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THE BATH ROOM

SPATIAL EXPERIENCE OF TAILOR-FIT SPACE

LORNA SMITH

2012



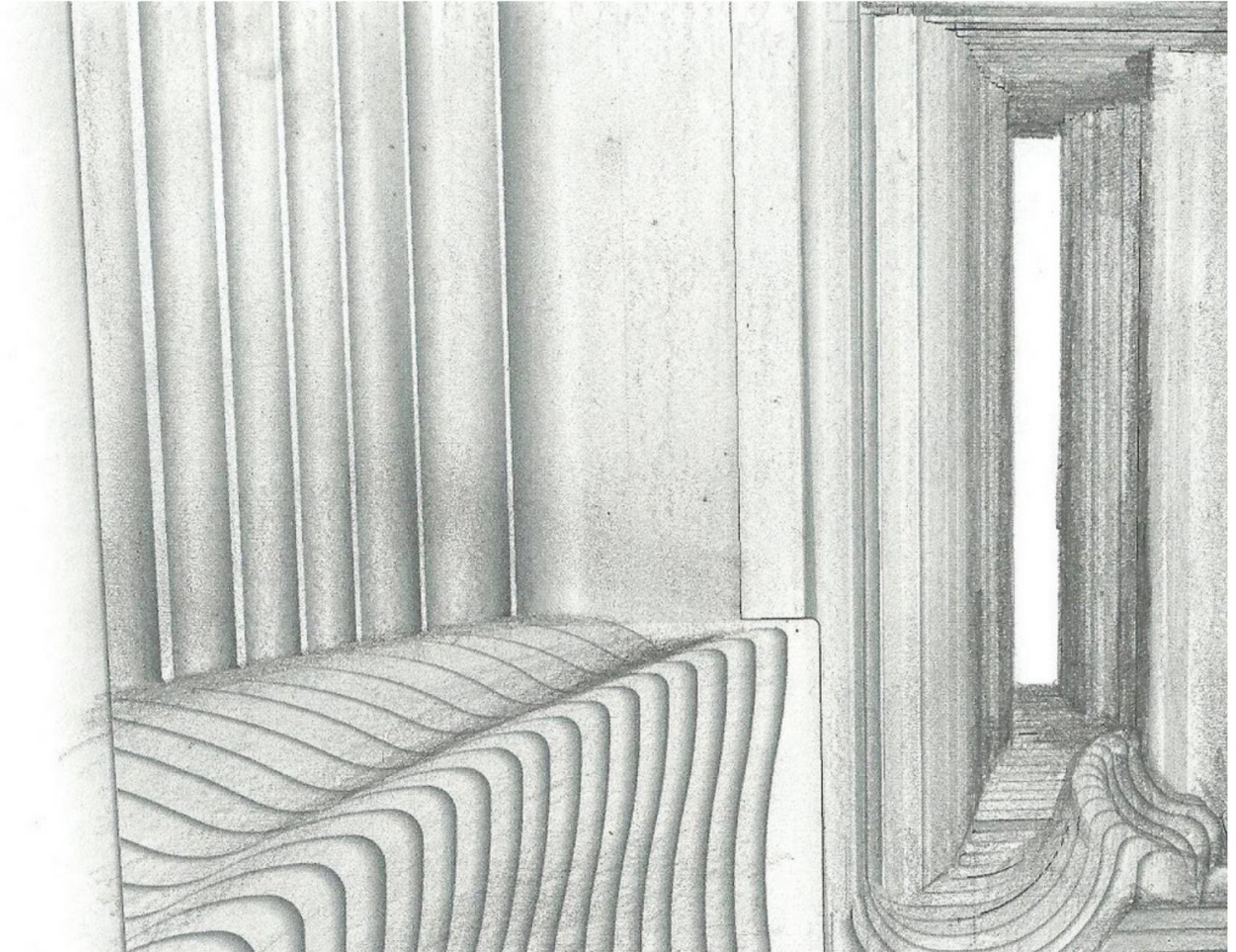


Figure 1. Hand rendering over SketchUp visualization looking through bathroom design. Smith, L. (2011).



THE BATH ROOM

SPATIAL EXPERIENCE OF TAILOR-FIT SPACE

A thesis presented in partial fulfilment of the requirements for the degree of Master of Design, Massey University, Wellington, New Zealand, 2012.



Figure 2. Image of bathtub with 'soap mould'. Santos Quartino, D. (2008).

THE BATH ROOM

ABSTRACT

The contemporary domestic bathroom is a place where function and ritual coincide with the body and mass-produced industrial products; but, what about the bathroom as a whole? The bathroom has become a place to perform certain rituals, rather than a room to occupy one's rituals.

My personal experiences of the standardized domestic bathroom have encouraged me to test the boundaries, forms, aesthetics, and functions of what is commonly understood to be a bathroom.

This research explores this interface in the redesign of my standardized domestic bathroom where I use my own body and domestic rituals to investigate the potential for a bathroom design that is tailor-fit to its user.

THE BATH ROOM

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CONTENTS

iv	ABSTRACT
vi	ACKNOWLEDGEMENTS
vii	CONTENTS
ix	FIGURES LIST
1	PAST & PRESENT
7	THE BATH ROOM
13	MY BATHROOM AS A RESULT OF MY BODY
19	BATHROOMS
23	RECONFIGURING MY BATHROOM
27	DORNBRACHT
32	INSIDE OUT
33	JULIAN HAKES
37	DRAWING MOVEMENT
40	BART PRINCE
43	JANET FRAME: LIVING, WRITING
45	HERTZIAN SPACE
47	MY BATHROOM DIARY

51	PROGRESSION IN MY DIARY
53	PROGRESSIVE BATHROOMS
59	POST-BATHROOM DIARY
65	LINEAR DIAGRAMS
69	MOVEMENT DIAGRAMS
73	RE-DESIGN ITERATIONS
75	ITERATION 1
77	ITERATION 2
81	ITERATION 3
85	BATH ROOM RE-DESIGN
89	FORM GENERATION
95	BATH ROOM DESIGN
99	DRAWING THE BATH ROOM
109	CONCLUSION
125	BIBLIOGRAPHY
131	APPENDICES

FIGURES LIST

Unless otherwise identified, all images are the work of Lorna Smith.

Fig.

- 2 Image of bathtub with 'soap mould'. Santos Quartino, D. (2008). *150 Best Bathroom Ideas*.
- 5 Plans of my house in Rolleston showing existing bathroom layout. Stonewood. (2009). Personal collection.
- 6 Bathroom image. Santos Quartino, D. (2008). *150 Best Bathroom Ideas*.
- 7 Image of bathtubs 3600 years apart. Wright, L. (1963). *Clean and Decent: The fascinating history of the bathroom & the water closet*.
- 8 Statements Bathculture 002:98. Photograph (self-portrait). Van Lammsweerde, I. (1998). Image retrieved from http://www.cultureprojects.com/eng/statements2/statements2/inez_02.htm

- 13 Surfacing Over There, Shower Series. Joni. Paiement, A. (2002). Image retrieved from http://onesmallwindow.com/wp-content/uploads/2011/03/h_alainpaiement.jpg
- 14 Surfacing Over There, Shower Series. Lio. Paiement, A. (2003). Image retrieved from <http://www.matthieufossgallery.com>
- 15 Image of stone basin. Santos Quartino, D. (2008). *150 Best Bathroom Ideas*.
- 16 Image of individual products within bathroom. Santos Quartino, D. (2008). *150 Best Bathroom Ideas*.
- 17 Symetrics Modular bath fitting system. Dornbracht. (n.d.). Image retrieved from <http://www.dornbracht.com/en/>
- 21 Symetrics, RainSky M modular shower system. Dornbracht. (n.d.). Image retrieved from <http://www.dornbracht.com/>
- 22 Elemental Spa Shower component. Dornbracht. (n.d.). Image retrieved from <http://www.dornbracht.com/>
- 23 Elemental Spa whole bathroom design. Dornbracht. (n.d.). Image retrieved from <http://www.dornbracht.com/>
- 24 Mojito shoe, elevation view. Hakes, J. (2009). Image retrieved from <http://www.dezeen.com/2009/09/23/mojito-shoe-by-julian-hakes/>
- 25 Mojito shoe, plan view. Hakes, J. (2009). Image retrieved from <http://www.dezeen.com/2009/09/23/mojito-shoe-by-julian-hakes/>
- 29 Seymour Residence. Prince, B. (1981). Image retrieved from <http://www.bartprince.com/seymour.html>
- 30 Seymour Residence. Prince, B. (1981). Image retrieved from <http://www.bartprince.com/seymour.html>
- 31 Seymour Residence. Prince, B. (1981). Image retrieved from <http://www.bartprince.com/seymour.html>
- 32 Price Residence. Prince, B. (1984). Image retrieved from <http://www.bartprince.com/price.html>

- 33 Price Residence. Prince, B. (1984). Image retrieved from <http://www.bartprince.com/price.html>
- 34 Price Residence. Prince, B. (1984). Image retrieved from <http://www.bartprince.com/price.html>
- 35 Bradford Residence. Prince, B. (1987). Image retrieved from <http://www.bartprince.com/brad.html>
- 36 Bradford Residence. Prince, B. (1987). Image retrieved from <http://www.bartprince.com/brad.html>
- 37 Bradford Residence. Prince, B. (1987). Image retrieved from <http://www.bartprince.com/brad.html>
- 38 Hight Residence. Prince, B. (1992). Image retrieved from <http://www.bartprince.com/hight.html>
- 39 Hight Residence. Prince, B. (1992). Image retrieved from <http://www.bartprince.com/hight.html>
- 40 Hight Residence. Prince, B. (1992). Image retrieved from <http://www.bartprince.com/hight.html>
- 43 Form created during full body massage. Burry, M. & Taylor, M. (2007). *Thinking Inside the Box*.
- 44 Hertzian Space. Burry, M. & Taylor, M. (2007). *Thinking Inside the Box*.
- 54 Ebb Bathroom shower, bath and sink unit. UStogether. (n.d.). Image retrieved from <http://www.ustogether.eu/>
- 55 Ebb Bathroom sink and bath unit. UStogether. (n.d.). Image retrieved from <http://www.ustogether.eu/>
- 56 Loop Bathroom. UStogether. (n.d.). Image retrieved from <http://www.ustogether.eu/>
- 57 Vertebrae Vertical Bathroom unit. Design Odyssey. Image retrieved from <http://www.designodyssey.co.uk/product>



Figure 3. Photograph of the shower unit in my bathroom in Rolleston. Smith, L. (2011).

PAST & PRESENT

Bathroom¹

_a room containing a bath and usually also a washbasin and a toilet.

I grew up on the West Coast of Scotland in a small village of around three-hundred people, called Dalmally. I moved with my family to New Zealand in 2005, but prior to that, I had lived in the same home for seventeen years. My home was a two-story, semi-detached, white, pebble-dashed council-house (similar to the Kiwi State House); it had a small kitchen, a small lounge, a dining-room, two average sized bedrooms and one bathroom - containing a toilet, a sink, and a bath/shower tub.

My bathroom daily rituals and routines throughout my childhood and adolescent years consisted of a two to three hour treatment for my eczema. For this personal reason, the bathroom has never really been a space I enjoy entering and more often than not evokes a feeling of dread.

1. Dictionary definition of bathroom from Oxford Dictionaries Online. Retrieved 19 June, 2011, from <http://english.oxforddictionaries.com/definition/bathroom>

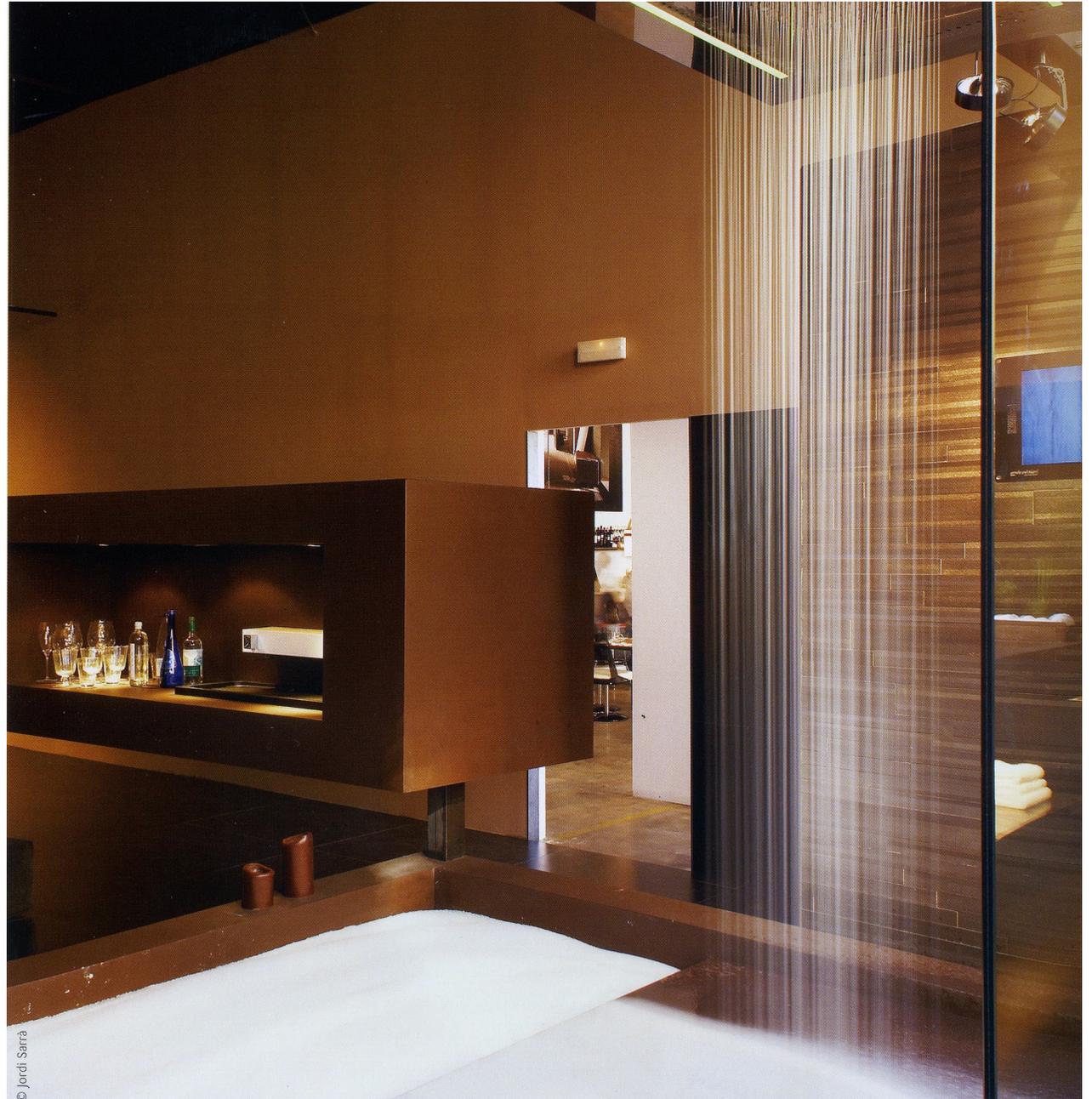


Figure 4. Photograph of my bathroom in Rolleston. Smith, L. (2011).

My fascination with the domestic bathroom started from an early age - perhaps because I lived in a basic, standardized council-house, and perhaps because I have never really experienced anything more than the standard. I remember one particular time when I was with my mum visiting her family in Liverpool, we were with my Uncle David and we had to visit his boss – I must have only been about six years old at the time. I can't remember her house, where it was, or even her name, but I do remember announcing to my mum, Uncle David, and his boss that I needed to go to the bathroom.

I walked up the staircase - it seemed very tall, it had a dark glossy timber bannister with thin regular balustrades all the way to the top, and it hooked around to the left at the bottom. I remember standing at the top of the stairs and yelling down "Muuuum!" Mum came rushing to my aide, perhaps thinking I was injured or had done something unspeakable in a stranger's house. When she got to the bottom of the stairs I told her to, "come, quick." She bounded up the stairs and followed me into the bathroom. I turned to face her as she walked through the

I believe that my personal experience of the domestic bathroom has informed my design practice, specifically my desire to make interiors more fitting to the person that uses them. This desire is demonstrated through this Master of Design project, using my skills as a spatial designer to tailor my own bathroom with intent to connect the bathroom space with its user - me.



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Figure 6. Bathroom image. Santos Quartino, D. (2008).

THE BATH ROOM

Bath³

_a large container for water, used for immersing and washing the body;

_an act or process of immersing and washing one's body in the water held by a bath

Room³

_space that can be occupied or where something can be done:

Ritual⁵

_a series of actions habitually and invariably followed by someone

Routine⁶

_a sequence of actions regularly followed

_performed as part of a regular procedure

3. Dictionary definition of bath from Oxford Dictionaries Online. Retrieved 19 June, 2011, from <http://english.oxforddictionaries.com/definition/bath>

4. Dictionary definition of room from Oxford Dictionaries Online. Retrieved 19 June, 2011, from <http://english.oxforddictionaries.com/definition/room>

5. Dictionary definition of ritual from Oxford Dictionaries Online. Retrieved 19 June, 2011, from <http://english.oxforddictionaries.com/definition/ritual>

6. Dictionary definition of routine from Oxford Dictionaries Online. Retrieved 19 June, 2011, from <http://english.oxforddictionaries.com/definition/routine>



Figure 7. Image of bathtubs 3600 years apart. Wright, L. (1960).

The bathroom is profoundly a ritual-based room; it is a room built for purpose and one enters it with specific intents, such as washing, showering and bathing. Current bathroom designs seem to lack the presence of the body in their overall design, however, without the body the bathroom would serve no purpose. The bathroom appears to be defined by the multiples of singular mass-produced products it contains. Lawrence Wright in *Clean and Decent* (1960) highlights that the form of the bathtub hasn't changed in over 3600⁷ years .

The contemporary domestic bathroom is a place where function and ritual coincide with the body and mass-produced industrial products and materials. For this reason, and with no disrespect to ergonomics, this project is based on the qualitative, performative experience of space, rather than the quantitative. The connection between bathroom-space, bathroom-user and bathroom-product has disintegrated, so what about the bathroom as a whole? Is it possible to reconcile the differences within the bathroom through the relationship between space, body and product? Practice-led design research⁸ presents itself as a valuable tool in re-connecting

7. Wright, L. (1960). *Clean and Decent: The fascinating history of the bathroom & the water closet*. Pp. 4 – 9.

8. Pedgley, O. (2007). Capturing and analysing own design activity. *Design Studies*, 28(5), 463 – 483.

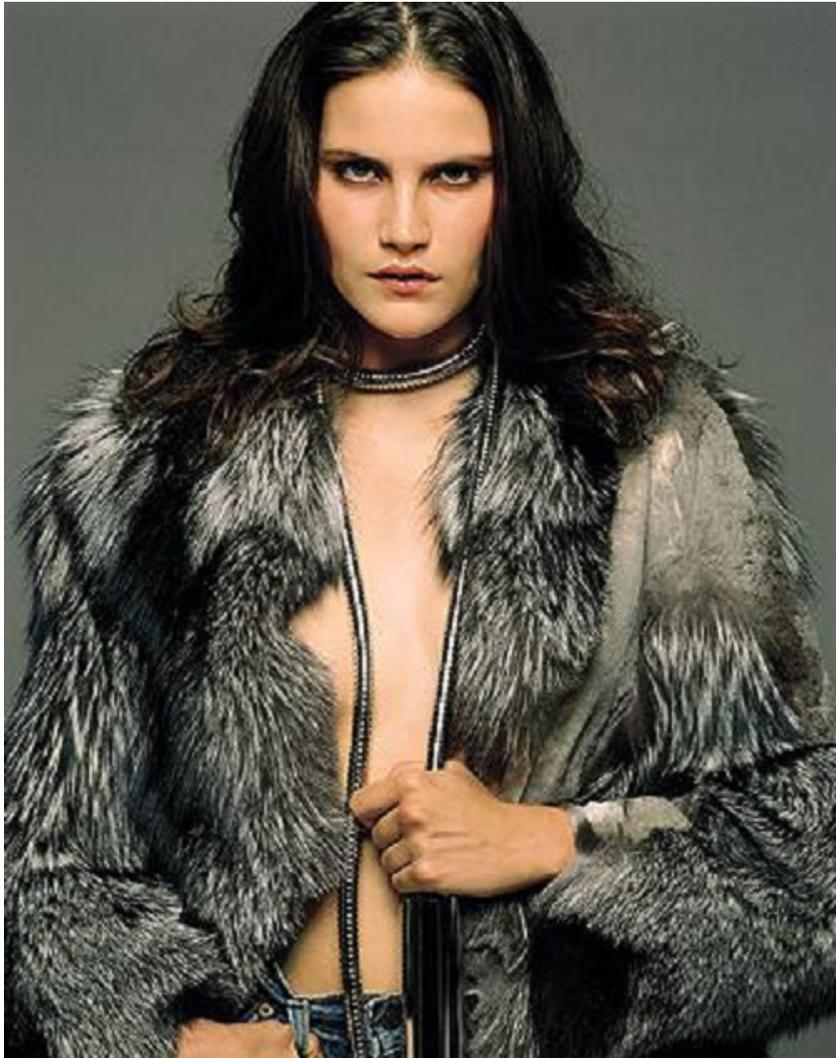


Figure 8. Statements Bathculture 002:98. Photograph (self-portrait). Van Lammsweerde, I. (1998).

the body, product and space to create the bathroom. Using my own body and bathroom as investigative tools, this design research project seeks to establish another method for designing a bathroom. I intend to use my body as a device to explore the relationship between body, space and product. Pedgley (2007) notes, “One of the chief characteristics of practice-led research is that it is highly personal, being centred on the creative practices of the self.” This method for design would highlight in itself the importance of the personal – in theory and design.

In Dirk Hebel and Jorg Stollmann’s *Bathroom Unplugged: Architecture and Intimacy*, Andreas Dornbracht (CEO of German bathroom and kitchen manufacturer *Dornbracht*) in *People, Rituals, Architecture* (2005, p. 21) states, “...if we want to find ourselves, we must enjoy ourselves. In an individually personalized environment. In our own personal bathroom. A bathroom that, in its entirety, is a kind of interface for our physical and spiritual needs and which also reflects them.”⁹ Dornbracht’s *Statements Culture Project* series hints at a shift from product-driven design to user-central design - thinking described by Dornbracht as “changing
9. Dornbracht, A. (2005). *People, Rituals, Architecture*. In D. Hebel & J. Stollmann (Eds.), P. 21 – 22.



Figure 9. Photograph. My bathroom as a result of my body, Smith, L. (2011).

from that of 'bathroom user' to 'bathroom occupier.'" Inez Van Lammsweerde's *Bathculture Statements*¹⁰ (1998) for *Dornbracht*, shows herself wearing a showerhead and hose. It is a provocative visual of the product moving to the background of bathroom design, and the body to the foreground – a visual shift from a typically product-based perception of the bathroom.

The bathroom needs to become more than a place to perform certain rituals, but a room to occupy one's rituals. Examination of my own routines, rituals, actions and movements within my current bathroom emphasizes that my own bathroom excludes personal design and a relationship between product, body and space. With no disrespect to Ergonomics, my research explores the qualitative, performative aspect of space rather than the quantitative. This research explores this interface in the context of the redesign of a standardized domestic bathroom where I use my own body and domestic routines to test the boundaries, forms, aesthetics and functions of what is commonly understood to be a bathroom.

10. Statements Bathculture 002:98. Photograph (self-portrait). Van Lammsweerde, I. (1998). Image retrieved from http://www.cultureprojects.com/eng/statements2/statements2/inez_02.htm



Figure 10. Photograph. My bathroom as a result of my body. Smith, L. (2011).

MY BATHROOM AS A RESULT OF MY BODY

As an initial investigation into this relationship between bathroom space, bathroom product and bathroom user, I took a series of photographs called *My bathroom as a result of my body*. These images were taken after I had one of my daily showers and focus on what the bathroom looks like after using it for its intended purpose.



The images are primarily of the glass structure of the shower cubicle coinciding with the stream/drips/watermarks left after using the shower for the 'act of showering'. The steam/drips/watermarks are an unintentional drawing of the relationship between my body and the shower during the act of showering. The splashes made by myself during showering/washing/combing/shampooing/conditioning/scratching/turning-on/turning-off/adjusting/shaving/lifting/bending hit the steamy glass partition and create a drawing of the consequence of movement - the effect of using the shower for showering.

Figure 11. Photograph. My bathroom as a result of my body. Smith, L. (2011).



Figure 12. Photograph. My bathroom as a result of my body. Smith, L. (2011).

The actions and movements I do when I shower depend on what I enter the bathroom to do. If I have a bath, chances are I won't leave any marks on the shower. If I shower, wash myself but not my hair, I will leave washing/scrubbing/rinsing marks on the shower cubicle - visible from the inside and out. If I shower myself and wash my hair, I will leave completely different marks - or traces - on the shower. Every time I shower the markings I create will be completely different - as unique to me as my fingerprints - and created as a consequence of movement, ritual, routine and actions within the shower.



Figure 13. Surfacing Over There, Shower Series. Joni. Païement, A. (2002).

The photographs celebrate the individuality of every action, routine and ritual during each unique bathroom experience. They capture the moment when the fluid motion my body creates coincides with the water from cleaning myself and becomes visible on the product that facilitates the act of showering.

Alain Païement's *Surfacing Over There* exhibition (Mumbai, 2011) contains images from his *Shower Series*, a sequence of photographs captured from over-head which focus on the intimacy between the viewer and the subject during the act of everyday bathing and showering.

Joni (2002) is an image of a woman reaching around her torso to wash her back, hunched forward with her head almost between her legs, touching the bathtub's taps. The bath is small and square highlighting a contrast between her body shape and the bathtub shape. Body parts are extending past the boundaries of the product, fighting to perform the routines and rituals that this bathtub is meant to allow.



Figure 14. Surfacing Over There, Shower Series. Lio. Paiement, A. (2003).

Lio (2003) shows a man hunched over, his back pressed against the cold white tiling of the shower cubicle, showering the soap from his neck and shoulders. Once again, the body seems to be cramped into an unnaturally formed space that doesn't allow for movement it should facilitate.

These images are particularly striking to me because they highlight a non-fit between the user and the bathtub/shower. The subject seems cramped and awkward whilst attempting to perform their daily rituals and routines in the corresponding bathroom products required.



Figure 15. Image of stone basin. Santos Quartino, D. (2008).

BATHROOMS

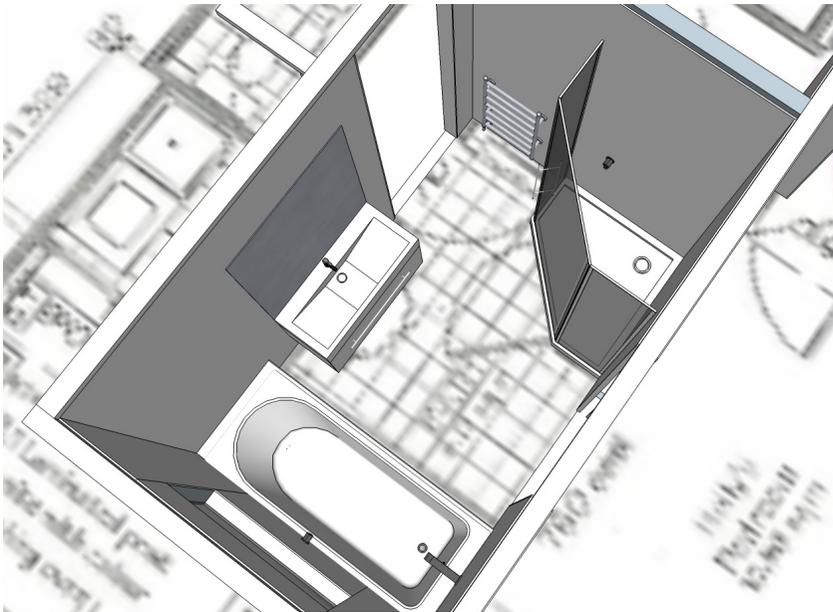


Figure 16. Image of individual products within bathroom. Santos Quartino, D. (2008).

Common domestic bathrooms, like the one I use in Rolleston, are rooms in houses – with walls, floors and ceilings – fitted with bathroom products, generally a shower, sink and bathtub. The relationship between these products is that they all belong in the bathroom, and that they are all used as part of daily rituals and routines that consist of cleaning, washing and cleansing oneself. Other than these basic human necessities, the products have no physical relationship to the bathroom as a space, or the bathroom user for that matter. If the shower, sink and bathtub were in another room within the home, that room would then become the bathroom. Therefore it appears that the bathroom is defined by the products it contains and their individual functions rather than the room as a whole.

French author, Georges Perec¹¹ writes about everyday life, things we do and the places we do them in without much consideration. *Species of Spaces and Other Pieces* (2008, p. 6) discusses the millions of spaces we live our lives in. In Perec's words, "To live is to

11. Perec, G. (2008). *Species of Spaces and Other Pieces*. Penguin Classics; London.



FROM TOP TO BOTTOM

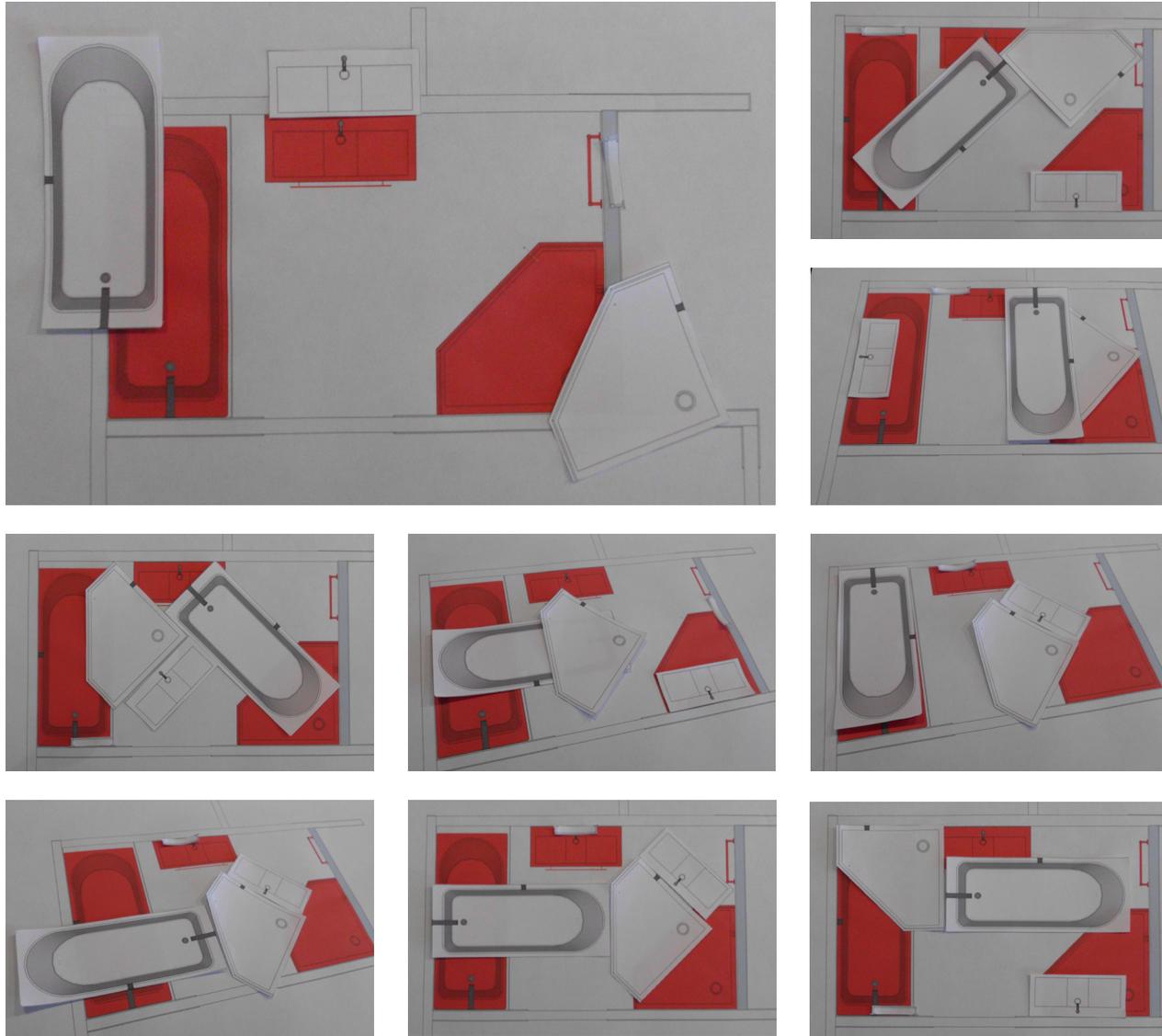
Figure 17. Symetrics Modular bath fitting system. Dornbracht.

Figure 18. SketchUp ariel view of my existing bathroom. Smith, L. (2011).

pass from one space to another, while doing your very best not to bump yourself’.

Perec, in *The Apartment* (2008, p. 27), states that “The interest of such an undertaking [as living in an airport for X amount of time] would lie above all in its exoticism: a displacement, more apparent than real, of our habits and rhythms, and a minor problem of adaptation”. Using inhabiting an airport as an example, Perec states that no matter how extraordinary a situation may be, we will always adapt to the space (or room) provided for us. The bathroom is another example of this situation, the placement of products within a space does not need to be taken into consideration of the layout of the room when one will simply seek out a bathtub, or a sink, or a shower. In my opinion, despite this, the placement of products, the relationship between areas of the bathroom, and an individual’s movements within a space should be taken into consideration of the final design of a space. Georges Perec suggests that it is not where we perform our daily actions that matter – as humans we will adapt to the environment we inhabit.

To put this theory to the test, I stepped back to my own bathroom in Rolleston, which I use on a daily basis, to experiment with my bathroom as a whole; I wanted to see if the relationship between space and product had actually been considered during the design of the space, and if the layout of the products within was deliberate.

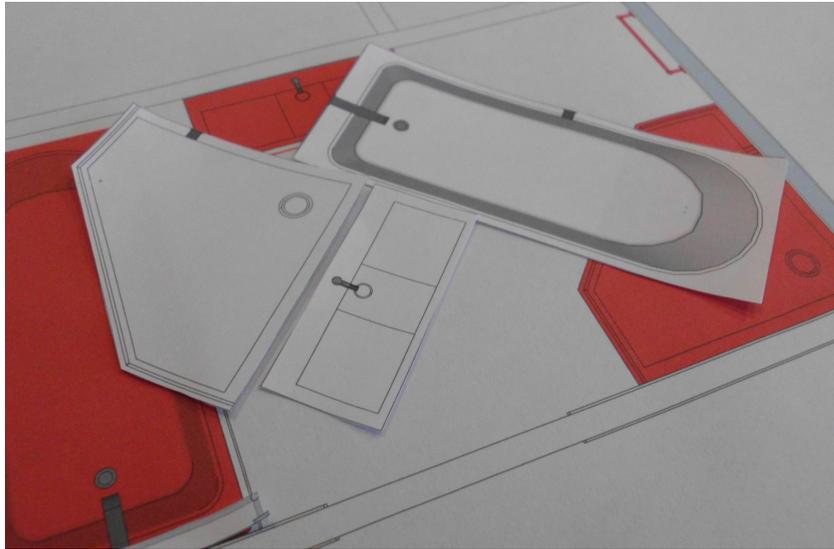


ABOVE
Figure 19. Reconfiguring the Bathroom. Smith, L. (2011).

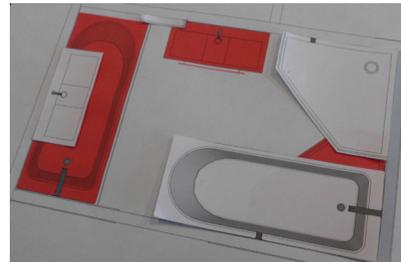
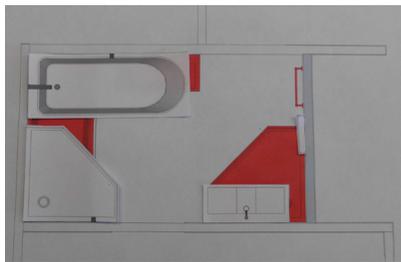
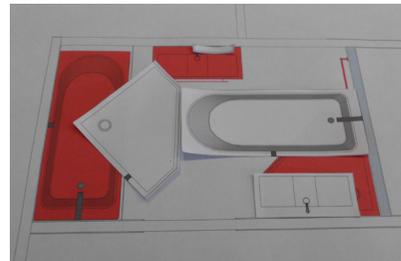
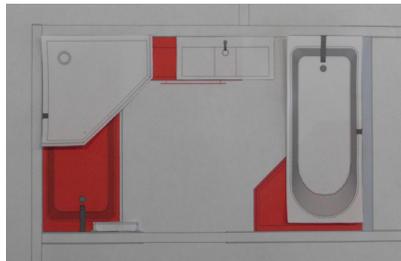
RECONFIGURING THE BATHROOM

My bathroom is not difficult to negotiate, the bathtub is at one end, the shower at the other, and the sink and mirror in the middle. However, was the layout considered in terms of the persons going to be using it? Or is the layout a consequence of space size and product size? If Georges Perec in *The Apartment* (2008) is correct, and as humans we will adapt to spaces provided, then layout is irrelevant apart from convenience and function. However, as humans, should we 'adapt' to spaces provided for us, or should spaces adapt to us?

I printed out two plans of my bathroom, scale 1:20, one red and one white. I laid the white plan flat on my desk and cut out the products from the white bathroom. I then attempted to rearrange them in a variety of configurations within the confines of my bathroom's existing structure, taking into consideration entry and exit points as well as accessibility to all of the products, and excluding convenience and function (as we can 'adapt').



To my disappointment, the products (shower, bathtub, sink and towel rail) would not fit into the bathroom room any other way other than how they are in reality; the layout is a result of pre-selected plans and post-selected products as well as the economic value of ordering the products, resulting in my bathroom layout. They are arranged the only way the products can be within the space in order for the bathroom to function.



ABOVE
Figure 20. Reconfiguring the Bathroom. Smith, L. (2011).



Figure 21. Symetrics, RainSky M modular shower system. Dornbracht.

DORNBRACHT

Andreas Dornbracht, as previously mentioned is the CEO of Dornbracht. In *People, Rituals, Architecture* (2005), Dornbracht acknowledges the need for the bathroom to be considered as an entire space, as shown in his *Statements Culture Project* series, Dornbracht says that his company “have finally reached a point where our collected findings are again able to influence the design of standard shapes. And for once, the product is not the only focus of attention.” Not only does this highlight that there is a shift from product-based bathrooms to considering a bathroom as a whole space, but also that the product *was* the only focus .

Dornbracht's Symetrics series is a step closer to achieving a whole bathroom space. A modular system has been designed so the user can ‘personalize’ their bathroom. With *RainSky M*, a space has been created using this modular system, removing the shower as one product and replacing it with a series of modules to create the product, space, or room. According to *Dornbracht's* website, “*Symetrics* opens up new perspectives in bathroom planning. This



focuses not on the individual series or fitting, but on the room as a whole. By clearly separating the spouts and the controls, the entire appearance of the bathroom is redefined by the arrangement of the modules. This provides diverse application options for each area of the bathroom.”¹²

Dornbracht's Elemental Spa series looks at visualizing the movement that occurs within the bathroom, most often unnoticed. The concept for the design is “water changes everything”. According to Dornbracht, the *Elemental Spa* focuses on water as it “becomes the starting point for personal and shared rituals in physical and mental cleansing”.¹³



Internal copper cladding throughout wet areas within the bathroom allows for the appearance of the bathroom to change through user occupation from the ritual of cleaning oneself. The water splashes onto the copper surface and gradually turns green over time. In this sense, *Elemental Spa* also considers duration within the bathroom, time spent using the bathroom will change its appearance.

FROM TOP TO BOTTOM

Figure 22. Elemental Spa Shower component. Dornbracht.

Figure 23. Elemental Spa whole bathroom design. Dornbracht.

12. Dornbracht. Symmetrics description.

13. Dornbracht. Elemental Spa description.

INSIDE OUT

As a spatial designer, it is my observation that many contemporary interiors are industrial products of the architecture they are contained within. This section of my thesis looks at various ways of 'designing from the inside out'. The examples which follow are all methods of 'designing from the inside-out', some more successful than others. I have used these to drive the re-design of my bathroom, and learning that the 'inside-out' could be translated in multiple ways. This section aims to interpret my own translation of 'inside-out' with an attempt to clarify my own project.

JULIAN HAKES

HOW TO DESIGN FROM THE INSIDE OUT

Julian Hakes, a bridge architect from the United Kingdom, designed a shoe called the *Mojito*. The design comprises a single piece of carbon fibre that wraps around the wearer's foot, forming support for the heel and ball. Similar to the design of bridges, with the *Mojito* shoe, the foot naturally forms a bridge between the two¹³. The shoes are laminated with rubber on the side that touches the floor and leather on the side next to the skin.

The *Mojito* shoe design looks at the movement of the foot, how it transfers its weight and then uses this to inform the design. Hakes approached the question of, "if the design of a shoe was an evolution of the early sandal then how can new materials and design techniques provide a new solution?"¹⁴ Hakes does not seek to disregard current shoe design methodology, however he does find a niche of a new way to design shoes. To design something in an alternative way is important when approaching design, as one

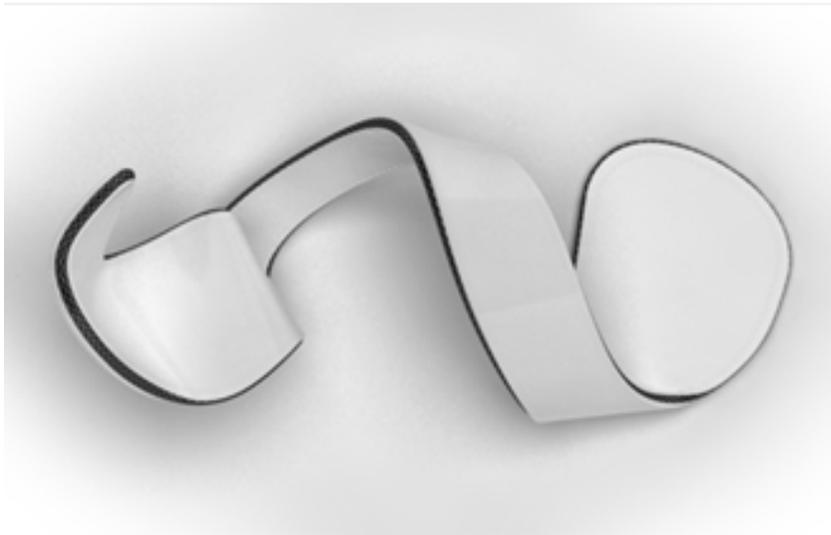


Figure 24. Mojito shoe, elevation view. Hakes, J. (2009).

13. Dezeen » Blog Archive » Mojito shoe by Julian Hakes. (n.d.).

14. Dezeen » Blog Archive » Mojito shoe by Julian Hakes. (n.d.). Interview with Julian Hakes.

cannot design for the future without learning from the past. In my own design I am seeking to carry this method into the re-design of my domestic bathroom, expressing the desire for an alternate method for designing interior spaces without ignoring previous methods and current design practices.



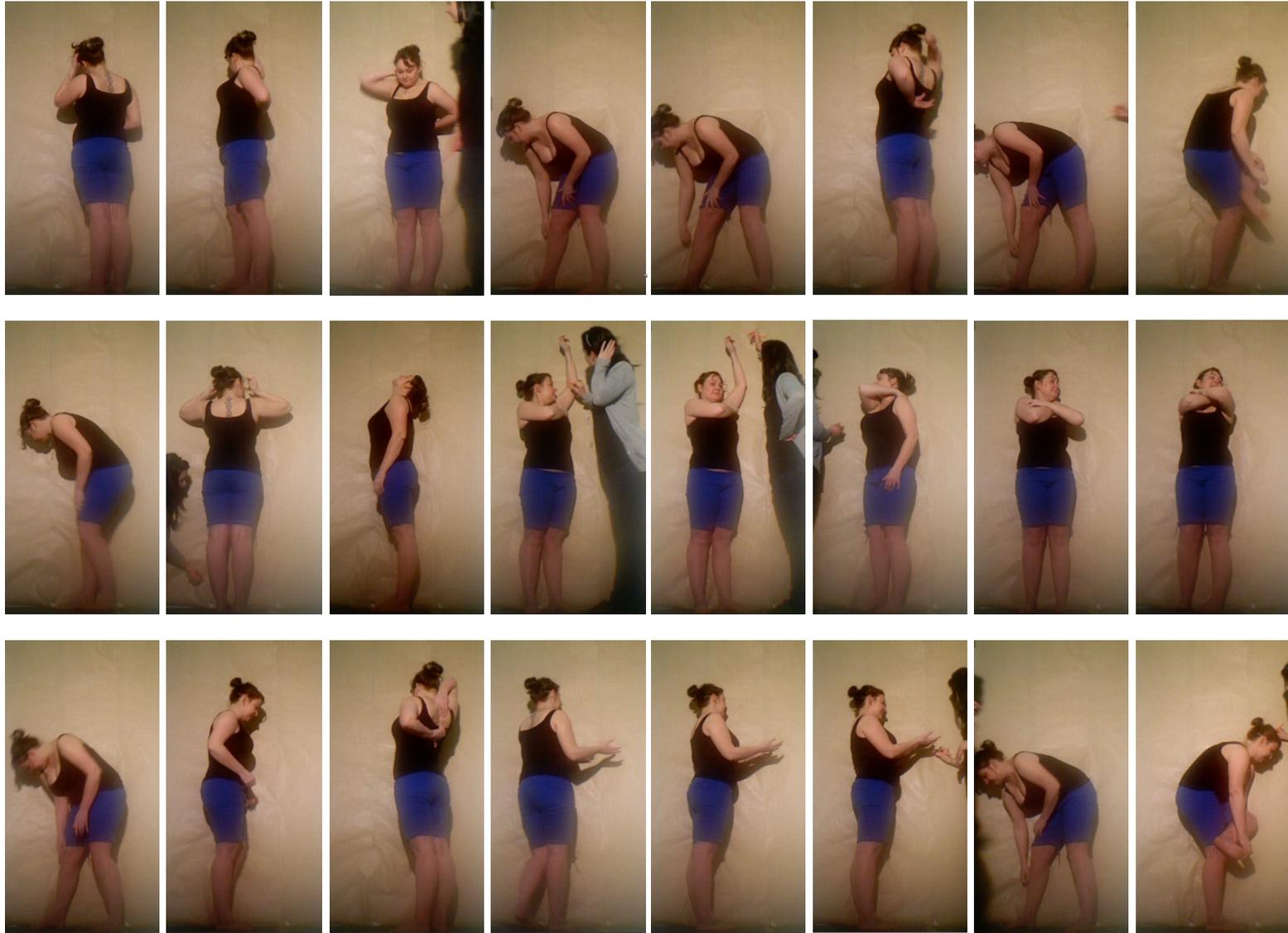
Hakes states, “Most shoes are designed from the outside in - they are designed to look good on the foot. As an architect I did the opposite and designed them from the inside out - I looked at how the foot moves, how it transfers the body’s load. For me, it wasn’t much different from designing a bridge.”¹⁵

Another aspect of the process for designing the Mojito shoe that Hakes adopted was to use his own body to try out his design thinking. He wrapped his foot in tracing paper, binding it with masking tape, and then drew various geometries onto and over the form of his foot. This produced a seamless geometry of the foot which starts at the ball, wraps over the bridge of the foot and back to provide the support for the heel.

Figure 25. Mojito shoe, plan view. Hakes, J. (2009).

15. Style Hive Blog Archive. Mojito shoe by Julian Hakes (2009).

This is similar to the process I have been undertaking to re-design my bathroom, using my body as the tool to investigate the potential for an alternate method for designing interior spaces. Instead of considering the interior as a by-product of its architecture, movement mapping and patterns in an individual's daily routines and rituals could generate an interior space. The use of one's own body can be used to realize future design, and Julian Hakes is an example of this methodology. I took Hakes exercise to heart, but instead of wrapping my body in paper, I traced my body onto paper.



ABOVE
Figure 26. Movement Drawings. Smith, L. (2011).

DRAWING MOVEMENT

Using Hakes method of tracing the body to determine a shape and form for my design, I set about to create life-size drawings of myself during the re-enactment of the act of showering and bathing.

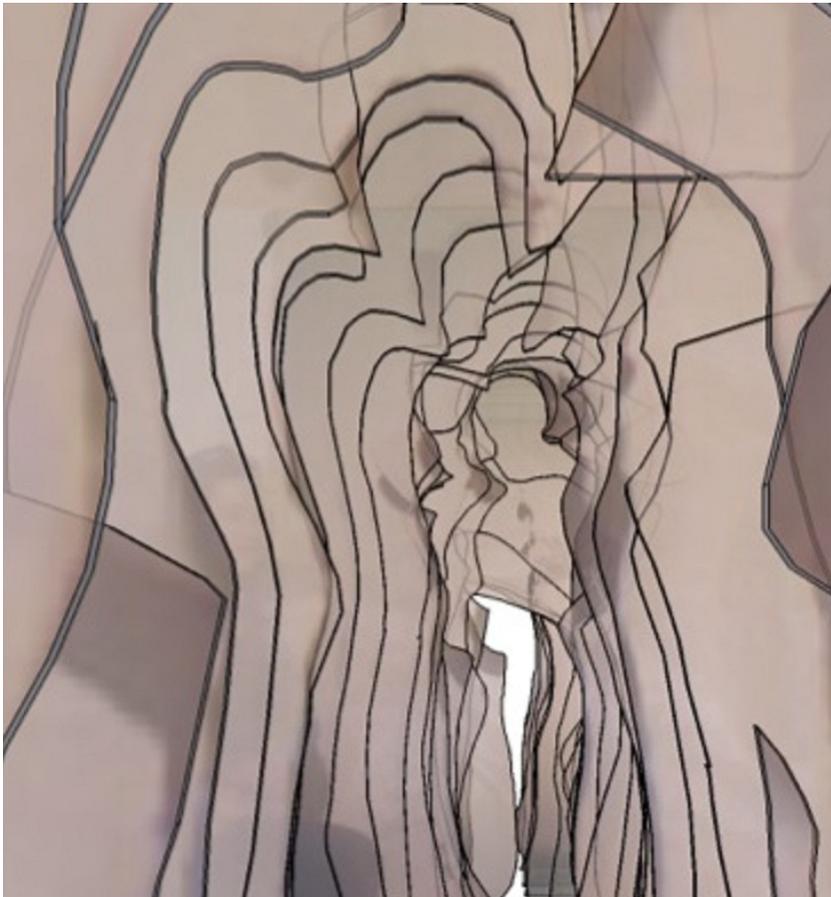


Figure 27. Visualizing Movement in SketchUp. Smith, L. (2011).

With the aid of my friend, I set about to do two sets of two drawings – two of showering, two of bathing. I set up a light projector, aiming it at a flat bare wall. I pinned up a giant pieces of brown paper which was longer than the distance between my arms stretched to the tips of my toes. The first set of drawings consisted of myself holding typical showering and bathing poses while my friend traced around the shape of my body. The second set consisted of myself trying to draw myself whilst I re-enacted the act of showering and bathing.

The most important information I gained from this series of four drawings is that my body is *always* moving. I learnt that no matter how still I tried to be, the slightest movement would alter the drawing of my body shape substantially.

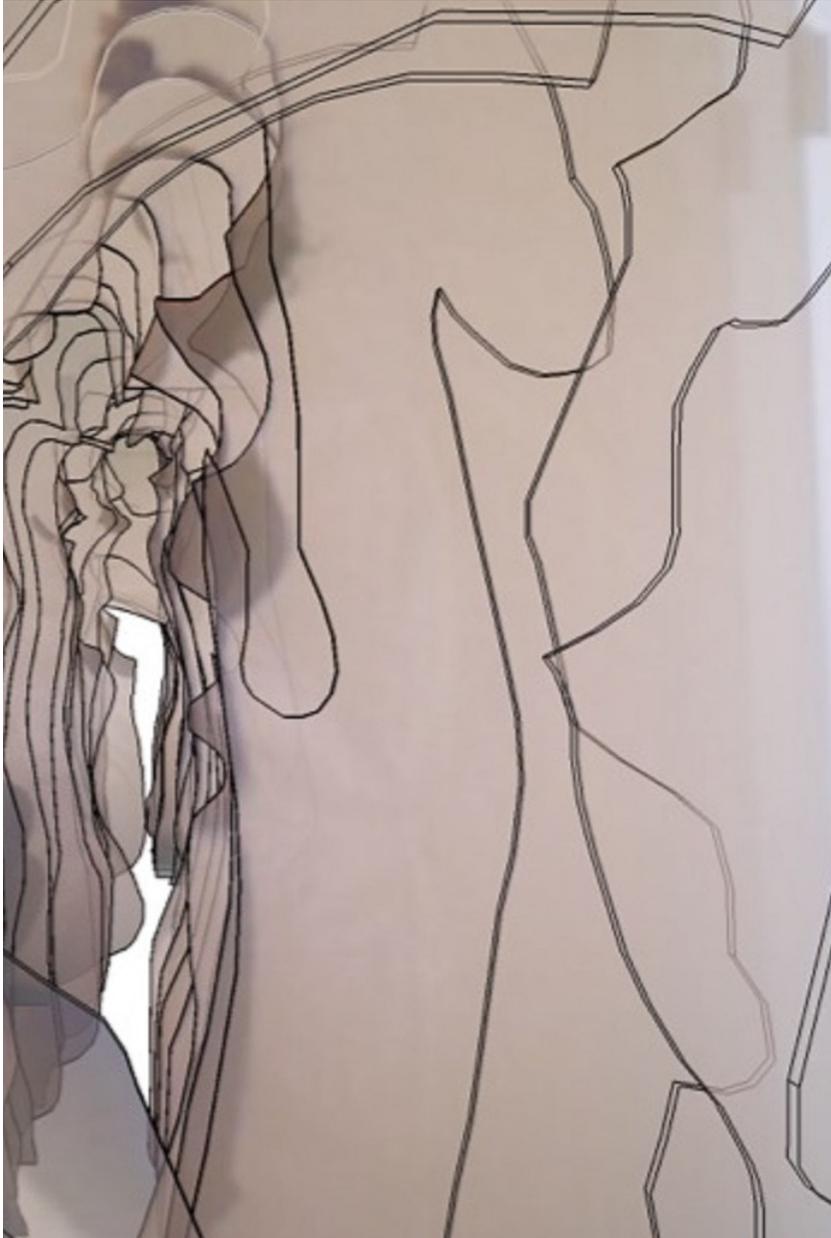


Figure 28. Visualizing Movement in SketchUp. Smith, L. (2011).

Hakes' method works well on a small scale, but not on a larger scale. The drawings were definitely of valuable use to this project. I traced the drawings into a 3D digital modelling program, SketchUp.

Figures 27 and 28 show the space generated using the *Movement Drawings*. The space developed into a long linear corridor, still-framing slices of the movements that occurred during the act of drawing. Whilst the drawings served as a reflective tool to look back on the movements made during the act of re-enacting showering and bathing, it would be very difficult for this space to actually function as a bathroom. The digital model and drawings serve as a visual reflection of the experience of showering and bathing.

The spaces were designed and considered from the inside out, as much so as Julian Hakes *Mojito* shoe. However, the spaces that developed were not really inhabitable – the design produced long corridors of space to inhabit but would most likely interrupt any rituals and routines I tried to do within it.

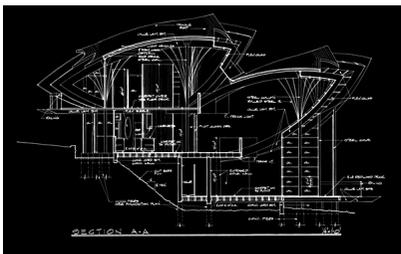
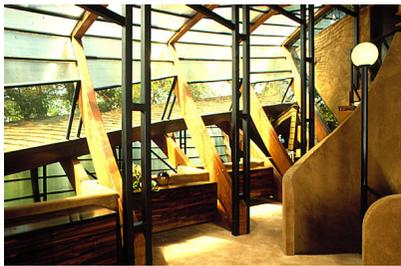
BART PRINCE

HOW NOT TO DESIGN FROM THE INSIDE OUT

Bart Prince is an architect, designing for his self-titled company. Prince states that, “Architecture comes about as a result of the synthesizing by the architect of creative responses to input from the client; data gathered from the site and the climate; and an understanding of structure, materials, space and light. Working from the inside-out, the architect guides the growth of an idea resulting from the combination of these responses to a completed design which is as much a portrait of the client as it may be of himself.”¹⁶

Bart Prince takes a different stance from Julian Hakes in terms of designing “from the inside-out” – whilst Hakes focussed on the movement of the body to drive the design of the shoe visibly from the inside to the outside, Prince claims that the response to the brief from a client and their involvement on a project drives the design of a building from the inside (core values/wants as directed

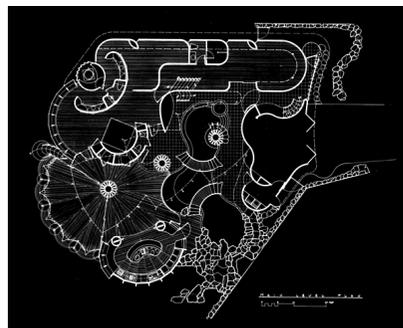
16. Bart Prince. Quote from Bart Prince. Retrieved April 17, 2011, from <http://www.bartprince.com/>



1981-82

FROM TOP TO BOTTOM

Figure 29. Seymour Residence. Prince, B. (1981).
 Figure 30. Seymour Residence. Prince, B. (1981).
 Figure 31. Seymour Residence. Prince, B. (1981).



1984-89 + 1994-96

FROM TOP TO BOTTOM

Figure 32. Price Residence. Prince, B. (1984).
 Figure 33. Price Residence. Prince, B. (1984).
 Figure 34. Price Residence. Prince, B. (1984).

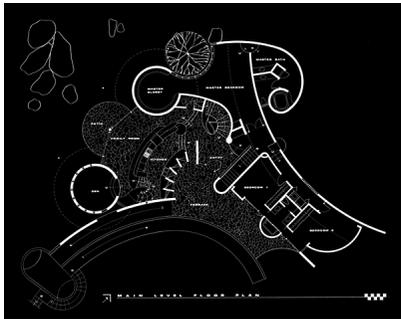
by the client) to the exterior shape and form of a building.

Prince talks about *how* he creates architecture, the *how* is heavily dictated by the *who*. “A completed design is as much a portrait of the client as it may be of himself”¹⁷ – this is a notion I have played around with myself, that the design and the person the design is for could be a portrait, or a self-portrait in my case.

In my opinion, the aesthetic language throughout Prince’s designs is very similar and succinct - as demonstrated in figures 29 to 40. If one is to design for the individual, then I believe each design should be unique and without an intentional aesthetic language. Perhaps Prince’s aesthetic style is not coincidence, perhaps this language is his signature, but personally I feel that if design is to truly be individual and unique to it’s inhabitant, little aesthetic language should occur.

“The scheme grew from the inside-out beginning with the desires of the client for privacy as well as an integration with the site and close association with the sea.” From this description of the scope

17. Bart Prince. Quote from Bart Prince. Retrieved April 17, 2011, from <http://www.bartprince.com/>
 18. Bart Prince. Description of scope for Joe and Etsuko Price Residence. Retrieved April 17, 2011, from <http://www.bartprince.com/price.html>



1987-88

FROM TOP TO BOTTOM

Figure 35. Bradford Residence. Prince, B. (1987).
 Figure 36. Bradford Residence. Prince, B. (1987).
 Figure 37. Bradford Residence. Prince, B. (1987).



1992-93

FROM TOP TO BOTTOM

Figure 38. Hight Residence. Prince, B. (1992).
 Figure 39. Hight Residence. Prince, B. (1992).
 Figure 40. Hight Residence. Prince, B. (1992).

of the *Price Residence* (figures 32 - 34), Prince reveals the 'desires of the client' are a driver for the design of the home. The desires of the client may be present, but what about another layer of the person who will be using the home? Like a portrait, where is the relation to a body in time? To me, in Prince's designs, there is a confusion between what the body needs (basic necessity) and what the body wants (self-indulgent). Prince appears to have adopted an aesthetic of his own that also drives the design of the building and, consequently, interior spaces. Prince's integration of 'client desires' is a method for designing from the inside out – making their dreams reality – and projecting their inside [dreams] – out [reality].

JANET FRAME; LIVING, WRITING



Figure 41. Overlaid still shots of the act of showering. Smith, L. (2010).

Janet Frame: Living, Writing is a project I undertook as a final year spatial design student at Massey University. It investigated how a building could be designed from the inside-out, using Janet Frame's autobiographical novels and focusing on the bodies' movements within the common domestic dwelling during the 'act of doing'. I then used these as the driver for the physical and aesthetic appearance of the home – starting with the interior.

I brought this method of design into this Master of Design project. I set about to design 'from the inside out' – mapping and investigating the body's subconscious gestures and actions whilst performing specific daily tasks and rituals, and exploring how these can be translated into inhabitable spaces. It is my belief that we currently negotiate spaces that are made for us as a consequence of the common practice that architecture is designed and built before the interior; however it is the interior we inhabit. So, should the interior be a product of its architecture? Or can an interior be designed using its inhabitants bodies movements, rituals and routines as a

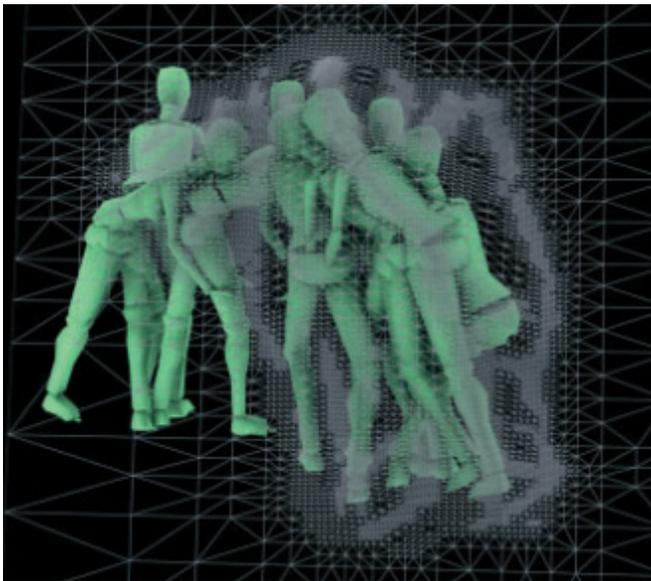
driver to accommodate a host of functions?

Figure - is the showering space I created in my final year, showing the body during the act of showering and the space that was created from this.



Figure 42. Janet Frame: Living, Writing. Act of showering creating a shower space. Smith, L. (2010).

HERTZIAN SPACE



FROM TOP TO BOTTOM

Figure 43. Form created during full body massage. Burry, M. & Taylor, M. (2007).

Figure 44. Hertzian Space. Burry, M. & Taylor, M. (2007).

Mark Taylor and Mark Burry have approached making a space from a person's movements during the act of doing something. In *Hertzian Space: Material Response to Spatial Practice*, Taylor and Burry aim to spatialize the act of a full body massage.

Taylor and Burry offer to “generate surface from context-specific bodies and activities that directly influence material arrangement.”²⁰ In *Hertzian Space*, the potential for a physical realization is already there. “Interior surfaces become an outward projection – a spatial presence of occupational activity”. This reinforces the notion of designing from the inside out, movements/activities that would normally occur on the inside are driving the spatial form as seen from the outside. This differs from my project as I am aiming to explore conceptually what a tailor-fit bathroom might look like.

Hertzian Space allows for the possibility that the exterior can be a product of the interior through examination of our inhabitation whilst doing an activity.

20. Taylor, M., & Burry, M. C. (2007). *Hertzian Space*. Thinking Inside the Box, p. 150.

Bathroom Diary

Bathroom Diary

Date started:
12th August 2011
@ 3pm.

Objective: To ~~monitor~~ monitor my bathroom usage, what I do in the bathroom and to clarify daily routines or deviations from routine for myself. To include other bathroom activities in my research project + design for them.

Figure 45. Extract from Bathroom Diary. Smith, L. (2011).

BATHROOM DIARY

In order to consider every routine and ritual, action and movement I do in the bathroom, I kept a *Bathroom Diary*. Upon commencing writing my diary I had no preconceptions of what the results of writing about my daily activities would be, however the objective of the diary as stated when I first began writing was: "To monitor my bathroom usage, what I do in the bathroom and to clarify daily routines or deviation from routine for myself. To include other bathroom activities in my research project, and design for them".²¹

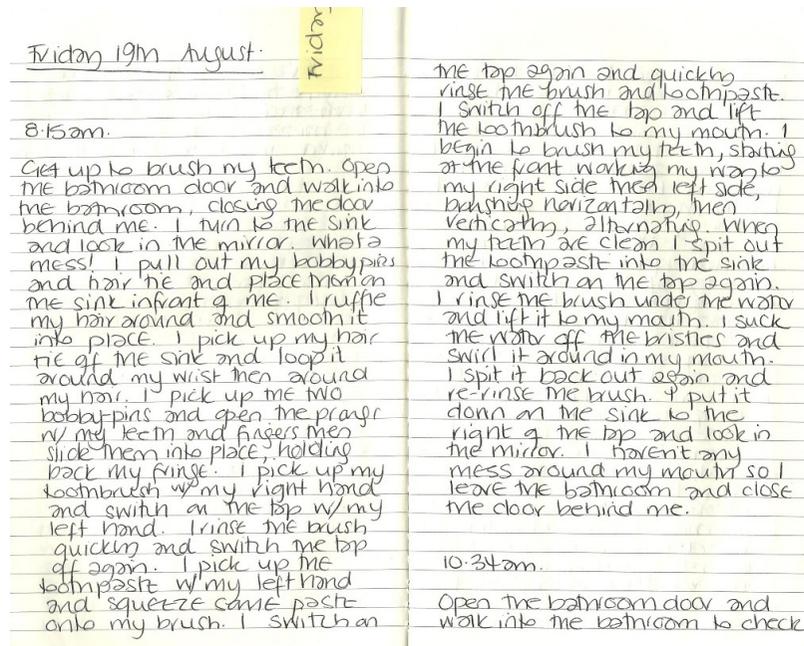


Figure 46. Extract from Bathroom Diary. Smith, L. (2011).

In this diary I initially started by writing the time I entered the bathroom, and followed up with a brief description of what I did whilst in the bathroom. At the end of each day I intended to write a list of the products I used and draw a quick sketch of how that day's bathroom might look, but it proved rather difficult. Firstly, a day is too short a segment of time to draw up an entire bathroom – there are times when all I would use was the sink and mirror. Secondly, after writing about a specific space (my bathroom) it became difficult to draw a new bathroom, or re-design my

21. Lorna Smith. (2011, August 20). The Bath Room_Diary Entry. The Bath Room

<p>my hair again, hair brush in hand. I untie untie my hair and put the hair tie and bobby-pins on the sink. I begin to brush my hair starting w/ short bursts to grab all the knots. When the knots start to lessen I brush my hair from the root to the tip til all of the knots are gone. When my hair is brushed I place the brush on the edge of the sink and pick up my hair tie. I loop it around my wrist and flip my head back. I push my hair into a pony tail shape and wrap the hair tie around it, looping it around into a bun. I pick up my two two bobby-pins off the sink and put the tips of them in my mouth. I pick one out, open the mouth prongs w/ my teeth and hand and slide it into place, holding back my fringe. I use the second bobby-pin to hold the first securely in place. Once everything is in place I check check myself out in the mirror to make sure my hair</p>	<p>looks ok. It does so I do one last lookover to make sure I have nothing on my face etc. I leave the bathroom, closing the bathroom door behind me.</p> <p>6:58pm.</p> <p>Need to shower. Open the bathroom door carrying my moisturizers and place them down on the sink. I switch on the light w/ my right hand and close the bathroom door. Look in the mirror and decide to re-do I go over to the toilet and switch it on, then adjust the temperature so it'll be warm when I get out the shower. I look in the mirror and decide to re-do my hair. I pull out my bobby-pins and hair tie and put on them on the sink. I tidy my hair and re-tie the lengths of hair into a ponytail with the hair tie. I pick up the two bobby-pins off the sink and put them in my mouth. I pick up the chunk of hair</p>
--	---

<p>that is my fringe and loop it into how I want it. I pick a bobby-pin out of my mouth, pull apart the prongs and slide it into my fringe. I do the same w/ the second of the two. I take off my glasses and put them on the sink and begin to undress. I take off my noddie, dress, stockings, bra and undies and throw them on the floor by the door. I switch on the shower and step out of the shower. I put on my shower cap looking in the mirror, I look it at the front of my forehead and pull it back then tuck in my stray hairs so they don't get wet. I open the shower door and test the water temperature w/ my hand. I step in and close the door behind me. I start to rub water on my arms, rubbing in circular motions and gradually move to my torso and back, meaning water over my shoulders and under my arms. I turn around in the shower and wet my back more, spreading directly under the water. I rub my</p>	<p>back or what little parts of my back I can reach and stand still under the pressure so the water beats down on my shoulders. I turn back around and start to rub the water on my legs, lifting one leg at a time to rub into lower parts and feet. I grab a dollop of moisturizer and rub it together in my hands creating a soapy lather. I rub it on my skin from head to toe then rinse it off again under the shower. Once all the soapy moisturizer has been washed off I switch off the water and grab the squeegee off its hook. I start squeegee use the glass panels starting at the top and drag it down, clearing the glass of any water marks. Once I have squeegeed I open the shower door and put the squeegee on its hook. I step out of the shower and close the door behind me. I grab my towel off the towel rack and proceed to dry myself. I dry my face first and remove my shower cap. I hang it on the shower</p>
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FROM TOP TO BOTTOM

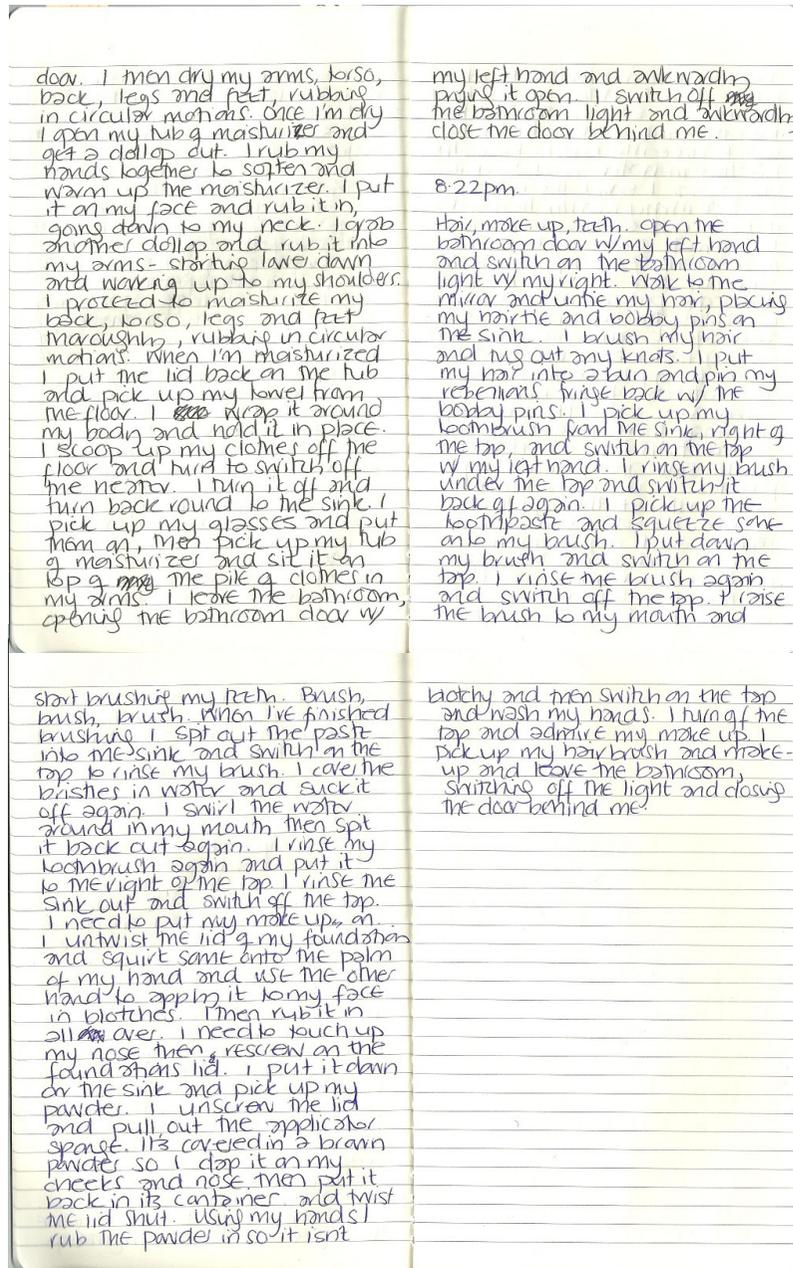
Figure 47. Extract from Bathroom Diary. Smith, L. (2011).

Figure 48. Extract from Bathroom Diary. Smith, L. (2011).

bathroom. I decided two days into my diary not to draw a sketch at the end of each day.

Instead I decided to be very specific about what I was writing – entirely down to details such as which hand I used to open the bathroom door, and which hand I would hold my toothbrush in. Every time I entered the bathroom, and after exiting it again, I would recall what I had done and write it down specifically in my diary.

Owain Pedgley in *Capturing and analysing own design activity* (2007) states that, “data collection tools for practice-led research must also satisfy four additional criteria: solo effort [done by oneself], endurance [a lengthy study/project], subject delimitation [directed at a specific subject area], and mobility [carried out in multiple locations].” The *Bathroom Diary* satisfies all of the criteria specified – it is done by myself (a recollection of my own memories and experiences within the bathroom and written by myself), it has been kept for a long period of time, it is directed at keeping a log of a specific subject area (bathroom rituals and



FROM TOP TO BOTTOM

Figure 49. Extract from Bathroom Diary. Smith, L. (2011).

Figure 50. Extract from Bathroom Diary. Smith, L. (2011).

routines), and it is a mobile, tangible object.

The diary as a method to record personal, intimate details is conventional – it is a personal account of a particular moment in time, “As well as facts, diaries traditionally reveal emotional responses towards circumstances, along with moments of serendipity”²². As such, moments of personality come through in the diary – moments when I'm not just describing how I open something or when I step into the bath, but moments that reveal part of the person that is opening the door or stepping into the bath.

22. Pedgley, O. (2007). Capturing and analysing own design activity. P. 471.

PROGRESSION IN MY DIARY

After three weeks of keeping my bathroom diary, I had enough data to use to begin to consider other aspects of my bathroom design that previously I hadn't.

Reflecting on my diary, duration and time spent within the bathroom became a valuable driver for the re-design. I found that I spent most of my time in the bathroom in front of the mirror - admiring myself, or checking myself for imperfections on the surface.

The shower was the next product I spent most of my duration in the bathroom for: preparing, undressing, putting on my shower cap, stepping into the shower, washing myself, applying soap, washing my hair with shampoo, conditioning my hair, washing myself again, shaving my legs and underarms, washing myself again, squeegee-ing the shower cubicle, opening the door and stepping out, drying myself, moisturizing myself, getting dressed and finally, leaving the bathroom.

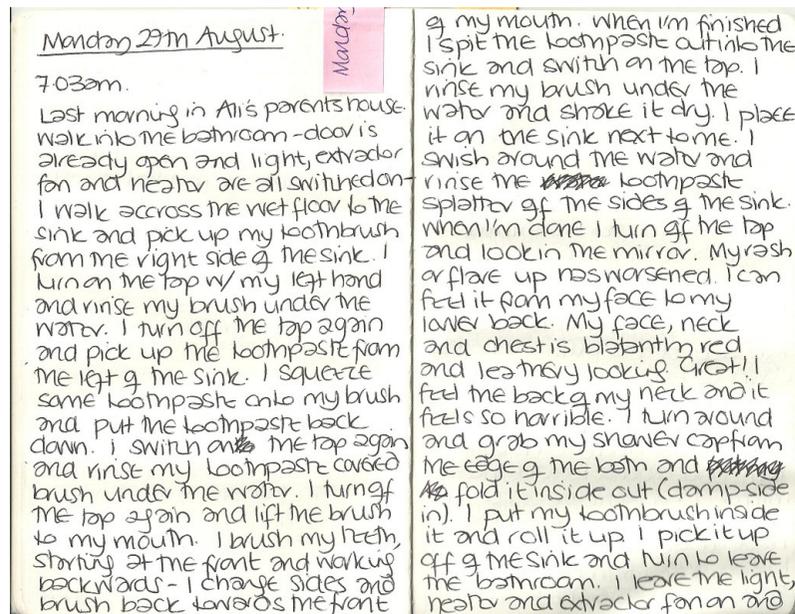
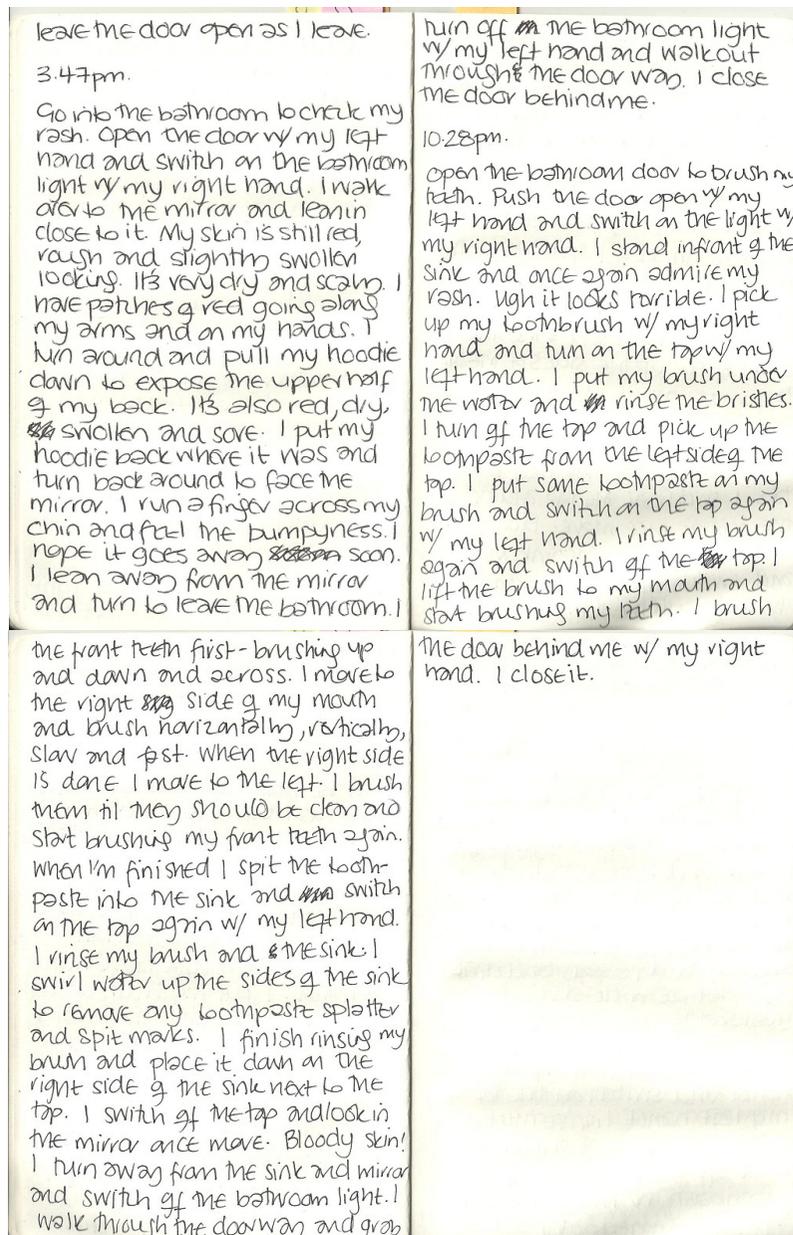


Figure 51. Extract from Bathroom Diary. Smith, L. (2011).



FROM TOP TO BOTTOM

Figure 52. Extract from Bathroom Diary. Smith, L. (2011).

Figure 53. Extract from Bathroom Diary. Smith, L. (2011).

Lastly, I used the bath. Once in the entire time I kept my *Bathroom Diary* I had a bath. This was time-consuming in terms of having to perform the same actions as a shower, but having to run the bath beforehand and constantly check on its temperature and water level. It is interesting to note that whilst it is common to lie in the bath, I find it very uncomfortable. I am too short and have to balance on my tip-toes lying flat so my head doesn't go underwater. I prefer to sit in the bath within its width, sitting in the cross-legged Lotus position, to relax. Other than the once I bathed in it, and the daily prop it has become for ease of moisturizing my legs, it was seldom used.



Figure 54. Ebb Bathroom shower, bath and sink unit. UsTogether.

PROGRESSIVE BATHROOMS

UsTogether

UsTogether is a British/Irish design company that creates bathroom furniture specifically for a person's daily rituals and routines. *UsTogether's* designs are developed through conceptual thinking driven by "a practical requirement to get out in the morning and a desire for a separate bathing space to relax and escape"²³.

Ebb Bathroom

The *Ebb Bathroom* has been designed in a linear formation designed to deal with a person's hectic schedule in the morning, but also their unrushed schedule of an evening. This is visually evident in the design of the two pieces to the right. The shower, bath and sink unit places the sink for easy access at one end of the unit, making it readily accessible to its user. The bath is enclosed within the sink and shower areas whilst the shower is at the far end, sheltered by the rest of the structure. The structure of the



Figure 55. Ebb Bathroom sink and bath unit. UsTogether.

23. UsTogether. Statement of intent. Retrieved August 24, 2011, from <http://www.ustogether.eu/>

Ebb Bathroom creates a piece of furniture that acts as both the bathroom products and the bathroom space.

Loop Bathroom



UsTogether's Loop Bathroom design has a similar statement of intent as *Ebb Bathroom* does, "a practical requirement to get out in the morning and a desire for a separate bathing space to relax and escape". This is evident through the minimal aspects of the sink design in comparison to the comfy, welcoming design of the bathing area. The recliner makes a visual shift to relating the product to the body that uses it, however it remains a mass-produced piece of bathroom furniture that can be bought by anyone.

Design Odyssey – Vertebrae Vertical Bathroom

Design Odyssey are a product development company that specialize in bathroom design and are known for the *Vertebrae Vertical Bathroom*²⁴. The *Vertebrae Vertical Bathroom* is a linear bathroom design which occupies 4.3 square feet. Designed as

24. Design Odyssey's *Vertebrae Vertical Bathroom* design. Retrieved September 20, 2011 from <http://www.designodyssey.co.uk/product.php>

Figure 56. Loop Bathroom. UsTogether.

a 'space-saving' design for a bathroom, it is also a progressive bathroom design, but in a vertical manner as opposed to the previous horizontal designs from UsTogether.



Figure 57. Vertebrae Vertical Bathroom unit. Design Odyssey.

The bathroom's modules all rotate around a central axis and everything feeds down through the central axis which connects to the ceiling. The progression is from shower at the very top of the structure, through to a toilet cistern, storage space, basin and finally the toilet at the bottom. Functionally, this works well. However, spatially it could be problematic and time-consuming shifting from using the shower to using the toilet, for instance.

The flow and language from *UsTogether's Ebb Bathroom* design is similar to the progression evident in my own routines and rituals as written in my *Bathroom Diary*. A progression from areas of high use (similar to *UsTogether's* notion of getting out in the morning), and areas of low use (a place to relax) should be visible in my design. This visually demonstrates in a linear method my own individual routines and rituals within the domestic bathroom, however, spatially the *UsTogether's* bathroom designs still consist

of bathroom products and eradicate the bathroom space as a whole – these products could be placed anywhere and function as a bathroom. It is my intention to unite the bathroom products and space together, where the bathroom space and bathroom products join together to complete the bathing experience.

ROOMS	DAYS	PRODUCTS	BODY PARTS	ACTIONS	MATERIALS
BATHROOM	MONDAY	LIGHT SWITCH	FACE	HOLDING	PLASTIC
		HEAT SWITCH	EYES	COVERING	
BEDROOM		EXTRACTOR FAN SWITCH	EYE SOCKET	CLOSING	MIRROR
		EXTRACTOR FAN	EYEBROW	SHOWERING	
LIVING ROOM			EYELASHES	MOISTURIZING	
		SPONGE	LIPSTICK	ITCHING	
DINING ROOM		POWDER SPONGE	LIPGLOSS	SCRATCHING	ALUMINIUM
		POWDER	LIPS	WASHING	
WASHROOM	TUESDAY	POWDER TUB	EYELINER	DRYING	GLASS
		MOISTURIZER (EMULSIFYING	EYE SHADOW	BATHING	
POWDER ROOM		OINTMENT) TUB	EYEBROW PENCIL	DRESSING	METAL
		BATHTUB	NOSE	UNDRESSING	
BOARDROOM		BATH TAP	FOUNDATION	ADMIRING	
		BATH FAUCET	CHEEK BONES	INVESTIGATING	
BALLROOM		BATH PLUG	MIRROR	RUBBING	RUBBER
		BATH DRAIN	ARMS	DRAGGING	
BOXROOM	WEDNESDAY	BATH FAUCET	BENCH	SQUEEGEE-ING	CHROME
		BATH MAT	SHOULDERS	GROWLING	ACRYLIC
CLASSROOM		SHOWER MAT	SQUEEGEE	REMOVING	
		SHOWER CAP	SQUEEGEE HOOK	PUSHING [THE DOOR]	TILE
HOTEL ROOM		SHOWER FAUCET	BODY	CARRYING	
		SHOWER HOSE	FATTY LEMNIS W/ELOCON	COMBING	CEMENT (GROUT)
CLOAKROOM		SHOWERHEAD	MOISTURIZER		
		SHOWER DRAIN	FATTY LEMNIS W/ELOCON	GROWLING FACE	DPM
DRESSING ROOM	THURSDAY	SHOWER DOOR	MOISTURIZER TUB		
		CHANGING ROOM	SHOWER CUBICLE	EMULSIFYING OINTMENT	PLYWOOD
		RESTROOM	SHOWER SHELVES	MOVING UP	
			SINK SHELVES	STARTING AT	CONCRETE
EQUIPMENT ROOM			SINK DRAWER	LEAVING HUGE	
			SINK TAP	TRYING TO	
BOILER ROOM	FRIDAY		CARDIGAN	LOOKING UP	
			DRESS	WORKING TOWARD	SILICONE
		TOWEL	STOCKINGS	SWITCHING ON	
LAUNDRY ROOM		HAIR TOWEL	BRA	SWITCHING OFF	PVC
		BODY TOWEL	UNDIES	TAKING OFF	
COMMON ROOM		TOWEL RAIL	CLOTHES	PUTTING THEM	AQUALINE JIB
		HEATED TOWEL RAIL	SLIP	[HAIR] STICKING OUT	
DRAWING ROOM		HEATER		DOING [A SHIMMY]	JIB
		HEATER LAMPS		SECURING	
FAMILY ROOM	SATURDAY	LAMP (LIGHT)	SOAP	CLOSING OVER	PLASTER
			TOILET PAPER	LETTING THE	
SITTING ROOM		HAIR TIE	HEADREST	HAVING A	PAINT
		HAIRBRUSH		PRODUCING [BUBBLES]	
MEDIA ROOM		MAKE-UP BRUSH		MOVING UP	VARNISH
		TOOTHBRUSH BRISTLES		LIFTING UP	MDF
SUNROOM		TOOTHBRUSH		COVERING [ME]	
		TOOTHPASTE		COMBING OUT	TIMBER
SAFE ROOM	SUNDAY	TOOTHPASTE TUBE			
			FRINGE		
			PONY TAIL		

Figure 58. Rooms > Days > Products > Body Parts > Actions > Materials Table. Smith, L. (2011).

POST- BATHROOM DIARY

My *Bathroom Diary* led me to reflect upon what I had recorded over the 3-week period and translate the data into diagrams and tables. The diagrams visually demonstrate the movements I made on each day, and the tables look at the individual relationships between the moment in time recorded (day and hour) and either, body parts, products, or actions mentioned within the diary.

My *Bathroom Diary* became the tool for me to move forward towards the re-design of my current bathroom, and to establish an alternate method in bathroom design. Using diagramming and tables I was able to reflect upon my own rituals and routines and translate these into potential spatial gestures. I scoured through my three-week long *Bathroom Diary*, and created a table of rooms, days, products, body parts, actions and materials mentioned in the diary. Inspired by Georges Perec in *Species of Spaces*, I devised a table in which every word relating to one of these categories was grouped to create a visual link between the space, body part and product. This table looks at the connections between spaces and

	SPACE	
OPEN	SPACE	
ENCLOSED	SPACE	
OUTER	SPACE	
	SPACE	SUIT
	SPACE	AGE
LIVING	SPACE	
PROJECTIVE	SPACE	
	SPACE	CAPSULE
LACK OF	SPACE	
	SPACE	BAND
	SPACE	HEATER
DEEP	SPACE	
	SPACE	ODYSSEY
	SPACE	SALESMAN
EUCLIDEAN	SPACE	
	SPACE	CADET
	SPACE	STATION
BLANK	SPACE	
	SPACE	OUT
PARKING	SPACE	
	SPACE	INVADERS
	SPACE	WALK
	SPACE	TIME CONTINUUM
	SPACE	BAR
LOST IN	SPACE	
STARING INTO	SPACE	
WATCH THIS	SPACE	
	SPACE	CURVE
	SPACE	LATTICE
	SPACE	OPERA
CATCHER	SPACE	
	SPACE	SICKNESS
BUNCHER	SPACE	
THREE-DIMENSIONAL	SPACE	
HAIR	SPACE	
	SPACE	RACE
NULL	SPACE	

Figure 59. Space diagram. Perec, G. (2008).

rooms, the actions we do in rooms, and the product that is the facilitator for the action.

The actions we do within a space are defined by the room itself. Such actions as bathing, showering, drying, carrying, and rubbing can only be facilitated by the product we are presented with. The action is a consequence of our engagement with a particular product and so I have created a list from my diary of the actions I made within the bathroom in relation to all of the products contained within the room, as opposed to a particular action with a particular product.

It takes the viewer on the journey from type of room - highlighting in a similar manner to Georges Perec in *The Apartment* - that rooms are “malleable space”; a bedroom could be a bathroom if it contained a bath etc – rooms are defined by the function they facilitate. The diagram then goes on to duration - weekly, from Monday through to Sunday - which highlights the rooms everydayness, and onto the products the room contains which narrows down the possibility of what that room could be - a

bathroom contains a bath.

The table then looks at the body parts in specific relation to my diary and what body parts are highlighted within the diary. Parts such as toes and ears are seldom, if ever, mentioned in my diary. The emphasis on facial parts relates to the mirror and constant need to check if I look okay. The actions we do within a space are defined by the room itself. Such actions as bathing, showering, drying, carrying, and rubbing can only be facilitated by the product we are presented with. The action is a consequence of our engagement with a particular product and so I have created a list from my diary of the actions I made within the bathroom in relation to all of the products contained within the room, as opposed to a particular action with a particular product.

Perec (*The Apartment*, P. 28) writes, "It seems to me, in any case, that in the ideal dividing-up of today's apartments functionality functions in accordance with a procedure that is unequivocal, sequential and nycthemeral." In other words, that today's apartments (the today of pre-1973 at least) are sequential to time and that "each room

has a particular function". I agree with these statements, we pay more attention to our bedrooms than our bathrooms because we spend more time sleeping than bathing - even though we are completely passive in one of these rooms. Later Perec goes on to compare the bedroom to a broom closet because functionally they both facilitate the same functions for exhausted bodies and vacuum cleaners, "recuperation and maintenance", which I find rather interesting. Both could be used for the same function if duration was not a key factor in the design of such rooms.

In *The Apartment*, Perec's model of a daily fictional family requires that the bathroom is used throughout the day by at least three separate people on six occasions between 07.15am and 21.45pm - the duration of time spent in each place varies greatly however. One hour twenty-five minutes was spent in the bathroom in comparison to nine hours in the bedroom (p. 28 - 30). If action within the room is taken into consideration, the bathroom becomes the most used space and therefore closer attention should be paid to it.

LINEAR DIAGRAMS

POST-BATHROOM DIARY

Through observation of my body's movements, the keeping of a bathroom diary (both filmic and written), and organization of body parts, products, and actions from the diary, I have generated a series of diagrams. These diagrams inform me of the actions, body parts and products that are most used – most interacted with, and most recorded – which will aid me in the generation of a tailor-made bathroom design unique to my own rituals, routines and actions – as fitting as a tailor-made suit.

Going through my diary and re-reading what I had written, I noticed an overwhelming amount of terms that were related to specific body parts, actions for doing something or specific products associated with the bathroom. I decided to go through a week of the diary and write down all of the terms mentioned and associated with these three areas (body, action and product) during this time.

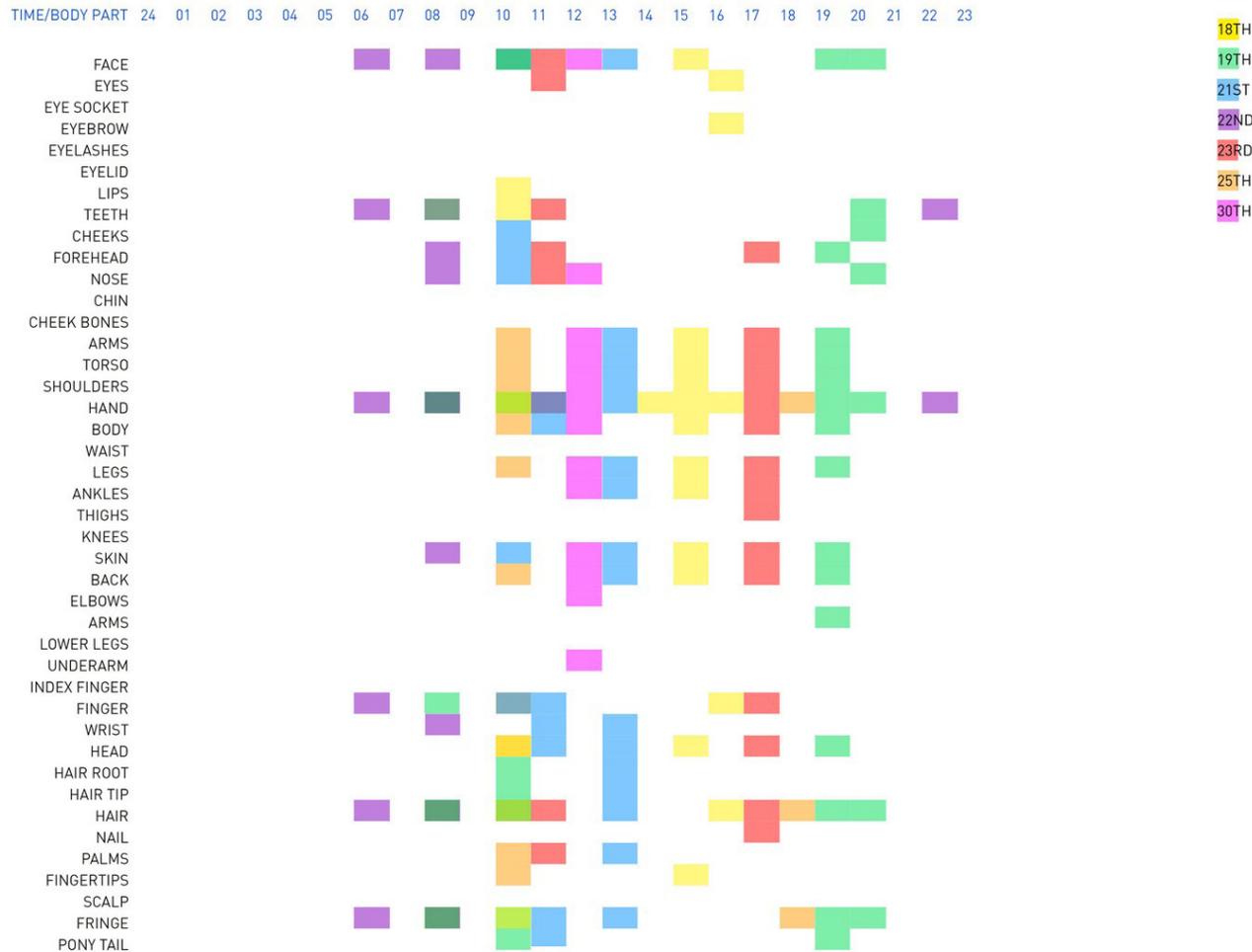


Figure 60. Time/Body Part diagram. Smith, L. (2011).

The diagrams establish what parts of my body I personally use most within the bathroom, which products I interact with most (this could be from door to light switch to toothpaste), and finally which actions I perform most in the bathroom.

The *Time/Body Part* diagram indicates to me that the body part I mention most often in my *Bathroom Diary* are my face, hands, hair and fringe. This is likely due to the product I interact with most often being the mirror – spending most of my bathroom time making sure I look okay or staring into it whilst I brush my teeth.

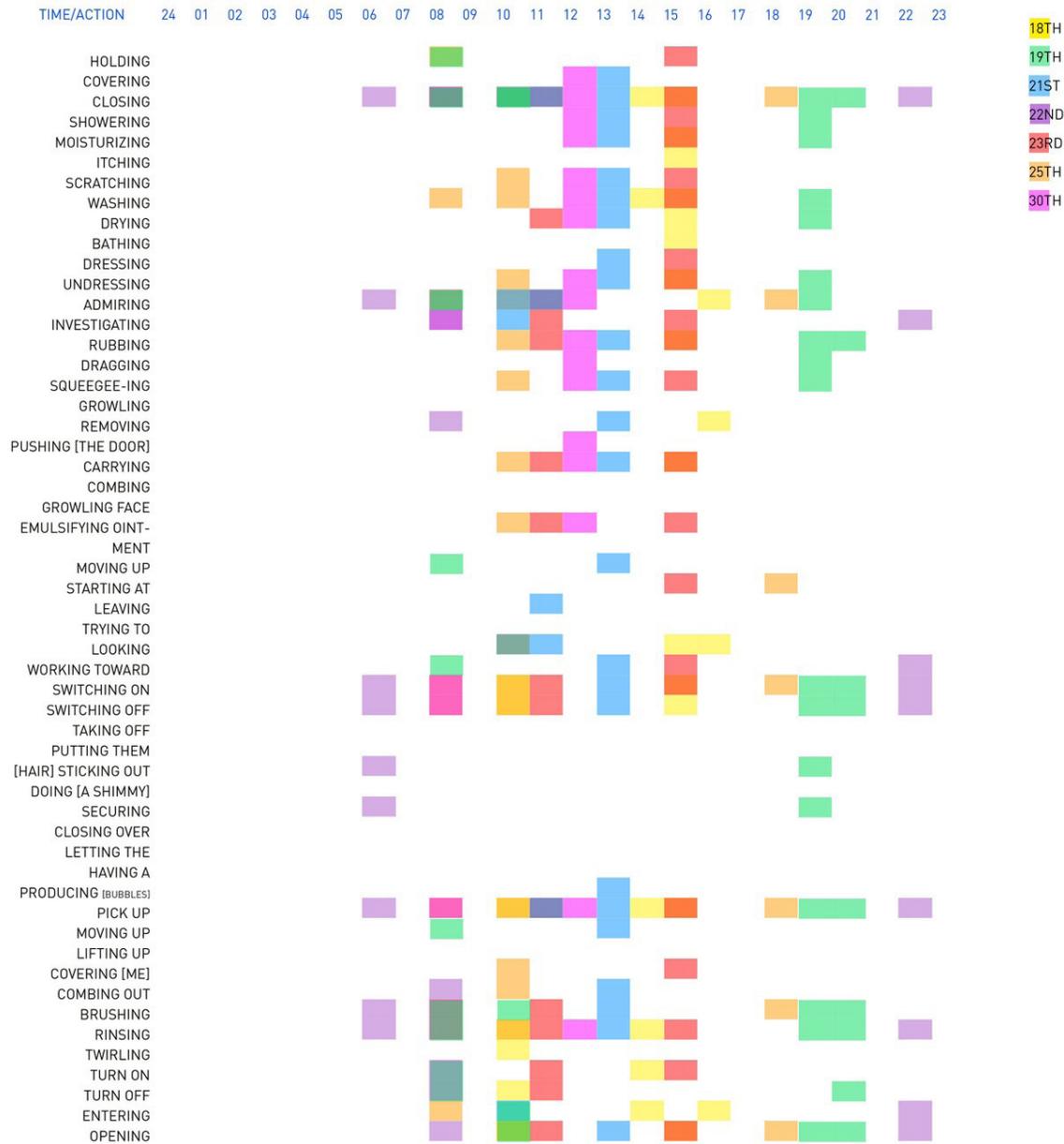


Figure 61. Time/Action diagram. Smith, L. (2011).

The *Time/Action* diagram tells me that the actions I perform most often within my bathroom are: closing and opening (doors, drawers, blinds etc.), switching on and switching off (lights, switches, taps, faucets, heaters etc.), admiring, picking [something] up, and rinsing (toothbrush, myself, shower, bath, hair etc.).

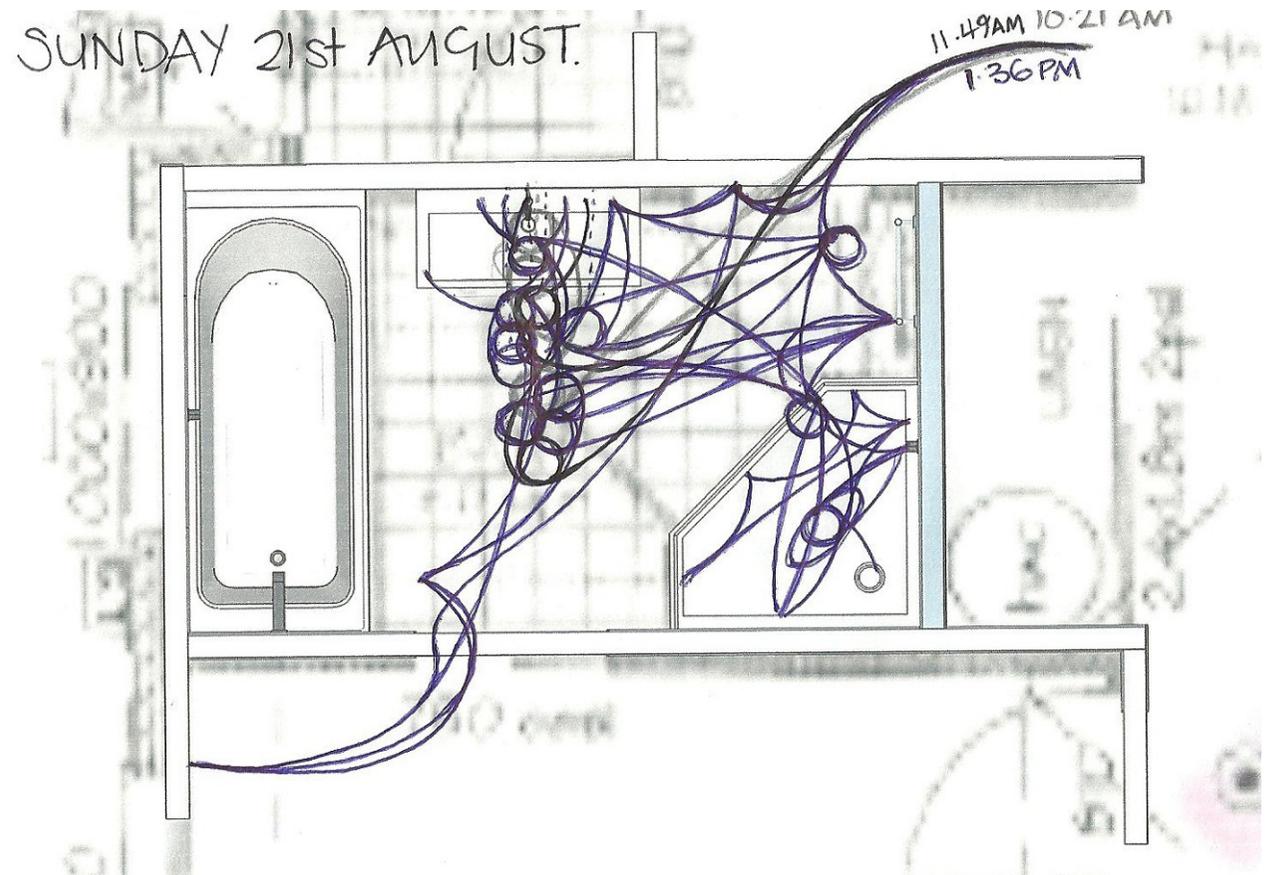


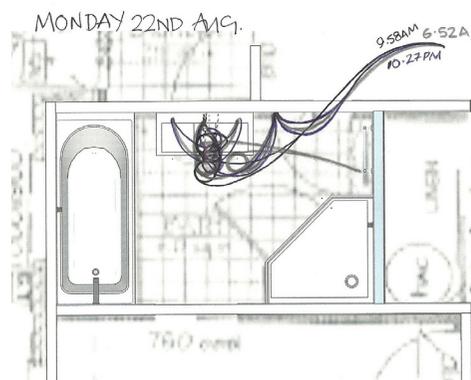
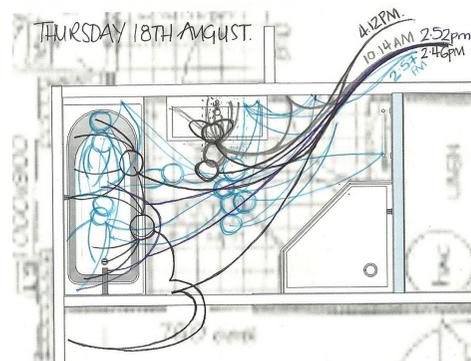
Figure 62. Movement Diagram - 21st. Smith, L. (2011).

MOVEMENT DIAGRAMS

POST-BATHROOM DIARY

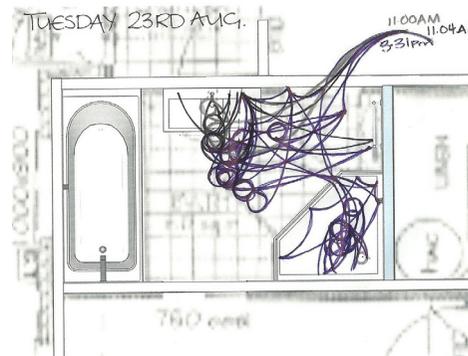
After re-reading my *Bathroom Diary*, it became evident that a single day was not going to be sufficient time to give enough depth into my rituals, routines, movements and actions within my bathroom, or me as the person writing the diary. A day, also, would not wholly reflect the person within the bathroom. I decided to conduct further studies of my *Bathroom Diary* in week segments. I created a *Movement Diagram* for each day during a week of my *Bathroom Diary* and then combined them to create a potential bathroom form.

The diagrams of movement create a visual map that focuses on paths between points mentioned in the diary. A week of *Movement Diagrams* were overlaid on top each other and created a 'blob' or form in plan view that highlighted my occupancy (area that became part of the form) and density (area of denser colour) within the bathroom whilst occupying it, as mentioned in my



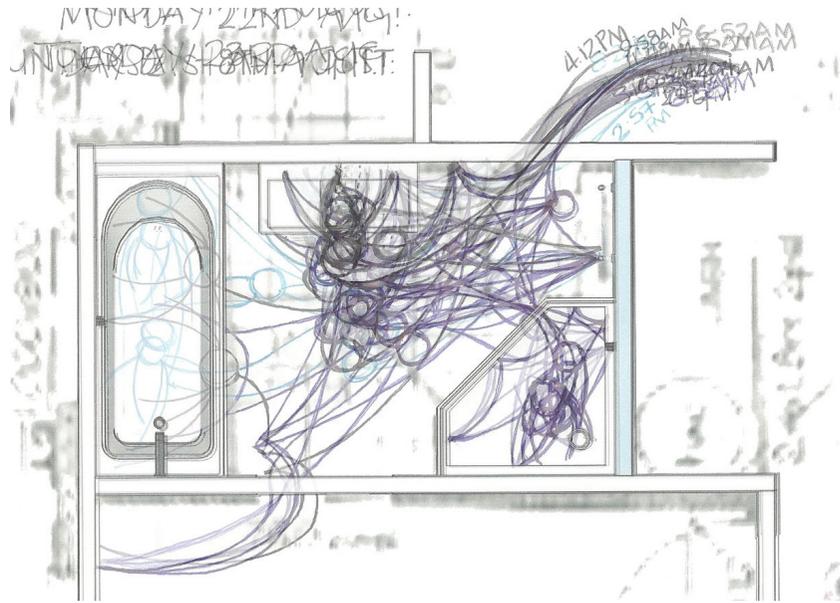
TOP ROW

Figure 63. Movement Diagram - 18th. Smith, L. (2011).
Figure 64. Movement Diagram - 19th. Smith, L. (2011).



BOTTOM ROW

Figure 65. Movement Diagram - 22nd. Smith, L. (2011).
Figure 66. Movement Diagram - 23rd. Smith, L. (2011).



Bathroom Diary.

My *Bathroom Diary*, *Tables*, *Linear Diagrams* and *Movement Diagrams* all inform the re-design of my bathroom. Taking into consideration the routines and rituals that are apparent in my *Bathroom Diary*, these should be translated physically and aesthetically into the new bathroom design. Data collected and transformed into tables and diagrams acts as additional information which can be overlaid into the design. The *Movement Diagrams* have served well as a mapping tool of the interaction I have with my current bathroom in Rolleston. The *Movement Diagrams* also highlight positive and negative space which I occupy, or don't, which otherwise wouldn't of been evident without the visual.



FROM TOP TO BOTTOM

Figure 67. Movement Diagrams overlaid. Smith, L. (2011).

Figure 68. Movement Diagram form generation. Smith, L. (2011).

RE-DESIGN ITERATIONS

The re-design of my domestic bathroom should consider the previous diagrams and tables to inform the personalization of the bathroom for myself. The *Bathroom Diary* made evident parts of the bathroom which should be paid close attention to – including hand surfaces and the picking up of objects. The Bathroom Diary also made clear that I use the sink area most often in comparison with the bath area least often – this is reinforced by *UsTogether's Ebb Bathroom* design. My bathroom could be organized in such a way as to allow for areas used most often to be nearest the main point of entry, and areas used least often to be furthest from entry. For this reason, my initial iterations focus on a continuous 'bathroom strip' that allows for this progression from areas of high-use to areas of low-use to occur. Because of the nature of the strip, penetration of the existing bathroom shell occurs – this highlights the non-fit of my current bathroom and the potential for a better fitting design to occur and inform the bathroom space. These linear areas of function within the bathroom redesign inform a layout which highlights my use within my existing bathroom. The

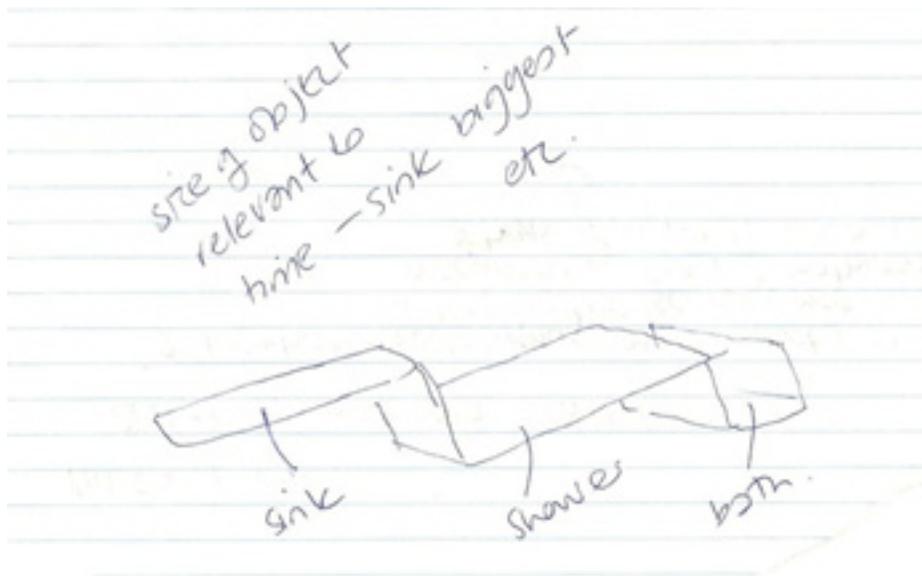


Figure 69. Design initial sketch. L. (2011).

size of individual areas within this linear method of thinking could also be designed to reflect the amount of time spent within each area. This will be explored throughout the iterations.

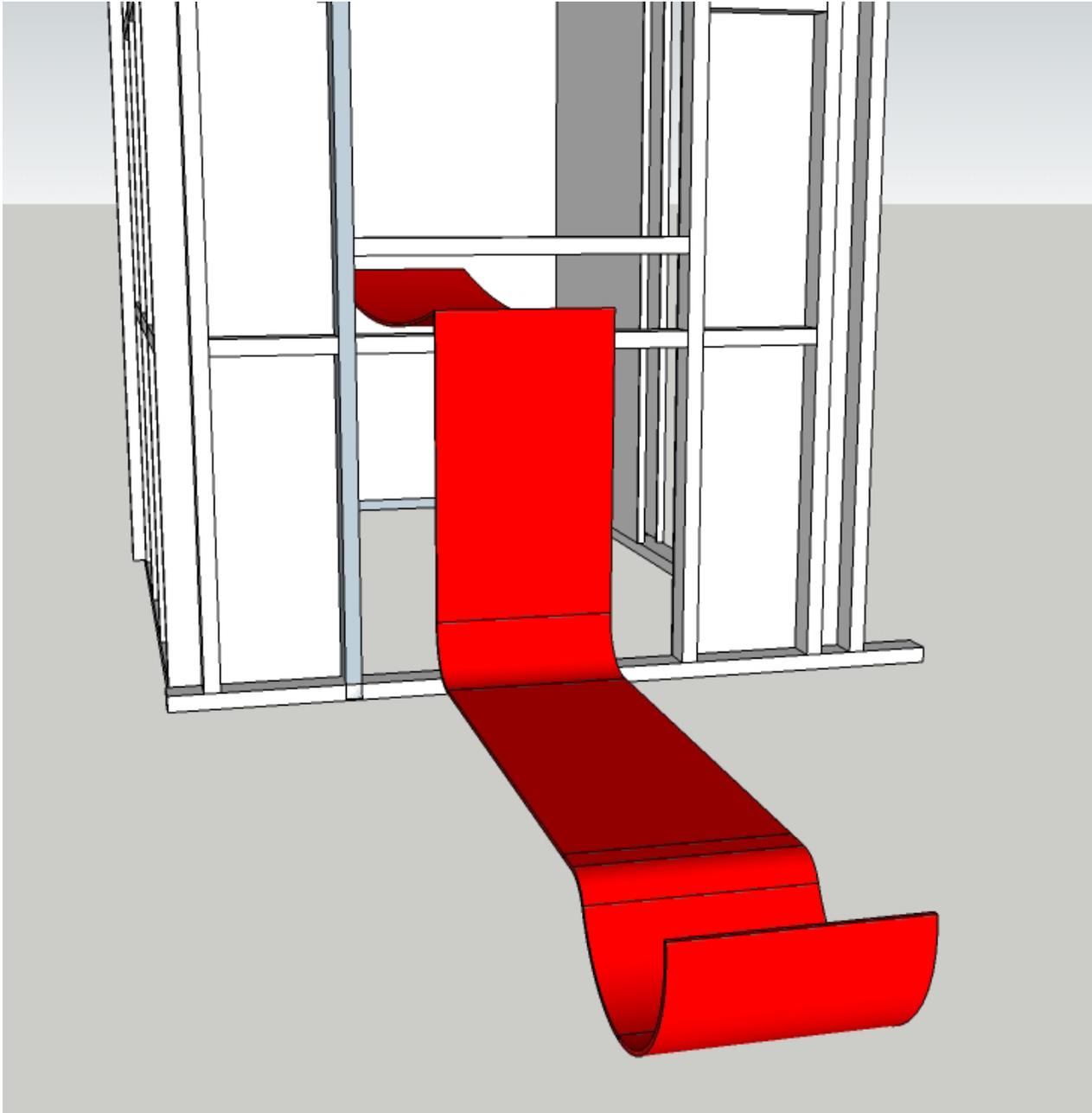
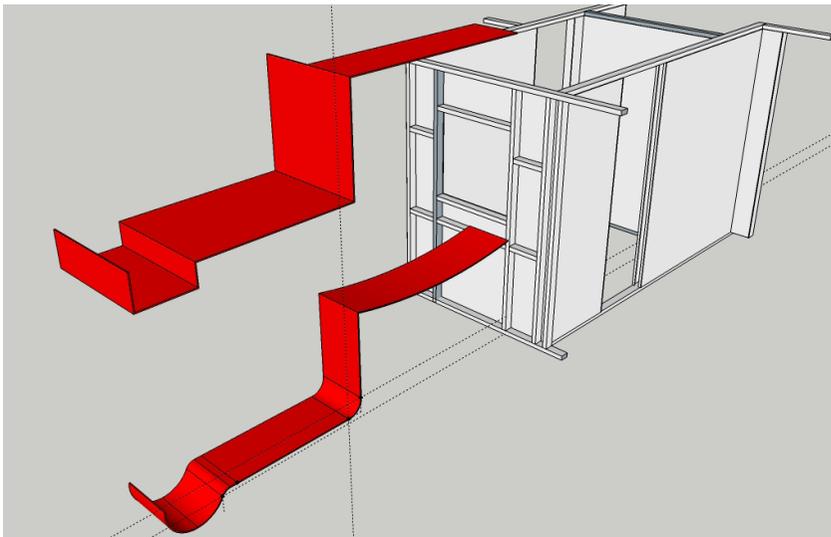
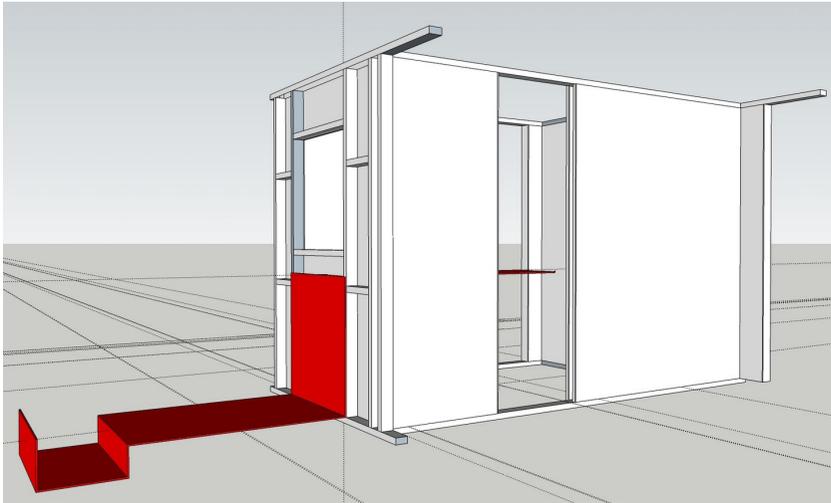


Figure 70. Iteration 1 development - image highlights difference between bathroom area heights and sizes. L. (2011).

ITERATION 1



FROM TOP TO BOTTOM

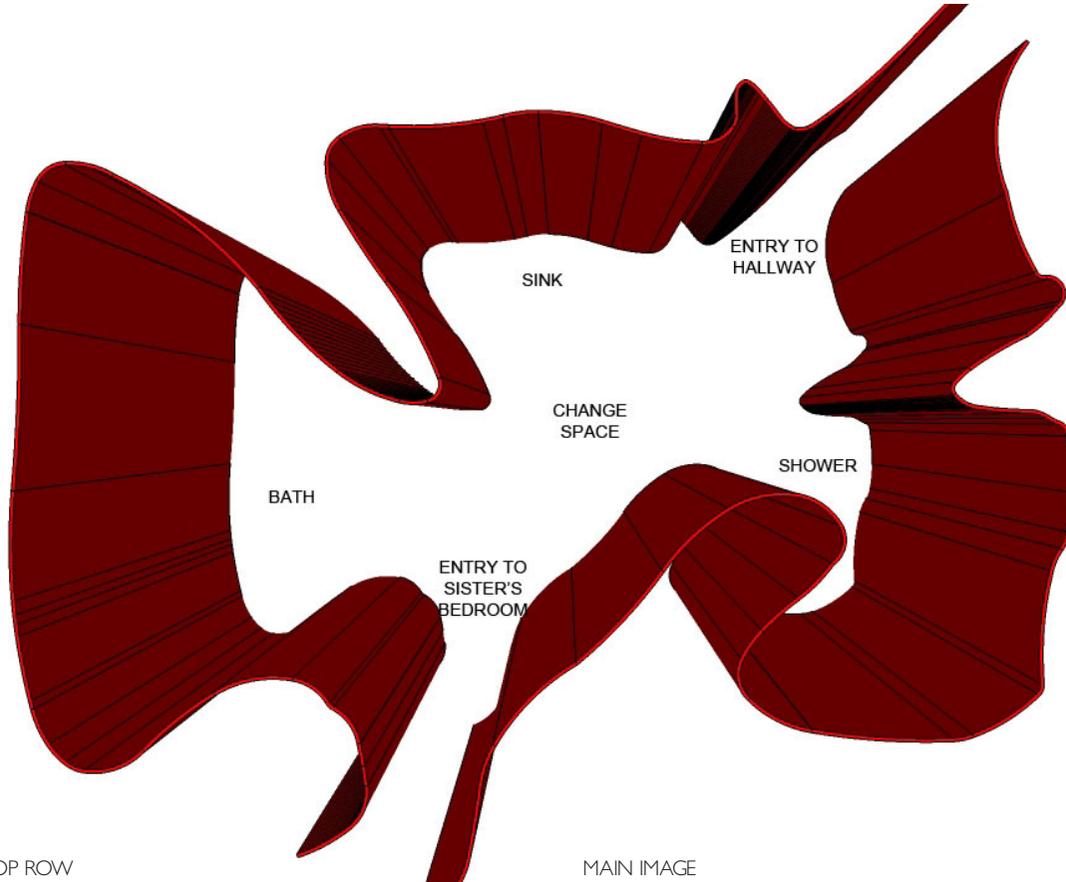
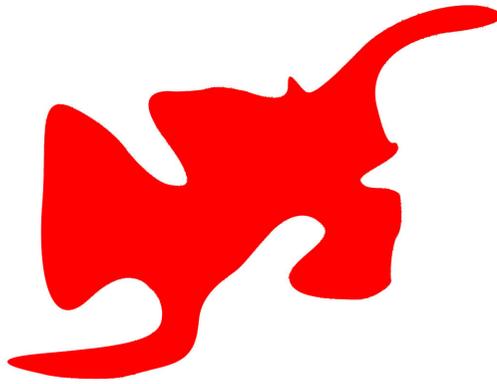
Figure 71. Iteration 1 development. Smith, L. (2011).

Figure 72. Iteration 1 development to more 'fitting' form. Smith, L. (2011).

Iteration 1 is the development of a folding strip design which goes through the existing shell of my current bathroom in Rolleston. The strip progresses from areas of high-use (sink) to areas of low-use (bath) where the sink is the highest point of the design and the bath is the lowest, being recessed into the ground.

Various stages of development occurred in the re-design of my bathroom, none of which I was happy with. Firstly the experience of the bathroom would happen in a very linear process which might become boring in time. Secondly, the strip was long and narrow, and for the act of washing, showering, and bathing, the strip would also need to take on another form which would render the strip useless formally.

The final stage of development starts to morph the form of the strip into a shape that is more fitting to the body, and reflects the time spent within each individual area.



TOP ROW

Figure 73. Movement Diagram form generation. Smith, L. (2011).

Figure 74. Movement Diagram form generation 2. Smith, L. (2011).

MAIN IMAGE

Figure 75. Movement Diagram translated into 3-dimensional form in plan view. Smith, L. (2011).

ITERATION 2

Iteration 2 acknowledges the different areas within the bathroom and divides the bathroom as a whole into areas of low-use to areas of high-use similar to *Iteration 1*. The *Movement Diagrams* – interpreted into space from the *Bathroom Diary* – have created a plan shape that can be manipulated and developed to reflect other aspects of my personal bathroom use, both physically and mentally.

Iteration 2 divides the bathroom room into the different areas used for different rituals and routines. The form is developed from the earlier *Movement Diagrams* and uses the *Linear Diagrams* and the *Bathroom Diary* to inform design decision making.

Using the *Movement Diagrams* and *Bathroom Diary* as a guide, the interior form of the bathroom space has been created. Areas within the ribbon are areas that were used on a daily basis to carry out my daily rituals and routines, and areas outside of the ribbon were not entered. The development of this form can be

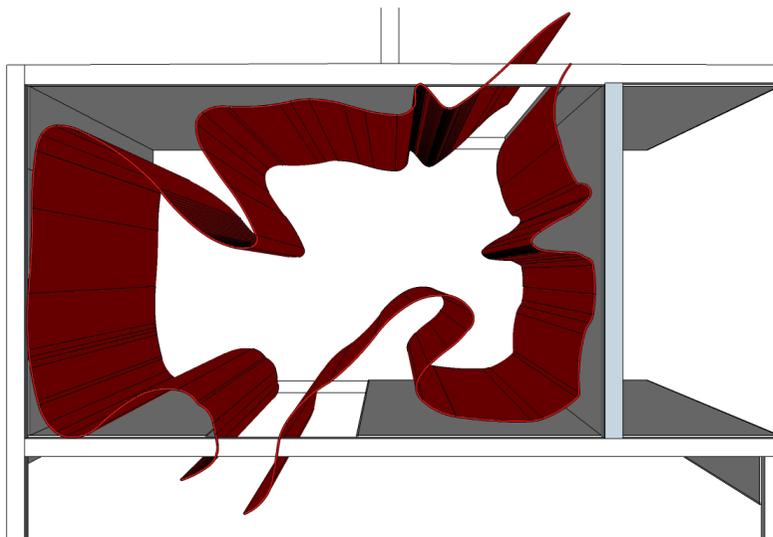
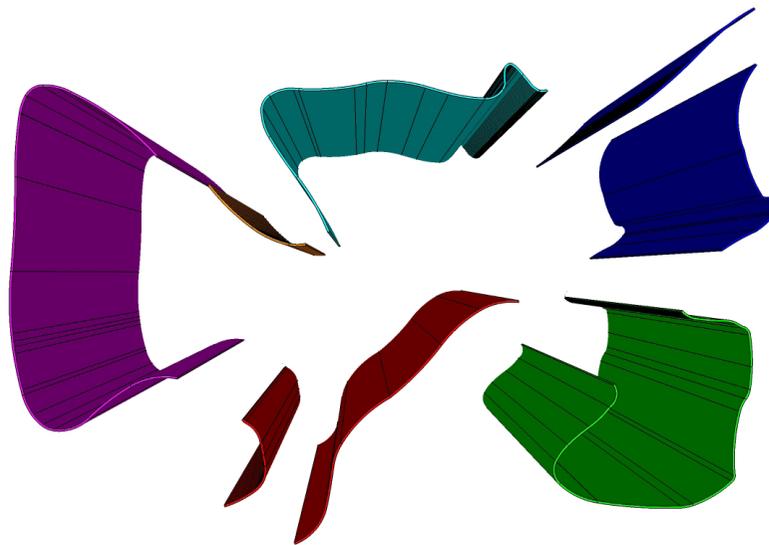
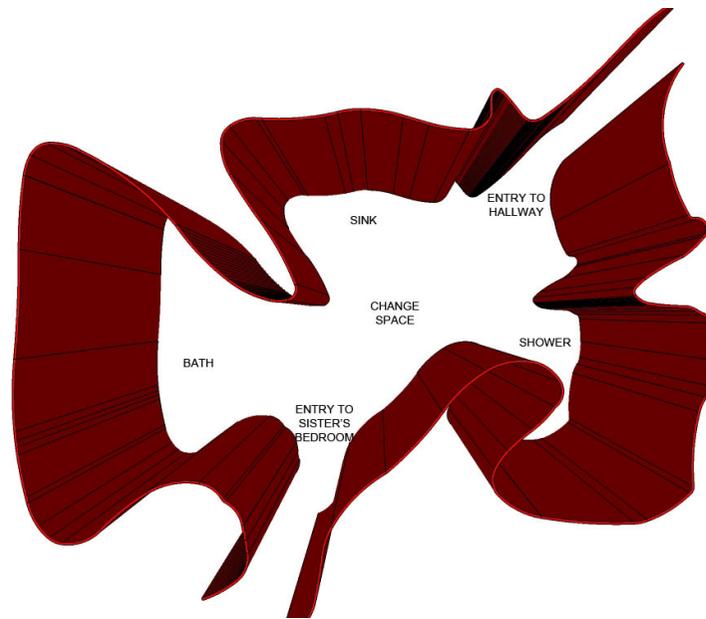


Figure 76. Iteration 2 development showing ribbon inside existing structure. Smith, L. (2011).



FROM TOP TO BOTTOM

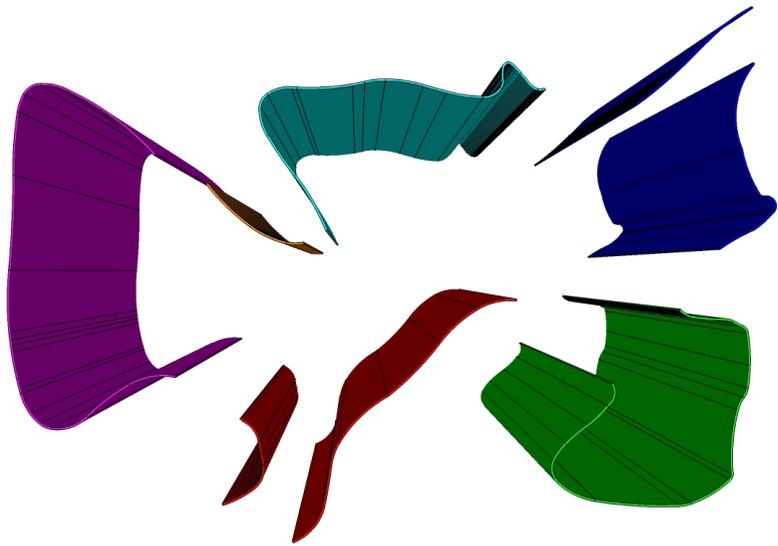
Figure 77. Movement Diagram translated into 3-dimensional form in plan view. Smith, L. (2011).

Figure 78. 3-dimensional form in Figure 77 divided into bathroom areas. Smith, L. (2011).

seen in figures 73 to 75 and in the *Movement Diagrams* section of this thesis. This contrast also highlights the rectilinear form of the existing bathroom site with the fluid motion created by my body.

Differentiation between the different places where the individual products would be also implies that a particular action would occur within that space. This directly references the existing site and where different products and components would be. The original 'red-ribbon' form from *Iteration 1*, including areas of space within the existing bathroom structure, has been divided up into the different areas physically. The space has been divided into multiple forms or areas of space, which for ease of viewing and manipulating, I have colour-coordinated. The pink area is the bathing area, the aqua is the sink area, the blue is the entry into the existing bathroom (and the new bathroom), the green is the showering area, and the red is the exit point.

Dividing the new bathroom space into these various components allows for the individual areas to have the form of my body's movement, and for additional layers of myself to be realised.



FROM TOP TO BOTTOM

Figure 79. 3-dimensional form in Figure 77 divided into bathroom areas. Smith, L. (2011).

Figure 80. Iteration 3 development shown in relation to existing structure. Smith, L. (2011).

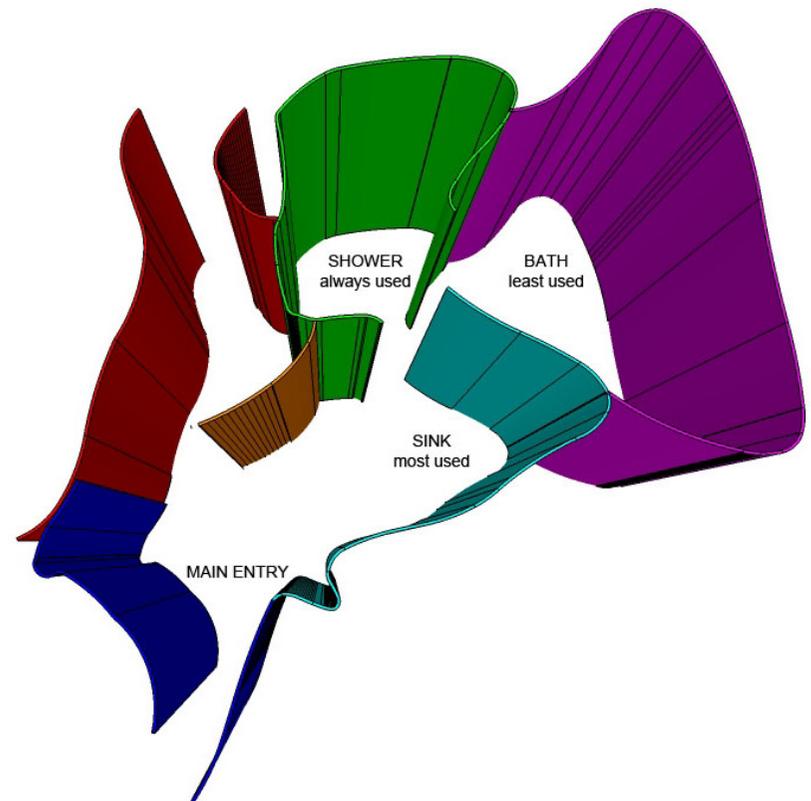


Figure 81. Iteration 3 development, bathroom areas rearranged and labelled. Smith, L. (2011).

ITERATION 3

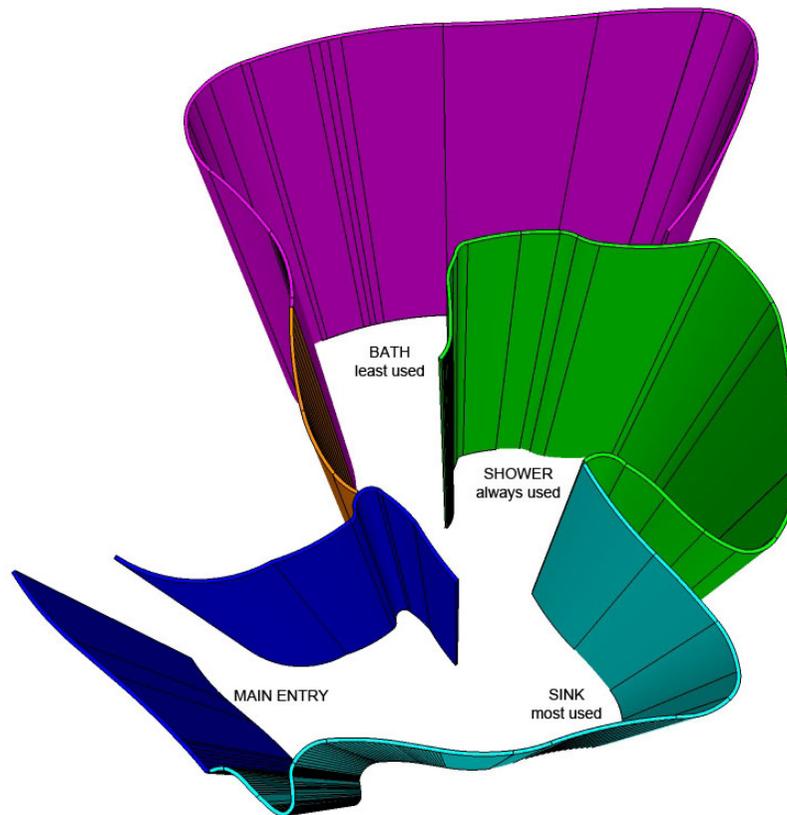
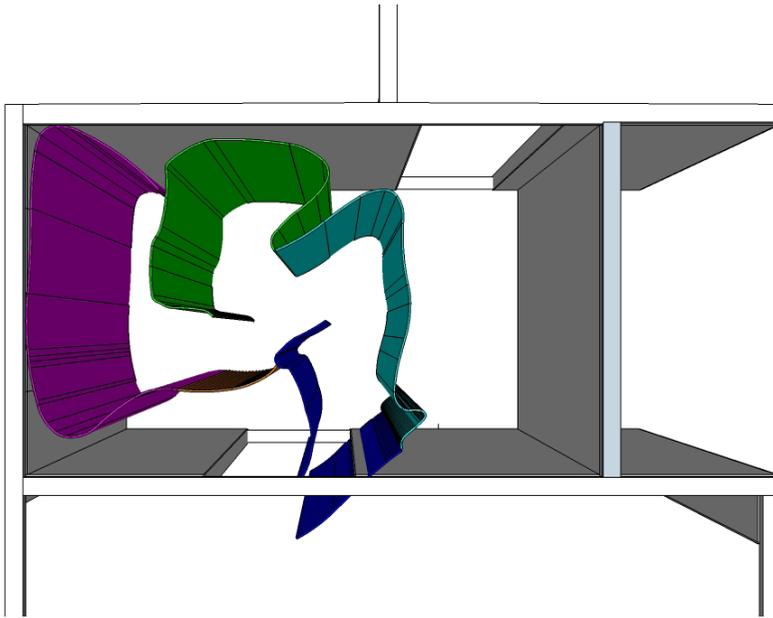


Figure 82. Iteration 3 development, bathroom areas rearranged and labelled. Smith, L. (2011).

Iteration 3 leads on from *Iteration 2* in terms of form. The form of the design has been reconfigured and arranged into a variety of layouts which reflect my own personal use within the bathroom as determined through the *Bathroom Diary* and *Movement Diagrams*.

Individual areas have the potential to be reconfigured to produce a better fitting bathroom design relative to my body's physical and mental needs. Similar to *Iteration 1*, the layout and form of the bathroom can be influenced by analysis of my duration within my bathroom as recorded in my *Bathroom Diary*. According to my *Bathroom Diary*, the order in which I would use the bathroom is: sink area most often, shower area second most often, and bath area seldom. Further to this, the sink would be used in small regular bursts of time, the shower in medium regular bursts of time and the bath in long rare segments of time. This suggests that the bathroom should be ordered in such a way that accommodates the amount of time spent within each area as well as how often I



use a particular area of the bathroom.

The progression from areas of high-use (sink) to areas of low-use (bath) explored through *Iteration 1* has been taking into consideration of the layout of *Iteration 3*. All reconfigurations focus on the journey and experience through the bathroom to its user, making it easier to access areas which are used more often, and tucking away areas which are used least often, yet longer periods of time are spent there.

Relating the new design development to the existing bathroom structure highlights the difference in space sizes between the existing bathroom containing bathroom products, and the new bathroom designs, containing bathroom areas.

Each bathroom area within the bathroom as a whole room allows for the individual movements, rituals and routines for washing, showering, cleaning, bathing etc to occur whilst also allowing the potential for a holistic bathroom to occur.

Figure 83. Iteration 3 development shown in relation to existing structure. Smith, L. (2011).

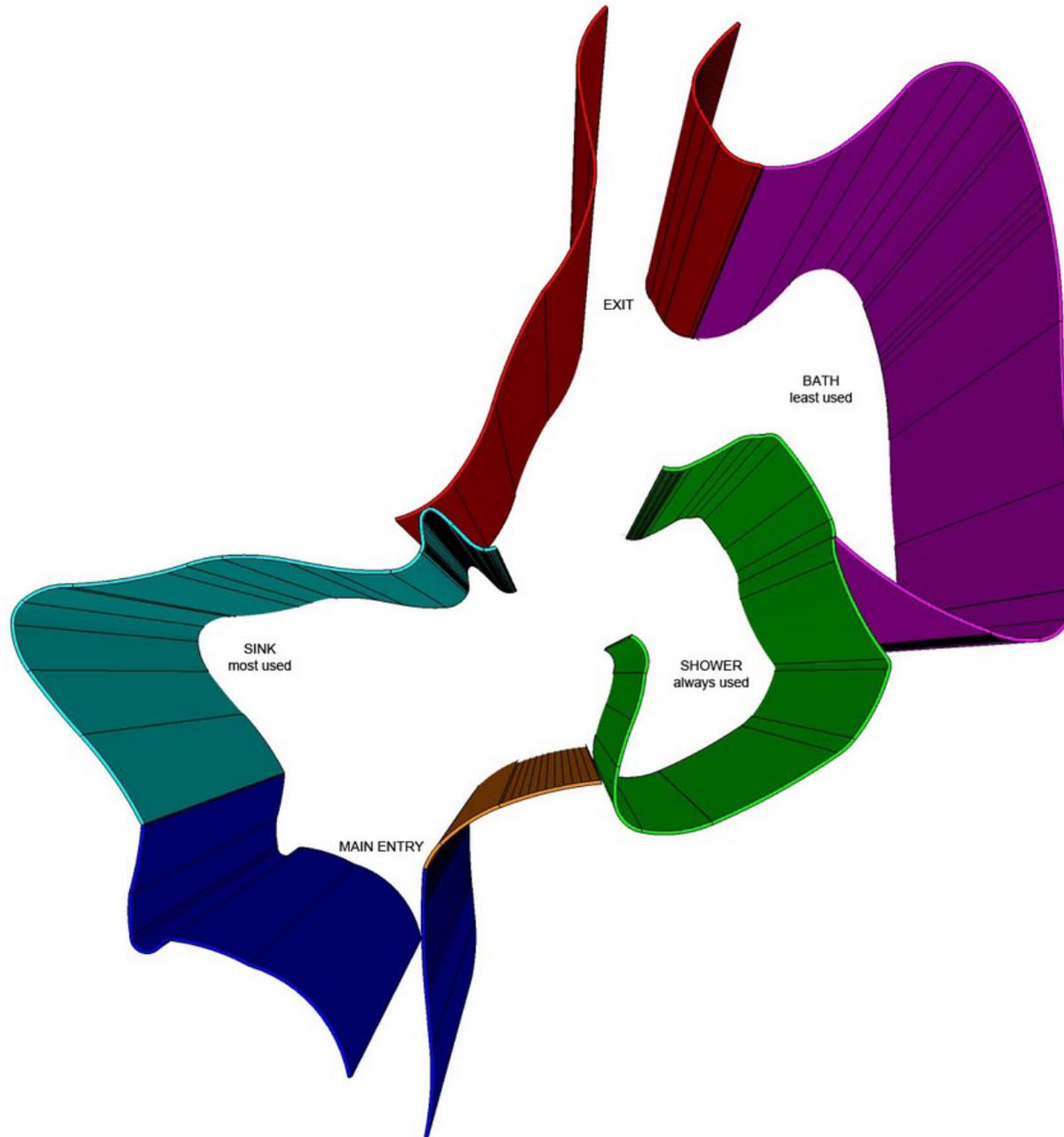


Figure 84. Iteration 3 development, bathroom areas rearranged and labelled. Smith, L. (2011).

This method of designing the bathroom adds a personal touch to the bathroom unique to my personal use. This is a part of the bathroom which occurs mentally and can be translated physically into the design of my new bathroom. The linear use of the bathroom from sink (most often) to shower to bath (least often) should be translated into the aesthetic design and layout of my bathroom design.

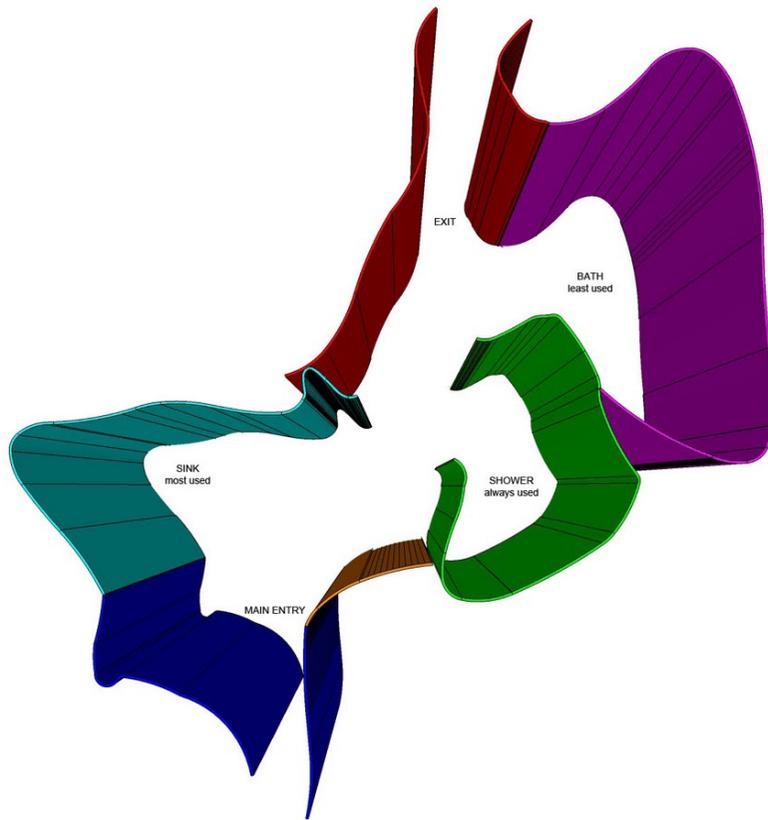


Figure 85. Iteration 3 development, bathroom areas rearranged and labelled. Smith, L. (2011).



Figure 86. Iteration 3 development, bathroom areas resized according to use. Smith, L. (2011).

BATH ROOM RE-DESIGN

The re-design of my bathroom will physically represent the progression from areas of high-use (closest to entry point) to areas of low-use (furthest from entry point), using the individual colour-coordinated areas to inform the layout and form generation.

In figure 85 plan view, the difference in size between the shower and bath areas is evident; the bath area is much larger, yet it is seldom used in comparison to the daily use of the shower. What if the shower became large and the bath became small? Lawrence Wright in *Clean and Decent* (1963) discusses shallow baths at the time of Agamemnon in Greece – Greeks would have a short, shallow, cold bath so as not to be seen to overindulge or be greedy to the Gods²⁵.

Design development emphasises the areas of high use not only in terms of linear duration, but represented in the physical properties of the individual areas themselves. In figure 86, the properties of the individual areas have been changed in size to represent the

25. Wright, L. (1963). *Clean and Decent: The fascinating history of the bathroom & the water closet* (4th ed.). London: Routledge & Kegan Paul.

duration in which they are used and interacted with.

I have conceptually re-sized the areas within the bathroom to represent the importance of their presence to me, it's user. The sink, once small and placed on an empty wall, is now the same size as a common domestic bath. The shower has been reconfigured to be twice the size of the domestic shower, and much larger than the bath, which is now only big enough to sit cross-legged in – the way I sit in the bath anyway. By changing the physical characteristics of the bathroom, the design becomes a visual representation of my time spent within the bathroom, and allows for the design to be tailor-fit to my body's wants and needs.

The experience of the bathroom has become dramatically altered, with the sink coming to the forefront of the bathroom design and the bath becoming small and brief. Despite what may seem like a compromise between what I want and what I need, the bathroom has become a true representation of what a bathroom tailor-fit to my bodies daily routine, rituals and movements would be.

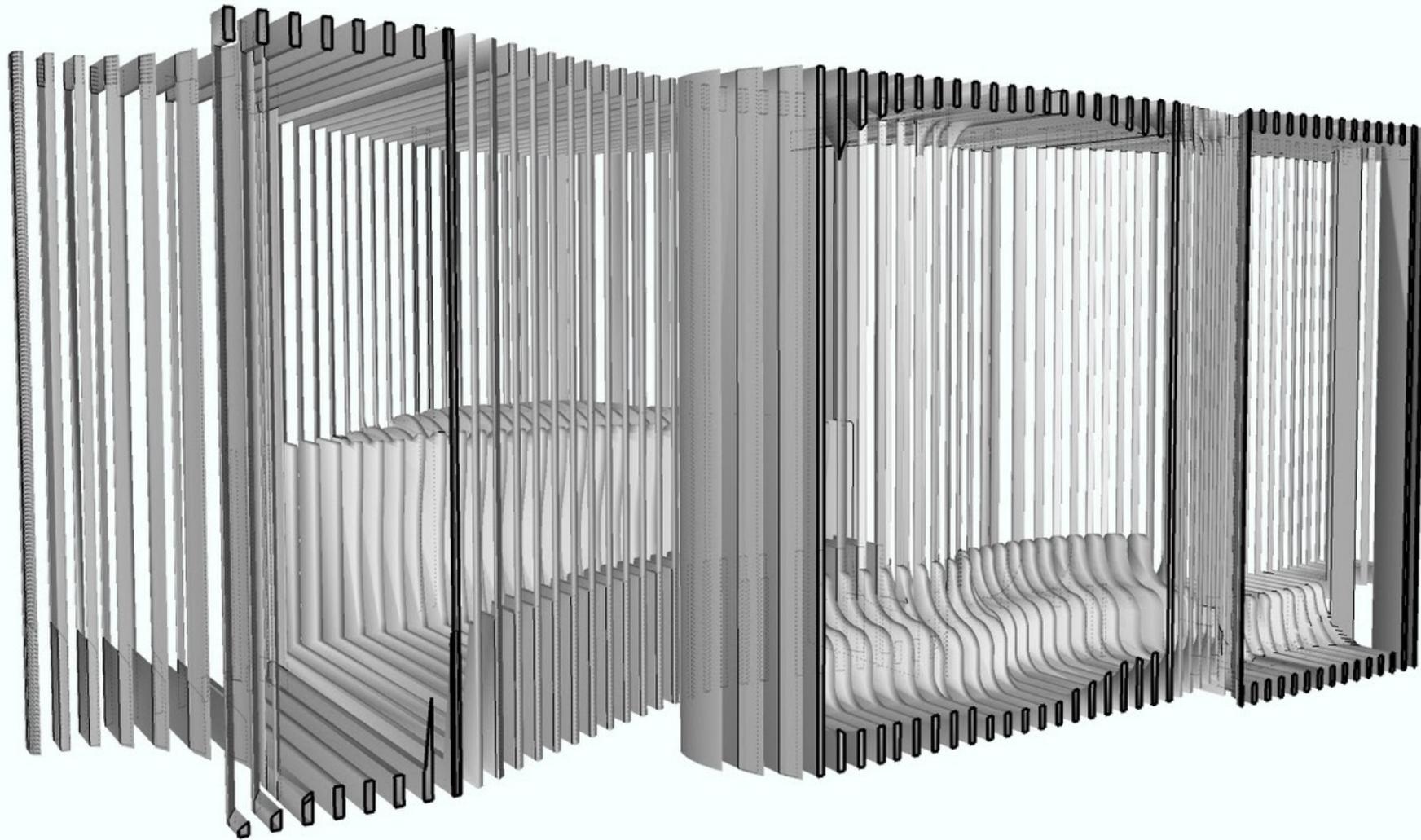


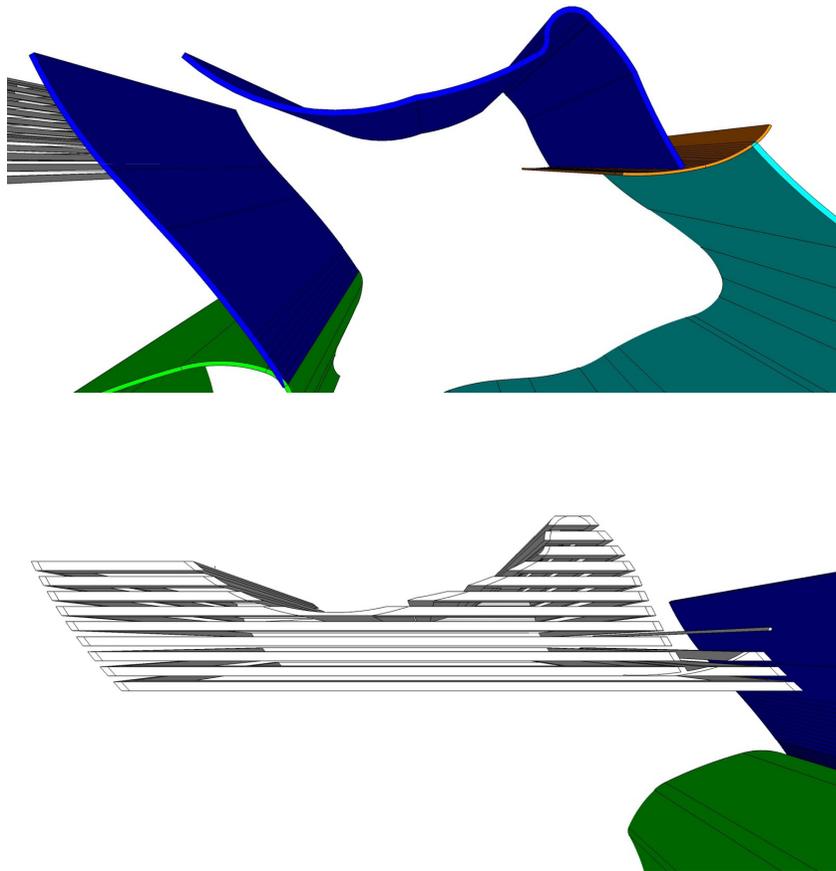
Figure 87. SketchUp model of bathroom design, sectional perspective cutting through entry (left), shower (middle) and bath (right). Smith, L. (2011).

FORM GENERATION

To enable me to visualize my design and continue to develop the information gathered in the *Bathroom Diary* and through the drawing of the *Movement Diagrams*, I decided to use Google SketchUp.

Initially, SketchUp allowed me to produce vast quantities of work in short spaces of time, test out ideas and alter existing models fast. SketchUp also allowed me to change the properties of shapes created so that the design became fluid, seamless, represented my movements and fitted to my body.

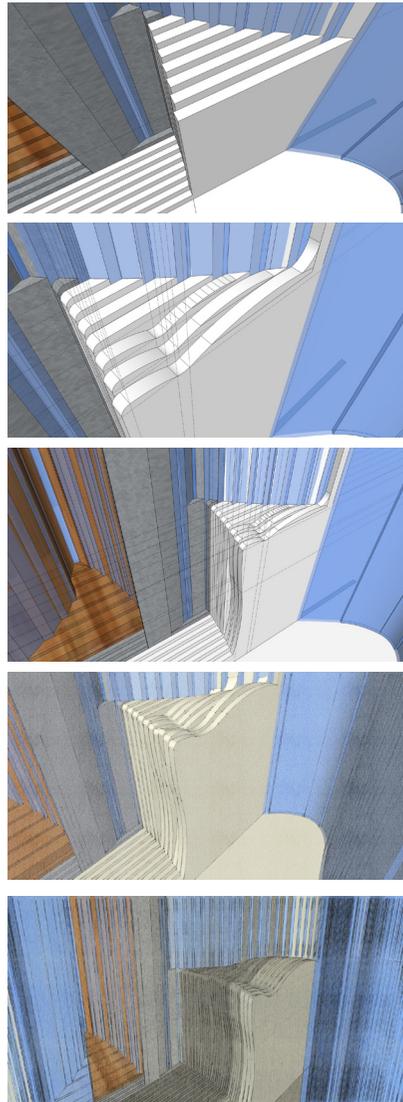
Transformation of a rectangular form into a form generated by the movements of an individual in space proved to be a valuable tool – not only for visualizing my design 3-dimensionally, but for allowing complex shapes to be produced and unique each singular time. In order to design a bathroom that unites the bathroom-space and bathroom-product through the bathroom-user (body/self), further design development and integration of previous design



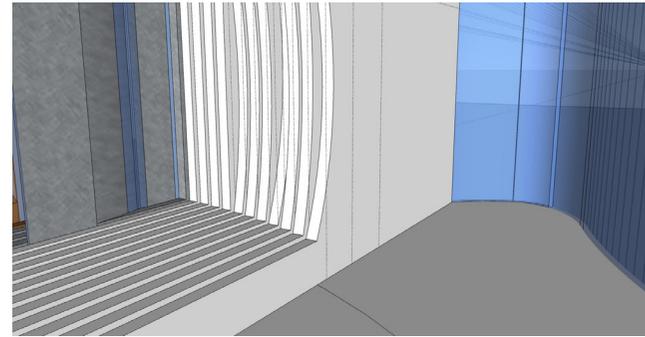
FROM TOP TO BOTTOM

Figure 88. Plan view of part of Iteration 3. Smith, L. (2011).

Figure 89. Same plan view showing how design is being developed. Smith, L. (2011).



ABOVE
Figure 90. Sequence of sink formation.
Smith, L. (2011).

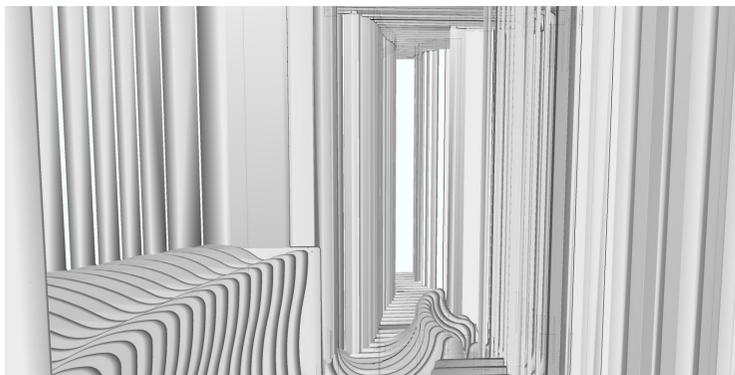
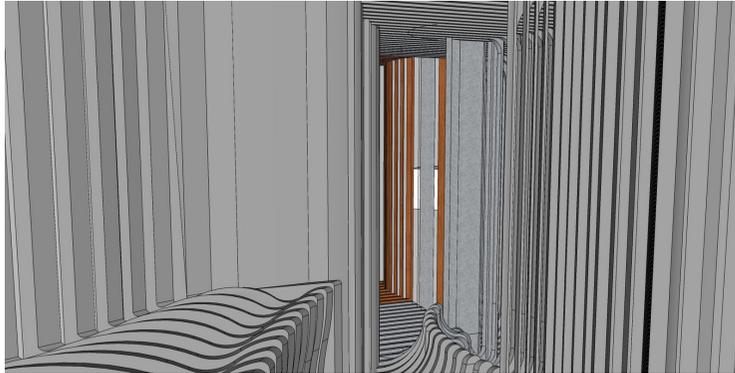


FROM TOP TO BOTTOM
Figure 91. Sink beginning shaped by my movements. Smith, L. (2011).
Figure 92. Sink formation from viewer's eyes. Smith, L. (2011).
Figure 93. Plan view of design in process. Smith, L. (2011).

experiments needs to occur.

Upon reflection of my *Bathroom Diary* and the subsequent design explorations, I have come up with a set of additional criteria to be considered in the final re-design of my bathroom. Areas within my *Bathroom Diary* that discuss my personal bathroom experiences suggest movements and actions that occurred on a daily basis – these are considered my own personal routines and rituals. These daily actions include:

1_ The sink area where I brush my teeth must be able to hold my toothbrush, tooth paste, and



FROM TOP TO BOTTOM

Figure 94. Looking through the bathroom (colour-coordinated). Smith, L. (2011).

Figure 95. View of shower area. Smith, L. (2011).

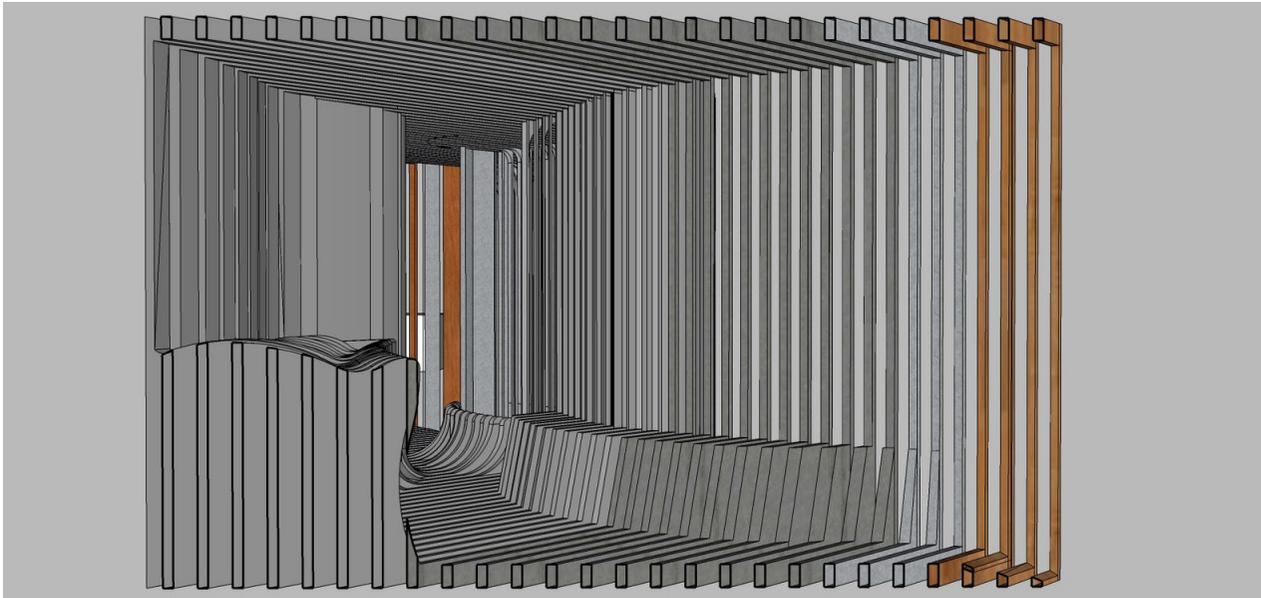
Figure 96. Looking through the bathroom. Smith, L. (2011).

be close enough to bend over easily for spitting out toothpaste. The taps must be easily accessible so I can wash my brush underneath.

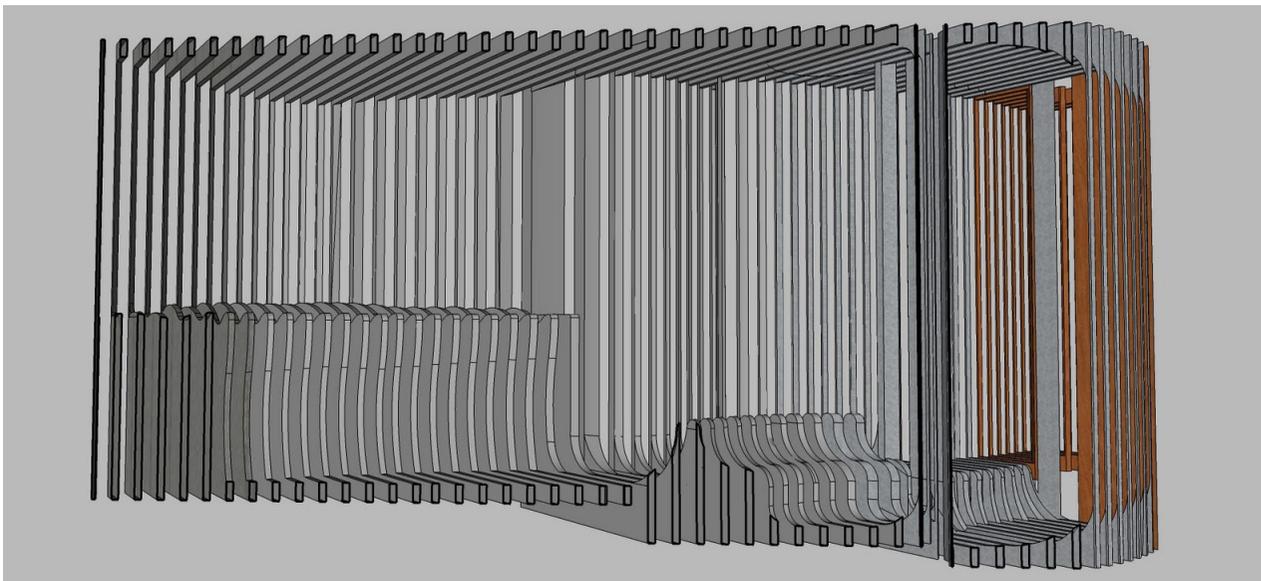
2_ The sink must be able to hold my hairbrush on occasions I when I brush my hair; it needs to have room for bobby-pins and hair-ties. The taps must be tall enough for me to fit my head under without a struggle and the sink needs to be able to be leant against for support during this. In the instance of washing my hair, I need to be able to place shampoos, conditioners and other hair products on the bathroom sink.

3_ As I have severe eczema it is important to have a place where I can moisturize, check my skin for new patches of eczema and treat it. This requires an area for applying moisturizer to my entire body.

4_ During the act of bathing, I sit in the bath with my legs crossed. This is a personal aspect which corresponds to my preference for a small bath. This bath must allow for this cosy pose to make me feel relaxed and cocooned. The cross-leg pose reflects the Lotus Position in Buddhist meditation and reinforces relaxation.



5_Personally I find it very inconvenient to have drawers within the bathroom – not only does it take up space when opened, but they require an unnecessary action. The use of shelving over drawers is preferred.



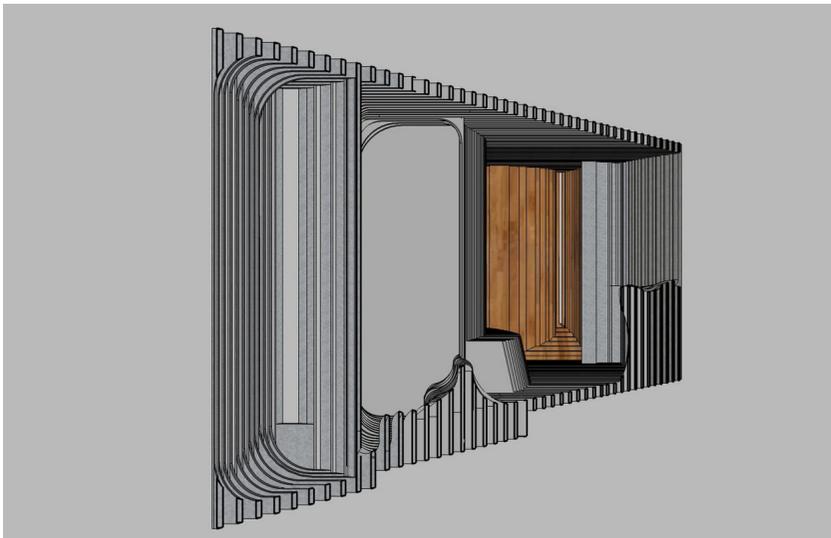
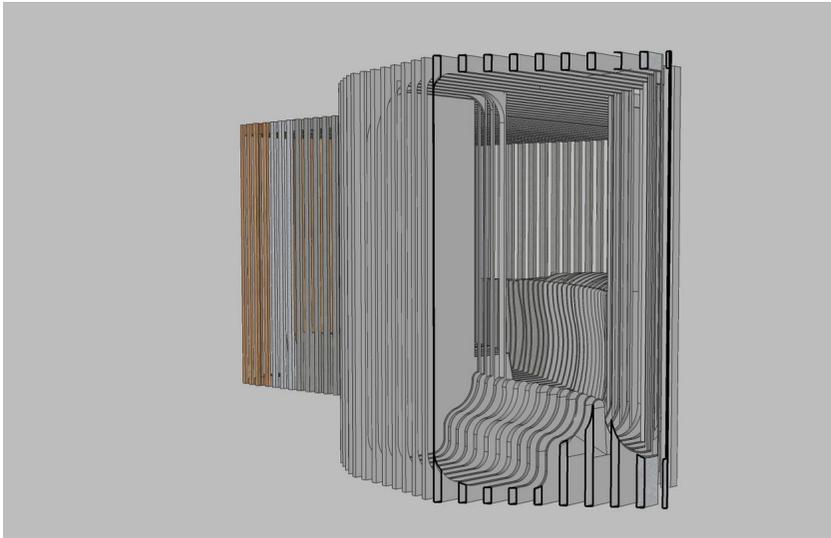
6_The shower should allow for free-flowing elbow movements during the act of showering, shampooing, conditioning, and washing myself.

7_The bathroom should accommodate as much natural light as possible without seeming over-exposing.

FROM TOP TO BOTTOM

Figure 97. Section cut through sink area of design. Smith, L. (2011).

Figure 98. Section cut through sink, shower and bath areas. Smith, L. (2011).



8_ The sink area should be the most accessible area within the bathroom, followed by the shower space, and lastly the bath space.

My re-designed bathroom has morphed into a form not commonly used in domestic bathrooms. The existing rectilinear bathroom room has transformed into a shape derived from the movements my body makes whilst performing certain actions within my current bathroom situation. The size of each area within my new bathroom has changed significantly; the sink area is the largest space within the design whilst the bath area has become the smallest.

FROM TOP TO BOTTOM

Figure 99. Section cut through bath area of design. Smith, L. (2011).

Figure 100. Section cut through bath (left), shower and sink areas. Smith, L. (2011).

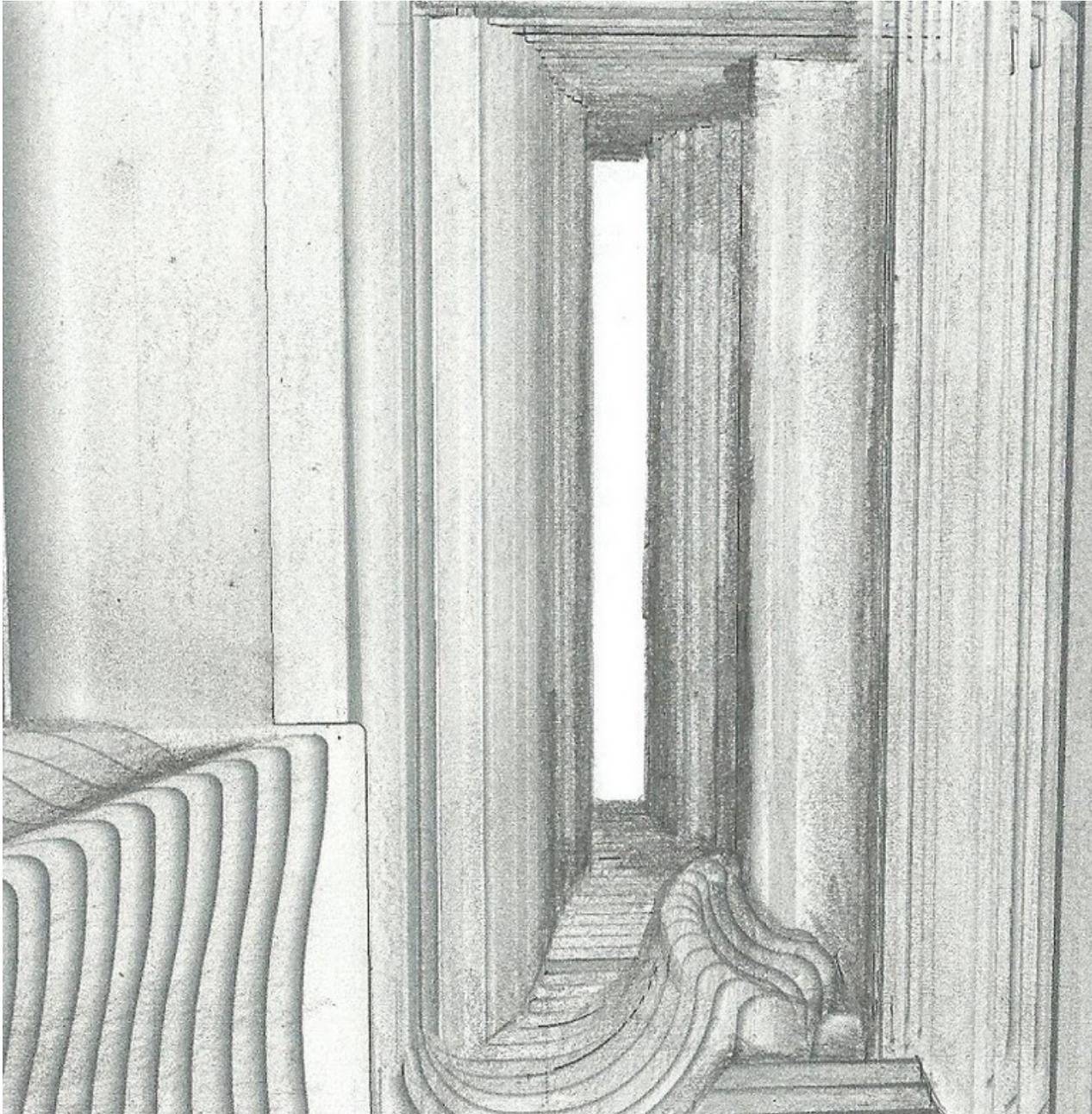


Figure 101. Hand render looking through bathroom design. Smith, L. (2011).

BATH ROOM DESIGN

The order of different bathroom areas within my design is personal to me. The design of the bathroom on this basic level will allow for the bathroom to be easily accessed and used by myself. The re-sizing of various areas within my bathroom suggests the importance of particular areas and reflects the amount of time I spend in each area. The sink has become the largest area; conceptually this connects the visual aesthetic of the bathroom with the programmatic requirements of the bathroom.

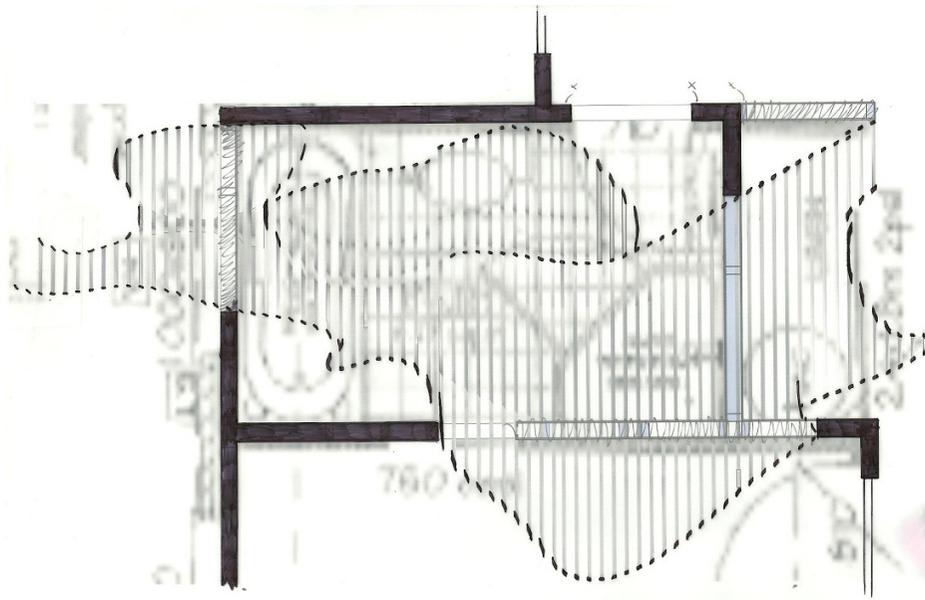


Figure 102. Plan view of bathroom design overlaid onto existing bathroom plan w/ alterations. Smith, L. (2011).

The values of an individual body as the facilitator for a bathroom design which is both unique and personal to its user are evident. Spaces can be formed and morphed by one's own movements, rituals and routines within a space. The bathroom, more often than not, is prescribed for us through a pre-drawn room and a prescribed series of products. Through this conceptual project, and the process I have undertaken throughout its duration, I have been connected with my bathroom in a way that has allowed me to visualize what a tailor-fit bathroom experience could be.



Figure 103. Hand render looking at the bathroom's sink. Smith, L. (2011).

The bathroom is already a very personal room, and it is the room where we feel most comfortable to expose ourselves. Designing for the individual creates a relationship between body and space which is more personal than that. It is personal because the space reflects one's own body, it's rituals, and it's routines that occurs within this space.

The design of my domestic bathroom should be considered as a whole space. The product and structure collide to create a space for human ritual and routine, where the body becomes the facilitator for the re-design of the bathroom and unites the product and structure.

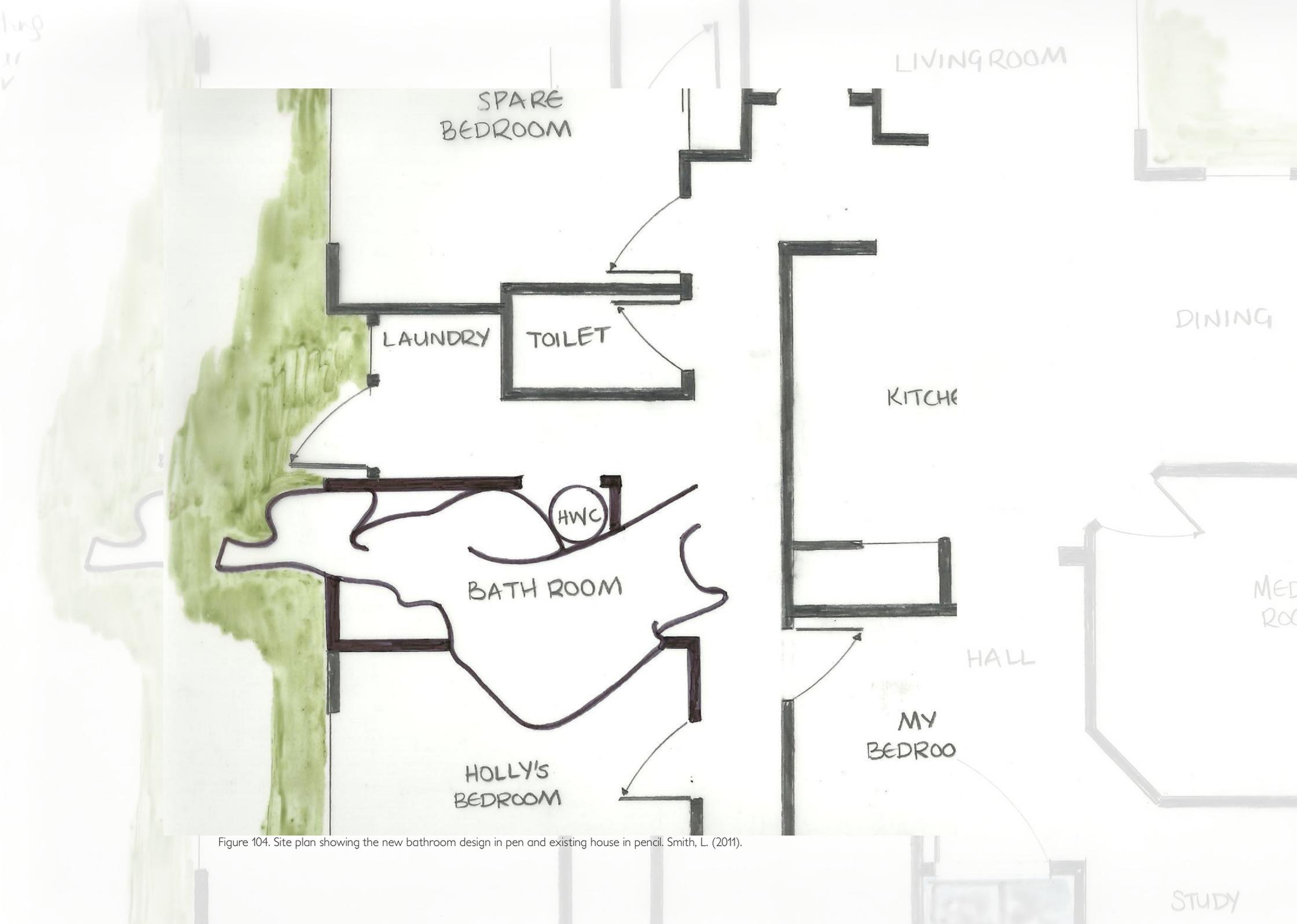


Figure 104. Site plan showing the new bathroom design in pen and existing house in pencil. Smith, L. (2011).

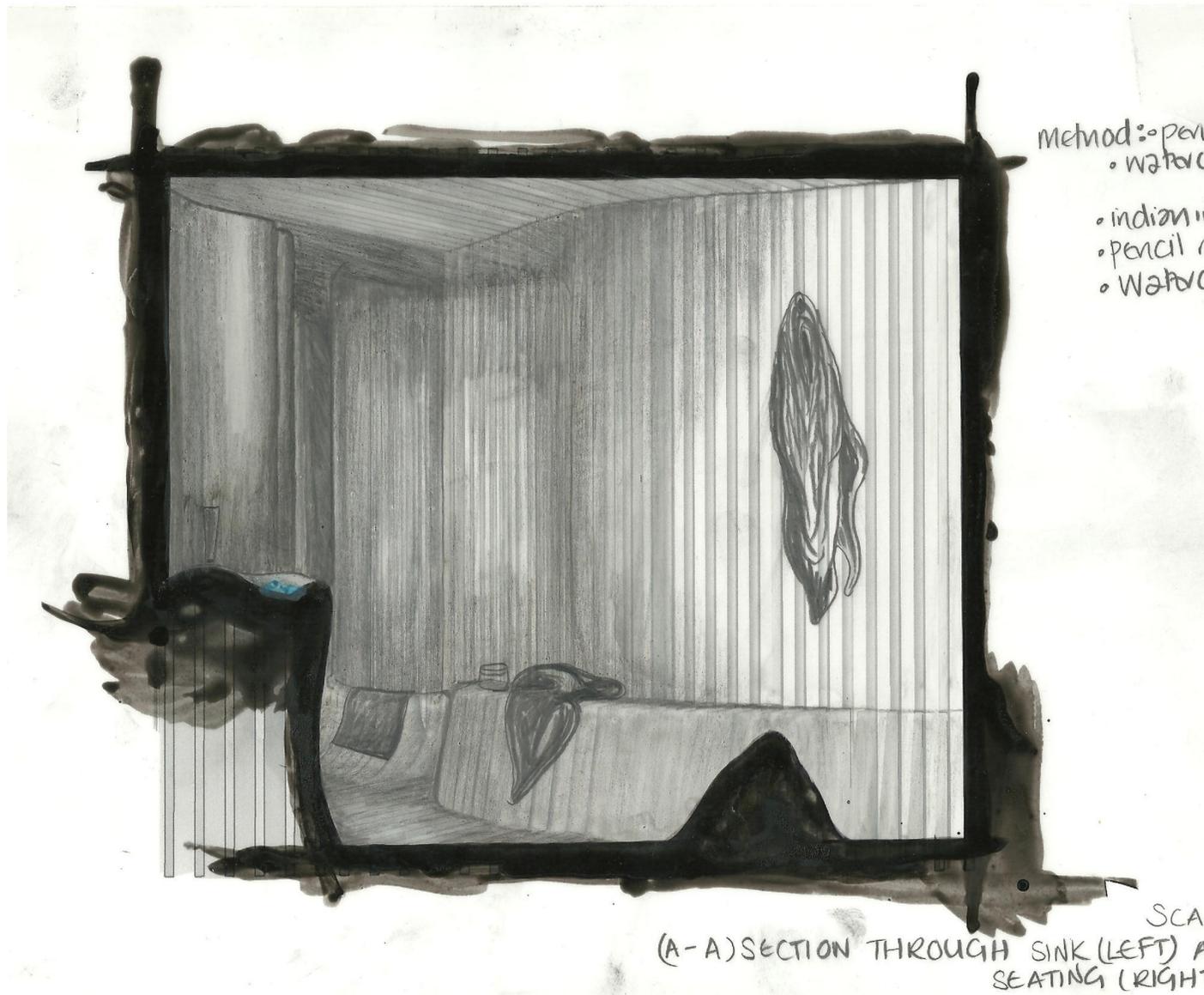
DRAWING THE BATH ROOM



Figure 105. Hand drawn sectional perspective cutting through entry (left), shower and bath. Smith, L. (2011).

Although SketchUp was a valuable tool for digitally constructing and visualizing my design, the quality of the rendered images feel impersonal. My project seeks the individuality of a design fitting to its user and so I feel that the drawings should speak to these values. SketchUp produces images that feel mass-produced and industrialized - opposite from the concept and scope of my project. The use of an architectural programme has allowed for quick manipulation of the digital model and for my desire for a tailor-made bathroom to be visualized and seen by outsiders.

Reflection upon this year's case studies, experiments and experiences has led me to believe that I can represent another part of myself - through my choice of visualization. The high level of self that has been poured into this project made it clear to me that conceptually I should draw the re-design of my bathroom. As personal to me as my hand-writing in my *Diary*, or my portrait as Bart Prince would say, my drawings would create another level of myself to be made visible in the design.



Along with moments of truth within the design, hand drawings perform similarly to my *Bathroom Diary*. As Pedgley²⁶ would say, the drawings would reveal moments of fact along with “emotional responses” and “moments of serendipity”.

Only I could have drawn these drawings, as this bathroom is a personal experience of a tailor-fit space for myself. Both the design and the drawings reflect my personality and individuality, and, through the design process and method of display my daily rituals and routines are evident.

I originally chose to work with

Figure 106. Hand drawn sectional perspective cutting through sink and change areas. Smith, L. (2011).

26. Perce, G. (2008). *Species of Spaces and Other Pieces* (third.). London, England: Penguin

2cm section outline
 pencil rendering
 water colour wash
 pencil rendering
 water colour, water.



THROUGH BATHROOM
 DESIGN

Figure 107. Hand drawn sectional perspective cutting through corridor areas. Smith, L. (2011).

dry media, picking up my set of drawing pencils and focusing on shadow and light within the new bathroom. I felt careful and curious at the same time, but the design I had created would not allow me to 'stay within the lines' so to speak. This has been a messy project from the start, and I knew I couldn't represent my bathroom truthfully without the very element that makes the bathroom function, water.

This stage of the drawing development led me to creating a series of different drawings, all of which were trying to tell the story of my design and its individual bathroom areas.

Initially I started by cutting sections through the design so the viewer could understand the relationship between the different bathroom areas. I quickly realised that I wanted the viewer to experience the bathroom how I would, and thus began creating drawings of my bathroom design as seen through my eyes.

Each drawing has been created using different methods to see how best I could create my bathroom and allow others to experience it



Figure 108. Hand drawn section through shower area. Smith, L. (2011).

the way I have. I wrote the method for each drawing in the corner so I could replicate it if I wanted to. I used ink on pencil, pencil on ink, ink on water colour, and water colour on ink, all of them at once and worked into them again and again and again, each time leaving traces of myself behind through smudges, mistakes, imperfections, and fingerprints.

I finally took my drawings into the bathroom to shower with me while I drew them. Splashes hit the paper leaving real moments of movement embedded on the drawings. I treated the paper like a part of myself. When I exfoliated, I exfoliated the paper. When I shampooed, the paper was shampooed. And when I shaved, the paper was shaved.

This Master of Design project feels like it could never end, like I could continue to go into the bathroom and discover new aspects of myself. Over time new routines and new rituals will emerge but I guess that could only be designed for upon their realization. Because of the nature of this project - a project I hold dear to myself, because it is myself - I continued to draw my bathroom,

taking paper with me to where it and I are most vulnerable and at our most personal, and continuing to draw in the space that started this project, with the products that frustrate me – the bath room.

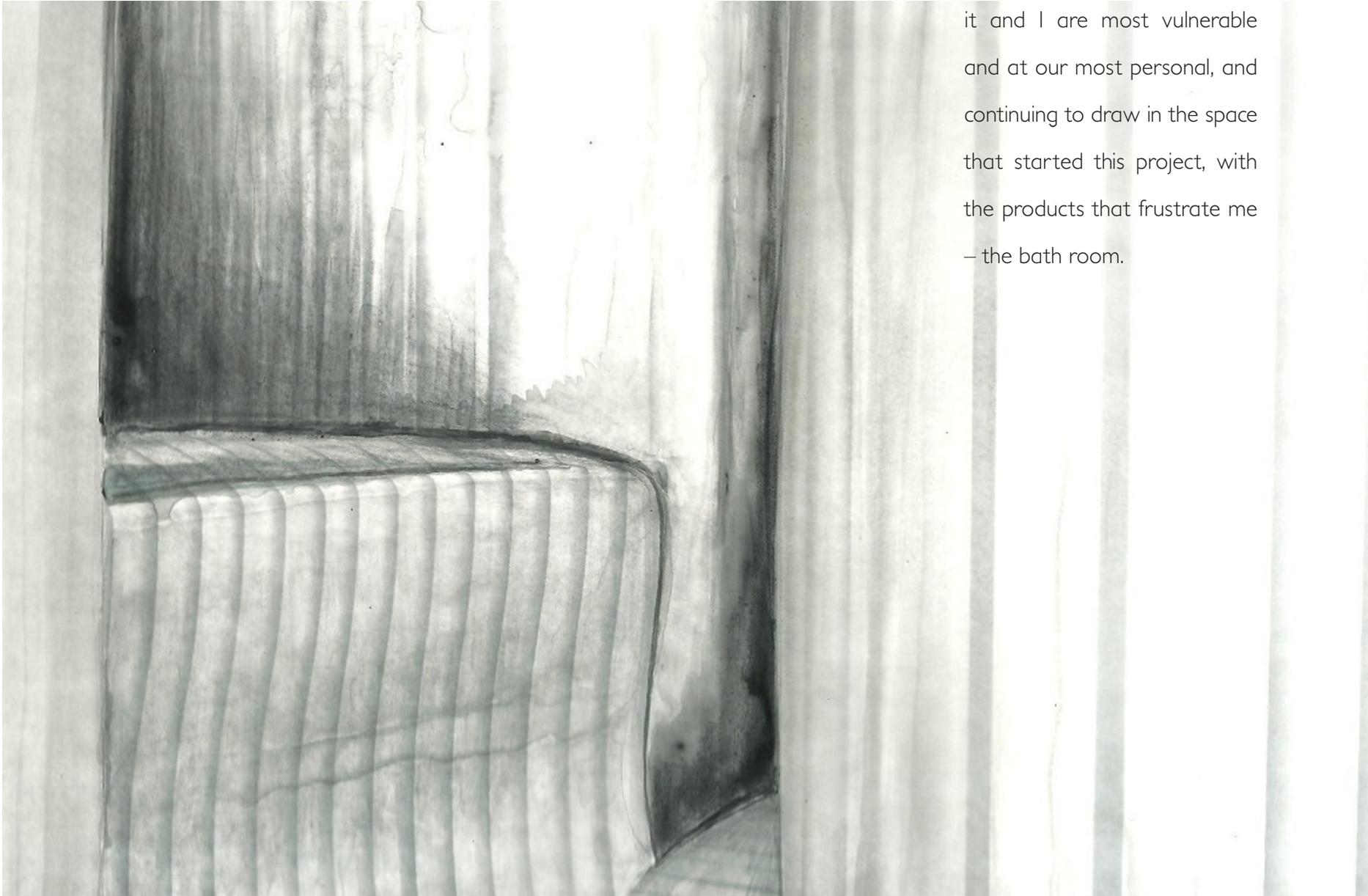


Figure 109. Hand drawn perspective looking towards the sink area from the bathroom entry. Smith, L. (2011).

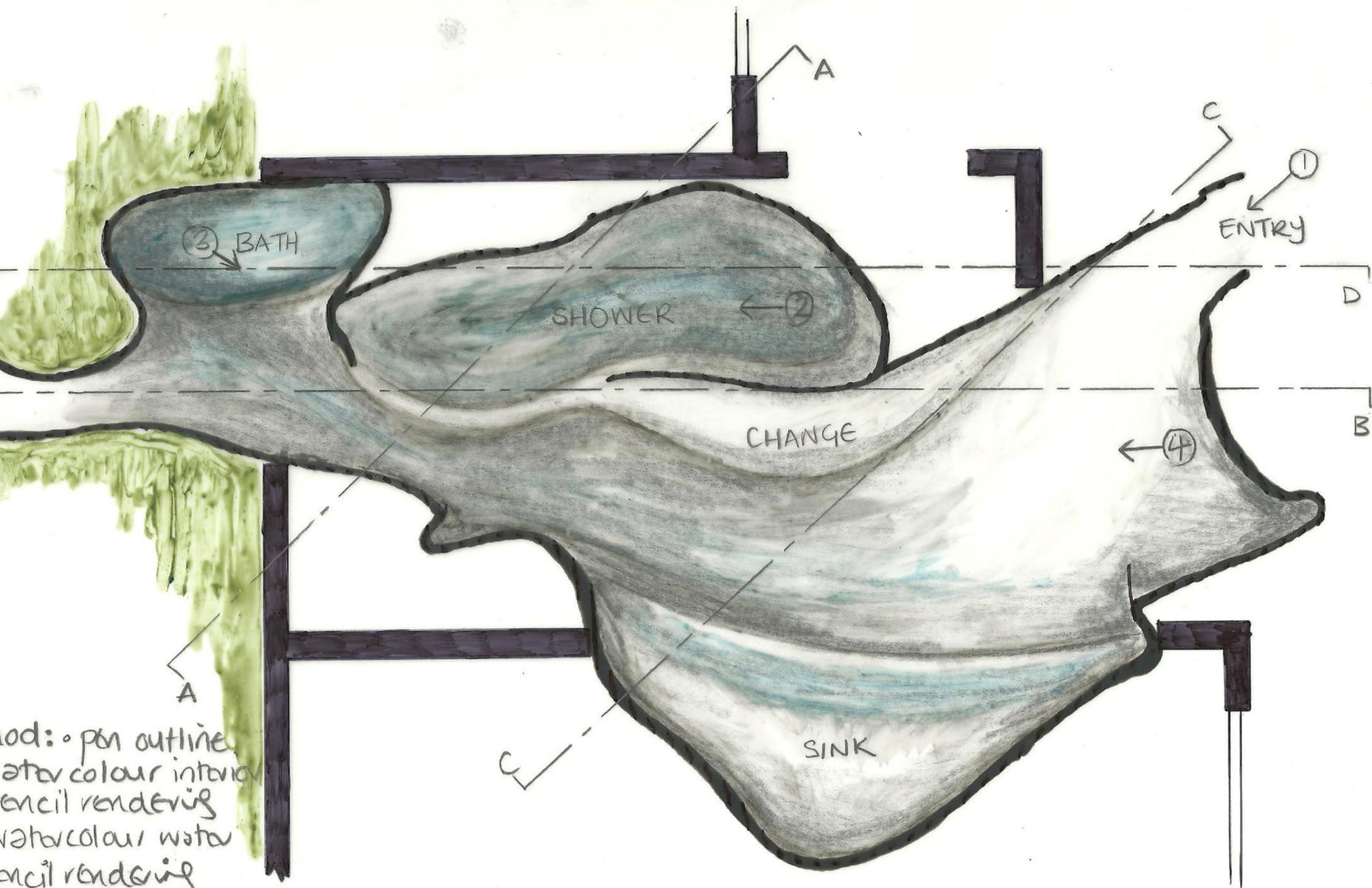


Figure 110. Hand drawn plan of new bathroom design, scale 1:20. Smith, L. (2011).



Figure 111. Hand drawn perspective as if viewer is standing in the shower (through my eyes). Smith, L. (2011).

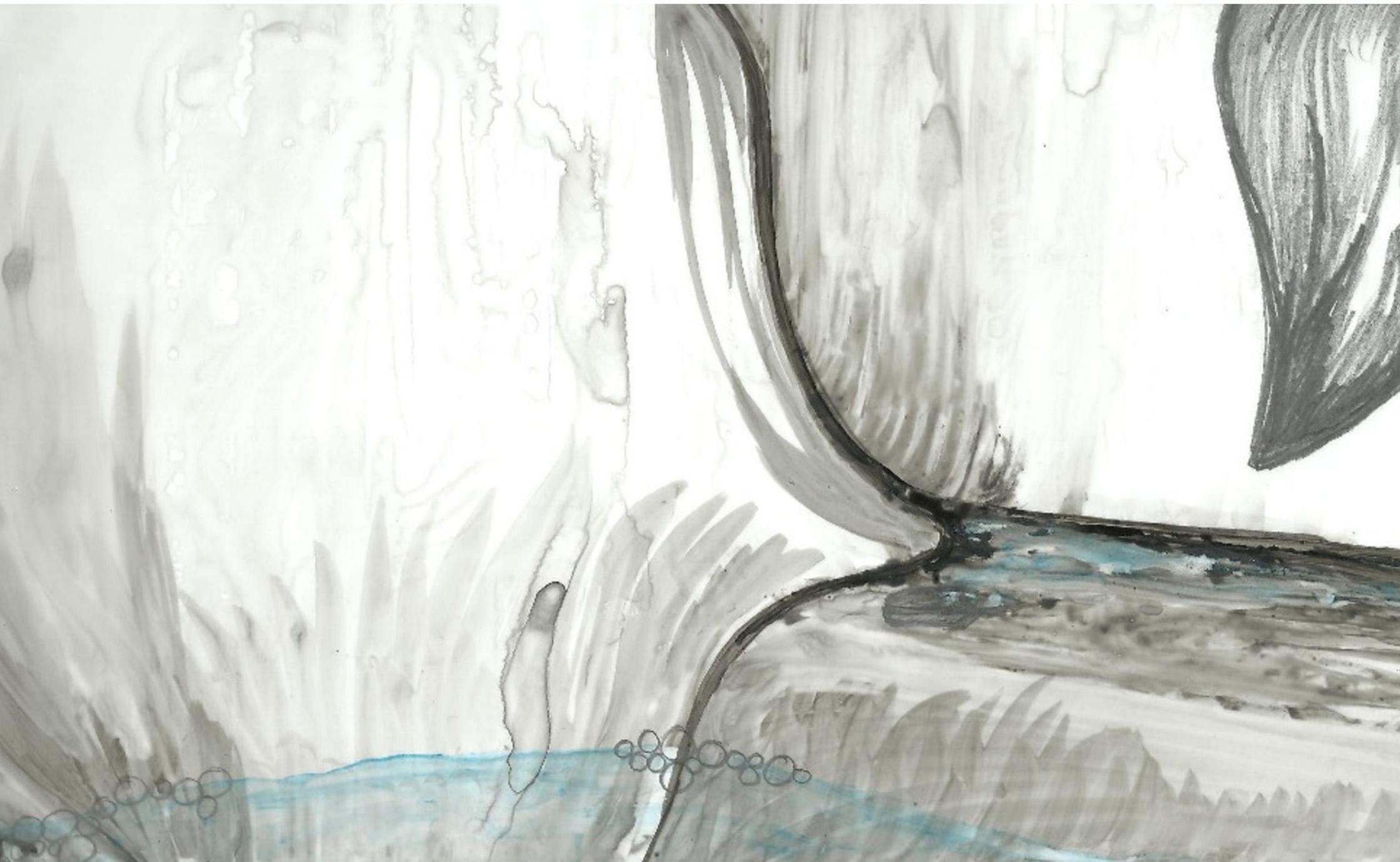


Figure 112. Hand drawn perspective as if viewer is sitting in the bath (through my eyes). Smith, L. (2011).

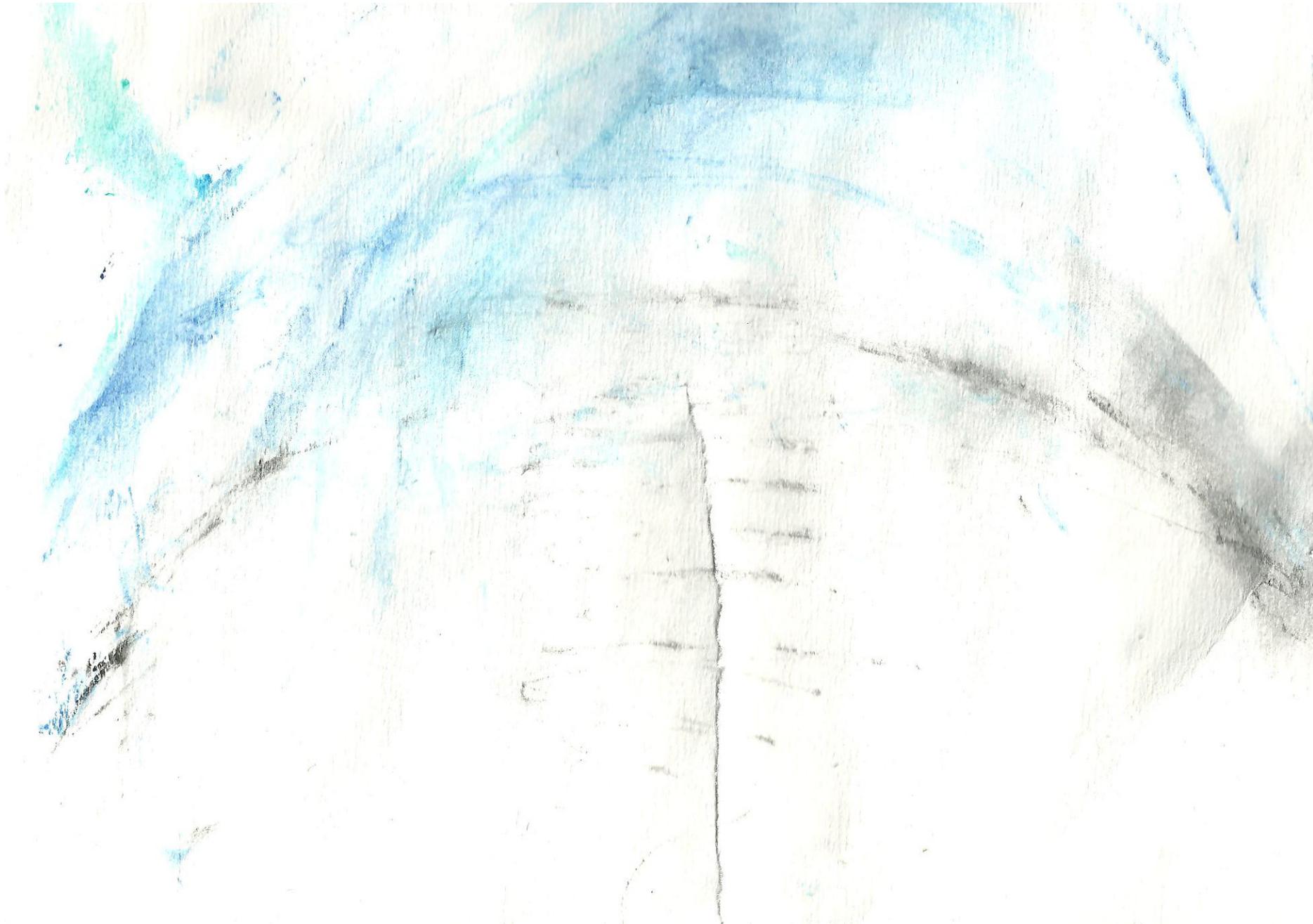


Figure 113. Hand drawing of showering whilst showering. Smith, L. (2011).

CONCLUSION

Throughout the duration of *The Bath Room* project, practice-led design research has aided me in making informed decisions about the potential for an alternative method for designing domestic bathrooms. The relationship between space, body, and product is made evident through the redesign of my current domestic bathroom through the relationship between me and my bathroom space. *The Bath Room* is a project which isn't meant to be physically realized; it is a conceptual poetic project that tests the limits of what is currently understood to be a domestic bathroom. In a world dominated by standardized, industrial products, *The Bath Room* explores conceptually what an interior space designed specifically for an individual could be.

Through *The Bath Room* project, I have learned that there is great merit in not standardizing a bathroom or filling it with collections of mass-produced accessories and products. Each individual bathroom could be unique to its inhabitants, mimicking their movements, daily rituals and routines to form a space that



Figure 114. Hand drawing of bathroom design entry (partial). Smith, L. (2011).

fits its user – in comparison to the rigid geometries, aesthetics and mass-production of common domestic bathrooms and the products they contain. Designing for one's individual rituals and routines allows the shape, form, and aesthetics of your bathroom to take on the form of the movements required to perform these. Because the design has taken on the form of these movements for daily rituals and routines, the bathroom space transforms into a room that 'fits' one's own body and accommodates movements which occur within the bathroom.

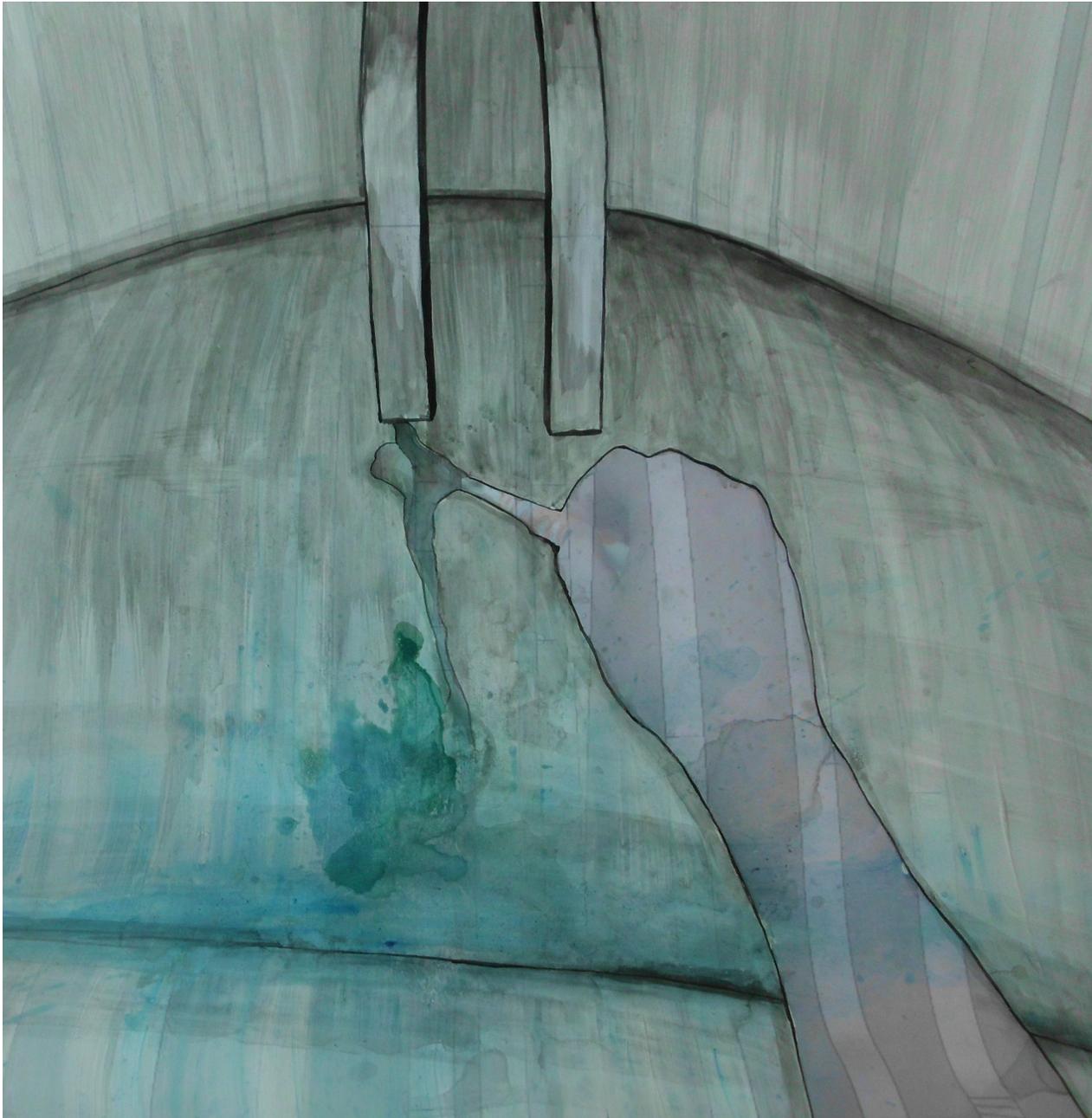


Figure 115. Hand drawing of bathroom design sink area (partial). Smith, L. (2011).

The various iterations undertaken throughout the duration of this project have helped to inform my design and it's development. I have learnt that my bathroom is designed on the basis that the products my body requires to complete my own individual bathroom rituals and routines cannot fit into my existing bathroom space in any other configuration than the way they are currently permanently fixed. Knowing that my bathroom is the consequence of space-size and product-size encouraged my decision to design bathrooms for the individual.



The Bath Room visualizations have demonstrated that it is possible to design for an individual. This project gave me the opportunity to experience a bathroom beyond common conventional standardized bathrooms like the one I had in Scotland, and the one I use today - a bath room tailor-fit to my body. Perhaps this project will encourage other people to seek individual spaces designed for themselves, perhaps even designed by them, in an attempt to conceptually visualize a design that 'fits'.

I have also learnt through my *Bathroom Diary* that there is a disrupted link between my own daily movements, actions, rituals and routines and my own current domestic bathroom. My *Bathroom Diary* gave me the means to visualize the space I use within my existing bathroom – wasted space (space that wasn't entered within my bathroom) and utilised space (the space I occupied physically and as recalled in my *Bathroom Diary*). Using Pedegly's notion that a diary can capture moments of chance²⁷, moments of my subconscious self has been captured and realized through my bath room design and its visualization through the design drawings. My body's movements created the link between

27. Pedgley, O. (2007). Capturing and analysing own design activity. *Design Studies*, 28(5), 463 – 483



Figure 117. Hand drawing of bathroom - looking through entire design. Sink left, shower right. (partial). Smith, L. (2011).

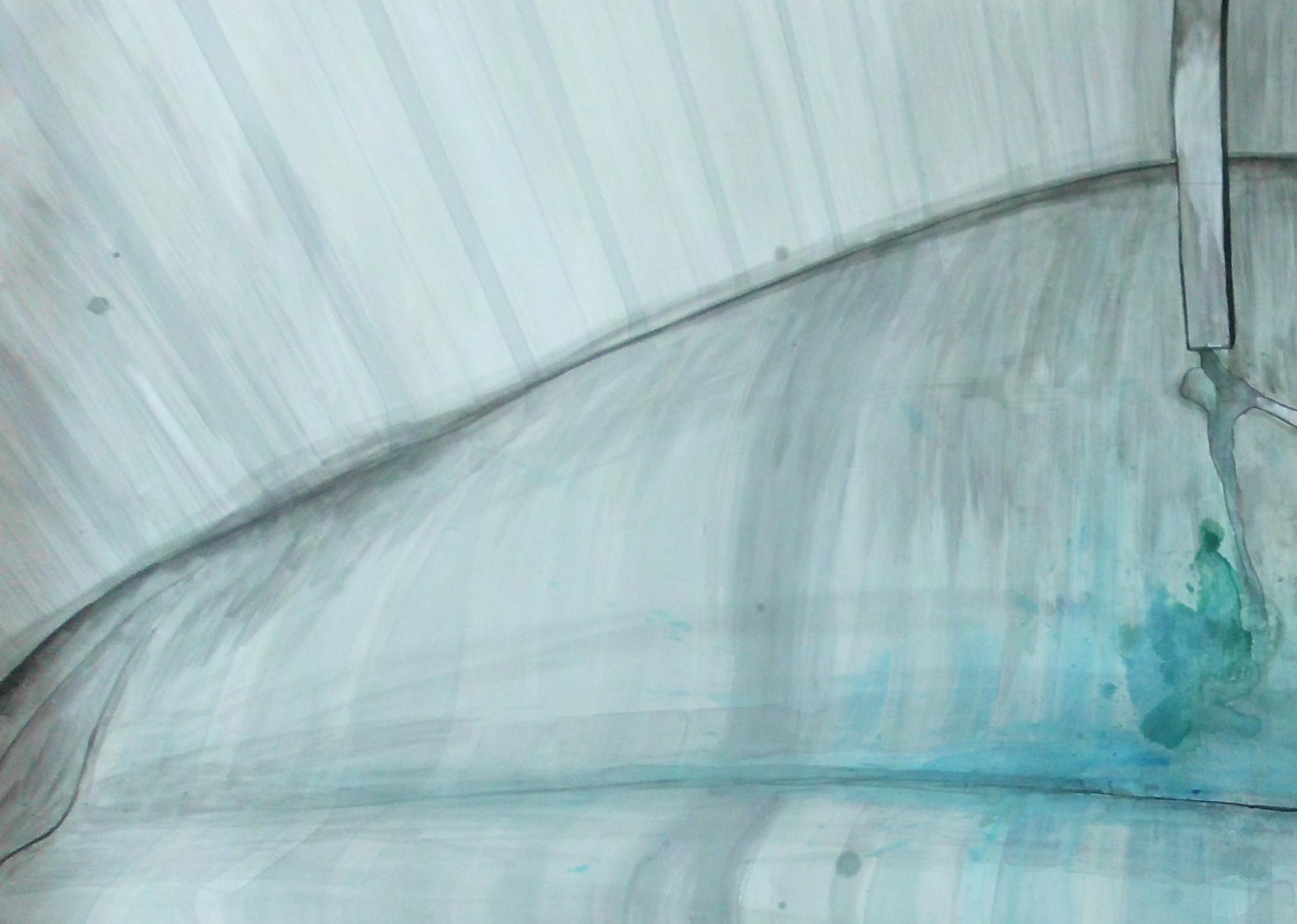
the product and the space, creating an individual bathroom that unites product and space.

All of the information I have gathered through practice-led design research has informed my design work and design output, both positive and negative information has been helpful. Through the investigation of the individual within a place of dwelling, the disrupted link between bathroom-space and bathroom-product has been reunited; the walls, floors and ceilings merge with the sink basin, the bathtub, and the shower space.



Figure 118. Hand drawing of bathroom shower area (partial). Smith, L. (2011).

As the facilitator and designer of this project, and due to the intimate nature of the design process, I was persuaded to hand draw the redesign of my bathroom. This links to the life-size drawings I created of myself, to the diary (both physical and mental recordings of myself within the personal, intimate bathroom space), through to my hand writing recording myself and to the filming of my body during the act of bathing, showering, washing etc. All of these are highly intimate, highly personal, but most importantly highly individual – like my design.



The process I have undertaken in the last 9 months has demonstrated how a bathroom design can be visualized using analysis and recording of one's individual rituals and routines within an existing bathroom.

My bathroom design has become a continuous unified space where product and spatial surfaces flow together, and my body was the facilitator for this to occur. Using hand-drawing as a method to visualize an individual bathroom space, I have captured moments of *The Bath Room* experience recorded throughout the duration of this project.

Figure 119. Hand drawing of bathroom sink area (full image). Smith, L. (2011).

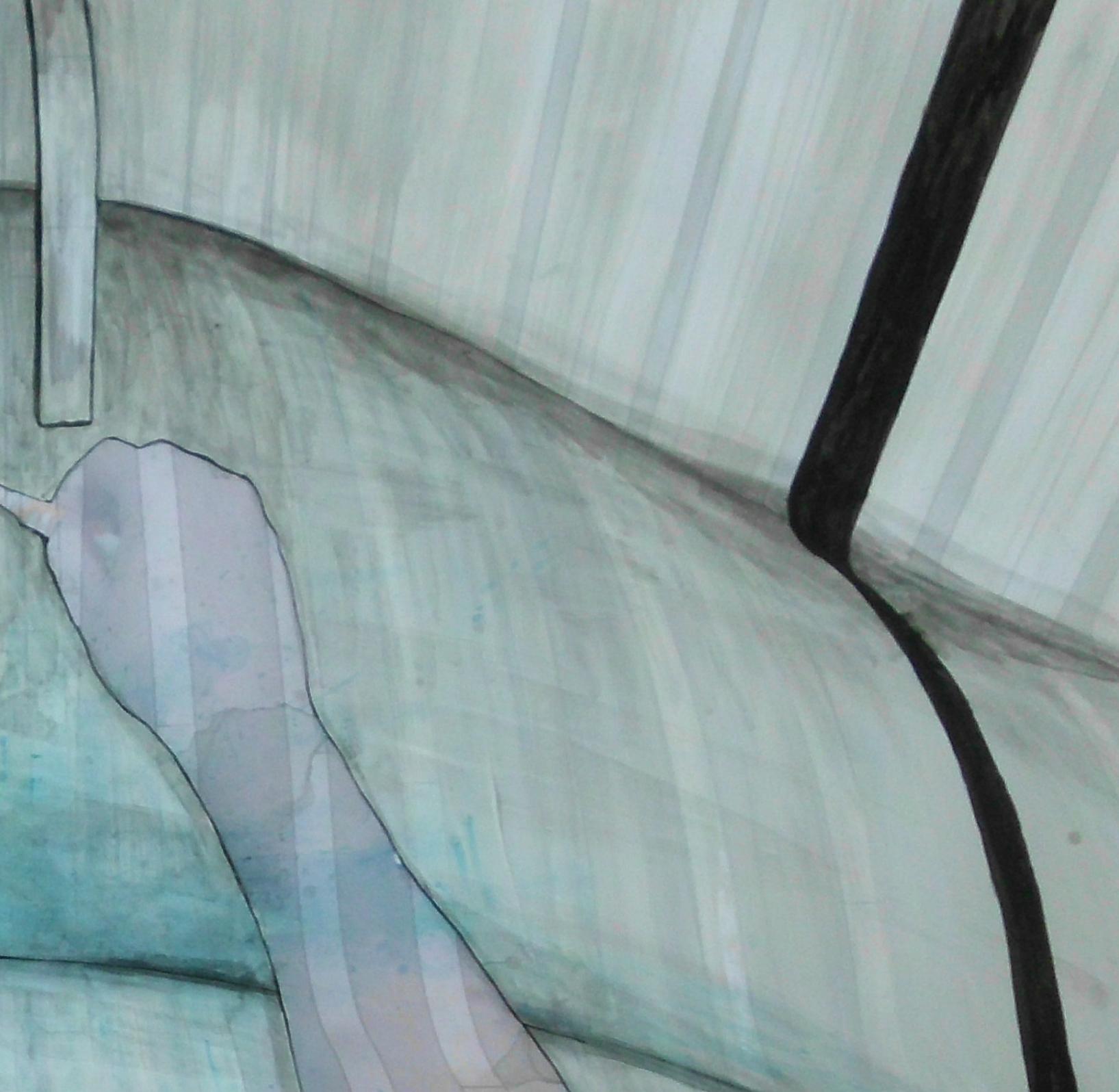




Figure 120. Hand drawing of bathroom bath area (partial). Smith, L. (2011).

OPPOSITE PAGE

Figure 121. Hand drawing of bathroom design looking through entire design (full image). Smith, L. (2011).

The drawings capture the unknown experience of showering, bathing, and washing, and draw a parallel to previous studies undertaken earlier in this project. It is quite beautiful that I began initially photographing the visible relationship between my body and bathroom products. In my final drawings I stepped back into the shower and applied the same techniques with my hand-drawings going through the same experiences as these earlier studies.



Subsequently the steam and splash marks leave moments of truth embedded into these conceptual drawings of my experience within *The Bath Room*.

OPPOSITE PAGE

Figure 122. Hand drawing of bathroom design shower area (full image). Smith, L. (2011).



OPPOSITE PAGE

Figure 123. Hand drawing of bathroom design bath area (full image). Smith, L. (2011).



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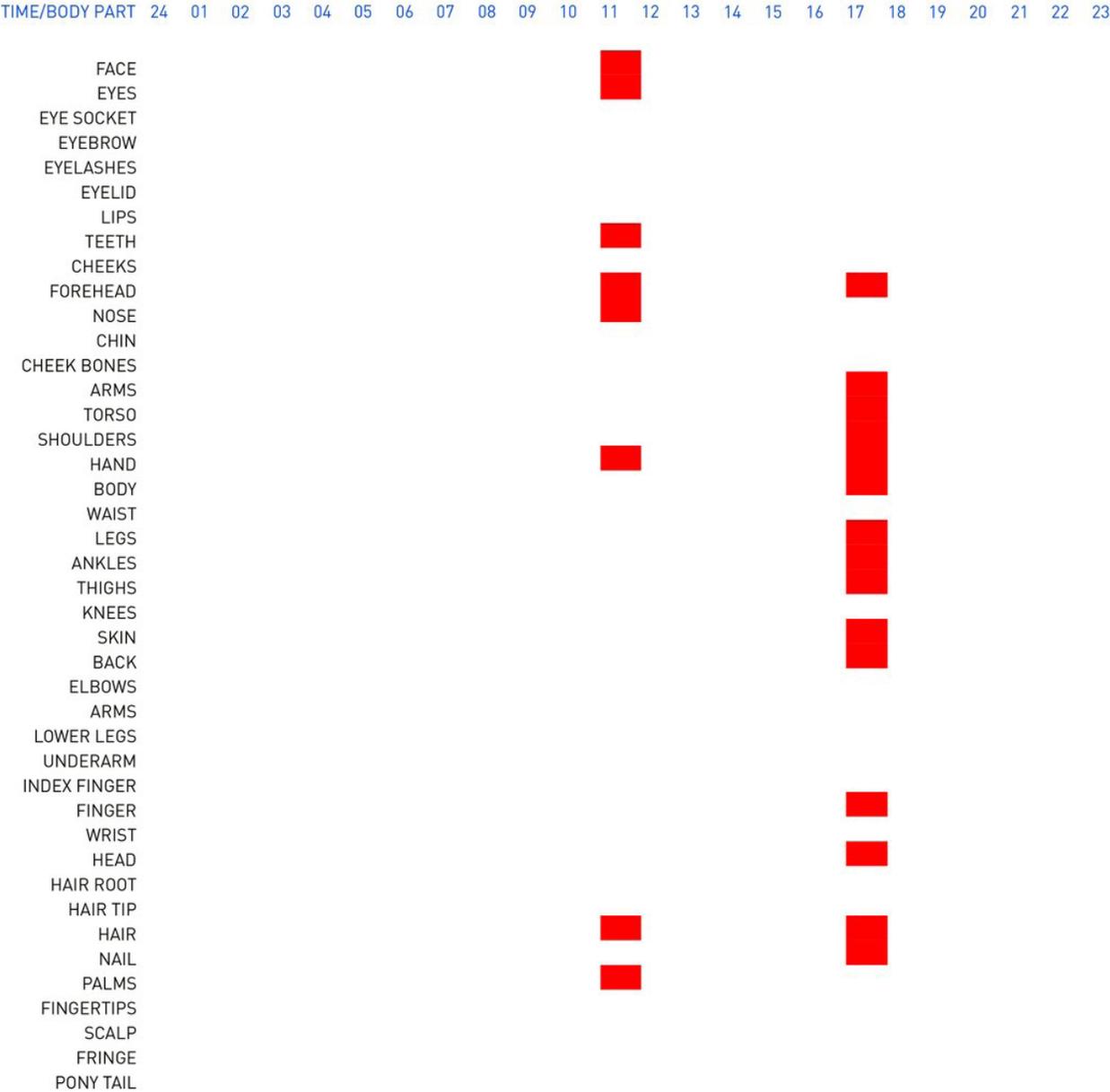
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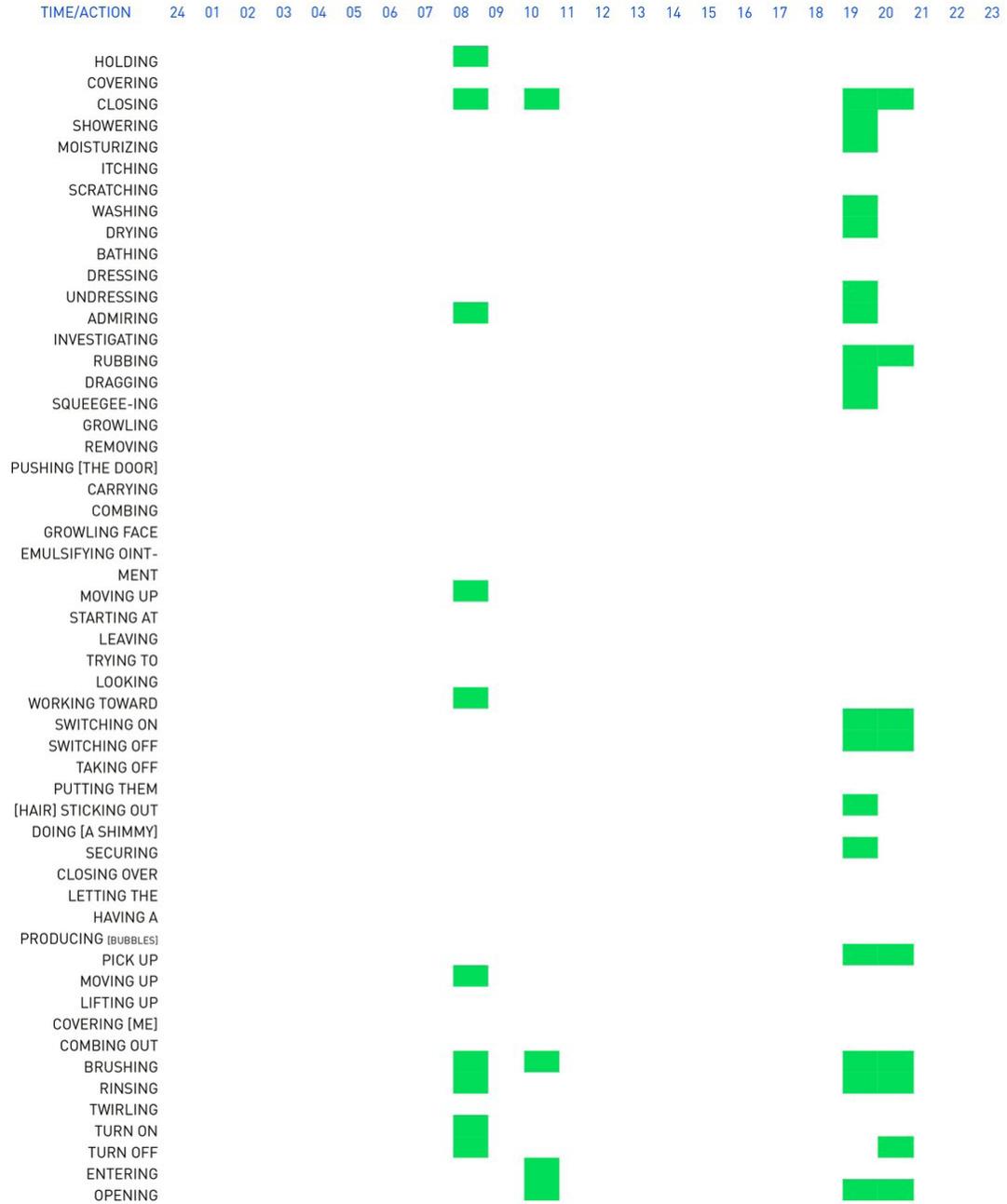
APPENDICES

- A TIME/BODY PART 18TH AUGUST
- B TIME/BODY PART 19TH AUGUST
- C TIME/BODY PART 21ST AUGUST
- D TIME/BODY PART 22ND AUGUST
- E TIME/BODY PART 23RD AUGUST
- F TIME/ACTION 18TH AUGUST
- G TIME/ACTION 19TH AUGUST
- H TIME/ACTION 21ST AUGUST
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- K MOVEMENT DIAGRAM 18TH AUGUST
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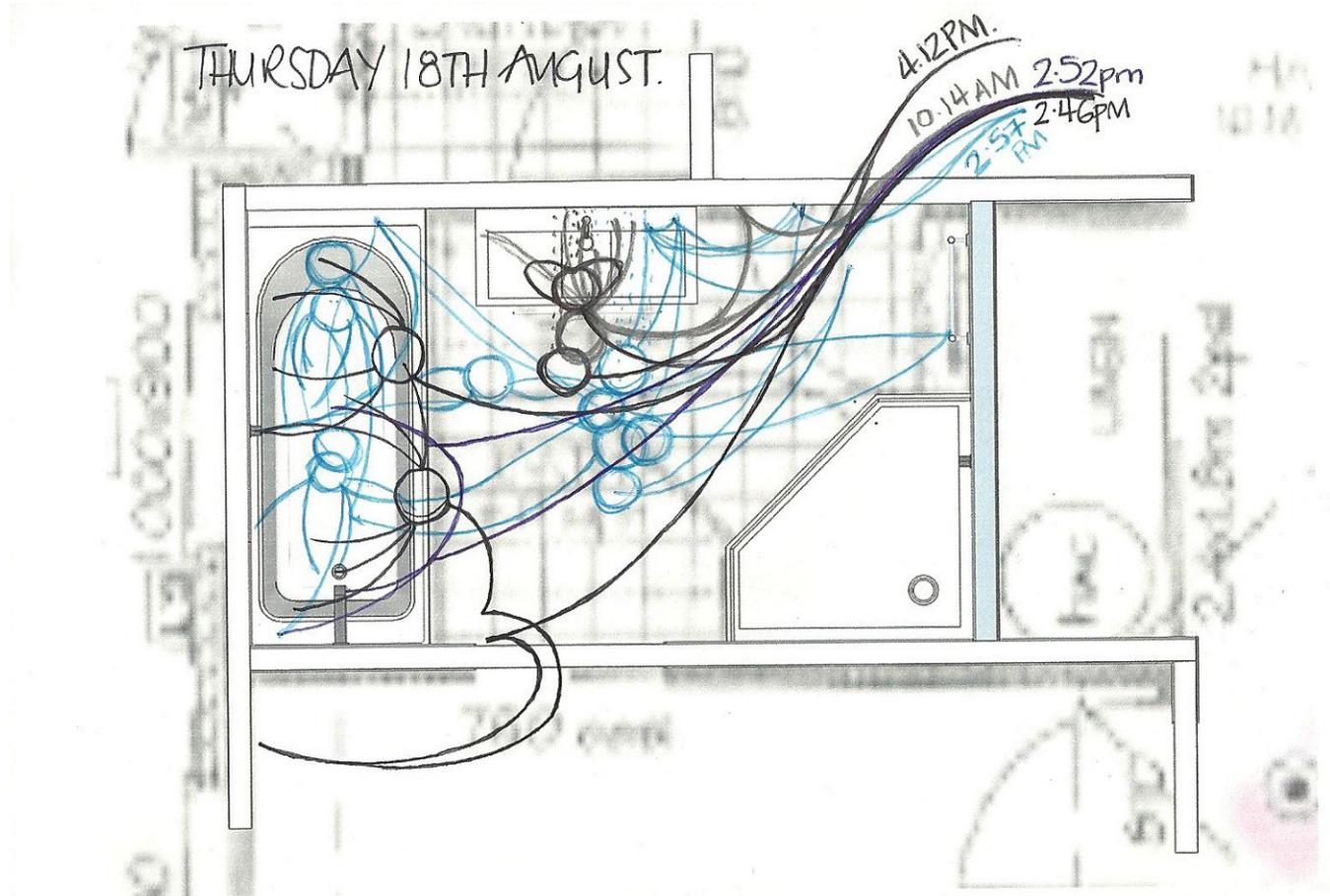
APPENDIX E



APPENDIX G

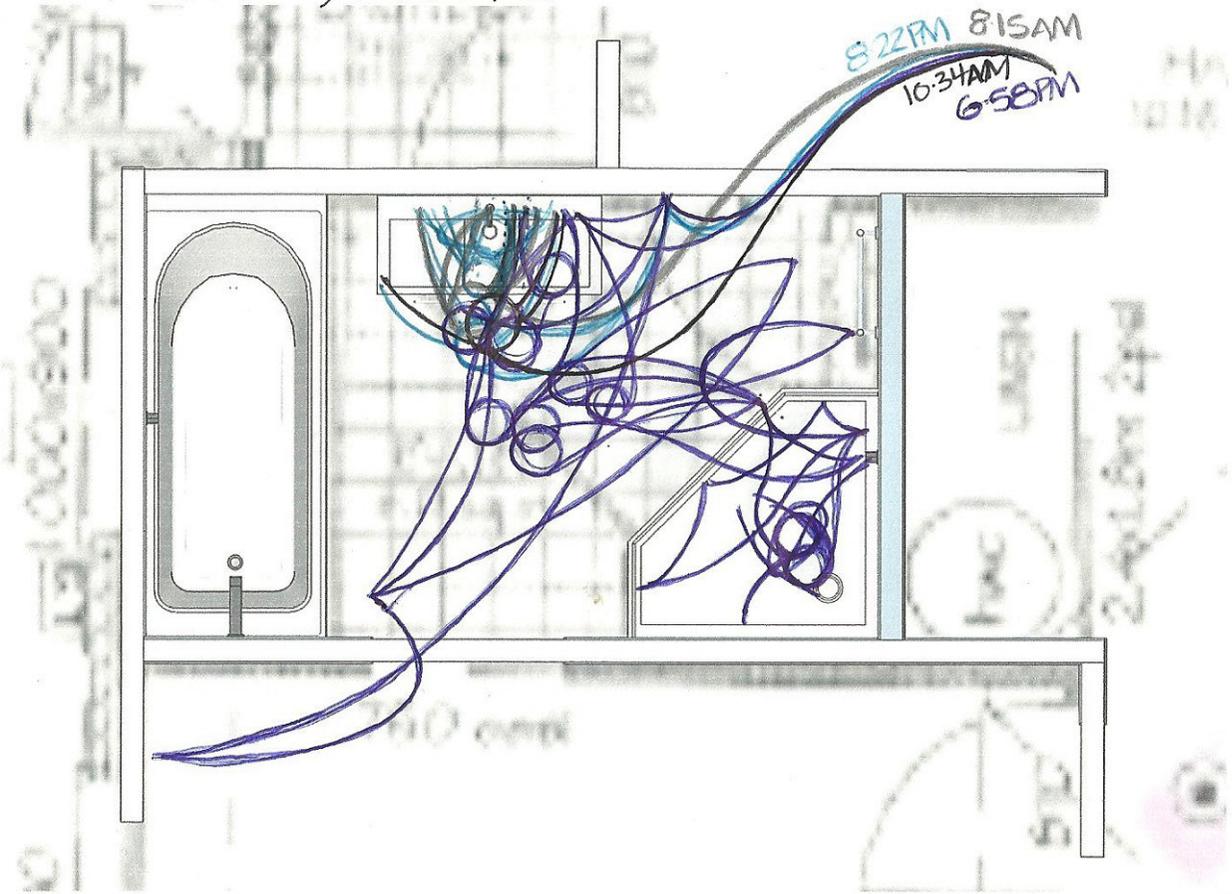


APPENDIX K

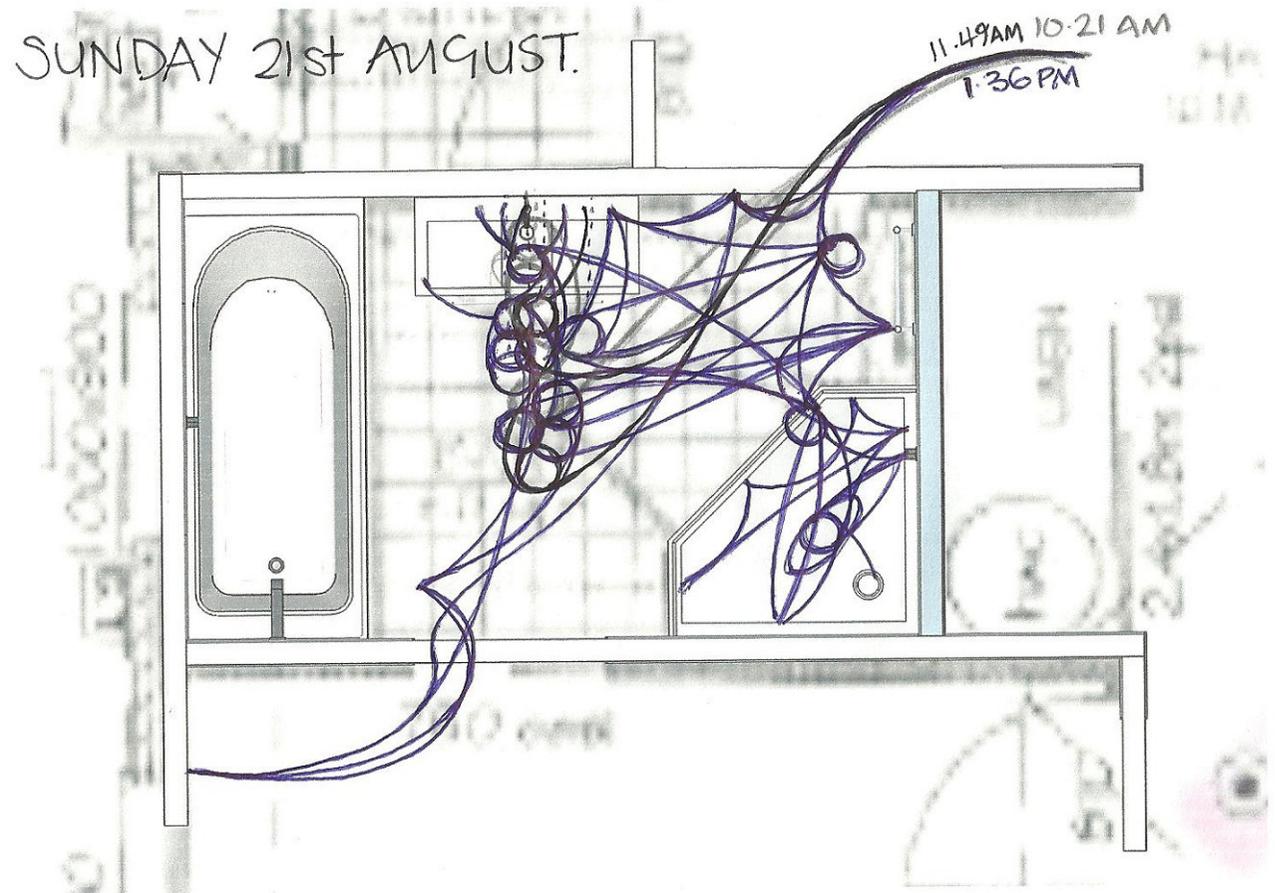


APPENDIX L

FRIDAY 19TH AUGUST.



APPENDIX M



APPENDIX N

