

SPINE & BRAIN DISEASE REHABILITATION WELLNESS CENTRE

KAKKANAD, KOCHI, KERALA

INTRODUCTION

Rehabilitation helps people gain greater independence after illness, injury or surgery. Following Spinal Cord and/or Brain Injury, rehabilitation is the only hope to independent living. Several congenital (ie. cerebral palsy) and acquired neurological disease (ie. stroke) in adults and children have no cure and thus, preventing complications and rehabilitation, leads to better outcomes and quality of life. Following physical trauma or major surgery, a period of recuperation and rehabilitation is needed prior to returning to normal daily activities.

Rehabilitation includes physical, mental, intellectual, speech, spiritual, vocational and community based therapies. To undergo rehabilitation an understanding of the needs, goals and outcome for each individual is required. For this a suitable environment with modern facilities and well experienced team who can provide comprehensive care is essential. Our aim is to provide a multi-disciplinary, cost-effective, rehabilitation service with the state-of-the-art facilities. Currently there is no such centre available for holistic care in this region in the private sector.

EXISTING NEEDS AND SHORT COMINGS IDENTIFIED

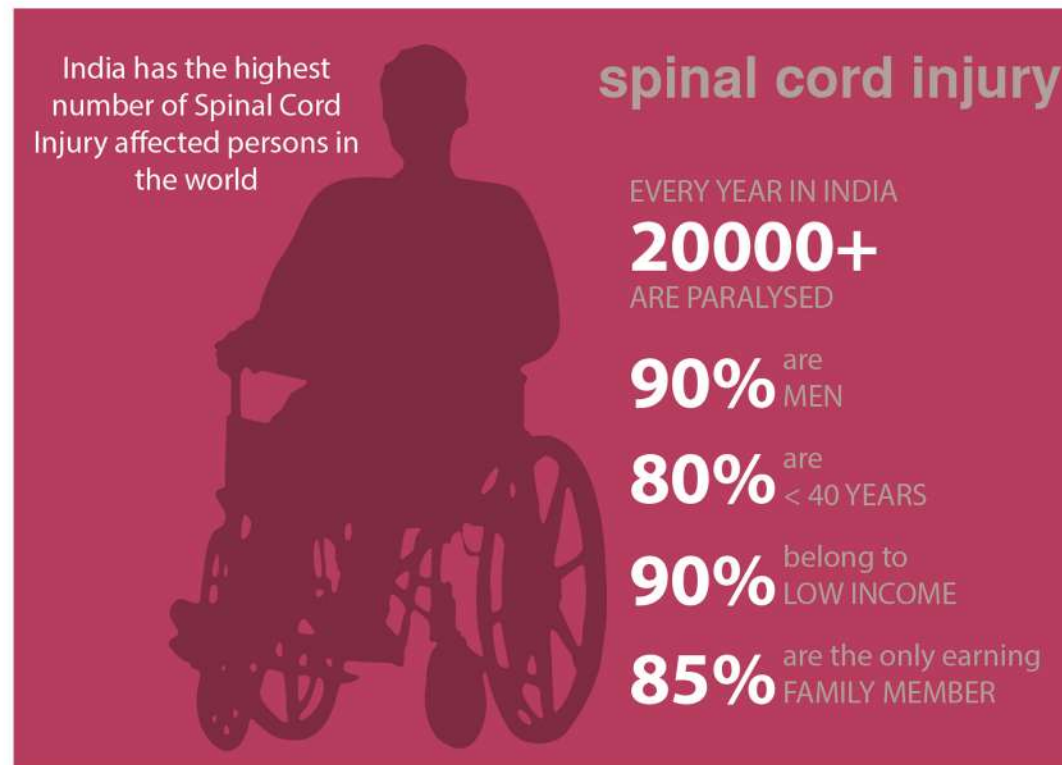
- Lack of dedicated comprehensive centre for rehabilitation of patients with Spinal Cord Injury and/or Traumatic Brain Injury.
- Non-availability of 'All under One-Roof' care centre that attends to rehabilitation needs of patients with neurological diseases.
- Differently-abled sports and research centre for rehabilitation.
- Elderly Care Rehabilitation - ie. post knee replacement, post injury and fracture.

01 PROJECT DESCRIPTION

REHABILITATION FACILITY ORGANIZATIONAL CHART



FIELD ANALYSIS



"OUR GREATEST GLORY IS NOT
IN NEVER FALLING BUT IN
RISING EVERYTIME WE FALL"

- CONFUCIUS



BENEFICIARIES

- SCI & TBI patients – Complete and Incomplete
- Non traumatic Neurological Diseases – Stroke, Multiple Sclerosis, Poliomyelitis, GB syndrome, Spinal tumours, Cerebral Palsy and other Neurological conditions.
- Elderly – Following major surgery or trauma.
- Others – Children with congenital neurological disorders, cardiac rehabilitation and post discharge from hospital with chronic disease.
- Post Ortho surgery – Joint replacements and poly trauma.
- Geriatric rehabilitation

SPINE & BRAIN DISEASE REHABILITATION WELLNESS CENTRE

KAKKANAD, KOCHI, KERALA



LOCATION : Charlestown , MA , United States
SIZE : 262,000 sq. feet
YEAR COMPLETED : 2013
ARCHITECT : Perkins and Will



The scale of the building is visually reduced by dividing the structure into two connected sections – an eight-story patient tower and a three-story therapeutic gymnasium and pool.

Outdoor terraces and balconies totalling 8,500 square feet are accessible to patients, visitors, and staff.

CASE STUDY- SPAULDING REHABILITATION HOSPITAL



Glass curtainwall is generously integrated into the design creating transparency and an abundance of natural light throughout the interior resulting in an atmosphere that is open and inviting.

Solar shading built into the facade system maintains comfort in interior spaces, such as patient and family lounges.



Toilet



Hydrotherapy pool



One of the goals was to make it totally integrated on the interior and exterior, create more transparency between the hospital and the community, and to break down stereotypes that we have of people with disabilities.



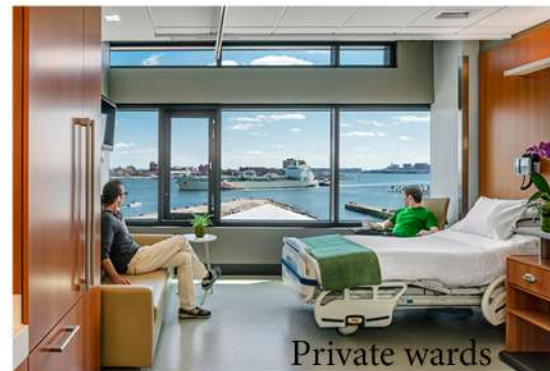
Lobby

The main lobby features an art glass installation by artist Paul Housberg.



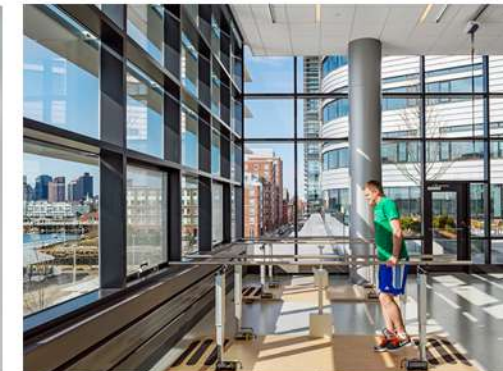
Reception

Cut-outs in reception desks allow wheelchair users to pull up without obstructions.



Private wards

The hospital has 132 patient rooms, many of which have views of the harbor.



The third floor therapy gym opens onto a terrace. Visible beyond this outdoor space is the curved facade of the inpatient tower.



Therapy gym

SPINE & BRAIN DISEASE REHABILITATION WELLNESS CENTRE

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LOCATION : Arnhem , Netherlands
SIZE : 14,000 sq.m
YEAR COMPLETED : 2011
ARCHITECT : Koen van Velsen BV

The Rehabilitation Centre Groot Klimmendaal is a gorgeous glass-clad building that sits tucked amongst a groves of trees in the Dutch forest. The project was also recently announced as one of the six finalists for the European Union Prize for Contemporary Architecture – Mies van der Rohe Award 2011.

A smaller footprint combined with natural daylighting and an interior circulation plan that encourages exercise are some of the interesting features included in the rehab and community centre. The three-story building is clad in anodized, brown aluminum as a way of blending into its forested surroundings.

The design ambition was not to create a centre with the appearance of a health building but a building as a part of its surroundings and the community.

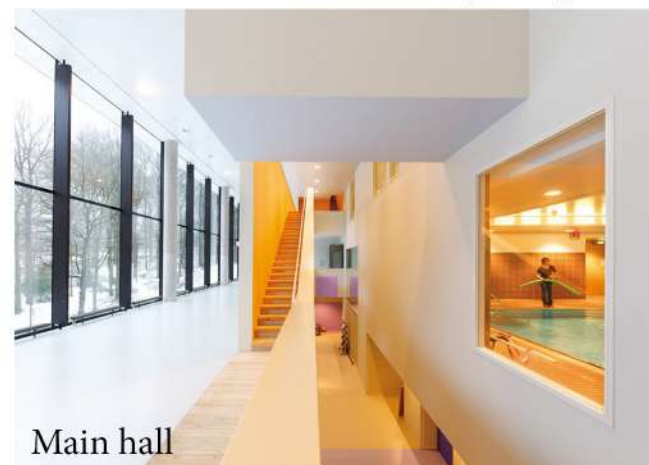
CASE STUDY- REHABILITATION CENTRE GROOT KLIMMENDAAL



Restaurant

Energy efficiency is employed as a sustainable strategy and is achieved through the use of efficient mechanical and electrical installations as well as the use of thermal mass, which reduces the need for heating and cooling.

The choice of selecting sustainable building materials and materials requiring little maintenance for floor finishes, ceilings and facade cladding result in a building which can be easily maintained and with a long lifespan.



Main hall



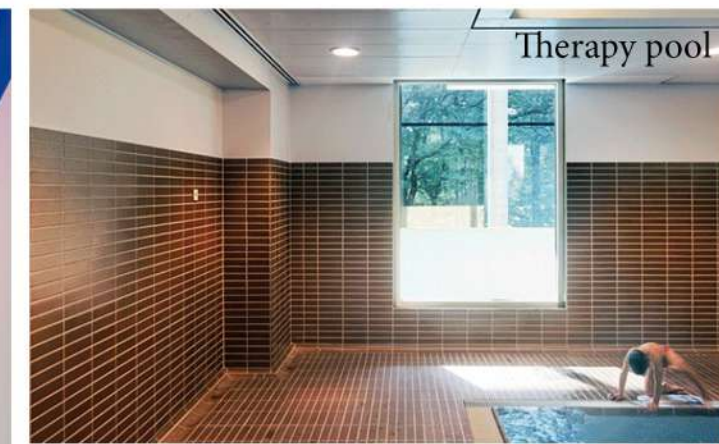
Theatre foyer

A combination of large and small voids and light wells ensure a spatial connection between different levels and allow natural daylight deep in the heart of the 30metres wide building. Interplay of striking but subtle colours and direct and indirect (artificial) lighting enlivens the interior.



Staircase well

The care concept is based on the idea that a positive and stimulating environment increases the well-being of patients and has a beneficial effect on their revalidation process.



Therapy pool

Transparency, continuity, layering, diversity, the play of light and shadow and the experience of nature are all ingredients of this stimulating environment.



Auditorium

SPINE & BRAIN DISEASE REHABILITATION WELLNESS CENTRE

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LOCATION : Chambersburg, PA
SIZE : 49,400 Sq. Ft.
YEAR COMPLETED : November 2018

The project, is designed with a specific focus on whole-person healing and the incorporation of research-based elements intended to promote the physical, emotional, and spiritual growth of guests.

Biophilic design was a focus during the design process because research has found that incorporating elements from nature into the built environment improves recovery times and increases engagement by feeding occupants' desire for connection with their local environment.



Designers incorporated a soft green and blue color palette, along with the wood and natural elements, to support the Well building standard and biophilic design.

CASE STUDY- MENNO HAVEN REHABILITATION CENTRE



Wall incorporating wood and felt panels, as well as planters with native grasses, and digital and branded signage near the reception desk help showcase the facility's technological and hospitality-driven design focus.



Ten-foot ceilings and full height windows in gathering places establish a physical connection with the outdoors by negating the separation between inside and outside. The therapy courtyard is designed to provide passive therapy opportunities in a relaxing, hospitality-focused space.



Each guest suite achieves spatial daylight autonomy by receiving at least 30 footcandles of natural illumination during daytime hours



Nature is incorporated into these spaces through textures and live plant materials. Translucent window brings in diffused light throughout the day, even when guests utilize available blackout shades on the window below, to establish circadian rhythms that promote better sleep and accelerate recovery times.



The bright white walls and ceiling with pops of color delivered through the acoustic clouds and side seating keep the space feeling vibrant.

The bold pops of color are married with bright floral and greenery elements throughout the space.

Medical aspects such as incorporating medical gases into the headwall of the bed behind artwork—ready to be assessed if needed, but not visible

Stone and wood elements complemented with contemporary lighting and custom dimensional artwork create an inviting lobby space.

SPINE & BRAIN DISEASE REHABILITATION WELLNESS CENTRE

KAKKANAD, KOCHI, KERALA



LOCATION : Abu Dhabi, United Arab Emirates
SIZE : 66685 Sq.m
YEAR COMPLETED : March 2013
ARCHITECT : HKS

To design a comprehensive, human-centered substance abuse rehabilitation experience that embraces the rich history of Abu Dhabi and the modern high-tech world.



The project consists of male inpatient/outpatient program, administration, women's inpatient / outpatient program, training & conference center, mosque, recreation areas (indoor gym , outdoor play ground and healing gardens), ancillary & security. Residential areas for inpatients are located in the inpatient buildings for Male & female buildings and the VIP villas with private access

CASE STUDY- NATIONAL REHABILITATION CENTRE MAFRAQ



Reception cum waiting area is incorporated with diffused lights and neutral beige color palette with some green indoor plants.



Restaurant false ceiling are designed using wooden battens by providing the cut outs in the form of leaf .



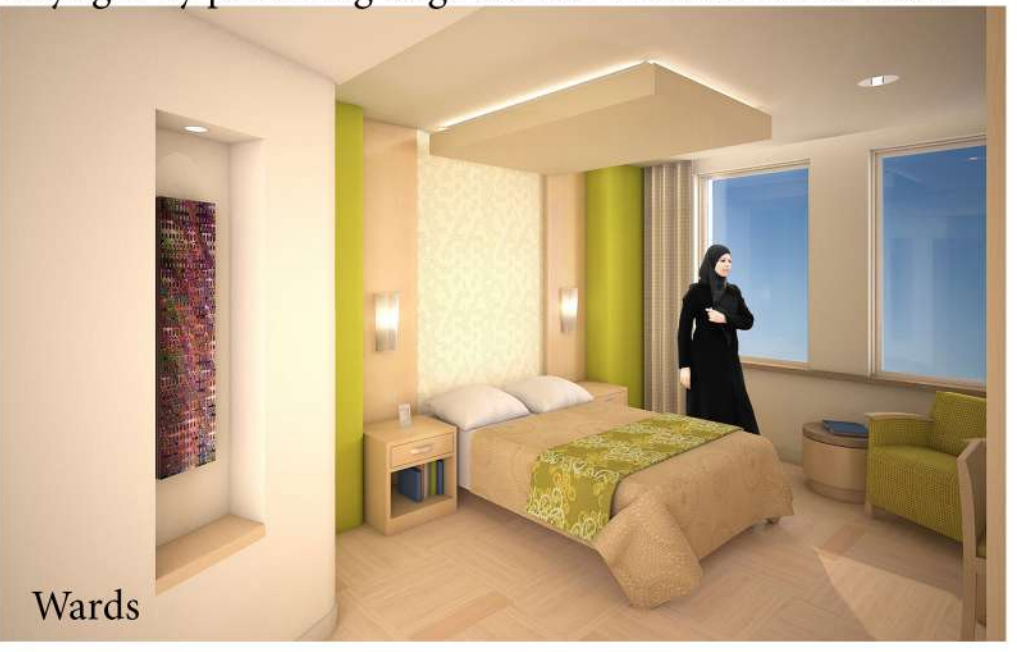
Living area



Therapy pool interior walls are accented with stone wall cladding as well as more amount of daylight enters the space by providing large windows.



Corridor spaces next to courtyard receive more amount of daylight by providing large curtain walls on either sides.



Wards

SPINE & BRAIN DISEASE REHABILITATION WELLNESS CENTRE

KAKKANAD, KOCHI, KERALA



LOCATION : Basel, Switzerland
SIZE : 22,890sqm / 246,387sqft
YEAR COMPLETED : September 2002
ARCHITECT : Herzog & de Meuron

The connection between indoor and outdoor spaces was our primary architectural concern. The complex is conceived from inside out: instead of an arrangement of structures, courtyards are placed in a large rectangle. They serve as orientation and allow daylight to penetrate the entire interior.



CASE STUDY- REHAB BASEL, CENTRE FOR SPINAL CORD AND BRAIN INJURIES



Therapy pool

Other structures are oriented inwards like the bathhouse whose small round holes in the roof make the place intimate from within but spectacular-looking from outside. There are places where one can retreat and others in which to enjoy company.

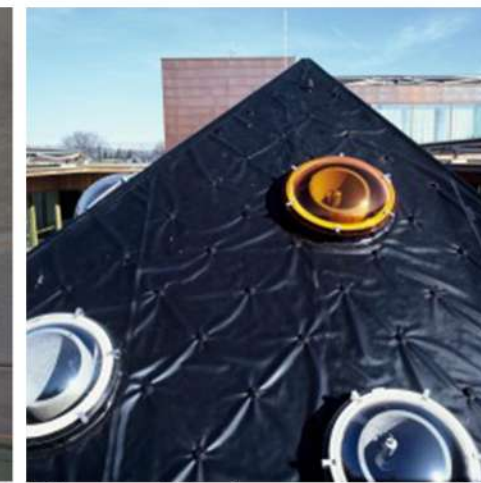


Lobby

Wood of different kinds and uses is the predominant material on the façades and inside. Delicate structures of wooden rods, horizontally interwoven in some places, vertically inserted into the ground in others, guide cloth awnings or function as screens to provide privacy. The plexiglas dowels that link these wooden rods glisten like beads when light falls on them.



Lobby



In one of the courtyards in this calm, serene setting, an irregular pyramid of concrete punctured with round skylights comes as a bit of a surprise. The mysterious angular hulk, shrouded in a black rubber, contains a dimly luminous swimming pool—a dramatic antidote to the rest of the center's abundant daylight.

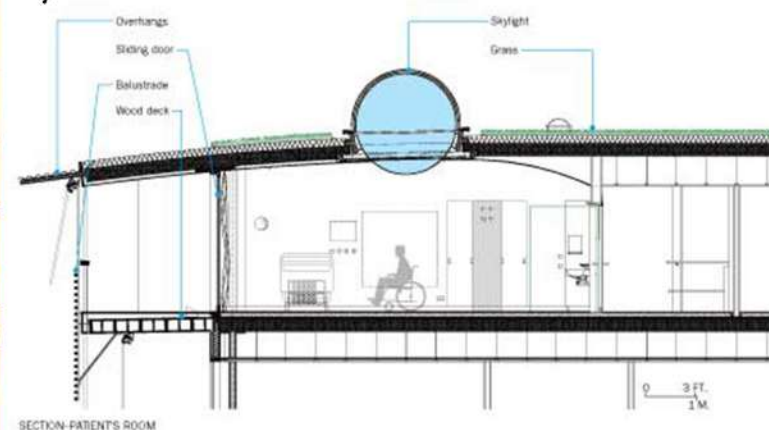


Courtyard

You walk in through a large courtyard, the centre of which is a cultivated field. In other words, you enter the complex through an outdoor space. From the main lobby, various inner courtyards provide orientation: one is filled with water, another is clad entirely in wood, the bathhouse is placed in the third, etc. You proceed along them until you reach your destination.



Wooden Deck



SECTION-PARENT'S ROOM

Transparent plastic spheres, 7 feet in diameter, embedded in the bedroom ceilings brings in sunlight from above, making artificial illumination hardly necessary during the day.

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ADMINISTRATION AREA

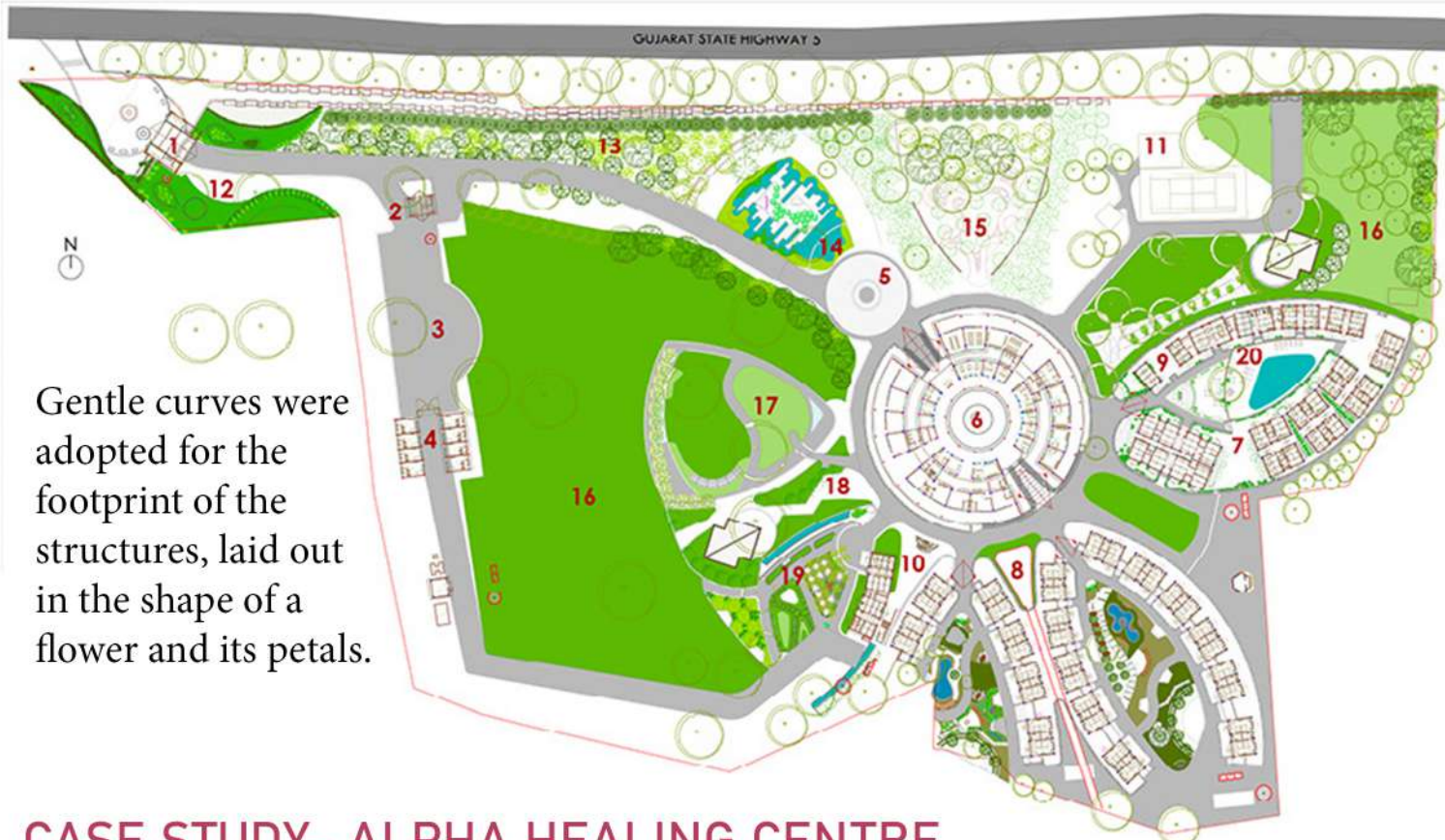
1. RECEPTION	26'9" x 15'0"
2. ADMIN & ASSESSMENT	13'0" x 12'3"
3. ACC. / PURCHASE DEPT.	26'6" x 12'3"
4. H.R MANAGER	13'0" x 12'3"
5. DIETICIAN/NUTRITION	13'0" x 12'3"
6. ADMIN OFFICE MANAGER	13'0" x 12'3"
7. OFFICE MANAGER	13'0" x 12'3"
8. CLINICAL DIRECTOR	13'0" x 12'3"
9. PROGRAM DIRECTOR	13'0" x 12'3"
10. MANAGING DIRECTOR	13'0" x 12'3"
11. THERAPIST	26'6" x 12'3"
12. NURSE STATION	13'0" x 12'3"
13. DR. ROOM	13'0" x 12'3"
14. STORAGE	11'0" x 5'6"
15. LAB	13'0" x 12'3"
16. FAMILY ROOM	13'0" x 12'3"
17. FEMALE TOILET	13'3" x 11'3"
18. MALE TOILET	13'3" x 11'3"
19. LOUNGE / WAITING ROOM	40'0" x 13'3"
20. EMERGENCY ROOM	13'3" x 16'6"
21. ROOM UNITS	14'9" x 15'0"
22. GENERAL STAFF ROOM	20'9" x 15'0"
23. VISITING CONSULTANTS ROOM	20'9" x 15'0"
24. BUSINESS CENTER	20'9" x 15'0"
25. BEHAVIOR / TECH STAFF	20'9" x 15'0"
26. CONFERENCE ROOM	20'9" x 20'0"
27. MEDIA / HOME THEATER	20'9" x 20'0"
28. LECTURE / GROUP THERAPY	41'9" x 13'0"
29. CASE MANAGERS	41'9" x 15'0"
30. THERAPIST 4	20'9" x 15'0"
31. THERAPIST 3	20'9" x 15'0"
32. THERAPIST 2	20'9" x 15'0"
33. THERAPIST 1	20'9" x 15'0"

RECREATION & ACCOMMODATION AREA

1. LIBRARY	12'0" x 20'0"
2. FEMALE TOILETS	9'9" x 12'0"
3. MALE TOILETS	9'9" x 12'0"
4. INDOOR SPORTS	31'6" x 20'0"
5. MALE TOILET	8'9" x 11'6"
6. AEROBICS	12'0" x 20'0"
7. GYM	19'3" x 20'0"
8. FEMALE TOILET	8'9" x 11'6"
9. RECEPTION	6'0" x 20'0"
10. REFLEXOLOGY	12'0" x 20'0"
11. SFRFNITY ROOMS	12'0" x 20'0"
12. RECEPTION	6'0" x 20'0"
13. GENTS MASSAGE	12'0" x 15'0"
a. steam room	4'3" x 4'6"
b. toilet	4'3" x 4'6"
14. LADIES MASSAGE	12'0" x 20'0"
a. steam room	4'3" x 4'6"
b. toilet	4'3" x 4'6"
15. SUITE ROOMS :	
1. LIVING/DINING	18'0" x 12'0"
2. BEDROOM	18'0" x 12'0"
3. DECK	5'0" x 8'6"
4. ATT. TOILET	7'3" x 6'0"
5. POWDER ROOM	4'0" x 6'0"
16. DOCTOR'S COTTAGES :	
1. FOYER	7'0" x 12'0"
2. LIVING ROOM	12'0" x 18'0"
3. DINING ROOM	12'0" x 18'0"
4. BED ROOM	12'0" x 18'0"
5. ATT.TOILET	6'0" x 7'9"
6. BED ROOM	12'0" x 10'0"
7. ATT.TOILET	6'0" x 5'8"
8. POWDER ROOM	6'0" x 3'9"

LOCATION : Jambughoda, Gujarat
SIZE : 75000 sqft.
ARCHITECT : Art & Architecture Associates

The refreshing, rejuvenating associations of a flower have been carried through the design in a subtle way. The footprint arrived at through the curved lines enabled the designers to conserve as many trees as possible on the site.



Gentle curves were adopted for the footprint of the structures, laid out in the shape of a flower and its petals.

BUILDING UNITS

1. MAIN ENTRANCE	1419 sq.ft
2. RECEPTION	474 sq.ft
3. PARKING AREA	9074 sq.ft
4. SERVANT QUARTERS	3314 sq.ft
5. ENTRANCE PORCH	6381 sq.ft
6. ADMINISTRATION AREA	25645 sq.ft
7. DOCTORS ACCOMMODATION	16225 sq.ft
8. PATIENT ACCOMMODATION	34728 sq.ft
9. RECREATION AREA	8218 sq.ft
10. CANTEN	3173 sq.ft
11. OUTDOOR SPORTS	36257 sq.ft

LANDSCAPE AREAS

12. ENTRANCE LANDSCAPE	10934 sq.ft
13. DENSE PLANTATION	71374 sq.ft
14. WATER SCAPE	7438 sq.ft
15. EXISTING PLANTATION	30403 sq.ft
16. LAWN AREA	111190 sq.ft
17. ORGANIC PLANTATION	17872 sq.ft
18. YOGA PAVILION	11569 sq.ft
19. OUTDOOR DINNING	7636 sq.ft
20. POOL DECK LANDSCAPE	7203 sq.ft



CASE STUDY- ALPHA HEALING CENTRE

SPINE & BRAIN DISEASE REHABILITATION WELLNESS CENTRE

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ACCOMMODATION AREA
PATIENT ROOMS
 1. DELUXE ROOM 12'0"X20'0"

The designers have attempted to make the complex as self-sufficient as possible, without compromising on comfort levels. Solar panels produce approximately 30KW, supplementing the electricity consumed from the grid. Organic farming enables 50% of the requirement of vegetables to be grown on the site. Waste water is used for irrigation and rainwater is harvested in a catchment area. Several water bodies have been created as part of the landscaping, to add to the visual appeal of the space.

The site has been conserved, local materials have been used, light and ventilation has been optimised and there is a perceptible connect with nature. The possibility of horizontal as well as vertical expansion has been provided and there is integration of energy saving, agriculture, recycling of organic waste and water. Recyclable materials have been used to minimise the green footprint.



The facility has a fully equipped administrative and medical centre at the core, recreation, special residences and doctor's residences in the eastern petals, with residences for patients in two of the southern petals. The restaurant sits in the western petal, along with lawns for hosting events. Organic farms and vegetable orchards lie on the southwestern zone of the site. The central structure is circular in shape, with an open to sky courtyard at its centre.



To maximise the therapeutic effects of nature and holistic healing, this design strives to create a connection between the patient and the natural environment – integrating a contemporary building into the untouched countryside.

The design is the thought that nature is a healing partner for drug and alcohol rehabilitation, combined with the role that flowers have played in some medicinal practices in ancient India – to address the spirit, mind and body in tandem.



CASE STUDY- ALPHA HEALING CENTRE

SPINE & BRAIN DISEASE REHABILITATION WELLNESS CENTRE

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Introduction



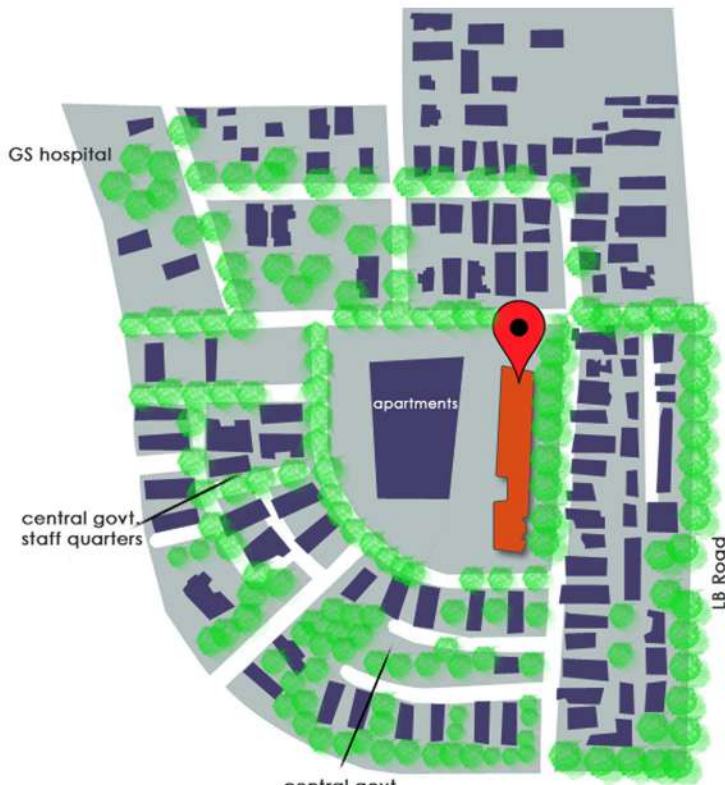
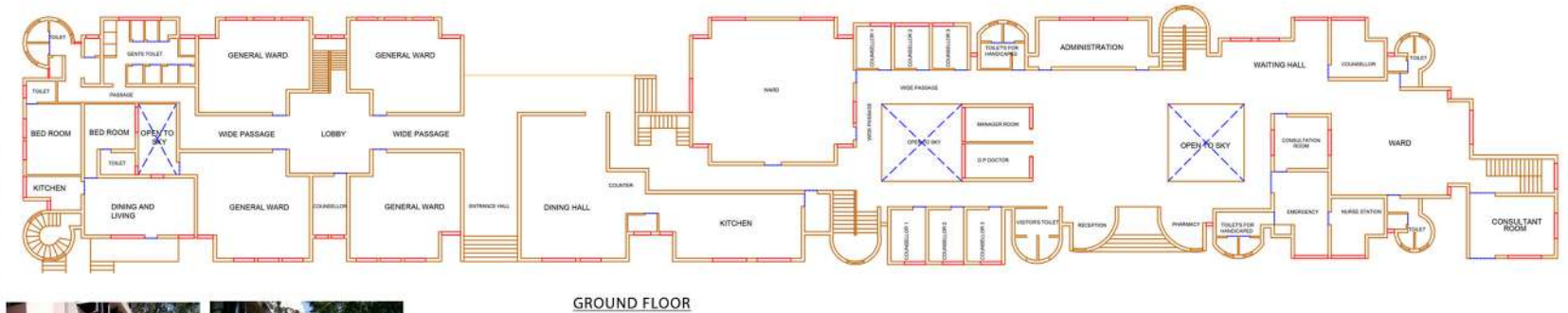
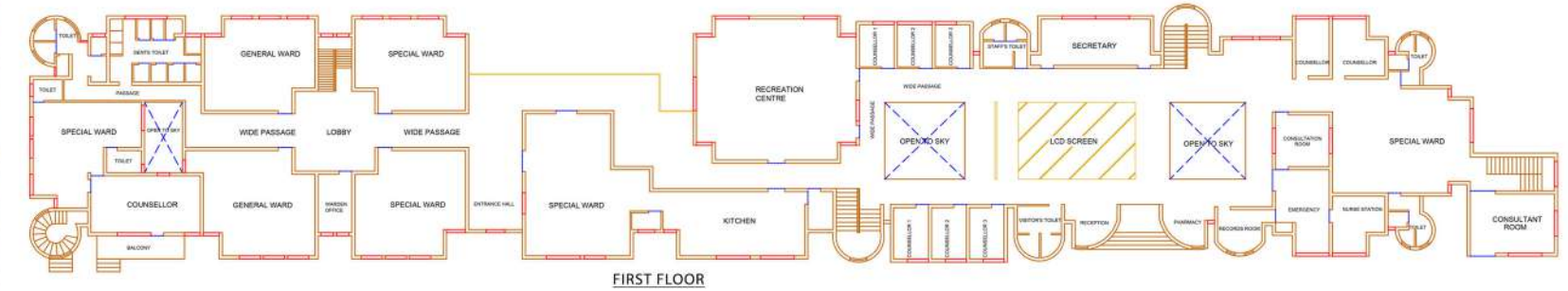
Location : Adayar, Chennai
 Type : Male and Female
 Patients capacity : 90.
 Year of completion : 1980
 No. of stories : 2
 Built-up area : 2432 sq.m.

It's a complete de-addiction and rehabilitation set up, built to Oversee the **mental position, hygiene** and also the comfortability of different class of drug addicted patients. It is located in **Chennai (INDIRANAGAR)**. It also initiated a vocational training unit to teach tailoring and computer education to drug addicts and their families. They have collaborated with many international agencies like **UNODC, WHO, ILO** and **European commission** in undertaking specific projects and placing the institution in the international map.

Facilities

Detoxification unit

- >Emergency ward
- >General wards and special rooms
- >Family ward
- >Family therapy center
- >Canteen
- >Pharmacy



Inpatient treatment -The treatment programme is a residential, multidisciplinary.

Out patient unit- it is easily accessible from main entrance to counsellors visitor lounge, patient lounge.

Psychological therapy comprises individual counselling, lectures, group therapy and relaxation techniques. individual care and attention are given to patient.

Detoxification unit- where the medical treatment is given for withdrawal symptom due to sudden stoppage of drug are dealt here.

Nurse station is centrally located between the emergency ward and this unit. Emergency ward where the condition becomes serious.

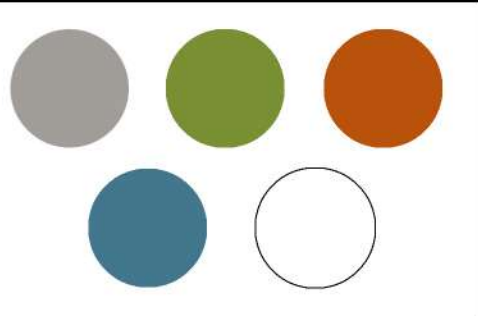
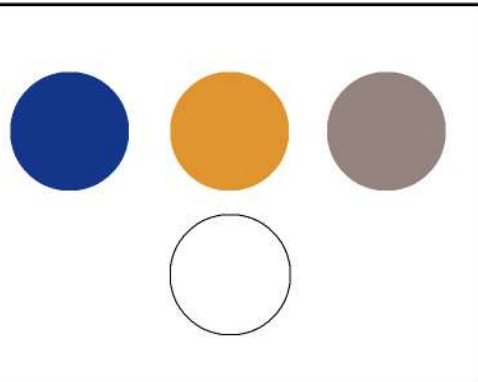
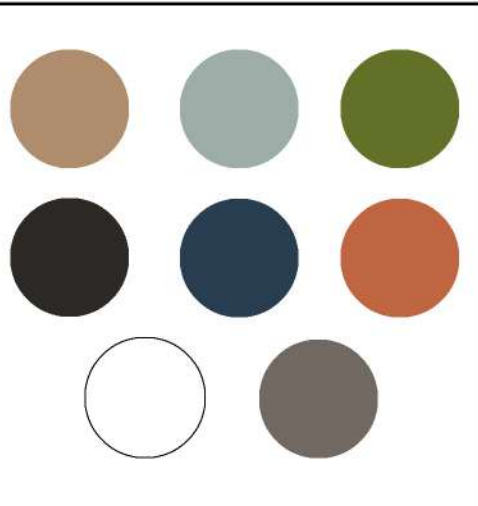
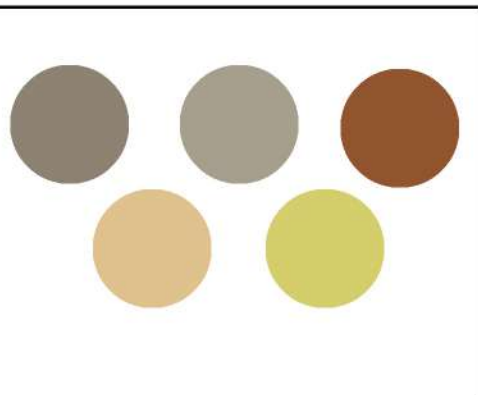
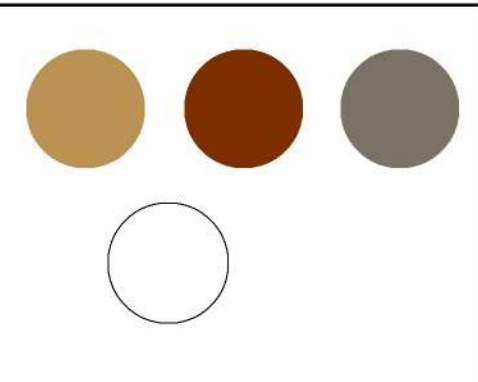
Inference

>The treatment has its philosophy deep-rooted in a conviction that addicts when provided with timely meditation treatment can lead better lives free of abuse of drugs and alcohol dependence, total abstinence from addiction for effecting positive changes in the behavior and attitude of individuals to enhance the quality of his/her life.

>The psychiatrist and medical officer's room is so located such that they can keep an eye on patients of detoxification ward as well as emergency ward.

Activities	Room	User
Individual counseling	Counseling room	Counselor, social worker, patient
Lectures	Therapy hall	Counselor, social worker, 25 patient
Group therapy	Therapy hall	Counselor, social worker, 15 patient
Relaxation technique	Therapy hall	Therapist, patients
Recreational activities	Recreational centre	Patients
Educative films	Recreational centre	Patients

CASE STUDY - TTK DRUG DEADDICTION CENTRE-CHENNAI

CASE STUDY	COLOUR	MATERIALS	LIGHT	SPACE	BIOPHILIC PATTERN
01.SPAULDING REHABILITATION HOSPITAL		Wooden texture wall panels. wooden tile flooring. ceramic tiles on therapy areas.	Diffused strip lights in therapy space. Recessed spot lights. Natural daylight penetrate through curtain walls.	The goal was to make it totally integrated interior & exterior. To create more transparency between rehabilitation hospital and community.	Visual connection with nature. Thermal & airflow variability. Material connection with nature.
02.REHABILITATION CENTRE GROOT KLINMMENDAAL		Sustainable materials & little maintenance requiring materials are used in floor finishes , ceiling & facade cladding.	Combination of large & small voids and light wells are created to allow natural daylight deep into the building. Recessed warm colour ceiling lights.	The design ambition was not to create a centre with the appearance of a health building but as a part of its surrounding & community.	Visual connection with nature. Prospect
03.MENNO HAVEN REHABILITATION CENTRE		Through textures and live plant materials nature is incorporated. Accent Stone wall cladding Grooved Wooden panel . Ceramic tile flooring. Carpet flooring.	Recessed spot lights. Recessed strip lights. Pendant lights. Natural daylight from full height windows.	Biophilic was the focus during the design process because research has found that incorporating elements from nature into the built environment improves recovery time.	Visual connection with nature. Material connection with nature. Biomorphic forms & patterns.
04.NATIONAL REHABILITATION CENTRE MAFRAQ		Stone wall cladding . Wooden batten ceiling. Accent pattern wallpaper. Ceramic wooden texture floor tiles.	Warm colour diffused lights. Recessed spot lights. Hanging lights. In pool area diffused daylight enter the space through large full height windows.	To design a human - centered rehabilitation centre that embrace the rich history of Abu Dhabi the modern high-tech world.	Visual connection with nature. Thermal & airflow variability. Material connection with nature.
05.REHAB BASEL CENTRE FOR SPINE & BRAIN INJURIES		Slopped Concrete roofing with numerous small holes in it. Vinyl wooden texture flooring.	Diffused natural lights through curtain walls . Recessed spot lights. Natural Daylight from small holes in roof	The connection between indoor and outdoor spaces through courtyards was our primary architectural concern.	Visual connection with nature. Material connection with nature.

SPINE & BRAIN DISEASE REHABILITATION WELLNESS CENTRE

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Biophilia is humankind's innate biological connection with nature.

14 patterns of biophilic design

*Nature in the Space

- 1. Visual Connection with Nature.** A view to elements of nature, living systems and natural processes.
- 2. Non-Visual Connection with Nature.** Auditory, haptic, olfactory, or gustatory stimuli that engender a deliberate and positive reference to nature, living systems or natural processes.
- 3. Non-Rhythmic Sensory Stimuli.** Stochastic and ephemeral connections with nature that may be analyzed statistically but may not be predicted precisely.
- 4. Thermal & Airflow Variability.** Subtle changes in air temperature, relative humidity, airflow across the skin, and surface temperatures that mimic natural environments.
- 5. Presence of Water.** A condition that enhances the experience of a place through seeing, hearing or touching water.
- 6. Dynamic & Diffuse Light.** Leverages varying intensities of light and shadow that change over time to create conditions that occur in nature.
- 7. Connection with Natural Systems.** Awareness of natural processes, especially seasonal and temporal changes characteristic of a healthy ecosystem.

*Natural Analogues

- 8. Biomorphic Forms & Patterns.** Symbolic references to contoured, patterned, textured or numerical arrangements that persist in nature.
- 9. Material Connection with Nature.** Materials and elements from nature that, through minimal processing, reflect the local ecology or geology and create a distinct sense of place.
- 10. Complexity & Order.** Rich sensory information that adheres to a spatial hierarchy similar to those encountered in nature.

*Nature of the Space

- 11. Prospect.** An unimpeded view over a distance, for surveillance and planning.
- 12. Refuge.** A place for withdrawal from environmental conditions or the main flow of activity, in which the individual is protected from behind and overhead.
- 13. Mystery.** The promise of more information, achieved through partially obscured views or other sensory devices that entice the individual to travel deeper into the environment.
- 14. Risk/Peril.** An identifiable threat coupled with a reliable safeguard

18.CONCEPT : BIOPHILIC DESIGN

14 PATTERNS	* STRESS REDUCTION	COGNITIVE PERFORMANCE	EMOTION, MOOD & PREFERENCE	
NATURE IN THE SPACE	Visual Connection with Nature	* * * Lowered blood pressure and heart rate (Brown, Barton & Gladwell, 2013; van den Berg, Hartig, & Staats, 2007; Tsunetsugu & Miyazaki, 2005)	Improved mental engagement/ attentiveness (Biederman & Vessel, 2006)	Positively impacted attitude and overall happiness (Barton & Pretty, 2010)
	Non-Visual Connection with Nature	* * Reduced systolic blood pressure and stress hormones (Park, Tsunetsugu, Kasetani et al., 2009; Hartig, Evans, Jamner et al., 2003; Orsega-Smith, Mowen, Payne et al., 2004; Ulrich, Simons, Losito et al., 1991)	Positively impacted on cognitive performance (Mehta, Zhu & Cheema, 2012; Ljungberg, Neely, & Lundström, 2004)	Perceived improvements in mental health and tranquility (Li, Kobayashi, Inagaki et al., 2012; Jahncke, et al., 2011; Tsunetsugu, Park, & Miyazaki, 2010; Kim, Ren, & Fielding, 2007; Stigsdotter & Grahn, 2003)
	Non-Rhythmic Sensory Stimuli	* * Positively impacted on heart rate, systolic blood pressure and sympathetic nervous system activity (Li, 2009; Park et al, 2008; Kahn et al., 2008; Beauchamp, et al., 2003; Ulrich et al., 1991)	Observed and quantified behavioral measures of attention and exploration (Windhager et al., 2011)	
	Thermal & Airflow Variability	* * Positively impacted comfort, well-being and productivity (Heerwagen, 2006; Tham & Willem, 2005; Wigö, 2005)	Positively impacted concentration (Hartig et al., 2003; Hartig et al., 1991; R. Kaplan & Kaplan, 1989)	Improved perception of temporal and spatial pleasure (alliesthesia) (Parkinson, de Dear & Candido, 2012; Zhang, Arens, Huizenga & Han, 2010; Arens, Zhang & Huizenga, 2006; Zhang, 2003; de Dear & Brager, 2002; Hescong, 1979)
	Presence of Water	* * Reduced stress, increased feelings of tranquility, lower heart rate and blood pressure (Alvarsson, Wiens, & Nilsson, 2010; Pheasant, Fisher, Watts et al., 2010; Biederman & Vessel, 2006)	Improved concentration and memory restoration (Alvarsson et al., 2010; Biederman & Vessel, 2006) Enhanced perception and psychological responsiveness (Alvarsson et al., 2010; Hunter et al., 2010)	Observed preferences and positive emotional responses (Windhager, 2011; Barton & Pretty, 2010; White, Smith, Humphries et al., 2010; Karmanov & Hamel, 2008; Biederman & Vessel, 2006; Heerwagen & Orians, 1993; Ruso & Atzwanger, 2003; Ulrich, 1983)
	Dynamic & Diffuse Light	* * Positively impacted circadian system functioning (Figueiro, Brons, Plitnick et al., 2011; Beckett & Roden, 2009) Increased visual comfort (Elyezadi, 2012; Kim & Kim, 2007)		
	Connection with Natural Systems			Enhanced positive health responses; Shifted perception of environment (Kellert et al., 2008)
NATURAL ANALOGUES	Biomorphic Forms & Patterns	*		Observed view preference (Vessel, 2012; Joye, 2007)
	Material Connection with Nature		Decreased diastolic blood pressure (Tsunetsugu, Miyazaki & Sato, 2007) Improved creative performance (Lichtenfeld et al., 2012)	Improved comfort (Tsunetsugu, Miyazaki & Sato 2007)
	Complexity & Order	* * Positively impacted perceptual and physiological stress responses (Salingaros, 2012; Joye, 2007; Taylor, 2006; S. Kaplan, 1988)		Observed view preference (Salingaros, 2012; Hägerhäll, Laike, Taylor et al., 2008; Hägerhäll, Purcella, & Taylor, 2004; Taylor, 2006)
NATURE OF THE SPACE	Prospect	* * * Reduced stress (Grahn & Stigsdotter, 2010)	Reduced boredom, irritation, fatigue (Clearwater & Coss, 1991)	Improved comfort and perceived safety (Herzog & Bryce, 2007; Wang & Taylor, 2006; Petherick, 2000)
	Refuge	* * * Improved concentration, attention and perception of safety (Grahn & Stigsdotter, 2010; Wang & Taylor, 2006; Wang & Taylor, 2006; Petherick, 2000; Ulrich et al., 1993)		
	Mystery	* * Induced strong pleasure response (Biederman, 2011; Salimpoor, Benovoy, Larcher et al., 2011; Ikemi, 2005; Blood & Zatorre, 2001)		
	Risk/Peril	* Resulted in strong dopamine or pleasure responses (Kohno et al., 2013; Wang & Tsien, 2011; Zald et al., 2008)		

BIOPHILIC DESIGN ELEMENTS:

1.VISUAL ELEMENTS



CSG International, Bangalore

2.AUDITORY ELEMENTS



Prudential Work place Singapore

3.OLFACTORY ELEMENTS



The Hive, Bangalore

4.SENSE OF TOUCH



Li & Fung, Hong Kong

5.THERMAL VARIABILITY



Adobe, Bangalore

6.LIGHT VARIABILITY



Coca-Cola, Singapore

7.PRESENCE OF WATER



Prudential WorkPLAYce, Singapore



Plants



Water



Materials



Patterns



Wind/Air



Light/Space

Material board



plywood with laminate finish



sustainable cork floor with veneer finish flooring



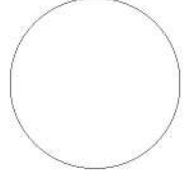
plain off -white cotton canvas fabric



Linoleum flooring



Stone texture wall tile



MOOD BOARD