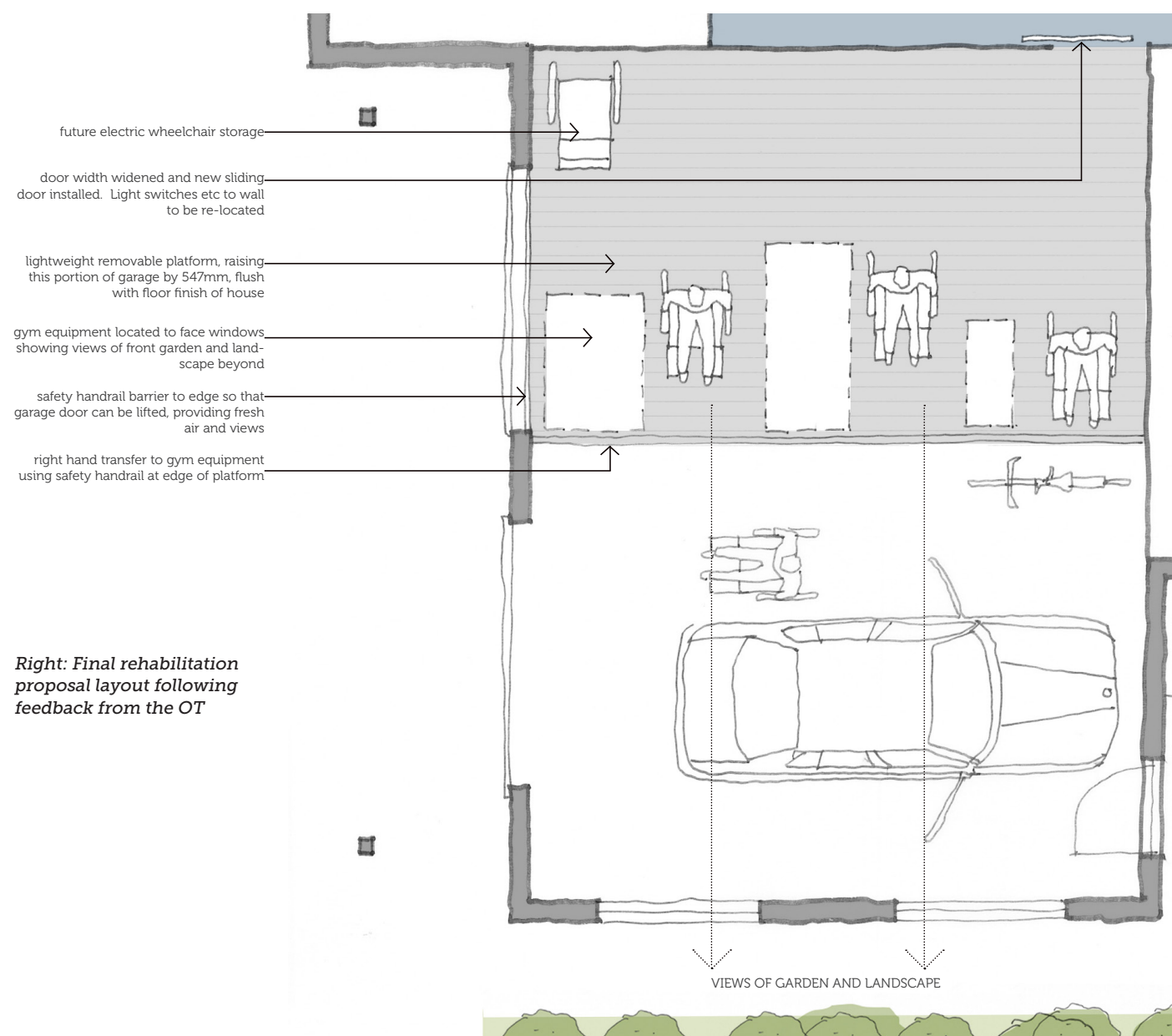
Below bottom: Section through the final proposal for the rehabilitation gym platform

Both David and his OT felt that this rehabilitation plan was an excellent and important idea which would help to provide the uplifting incentive required to keep his spirits up during this period of intense rehabilitation.

With the garage roller door up, the space, easily accessed from David's bedroom and new accessible bathroom is connected to the landscape and fresh air.

The platform is easily removable if the house is sold at a later date, returning to a two-car garage arrangement.





Right: Final rehabilitation proposal layout following feedback from the OT

DESIGN SOLUTION FOR THE FLOORING TO BEDROOMS AND HALLWAY AREAS

The thick cut pile plush carpet in the bedroom and hall areas is too difficult for David to easily move his wheelchair over. We therefore suggested they replace these carpets with a commercial grade dense loop or woven carpet product. As they are self funded and were intending renovations in any case, we presented three possible product options ranging from the more expensive Tretford and RC+D products, to a cheaper Godfrey Hirst loop pile carpet.

Below: Images of different loop pile carpet products



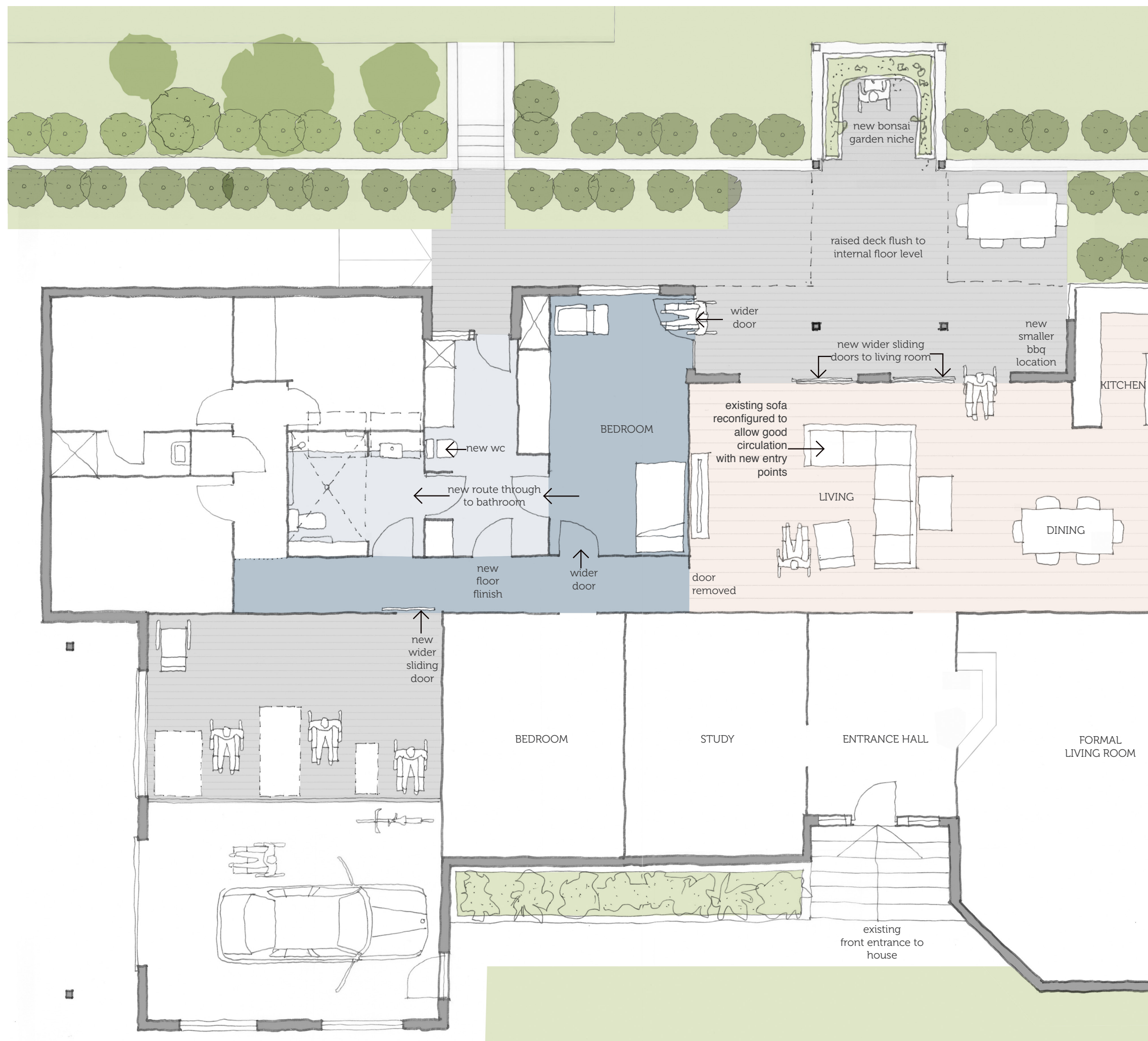
FEEDBACK FROM THE PARTICIPANT, AND THE OCCUPATIONAL THERAPIST

Overall, Janette and David were very happy with the designs presented to them. With some tweaking, a final plan for all the areas discussed was developed. Janette had suggested that if they were going to get the living room doors replaced, logically they would also replace the fixed glazing nearer to the television, possibly also making this area open-able. In making this change, we looked at re-arranging their current furniture to allow good circulation.

David and his OT were enthusiastic about the prospect of the bonsai garden and the garage gym in that they would help to enable David to spend more time connected to outdoor life and provide both therapy and much needed rehabilitation. Janette was very enthusiastic about the new bathroom - both aesthetically and because of the promise of freedom it would afford her if David was able to be more independent.

Right: Revised plan following feedback from the participants and the occupational therapist

NOTE: Some dimensions to earlier plans were corrected in this final plan following the second site visit



CONCLUSIONS AND NEXT STEPS

In David’s case, it is quite possible that intense rehabilitation will lead to greater independence and possibly a return to life as it used to be, if not completely, at least partially. David would once again be able to contribute to the medical profession. It would also mean that his wife’s role as carer would be dramatically reduced, allowing her to continue with the retirement ideas she had previously planned for herself.

In this instance, the modifications will have as great a benefit for Janette as for David. Janette’s day is currently all about caring for David and it is physically very tiring for her. The bathroom modifications suggested here are more elaborate than the modifications suggested in Chapter 2. This is in part because they are in keeping with the house; they work for David’s current needs but they also make sense for the size and specification level of the house. Janette was very keen to avoid creating a bathroom that looks

like a disabled bathroom. She wants the modifications to fit in with the decorating ideas they had prior to the stroke so that life can continue on the route they had planned rather than taking a backwards step.

Janette and David are considering renting out bedrooms on AirBnB once the work is done, advertising the house as wheelchair friendly. They also liked the new connectivity with the deck area, making it easy for guests to access.

The proposals for the living room and outdoor covered area achieve three things for David: easy independent flush level access, an outdoor covered room and a bonsai gardening area. It is a relatively easily constructed element that can be simply laid over the existing concrete paving, and will be an attractive addition to the house even without the requirements of a wheelchair user.

SUMMARY

The principles developed in our first stage report *Best Practice Discussion Paper* has been applied in this second stage of ‘Effective Design Strategies to Improve Accommodation Outcomes for people who have sustained a spinal cord injury or a traumatic brain injury’.

The importance of connecting with outdoor spaces was an especially important need for the participants whose injuries were recent and who were not yet as independent as they will eventually be. Any opportunity to maximise connection with neighbours and the wider community was welcomed.

In the first chapter, the need for the participant to take ownership of the space and all the decisions being made was certainly a major driving factor. With such recent injuries having taken control away, this need was very understandable. It was also potentially frustrating for those specialists and carers who were trying to find solutions to the access issues. Luckily, the people involved were all unusually patient and caring in this instance, completing more work on different options than is usually the case. In some cases therefore, finding a resolved solution might not be as important as allowing ownership. Allowing ownership might even lead to a better solution.

The concepts discussed in ‘Designing for All’ section of Best Practice Discussion Paper also applies to the design proposals presented here, even though these spaces are private ones. A living space that opens out fully to a flush level deck is an accessible arrangement for a wheelchair user; it is also a desirable modern living arrangement that allows easy open circulation for social gatherings. Likewise an accessible bathroom can be one that is desirable and convenient for all users, as discussed in our first report.

In addition to these overlaps, we found some other interesting issues emerging: that time is required to allow people to process their situation; the holistic masterplanning design process can help the recently injured to understand what the future holds, and that an environment which nurtures the rehabilitation process is crucial - as important as access itself.

The importance of allowing people who have recently sustained a SCI or an ABI time to process their new situation and to understand what their future holds was a key factor. It is clear that there is no easy answer to this; resolving home modification designs can be urgent. Rushing into modifications without understanding the values of users and the overall site potentials can, however, result in abortive work. Yvette’s initial modifications were completed prior to her return home. The bathroom work has been successful. The ramp work has elements that will now be undone. David and Janette, on the other hand, opted for temporary equipment as an interim measure. Janette admitted that the bathroom arrangement is dangerous, as it requires her to lift David onto a plastic shower chair that is balanced over the bath. This has resulted in a recent accident and a trip back to hospital. These two scenarios demonstrate the difficulties in finding a balance between the need for time to process the situation, and practical safety issues.

An analytic masterplanning design exercise can in itself assist in the therapeutic process of coming to terms with these major life changes. All of us, wheelchair bound or not, need to be able to envisage a happy future if we are to get ourselves out of bed every morning. If our world unexpectedly turns upside down, our ideas for our future are put on hold or possibly even halted altogether. A new plan needs to

emerge, and part of that plan involves our living arrangement. This analysis needs to look at the values of the individuals concerned as well as the potential of their homes. Many people who are not trained in spatial design principles cannot easily see the potential of their own living environments. Having professional help with a masterplanning exercise can help them to see possibilities for the future - ways of using their space that they not previously considered. Seeing these possibilities can help people to feel that they are taking back control of their lives, making better, well-informed decisions. For all three of the participants in this study, the question of whether or not to stay in their current accommodation was a real consideration. Emotional ties to home and community were expressed, and all were highly engaged in the masterplanning exercise as it potentially offered them the chance to stay.

Rehabilitation is sometimes an urgent as access. In those instances, the sooner a user is rehabilitated, the sooner they will become independent functioning individuals who are less reliant on their carers and funding bodies. Given this fact, identifying how rehabilitation might best occur for the individual concerned (i.e.: enabling a functional and accessible gym space, or an accessible garden to get “hands in the soil” for instance), would appear to be a key ‘reasonable’ design criteria.

The last new issue to emerge in this second stage is the need we found to take the requirements of the extended family and carers into account when looking at home modifications. It does not make sense to see people in isolation, as though only the wheelchair user is important as a determinant of the design. The wheelchair user functions within a household or family environment. Sometimes the carer’s life has been affected as dramatically as the patient with a SCI or an ABI and certainly modifications to a home will affect all the people residing there.

Findings

- 1a.

MASTERPLANNING FOR KEY FIRST DECISIONS: A high-level masterplanning design exercise which identifies possible synergies between user priorities and latent site-wide potential – can help people envisage their future, and hence make more effective decisions about where and how they might live long term. Fundamental decisions such as whether or not to continue living in one’s existing home can be enabled by this process, which in turn can help to make decisions about the first stages of home modifications and avoid abortive work.
- 1b.

BROAD BRUSH OPTIONS: Illustration and discussion of broad schematic design options – ie quick sketches of lateral alternative solutions– can help to clarify user priorities. This is a ‘brainstorming’ type activity that is fast and efficient, but based on careful spatial analysis of existing site attributes. It needs to include an understanding of how things might be built, but without getting bogged down in the details or minutiae of regulations. These sketch design options focus on the ‘big picture’ and the way different approaches might enable or enhance different life scenarios for the occupant.
2.

TIME FOR REFLECTION AND PROCESSING: Allowing time for users to process their new situation and experience living back in their house can lead to better long-term decisions based on a clearer understanding of needs and opportunities in situ. It may be that temporary or removable modifications should be undertaken at first, to allow time for this consideration to take place

before deciding on permanent changes. The design process can take place during this period of reflection, and can benefit from more meaningful user input.

3. **EMPOWERING USERS:** Participation in the design process can be empowering for people with a SCI or an ABI, enabling greater control and ownership of the decisions made, supported by an 'envisaging' masterplanning process that is focussed on positive opportunities. This is especially important in patients with a SCI or an ABI where so much control has been removed by injury.
4. **USER SPECIFIC REHABILITATION** activities with a deep connection to residents' interests and background (such as participation in gardening, family gatherings and physical exercise) can and should be factored in as key criteria when deciding on how to proceed with even basic home modifications.
5. **NO ONE SIZE FITS ALL:** Each user is an individual with different cultural values and interests.
6. **BALANCING THE NEEDS OF THE USER, CARER AND FAMILY:** Taking other family members and carers into account is key to a happy household; careful consideration of their needs and values will also help the person with a SCI or ABI in the long term. Home modification decisions that find a careful balance between user needs and other household pressures/requirements will be more likely to succeed.
7. **MAXIMISE OPPORTUNITIES FOR CONNECTIONS:** Decisions around access and function can also maximise opportunities for connections with gardens, with outside spaces, with neighbours and the wider community, responding to the opportunities afforded by the specific site conditions.
8. **MORE THAN ONE PURPOSE:** Each element of modification work can serve more than one purpose if considered carefully and in a holistic manner.

Recommendations:

Of the 8 lessons derived from this study, listed above, all are underpinned by the importance of an analytical masterplanning exercise. This exercise might raise fears about user expectations for funding. Perhaps a solution to this can be found by separating an analytic masterplanning exercise from the purely fundable built projects exercise. None of the participants who took part in this study had any problem understanding that it was a theoretical process only which may or may not benefit them, and that its purpose was to look at the big picture. We recommend that this process be further tested within the TAC Home Modifications Team process, to further understand the benefits that the two-staged design approach could have.

We recommend that the work we commenced with Frank and Yvette to develop an accessible garden be continued. This work has potential to lead to garden designs which would benefit the wider SCI community - an opportunity to realise results that demonstrate many of the key principles pinpointed in this research.

ILLUSTRATION CREDITS

Except where acknowledged, all illustrations in this report are the property of Monash Architecture Studio. The authors are grateful to all who gave their permission for the use of copyright material.

APPENDIX:UNPACKING THE MASTERPLANNING PROCESS

The masterplanning we discuss in this report is a process we used to look at possible home modification options for users.

In order to do this in a way that takes into account a bigger holistic picture, we started by interviewing the person who has sustained a SCI or an ABI and their primary carer or family member. Examples of some of the questions we asked in our initial interview are:

- “Tell us a bit about yourselves and your interests.”
- “How many people live here/in your house?”
- “Why did you move to your house originally?”
- “Do you know your neighbours?”
- “What percentage of your time do you spend at home?”
- “Which parts of the house do you spend most of your time in?”
- “What do you love about the house?”
- “What isn’t working for you about this house?”

By asking these kinds of questions, which do not immediately focus on the mechanics of how they will enter the house, how they will use the bathroom and where their bedroom is located, the participant provides useful information about their values, about how they live in their environment, as well as how they used to function prior to their accident or injury, and how strong their ties to their existing environment are. These kinds of questions generally lead them to discussing what their interests are and the ways in which their environment either helps or hinders them pursuing the things they love to do. Even though some of the interview strayed into areas that were not relevant, it was still useful for providing a broad picture of the user, their family life and their home.

Following this, the research team walked around the house with the participant, viewing all the rooms of the house and garden, getting an understanding of how each space is used now and how it was used prior to the accident or injury. We took measurements and photographs in order to be able to draw the house to scale. This was not an expensive measured survey drawing process, however it is accurate enough to be able to draw up designs to the level presented in this document. We also made use of nearmaps.com to get reasonably accurate roof plan, site boundary outline and existing site context information, in addition to the observations we made of the surrounding neighbourhood when we visited. The interview and site visit usually involved one day’s work, sometimes less.

This analysis of the participants as well as the site provided the information required to be able to rough-out ideas for masterplan designs. By thinking about what it would take for the user to be able to live in this house comfortably and happily now and in the foreseeable future, given all the information they have provided about their life, the design work can take shape. To begin with, the concept designs were rough and ready, hand drawn. In some cases we came up with 2 or 3 options, and in all cases we broke the ideas down into discreet areas of work, so that they can be undertaken separately if required. The drawing up of the site context information and the very rough brainstorming session was generally 1 days work.

Once we agreed on the masterplan ideas as a team, we drew up the designs a little more carefully in plan and section – still by hand – just to a level that the participant would be able to understand the ideas being discussed. If it was relevant, we also did some Internet research, looking at exemplary precedents of the ideas being discussed (for instance, accessible gardens research). This drawing work and research usually took 3 days.

We then returned to the participant to discuss these ideas. Taking on board their feedback, as well as feedback from their occupational therapist, we updated the drawings with further ideas or information, which was generally another day’s work.

All up therefore, this masterplanning process can be completed for each participant in roughly 6 or 7 days. For the purposes of this report, we have illustrated the ideas a little further with perspective drawings, as we needed to protect the participant’s privacy, excluding any photographs of their house. These kinds of drawings are not really necessary and would increase the amount of time spent on this process.

If this masterplanning process were undertaken whilst the participant were still in rehabilitation (on a home visit), there would then be a further stage in the process, deciding on whether temporary works or equipment should be installed prior to any permanent works being undertaken. Once the agreed masterplan drawings have been priced and programmed, discussion can take place about the timing of the works and whether temporary works will be required as well. In David and Janette’s case, for example, it may have been agreed that the bathroom works would need 4 weeks (for instance) + time for mobilisation, and during that time, an external portable bathroom would have been discussed, as their existing bathroom was going to be stripped out. The length of time required for the new works to take place would give a good indication of how suitable any temporary equipment would be.

In Yvette and Frank’s case, the works undertaken to their ramp, which may well now be partially pulled apart, could have been avoided. It is true that it may take them some time to decide on suitable planter heights and depths, but temporary side barriers could have been put in place to allow Yvette to return home, instead of expensive handrails, if it was known that the sides would eventually be lined with planters.

We have suggested in this report that time is required for participants to process the changes in their life. All the participants involved in these case studies were already at home when we undertook this research work; they had therefore had some time to begin that processing process. The next logical step in testing out the effectiveness of this process would be to undertake the work whilst participants are still in rehabilitation.

SUMMARY:

1.	Recorded interview of user	2 - 3 hours
2.	Visit to site to make observations, take measurements & photos	½ day
3.	Analysis of interview and site: >define user interests and needs >define latent site potential	1 day
4.	Draw up options for proposals	2 - 3 days
5.	Present options to user and O.T.	2 hours
6.	Take on board feedback & make adjustments to proposals	1 day
7.	Present final outcome to user	2 hours

TOTAL TIME	6 - 7 days
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