

THE CREATION OF A BIRTHING CENTRE:  
Considering the prevention of post-natal depression.

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THE CREATION OF A BIRTHING CENTRE:  
CONSIDERING THE PREVENTION OF POST-NATAL DEPRESSION.

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## **ABSTRACT**

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This thesis explores the notion of interior architecture as a tool in the prevention of post natal depression. This research is part of a larger and current theoretical argument that places interior architecture in a catalyst role for the prevention of mental illness.

Initial research shows that the act of giving birth and its physical and mental recovery are tightly linked to the potential development of depressive disorder. Accordingly this research will explore the spatial requirements for birthing with the prevention of mental disorder in mind. The design will be developed at the intersection of a series of criteria of spatial qualities in the prevention of depressive orders and evidence based hospital design parameters for birthing.

This research aims to establish a comprehensive base guideline specific for the design of birthing centres, focusing on the prevention of post natal depression. The design here presented is a series of tests and assessment of this guideline.





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## **INTRODUCTION**

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Nearly twice as many women as men are affected by a depressive disorder. The major depressive disorders in women are: premenstrual dysphonic disorder (PMDD), depression in pregnancy, post-natal depression, and depression related to pre-menopause/ menopause.

This research will explore the relationship between prenatal health consultation, birthing and the prevention of post natal depression.

The aim of this thesis is to establish a comprehensive evidence base guideline specific for birthing centres focussing on the prevention of post-natal depression.

This thesis therefore will focus on the design of a birthing centre with emphasis on the birthing room and the communal gathering areas.

This thesis is designed in four clear segments:

The first part investigates the current literature on Interior Architecture as a healing tool and depressive disorders in women.

The second chapter explores the main precedents within healthcare architecture, including the work of architect Bianca Lepori. The issues of light, colour, materials and wayfinding will be researched.

The third segment presents a series of six designs. More specifically the evolution of a design response to site, programme and function. It includes furniture and lighting as an integral part of the design.

The final chapter describes more specifically the final design. It is understood that the final design helps define a definition of a guideline for the design of birthing centres in the context of contemporary thinking.

An evidence based design guideline will be the final outcome of the research and design process. The final design presented is a series of tests and assessment of this guideline. This guideline can be used by architects and interior designers in the design of a birthing centre considering the prevention of post-natal depression.



# CHAPTER 1

AT THE INTERSECTION OF BIRTHING  
AND DEPRESSION



## INTRODUCTION CHAPTER ONE

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Chapter One investigates the current literature on the role that interior architecture may have as a healing tool and depressive disorders in women.

This chapter explores the two viewpoints of environmental psychology and interior architecture to create an environment that can become a healing tool for depression and anxiety in women. *"The Ghost in the house"* by Tracy Thompson highlights the problem of post-natal depression in woman. Roger S. Ulrich, PhD is the most important precedent for incorporating natural elements within the interior architecture which influences the healing process. Ulrich discusses these natural elements in his research paper *"Effects of interior design on Wellness: Theory and recent scientific research."* Esther M. Sternberg also investigates the notion of environmental psychology and interior architecture in her book *"Healing spaces, the science of place and wellbeing"*. Bianca Lepori is the most influential architect in the creation of birthing territory; her work is discussed by Kathleen Fahy in *"Birth territory and Midwifery Guardianship"*. Ian Forbes, the adjunct professor of the research group for health architecture looks at the birthing unit identifying a sequence of events within the birthing environment discussed in his research paper *"Birthing unit design: Researching new Principles"*. Bilge Sayil Onaran explores the powers of sustainable materials on the recovery of patients within a mental health hospital in *"Sustainable Therapy Room Surfaces in Acute Mental Health Hospitals"*. The overall outcome of the thesis will contribute to existing knowledge by establishing clear outlines for the development of a birthing unit with the intentions of hindering the development of post-natal depression in women.

This chapter tests the two viewpoints of environmental psychology and interior architecture to create an environment that can become a healing tool for depression and anxiety in women. The overall outcome of this research will contribute to existing knowledge by establishing clear outlines for the development of a birthing centre.

Tracy Thompson explains depression in women in her book *The Ghost in the House*. She states that “Depression is a fire in the brain that, once ignited, is hard to extinguish. For many once developed it becomes a chronic, lifelong condition. Motherhood is another lifelong condition: once a mother, always a mother.” (Thompson, 2) Therefore it is important to try and prevent the development of post-natal depression before it digs its claws in to the woman and affects her for the rest of her life. Women constitute two-thirds of patients suffering from common depressive disorders. Four depressive conditions specific to women are: premenstrual dysphoric disorder (PMDD), depression in pregnancy, post-natal depression, and depression related to pre-menopause/menopause. The treatment of depression in women is therefore a substantial public health concern. High-quality, empirical data on depressive disorders specific to women are limited. As a result, there are no comprehensive evidence-based practice guidelines on the best treatment approaches for these illnesses. (Thompson, 5) This gap in knowledge is an important aspect of design that needs to be considered for the development of healing Architecture. The aim for this thesis will be to create an evidence based design guideline for healing interior architecture focused on preventing the development of post-natal depression.

The incidence of depression in women peaks between the ages of twenty-five and forty-four, which are, not coincidentally, the major childbearing years. (Thompson, 20) When investigating the condition under which women give birth the question arises of the birthing surroundings playing a role in the development of post-natal depression. Ann Oackley studied a group of new mothers from pregnancy to a few weeks after birth and found that a traumatic birth often led to depression. When looking at the statistics displayed in

Dr Paul Nicholson’s book, *Post-natal depression: facing the paradox of loss, happiness and motherhood*, it becomes clear how big the problem of post-natal depression in woman really is;

- 1 in 10 woman get Post-natal depression
- 10% of new mothers have severe Post-natal depression
- 80-90% of new mothers experience the baby blues

Having a history of depression prior to childbirth makes post-natal depression more likely, and suffering one episode of post-natal depression puts you at a higher risk of developing it again should you have another baby. ( Thompson, 45) Therefore creating a birthing clinic with the possible development of post-natal depression in mind will give these women the support necessary to deal with this difficult disease.

Dr. Roger S. Ulrich’s work is the most important precedent for incorporating natural elements within the interior architecture which influences the healing process. Roger discusses these natural elements in his research paper, ‘Effects of interior design on Wellness: Theory and recent scientific research.’ Ulrich’s 1984 affirmation that post surgical patients whose rooms offered an outdoor view recovered more quickly, researchers with an interest in caring/healing architecture have begun to systematically explore the impact of the environmental support on health and healing (Ulrich, 5). “Interior design psychology is a direct study of the relationship between an environment and how that environment affects the behaviour of its inhabitants, with the aim of maximising the positive effects of this relationship. Through interior design psychology the performance and efficiency of the space and well being of the individual are improved.” (Ulrich, 1) Roger Ulrich has shown that by incorporating this psychology into design one can control an environment and to an extent, the relationship and behaviours of its inhabitants. Ultimately the ideal outcome for the birthing room would be to apply interior design psychology to the design of the room to hinder the development of post-natal depression in women.



Ian Forbes, the adjunct professor of the research group for Health Architecture looks at the birthing unit identifying a sequence of events within the birthing environment discussed in his research paper 'Birthing unit design: Researching new Principles.' Forbes states that the stressors in the hospital must be removed in order to create a calming, healing environment. Stressors in a hospital setting include noise, temperature, and most relevant seems to be the lack of control for the birthing mother. Many studies have found that lack of control is associated with such negative consequences as depression, passivity, elevated blood pressure, and reduced immune system functioning. (Forbes, 1) In healthcare contexts lack of control is a pervasive problem that increases stress and adversely affects wellness. Esther states in 'Healing spaces' that besides removing stressors from the environment, health care design research aims at adding features that enhance comfort and take in to account the spiritual and social aspects of the patients life. This is what Roger Ulrich refers to in Effects of interior design on wellness as ecological health.

It includes the addictions of:

- gardens,
- views of nature,
- artwork,
- soothing music,
- soothing colours

and spaces where family members can congregate for mutual support. (Sternberg, 237)

Ecological health also includes environmentally friendly or "green features" such as construction materials that improve indoor air quality by reducing noxious gas, renewable energy systems, open spaces, balconies and gardens. Esther M. Sternberg also investigates the notion of environmental psychology and interior architecture in her book Healing spaces, the science of place and wellbeing. A branch of architecture called biophilic design takes this one step further: it espouses the notion that nature itself has a healing effect. (Sternberg, 237) This thesis will investigate the power of indoor plantscaping through design of the communal areas in the birthing centre.

Bianca Lepori is the most influential architect in the creation of birthing territory; her work is discussed by Kathleen Fahy in Birth territory and Midwifery Guardianship. Lepori has raised concerns through her publications and conference appearances about poor total environments for birthing in hospitals. (Fahy) Lepori contrasts the positive spirit of home birth to hospital environments, which, she believes cause women to unconsciously accept the technologically expedient pathway laid down by the hospital birthing process, which for most woman is not a good birthing choice. Lepori says that, although technology is essential for safe birth, we have forgotten the 'soul' of the places we build (Forbes, 3) The solution would be to bring the battle between the technical and the emotional into balance. Kathleen Fahy states that in her opinion "An ideal birthing environment is one in which the physical terrain more closely resembles the home and culture of the women and one in which the woman feels safe, secure and in control of what happens to her and her baby." (Fahy, 12) The ideas of creating a homely environment for the women will be addressed throughout the thesis by incorporating features such as colour, materials and soft furnishings.

Kathleen Fahy argues in 'Birth Territory and Midwifery Guardianship' that feeling submissive actually weakens people physically, intellectually and emotionally. Women need to feel strong and confident in order to make the best decisions for themselves and their babies. A negative birthing experience may contribute to victimhood and depression and this experience prevents the uterus from contracting properly reducing the woman's interests in and energy for birthing.

"A different birthing experience has the possibility to have a healing effect on some of the past trauma and may avoid post-natal depression with the consequent lack of energy for early mothering." (Fahy, 15)

Natalie Angier, a medical journalist, describes birth as a '...feat of almost cataclysmic stress' (Fahy, 15) women deal with this amount of stress through the chemical release of oxytocin during birth.

Oxytocin facilitates a strong bond between mother and her infant; enables the mother to conserve energy to produce sufficient calories for her baby's growth; calms the mother and slows her down so that she enjoys the enforced period of stillness required for breast feeding and caring for her infant, ultimately improving the long term physical and emotional health of both the mother and her infant.

Because this chemical is so important in the prevention of post-natal depression, the environment must work hard to support the woman in being able to release as much oxytocin as possible.

"The optimal birth environment provides key elements such as a lockable door to guarantee the woman's privacy; opportunities to see and experience warm water; comfortable furniture; quietness and birth companions who know how to optimize the oxytocin system." (Fahy, 70)

Understanding the oxytocin system is a key to approaching the creation of safe birth spaces since it is the agent behind all states of relaxation and wellbeing.

Oxytocin can be blocked by: anaesthetics, adrenaline/fear, feeling uncared for, separating mother and baby at birth, hostile environments

Blocking oxytocin may result in: failed breast feeding, hypertension, hyper vigilance (post traumatic stress disorder), Depression, Inability to love oneself or others, Antisocial behaviour.

Oxytocin effects on psychology and behaviour: increases trust, conserves energy, induces sleep, improves healing, lowers level of stress hormones

Oxytocin can be stimulated by: smell (aromatherapy), touch, eating, warmth, immersion in warm water, hearing pleasant sounds, seeing scenes of nature, relaxing activities (meditation)

By incorporating all these positive attributes to stimulate oxytocin the environment becomes an important tool in the prevention of post-natal depression in birthing women.

An online survey of nearly 2000 women conducted by the national child birth trust in the UK (NCT 2003). Nine out of ten women thought the physical surroundings affected how easy or hard it was to give birth. Women listed a range of attributes they thought were very important in the birth environment, but few women actually had access to these; female space, shapes, space, elements of nature, water, texture, privacy, light, colour, support, noise control, thermal comfort, air quality, accommodation for companion, food and drink, safety. In addition to these controls, the women surveyed emphasised the importance of beauty, nature and ambience in the birth space. Ian Forbes, the adjunct professor of the research group for Health Architecture looks at the birthing unit identifying a sequence of events within the birthing environment;

- access to the community,
- outside access to the birthing unit,
- welcome arrival,
- easy wayfinding,
- birthing unit as home,
- the arrival hall,
- the family room,
- the mother's room, privacy,
- home comforts,
- birthing pool,
- convenient ensuite,
- materials support for birthing,
- controlling sound,
- ancillary spaces,
- connecting to nature.

All points will be considered and investigated in the process of the design thesis. The above sequences from both the survey and Forbes's work can be used as the beginning of the checklist against the design of the final Birthing room.

In birthing centres it's important to make a direct relation with the nature and the patients. According to Rodermann, in a healthcare settings, simulating these characteristics and features of nature, may help the patient to recover.

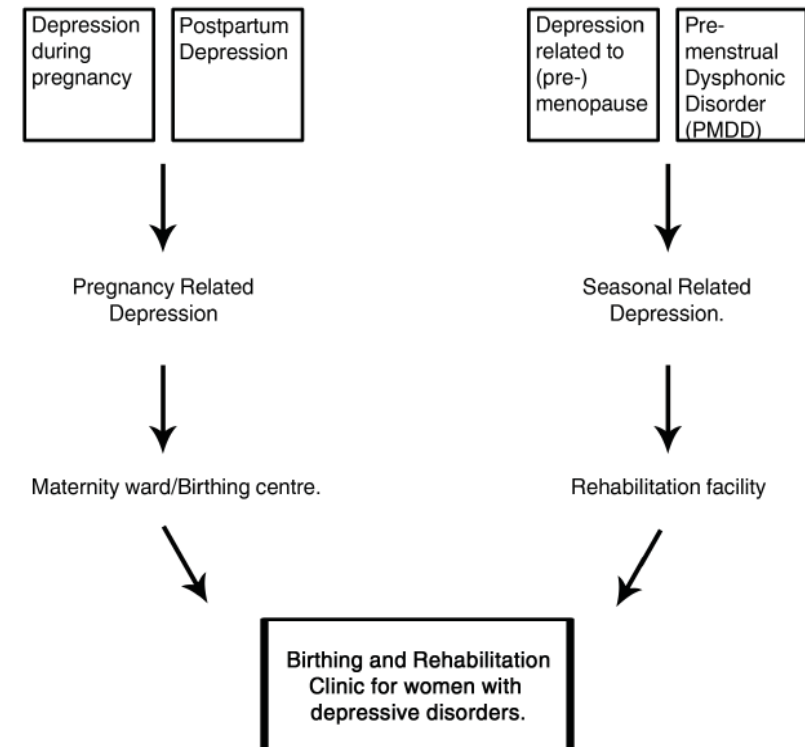
Bilge Sayil Onaran explores the powers of sustainable materials on the recovery of patients within a mental health hospital in Sustainable Therapy Room Surfaces in Acute Mental Health Hospitals. The right environment can create an uplifting positive, calming, and healing effect. The appropriate ambiance can be achieved by using proper fitting elements;

- light,
- colour,
- texture,
- aroma,
- sounds,
- surface materials,
- integration of interior and exterior spaces.

Prolonged exposure to low levels of environmental stimulation produces boredom and often negative feelings such as depression. (Ulrich, 50) Using sustainable materials in the birthing room may promote healing, which is important for women who are likely to develop post-natal depression. Bilge Sayil Onaran investigates the link between sustainable materials and mental health. By understanding how the application of these materials can help people with mental illness we can apply the same techniques in the birthing room to aid the prevention of post-natal depression in women giving birth.

Gaps of knowledge exist within healthcare architecture as there is no clear outline of what a birthing room for the prevention of post-natal depression should consist of. By linking the research found of what a healing hospital room should consist of and the aspects of how Oxytocin can be stimulated by the environment we can aim to create the most revolutionary birthing centre to date. This thesis will explore the guidelines outlined by the readings from this literature review, such as colour, light and sustainable materials, as a base for the creation of an evidence based design guide will be created for future use in the development of birthing units with the prevention of post-natal depression the driver for this design thesis.

Fig.1 Most common depressive disorders specific to women, by author.



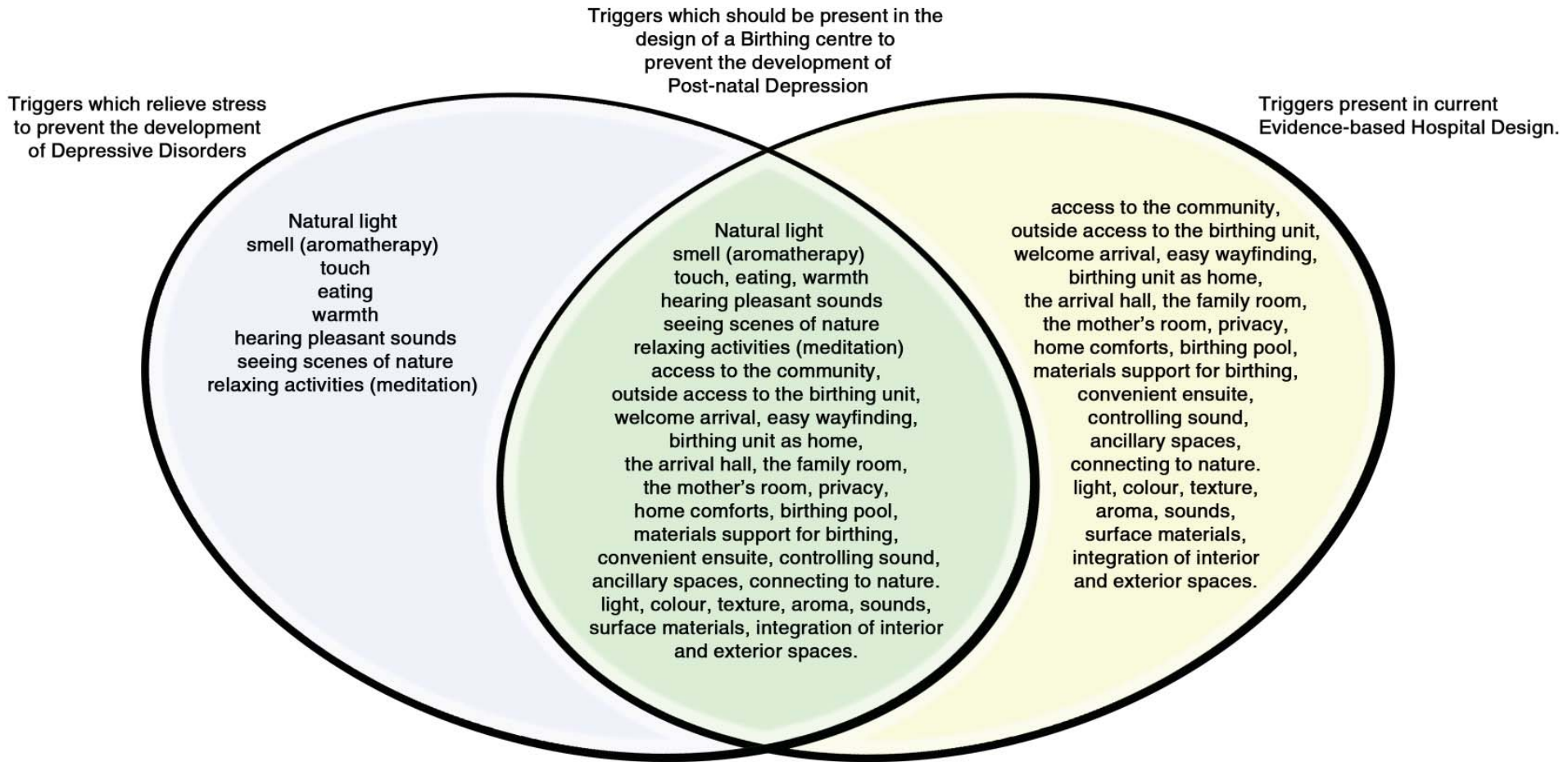


Fig. 2 The intersection of the domain of health care (birthing) with preventative care for mental disorder. (By author)

## SUMMARY CHAPTER ONE

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From the literature above a series of triggers has been established. These triggers form the beginning of the evidence based design guideline for the creation of a birthing room considering the prevention of post-natal depression;

- natural light
- smell (aromatherapy)
- touch,
- eating,
- warmth
- hearing pleasant sounds
- seeing scenes of nature
- relaxing activities (meditation)
- access to the community,
- outside access to the birthing unit,
- welcome arrival,
- easy wayfinding,
- birthing unit as home,
- the arrival hall,
- the family room,
- the mother's room,
- privacy,
- home comforts,
- birthing pool,
- materials support for birthing,
- convenient ensuite,
- controlling sound,
- ancillary spaces,
- connecting to nature.
- light, colour,
- texture,
- aroma,
- sounds,
- surface materials,
- integration of interior and exterior spaces.

Chapter two, will focus on some selected elements found at the intersection of the domain of health care (birthing) with preventative care for post-natal depression.

The selected elements particular to exploration in chapter two are: colour, light, materiality, wayfinding and relationship to the natural environment.



# CHAPTER 2

PRECEDENTS





## **INTRODUCTION OF CHAPTER TWO**

This chapter will firstly contemplate on a narrative, the story of birth.

The main text will then focus on some selected elements found at the intersection of the domain of health care (birthing) with preventative care for mental disorder. These elements are located in figure 2, page 20.

The ones particular to the exploration of chapter two are: colour, light, sustainable materials, wayfinding and interior landscaping.

Each element will be developed through case studies and related text. The reader will find that on each page, a series of key points that have been selected by the author in anticipation of the application in the design process. These key points will be highlighted by the green text.

The other elements remaining from the list such as, smell, touch... will be explored throughout the design process and exposed in later chapters.

## 3.2 ANALYSIS OF BIRTHING STORIES

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### Niki's birthing story

The story to follow demonstrates a relatively ideal 'birth territory'. This story has been checked and validated by Niki, Carolyn and Andrew. The authors of this chapter were the midwives at this birth. The story has previously been published as part of a journal article (Fahy, 65).

*Niki was having her first baby. Labour had begun with the baby's head in an occipito-transverse position, this is not unusual, and many babies start in this position. Niki used the deep birth pool for eight hours using meditation techniques to cope with the sensations of labour. (Gavin) Niki's partner was a quiet, loving and supportive presence. Carolyn (the other midwife) and I were quiet and unobtrusive; however, in line with medical protocols we recorded Niki's blood pressure twice hourly and assessed her pulse and the baby's heart rate every 15 minutes. (1) All went well until transition which continued for about 3 hours.*

*During the first part of this time Niki wanted to get out of the bath and change positions and we encourage her to follow this instinct. (2) As the time progressed and we saw no signs of second stage, Carolyn suggested that Niki move her hips in particular ways to assist with pelvic opening and optimal fetal positioning. With great strength courage and endurance, Niki followed Carolyn's advice and squatted, lunged, walked, used hands and knees positions and the birth stool; all at no avail. (3) We discussed with Niki and Gavin that on palpation the baby's head was still in the deflexed occipito-transverse position. A vaginal examination confirmed that the head was deflexed and in the occipito-transverse position at the spines and may be caught up on the spines. As the cervix was not yet fully dilated, the obstetrician (Andrew), whom they knew a little, suggested to Niki that she may want to have an epidural and her contractions strengthened by the use of Syntocinon infusion.*

*Andrew's use of power/knowledge is integrative as it leaves the choice of having both the epidural and Syntocinon up to Niki. These words had an almost immediate effect on Niki. She turned on her side, went physically limp as if giving up, and cried. She said, 'I don't want Syntocinon'. Up until this point Niki had been strong and active, suddenly she appeared weak and passive. (4) Carolyn spoke firmly to her.' No, Niki you don't have to have Syntocinon. There are midwifery strategies that we can try, you can still have a normal birth, but we need you to try to be here and fully present'. (5) 'You need to come back here right now and you need to be strong and courageous. I want to get you up and start moving'. The effect of Carolyn's powerful intervention was amazing. Niki regained her strength and confidence. With fortitude and grace Niki got up and started moving. She begins stepping sideways up the steps off the birth pool.*

*When Andrew got back he examined Niki and found her fully dilated, but the head was still in the deflexed occipito-transverse position. At this point all five of us discussed the three options for moving forward. Niki chose a manual rotation. Andrew said it might be too painful but she was willing to try if Niki was. With Niki sitting on the birth stool Andrew performed a manual rotation when Niki had a contraction. The head moved easily into the correct position and baby Declan was born normally about two hours later. (6) Immediately after birth, Niki, Gavin and baby Declan were bonding beautifully (7); nearly two hours later Niki birthed the placenta physiologically with minimal blood loss. Niki and Gavin described amazing feelings of being overwhelmed with love for Declan. Niki was proud of herself and very pleased with Gavin's support in labour. Gavin was proud with Niki and himself; they were both thrilled with the outcome. Niki and Declan proceeded to have a positive postnatal and breastfeeding experience.*

## Interpretation of Niki's birthing story.

1. The jurisdiction of the space is Niki's and the midwives are acting as midwifery guardians.
2. 'Integrative power' is used by Niki and the midwives.
3. This is a use of integrative power; it brings midwifery power/ knowledge to the situation and integrates with the power of the woman and her body.
4. Niki's ego-based determination to have a particular experience has created determination to have a particular experience has created 'disintegrative power' that has undermined her embodied self causing a loss of power illustrated by her weakened passivity.
5. This is a call to be mindful; to bring the mind and the body together in harmony.
6. This is the use of integrative power.
7. Create a comfortable space for the family to be together.

## WHAT DOES THIS STORY TEACH US IN RELEVANCE TO DESIGNING A BIRTHING UNIT.

Because of the natural birth they have a good experience and positive postnatal experience reducing the risk of post natal depression.

Since you can feel your body's reflexes in natural childbirth, mothers can push better and generally faster.

Moving around a lot so need plenty of space. Use of pool and birthing stool.

The allowance of the space may have allowed Niki to have a natural birth resulting in a good experience with no further complication such as post natal depression.

The aim of the birthing unit will be to encourage natural birth through designing a birthing room that supports the woman appropriately during birth. Details of how this might be done will be explored throughout the thesis.

## THE EVIDENCE-BASED DESIGN WHEEL



Evidence-based design (EBD) is an approach to environmental design (architectural, interior, and landscape) that aspires to base design decisions on documented research and well-established best practices, with the aim of improving outcomes. (Hamilton, 26) Healthcare environments designed on the basis of solid research evidence are intended to improve patient safety, reduce stress, increase care delivery effectiveness, and enhance quality of care (Ulrich, 7) The environment is designed to be therapeutic for patients, supportive of family, efficient for staff, and restorative for all. (Ulrich, 7)

Environmental design research in healthcare settings has increased steadily over the last several decades. The most extensive review of the research literature to date (covering more than 600 studies) was conducted in 2004 by Roger Ulrich, Craig Zimring, and colleagues in a report for The Centre for Health Design and supported by the Robert Wood Johnson Foundation. (Ulrich, 21) This impressive study organizes the substantial research knowledge base on the effects of the environment in terms of various outcomes: staff stress and fatigue, effective care delivery, patient safety, patient stress and other patient outcomes, and overall healthcare quality.

The following 12 environmental factors and the overall healing environment concept proposed by Ulrich comprise a comprehensive, strategic, values- and evidence-based set of design responses that create therapeutic healthcare environments, (Ulrich, 23) i.e. curative settings that support healing and improve the healthcare experience.

<http://www.healthcaredesignmagazine.com/article/evidence-based-design-wheel>

## **THE CURRENT EVIDENCE-BASED DESIGN GUIDELINE**

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### **1. Single patient rooms.**

As reported in a recent review of the literature, (Chaudhury, 760) Single patient rooms have shorter length-of-stays, fewer medication errors, lower costs, higher occupancy rates, lower rates of hospital-acquired infection, fewer patient transfers, increased privacy and control, less noise, fewer sleep disturbances, and higher patient satisfaction. The most recent AIA guidelines for new construction stipulate that all patient rooms be private (AIOA).

### **2. Noise.**

Noise negatively affects patients and staff, yet hospitals are notoriously noisy places. Noise disrupts sleep, impedes healing, and causes stress (Ulrich, 24) . Sound levels in hospitals (typically 65-85dB, comparable to a loud restaurant or heavy street traffic) result from a cacophony produced by a combination of sources: people walking, talking, and simply doing their jobs; buzzes, beeps, and alarms from equipment; and the many hard surfaces that are easy to keep clean but do little to absorb noise. Reducing noise can be achieved by adopting a systemic approach to sound control that requires attention at four levels: noise-attenuating materials selection and installation, proximal location of support spaces and equipment, operational and behavioural changes by staff, and equipment maintenance. (Geboy, 1)

### **3. Windows.**

Patients in rooms with windows, particularly windows with pleasant views to nature, have shorter recovery times and fewer complications, and request less pain medication. Employees with access to windows and nature views experience less stress, better health, and higher job satisfaction.

### **4. Light.**

Bright light, either natural or artificial, can improve patient outcomes, affecting such factors as depression, agitation, sleep, circadian rest/activity rhythms, and length of stay. Sunlight has been linked with shorter stays, lower stress, less pain, lower intake of pain medication, and even lower mortality. For staff, ensuring that appropriate, non glare light levels are brought to the tasks at hand can improve staff accuracy and effectiveness.

## **WHAT MAY BE USED IN THE DESIGN OF THE BIRTHING ROOM.**

Single patient rooms increased privacy and control, less noise.

Reducing noise can be achieved by adopting a systemic approach to sound control that requires attention at four levels: noise-attenuating materials selection and installation, proximal location of support spaces and equipment.

Important to create a view from the bed in the design of the birthing room. Patients in rooms with windows, particularly windows with pleasant views to nature, have shorter recovery times and fewer complications.

Bright light, either natural or artificial, can improve patient outcomes, affecting factors like depression and sleep which is important in the birthing room design. A big window for natural light is also very important.

### **5. Access to nature.**

Research has repeatedly demonstrated the emotional and physiological benefits of visual and physical access to nature: stressful and negative emotions decrease while pleasant emotions increase. Patients viewing nature recover faster, have less stress, anxiety and pain, and require less pain medication. Gardens located in healthcare settings offer patients, visitors, and staff the opportunity for direct interaction with the restorative, calming effects of nature.

Patients viewing nature recover faster, have less stress, anxiety and pain, and require less pain medication.

### **6. Positive distractions.**

The term “positive distractions” refers to several socio-environmental features—music, laughter, pets, and realistic art (preferred over abstract by most patients), (Geboy, 1) as well as natural elements such as trees, flowers, and water—the presence of which improve mood and relieve stress. These positive distractions attract and sustain attention, produce positive reactions, and alleviate stress and anxiety.

Natural elements such as trees, flowers, and water—the presence of which improve mood and relieve stress.

### **7. Furniture arrangements.**

In public areas, different types of furniture arrangements can either discourage or promote social interaction. (Ulrich, 21) For example, seating arranged around the perimeter of a room (as in the archetypal healthcare waiting area) and large open dining areas furnished with long banquet tables (such as in the typical hospital cafeteria) are institutional, noisy, and inhibit interpersonal interaction. Arrangements that promote social interaction in waiting areas include comfortable, supportive furniture positioned in small, flexible groupings, with seating placed at right angles. Large dining areas should be subdivided with tables seating four to encourage social interaction, enhance relative privacy, and improve eating behaviour.

Arrangements that promote social interaction in waiting areas include comfortable, supportive furniture positioned in small, flexible groupings, the furniture in the birthing room has to be soft and comfortable.

### **8. Air quality.**

Poor air quality and ventilation allow the transmission of bacteria and put patients and staff at risk of hospital-acquired infections. (Joseph, 1) The type of air filter, direction of airflow, air pressure, air changes per hour, humidity, and ventilation system maintenance have all been linked to infection rates.

Air quality is important in the birthing room by creating windows that can open.

### **9. Flooring materials.**

The three main flooring options for healthcare settings—carpet, vinyl, and rubber—each have unique benefits and limitations. Flooring decisions for patient care areas be made on the basis of materials performance in line with four (often divergent) criteria: infection control, ease of maintenance, potential to contribute to a systemic program for sound control, and specific patient population needs and preferences. (Geboy, 1)

The three main flooring options for healthcare settings—carpet, vinyl, and rubber

### **10. Wayfinding.**

Disorientation in built environments is embarrassing and stressful, wastes time and, in some cases, is even fatal. Support for wayfinding depends on more than signage and coloured lines on the floor—a good wayfinding program requires an integrated, coordinated system in which three elements—human behaviour, environmental design, and organisational policies and practices (Carpman, 1)—all work in harmony to ensure that patients, visitors, and staff can effectively navigate the environment.

Wayfinding. Disorientation in built environments is embarrassing and stressful.

### **11. Building layout.**

Perhaps the most discussed aspects of building layout in healthcare settings today are workstations: Should they be decentralized, centralized, or some combination of the two? Workstations that are close to patients result in fewer errors, decrease nurses' travel time and distances covered during the day, increase nurses' time spent caring for patients and families, and improve job satisfaction. Decentralized workstations that incorporate supplies are convenient, improve delivery time, and reduce supply costs.

Workstations that are close to patients result in fewer errors.

### **12. Ergonomics.**

Patients and staff in healthcare settings benefit from improved ergonomic designs of furniture and equipment. Among patients, injuries such as falls decrease in environments that are designed from an ergonomically conscientious perspective. Patient comfort during medical procedures and hospital stays is improved with thoughtfully designed furnishings. Improved ergonomic designs of patient beds, assistive equipment, and workstations reduce stress and injuries among staff.

Patients and staff in healthcare settings benefit from improved ergonomic designs of furniture and equipment.





## **HEALTHCARE FACILITY DESIGN PRECEDENTS**

This section will introduce the two main design precedents used within this research.

The sanatorium of Paimio by Alvar Aalto started the interest in architecture as a tool for healing. Aalto's work is a great example for the use of colour within a healthcare facility. Colour will be examined closely in the next section "Colour in healthcare facilities".

The work on Birthing rooms by Bianca Lepori is a great precedent for the components needed in the development of the actual birthing room.



The Paimio Sanatorium in Finland, designed by Alvar Aalto.  
Picture supplied by Diana Anderson <http://www.cmaj.ca/content/182/11/E535.full.pdf>



This interior view of the main hospital wing demonstrates the architect's use of interior colour to promote brightness of the space. Picture supplied by Diana Anderson <http://www.cmaj.ca/content/182/11/E535.full.pdf>

## ALVAR AALTO, SANATORIUM OF PAIMIO

In recent years, research has shown that conventional hospital designs can heighten stress, diminish satisfaction with care, reduce safety, worsen medical outcomes, diminish staff morale and decrease overall effectiveness in delivering care. Additional research supports the view that the improved design of hospital environments can play a role in reducing stress, making patients safer, promoting better outcomes and enabling staff to do their jobs more effectively and with less strain (De Swaan, 89-271).

Aalto's starting point for the design of the sanatorium was to make the building itself a contributor to the healing process. He liked to call the building a "medical instrument". For instance, particular attention was paid to the design of the patient bedrooms: these generally held two patients, each with his or her own cupboard and washbasin. Aalto designed special non-splash basins, so that the patient would not disturb the other while washing. The patients spent many hours lying down, and thus Aalto placed the lamps in the room out of the patients line of vision and painted the ceiling a relaxing dark green so as to avoid glare. Each patient had their own specially designed cupboard, fixed to the wall and off the floor so as to aid in cleaning beneath it. (Schildt)

### WHAT MAY BE USED IN THE DESIGN OF THE BIRTHING CENTRE.

-Being able to see out of a window, instead of looking against a dead wall is a huge factor which needs to be considered in the design of the birthing room.

-The bright colours of flowers, interior landscaping is an excellent way to incorporate nature within the interior realm.

-Lighting will have to be addressed closely as Aalto demonstrates.

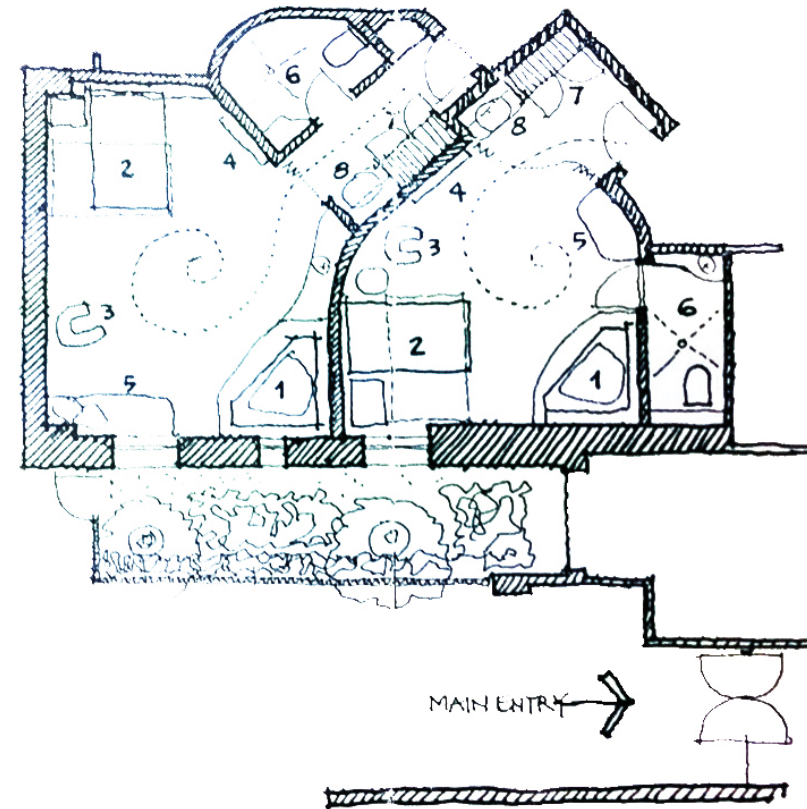
-The colour of the walls also needs to be considered with close attention to detail.

## **BIRTHING ROOM DESIGN, BIANCA LEPORI**

Together with Professor John Gray, from Victoria University of Wellington, Bianca was invited to prepare a sketch of how this place could be modified. The original sketch included on the right illustrates the enactment of the design principles that were developed and the minimal design compromises that had to be made to fit into the available space.

Bianca Lepori was convinced that a new mind-body spirit birth space that considered all the sensory modalities involved in the perception of stress or ease would have a positive impact on a women's perception of anxiety and therefore psychological processes and the progress of labour.

*"Birth territory and midwifery guardianship, theory for practice, education and research"* written by Kathleen Fahy is based on Bianca Lepori's work and will offer a great starting point for the development of the birthing room.



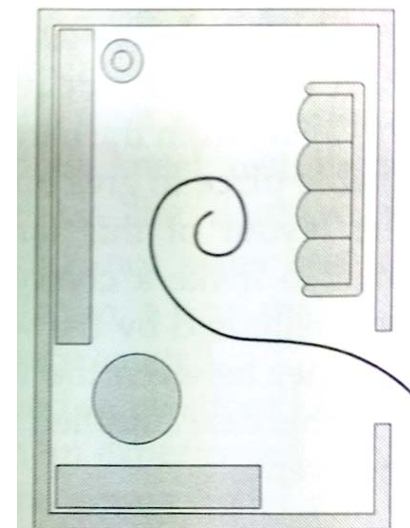
### **WHAT MAY BE USED IN THE DESIGN OF THE BIRTHING CENTRE.**

Lepori developed a checklist for the appropriate birthing environment that may be useful.

This research will build upon her already existing knowledge.

Lepori's research includes: Accommodation for companion, Air quality  
Thermal comfort, Noise control, Support, Colour, Light, Privacy, Texture, Water, Elements of nature, Space, Shapes, Female space

1. Tub bath
2. Bed
3. Chair stool
4. Baby resuscitation bay
5. Seat couch
6. Shower/wc
7. Cupboard
8. Basin

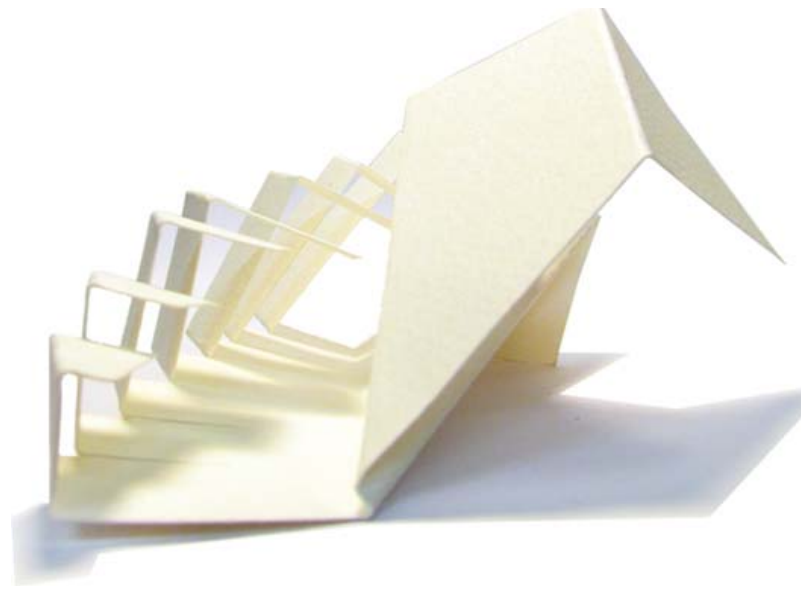




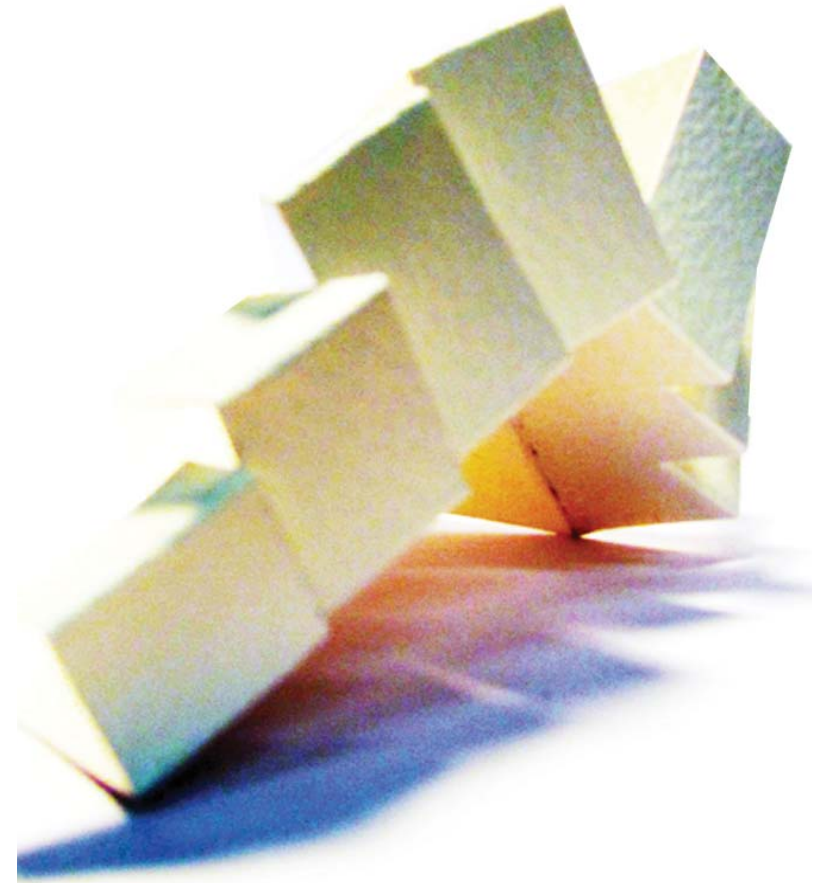
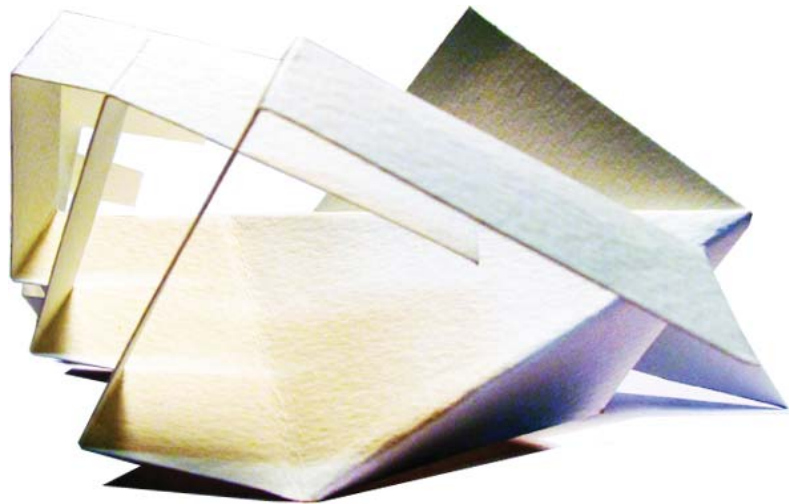
## **COLOUR IN HEALTHCARE FACILITIES**

This section will firstly explore the meaning of different colours, how they effect people emotionally, and how they could possibly be used in the development of a birthing centre. The application of colour is important in the design of a birthing centre which focuses on considering the prevention of post-natal depression. Colour when applied with care has a positive reaction on the occupant's mood, performance, and productivity.

Secondly examined are healthcare centres and the colour palettes used within these facilities.



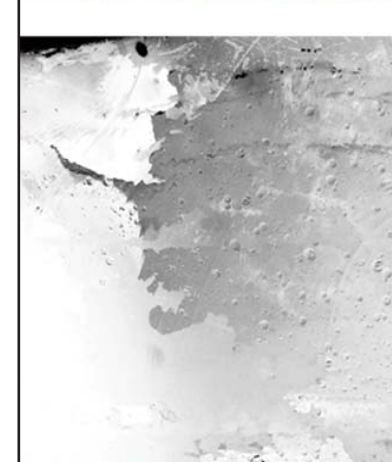
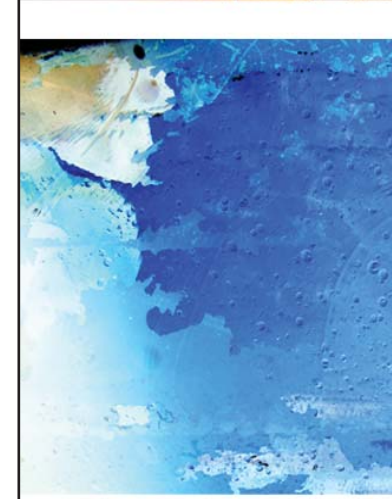
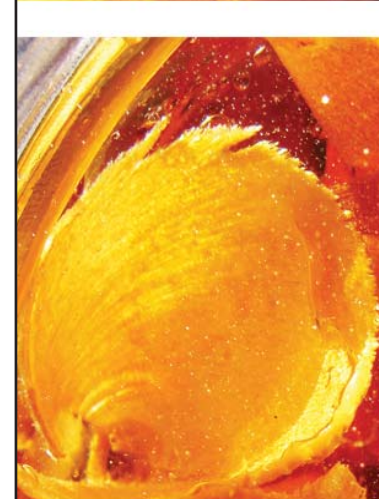
*“Colors are the catalysts for your feelings, molding moods and enhancing lives. The right colors and combinations will stimulate you and relax your senses, release happy memories, reflect how you and your significant others relate to each other,” (McLean, 1) writes. The models made by Author show are a representation of how colour can be introduced in a white atmosphere, through the use of light. The use of light in Healthcare facilities will be further explored in the section ‘Light’ on page 55.*



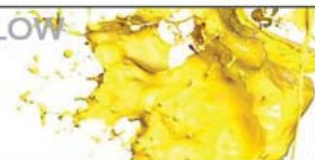

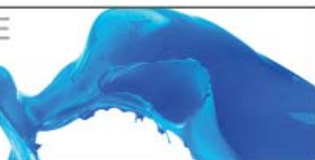




Highlighted by Alvar Aalto in the section “healthcare precedents”, colour is an important aspect of healthcare design.

The idea of using different colour palettes in the birthing room and the communal areas is an important aspect that will be considered in the design process of the final birthing centre design. The colour of natural materials such as wood is important to consider as they create a warm and inviting atmosphere to the occupants. “Colours of natural materials and the materials themselves help to create the feeling of spaciousness. Wood colours ranging from the paleness of scrubbed birch to the darkness of dark walnut can be perfect foil for all sorts of additional complimentary colours from nature” (Beckwith, 2). The application of colour is important in the design of a birthing centre which focuses on considering the prevention of post-natal depression.

Colour when applied with care has a positive reaction on the occupants mood, performance, and productivity. “One’s cultural background, gender, and ability to screen out extraneous stimuli are all factors that might lead to selecting a colour that makes an individual feel better.” (Beckwith, 4) By developing separate colour schemes the woman can chose a colour scheme she prefers and feels most comfortable in. This could also be done through light.



COLOUR	PERSONALITY	POSITIVE QUALITIES	NEGATIVE QUALITIES
RED 	<ul style="list-style-type: none"> <li>- Outgoing</li> <li>- Active</li> <li>- Physical</li> </ul>	<ul style="list-style-type: none"> <li>- Motivating</li> <li>- Warming</li> </ul>	<ul style="list-style-type: none"> <li>- Irritable</li> <li>- Anger</li> </ul>
ORANGE 	<ul style="list-style-type: none"> <li>- Sociable</li> <li>- Creative</li> </ul>	<ul style="list-style-type: none"> <li>- Practical</li> <li>- Joyfull</li> </ul>	<ul style="list-style-type: none"> <li>- Over-Powering</li> <li>- Hyper-Activity</li> </ul>
YELLOW 	<ul style="list-style-type: none"> <li>- Quick</li> <li>- Alert mind</li> <li>- Sunny</li> <li>- Ideas</li> </ul>	<ul style="list-style-type: none"> <li>- Bright</li> <li>- Happy</li> <li>- Communicative</li> </ul>	<ul style="list-style-type: none"> <li>- Egoentric</li> <li>- Fearful</li> </ul>
GREEN 	<ul style="list-style-type: none"> <li>- Caring</li> <li>- Empathetic</li> <li>- Natural</li> </ul>	<ul style="list-style-type: none"> <li>- Balance</li> <li>- In harmony</li> <li>- Abundant</li> </ul>	<ul style="list-style-type: none"> <li>- Indecisive</li> <li>- Feeling Trapped</li> </ul>
BLUE 	<ul style="list-style-type: none"> <li>- Peaceful</li> <li>- Quiet</li> <li>- Introverted</li> </ul>	<ul style="list-style-type: none"> <li>- Loyal</li> <li>- honest</li> <li>- Cooling</li> </ul>	<ul style="list-style-type: none"> <li>- Depressive</li> <li>- Withdrawn</li> </ul>
PURPLE 	<ul style="list-style-type: none"> <li>- Creative</li> <li>- Spiritual</li> <li>- Sensitive</li> </ul>	<ul style="list-style-type: none"> <li>- Powerful</li> <li>- Seeker of Truth</li> <li>- Inspirational</li> </ul>	<ul style="list-style-type: none"> <li>- Misuse of Power</li> <li>- Obsessive</li> </ul>
BLACK 	<ul style="list-style-type: none"> <li>- Feminine energy</li> <li>- Mysterious</li> </ul>	<ul style="list-style-type: none"> <li>- Potential</li> <li>- Powerful</li> </ul>	<ul style="list-style-type: none"> <li>- Identity crisis</li> <li>- Hides from the world</li> </ul>



## Potential use of colours in Program

Use of colour RED will only be used as a detail in certain areas as the colour red could be intimidating causing stress for the birthing woman.

Use of colour ORANGE in social areas such as the cafeteria.

Use of colour YELLOW in birthing room as it is calming and also resembles the sun which is uplifting for depressive disorders.

Use of colour GREEN in birthing room as it is often used in healthcare facilities to balance red from possible blood loss.

Use of colour BLUE in birthing room as it has a calming effect when the right hue of blue is used.

Colour PURPLE will not be used as it is a misleading colour for most people.

Colour BLACK will not be used as it has a depressing effect on some people.

The table of the left is from the book "The Healing Home"  
by Suzy Chiazzari, pg105

COLOUR

PERSONALITY

POSITIVE QUALITIES

NEGATIVE QUALITIES



- Masculine Energy

- Purity
- Cleansing

- Irritable
- Anger



- Earthy
- Physical

- Secure
- Safe

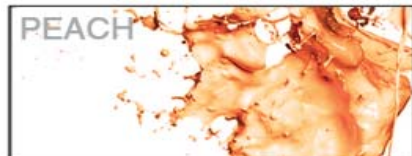
- Restrictive
- Barren



- Self-reliant
- Independent

- Individual
- Self-sufficient

- Rigid
- Critical
- Uncommunicative



- Warm
- Caring

- Creative
- Supportive
- Charitable
- Mature

- Sentimental
- Low Self-esteem



- Loving
- Nurturing
- Emotional

- Understanding
- Sympathetic

- Immature
- Needy
- Emotional
- Unstable



- Fresh
- Sparkling
- New Ideas

- Uplifting
- Refreshing
- Communicative
- Cool

- Cold
- Isolating



- Softer version of each colour.

- More sensitive
- Gentle

- Easily Led
- Impressionable

## Potential use of colours in Program

Use of colour WHITE will be used carefully as this colour can be perceived as sterile, trying to get away from the typical hospital look.

Use of colour BROWN in Birthing room as it grounds the design by bringing in natural tones to balance out the green and blue.

Use of colour GREY in birthing room as the chrome fittings for the hardware.

Use of colour PEACH in Social areas, it has a similar effect to orange without the sudden impact.

Colour PINK will be used in small areas, such as a cover on a piece of furniture.

Colour TURQUOISE will not be used

Pastels will be used when the impact of the vibrant colour is overpowering.

The table of the left is from the book "The Healing Home"  
by Suzy Chiazzari, pg105



## **CASE STUDY ONE**

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“The use of colour in the Paimio Sanatorium was planned carefully. Research had shown that the comfort of both patients and staff could be increased by using warm and calm tones. Through the choice of colours, Aalto wanted to create a comfortable and humane atmosphere in the hospital. Even strong colours were used in the communal spaces. Yellow rubber flooring in the corridors and stairwell of the central wing adds to the feeling of brightness and sunlight. The exterior of the building is dominated mainly by white and black, but with colour accents in red for the balcony rails and yellow for the roof terrace. In the interior the main colours are white, black, yellow and turquoise (the so-called Paimio Blue). The patients’ rooms were painted a neutral light colour and the ceilings grey-green. The corridor walls on each storey of the patient wing have a different colour. Aalvar designed the ceilings in the rooms to be painted a calming dark green so as to avoid glare and promote relaxation. In contrast, the colours used by Aalvar in the communal areas were brighter and more stimulating as to promote interaction between both the patients and staff members.”

Provided by National board of antiquities, pg 50 <http://www.nba.fi/fi/File/410/nomination-of-paimio-hospital.pdf>



Soothing colors can affect a patient's mood and even contribute to the healing process. Courtesy of Sherwin-Williams.

## **CASE STUDY TWO**

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The Pink colour is appropriate for the children’s ward but would be too emotional for the birthing room. The lighter colour does have a soothing effect which indicates that it could be a good option to use in small areas.

The natural colours work well within the environment of the health setting. The use of green is commonly seen within a healthcare facility as it counteracts the colour red of blood. The use of Plants is an excellent way of creating a rehabilitating environment. Seeing the medical bed is not good for the patients moral.

In the design of the birthing room the bed will need to be addressed with care as it need to function as both a medical bed and appear to be a normal 'homely' bed. This will decrease the woman's anxiety reducing the chance of developing post-natal depression.



Flowers, photos, and other amenities add a personal touch to patient rooms. Photo courtesy of Business Interiors by Staples.

The natural colours work well within the environment of the health setting. The use of patterns on the ground is an excellent way of creating a stimulating space in a large area without it being overpowering.

The use of vinyl flooring is an excellent flooring choice as it is easily maintained. A variety of flooring options are investigated in the section 'sustainable materials'.



Natural colors and patterns can remind patients of the outdoors. Courtesy of Sherwin-Williams.

Images provided by Jennifer Kovacs Silvis pg, 1  
<http://www.healthcaredesignmagazine.com/article/healing-hues-choosing-paint-colors-healthcare?page=3>



## CASE STUDY THREE

Alicia Surgery Center, Laguna Hills, CA

“The colours were carefully chosen to create a soothing atmosphere that could help reduce patient’s anxiety levels and expedite recovery. Warm white was used along the walls of the recovery beds to have a neutral backdrop for accurate patient assessment, while golden yellow suggests sunshine and positive energy. Reminiscent of plant life, the green used throughout the centre communicates rebirth, growth and vibrancy. What’s more, because many of the centre’s patients are over the age of 50, these hues are especially significant. Aging causes a decrease in visual sensitivity to blue colours and a reduced ability to discriminate purple and red colours, so this type of yellow-green scheme is easier on seniors’ eyes. In addition, Snowden is always careful to incorporate the principles of harmonizing elements, materials and finishes. She believes that good design enhances the flow of energy (chi) and promotes healing.”

Image, quotes and colour palette supplied by Sara McLean  
<http://www.specsspaces.com/blogEntry.aspx?entryId=73>

### WHAT MAY BE USED IN THE DESIGN OF THE BIRTHING CENTRE.

- Soft and calming palette.
- The colours used help reduce patients’ anxiety levels, consider using yellow white, golden yellow and refreshing green in design of the birthing centre.
- The green used throughout the centre communicates rebirth, growth and vibrancy.
- Good design enhances the flow of energy (chi) and promotes healing.

## CASE STUDY FOUR

North Orange County YMCA, Fullerton, CA

“It is colour which makes the first impression, not form. Therefore, colour is a crucial element.”

“Keeping in mind the organization’s mission of building healthy spirits, minds and bodies for all, the designer Snowden chose hues that would help welcome, enliven and inspire visiting families. Employing a lively colour palette, she selected bold colour accents that would accompany the YMCA’s brand colours. Cherry red inspires energy, while colours like olive and denim promote harmony and balance. They all work together to create a space where families can learn, grow and play together. And, in an age of video games, television and too little “together time,” that kind of healing design is priceless.”

Image, quotes and colour palette supplied by Sara McLean  
<http://www.specsspaces.com/blogEntry.aspx?entryId=73>

### WHAT MAY BE USED IN THE DESIGN OF THE BIRTHING CENTRE.

- The application of colour is a crucial element
- Colours like olive and denim promote harmony and balance.
- Create a space where families can learn, grow and play together. This could consist of family friendly communal areas and plenty of room in the birthing rooms for visitors.



**Weather Board**  
DE6222

**Swiss Coffee**  
DEW341

**Bamboo Mat**  
DE5457

**Marsh Field**  
DE5458

**Floating Lily Pad**  
DE5493

**Carved Wood**  
DE6125



## CASE STUDY FIVE

NAHB "Emerald" Certified Residential Remodel, Phoenix, AZ

"The 1,600-square-foot, 70-year-old ranch house is in the Pierson Place Historic District near the city's new light-rail line. For the project, Bubier chose colors that convey a fresh, modern feeling and breathe new life into what was previously a tired, dated home. She selected clear and vibrant green tones that visually open up the space and draw the eye through and outside of the home to the modern landscaping. In addition, she used DE6222 Weather Board as a grounding neutral to the other three brighter greens and as a complement to the espresso-stained millwork. Bubier explains,

"Green represents new growth and a new season, this home has experienced both of these things. Green is a healing colour and I wanted visitors and the new homeowner to feel refreshed when inside and to find the property memorable." We all know that "going green" is an expression that has nothing to do with colour. But in this case, Bubier's design proves that sometimes there's beauty in taking things literally."

Image, quotes and colour palette supplied by Sara McLean  
<http://www.specsspaces.com/blogEntry.aspx?entryId=73>

### WHAT MAY BE USED IN THE DESIGN OF THE BIRTHING CENTRE.

- The colour green is used in most healthcare facilities because of its healing properties and calming effect. The colour green will definitely be introduced in the design of the birthing centre.

-Use colours that convey a fresh, modern feeling and breathe new life into MaCalister Heights. The environment is being renovated from its dull current state in to a revolutionary birthing centre.



## CASE STUDY SIX

Beach House, The Peninsula, Long Beach, CA

“Because the house was used for entertaining guests and also as a rental property, the client, entrepreneur Ed Yawitz, envisioned a space that allowed guests to feel comfortable, without being afraid to touch anything. To communicate relaxation and tie the house to the healing power of nature, Heimbold and Schreiber conjured an ocean/beach atmosphere with colours evocative of marine environments. They selected warm brown to mimic sand tones and deep and cooler blues to reflect the ocean. The pops of white on the fireplace, bookcase and benches were all inspired by white coral, says Heimbold.”

“The colours are true to what nature provides, and I often use nature as inspiration while working on a project.”

Image, quotes and colour palette supplied by Sara McLean  
<http://www.specsspaces.com/blogEntry.aspx?entryId=73>

### WHAT MAY BE USED IN THE DESIGN OF THE BIRTHING CENTRE.

- Colours should be true to what nature provides
- The colours used should communicate relaxation and tie the birthing centre to the healing power of nature.

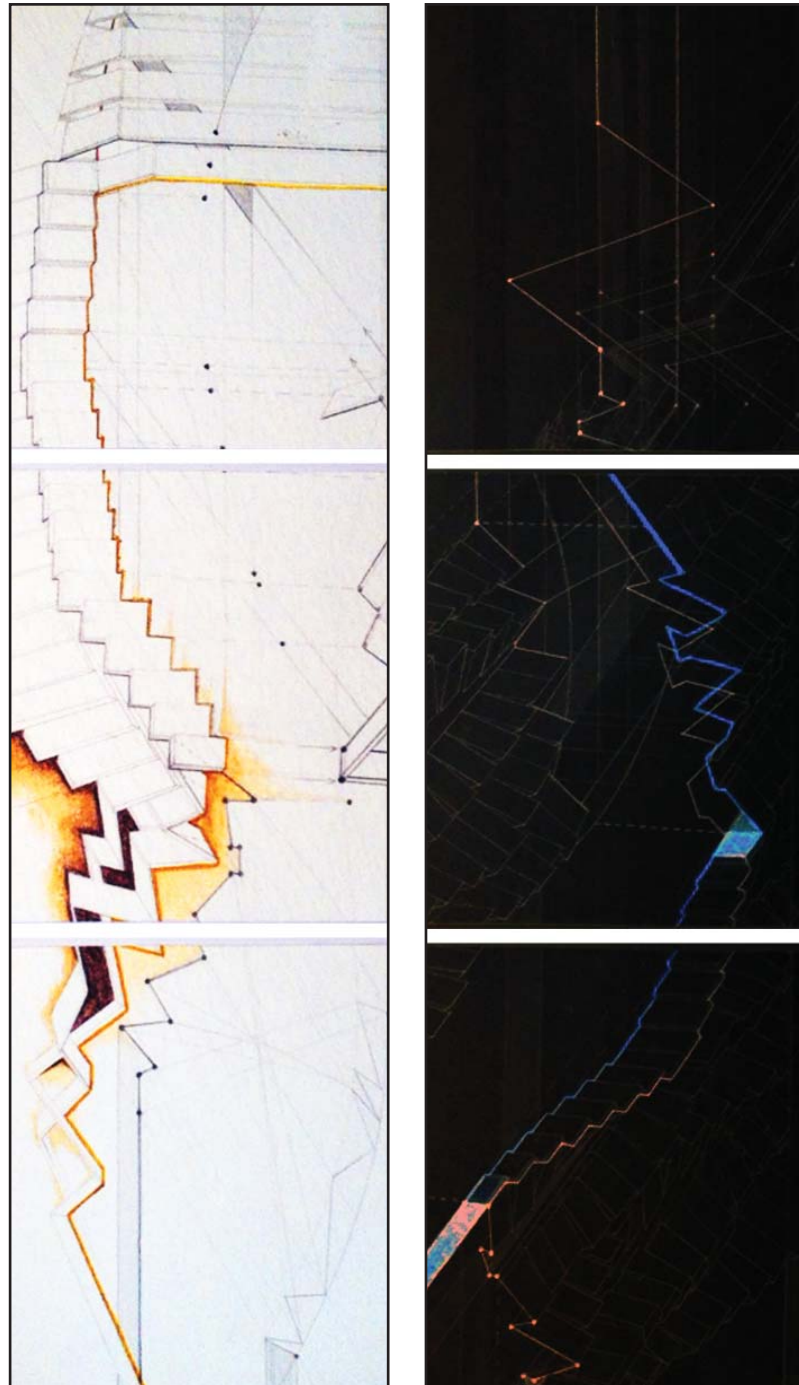




## **WAYFINDING**

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It has been found that disorientation in built environments is embarrassing and stressful. It wastes time and, in some extreme cases can result in fatality. Because the birthing centre is aiming to remove any stressors the design of wayfinding is an important aspect to be considered in the overall experience within the environment. Support for wayfinding depends on signage and colours—a good wayfinding program ensures that patients, visitors, and staff can effectively navigate the environment.



Psychoanalysis suggests that depressed people lack Hippocampus function which is suggested to aid in spatial memory. Therefore sufferers find it harder to make their way through spaces, which can add further stress. Wayfinding is therefore an important aspect of the healthcare facility (Damien, 1). There are multiple strategies that can help in hospital wayfinding. Symbols are an effective communication tool for breaking down language barriers, and with consistent use on signage and directional guides, symbols can help in the navigation of hospitals.

Interior design is a component that supports the wayfinding system with colour palettes, materials, and lighting; signs build on good interior design to perfect a wayfinding system. (Levin, 1) Colours discussed in the previous section are also effective design methods to identifying different spaces. Department entrances can be treated in similar methods either with a paint colour, floor pattern, ceiling detail, or combination.

Good wayfinding creates a clear sense of place in a confusing, complex, and often seemingly hostile healthcare facility. Unfortunately, most hospitals and medical centres are complex mazes of long and confusing corridor systems, with bends, turns, and foreign-sounding signs. Nothing looks familiar, and visitors, often already stressed with the demands of an illness, can find the experience frustrating (Levin, 1).

Within the environment of a birthing centre considering the prevention of post-natal depression it is important not create any more stress upon the woman in labour. Therefore the use of wayfinding is important. This issue will be tackled by using mostly light, colour and pattern. The effect of colour on people has been investigated in the previous section and it is clear that a brighter colours such as yellow is an appropriate colour to use for wayfinding in the communal areas.

The wayfinding design of the birthing facility will use bright colours such as yellow and invigorating green which stimulate the occupant and offer great guidance for both patient and staff as seen in the image pictured on the right. The aim in the birthing room is to create a more subtle approach to wayfinding by simplifying the amount of words used to do so and focus more on the environmental factors for wayfinding.

Image provided by DEXIGNER,  
<http://www.dexigner.com/news/24905>



Going beyond simple signage, hospital patients should be able to have a sense of their location without ever feeling lost. It has been found that having a sense of place helps keep patient stress levels down. Use of colour in hospital design has a multitude of uses. Colour can help patients have a sense of orientation – where colour is used to give different hospital areas a sense of place.

The mix of colour, pattern and light will be the ultimate combination for the creation of a perfect environment with optimal wayfinding for the patient and visitors alike. The use of light within a healthfacility will be further explored in the next section 'Light'.

Image provided by DESIGN\_AWAY  
[http://designdifference.blogspot.co.nz/2011\\_02\\_01\\_archive.html](http://designdifference.blogspot.co.nz/2011_02_01_archive.html)





## LIGHT

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This section focuses on the power of light. The first area looks at sunlight and the effects of light on people with depression. The second part looks at therapeutic lighting, which is created through artificial coloured lights. The Precedent of *The MRI suite at the centre for diagnostic radiology in Butzbach, Germany* gives a clear image of what the environment would look like with the change of colour.

*“A room needs a balanced aspect of both light and shade. Light is needed to invigorate and brighten the space, and shade is needed to create restful balance, relaxation and contemplation.”*  
(Beckwith, 3)



Prior to the advent of drugs, doctors utilised the healing properties of the sun to improve health, both physically and psychologically. (Day,1) Research has confirmed that lighting has a direct impact on peoples health. With appropriate lighting, patients will be safer and more satisfied with their environment and will recover faster. ( Simeonova, 1) Align with several evidence-based design strategies; the importance of nature and daylight on reducing pain, stress, lengths of stay, and special disorientation, and on improving sleep and self satisfaction. (Day, 1) Reshaping an interior environment can balance operational efficiency and patient/staff safety with the health and healthful impact of natural light and views of nature. (Day, 1)

### Sunlight and patient recovery

The association between sunlight and patient recovery time is emerging tentatively as an important factor in healthcare design. In a study of more than 600 patients admitted for myocardial infarction, those who stayed in sunlit rooms had a stay of 2.3 versus 3.3 days for those who stayed in non sunlit rooms. The mortality rate was also higher for patients in non sunlit rooms. ( Beauchemin, 91) Patients who occupied the bright, sunlit rooms experienced less perceived stress and a greater reduction in pain, using 22% less analgesic medication per hour compared with those in dim rooms. (Walch, 67)

Dealing with the treatment of seasonal affective disorder, a type of depression that afflicts an estimated 6.5% of the adult population, a direct connection has been established between morning and bright-light therapy, as a substitute for exposure to daylight, and a reduction of symptoms. In another type of artificial light therapy application, it was found that morning light therapy decreases the occurrence of ante partum depression during pregnancy. The study also suggested that light therapy might reduce postpartum depression. (Oren, 159)



Bridging the gap between the value of daylight and artificial bright light for patients with depression, a study suggests that those whose sleep patterns allowed them to rise earlier rather than later in the morning were less depressed. (Olders, 55) However, investigations are now beginning to more clearly define the benefits of sunlight and / or daylight to patients with depression. ( Yamada, 37) In one study, patients admitted to a hospital for non-seasonal bipolar depression were assigned to east or west facing rooms. Patients occupying the east facing rooms , which received morning sunlight, stayed on average of 3.67 days fewer than patients in the west facing rooms. ( Benedetti, 62) Similarly, in another report, depressed patients admitted to an inpatient psychiatric ward who were assigned sunny rooms had an average stay of 16.9 days compared with 19.5 days for those in dim rooms. (Beauchemin, 40)



### Reducing depression through light

Depression is a serious, widespread, and costly problem in healthcare facilities. A large body of rigorous evidence indicates that exposure to bright artificial light and daylight is effective in reducing depression and improving mood, even for people hospitalized with severe depression. Artificial light is commonly used in structured or formal protocols for treating depression.



Source of models: By author

## THERAPEUTIC LIGHTING

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### **Blue Light**

Blue light helps us sleep and calms the mind.

### **Green Light**

Use green light to relax and unwind, especially after a hot bath or when you practice a relaxation technique.

### **Orange Light**

Use orange light to combat depression and lift your mood.

Orange is warming, stimulating and creates an atmosphere of happiness and vitality.

### **Pink Light**

Particularly useful in the bedroom, has muscle relaxing qualities. It is also a gentle warming and loving colour.

### **Red Light**

The wavelength of the colour red has an arousing effect, preparing us to respond to danger.

### **Violet Light**

Violet light has been used successfully in many mental institutions to help people with obsessive behaviour patterns and neuroses. The frequency of the violet vibration activates the pineal gland which produces endorphins (chemicals found in the brain) that have a calming and uplifting effect.

Information above supplied by Suzy Chiazzari, 105 in The Healing Home

*The MRI suite at the centre for diagnostic radiology in Butzbach, Germany features a versatile lighting solution from Siemens Healthcare, thereby supporting an individual, patient-orientated adjustment of the examination situation. The 'Moonlight' offers users a choice of the entire colour palette, allowing them to set the colours for the individual patient.*

*The Copenhagen-based professor Niels Finsen, the father of rational light therapy, was first to prove that colours are clearly perceived as radiated energy by the human body and trigger clear responses within the body.*

*Tabesch reports, "I used to work at a 'normal' practice, where I always had two or three sedations each day. In the MRI suite, all of the claustrophobic patients can make it through the procedure without sedation. Before, I often experienced cases where these kinds of patients just jumped right out of the unit – something that hasn't happened in the new MRI suite." (Fisher, pg33)*

## Potential use of coloured lights in Birthing Room

*The colour changes used in the MRI suite is a great way to change the atmosphere within a possible stressful environment. The idea of incorporation a similar change of colour and light within the birthing room would vastly improve the patients sense of control and lower the woman's stress levels. Stress heightens the chance of developing depressive disorders. By creating an environment where stress is eliminated as best as possible, the birthing room becomes an environment which encourages the prevention of post-natal depression within the labouring woman.*

The challenges, solutions and results of using therapeutic lighting are written by sonja Fisher in Medical Solutions.  
Images on the right: [www.siemens.com/healthcare-magazine](http://www.siemens.com/healthcare-magazine)

**Challenges:**

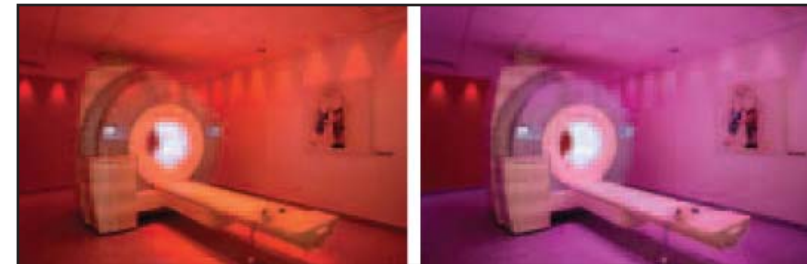
- Overcome cold, intimidating hospital atmosphere
- Look beyond mere results to accomplish both imaging excellence and supportive surroundings
- Positively distract patients from their suspected disease
- Cope with anxious, claustrophobic patients
- Additional strains for patients due to sedation in MRI
- Market private radiology centres

**Solutions:**

- Create pleasant surroundings to reflect patient-centered care
- Respond to patients' psychological predispositions
- Reasonable and effective application of colour and light
- MoodLight panel for digital mammography platform MAMMOMAT Inspiration
- Healthcare Lighting for radiology suites

**Results:**

- Colourful, appealing surroundings while imaging competence is maintained
- Content, relaxed patients contribute to achieving maximum imaging quality
- Reduction of sedation down to one percent in total
- Achievement of a competitive edge for private radiology centres
- Good working atmosphere and motivated staff



CT-guided pain therapy is conducted in a room where a simulated sky and colored wall modules help to distract and calm patients before and during their treatment.



## **SUSTAINABLE MATERIALS**

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This section explores the different sustainable materials available for the healthcare sector.

As a whole, the collection of sustainable materials explored the healing energies of light, space, dimension, texture, and colour.

The green ticks indicate the spaces in which the specific sustainable material could potentially be used.



### **Spill- stain- and microbial- resistant textile**

Sustainable fabrics used in a healthcare facility should feature environmentally-friendly materials. Textiles should be spill and stain resistance ensuring the safety within a healthcare facility.

The stain-, spill-, and microbial-resistant fabrics will be used within the birthing room and should be bleach cleanable as to ensure the safety of the expecting mother and her baby. The fabrics will be used on both the birthing bed and the furniture.



### **Antimicrobial surface additive**

An active antimicrobial additive should be incorporated into the resin used to create solid surface products. The additive effectively retards the growth of odor-causing bacteria, mold, and mildew.

The use of antibacterial surfaces is important in healthcare environment. Especially in a birthing room as newborn babies are prone to diseases.



### **Resilient composition tile**

Resilient Composition Tile is a material made from natural ingredients. The tile has naturally inherent antimicrobial and antistatic properties offer improved indoor air quality and combat MRSA and other strains of bacteria.

### **Floor, wall, and ceiling vinyl**

Vinyl can be applied to floors, walls, and ceilings. Providing maximum resistance in environments where increased vertical abrasions can occur, the resilient sheet vinyl protects itself from the threat of dirt and abrasions with its embossed-wood grain texture.

Vinyl will be used on the most surfaces in the birthing room as it safe, clean and has a great overall aesthetic.



### **Privacy curtain fabrics**

Sustainable privacy curtains have the ability to add subtle shapes, textures, and organic motifs to the environment. The curtains are antimicrobial and have a recyclable finish.



Images and information supplied by healthcare design magazine.<http://www.healthcaredesignmagazine.com/article/textilesfabrics-solid-surfaces-flooring>





## **INTERIOR PLANTSCAPING**

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This section will focus on the power of Interior plantscaping. Interior plantscaping provides opportunities to passively and/or actively address restoration of body functions. The primary focus is to regain wellness physically, psychologically, spiritually.



“The basic principles of harmony, balance, and the spirit of nature are becoming widely accepted and sought after in experimental spaces to create atmospheres that are more lively and life-giving, experimental architecture includes ecosystems growing on indoor walls.” (Beckwith, 2) These experimental structures are composed of rocks, plants and microorganisms that inhale dirty air and exhale clean air.

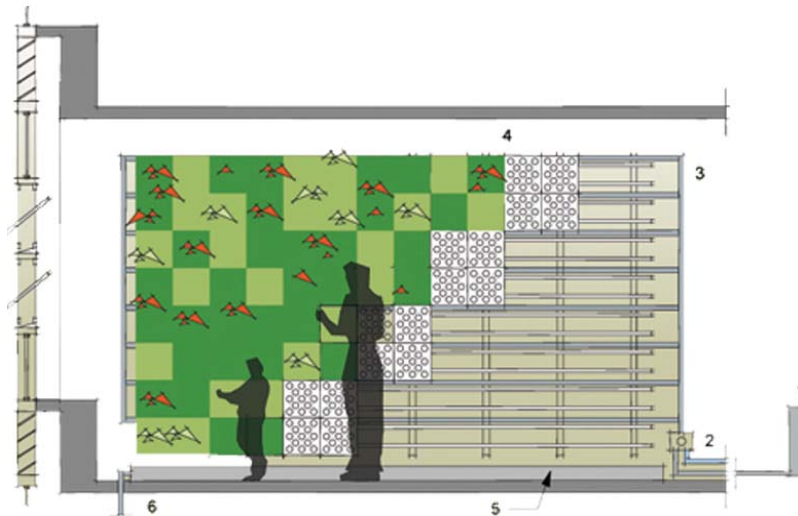
Within the environment of care, where life-challenging and life-threatening events are amplified, the pronounced focus on individual situations at hand necessitates diversions or distractions to allow those within to manage stress. Providing access to nature within healthcare facilities supports these evidence-based design concepts and offers opportunities for positive distractions. In this sense, positive distractions may be understood as “environmental design elements that effectively promote restoration from stress in patients, visitors, and healthcare staff” (Ulrich, 92).

Wherever possible, views of nature from patient rooms and public spaces should be considered throughout the design process of healthcare facilities. The interior design should also incorporate nature into the environment through interior courtyards and atria. These spaces are often landmark design elements and wayfinding queues in the public spaces. Wayfinding has been mostly discussed through colour, pattern and light. The use of plantscaping has been overlooked and would be a great way of incorporating plantscaping within the birthing centre.

Interior plantscaping reduces stress and encourages relaxation. Patients feel calmer and less stressed due to less noise and less heat from Green Walls. They help ease physiological and psychological pressures of city life by providing a spiritual and physical connection to nature. The beauty of a green wall can rejuvenate our minds and physical fatigue is greatly reduced. (Thorne, 1) Ulrich’s theory of supportive gardens as a source of stress restoration and buffering is another example of the type of research that defines nature as a vital component of the environment of care. “Patients who are in direct or sensual contact with nature have demonstrated a higher threshold of pain” (Ulrich, 84).

Therapeutic indoor gardens are designed garden areas that address the specific needs of the user groups within the environment of care. These indoor gardens are defined as places to “achieve a degree of relief from physical symptoms or awareness of those symptoms” and places to “facilitate an improvement in the overall sense of well-being and hopefulness that an individual is experiencing and thereby assisting physical improvement” (Smith).

### TYPICAL INDOOR GARDEN & GREEN WALL



1. IN-UNIT GREY WATER STORAGE TANK
2. FRESH WATER/GREY WATER CONTROL VALVE
3. SUPPLY PIPES TO GREEN WALL PANELS
4. PLANTS GROW OUT FROM PANELS
5. FLOOR GUTTER CATCHES EXCESS WATER
6. EXCESS WATER RETURNED TO CENTRAL GREY WATER STORAGE TANK





## **SUMMARY CHAPTER TWO**

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This chapter firstly contemplated on a narrative, the story of birth. The outcome of this story can be used in the design of the birthing room. Some elements that came from the contemplation of the birthing story are; space for the birthing mother to move around, the encouragement of natural birth.

The evidence based design guidelines discussed on pages 29-31 are an excellent start for the design process.

**COLOUR:** The variety of colours has an impact on people within the environment. By establishing a different colour palette for the communal areas and the private areas, the occupant can feel more confident.

**LIGHT:** Providing larger windows in patient rooms and other spaces might also help alleviate depression by permitting more exposure to daylight. The use of bright artificial light warrants consideration in settings where depression is a problem and sufficient daylight is not available.

**SUSTAINABLE MATERIALS:** adequate durability and ease of maintenance is the most important characteristic of a material appropriate for the birthing Room

**INTERIOR PLANTSCAPING:** The use of interior plantscaping is an important aspect in the design of healthcare facilities. They do not only cleanse the air and offer great healing properties to the occupant they can also be used for wayfinding.

**CHAPTER THREE** will investigate the site selected and the circulation issues that may occur in a building which is originally designed as domestic apartments.



# CHAPTER 3

DESIGN PARAMETERS





## **INTRODUCTION CHAPTER THREE**

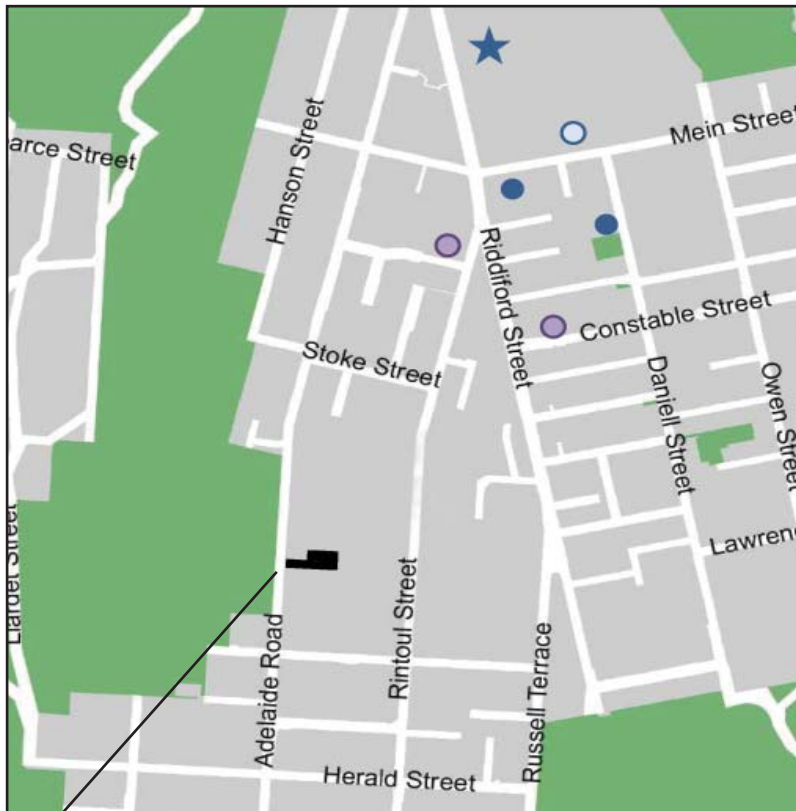
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Chapter three will explore the site “McAalister Heights” and its current habitation.

A Photographic survey of the Exterior and Interior helps to understand the current site and its domestic layout.

Section ‘Vertical circulation and internal Layout’ investigate the site selected and the circulation issues that may occur in a building which is originally designed as domestic apartments.





MaCalister Heights

- ★ Wellington Hospital
- Primary schools
- University of Otago
- Community centre / library



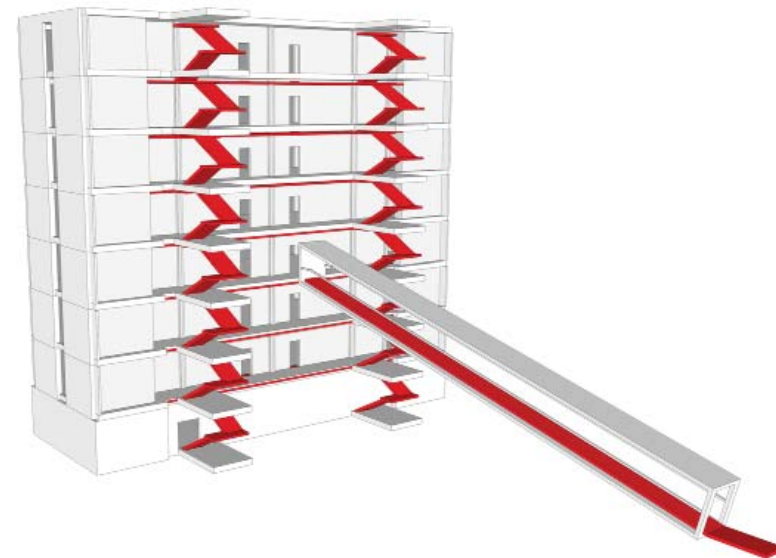
## SITE SELECTION

McAalister Heights is a Residential-Purpose built flat established in the 1960's designed by Sargent and Smith and Partners. McAalister Heights is located in the invigorating Newtown, Wellington.

The site was selected because of its location and beautiful surroundings. Located just 2 minutes from Wellington Hospital. The site is high on a hill surrounded by sweeping vistas on both the East and West side.

The elaborate ramp is an extension added to the apartment complex in 1969. The ramp makes getting to level four, five, six and seven more convenient.

CIRCULATION of the apartment complex consists of a long ramp entrance from the street on the central axis and branches off in to two main stairwells. There are currently no elevators located on site.



## EXISTING BUILDING

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McAllister Heights is a residential apartment complex located on 381 Adelaide Road, Newtown, Wellington. In the original plan of the apartment complex the building consists of four apartments per floor.

The main ramp of the building creates easy access to the fourth floor. This ramp was an extension added in 1969. Over time several garages were added with the latest garages built in 1994.

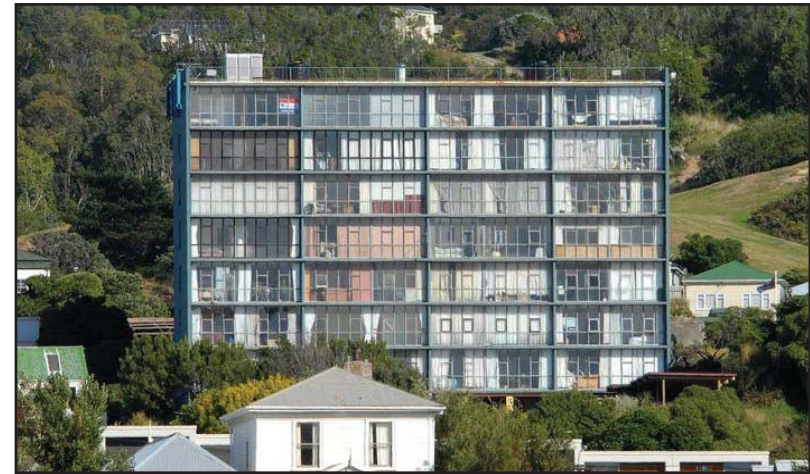
There is no record of any renovations done on site, but it is clear that the old windows have been changed recently with new aluminium double glazed windows on both sides of the apartment complex.

McAllister Heights is in close proximity to Newtown village including services like the Wellington Hospital and school, as seen on the map to the right.

The facade shows characteristics of 1960's modernism. With large glass panes located between concrete columns and concrete floor slabs.

The many windows on both the east and west sides of the building allow plenty of sunshine to stream in to the interior.

With exquisite views of the city and sea on the east side and tranquil garden views on the west.





## PHOTOGRAPHIC SURVEY, EXTERIOR

### FEATURES

Exterior Cladding:	Concrete
Exterior Joinery:	Aluminium, Double Glazing
Roof:	Concrete
Style:	Company Share
Use:	Residential apartments



The aluminium windows were installed in 2009. The double glazing windows offer a more comfortable living space by keeping the warmth in the building. The wooden doors are the only wooden features in the entire complex. All other materials are aluminium and concrete.



The new aluminium windows offer great views out to the city and sea while keeping the heat in the building.

There are many garages provided for its residents with four garages situated under the building as seen on the left. The rest of the garages have been extended over the years and have provided the residents with covered parking for their cars.

## **PHOTOGRAPHIC SURVEY, INTERIOR**

This is the smaller living area in the middle two apartments. Plenty of light is provided through the large floor to ceiling windows. Light as discussed in Chapter Two is a great asset in the healing of mental disorders. The access to light in a Healthcare facility is important as research has confirmed that lighting has a direct impact on peoples health. With appropriate lighting, patients will be safer and more satisfied with their environment and will recover faster.



The double glazed windows face east offering beautiful views over wellington city and the sea. The power of being able to look out of the window and experience beautiful landscapes encourages the healing process and provides the occupant with a sense of calmness. It is a great asset to have these big windows within a health facility as the women appreciates the positive attributes the view of nature offers her during the tough time of labour.



This is the living area in bigger side apartments. Light can be seen streaming in from both sides of the room.

The design is an open plan design with kitchen and living room connected. The kitchen has laminated floors and white walls with blue cabinets.





## **SUMMARY CHAPTER THREE**

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Chapter Three clearly shows the site in its current condition. The main issue in the current site is circulation and access.

This will have to be resolved carefully as the function of the building will go from residential to healthcare.

Chapter Four will firstly look at the current circulation issues. Secondly it will consist of five designs which respond to the existing facade by inserting an interior intervention within the shell of the existing site. The designs will focus on creating a vertical circulation path which can accommodate both patients and staff. The elements researched in chapter two will be explored within the design of the birthing centre.





# CHAPTER 4

BIRTHING CENTRE DESIGN



## **INTRODUCTION CHAPTER FOUR**

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This chapter will focus on the integration of a central core within the current site. Lift will have to be inserted and a secondary circulation core will aid in the convenience and presence of the intervention.

A series of five different designs will be displayed each showing a different design path, which will all contribute to the final design of the birthing centre. Each intervention will build upon the last and show the development between different design stages. The elements researched in chapter two will be explored within the design of the birthing centre. The ones particular to the exploration of chapter two are: colour, light, sustainable materials, wayfinding and interior landscaping.

The key points described in the proceeding chapters are represented in the green text and will be explored throughout the design process.

The elements within the evidence based design wheel (Found in page 29) will be considered throughout the design of the birthing centre. These elements include: Single patient rooms, Noise, Windows, Access to nature, Positive distractions, Furniture arrangements, Air quality and overall layout of the building.



## VERTICAL CIRCULATION AND INTERNAL LAYOUT

The most important aspect of the design layout is no doubt the circulation. The site is originally designed as domestic apartments. The circulation currently in site consists of two main staircases and a long ramp which connects ground floor to level three. A diagrammatic representation of the current circulation is shown in Figure 1. Proposed in the new design is the addition of two elevators. These will be put in place of the stairwells connecting all floors.

Elevators are a must in the design of a healthcare facility as the staff needs to be able to get from one floor to another quickly. Patients in a healthcare facility also need access to an elevator as they might have problems walking or are in serious pain affecting their mobility. Therefore one lift will be dedicated to staff and the other lift to patients and visitors.

Figure 2 shows the proposed circulation for the design of the birthing centre. A core with the main stairwell will replace the two current stairwells. This will allow for easy wayfinding throughout the whole centre as this will be the main core from which all the different working stations branch out from.

As seen in the diagram of the overall layout on the right, the nurses stations are connected closely to the circulation core, creating easy access to all floors. With the birthing rooms closely linked to the nurses' stations for convenience and safety reasons.



Figure 1.

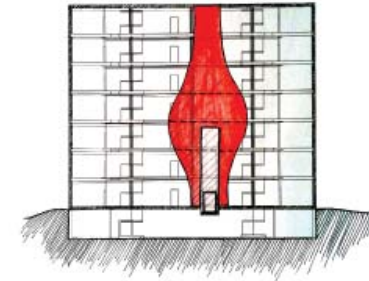


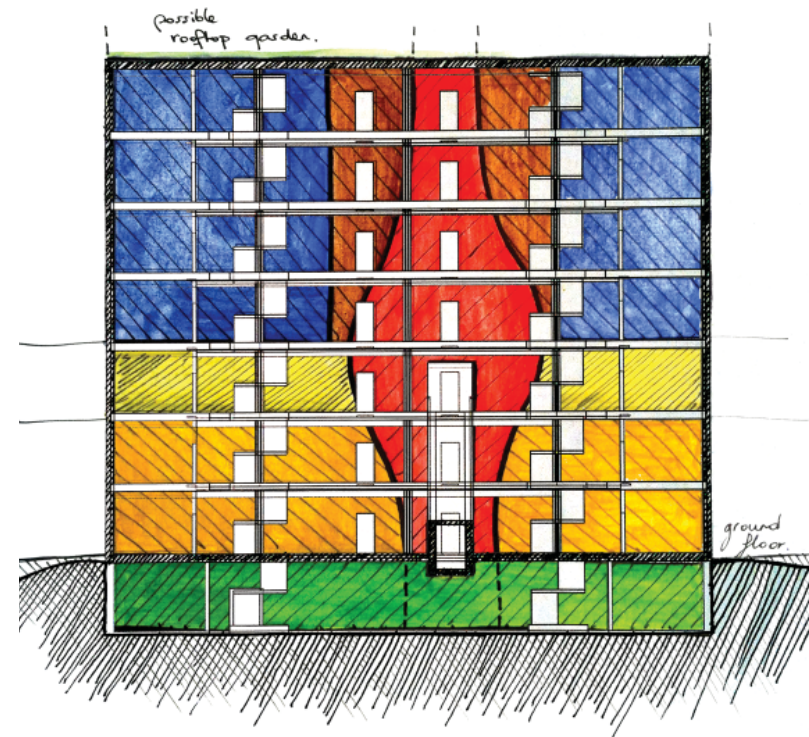


Figure 2.

-  Communal Garden Area
-  Seasonal related Depression Treatment Facilities
-  Circulation Area
-  Entry / Cafeteria / Seminar Space
-  Nurses hub
-  Maternity Ward / Birthing centre for women with depressive disorders

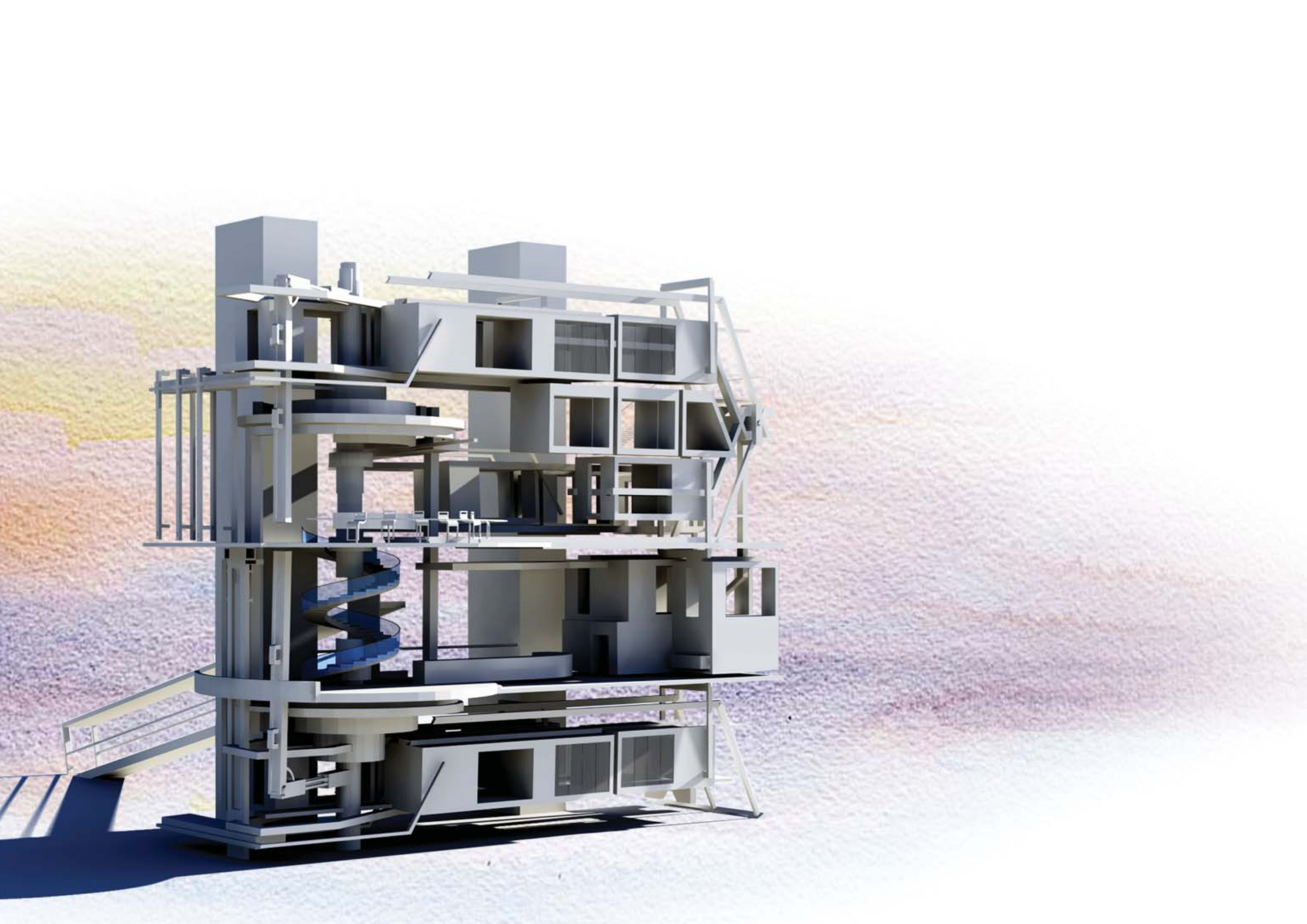




## **BIRTHING CENTRE, DESIGN STAGE ONE**

The first design explores the importance of Interior architecture on the design of a birthing centre.

The main aspects explored in the first design are building layout, circulation and wayfinding, all by incorporating the idea of one central circulation core. The facade has conformed to the design of the interior bending to the wishes of the occupant. The centre levered platform house the communal areas and cafeteria.





## Circulation and Facade.

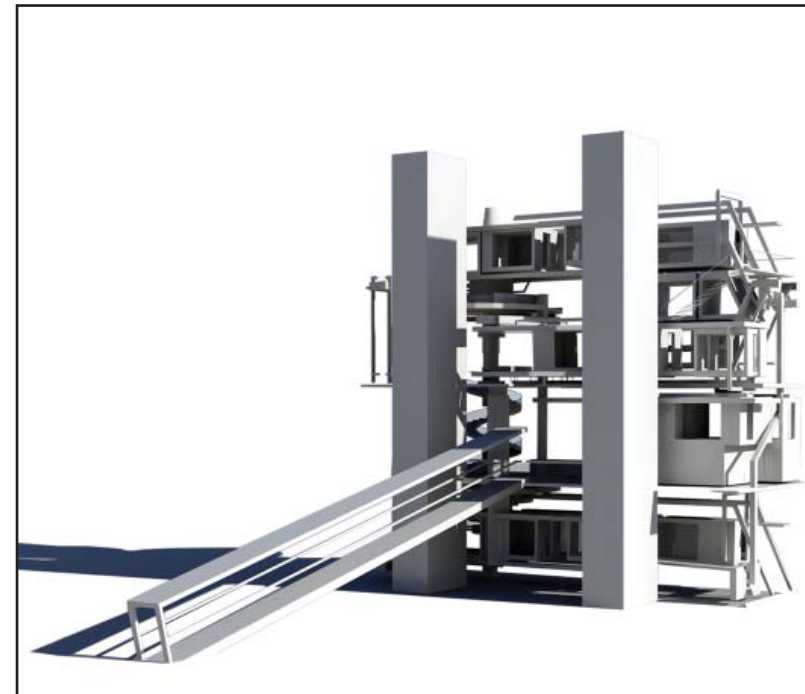
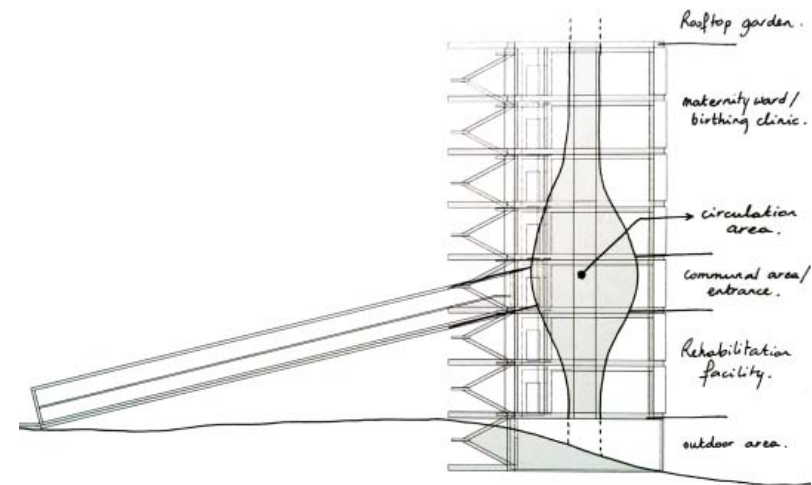
The main structural elements and integrity of the existing building will be retained. The concrete posts and beams will therefore stay and the concrete slabs will be modified to accommodate voids and larger public places.

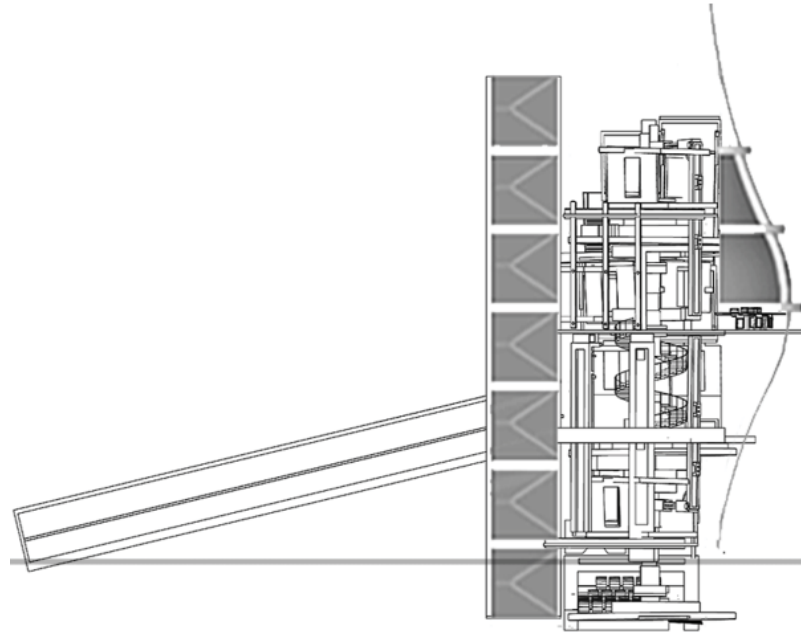
The general circulation has been changed from the existing building as there were currently no elevators on site. The elevators have been placed in the spaces of the staircases and a new circulation core has been added linking the communal areas. The spaces have been presented without the shell or structure to clearly understand the interior pathways created within the facility. The horizontal pathways are balanced out by the vertical circulation.

The circulation core has been portrayed in the diagram on the right, with the birthing rooms and nurses stations on the top, closely together for convenience. The workstations are close to patients resulting in fewer errors, decrease nurses' travel time and distances covered during the day, increase nurses' time spent caring for patients and families, and improve job satisfaction.

The communal area is located on the third floor which can be accessed by stairs or lift from the first floor or by using the purpose built ramp which is original to the site of McAlister Heights.

The core connects the bottom floor which houses an outside courtyard and the top floor which consists of a roof garden and viewing platform. Previously discussed access to nature is important in the facility of a birthing centre as it offers emotional support and enhances healing. Research has repeatedly demonstrated the emotional and physiological benefits of visual and physical access to nature: stressful and negative emotions decrease while pleasant emotions increase. Patients viewing nature recover faster, have less stress, anxiety and pain, and require less pain medication. Gardens located in healthcare settings offer patients, visitors, and staff the opportunity for direct interaction with the restorative, calming effects of nature.





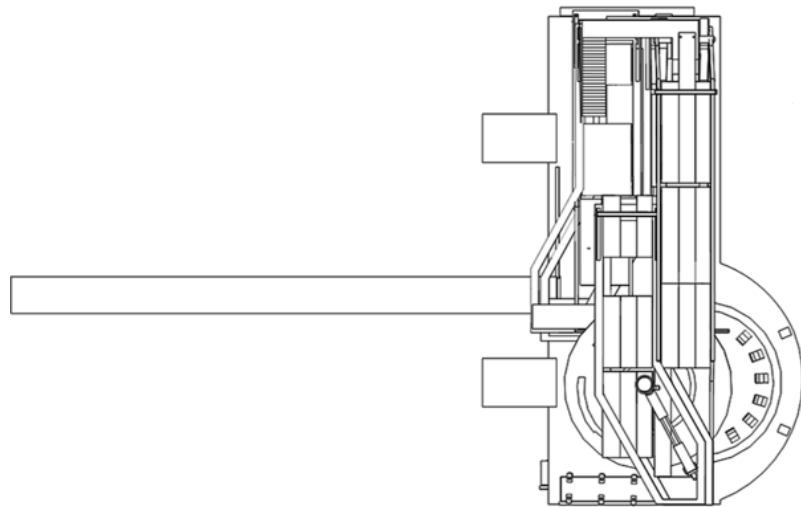
Diagrammatic section.

Outside access to birthing unit. The intervention creates a close relationship with the exterior landscape. To make navigation easy throughout the birthing centre the entrance can not be missed by the huge long ramp connecting the parking lot with the third floor which is the entrance lobby.

The circulation core connects all the floors and can be seen from any level in the building creating a sense of navigation for the occupant.

The route from the outside door to the birthing unit is almost completely surrounded by glass facing to the outdoors. The sweeping vistas of the beautiful woods can be witnessed by the woman in labour and offer a sense of relaxation, calming the woman down in the stressful situation of labour.

When looking at the elevation and plan of the intervention it becomes apparent that the interior intervention is pushing outside the boundaries of the original site. The elevation of the building appears to be bulging like a pregnant stomach. The building is conforming to the function within.

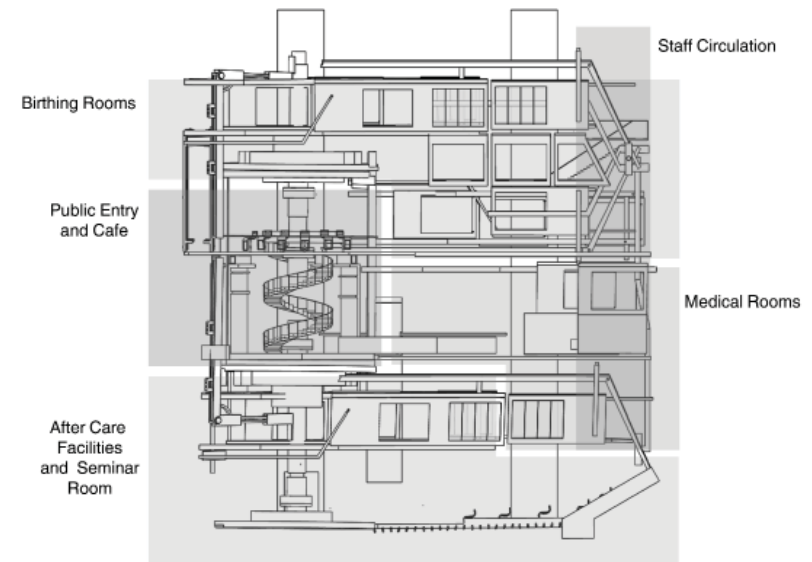


Diagrammatic plan.

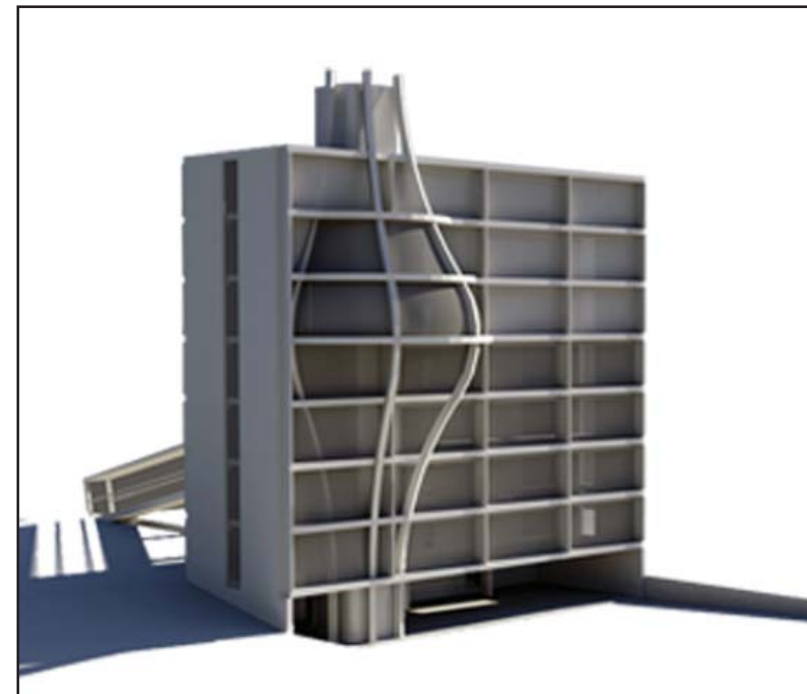
The exposed area of the intervention which influences the current facade houses the public facilities such as the cafe and communal gathering area.

The public arrival area situated just below acts as a transition space for the occupant. The woman needs to be able to transfer emotionally from being outside to being in an enclosed space. The windows offered by the original site are an excellent way to create a smooth transition.

In the diagram on the right the circulation is clearly divided into two areas, communal circulation and staff circulation. Dividing the two circulation paths assists in creating a safe environment for both staff and patients.



The facade has conformed to the design of the interior bending to the wishes of the occupant. The centre levered platform houses the communal areas and cafeteria. The interior intervention of the Birthing centre creates a huge impact on the exterior. When driving up to the centre the labouring woman will be able to witness the building which creates a calming atmosphere for the woman before she arrives at the birthing centre.





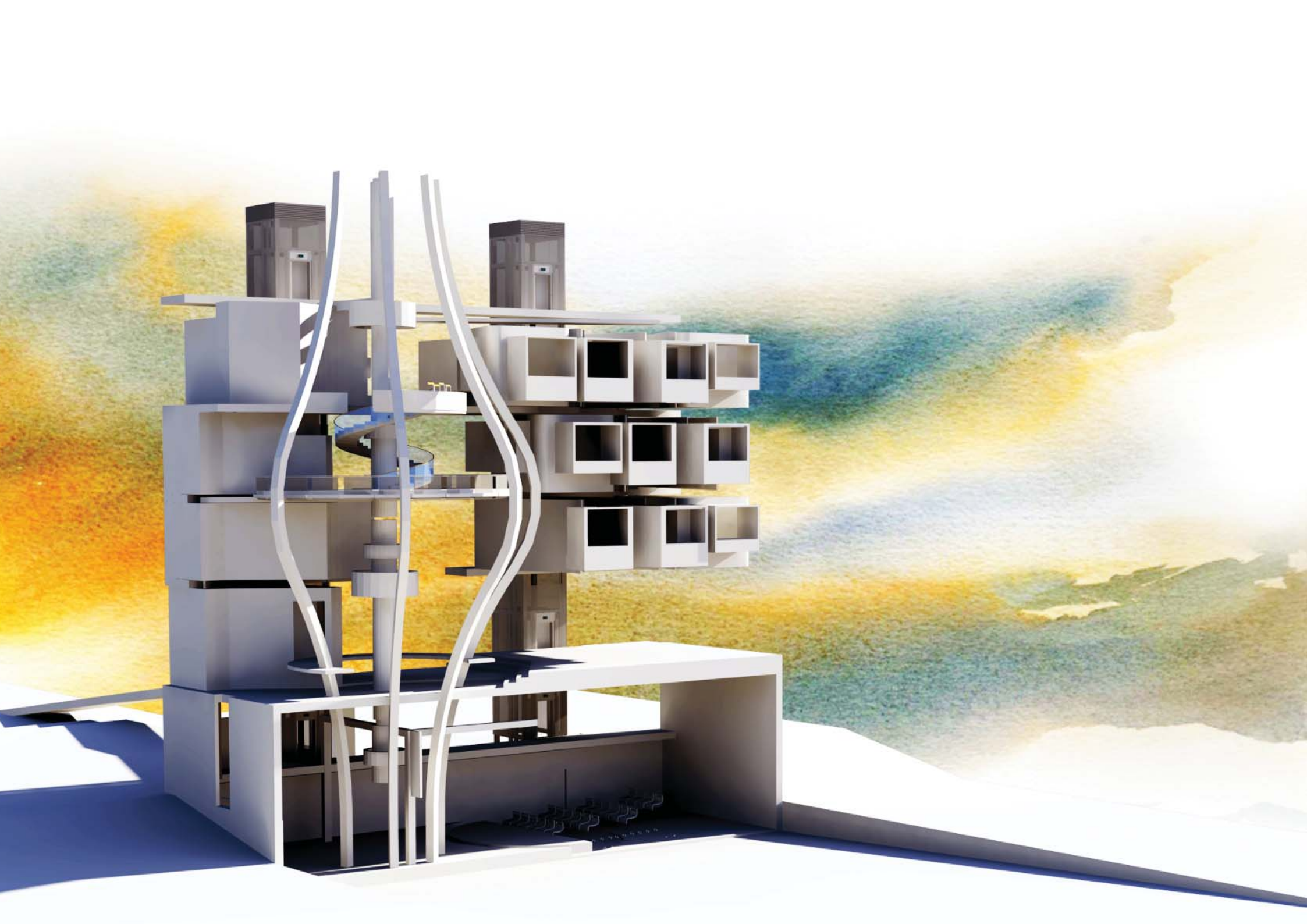
## **BIRTHING CENTRE, DESIGN STAGE TWO**

Birthing centre design two simplifies the forms created in design one by developing the functions and creating clear areas within the Birthing centre.

The design is broken up in to two main interventions which together form the design for the birthing centre.

The first intervention focuses on circulation and the communal areas.

Intervention two focuses on the birthing units and how the different units fit together without creating an impact on one another. The access to single birthing rooms is an important aspect to creating an appropriate birthing environment with the least amount of stressors. Reducing stressors such as noise and lack of light reduced the chances of a woman developing post natal depression.



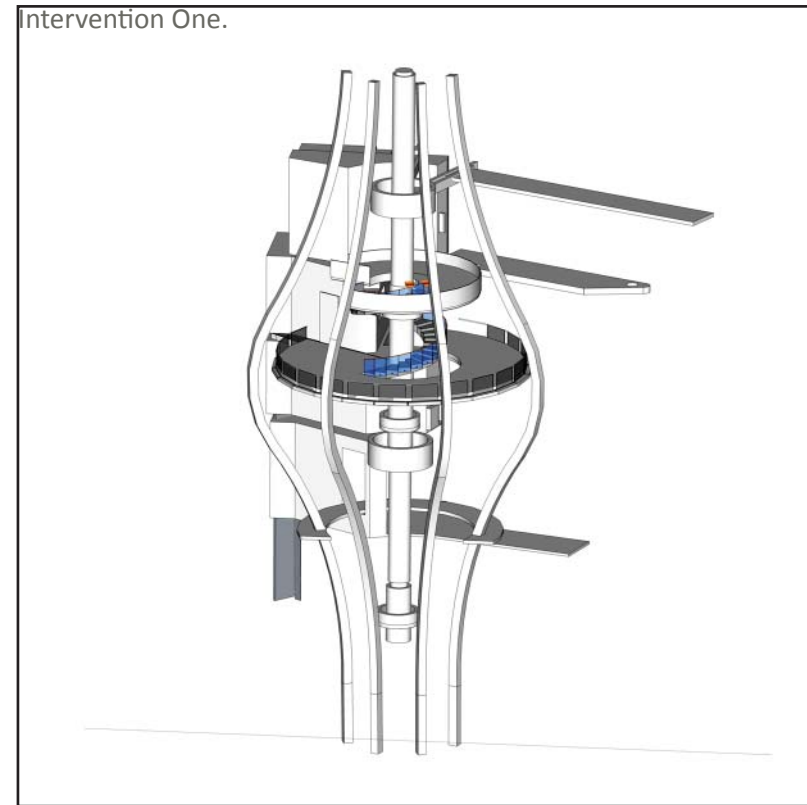
The design has been broken up in to two parts. Intervention one addresses the public spaces and circulation.

Intervention Two focuses on the birthing suites. The two functions have a completely different design language from each other which makes it easy to navigate through the building as wayfinding is an important aspect of healthcare design.

Intervention One resembles the public spaces and circulation. The main cafeteria is easily accessed by the circular staircase which connects the lobby with the top communal gathering space. Communal gather spaces are "Spaces where family members can congregate for mutual support." (Sternberg, 237) The form is similar to the form which housed the communal areas in Design One. The lines are refined and the cafeteria is now a clear round area in which interaction between visitors and patients can occur.

The idea is to extend the circulation core from level 3,4 and five to the entire vertical site. Therefore the lobby could be lowered to level one which would allow for easy access by woman being dropped off in acute pain of distress.

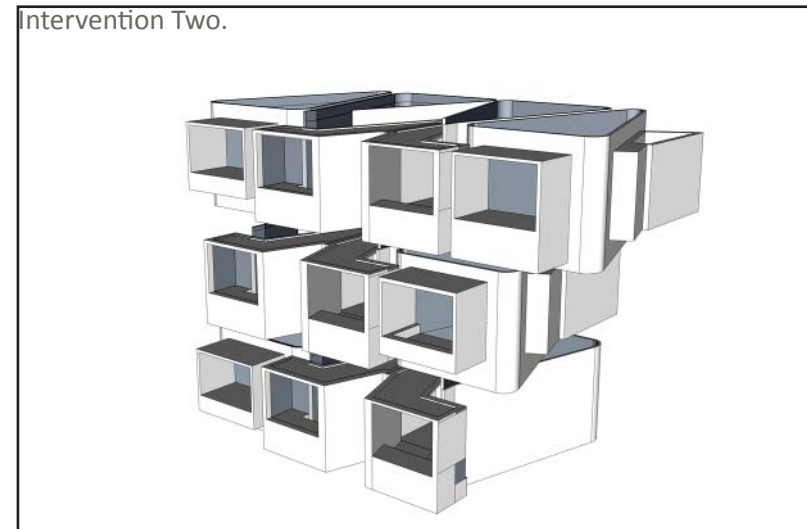
Intervention One.



The access to single birthing rooms is an important aspect to creating an appropriate birthing environment with the least amount of stressors. As previously discussed reducing stressors such as noise and lack of light reduced the chances of a woman developing post natal depression. Single patient rooms have shorter length-of-stays, fewer medication errors, lower costs, higher occupancy rates, increased privacy and control, less noise, fewer sleep disturbances, and higher patient satisfaction.

The individual rooms have large windows facing the East side. This enables the woman to experience the sunrise and take full advantage off the beautiful Wellington scenery. The effect of nature is a huge factor in creating a calming and relaxing atmosphere for the woman in labour.

Intervention Two.





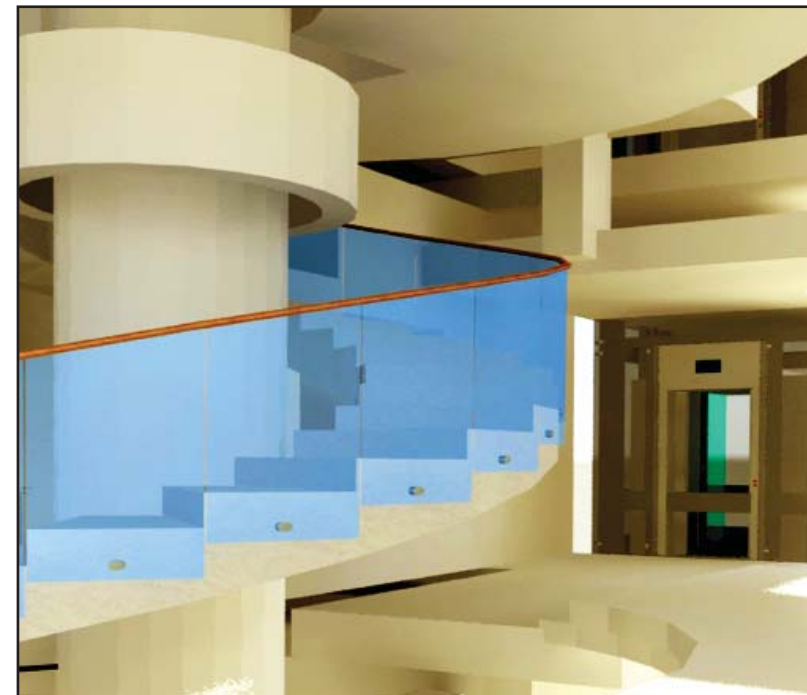


The 3D views represent the concept structure of the communal areas. There is a prominent centre core which everything revolves around. The interior is a blank canvas as there are no colours or textures added. The space seems very clinical and the aim is to remain with the idea of the central core as this idea works well for the function of the building.

The material added to the renderings is glass. It is clear from within the building that the outdoors plays a huge part of the way the interior is experienced. Colour and texture needs to be considered after the main design is established.

The built-in furniture is an important aspect of the design process as this needs to be established early on, because the exterior plays a major impact on the interior design. Furnishings arrangements that promote social interaction in waiting areas include comfortable, supportive furniture positioned in small, flexible groupings, with seating placed at right angles in line with the windows.

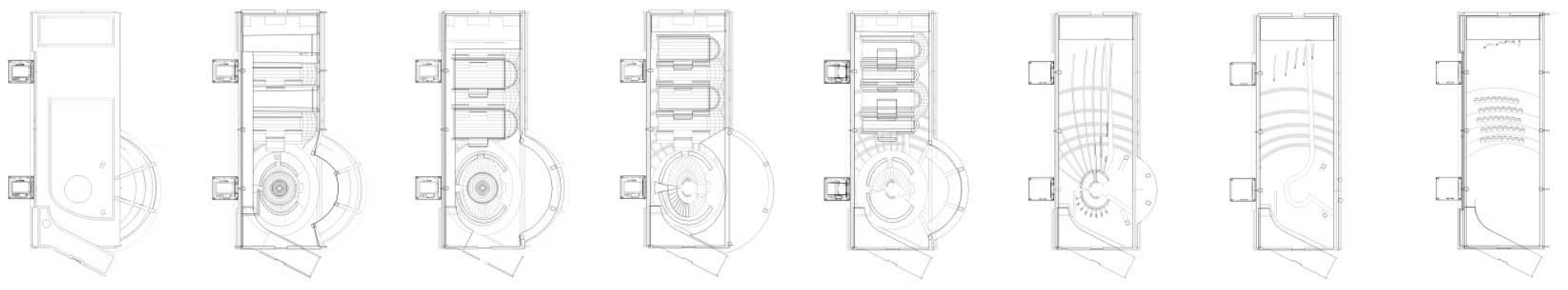
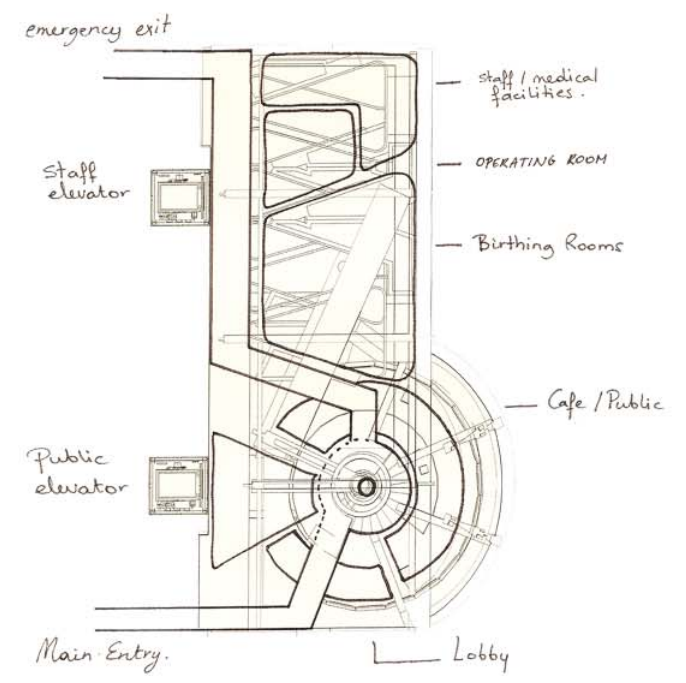
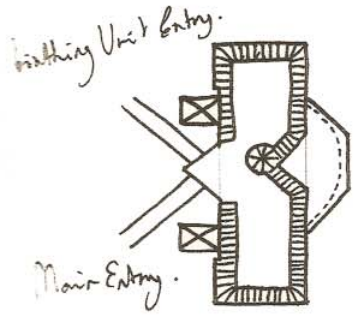
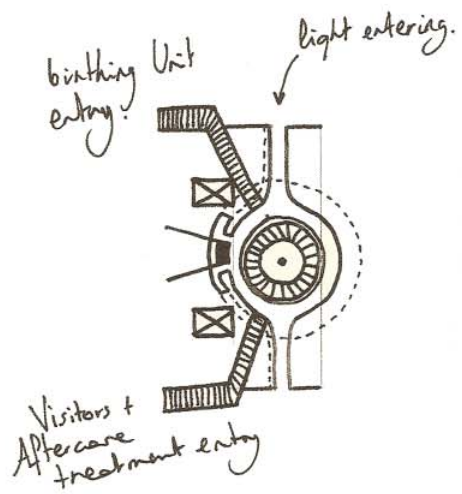
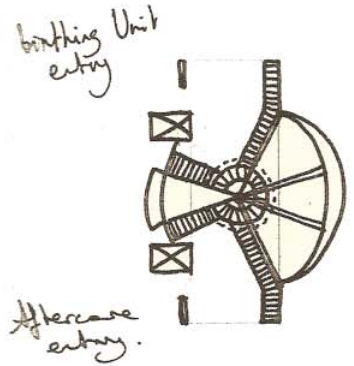
It is anticipated that by softening the interior and creating a harmonious environment for the occupant the overall experience will be enhanced.





## **BIRTHING CENTRE, DESIGN STAGE THREE**

Design three explores the possibilities of a 'futuristic' healthcare design. The Intervention is an extreme response upon the triggers outlined by the current evidence base design guideline for healthcare facilities. These triggers are Ergonomics, building layout, positive distractions, light. By designing the most extreme response to the triggers it is an excellent way to highlight important areas within the intervention.



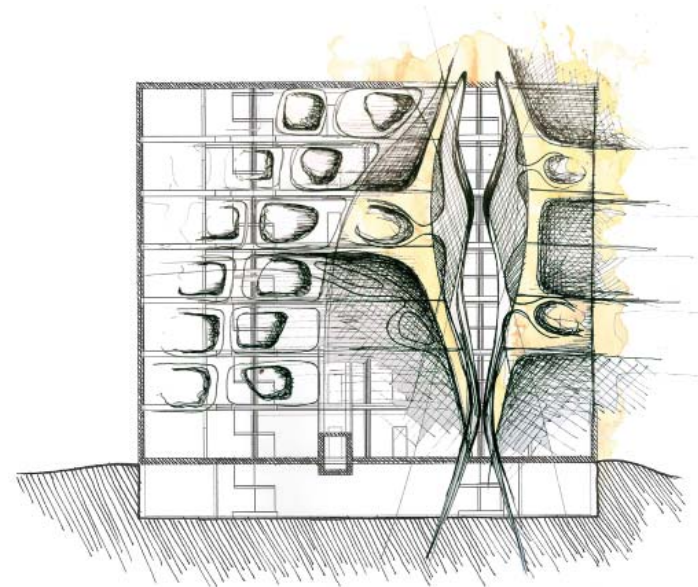
## Specification of layout.

The entry ramp from the previous design has been removed as this would cause too much stress for the women entering the birthing centre through such a narrow pathway. Instead the entry will be at ground level where it is convenient for the women to get out of the car and straight in to the facility.

The building layout is an important aspect of the design and the development of several circulation paths has been investigated as shown by the images on the left. The circulation paths all focus around the internal core which connects all levels together. The nursing stations are placed on either side of the core, with pathways on the west side connecting the levels.

The idea of the central core has been left intact as it works well within the vertical environment of the birthing centre. The space has several capsules in which the birthing will take place. These capsules house all the necessities for a comprehensive birthing unit. The capsules are being held by a big arm which houses the support services. The large windows in the birthing capsules offer a wide view as the capsules protrude out of the main structure of the original site. This allows for 180 degree views of the wellington landscape. The single birthing rooms have shorter length-of-stays, fewer medication errors, lower costs, higher occupancy rates, increased privacy and control, less noise, fewer sleep disturbances, and higher patient satisfaction. Each birthing room is divided by a sound proofed wall offering double the noise restriction. It is important that a woman in labour feels comfortable and can not be overheard or hear other patients in labour as this would add stress.

The spaces have been represented without the shell or structure to clearly understand the interior dynamic behind the interior intervention. The interior intervention has a powerful presence, this could be intimidating for the birthing mother. By creating several more straight lines the woman will be able to relate to the space more easily. The challenge will be to create a space which has the function and style of the intervention while familiarising the spaces occupied by the labouring woman.





Patients and staff in healthcare settings benefit from improved ergonomic designs of furniture and equipment. Among patients, injuries such as falls decrease in environments that are designed from an ergonomically conscientious perspective. Patient comfort during medical procedures and hospital stays is improved with thoughtfully designed furnishings. Improved ergonomic designs of patient beds, assisting equipment, and workstations reduce stress and injuries among staff.

Image One shows the view from the Lobby as you enter in to the birthing centre. The space has been ergonomically designed to entice people in to the space. The internal circulation core protrudes through the ceiling, gesturing of the life happening above. By having the core visible on each level it offers a sense of support to the occupant and creates an excellent wayfinding system. The core could be in a translucent material with lights guiding the visitors around the space. The core can act as the 'beacon of light'.

Image Two is the view from the common area looking towards the central core with the birthing rooms displayed in the background. The capsules resemble small dwellings in which birth may occur. These capsules portray a 'futuristic' look which could be daunting to the labouring woman. The idea of individual capsules works well within the health care facility as they offer an individual dwelling for the woman with maximum noise restrictions. The form of the capsules will have to be evaluated to become a more inviting space for the woman to give birth in.

Image One.

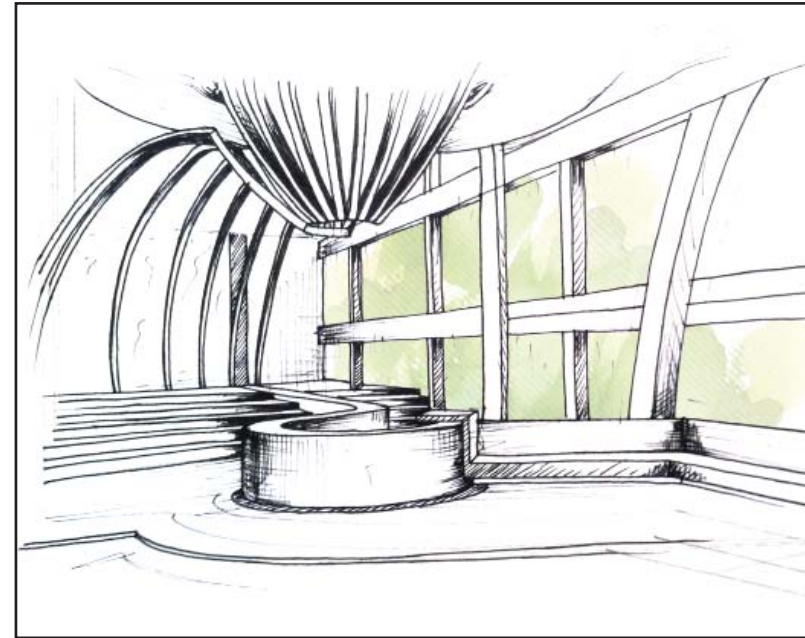
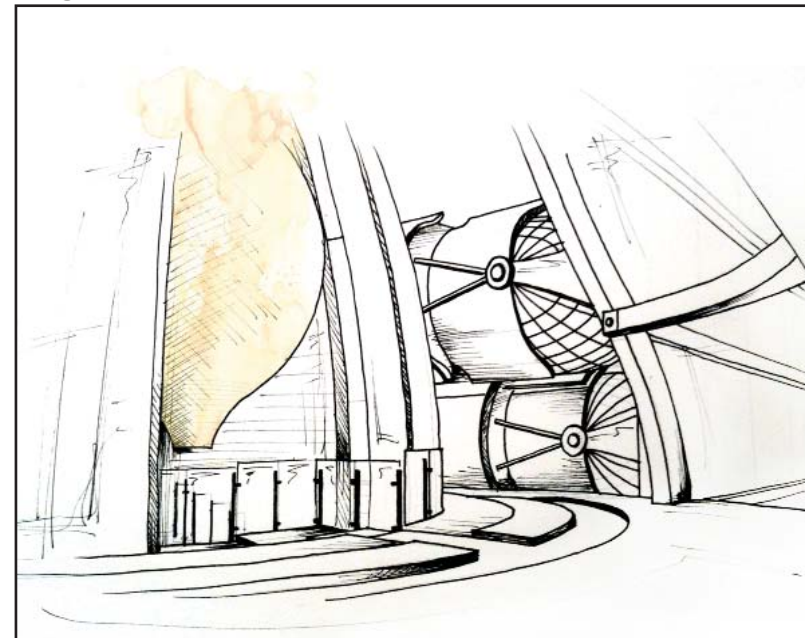


Image Two.







## **BIRTHING CENTRE, DESIGN STAGE FOUR**

Birthing design four focuses on retaining the layout established in design three while further developing the forms. The layout of the internal circulation core surrounded by birthing capsules which are being held by a big arm is an excellent building layout for a health facility. Design three will focus on retaining this layout while investigating different forms for the overall intervention.



The sketch displayed on the right represents the working process from an idea to a functioning concept design for a birthing centre.

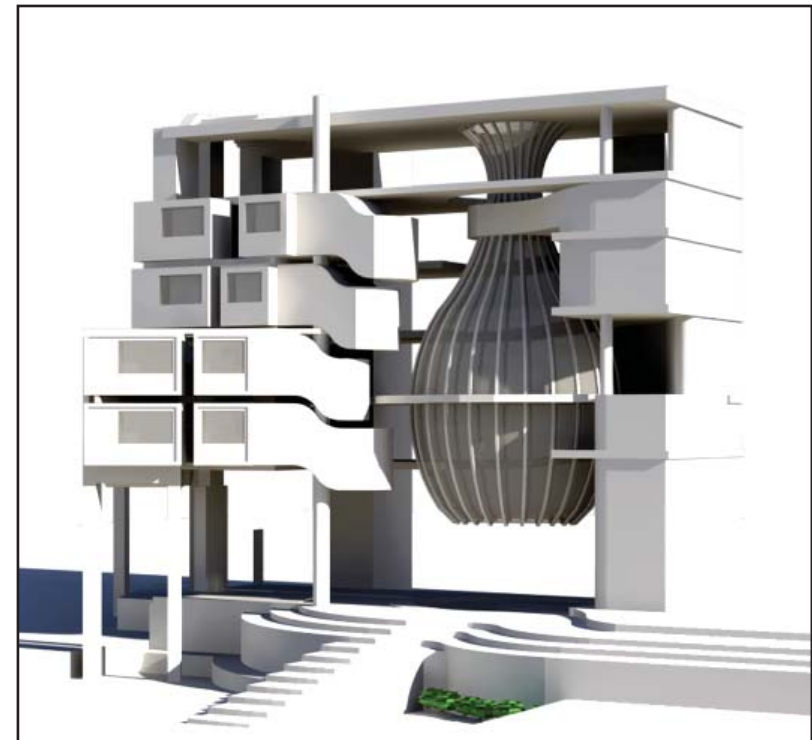
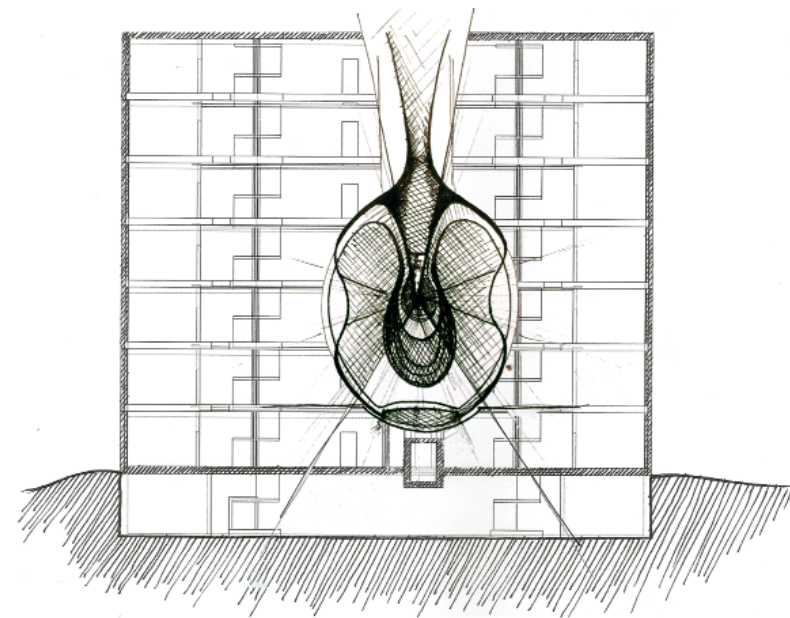
The layout of the internal circulation core surrounded by birthing capsules which are being held by a big arm is an excellent building layout for a health facility. The type of building layout used is the incorporation of centralised workstations. The support systems are hugging the building literally offering support for the birthing mothers.

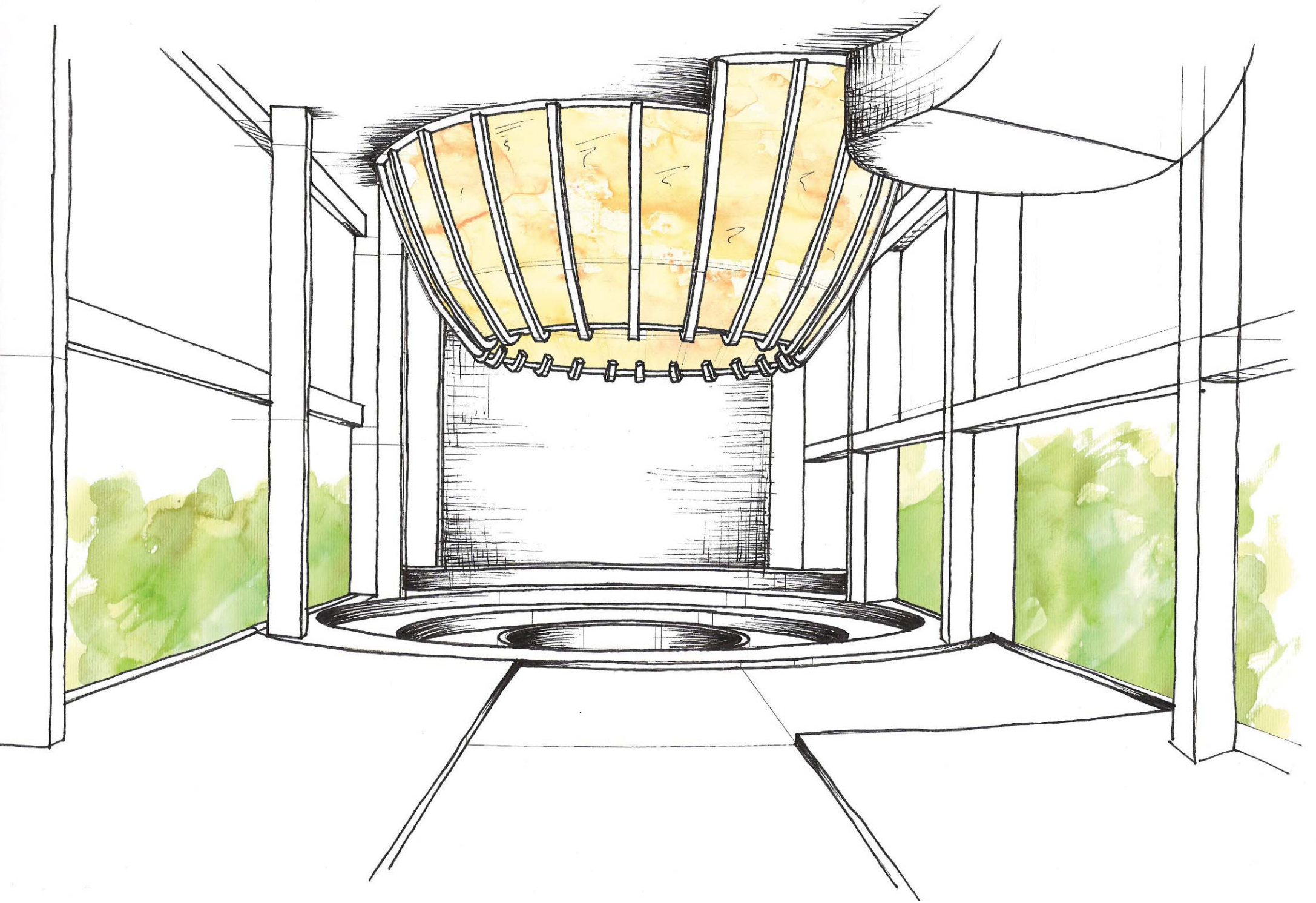
Workstations that are close to patients result in fewer errors, decrease nurses' travel time and distances covered during the day, increase nurses' time spent caring for patients and families, and improve job satisfaction.

The birthing capsules from design three have been abstracted to a more linear interpretation. The birthing rooms turn around the inner core and break out of the external shell. This creates a sense of movement and highlights the strength of the internal circulation core. The linear design of the birthing rooms in contrast with the fluid form of the circulation core creates an interesting relationship between the two different functions.

The relationship between the domestic and the communal could be integrated more smoothly in the next design development by creating floor levels and pathways which connect the two areas to each other in a functional matter.

The integration of the exterior and interior is very successful within the current design. The occupant is able to walk straight out in to the garden from the entrance lobby. The expecting mother needs to be able to transfer emotionally from being outside to being in an enclosed space. Indoor landscaping and plenty of windows are an excellent way to create a smooth transition. Windows are apparent in the design but the use of indoor landscape is yet to be investigated. This will be addressed in Design Five

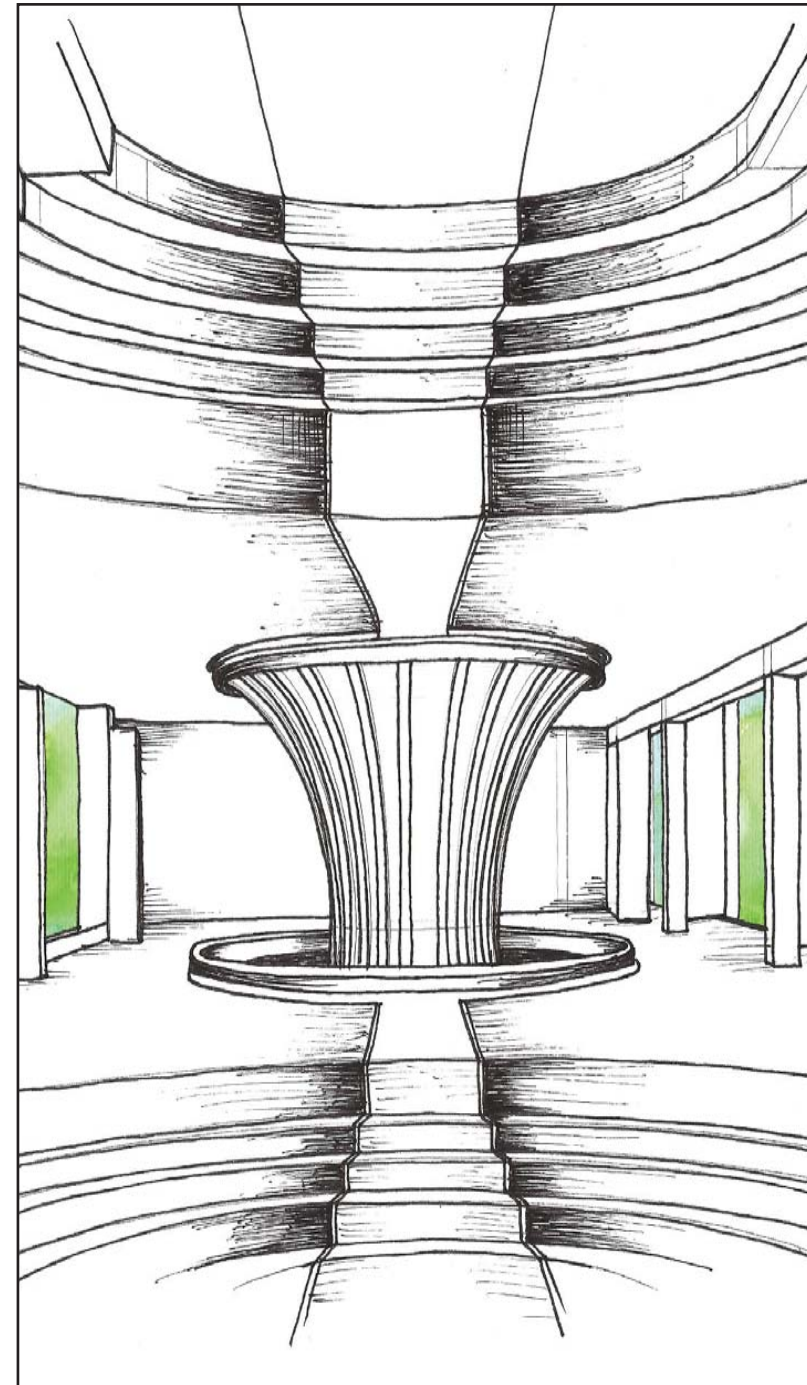




The image portrayed on the left is the interior view of the communal gather space located within the entry hall. The public arrival area should be a transition space. Indoor landscaping and plenty of windows are an excellent way to create a smooth transition. As discussed previously the importance of plenty of windows to the outdoors is addressed well within the design. The large windows also allow plenty of light to stream in to the entry hall, which as discussed in the current evidence based design guidelines for health facilities is an important aspect for success.

Light affects mood and stimulates people physiologically as well as psychologically. Light can improve patient outcomes. For staff, ensuring that appropriate, non-glare light levels are brought to the tasks at hand can improve staff accuracy and effectiveness.

The interior view shown on the right is a representation of the communal gathering area. The circulation core ends in this area and a glimpse of this core is visible within the communal area located on the top floor of the birthing centre. The furniture in the communal area is designed to promote social interaction between the visitors and occupants of the birthing centre.

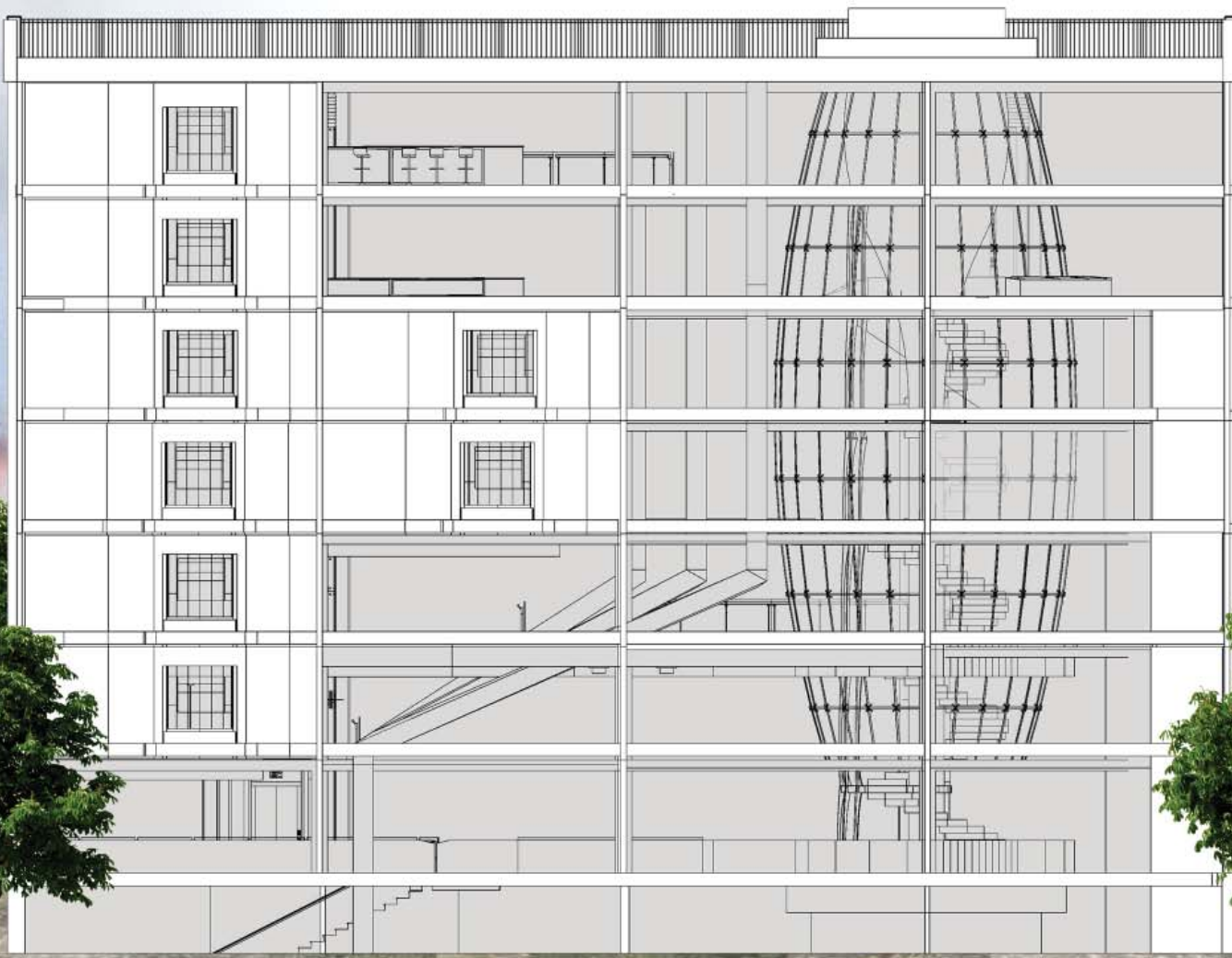




## **BIRTHING CENTRE, DESIGN STAGE FIVE**

Design five aims to incorporate the lack of indoor plantscaping identified in Design Four. Design stage Five is the most resolved design and will be the stepping stone for the final design. The design will incorporate all of the Evidence Based Design aspects needed for a successful healthcare facility. These aspects as discussed in previous designs are Wayfinding, Ergonomics, Building Layout, Furniture Arrangement, Access to Nature, Light, Colour, Windows and Internal Landscaping.

23140



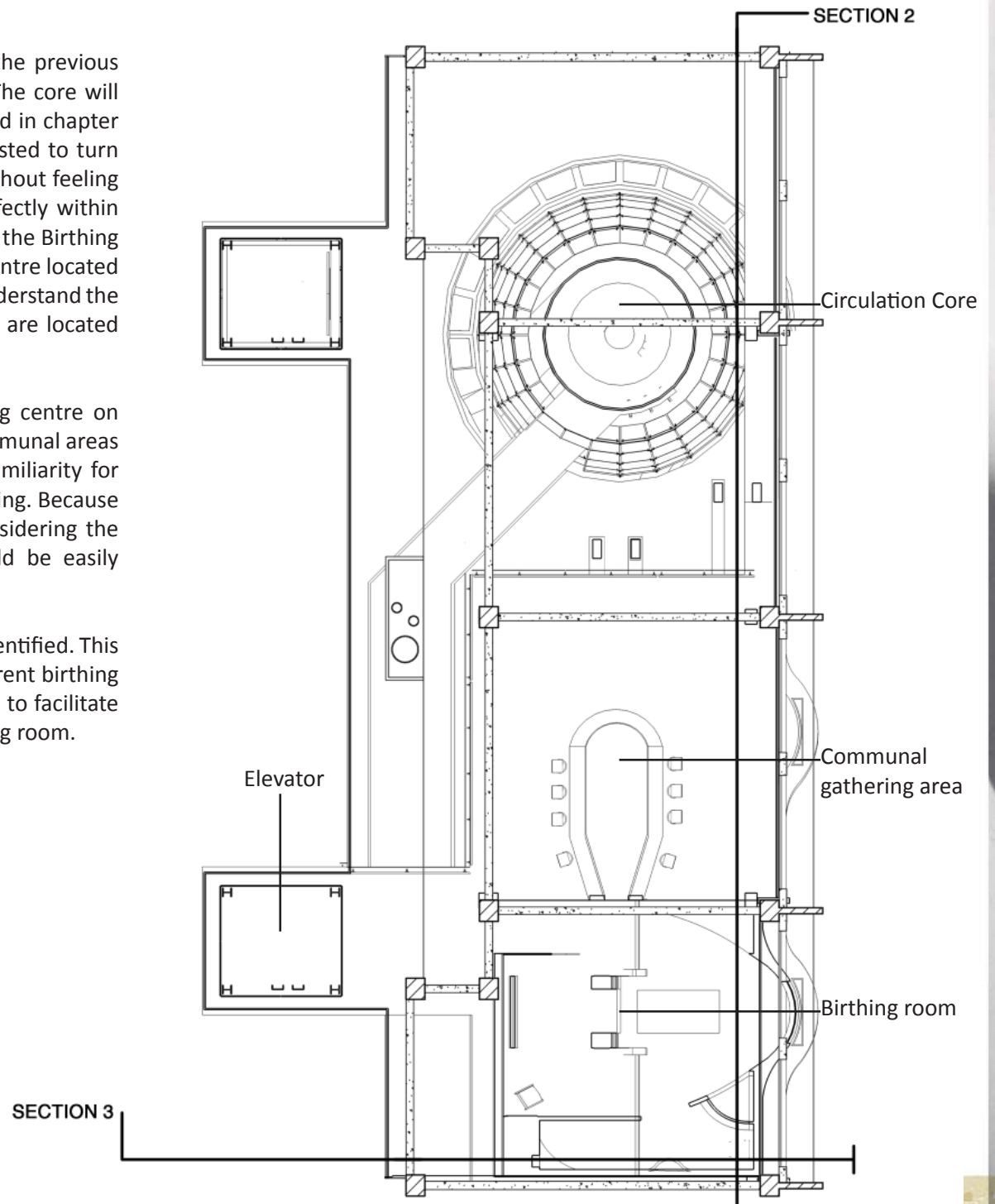
BUILDING ELEVATION WEST  
SCALE 1:200



The main circulation core has been elongated from the previous design to become a more streamlined intervention. The core will be made out of architectural glass which is investigated in chapter Two 'Sustainable Materials'. The glass will be sandblasted to turn the glass opaque which offers a sense of enclosure without feeling anxious within the circulation core. The core fits perfectly within the existing structure. The connection of the core with the Birthing rooms can be seen in the plan of the overall birthing centre located on the right. A series of sections have been drawn to understand the layout of the birthing centre correctly. These sections are located on the next page.

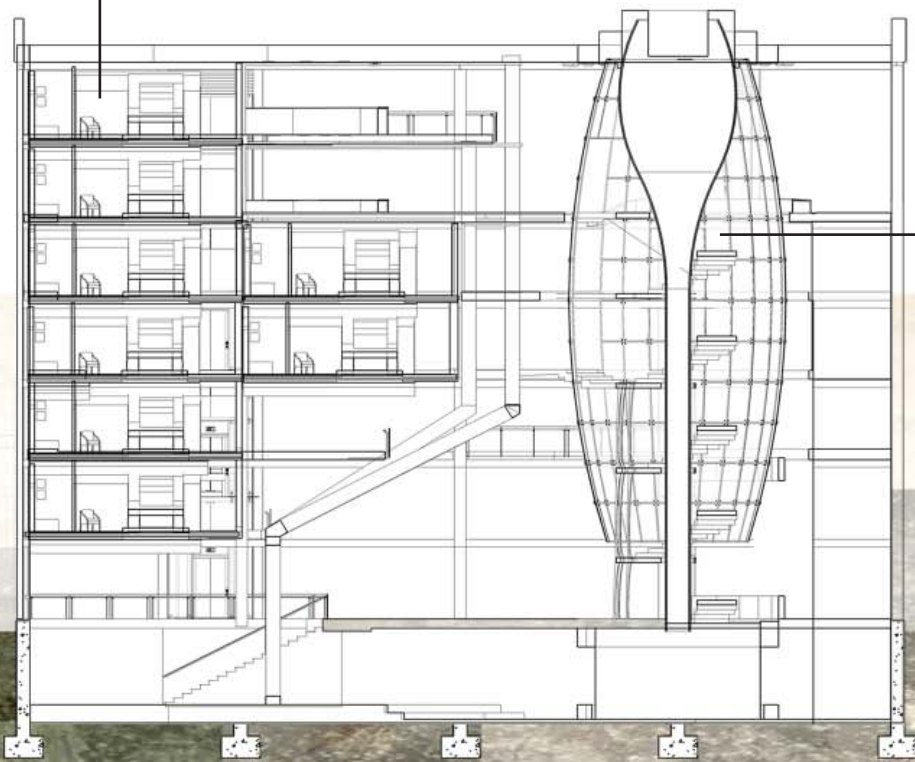
The core is an excellent way to circulate the birthing centre on foot. It has become the main attraction within the communal areas and is visible from every level. It offers a sense of familiarity for the occupant and helps the visitors assist with wayfinding. Because of the function of the building, a birthing centre considering the prevention of post-natal depression, all areas should be easily distinguished to visitors and patients.

The entrance to the maternity room should be easily identified. This can happen through wayfinding. The design of the current birthing centre follows all these criteria. Glazed doors are used to facilitate easy access from outside to the entrance of the birthing room.



PLAN Level seven  
SCALE 1:200

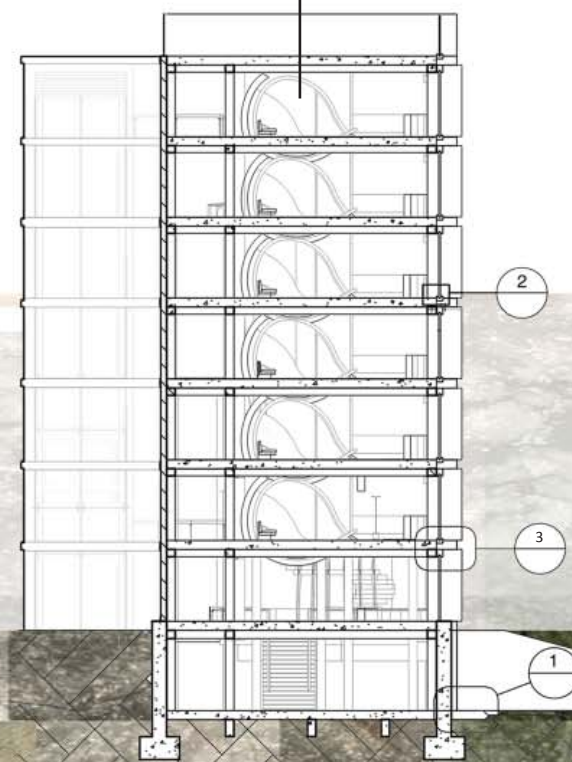
Birthing room



Circulation core

SECTION 2  
SCALE 1:300

Birthing room

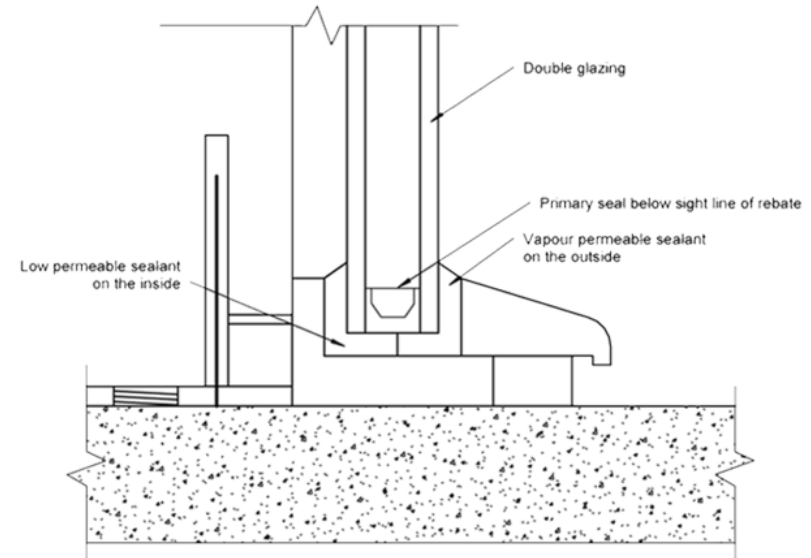


SECTION 3  
SCALE 1:300

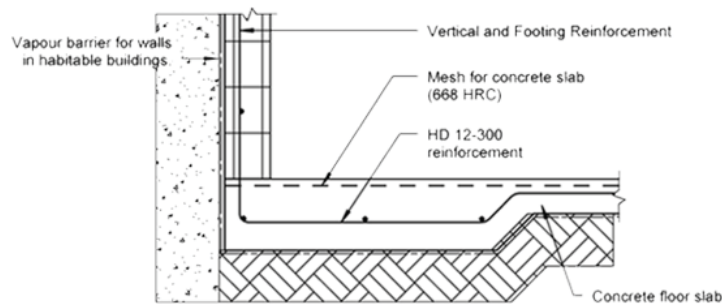
The sections and details provide a clear understanding of the overall design. Section two allows a glimpse in to the central circulation core. This shows the manner in which the inside form changes shape on the top floor indicating the end of the journey upwards for the occupants.

Section three shows the positioning of the birthing rooms on top of each other. The design of the birthing rooms will be discussed in section two of this chapter 'Design of the Birthing Room'.

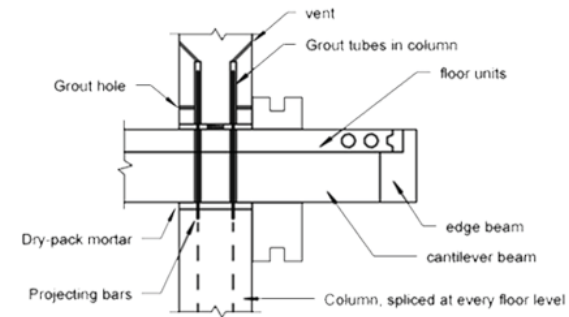
The details show the construction of certain aspects of the building. The basic structures of the floor slab, window and beam located within the facility herewith show that conventional construction will be used in this design.



2 Aluminium double glazed window frame  
1:5



1 Section through footing with integral floor slab  
1:20



3 Continuous beam with discontinuous columns  
1:20



The core as shown in section 2 on page 114 clearly shows the changing of form that happens within the circulation core. This matter will be used for the growth of indoor plantscaping. Addressed in Design four is the need for interiors plantscaping as a tool wayfinding. Interior plantscaping is also an excellent trigger for the relief of stress within an environment. These indoor gardens are defined as places to “achieve a degree of relief from physical symptoms or awareness of those symptoms” and places to “facilitate an improvement in the overall sense of well-being and hopefulness that an individual is experiencing and thereby assisting physical improvement” (Smith, 1).

Research has repeatedly demonstrated the emotional and physiological benefits of visual and physical access to nature and the relationship between access to nature and reduced stress. Patients viewing nature recover faster, have less stress, anxiety and pain, and require less pain medication. Gardens located in healthcare settings offer patients, visitors, and staff the opportunity for direct interaction with the restorative, calming effects of nature. Natural elements such as trees, flowers, and water—the presence of which improve mood and relieve stress. “The basic principles of harmony, balance, and the spirit of nature are becoming widely accepted and sought after in experimental spaces to create atmospheres that are more lively and life-giving, experimental architecture includes ecosystems growing on indoor walls.” (Beckwith, 2) These experimental structures are composed of rocks, plants and microorganisms that inhale dirty air and exhale clean air.

This access to nature is used within the interior plantscaping and also by the act of viewing nature. The view to nature is strongly supported by the design of very large glazed windows throughout the building. It is suggested here as well that the health centre employees will benefit and experience less stress and better health.





The Large windows do not only allow access to the outdoors but also allows natural light to stream in to the birthing centre. The positive qualities of natural light within a healthcare facility is highlighted in chapter 2 'Light'. Research has confirmed that lighting has a direct impact on peoples health. With appropriate lighting, patients will feel safer and more satisfied with their environment and according to research will recover faster.

Colour is an important aspect introduced in Design Five which has not been addressed thoroughly in any of the previous designs stages. The introduction of natural shades of yellow balance out the white glass of the core and work well with the interior landscaping. The use of blue tinted glass will reignite the sky in the background. A more thorough application of colour will have to be applied for the final design. The application of colour is most important in the design of the birthing room. This will be fully investigated in the next section of this chapter, Birthing room design.

In public areas, appropriate types of furniture arrangements can promote social interaction. (Ulrich, 4) Arrangements that promote social interaction in waiting areas include comfortable, supportive furniture positioned in small, flexible groupings.

The images shown on the next page portray the view of what the unit would look like during day and night. The image that portrays the night time shows the actual view users would see when driving up to the birthing centre. As most births occur at night, it is important to have a welcoming image. The internal core can be seen clearly as it lights up and welcomes the woman to the facility. The idea here is to create a warm glow that indicates the comfort and safety of the birthing centre.











## **SUMMARY BIRTHING CENTRE DESIGN STAGES**

Chapter Four represents the design process followed to get to the final design of the birthing centre. The Final design will be displayed in Chapter Five. The following aspects have been discussed in previous designs;

- Wayfinding,
- Ergonomics,
- Building Layout,
- Furniture Arrangement,
- Access to Nature,
- Light,
- Colour,
- Windows
- Internal Landscaping.

A clear building layout has been established with the internal circulation core as the base of the design with the birthing rooms and nurses stations working off this intervention.

Access to nature is established successfully through viewing with the enjoyment of the large windows throughout the whole east and west side of the building. These windows also allow natural light to stream in to the building which has a positive effect on the occupants.

In the next section 'Birthing Room design' the following aspects will be addressed;

- |                        |                                |
|------------------------|--------------------------------|
| -Light,                | -Ensuite/bathroom              |
| -Colour,               | -Managing the birthing bed.    |
| -Texture,              | -Material support for birthing |
| -Aroma,                | -Access to nature.             |
| -Sounds,               | -Positive distractions         |
| -Surface materials     | -Technical support.            |
| -Control               | -Oxytocin encouragement        |
| -Single patient rooms. | -Furniture arrangements        |
| -Noise.                | -Air quality.                  |
| -Birthing pool         | -Flooring materials            |



## **BIRTHING ROOM DESIGN**

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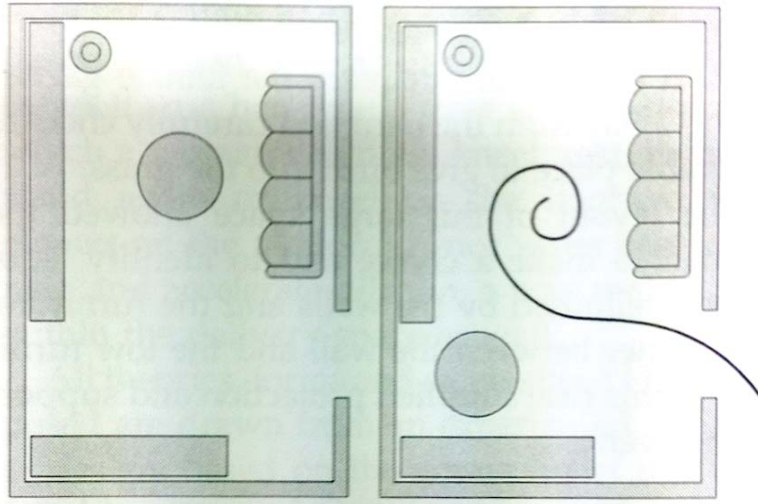
In this section firstly the work of Bianca Lepori will be considered as a recognised leading architect in the design of birthing spaces.

Secondly the layout of current health facilities will be considered and an outcome will be established that can be used in the final design of the Birthing Room.

Finally a selection of design will be explored taking into consideration the following aspects;

- Light,
- Colour,
- Texture,
- Aroma,
- Sounds,
- Surface materials
- Control
- Single patient rooms.
- Noise.
- Birthing pool
- Ensuite/bathroom
- Managing the birthing bed.
- Material support for birthing
- Access to nature.
- Positive distractions
- Technical support.
- Oxytocin encouragement
- Furniture arrangements
- Air quality.
- Flooring materials

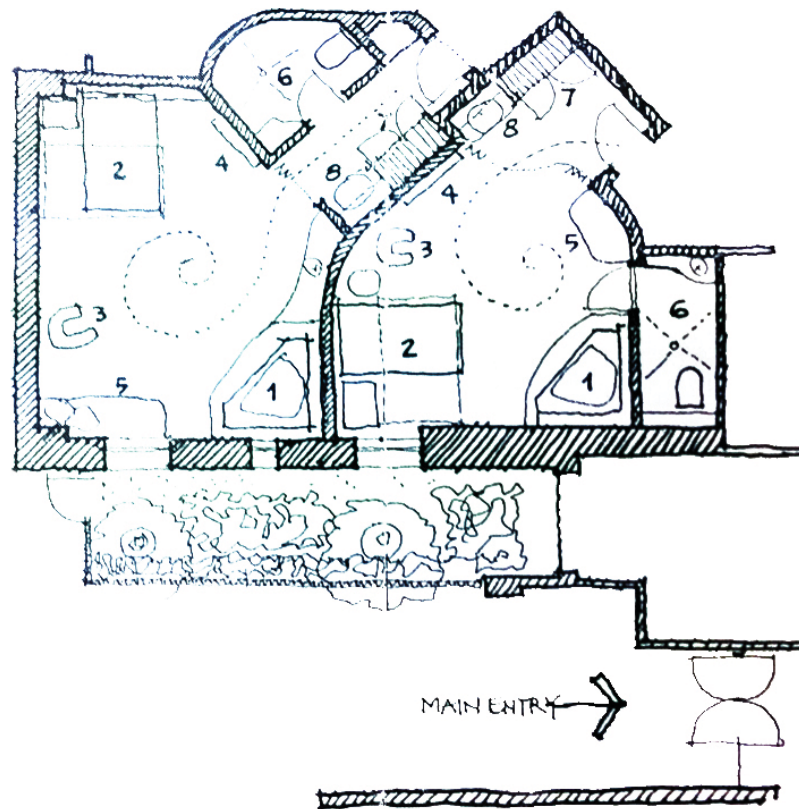
## Bianca Lepori's Birthing Room Design.



“In order to establish the perfect birth place it is important to analyse how women give birth in their own territory, at home. Home, the symbolic place which reproduces in each of us the feeling of the pre- natal period when our entire psychological system was protected by a soft and round inside, as the original womb.”

“The symbol of the spiral, which represents the progressive intensification of the delivery process until it ends in the “birth point”, replaces the arrow/path expression of efficiency. The natural spiral path is leading towards the centre of a women’s concentration and ability to listen, thus towards her own control and choice.”

“Women need a space in which to express themselves, it becomes clear what “domestic” means, in relation to birth environments, for the child bearing women. It means freedom of movement, the possibility to choose and control comfort and ease, the possibility of relying on fittings that support bodily needs. It means having the power to choose no matter what she chooses.”



The following aspects discussed by Lepori will be considered in the final design of the birthing room:

- Domestication of birthing room
- The progressive intensification of the delivery process
- Freedom of movement
- Ability to choose
- Control

The Images and text obtained are from the book “Birth Territory and midwifery guardianship, theory for Practice, education and research.” By Kathleen Fahy

## Tile Cottonwood Centre for Women 's Health, First birthing centre.

“This new facility rejected the notion of the patient as a passive participant in the birth process carried out in a coldly clinical environment. Instead it emphasized the notion of mum, baby and the family, and created an atmosphere to reflect birth as a joyous and shared event. This pioneering Utah facility quickly gained national attention and became a prototype for birthing centres in the US.”

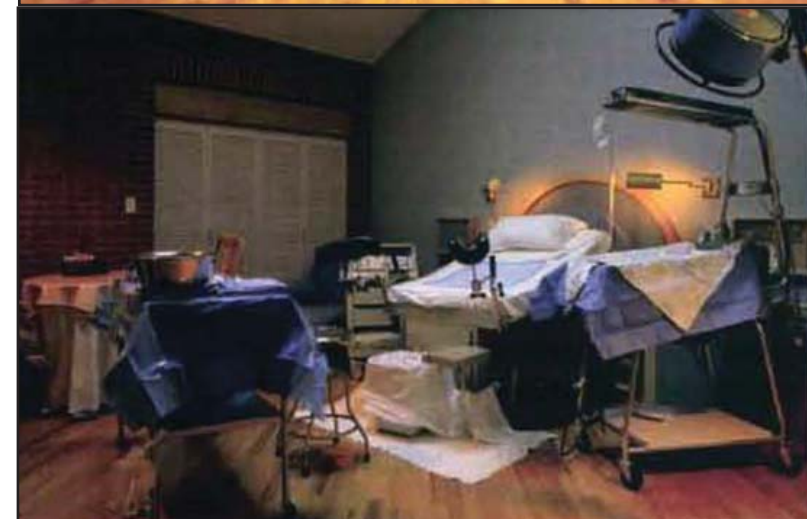
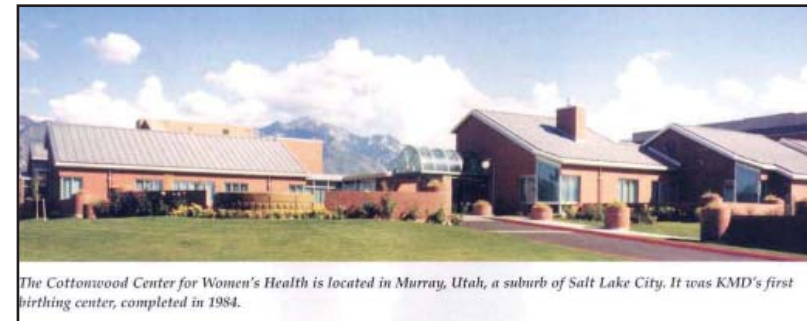
“The challenge hospitals originally faced was to create an environment that welcomed delivering mothers and their families with the comforts of home, but without compromising the safety of a hospital.”

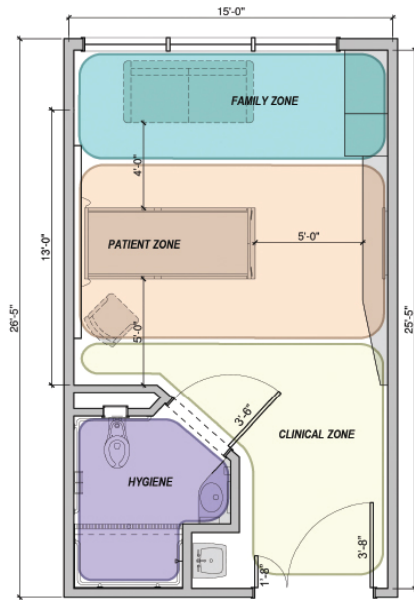
“Modelled after a home, the Centre featured residential detailing such as bay windows, cathedral ceilings, hardwood floors and exposed brick. On the surface, the rooms with their plush furnishings appeared like a well-appointed hotel. But beneath the surface lay a medical technology at ready access. Underneath the queen size quilts sat birthing beds that break apart for delivery. A decorative wall covering by the side of the bed hid a complete life support system. In a few moments the hotel-like ambiance converted into one providing the necessary environment for a medical intervention.”

The following aspects discussed will be considered in the final design of the birthing room:

- Add domestic features to the birthing centre and birthing room
- Transforming bed, from domestic to surgery bed
- Hide technical equipment

The Images obtained are from the magazine “Healthcare Building Ideas, show issue 04/05 2007”.





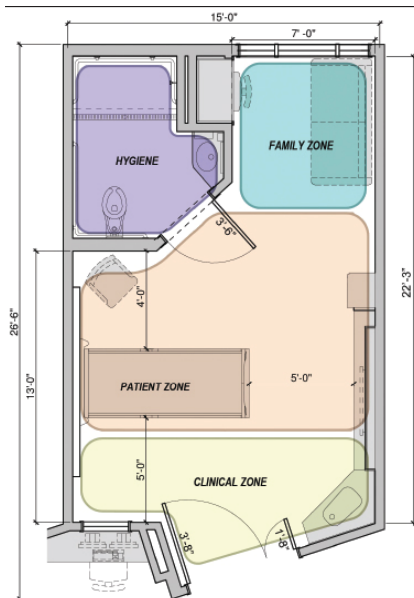
ROOM : 308 sf  
 TOILET : 50 sf  
 TOTAL : 358 sf

- No or minimal visibility of the patient from the hallway;
- Caregiver zone next to the head of the bed is compromised;
- To upgrade a room to ICU level of care, the family zone is compromised;
- Non-usable space exists at the entry to the room;
- Lost opportunity for a patient server; and
- Opportunity for larger windows

## OBSERVATIONS OF TOILET ROOM LOCATIONS IN ACUITY-ADAPTABLE PATIENT ROOMS

### WHAT MAY BE RETAINED FOR DESIGN DEVELOPMENT:

- Minimal visibility of the patient from the Hallway.
- Caregiver zone next to bed is appropriate
- Large windows



ROOM : 280 sf  
 TOILET : 50 sf  
 TOTAL : 330 sf

- Equipment, family, and bassinet may limit access to the bathroom;
- Family zone is more distant from the patient;
- Caregivers have immediate access to the patient upon entry to the room; and
- Opportunity exists for decentralized workstation and server on the corridor wall.

### WHAT MAY BE RETAINED FOR DESIGN DEVELOPMENT:

- Family zone in direct contact with patient
- Easy access to the bathroom
- Easy access for caregivers upon entry of the birthing room.



WHAT MAY BE RETAINED FOR DESIGN DEVELOPMENT:

- Caregivers have immediate access to the patient upon entry of the birthing room
- Easy access to the bathroom
- Distinct zones for patient and family

Creates family space near the patient head of bed;

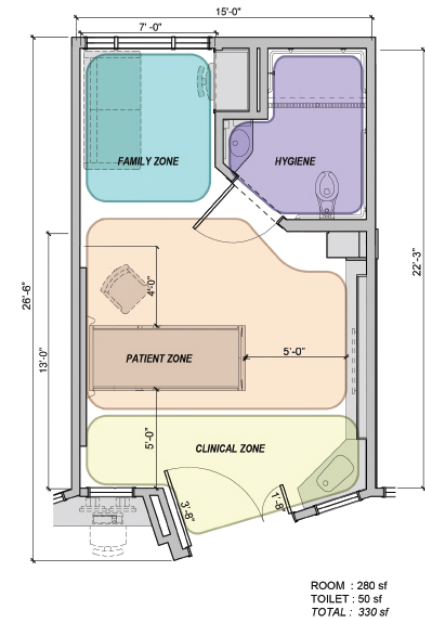
Caregivers have immediate access to the patient upon entry to the room;

Opportunity for decentralized workstations;

Distinct zones for caregiver, patient, and family;

Provides an opportunity for a server on the corridor wall; and

Caregiver, patient, and family have equal access to the bathroom.



WHAT MAY BE RETAINED FOR DESIGN DEVELOPMENT:

- Large windows
- Sufficient space at entry of birthing room
- Room size is larger than normal hospital room
- Family zone is important

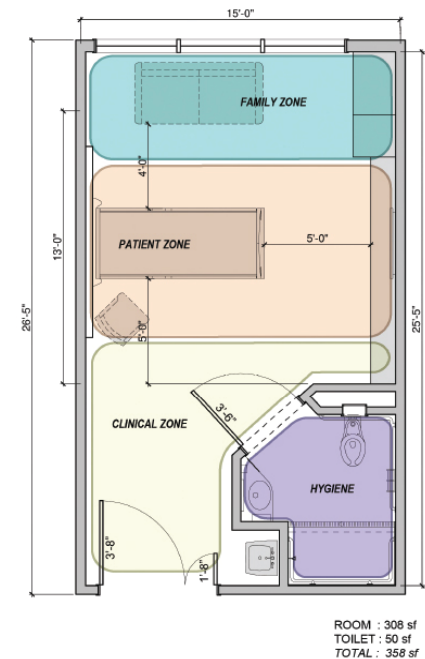
Inefficient space at entry to the room;

Opportunity for larger windows;

Limited opportunity for visibility of the patient unless room door is open;

Room size is larger to achieve 13-foot headwall for ICU level of care; and

Family zone is compromised.



## DIFFERENT BIRTHING ROOM DESIGNS

Bianca Lepori was convinced that a new mind-body spirit birth space that considered all the sensory modalities involved in the perception of stress or ease would have a positive impact on a women's perception of anxiety and therefore psychological processes and the progress of labour.

There is hardly any evidence of the women's experience in the birthing environment. There was an assumption that the environment is irrelevant to birth but one exception to this was a magazine and online survey of nearly 2000 women conducted by the National Child Birth Trust in the UK (Fahy). This survey discovered if women thought the physical environment had any impact on their birth experience. Nine out of ten women thought the physical surroundings affected how easy or hard it was to give birth. Women listed a range of attributes they thought were very important in the birth environment, but few women actually had access to these.

This table on the right highlights the points brought forward by the survey. The table contains a summary of the key concepts incorporated in the design of the birthing room.

The Images on the right are the first sketches of different possible birthing rooms. All the rooms have been analysed against the table of what an expecting mother wants in a birthing room.

Architect Bianca Lepori has established a list of factors that need to be considered in creating the optimal birth environments that respect the sacredness of birth.

- 1 Female space, cleanliness and order, calmness and peacefulness, culturally safe
- 2 Shapes, soft curves, rounded corners and edges to walls and furniture
- 3 Space, no direct line between bed and door, low wall for leaning on, pleasant walking way in and outside birthing room.
- 4 Elements of nature, windows on to outside world are essential, indoor landscaping.
- 5 Water, bath and shower available, bath should be part of birthing room, toilet and shower separate.
- 6 Texture, furniture, fabrics, artwork, natural materials such as timber, tiles
- 7 Privacy, lockable doors-ability to be able to control who enters the room, windows with one way glass.
- 8 Light, natural light through windows, windows low enough to see the view when lying in bed, dimmable lighting.
- 9 Colour, careful use of colours on walls and furniture.
- 10 Support, furniture: birth stool, bean bag, gym mat, exercise ball, chairs, bed or platform, mantle piece or bench for leaning on, comfortable chair for breast feeding
- 11 Noise control, sound reducing acoustics, other women in labour unable to be heard.
- 12 Thermal comfort, adjustable to enable woman to be naked, comfortable temperature.
- 13 Air quality, fresh air through opening windows
- 14 Accommodation for companion, comfortable place to sit, access to cafeteria
- 15 Food and drink, available for the woman and the family, small kitchenette area with microwave, toaster, hot water, refrigerator.
- 16 Safety, telephone in the room, equipment for the resuscitation of mother or baby (must be hidden)

(The above outcome of the survey was published in the book 'Birth territory and midwifery guardianship, theory for Practice, education and research' by Kathleen Fahy.)

FIGURE 1.

Figure 1 does not work extremely well as the most obvious problem is the location of the bed in relation to the door. There is no sense of privacy or control.

There is also a lack of storage space which allows for a clean and orderly room which is important for a calm state of mind in the labouring woman.

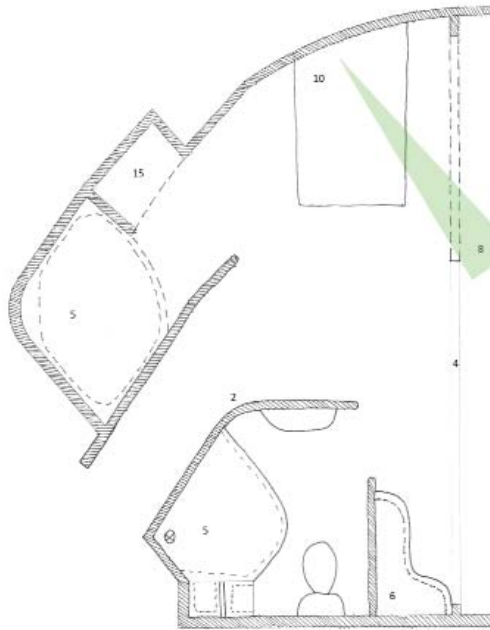


FIGURE 2.

Figure 2 is an excellent layout in terms of the location of the bed and the perimeter of all the functions around the room.

The overall footprint is random and could cause for problems when inserted within the straight and narrow footprint of the current building.

There is a lot of unusable space which could be avoided by straightening up the overall layout.

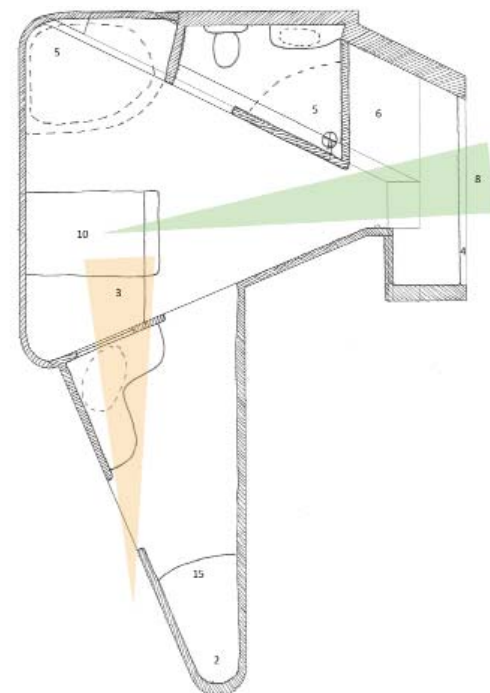


FIGURE 3.

Figure 3 has taken on the ideas of the design in figure 2 but has conformed to a more realisable layout plan. The relationship with the birthing bed and the door is excellent as you can not visibly see the woman on entry when she is lying on the bed. The location of the bath in relation to the bathroom is too far which would cause an inconvenience when the plumbing is installed.

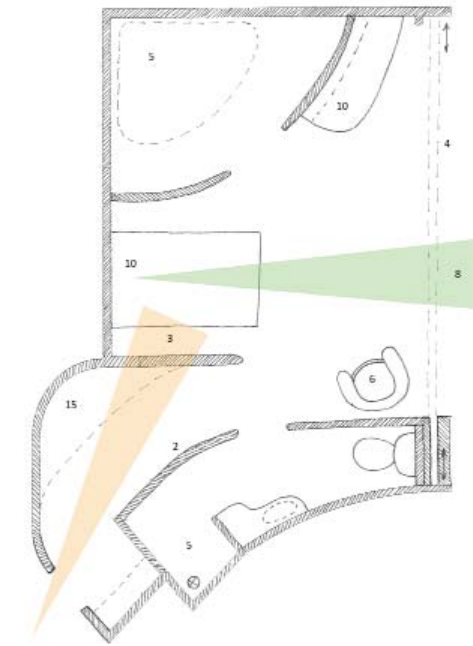
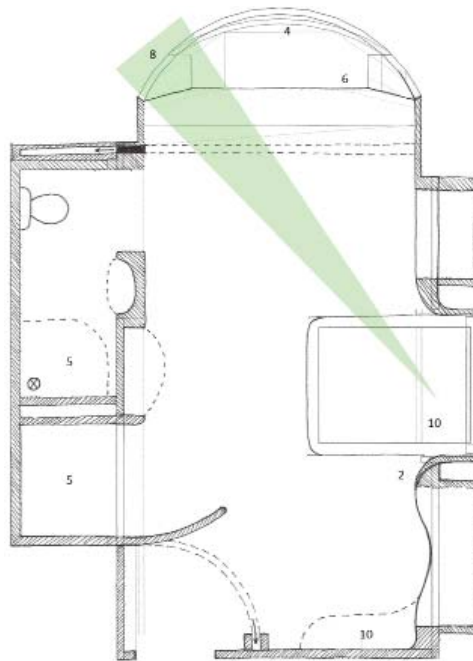
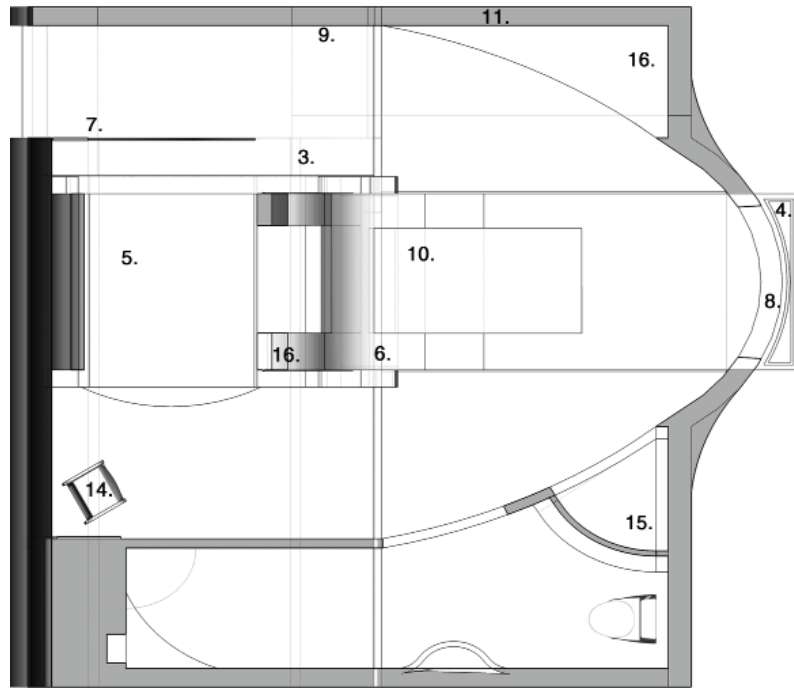


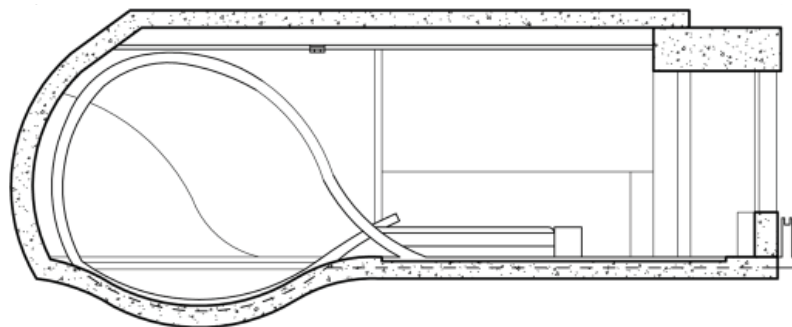
FIGURE 4.

Figure 4 is a great functioning layout. The relationship between the bed and the door is direct but this can be easily solved by a screen which the woman can choose to pull closed when she wants privacy. This gives her a sense of control which is important in the birthing environment. The relationship between the bed and the window should be considered more closely in the design process.





Diagrammatic plan, by author



Diagrammatic section, by author

## Attribution of survey factors into the thesis design

- 1 Female space, cleanliness and order, calmness and peacefulness, culturally safe
- 2 Shapes, soft curves, rounded corners and edges to walls and furniture
- 3 Space, no direct line between bed and door, low wall for leaning on, pleasant walking way in and outside birthing room.
- 4 Elements of nature, windows on to outside world are essential, indoor landscaping.
- 5 Water, bath and shower available, bath should be part of birthing room, toilet and shower separate.
- 6 Texture, furniture, fabrics, artwork, natural materials such as timber, tiles
- 7 Privacy, lockable doors-ability to be able to control who enters the room, windows with one way glass.
- 8 Light, natural light through windows, windows low enough to see the view when lying in bed, dimmable lighting.
- 9 Colour, careful use of colours on walls and furniture.
- 10 Support, furniture: birth stool, bean bag, gym mat, exercise ball, chairs, bed or platform, mantle piece or bench for leaning on, comfortable chair for breast feeding
- 11 Noise control, sound reducing acoustics, other women in labour unable to be heard.
- 12 Thermal comfort, adjustable to enable woman to be naked, comfortable temperature.
- 13 Air quality, fresh air through opening windows
- 14 Accommodation for companion, comfortable place to sit, access to cafeteria
- 15 Food and drink, available for the woman and the family, small kitchenette area with microwave, toaster, hot water, refrigerator.
- 16 Safety, telephone in the room, equipment for the resuscitation of mother or baby (must be hidden)

(The above outcome of the survey was published in the book 'Birth territory and midwifery guardianship, theory for Practice, education and research' by Kathleen Fahy.)

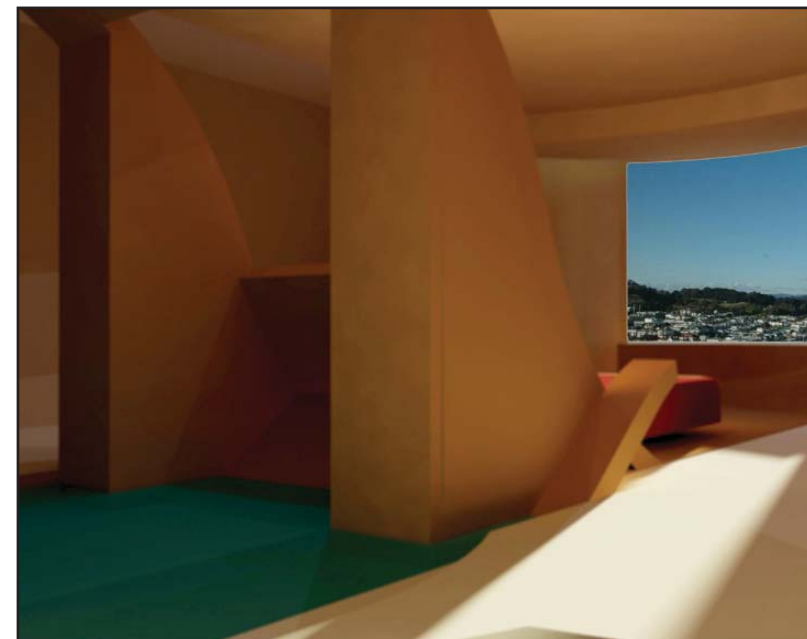
The aim of the birthing room is to create a healthy environment by taking a holistic approach of healing through appropriate balance of light, colour and space.

The first developed design for the birthing room is the creation of a single patient room. Single rooms have shorter length-of-stays, fewer medication errors, lower costs, higher occupancy rates, increased privacy and control, less noise, fewer sleep disturbances, and higher patient satisfaction. The form of the room is linear manipulated by curved walls. These curved walls create the focus of viewing the exterior from every corner in the room. The Bed has been positioned to face the window directly. This is done to encourage the occupier to enjoy the view of the immediate neighbourhood and the city in parts. Natural light and view of nature, once again here utilised to facilitate physical and psychological wellbeing of the occupier.

This thesis' main focus is on the prevention of post-natal depression, the birthing room will be designed to possess emotional triggers to help diminish the possibility of developing depression.

1. The room needs to have a homely atmosphere. The bed will be designed to appear domestic, which is usually associated with a healthcare facility. The bed is low, it can be moved and it is possible to lean against the bed. The bed is a critical element in setting the expression and impression of the birthing room.

2. The birthing bath located directly behind the bed is in a close proximity to the woman when she is in labour. The bath is easily accessible for the woman close to the birthing bed. The woman can easily go from one to the other without many complications. The bath is designed so that only one side of the bath faces the room and is not able to be approached from all sides- thereby not placing the occupant on display.





3. The view from within the room can also be accessed when lying in the birthing bath. It is important to have a clear view of the outdoors from all areas in the room to insure the birthing mother in prenatal and postnatal condition has the psychological support of the outdoors.

4. The natural light streaming in from the windows has a positive healing effect. To avoid glare a sliding screen (recessed) in a pelmet can be controlled by the user.

To avoid too bright and intrusive artificial lighting when lying in bed, a set of design lights are located on each side of the bed and walls. The occupant is able to dim and control all lights, offering a sense of control over the environment.

5. Control is added by the long entrance into the room. The birthing woman should be able to control who comes in to the main part of the room where birth occurs.

There is currently no kitchen area in the birthing room which is an important aspect when creating the optimal birthing room, this will have to be addressed in the next design.









A place for mother and baby to bond is important within the birthing room environment. Comfortable chairs for the partner and visitors is catered for.



During labour women often feel more comfortable leaning on something while kneeling. The material surrounding the birthing bed should preferably be wood so that the texture and the appearance are domestic and have a natural feel. There should be plenty of options for the woman to give birth on.



“Tranquil spaces for healing are about freeing up the mind and spirit by making the surroundings seem less complex and demanding.”(Beckwith, 1) Materials and accessories are located within closed storage cabinets. The sense of order in space is created. This is one of the optimal elements in a birthing environment.



The need for medical gases and suction are fundamental to delivery, even in rooms for low-risk uncomplicated births. Oxygen, suction and nitrous oxide should be stored behind cupboards, conveniently at hand while visually discreet.

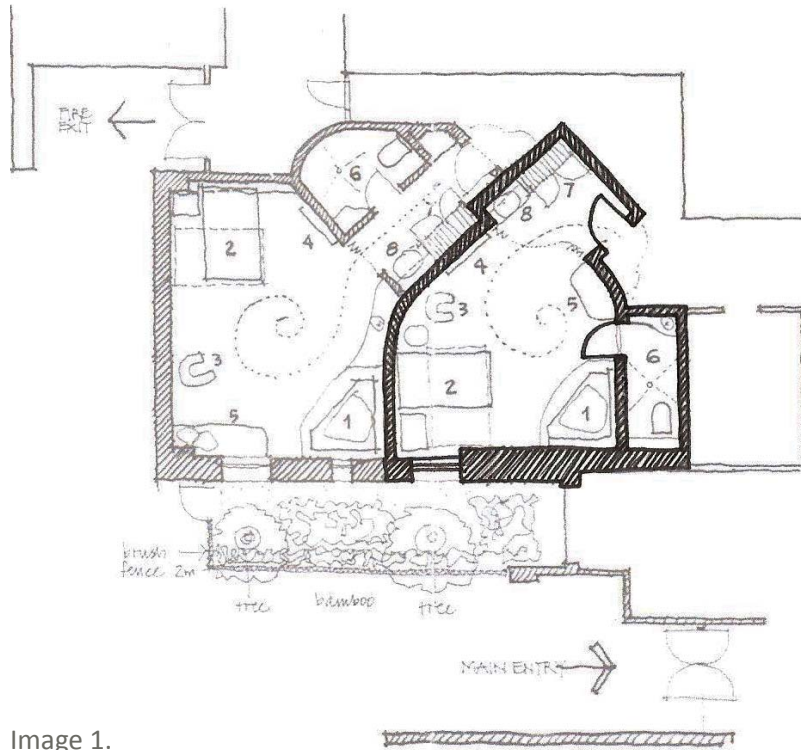


Image 1.

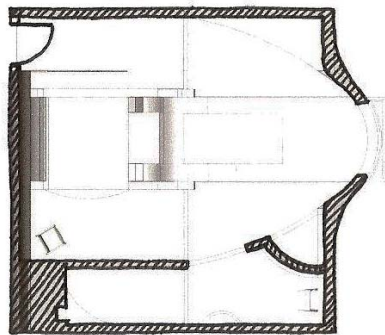


Image 2.

### Rationalisation Process.

Image 1. on the left is the Bianca Lepori's sketch of her ideal birthing room. The birthing room is about 28 sqm.

The current research design shown in image 2. is 42 sqm. The difference in area between the two models is too wide.

Therefore in the next design stage the room will be scaled down to rationalise the amount of space while still being functional and offering all the required elements for the prevention of post-natal depression.

As seen in image 4 on the right, The room is scaled down by about a third of its size. The layout is then manipulated to create a form which is most appropriate within the environment of a birthing centre.

The new room is 32 sqm. This is considered appropriate and closer to birthing room area.

The Plan and section on the far right of the page display the new plan and section of the proposed birthing room. This room is more linear and puts all the services such as kitchen and bathroom behind the birthing bed, out of view from the birthing woman. Her focus is on the outdoors which can be viewed clearly from both the bed and the bath.

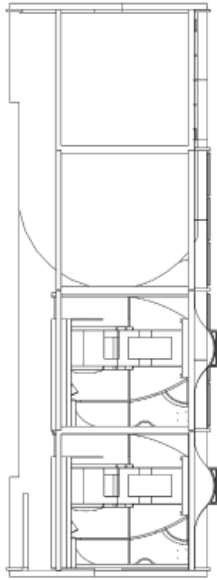


Image 3.

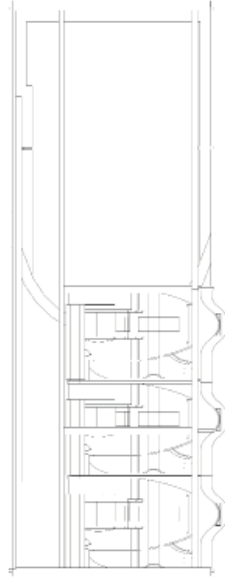


Image 4.

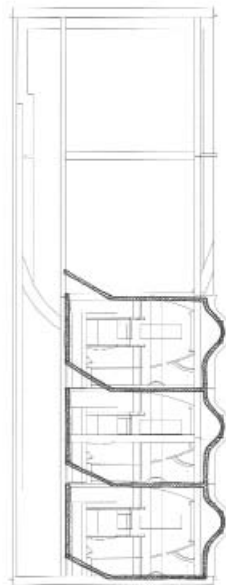
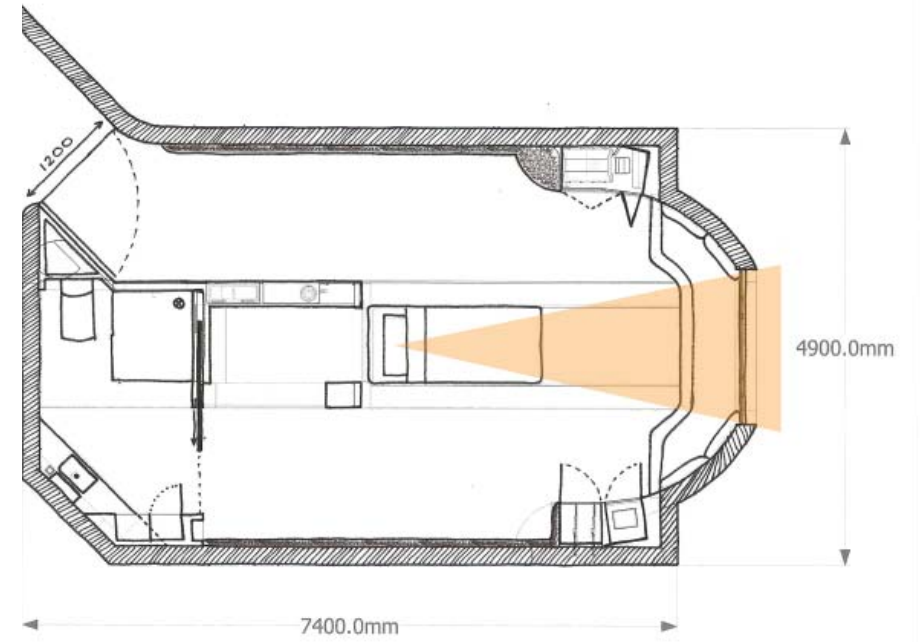


Image 5.

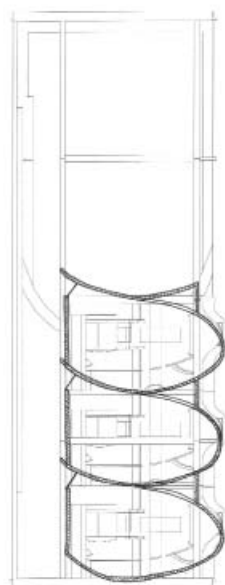


Image 6.

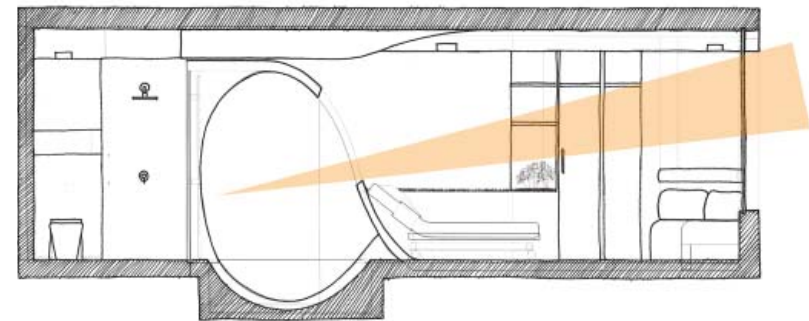




Image 1.



Image 2.

### The revised design.

Image 1. The material surrounding the birthing bed is wood so that the texture and the appearance are domestic and have a natural feel. The wooden fringes around the room which house the plantscaping is the perfect height to offer support to the birthing woman.

Image 2. The representation of the entry in to the birthing room. Firstly the kitchenette area greets the occupant to a pleasant homely like environment. Secondly the use of indoor plantscaping becomes apparent. Indoor plantscaping has a positive effect on the psychological health of the birthing woman. The presence of indoor plantscaping can improve mood and relieve stress. The smell of the flowers creates an uplifting atmosphere and has a similar effect to aroma therapy.

The birthing woman should have a sense of controlling who comes in to the main part of the room where birth occurs. This is not only done by the long entrance in to the room but also by the inability to see the birthing mother when entering the room. This gives her the chance to allow or deny the person entering entry in to the birthing room. The kitchen at the entry is an excellent distraction for people entering the room. Having a kitchen present in the birthing room is essential to offer the occupants a relaxed domesticated birthing environment.

Image 3. clearly demonstrates the central position of the bed within the facilities of the birthing room. “The bed needs to be low, it needs to move, it needs to be possible to lean against the bed.” ( Forbes, 4) The bed is a critical element in setting the expression and impression of the birthing room. If the bed screams of technical clinical procedures then the whole birthing experience will reflect this style of labour and birth. Therefore the bed displayed will need to be transformed to look like a normal bed which can perform like a hospital bed. This will be a huge aspect to consider in the final design.



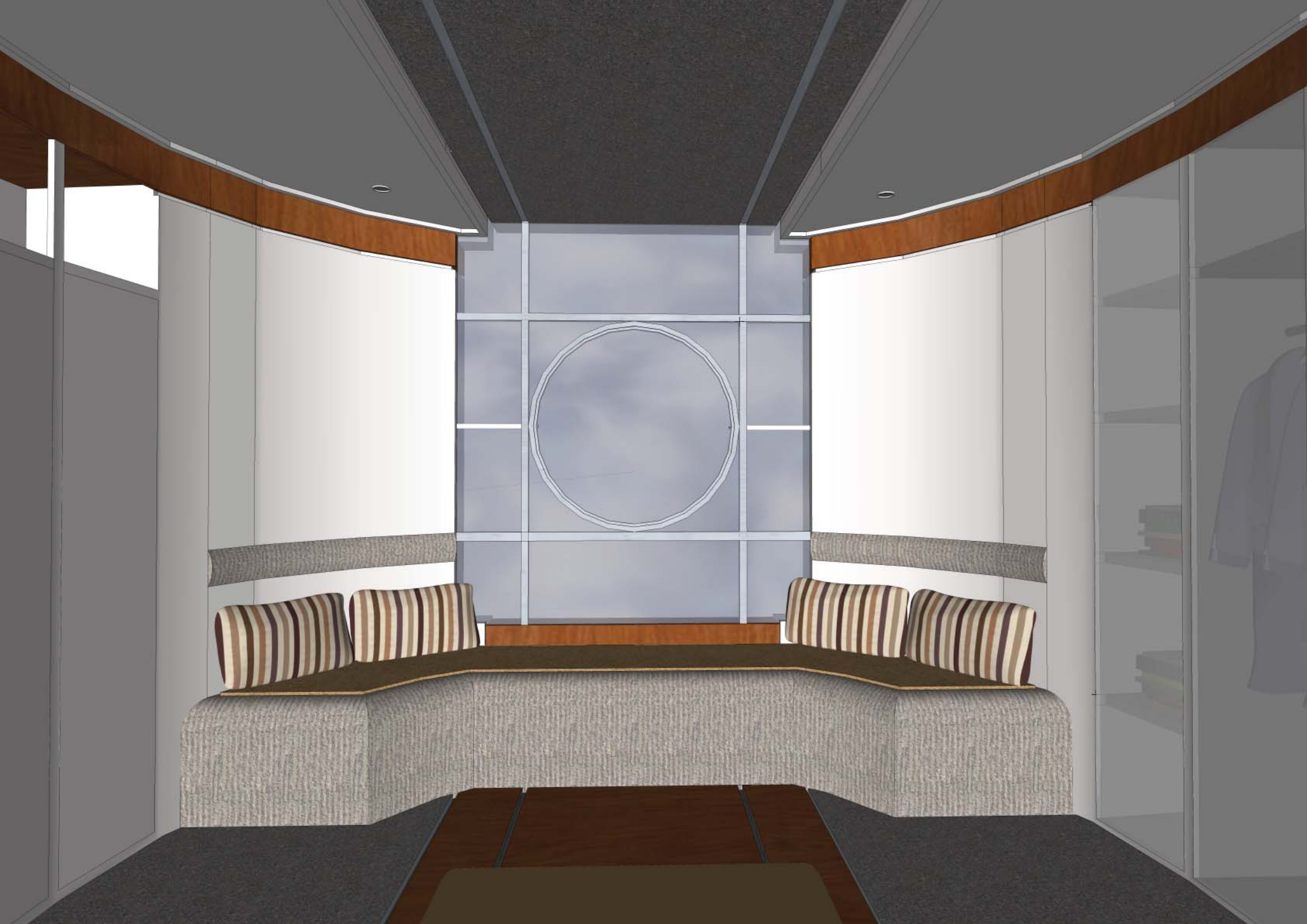
Image 3.

There should be a tub bath in the room which is easily accessible for the woman close to the birthing bed. The tub should be designed so that only one side of the bath faces the room and for reason of privacy and comfort is not accessible from all sides.

“In trying to simplify space, a plain wall in a shell of a room is not always possible. There may be all sort’s of equipment and life support elements essential to the function of the space, but blending them within the overall colour and finish of the space can help make them seem less intrusive.” (Beckwith, 3) The electrical equipment is hidden within the framework of the wooden curve behind the birthing bed. This will be clearly demonstrated in the final design which is shown in Chapter 5.



Image 4.



The seating bench displayed in front of the viewing windows is specifically designed to have visitors seating in the birthing room without disturbing the natural flow and technical functions of the room.

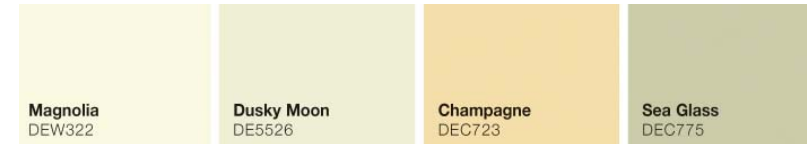
The bench also serves as an overnight bed for the birthing partner. When the woman wakes up she immediately is able to see her support systems in front of her and this offers a sense of safety to the birthing mother.

Colour is an aspect that has not been explored in close detail to this point. Careful selection of colours is important to support mood, providing restful psychological responses with warm tones that are more subdued in colour.

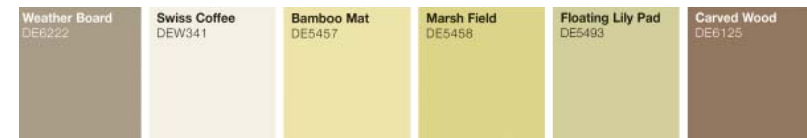
The swatches from previous healthcare facilities discussed in Chapter 2, pg 46-49 are considered in the design of the birthing room as these swatches are proven to be successful within a healthcare environment. Small changes will be made to adjust to the environment of the birthing facility.

The image of the window will be used as the canvas on which the different colours will be tested. These explorations are shown on pg 147 and pg 148

The first colour palette is originally used in the Alicia surgery centre.



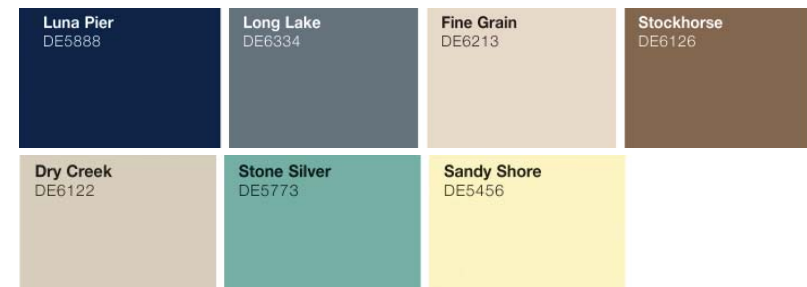
The second colour palette is originally used in the ranch house in the Pierson Place Historic District.



The third colour palette is originally used in design of the YMCA.



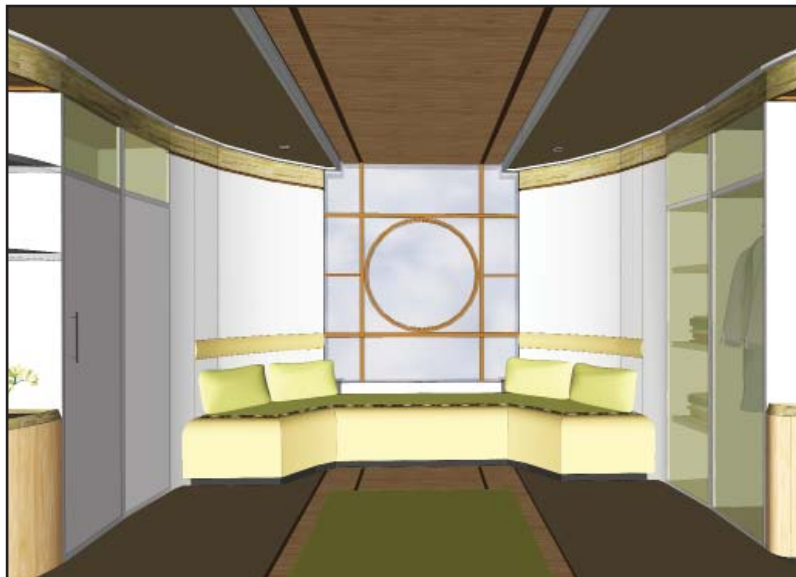
The fourth colour palette was used in the Ed Yawitz house.





The first colour palette is originally used in the Alicia surgery centre. The colours were carefully chosen to create a soothing atmosphere that could help reduce patients' anxiety levels and expedite recovery. Warm white was used along the walls of the recovery beds to have a neutral backdrop for accurate patient assessment, while golden yellow suggests sunshine and positive energy. Reminiscent of plant life, the green used throughout the centre communicates rebirth, growth and vibrancy.

This colour palette seems to be lightly too bland for the birthing room but could be appropriate within the communal areas.



The second colour palette is originally used in the ranch house in the Pierson Place Historic District. For the project, Bubier chose colours that convey a fresh, modern feeling and breathe new life into what was previously a tired, dated home. She selected clear and vibrant green tones that visually open up the space to the modern landscaping. "Green represents new growth and a new season. ,Green is a healing colour" (McLean, 1)

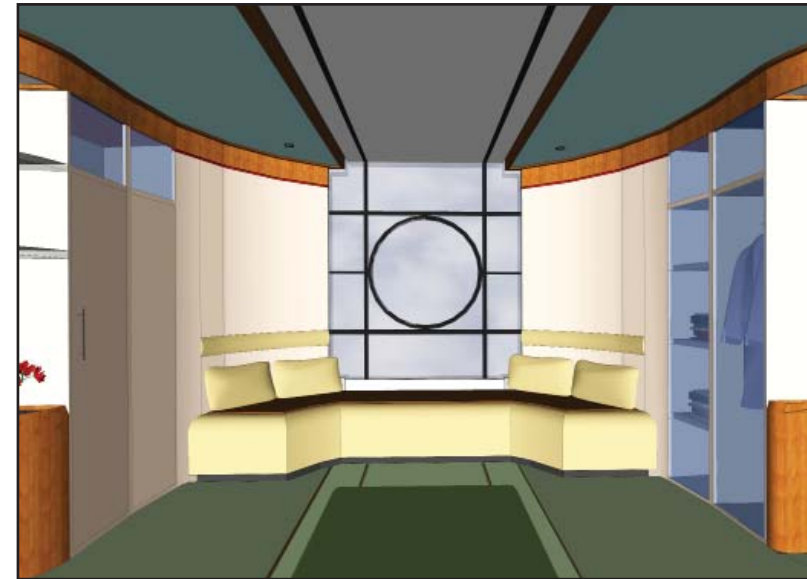
The colour green will be a definite addition to both the communal areas and the birthing room design.





The third colour palette is originally used in design of the YMCA. Cherry red inspires energy, while colours like olive and denim promote harmony and balance.

This colour palette would be perfect in the birthing room if the colour red were to be removed. The colour red is too overpowering (and reminiscent of blood) for the calming environment in the Birthing room.



The fourth colour palette was used in the Ed Yawitz house. The designers chose this palette because of its cleansing qualities. It is important to consider the colour palette of a home as the birthing room aims to house these qualities within its walls. To communicate relaxation and tie the house to the healing power of nature, The designers conjured an ocean/beach atmosphere with colours evocative of marine environments.





## **SUMMARY BIRTHING ROOM DESIGN**

The layout of current health facilities will be considered and an outcome will be established that can be used in the final design of the Birthing Room.

The following areas have been addressed in the process of the birthing room design:

- Light,
- Colour,
- Texture,
- Aroma,
- Sounds,
- Surface materials
- Control
- Single patient rooms.
- Noise.
- Birthing pool
- Ensuite/bathroom
- Managing the birthing bed.
- Material support for birthing
- Access to nature.
- Positive distractions
- Technical support.
- Oxytocin encouragement
- Furniture arrangements
- Air quality.
- Flooring materials

Scale layout and colour have been the major issues which have been resolved in this chapter. The outcomes of these issues will be addressed in the final birthing room design in Chapter 5.

The design of light fittings and furniture pieces in particular is the only element that has not been addressed within the environment of the birthing room. This will be investigated in the next section.



## **LIGHTING AND FURNITURE DESIGN**

This section will firstly look at the examples of lighting and furniture within the Sanatorium of Paimio by Alvar Aalto as this is the most influential precedent in the design of healthcare facilities.

Secondly a design will be created to be displayed within the birthing room.

Thirdly the design created will be tested against the current evidence based design guidelines for furniture in the field of healthcare.



## Lights located within the Sanatorium of Paimio.

The sanatorium of Paimio by Alvar Aalto is the main case study which sparked the interest in the idea of interior architecture as a healing tool. By studying the successful applications of details such as lighting design and furniture design this can be applied to the current design of the birthing room.

The image displayed on the left is a wall mounted lamp in the patients' room of the sanatorium of Paimio. As shown in the image the colours around the light create a radius around the light indicating its position within the environment. Wall mounted lights are great as they are not as intrusive as lights hung from the ceiling or spotlights straight above the birthing bed. These could offer a great solution in the birthing rooms when attached on either side of the birthing bed and bath.



The combination of indirect lighting and accent lighting creates a friendly atmosphere for public spaces and can illuminate specific destination. Light not only reveals focal points, but it can also increase the ability to distinguish form. (Rengal, pg1)

Most of the standardised lamps that Aalto designed were originally made for the Paimio Sanatorium with the sanatoriums specific conditions in mind. The idea behind several of the lamps, such as those in the patients' rooms and the dining hall, was that they utilised indirect light in order to minimize glare. Corridor lighting can help in wayfinding and emotionally transition patients to the exam rooms, where brighter task lights serve functional needs. (Vickery, 1) Public spaces and waiting areas are opportunities to create a design statement. Multilayered, multisource lighting sets a welcome tone.

Consequently light has different qualities, depending on the weather, season, time of day and location. It can be directed, reflected or diffused and the brightness and quality of the light will create different moods and atmospheres (Chiazzari, 102)

Image provided by National board of antiquities, pg 58 <http://www.nba.fi/fi/File/410/nomination-of-paimio-hospital.pdf>

## Lights created for the birthing room.

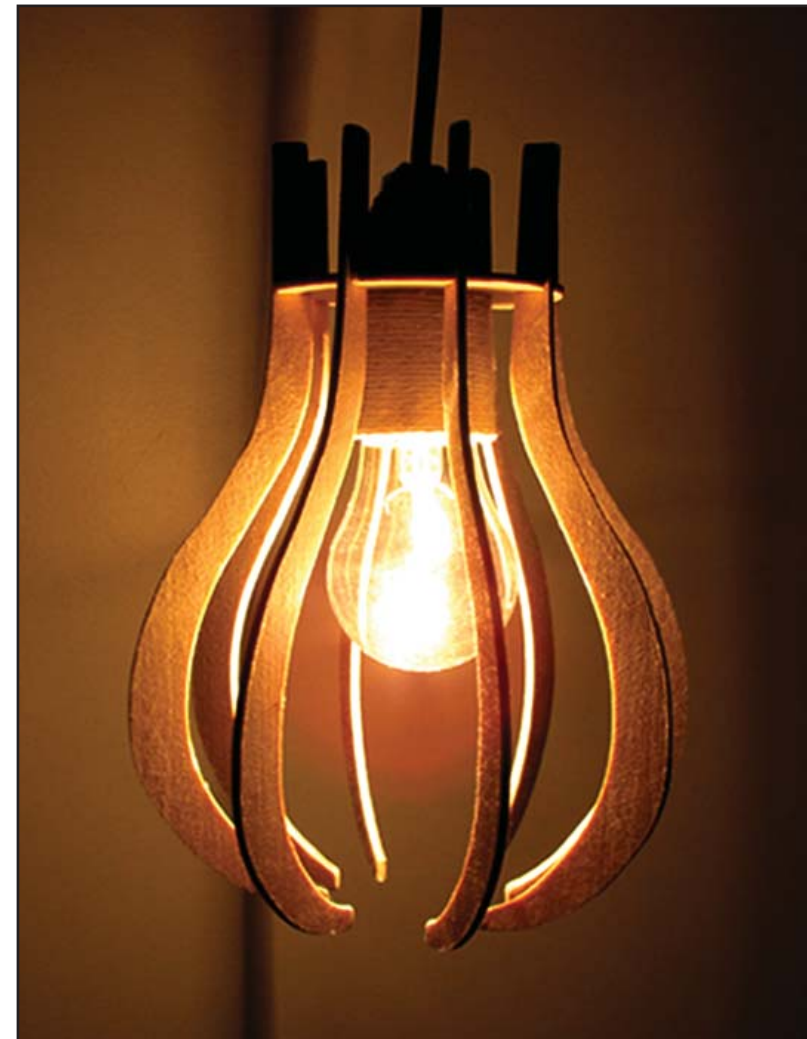
A large body of rigorous evidence indicates that exposure to bright artificial light and daylight is effective in reducing depression and improving mood for people hospitalized with severe depression. Artificial light is commonly used in structured or formal protocols for treating depression.

This thesis argues that lighting is one of the most important element to be considered in the design of a birthing facility. "Lighting directs patients through a clinic and helps healthcare providers deliver quality care. (Vickery, 1)

According to Vickery, warm general lighting to accent lighting and decorative lighting establish a relaxing mood and sense of wellbeing.

The light fitting designed specifically for the birthing room is designed to have a positive impact on the emotions of the birthing mother. The light aims to offer psychological support through the serene quality of light it creates through the shapes and linear lines.

The lamp on the right is a purpose designed light for the birthing room. The natural materials used are important within the birthing environment. The lamp is made out of all natural materials: wood and rope to hold the structure together.

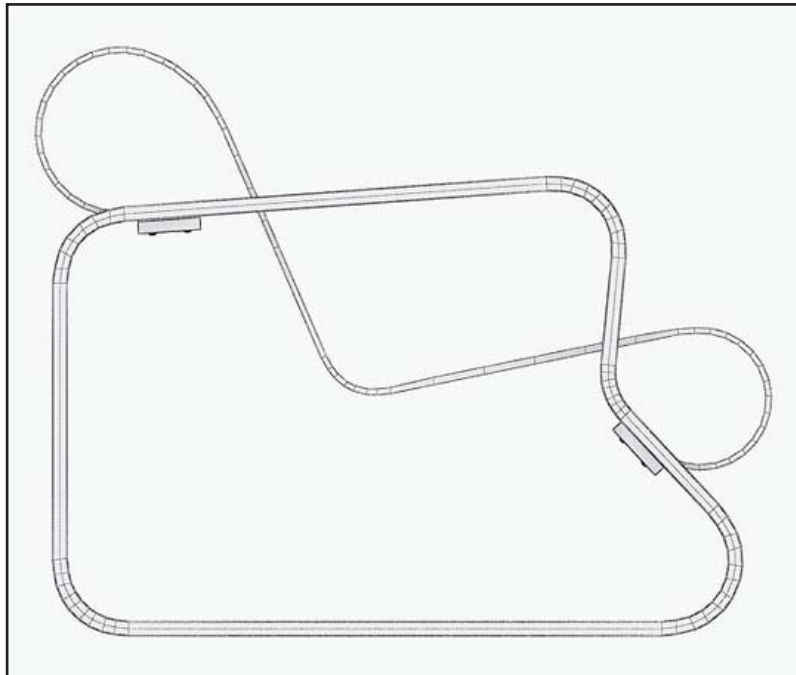


Lamp on right: designed and constructed by Author.



The Paimio Chair, laminated birch frame and lacquered plywood seat.

Aalto designed the chair's contours to help patients sit in such a way to help patients breathe easy. The therapy chair increases breathing which increases the amount of oxygen to the brain and ultimately offering a more efficient healing process. Aalto chose wood as the material, citing its warmth as a health advantage over the cold metal furniture being produced by the German Bauhaus.



Armchair version made from laminated birch frame and lacquered plywood seat.

Furniture built in to the interior architecture can also be a tool to aid the healing process. As seen in the chair of Paimio, the form of the chair makes people sit a certain way opening the air ways, enhancing breathing, increasing the amount of oxygen that gets to the brain, ultimately resulting in a more efficient healing process.



## Healthcare seating

The piece of furniture for the birthing room will be designed ergonomically while reflecting on the overall architectural language used throughout the birthing room. Custom made furniture will give a sense of being unique and carefully crafted.

Image one shows a clinical chair which has a conventional appearance. The materials used are excellent in preventing the spread of bacteria. The form is simple and the furniture piece for the birthing room will aim to find a medium between materials that prevent the growth of bacteria and an aesthetically pleasing design.

Image two is an excellent example of an upholstered healthcare facility chair. The materials investigated on page 62 display the possibilities of antibacterial materials appropriate for furniture within a healthcare facility.

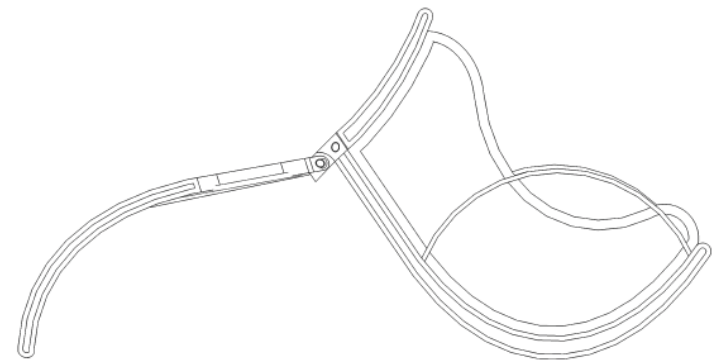
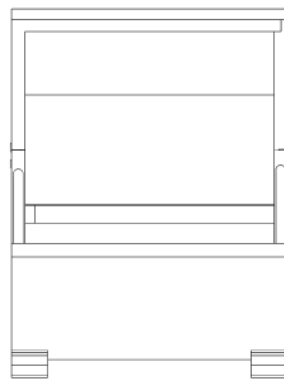
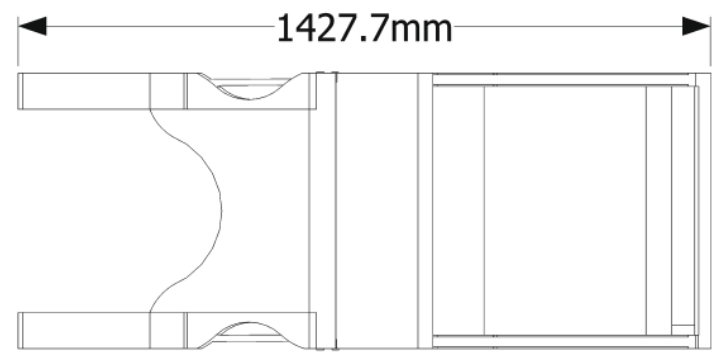
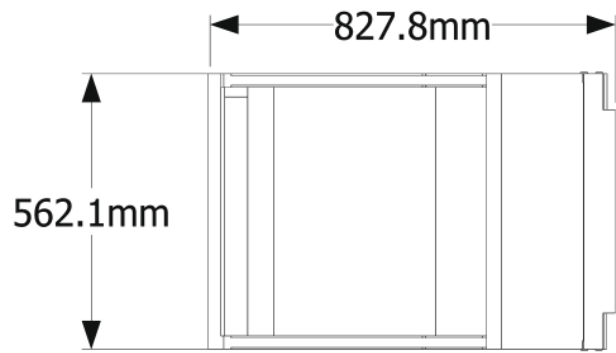


Image 1.



Image 2.

Images provided by <http://www.healthcaredesignmagazine.com/article/wall-coatingscoverings-fabrics-and-textiles?page=2>



Transforming Furniture Piece for birthing room  
SCALE 1:20

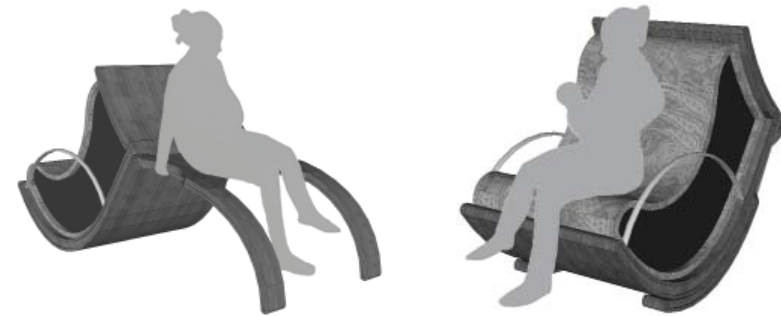
The image on the left is a plan and elevations of the piece of furniture designed specifically for the birthing room. With the specifications of the chair of Paimio in mind a chair is created to appear as an ordinary arm chair while it can be transformed easily into a birthing chair if the woman desires.

Labour can happen in many forms and positions and it is important to offer different options to give birth in within the room.

The possibilities of the chair are shown on the right with the transformation of the chair shown below it. In most cases the chair will remain in the position of an arm chair usable for visitors or as a breast feeding chair.

The form of the chair is closely related to the curved form of the wood behind the birthing bed. It is important for the furniture to give it a sense of belonging to the space having a similar language to the built-in interventions.

Wood is the most appropriate material for the birthing room which considers the prevention of post-natal depression, citing its warmth as a health advantage.

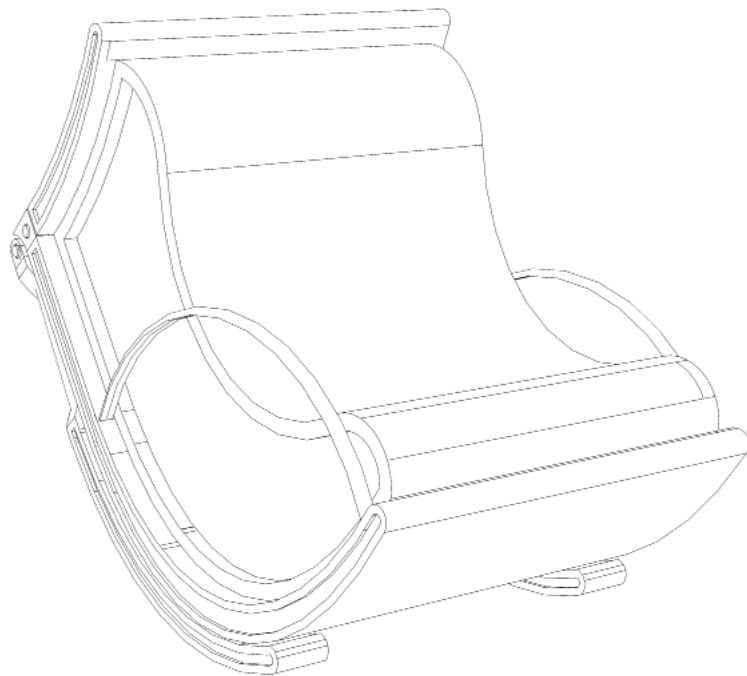


## Evidence-Based Design Furniture Checklist.

Furniture, heating and Lighting, remain indispensable to delivering quality healthcare. These common objects are expected to support many healthcare tasks, such as providing patients and family members with support from stress and fatigue, enabling caregivers to work safely and effectively as a team, and reflecting a healthcare organization’s vision and brand. (Malone)

The EBD Furniture Checklist (Malone) is divided into eight sections that correspond to common EBD goals for which furniture has been shown to play a role.

The piece of furniture designed for the birthing room will be tested against the current checklist.



Findings	EBD Goals and Furniture Features
	<b>1. Reduce surface contamination linked to healthcare associated infections</b>
	Surfaces are easily cleaned, with no surface joints and seams
✓	Materials for upholstery are impervious (nonporous)
✓	Surfaces that are nonporous and smooth
	<b>2. Reduce patient falls and associated injuries</b>
	Chair seat height is adjustable
✓	Chair has armrests
✓	Space beneath the chair to support foot position changes
✓	Chair seat posterior tilt angle and seat back recline to facilitate patient egress
	Chairs are sturdy, stable, and cannot be easily tipped over
	Rolling furniture includes locking rollers or casters
✓	Chairs have no sharp or hard edges that can injure patients who fall or trip
	<b>3. Decrease medication errors</b>
✓	Lighting fixtures provide 90-150 foot candle illumination and adjustable 50 watt high intensity task lamp for furniture with built in lighting that is

	used in a medication safety zone
✓	Furniture is configurable to create a sense of privacy to minimize distractions and interruptions from sound and noise during medication transcription, preparation, dispensing, and administration activities
	<b>4. Improve communication and social support for patients and family members</b>
	Furniture can be configured in small flexible groupings, which are easily adjusted to accommodate a varying number of individuals, in a variety of healthcare settings
	Wide-size and age variations are supported
✓	Acoustic and visual patient privacy are supported
	<b>5. Decrease patient, family member and staff stress and fatigue</b>
✓	Materials suggest a link to nature
✓	Appearance is attractive and noninstitutional
	Furniture is tested for safe and comfortable use by all, including morbidly obese individuals
	<b>6. Improve staff effectiveness, efficiency, and communication</b>
✓	Furniture is easily adjustable to individual worker's ergonomic needs
✓	Design enables care coordination and information sharing
✓	Materials are sound-absorbing
	<b>7. Improve environmental safety</b>

✓	Materials do not contain volatile organic compounds (VOC), including formaldehyde and benzene
	<b>8. Represent the best investment</b>
✓	Reflects and reinforces the organizational mission, strategic goals, and brand
✓	Integrates with existing furniture and objects for facility renovation projects
✓	Pieces can be flexibly reconfigured and moved to support changing and emerging missions
	Provide casters or glides to reduce floor damage
	Check that there are no protuberances that may damage walls; check chair rail heights
	Manufacturer provides results of safety and durability testing
	Manufacturer describes the specific evidence that has been used to design the product
	Manufacturer includes a warranty appropriate to use, such as furniture used all day, every day
	Replacement parts are available
	Repairs can be done in the healthcare facility
	Manufacturer or local dealer can assist with furniture repair and refurbishment
✓	Can be easily maintained by environmental services (housekeeping) staff



## **SUMMARY CHAPTER FOUR**

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Chapter Four represents the design process followed to get to the final design of the birthing centre. The following aspects have been discussed in previous designs:

- Wayfinding,
- Ergonomics,
- Building Layout,
- Furniture Arrangement,
- Access to Nature,
- Light,
- Colour,
- Windows,
- Internal Landscaping,
- Light,
- Colour,
- Texture,
- Aroma,
- Sounds,
- Surface materials
- Control
- Single patient rooms.
- Noise.
- Birthing pool
- Ensuite/bathroom
- Managing the birthing bed.
- Material support for birthing
- Access to nature.
- Positive distractions
- Technical support.
- Oxytocin encouragement
- Furniture arrangements
- Air quality.
- Flooring materials

The design of light fittings and furniture pieces is successful in relation to the function of the birthing room. Chapter Five will combine all of the possible triggers to create the most revolutionary birthing centre to date.





# CHAPTER 5

FINAL DESIGN



## **INTRODUCTION CHAPTER FIVE**

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The final design is a collaboration of all the points which have come forward in the design research. The process of different design stages have brought forward certain areas which need to be considered in the design of a birthing centre in the prevention of post-natal depression.

The points which are important to the environment and the people within the facility will be highlighted in **brown**. The words will form the Evidence Based Guideline for a birthing centre considering the prevention of post-natal depression as initially proposed in this thesis.



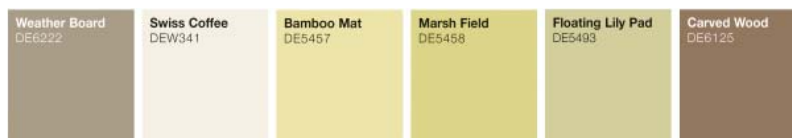
Labour and birth should happen as close to home as possible. Close **ACCESS TO THE COMMUNITY** is important and proximity to friends and support are essential for a healthy birthing experience. McAlister heights in Newtown offers the perfect sanctuary for birth close to wellington city.

The public **ARRIVAL AREA** should be a transition space. The woman needs to be able to transfer emotionally from being outside to being in an enclosed space. The Indoor landscaping located around the circulation core and plenty of windows create a smooth transition for the birthing woman.

The route from the outside door to the entrance of the birthing unit has glass doors and windows where staff and support can be readily seen. This creates for **EASY WAYFINDING** which is an important aspect of eliminating stress. Disorientation in built environments is embarrassing and stressful, wastes time and, in some cases, is even fatal. Support for wayfinding depends on signage and colours—a good wayfinding program ensures that patients, visitors, and staff can effectively navigate the environment. Another wayfinding tool used within the birthing unit is the integration of internal plantscaping.

The overall **BUILDING LAYOUT** is a centralised working mechanism. The workstations are close to patients to result in fewer errors, decrease nurses' travel time and distances covered during the day, increase nurses' time spent caring for patients and families, and improve job satisfaction.

The **COLOUR PALETTE** shown below is the colour palette chosen through the investigation of colour in previous chapters. The subtle browns and greens create a relaxing space while supporting the function of the building, a birthing centre. It is important to create a space that is not intrusive as to cause stress to the labouring woman as she enters the birthing facility.





The circulation core appears to have the qualities of a mother's womb with life constantly growing within. The **INTERIOR LANDSCAPING** has a huge impact on the overall design aesthetic. The interior landscaping is used as a wayfinding queue in the public spaces.

The **SOUND** of running water and **SMELL** of fresh water is brought into an interior landscape by selecting an appropriate fragrance for use in ambient scenting systems (although such fragrances are only be used in areas of transient occupancy, such as the communal gather spaces and lobby, rather than in continually-occupied birthing spaces).

The ability to **TOUCH** the plantscaping on the way up to the birthing unit adds an interesting tactile quality to the space. The close relationship to nature offered within the birthing centre facility embraces the idea of Interior Architecture as a healing tool.

The glass panes offer a safe environment within the core while the occupant is still able to take in the stunning **VIEWS** offered by the site. The Interior intervention highlights the beauty of the site by offering areas of rest within each level to enjoy the landscape. The impact of a view with sweeping vistas has been discussed several times to have an uplifting effect on the occupants psychological state. It is important for the whole environment to be considered as a healing space, not just the private Birthing rooms.









**FURNITURE ARRANGEMENTS.** In public areas, different types of furniture arrangements can either discourage or promote social interaction. (Ulrich, 4) The arrangement of furniture used around the circulation core is supposed to act as a contemplation space and relaxation in contrast to the furniture in the rest of the environment that promotes social interaction. The seats around the perimeter of the core all face out towards the view rather than facing towards other people. It is important to offer the occupant the choice of both an interactive space (which is shown on the next page) and a contemplation stage.





The images display convey the idea of an interactive **SOCIAL GATHERING SPACE**. The arrangement of the tables and the seats around the bar promote social interaction. The furniture is comfortable, supportive and positioned in small, flexible groupings, with seating placed at right angles.

The **LIGHT** in the communal gathering space is brighter to promote social interaction.







The entrance to the maternity room is **EASILY IDENTIFIED**. This is done through light, colour, pathways and numbers indicating the placement occupant within the space. The expecting mother can clearly see the different entrances to the individual units, this reduces anxiety. The room entries are highlighted both behind the number of the room and above the plants located outside each birthing room. The ceiling and floor have been designed purposely to draw the occupant in to the environment, this makes wayfinding much easier.

The **HALLWAY** has external windows on each side of the building. This offers a relaxing atmosphere for the expecting mother as she is able to see beautiful landscapes which ever side she looks.

The small library added on the beginning of the hallway resembles the presence of a relaxing **HOME**. The comfortable couches, lighting and realistic artwork all add to the creation of a **HOMELY ENVIRONMENT**. The term “**POSITIVE DISTRACTIONS**” refers to several socio-environmental features—music, laughter, and realistic art (preferred over abstract by most patients), (Geboy,5).



## FINAL BIRTHING ROOM DESIGN

The most recurring unit of the building, the birthing room, is the central point of the design, and thus particular attention was paid to its design in terms of the lighting, colour, materiality and the integration of technological equipment. Lighting conditions were a particular emphasis in all parts of the room, both in the design solutions and in the details. Steel windows represented the most modern fabrication technique.

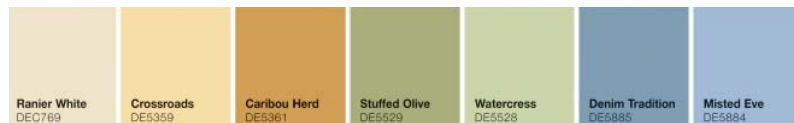
The views from the birthing room are the actual views that would be visible from the birthing centre.





The precedent of the MRI suite on pg 58 highlights the importance of **COLOUR** in a healthcare facility. The colour changes used in the MRI suite change the atmosphere within a possible stressful environment. This idea is incorporated within the birthing room. The colour changes from a warm gold tones, which would be the standard lighting in the room, to a warm red or soft blue. The ability to **CHANGE THE LIGHTING COLOUR** improves the patients sense of control and lower the birthing mothers stress levels. Stress heightens the chance of developing depressive disorders. By creating an environment where stress is eliminated as best as possible, the birthing room becomes an environment which encourages the prevention of post-natal depression within the expecting mother.

The use of colour is integrated within the **LIGHTING** design. The two work together to create the optimal atmosphere for the occupants. The overall colour palette used within the room is developed from the experiments shown previously. The colour palette consists of soft yellows, greens and blues. The colours represent the elements of nature, ground (Yellow), Trees (green) and the sky (blue). The colour palette used is shown below.





The aspects most important to the expecting mother are the freedom of movement, the possibility to choose and **CONTROL** comfort and ease, the possibility of relying on fittings that support bodily needs. It means having the power to choose no matter what she chooses.

The **MATERIAL** surrounding the birthing bed is designed for the expecting mother to lean on. It is important that the woman can feel comfortable in any position. Therefore as previously discussed preferably be wood so that the texture and the appearance are domestic and have a natural feel. This ledge also offers a close space for the family to sit on after birth to surround the new mother with the much needed **SUPPORT**. Support after birth has a huge impact on preventing depression so allowing spaces for the family to congregate around the new mother are essential.



The birthing chair works well within the environment of the birthing room. The **ERGONOMICS** of the chair relate to the birthing bed and bath. The chair can be moved around or transformed in to a birthing chair by folding the legs out. It is important for the woman to have the support of different birthing option while being disguised to conform to the overall **HOMELY ENVIRONMENT**.







The birthing bath is easily **ACCESSIBLE** and close to the birthing bed. This is designed for the expecting mother to move easily from one area to the other as she feels necessary. The bath is designed so that only one side of the bath faces the room and is not able to be approached from all sides- thereby not placing the expecting mother on display.



“Appropriate use of **ARTIFICIAL LIGHTING** to compliment its effects can balance the setting in patient rooms and other contact points within healthcare environments. Haven of calm can be created with lighting to offer a respite from the high activity areas. For natural harmony, it is therapeutic to create small cameos on which to focus - a point of interest, a highlight.” (Beckwith, 3)





As previously recorded equipment related to delivery and discretely hidden out of site from the expecting mother.

Evaluation of the concept and its implementation suggest that **ACUITY-ADAPTABLE** Rooms reduce transfers, and may reduce the incidence of medical errors and increase patient satisfaction.

“The bed needs to be low, it needs to move, it needs to be possible to lean against the bed. The bed is a critical element in setting the expression and impression of the birthing room. If the bed screams of technical clinical procedures then the whole birthing experience will reflect this style of labour and birth.” (Forbes, 9) The design of the **BED** is the most crucial part of the design as this is the main feature the expecting mother will be in contact with before, during and after labour. The bed is able to go up and roll out of the unit easily but does not represent this clinical feel when the bed is in the resting position. The image on the right shows the birthing room in full function in a time of emergency. Lights above the bed turn on and resuscitation equipment slides out of the side panel. The whole room transforms in to a functioning hospital room. The room can go **FROM HOMELY TO TECHNICAL** which is one of the most important aspects of the whole design.

The birthing room has all the necessities of a surgery room but the aim of the birthing room is to encourage a natural birth. In a natural birth the chemical **OXYTOCIN** gets released and it is this very chemical that has the power to prevent post-natal depression.

Oxytocin can be stimulated by: smell (aromatherapy), touch, eating, warmth, immersion in warm water, hearing pleasant sounds, seeing scenes of nature, relaxing activities (meditation). All of these aspects are supported by the birthing room which makes it an excellent environment for birth and woman who are likely to develop post-natal depression. It is suggested here that this birthing environment will give them the best chance of giving birth without developing post-natal depression.



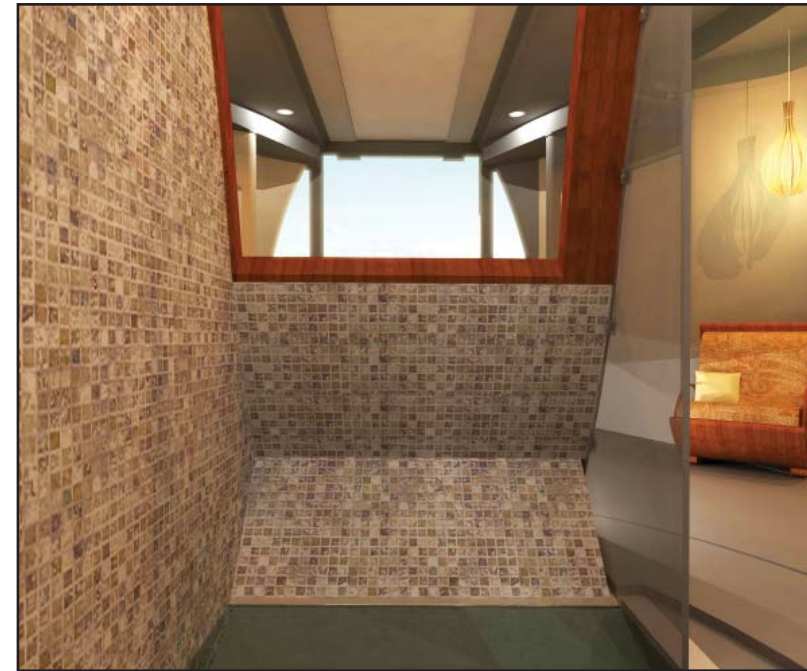




Finally the pioneering research of Dr. Ulrich confirms that **LANDSCAPE VIEWS** accelerate patient recovery. A study of surgical patients assigned to rooms with very large **WINDOWS** looking out on a natural scene had shorter postoperative hospital stays and took fewer analgesics compared with people not in these rooms. (Ulrich, 224)

“Tranquil spaces for healing are about freeing up the mind and spirit by making the surroundings seem less complex and demanding.”(Beckwith, 1) The closed doors on **CABINETS** for storage can do wonders for calming and creating order in a space which is optimal for the birthing room environment. “Placement of cabinets and screens can improve the balance of a space by complimenting a lone element that can not be moved or hidden.” ( Beckwith, 2) For example, the cupboards are unobtrusive and not a decorative feature in their own right, but support the overall space with balance while providing privacy as needed. The cabinets provide adequate space for the woman’s belongings. They are designed for easy access, and for quick unpacking and repacking to make the transition in and out of the birthing unit smoother.

**SOCIAL SUPPORT** after the birth is crucial for the prevention of post-natal depression. Evidence indicates that **SINGLE-PATIENT ROOMS** encourage family presence by providing more space and privacy and accommodating patient-family interactions, compared with multi-bed rooms. It is important to make sure that single-patient rooms include appropriate family zones and comfortable furniture to encourage family members to stay longer and provide more social support to patients.





The image on the right represents the alcove at the entry. This provides a place to wash hands and a cupboard for supplies before entry in to the main area of the unit.

The focal point upon entry of the birthing room is the stunning views. This distracts the occupant from the main birthing area allowing the expecting mother to feel less exposed.



The bathroom is located behind the birthing bath. The bathroom includes a toilet, hand basin, and shower for normal ablution functions. Ready access to an ensuite toilet enables women to remain relaxed and can open their bodies without fear of soiling floor mats or the bed. The bathroom has a homely appearance which is great for the moral of the expecting mother.

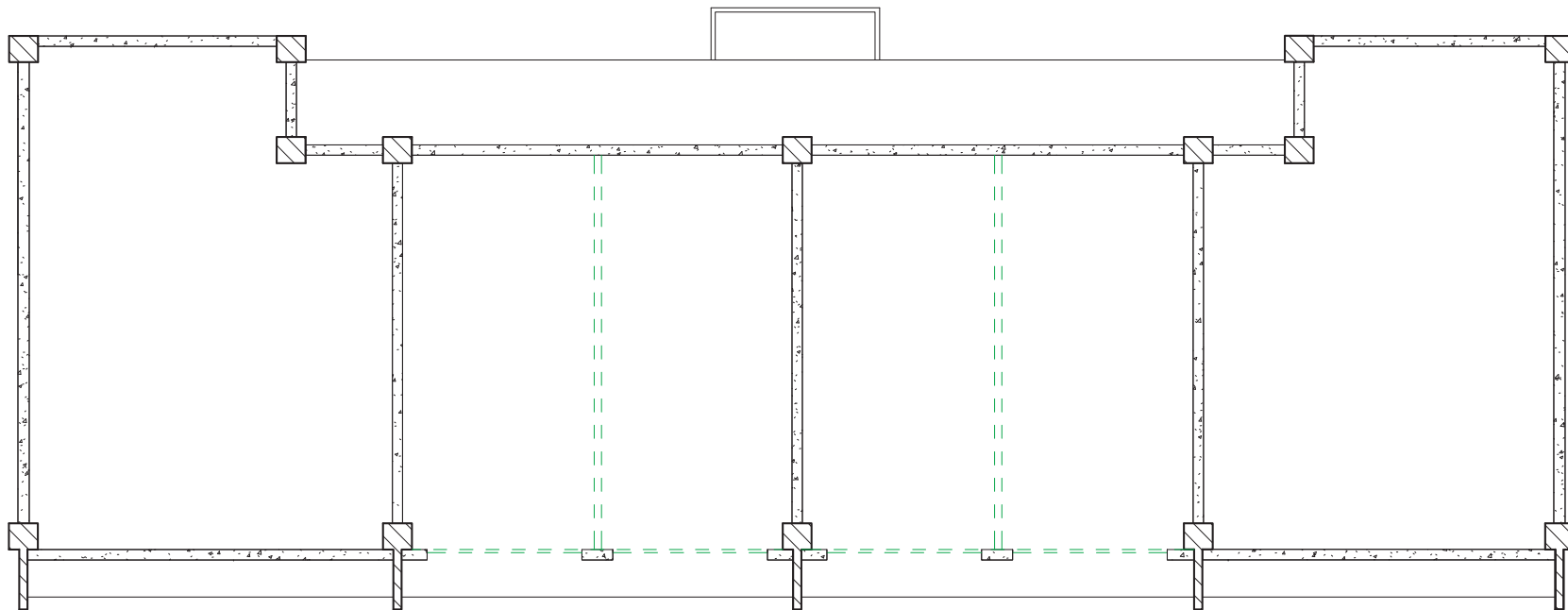
Every part of the birthing room design works together to aid the prevention of post-natal depression.





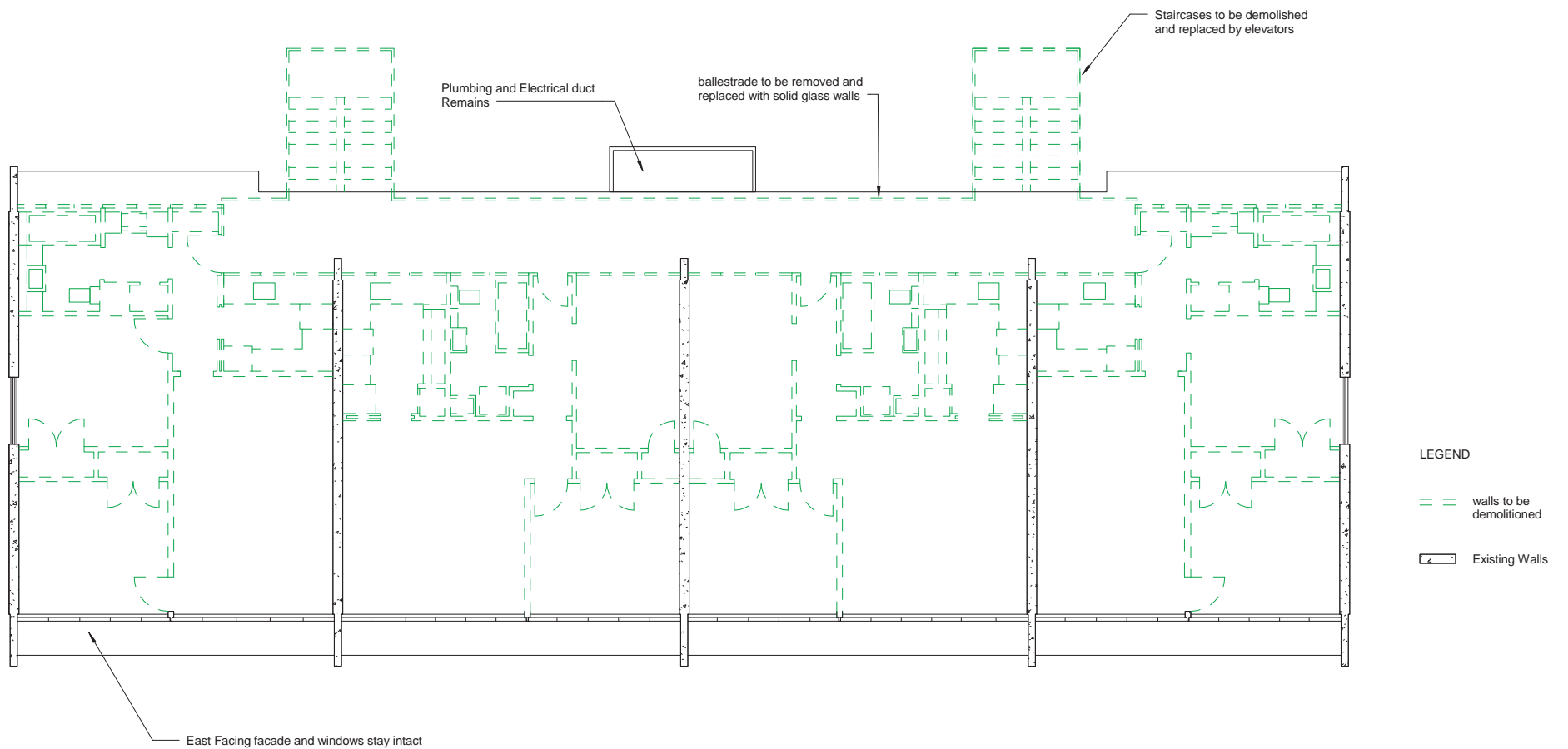


# DEMOLITION PLANS

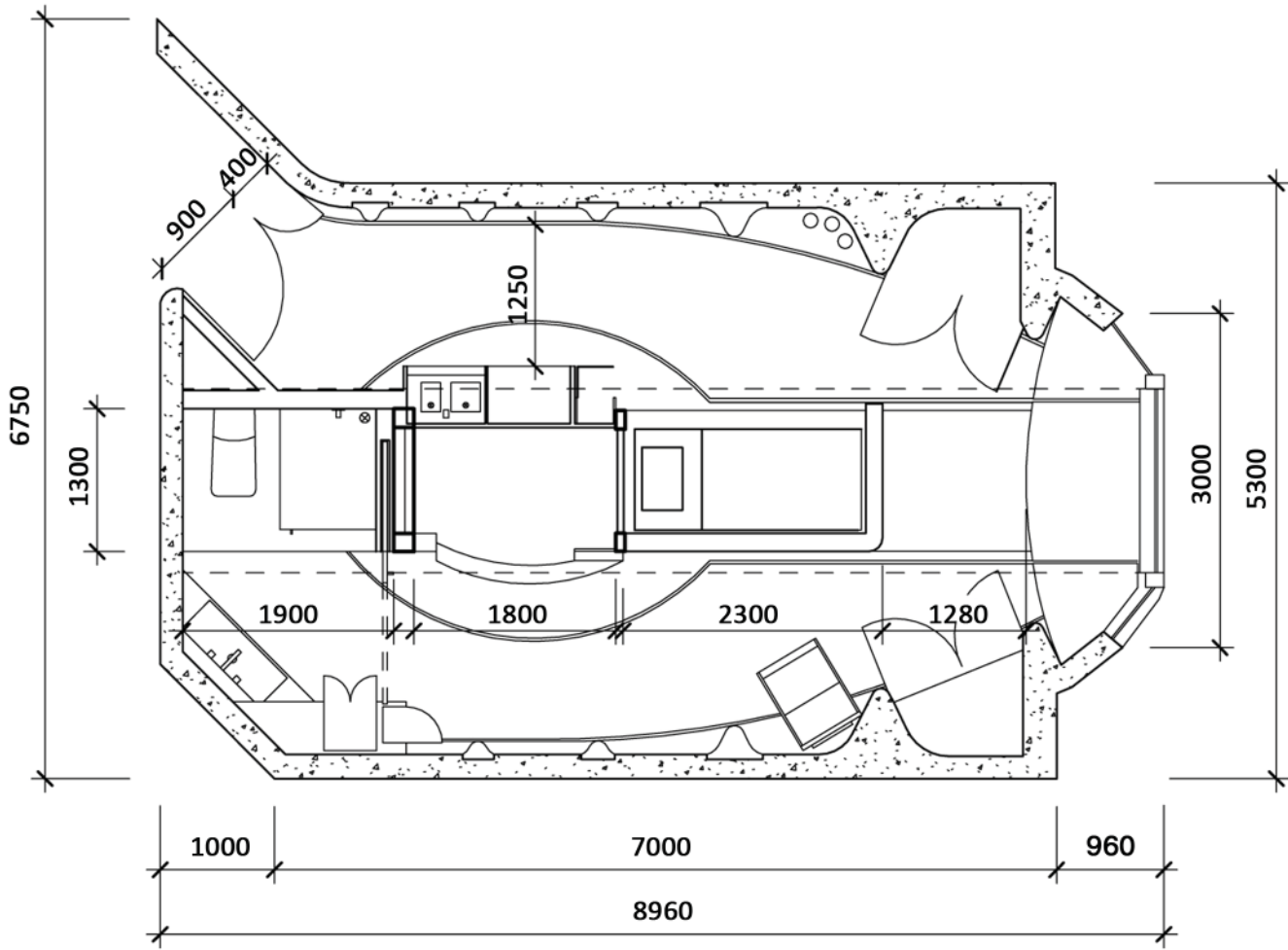


LEGEND  
— — walls to be demolished

Basement demolition plan  
SCALE 1:200

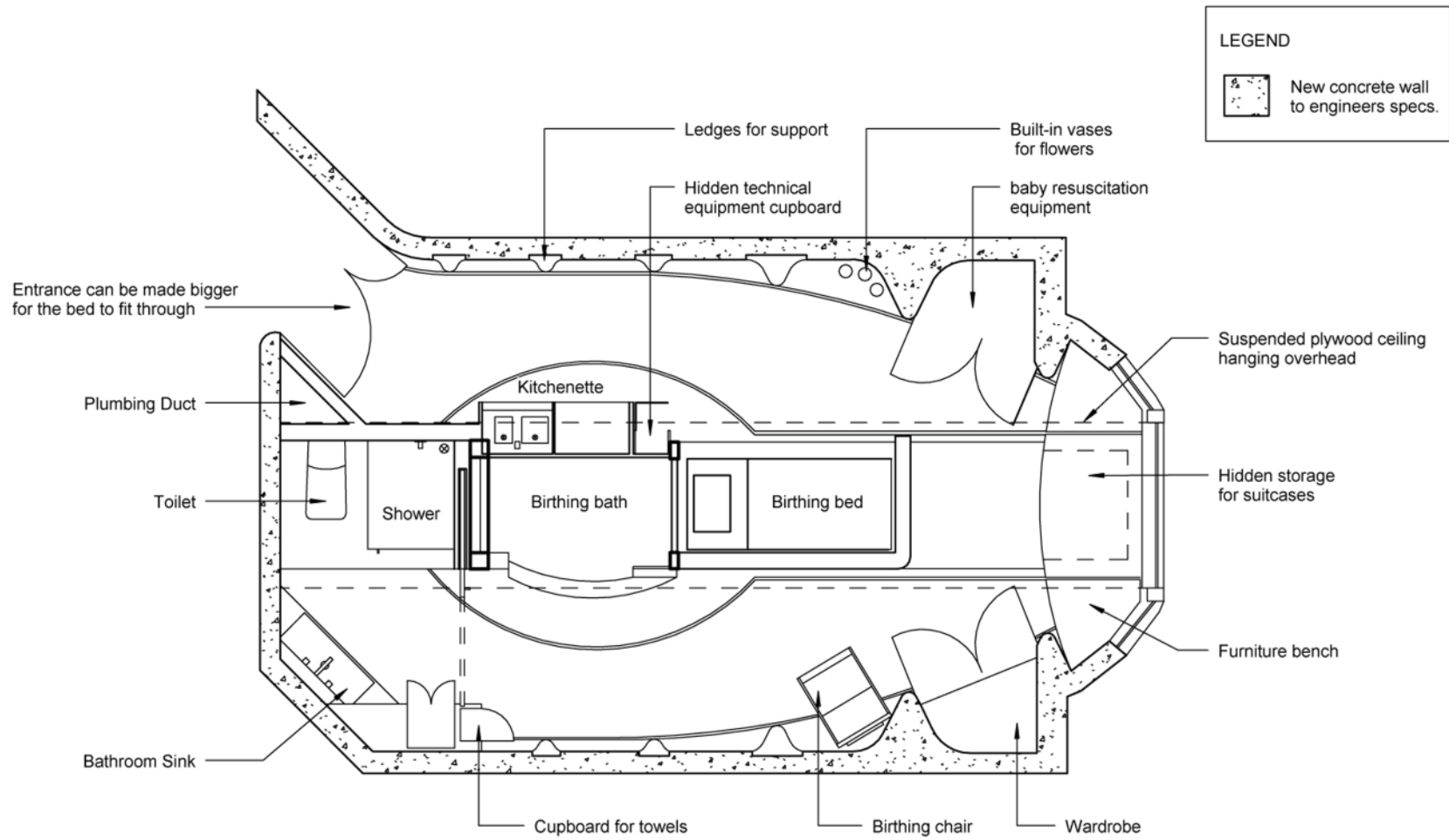


Level 1-7 demolition plan  
SCALE 1:200



**1** FLOOR PLAN OF BIRTHING ROOM  
1:100





2

**Floor Plan of Birthing Room**

SCALE 1:100

## SUMMARY OF KEY POINTS FORMING EVIDENCE BASED DESIGN GUIDELINE FOR BIRTHING CENTRES.

- light,
- colour,
- texture,
- aroma,
- sounds,
- surface materials,
- integration of interior and exterior spaces.
- space for the birthing mother to move around,
- the encouragement of natural birth.
- Sustainable materials.

### **Access to the community**

Labour and birth should happen as close to birth as possible. Proximity to friends and support are essential for a healthy birthing experience

### **Outside access to birthing unit**

The entrance to the maternity room should be easily identified. This can be done through wayfinding.

### **Easy Wayfinding**

Preference for women is an easy route from the outside door to a birthing unit entrance that has glass doors where staff and support can be readily seen. Disorientation in built environments is embarrassing and stressful, wastes time and, in some cases, is even fatal. Support for wayfinding depends on signage and colours—a good wayfinding program ensures that patients, visitors, and staff can effectively navigate the environment.

### **The arrival hall**

The public arrival area should be a transition space. The woman needs to be able to transfer emotionally from being outside to being in an enclosed space. Indoor landscaping and plenty of windows are an excellent way to create a smooth transition.

### **The corridor.**

Corridors should be familiar and welcoming, where room entries are highlighted in recessed openings, focussed ceiling lights identify rooms and if possible, external windows in the corridor.

### **Single patient rooms.**

Single patient rooms have shorter length-of-stays, fewer medication errors, lower costs, higher occupancy rates, increased privacy and control, less noise, fewer sleep disturbances, and higher patient satisfaction.

### **Control over lighting**

Control over lighting reduces stress in the expecting mother.

### **Control over access**

The birthing woman should be able to control who comes in to the main part of the room where birth occurs. This can be done by a long entrance in to the room.

### **Noise**

Noise negatively affects patients and staff, Reducing noise can be achieved by adopting a systemic approach to sound control that requires attention at four levels: noise-attenuating materials selection and installation, proximal location of support spaces and equipment, operational and behavioural changes by staff, and equipment maintenance.

### **Windows**

Patients in rooms with windows, particularly windows with pleasant views to nature, have shorter recovery times and fewer complications, and request less pain medication. Employees with access to windows and nature views experience less stress, better health, and higher job satisfaction.

### **Colour**

Careful selection of colours is important to support mood, providing restful psychological responses with warm tones that are more Subdued in colour. Rooms must have less white in exchange for stronger pastel colours.

### **Furniture arrangements.**

Arrangements that promote social interaction in waiting areas include comfortable, supportive furniture positioned in small, flexible groupings, with seating placed at right angles.

### **Ergonomics**

Patients and staff in healthcare settings benefit from improved ergonomic designs of furniture and equipment.

### **Building layout**

Workstations that are close to patients result in fewer errors, decrease nurses' travel time and distances covered during the day, increase nurses' time spent caring for patients and families, and improve job satisfaction.

### **Light**

Light affects mood and stimulates people physiologically as well as psychologically. Bright light, either natural or artificial, can improve patient outcomes, affecting such factors as depression, agitation, sleep, circadian rest/activity rhythms, and length of stay. Sunlight has been linked with shorter stays, lower stress, less pain, lower intake of pain medication, and even lower mortality. For staff, ensuring that appropriate, non glare light levels are brought to the tasks at hand can improve staff accuracy and effectiveness.

### **Birthing pool**

There should be a tub bath in the room which is easily accessible for the woman close to the birthing bed. The tub should be designed so that only one side of the bath faces the room and is not able to be approached from all sides- thereby not placing the occupant on display.

### **Ensuite/bathroom**

There should be a bathroom with toilet, hand basin, and shower for normal ablution functions.

### **Managing the birthing bed**

The bed needs to be low to be able to move. It needs to be possible for the user to lean against the bed. The bed is a critical element in setting the expression and impression of the birthing room. If the bed screams of technical clinical procedures then the whole birthing experience will reflect this style of labour and birth.

### **Material support for birthing**

Women often feel more comfortable leaning on something while kneeling. The material surrounding the birthing bed should preferably be wood so that the texture and the appearance are domestic and have a natural feel.

### **Communal gathering spaces**

Spaces where family members can congregate for mutual support.

### **Positive distractions**

Positive distractions. The term "positive distractions" refers to several socio-environmental features—music, laughter, pets, and realistic art (preferred over abstract by most patients),(Geboy) as well as natural elements such as trees, flowers, and water—the presence of which improve mood and relieve stress. These positive distractions attract and sustain

### **Technical support**

The need for medical gases and suction are fundamental to delivery, in all types of rooms including low-risk. Oxygen, suction and nitrous oxide should be stored behind cupboards.

### **Oxytocin**

Blocking oxytocin may result in: failed breast feeding, hypertension, hyper vigilance (post traumatic stress disorder), Depression, Inability to love oneself or others, Antisocial behaviour.

Oxytocin effects on psychology and behaviour: increases trust, conserves energy, induces sleep, improves healing, lowers level of stress hormones  
Oxytocin can be stimulated by: smell (aromatherapy), touch, eating, warmth, immersion in warm water, hearing pleasant sounds, seeing scenes of nature, relaxing activities (meditation)

### **Interior landscaping**

Research has repeatedly demonstrated the emotional and physiological benefits of visual and physical access to nature: stressful and negative emotions decrease while pleasant emotions increase. Patients viewing nature recover faster, have less stress, anxiety and pain, and require less pain medication. Gardens located in healthcare settings offer patients, visitors, and staff the opportunity for direct interaction with the restorative, calming effects of nature.



## CONCLUSION

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The design of a birthing centre in the prevention of post natal depression requires a careful consideration of many different factors.

Initial research has shown that the prevention of post natal depression is closely linked to the conditions of birthing and its preparation.

This thesis is an architectural study that offers its readers the development of a design led research on the creation of specific spatial qualities for birthing. These qualities are developed following guidelines sourced from the design research.

It follows contemporary thinking on both birthing and post natal depression. The developed design emerges from an initially proposed intersection; the intersection between the domain of birthing and the spatial qualities recommended in maternity ward and the domain of healing architecture considered in depression rehabilitation facilities.

The design has been developed and progressed from the birthing room to the occupation of an entire building, extending to landscape in one direction and the careful detailing of furniture in the other. This indicates that the specificity of the domain here researched required an integral design; a design that cannot be isolated in one scale of interventions such as an interior space solely and one that needs to be extended to as a wider spectrum of intervention as possible.

This thesis has explored the notion of interior architecture as a tool in the prevention of post natal depression and it is hoped, has made some valuable contribution to the current discussion on the role of interior architecture in the prevention of illness.

Ultimately this series of texts and drawings and summary of factors are presented as forming a design guideline for future use in the domain of preventative architecture.

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