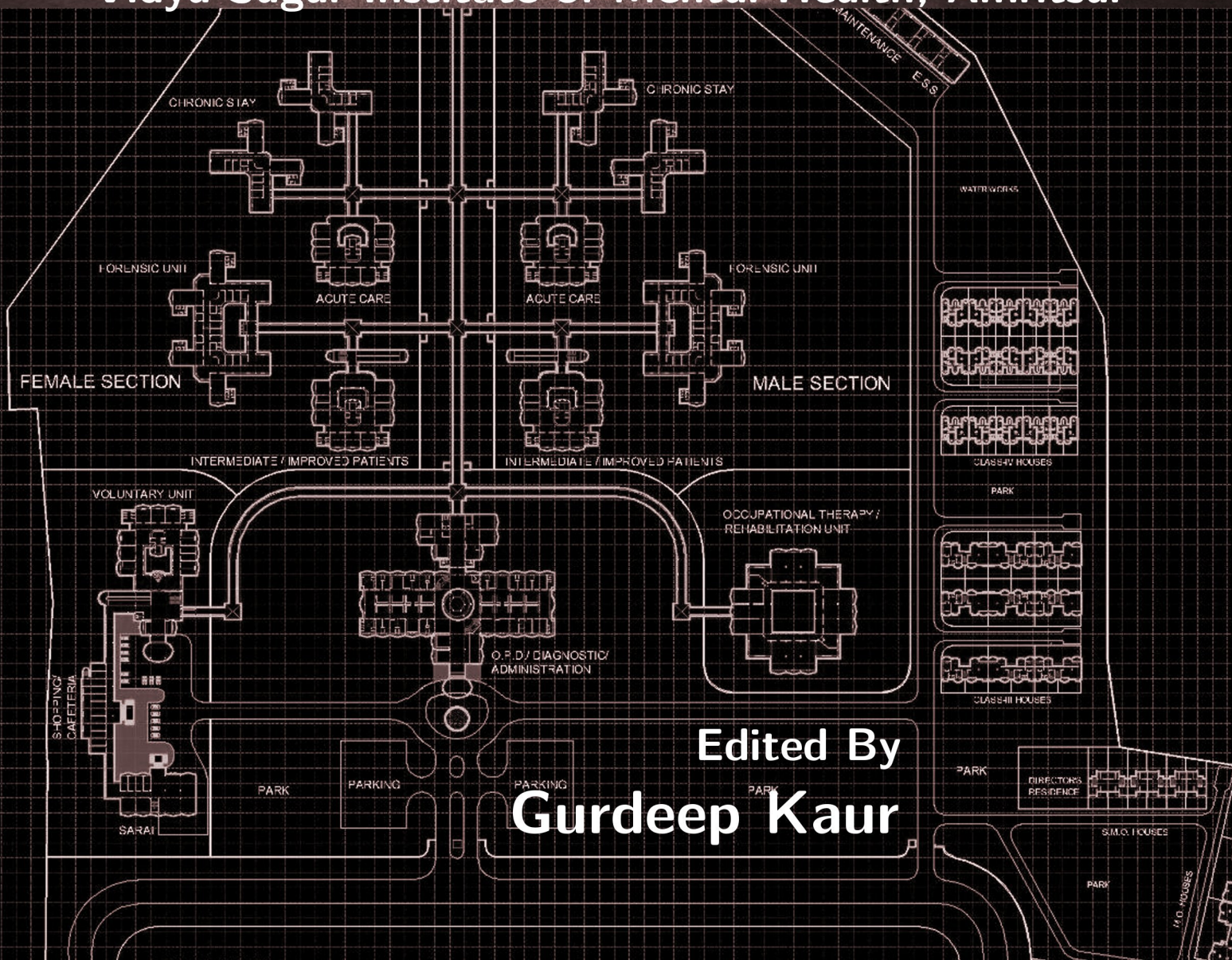




# Sarbjit Bahga's HUMANE ARCHITECTURE

Vidya Sagar Institute of Mental Health, Amritsar



Edited By  
**Gurdeep Kaur**

Sarbjit Bahga's

# Humane Architecture

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# *Contents*

Historical Background of Mental Hospitals in India	7
The Institute Complex	9
Architectural interpretation of the client's brief	13
OPD-cum-administrative wing	19
Occupational Therapy and Rehabilitation Unit	25
Inpatient Units	27
Voluntary Unit	37
Shopping Arcade and Cafeteria	41
The Serai Building	43
Kitchen and Laundry Block	45
Gallery of Other Infrastructure	47
Structural System	53
Specifications	55
Gallery of Campus Life	57
Award to the Institute from the Indian Concrete Institute	63
About Sarbjit Singh Bahga, Architect	65
Bahga's Architecture, Work Ethic, Philosophy, and Methodology	67
Index	75



## *Humane Architecture*

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ONCE described as the Mother of the Arts, architecture is the only art form which can be truly inhabited. The fundamental role of architecture, therefore, is to establish a rich and rewarding relationship between people and the built environment within which we exist. When building and user begin to develop an almost subconscious dialogue we have the beginnings of Humane Architecture.

It should not be assumed that architecture is always a direct response to the emotional and physical needs of humans; hidden agendas often prevail. At the same time a humane architecture is not merely the opposite to a potentially evil twin Inhumane Architecture, but instead is a way of building whose form and function are wrapped around and derived from the human condition. Far too often we see empty shells, devoid of a life and soul due to a painfully cold interaction between the pristine object-like building and its awkward-looking occupants.

Humane Architecture is concerned with the lived experience of form; a sympathetic architecture which guides people through life in a more comfortable and less inhibited way. It does not use form and materiality merely for effect, but manipulates them such that their inherent qualities become an emotional feature of the design and provoke a stimulating and rewarding relationship between buildings and people.”

*Matthew Lowther*



## *Historical Background of Mental Hospitals in India*

THE history of modern psychiatry in the Indian sub-continent is the story of the establishment of mental hospitals in India. No record exists of any institution for the insane before the arrival of the British East India Company in 1600 AD. The early establishment of mental hospitals on the Indian sub-continent, therefore, reflected mainly the needs and demands of European patients in India during that period. Later years saw the development and growth of mental institutions marked by both interest and neglect by the colonialists who ruled this country for over 200 years. There is also some evidence that the Portuguese first brought to India the modern medicine and hospitals during the 17th century in Goa. However, the establishment, segregation of lunatics in mental asylums, and their supervision were entirely of British origin.

The ideas and concepts as prevalent in England and Europe during those days greatly influenced the early institutions for the mentally ill in India. Primarily, the mental asylums were built to protect the community rather than treat the insane. Those asylums were constructed away from cities with high enclosures in early-dilapidated buildings such as barracks left by the military men. It appears that the lunatic asylums in India were first started to treat European soldiers employed with the East India Company. Till 1857, the growth of the lunatic asylums was restricted to major cities like Calcutta, Bombay, and Madras. Subsequently, the suppression of 1857 revolution brought about some interesting changes, and the power of the East India Company was directly taken over by the Crown on the of 1st November 1858. In this year, the first Lunacy Act, known as Act No. 36, was enacted. It not only gave guidelines for establishment of mental asylums but also set the procedure for admitting mental patients.

A committee appointed in Bengal in 1888 later modified this Act whereby elaborate instructions and guidelines for the admission and treatment of criminal lunatics were provided. The asylums then constructed were simply places of detention. As medical supervision of some sort was considered necessary in the event of illness of inmates, the institutions, for the sake of expediency, were given over their medi-



cal management.

A significant development of mental hospitals in India started in the early part of the 20th century. This was the result of adverse publicity about the condition of these hospitals. A need was felt for a more humanistic concern on the part of the Government. Amongst the significant changes thus brought about was the decision of the Government to put the mental hospitals, which were hitherto under the charge of the Inspector General of Prisons, under the charge of Civil Surgeons. The second change was in the recognition of the fact that specialists in psychiatry should be appointed full-time officers of these hospitals. The third significant addition was the intent of the Government to have central supervision of all lunatic asylums. This was contemplated in 1906, and brought about in the form of Indian Lunacy Act 1912. The other associated change noticed was the growing concern of the public about the condition of mental hospitals which resulted in not only the improvement of existing hospital conditions at that time but also in the opening of many more new hospitals. Yet another significant development in metamorphosis of these institutions was that in 1920 the Government decided to change the names of all mental asylums in India to mental hospitals. These were some significant changes that took place during this period, including the recognition of occupational therapy and other rehabilitative measures.

Since the country gained Independence in 1947, the emphasis of the Government of India has been more on the creation of psychiatric departments in general hospitals rather than establishing new mental hospitals. During the past few decades, very few new mental hospitals have been added, and amongst these most of the institutions have been in the private sector. There has also been some emphasis on improving the existing hospitals. A significant point to note is that no mental hospital has been closed in spite of the lack of financial support though the number of beds has been reduced in some large mental hospitals. Another important development has been the intervention of the Supreme Court of India following Public Interest Litigation for the improvement of the general condition of the mental hospitals. Subsequently, the administration of some State mental hospitals, like those at Delhi, Ranchi, Gwalior, Agra, and Tejpur, has been taken over by Autonomous Bodies. The future of mental hospitals as providers of mental health-care appears promising as a whole, though a number of constraints may yet be existing.

## *The Institute Complex*

THE Government Mental Hospital at Amritsar was established in 1948, and is being managed by the Punjab Government. Before the partition of the country, there was a large mental hospital in Lahore serving the entire state of erstwhile Punjab in British India. After the partition, it was decided to transfer the Indian patients from the Mental Hospital at Lahore to India. After a brief stay in the Mental Hospital at Ranchi, all the patients were housed in the newly-established Mental Hospital, a short distance away from the city of Amritsar. It was located in the old army barracks spread over an area of 35 hectares approximately. Initially, the bed-strength was 50, which was gradually increased to the present sanctioned strength of 811. Now this hospital is serving the three states of Punjab, Haryana, and Himachal Pradesh.

The services offered by the hospital include general psychiatric services, child-guidance clinic, de-addiction clinic, round-the-clock emergency services, and clinical psychology and biochemistry laboratories. Besides the above facilities, the hospital is involved in the teaching of psychiatry to undergraduate medical students and in psychiatric nursing to Diploma Nursing students.

Unfortunately, the condition of the hospital gradually deteriorated to most inhumane level over the years, particularly so during the last decade. Administrative apathy, lack of financial resources, combined with poor management, reached rock-bottom pathetic stage that the public started fast losing confidence in the hospital's ability to provide basic services to the patients. A number of scandals of gross mismanagement had been reported in the Press from time to time. Lately, the matter was also under the active consideration of the Human Rights Commission, Punjab.

In view of these developments, the Government of Punjab decided to set up a high-powered Advisory Committee to look into the affairs of the Government Mental Hospital, and to make suitable recommendations for its improvement. Several proposals were examined including shifting of the hospital to a new site away from the city, and improving the existing infrastructure. After going into various details, it was finally decided to construct a new 450-bed hospital on about 18-hectare

piece of land at the back of the present complex, which was partly lying unused and partly had old dilapidated buildings. It was proposed to dismantle the old structures.

Setting up a new Institute on the existing campus was a gigantic task, particularly because the functioning of the existing hospital was required to be undisturbed during construction period. After renovation of old vacant buildings, the area on the rear of the existing hospital was got vacated for unhindered construction activity. The existing utility services like sewer/effluent lines, electrical lines, and water supply lines, passing through the proposed new complex, have been diverted on alternative routes to the minimum inconvenience to the occupants. The phasing of the new construction has been done in such a way that full-fledged new services will also come in place during the construction. As soon as the new buildings are ready to house the patients and other activities, all the existing buildings in the front as well as residential complex will be pulled down, and a modern well-designed shopping complex created there. It is envisaged that the sale proceeds of the commercial complex will fully support the development.

The high-powered Advisory Committee finalized the following scope of work after detailed deliberations and site-visits:

## The Hospital

### Wards

<i>Male Section</i>	No. of beds
Intermediate and Improved patients stay	100
Forensic Unit	80
Acute Care	20
Chronic Stay	50
	Total: 250
<i>Female Section</i>	
Intermediate and Improved patients stay	60
Forensic Unit	20
Acute Care	20
Chronic Stay	50
	Total: 150
<i>Voluntary Unit</i>	50
	Grand Total: 450

- OPD-cum-Administrative Block comprising Consultation Rooms, ECT Wing, Medical Emergency Wing, Diagnostics, Administration, Library, Lecture Halls, Seminar Hall, Exhibition Hall etc.

- Occupational Therapy cum Rehabilitation Unit comprising Quiet Lounge, Noisy Lounge, Music Room, Workshops for Stitching, Embroidery, Knitting, Pottery, Canning, Candle making, Radio/T.V., Weaver's Shop, Carpenter Shop, Gymnasium, Thrift and Gift Shop, besides rooms for Counselling, and Psycho-education , etc.
- Service Blocks, Comprising Kitchen, Laundry, Stores and Maintenance Wing.
- Serai for 76 persons.
- Shopping Arcade-cum-Cafeteria.
- **Covered area of the hospital 37500 square metres**

### The residences

Residence Type	No.
Director	1
Senior Medical Officer	4
Medical Officers'	12
Class-III Staff	28
Class-IV Staff	70
	Total: 115

- **Covered area of the residences 8000 square metres**

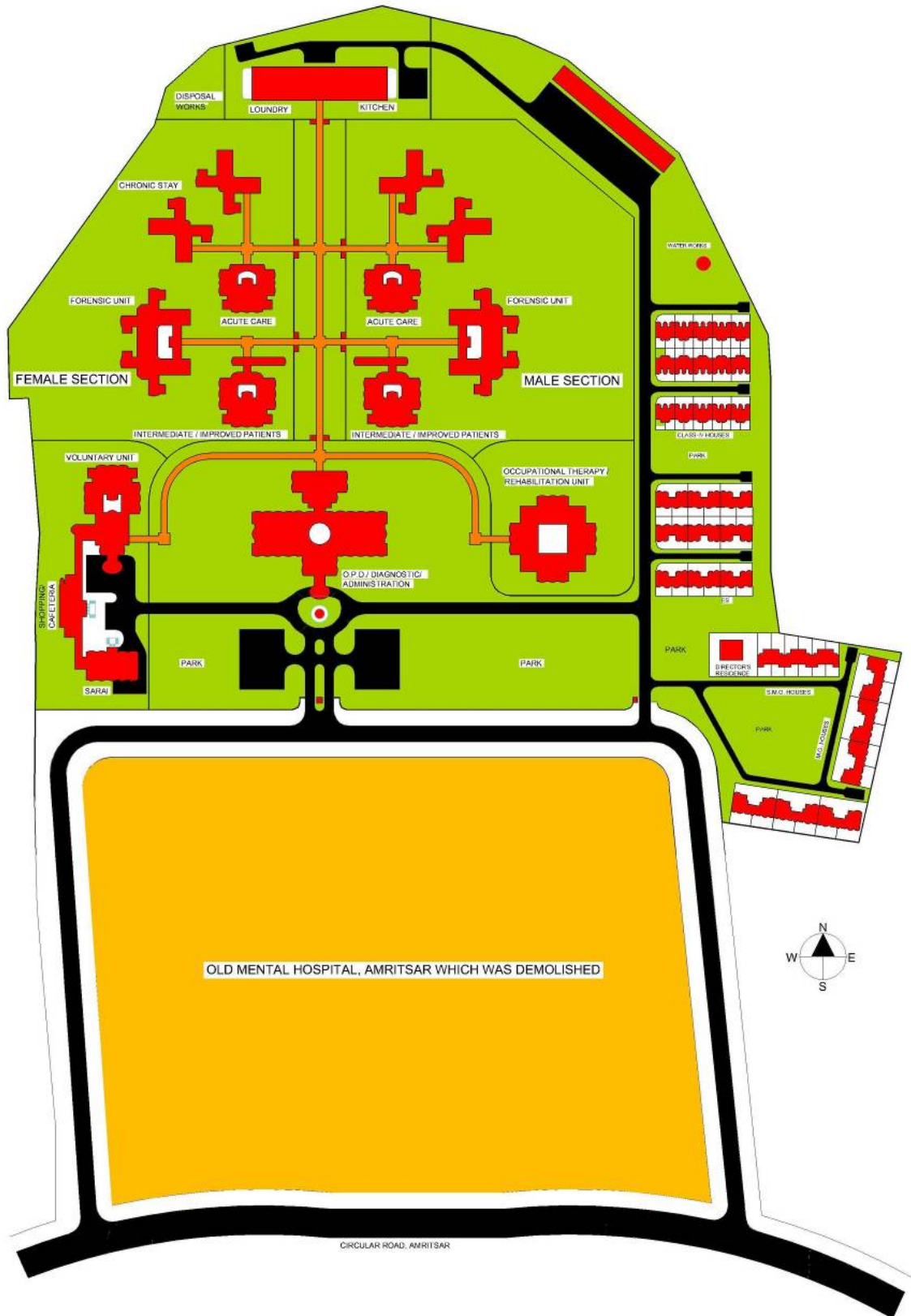


Figure 1: Composite layout plan of the Institute

## *Architectural interpretation of the client's brief*

HAVING finalised the above scope of work and a site of about 18 hectares, the next task was to translate the ideas into reality. It was indeed a Herculean task especially when there was no prototype of mental institute existing in India, nor were there any published works of this nature. In the given circumstances, the design had to evolve entirely on the basis of the Architect's conception of various spaces and his interpretation of the Client's Brief given by the Advisory Committee, in general, and Dr P Kulhara and Dr Ajit Awasthi of Department of Psychiatry, PGIMER, Chandigarh, in particular.

Mental hospital is a speciality hospital, with its patients having their special needs. Broadly, the patients can be acutely disturbed and excited, or behaviourally settled. Most of the patients are mobile, and, therefore, need more open space. Average stay of patients in a mental hospital is usually much longer than their counterparts in other hospitals, and they frequently suffer from social stigma and face problems in rehabilitation on discharge. All these factors have been taken into consideration while planning and designing the VSIMH, Amritsar.

The master plan comprises primarily two zones: the Outer Circle and the Inner Circle. The Outer Circle accommodates the buildings like OPD-cum-Diagnostic-cum-Administrative Block, Occupational Therapy/ Rehabilitation Unit, Voluntary Patients' Unit, Serai, Shopping/Cafeteria besides, Services like Kitchen, Laundry, and Stores. Staff quarters have also been located in the Outer Circle on the eastern fringe of the campus. The Inner Circle having wards of different types has further been divided in two Sections: the Male Section on the east and the Female Section on the west. These Sections are enclosed by 6-foot- high boundary-walls with restricted entries. Check-posts are provided at each entry point. This has been done to avoid two major problems: Escape of Patients and Pregnancy Cases, which often arise in mental hospitals in day-to-day practice, and have far-reaching legal implications. Each section has separate ward blocks i.e. for Intermediate/Improved Patients, Forensic Unit, Acute Care and Chronic Stay. The OPD-cum-Administrative Block is placed on the front that is the

southern side while the Kitchen and Laundry Block is placed at the back or the northern side. Occupational Therapy/Rehabilitation Unit on its east and a mini-complex of Voluntary Unit, Shopping/Café, and Serai on its west flanks the OPD/Administrative Block.

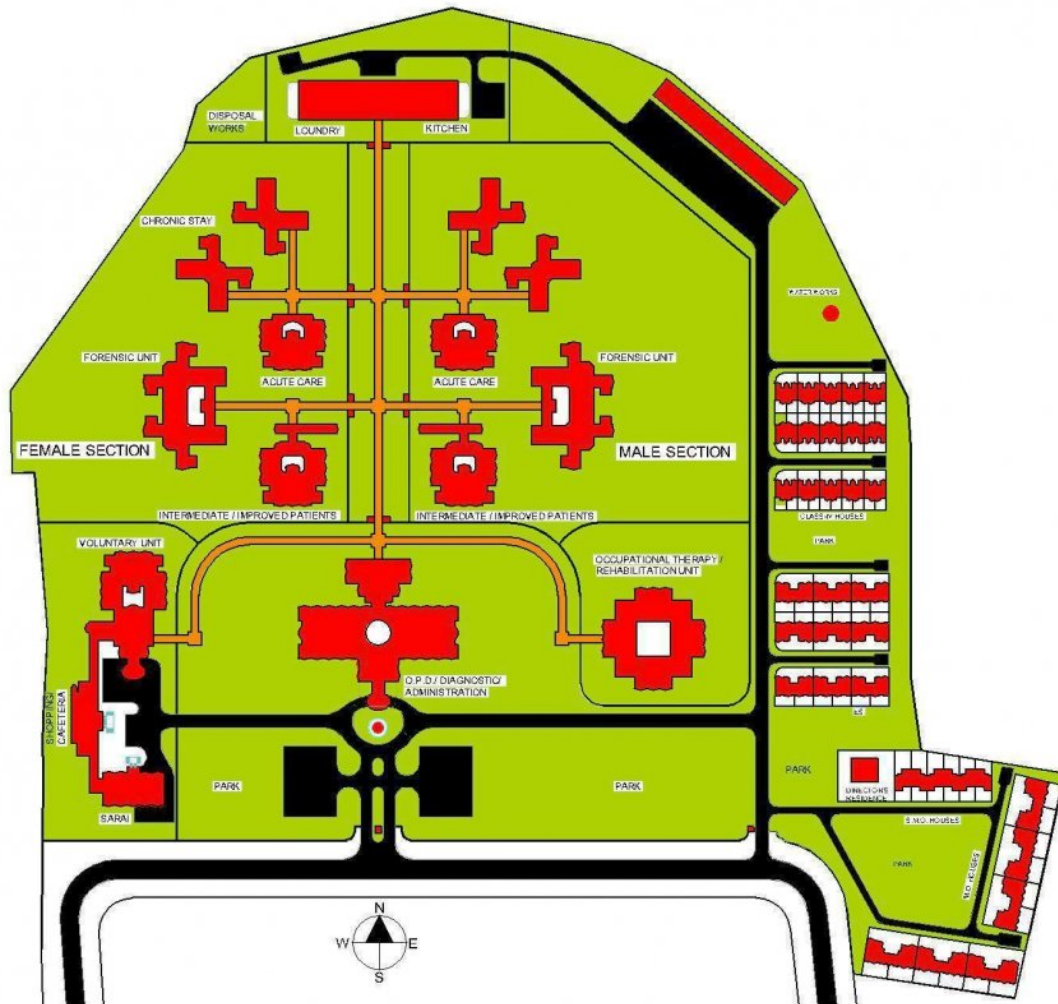


Figure 2: Layout plan of the Vidya Sagar Institute of Mental Health, Amritsar, Punjab

All the building blocks in the campus have been laid out on a strict Cartesian pattern with symmetrical juxtaposition reminiscent of traditional Indian campuses. The built-up masses and the open spaces are ingeniously interwoven to create a building-in-the-garden effect. The entire hospital complex has been linked by vaulted corridor running independently through open spaces with greenery on both the sides. Built-up benches have been provided at certain intervals for casual sitting while walking in the corridor. The intersections of two corridors have been developed as a 20 feet by 20 feet chowk with a high roof.

The entire Inner Circle has been kept strictly pedestrian so as to impart serene and tranquil environment to the inmates. Vehicular traffic has been restricted to the periphery. The designs of all the building blocks have been evolved keeping in view the peculiar requirements of different types of patients. For instance, the Acute Care and Chronic Stay Units have been kept single-storey, as it will be difficult for the patients in these blocks to go and live upstairs. On the contrary, the Intermediate/Improved Patients' Stay, Forensic Units and Voluntary Units have been designed as double or triple storied. Efforts have been made to evolve a distinctive architecture for each block so as to make them easily identifiable by the inmates. This has been achieved by building Forms that follow the Functions they are required to serve. As a result, each type of ward block and other building components in the campus have exclusive Forms truthfully emerging out of the most suitable and functional plans. However, the Unity and Consistency—the two important aspects of campus designing—have been taken care of by providing uniform external finishes i.e., exposed concrete and red sand-stone cladding.

The master plan provides for ample open spaces to be developed as gardens, parks, play fields, etc. This helps in creating a lively, cheerful, and natural environment, which is a prerequisite for such hospitals.



Figure 3: Curved and vaulted corridors – a hallmark of the campus

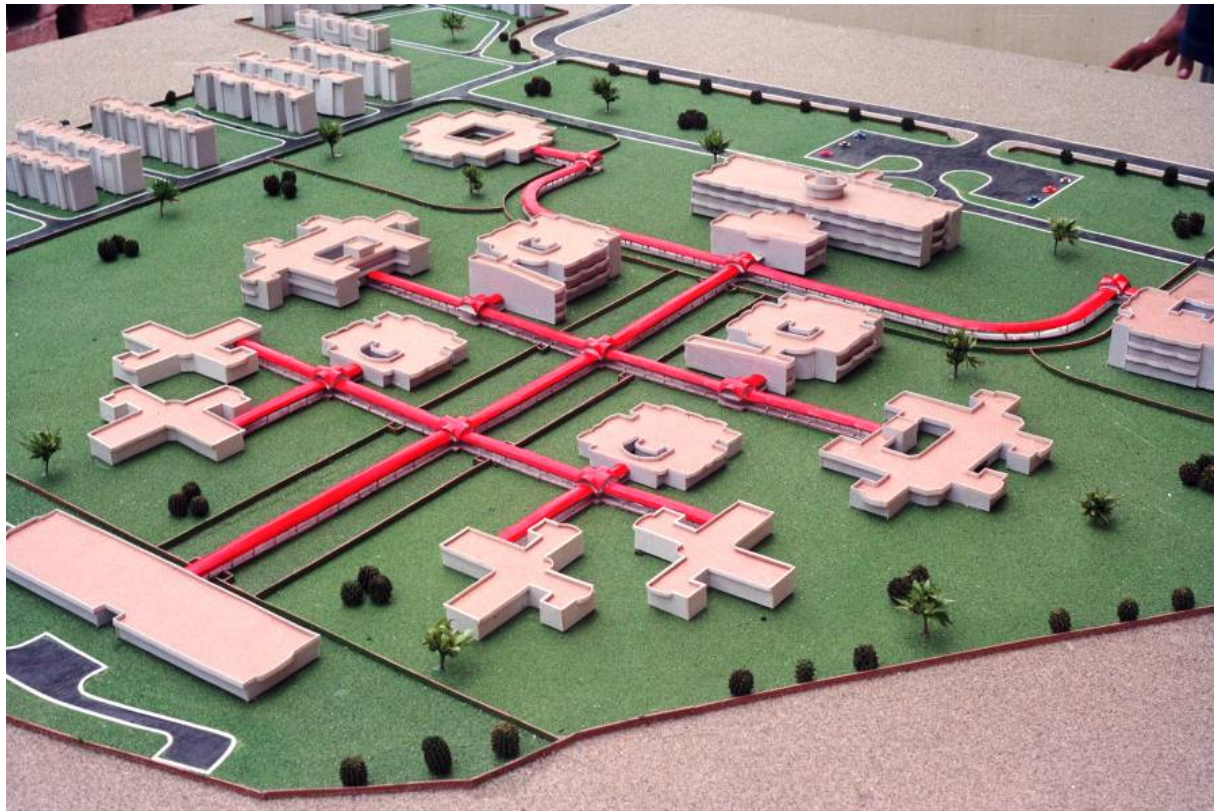


Figure 4: Model showing the layout of the complex





Figure 5: General view of the campus



Figure 6: General view of the campus



Figure 7: Pleasant external ambiance



Figure 8: Welcome to the institute



Figure 9: Vaulted corridor runs independently through open spaces



Figure 10: Curved and vaulted corridors – a hallmark of the campus

## *OPD-cum-administrative wing*

**T**HE Outpatient Department-cum-Administrative Block is strategically located on the southern side facing the main entrance to the hospital. By virtue of its location this block becomes a landmark in the entire campus. The three-storey building has a covered area of 8475 square metres, and is cross-shaped in plan. It accommodates registration, records, waiting spaces, consultation rooms, medical emergency, and ECT wings at ground floor level.

At the first floor level, there is diagnostic wing comprising laboratory, CT scan, X-ray, EEG, ECG, etc., besides a library, lecture halls, seminar hall, exhibition hall, and some administrative offices. The remaining offices have been accommodated at the second floor level. All the floors are vertically linked by a lift, two staircases, and a ramp adjusted in the core of the building. The circular ramp serpentine round a triple-height atrium, which receives daylight from top. This feature adds to the spaciousness and grandeur of the inner core.



Figure 11: Perspective rendering of OPD block



Figure 12: OPD-cum-administrative wing: front aspect

At the ground floor level, as soon as the patient enters the OPD, the receptionist attends him. Registration and other formalities are done and the patient is guided to the doctor's room. There is ample waiting space with proper sitting arrangements outside the doctors' chambers. Doctor's consulting room has been carefully designed to accommodate an office table, 3-4 chairs, and an examination table. One attached toilet has been provided with two chambers. The rooms are designed to avoid overlooking and communication with other rooms as this can cause possible interruption of confidential discussions.



Figure 13: Entrance to OPD block

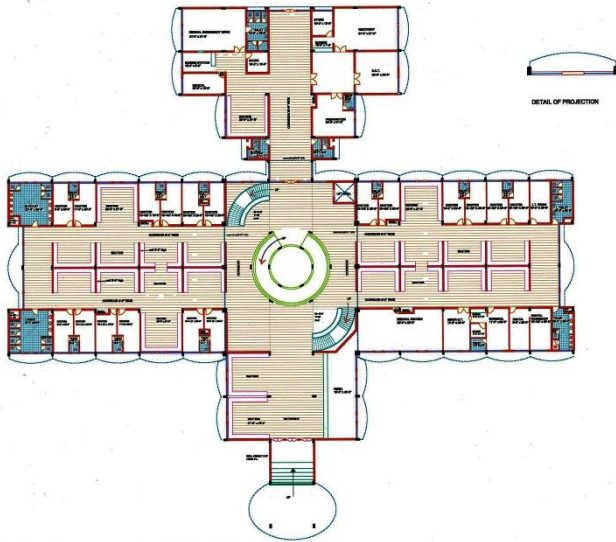


Figure 14: Ground floor plan

Figure 15: First floor plan



Figure 16: Second floor plan

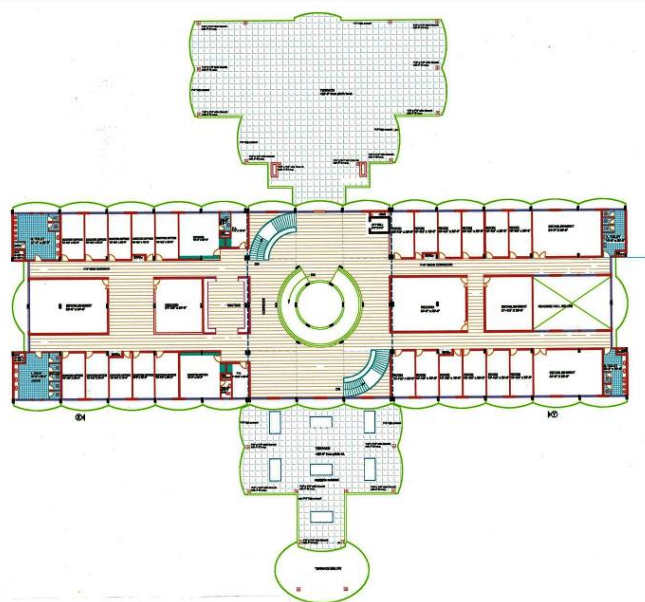




Figure 17: View of ramp in OPD block

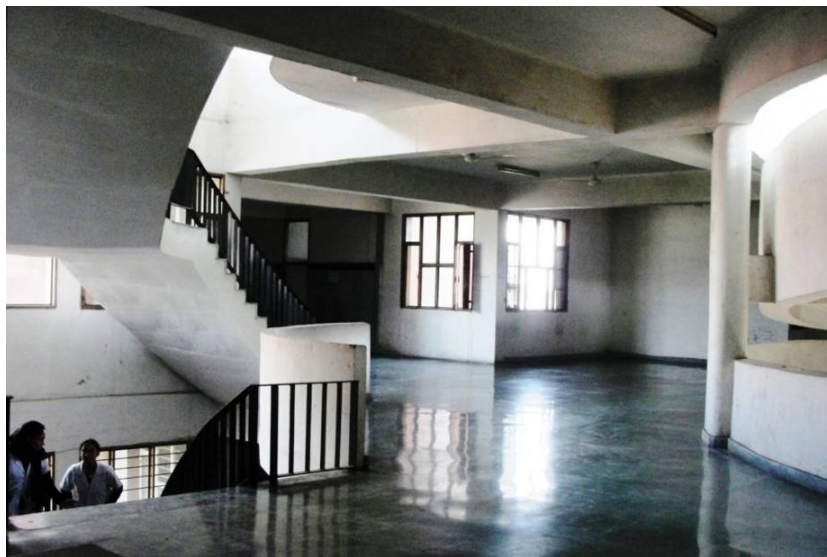


Figure 18: Foyer in OPD block



Figure 19: Top-lit atrium in OPD block





## *Occupational Therapy and Rehabilitation Unit*

**O**CCUPATIONAL therapy and rehabilitation is a vital component in the functioning of a mental hospital. Its purpose is to train the patients in utilising their time effectively and productively. The Occupational Therapy and Rehabilitation Unit has thus been designed to provide important supportive services for the betterment of mentally-ill patients. The single-storey building, having a covered area of 1685 square metres, is located in the Outer Circle on the eastern side of the OPD Block. It is well connected to the rest of the hospital complex by a covered link-passage.

The building is designed around a central courtyard of 64 feet by 64 feet in size. A singly-loaded corridor runs along this court and provides access to various activity-areas. These include noisy and quiet lounges, music room, art shop, workshops for radio/T.V. repair, candle-making, pottery / canning, stitching / embroider / knitting, and carpentry, besides weavers' shop, thrift and gift shop, and rooms for counselling and psycho-education. All these rooms and workshops draw sufficient daylight from large fenestrations on the outer periphery. In addition, ventilators have been provided on the internal courtyard side for effective cross-ventilation.

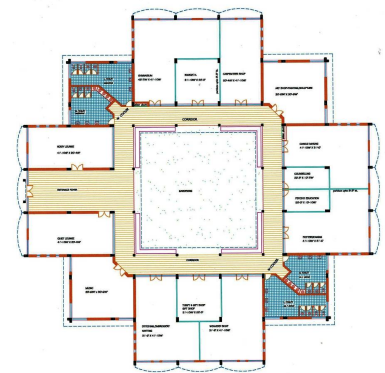


Figure 20: Ground floor plan occupational therapy unit



Figure 21: Entrance to the occupational therapy unit



## *Inpatient Units*

PATIENT units or wards form a major component of a mental hospital because contrary to the general hospitals, the average stay of a patient in such a hospital is much longer. There are broadly three types of activities involved in the in-patients' units. Firstly, the patients stay in a congenial environment together performing their daily-routine chores. Secondly, the service of meals, done three times a day, requires trolley movement between the Kitchen Block and the Wards. Thirdly, the replacement of dirty clothes with fresh laundry which takes place at least once a day also requires trolley-movement between the Laundry Block and the Wards. Apart from this circulation, the patients' movement from the Wards to the Occupational Therapy/Rehabilitation Unit and the doctors'/staff's movement from OPD/Administration Block to the Wards are also involved. The layout has thus been planned keeping in view the above activities and the easy flow of pedestrian movement between different activity-zones.

The design of various Ward blocks is governed by the Client's/User-Group's Brief provided to the Architect. Among other things, it stipulates that the Wards must be such that the patients feel secured. The feeling of security is the first prerequisite for rehabilitating the patient's normal relations with his environment, because a sense of insecurity engenders anxiety, which is the root-cause of much disturbed behaviour. Most of the Ward blocks, like Intermediate/Improved Patients Units, Acute Care and Voluntary Units, should have dormitories with six beds each. The other units like Chronic Stay and Forensic Units should have dormitories for 10-12 patients each. The Nursing Stations should have a central location in the Ward so that the patients remain under constant vigil. Each Ward should have a separate dining space, which can also serve the purpose of social interaction amongst the patients. Provisions for lounge and recreation room should also be made since psychiatric patients often have to stay for long periods. Adequate open area should be provided with each Ward for various group-activities of the patients. While designing the Ward blocks of different types, concerted efforts have been made pursuing the rationale that was drawn from a logical interpretation of the Client's Brief. As a result, each block is an

architectural manifestation of function, truthfulness, and aesthetics.

### Intermediate/improved patients' unit

The Intermediate/Improved Patients' Unit, as the name denotes, is meant for the patients who have either improved after a long treatment or their treatment involves shorter period of hospitalisation, and are likely to be relieved within a few weeks or months. Since the condition of this category of patients is comparatively better their Wards are designed to be two-and three-storey. In the Male Section this block is three-storey high, and accommodates 100 patients. It has a covered area of 3240 square metres. In the Female Section this block is double-storey and houses 60 beds. Its covered area is 2160 square metres.

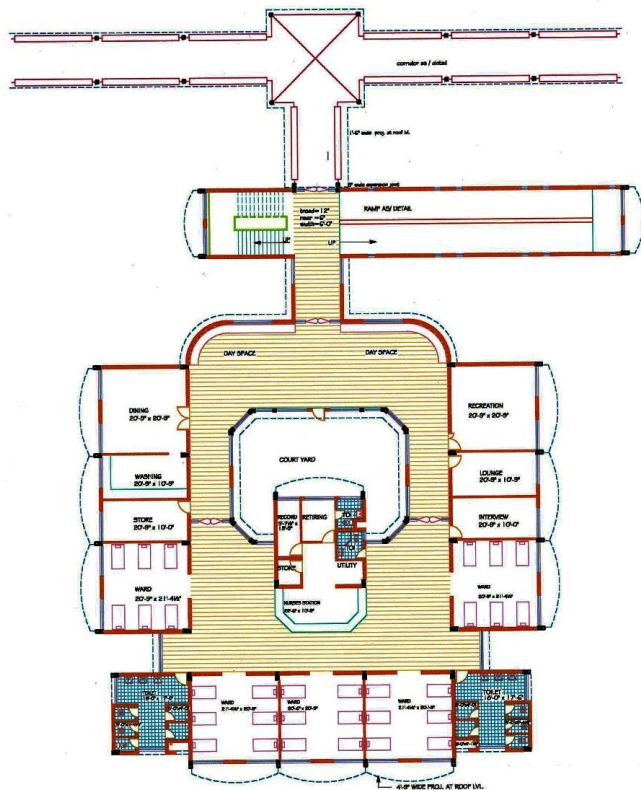


Figure 22: Ground floor plan of Intermediate unit

Each floor of these blocks has an identical plan, which accommodates six-bed dormitories, a recreation-room, lounge, interview-room, dining-room, wash-room, store, toilets, and nursing station. The comprehensive nursing station is designed to have a built-in counter, record-room, retiring-room, toilet, utility, and store. To provide security to the nursing staff, it is warded off from the patients' area by a mild-steel grill. The station is juxtaposed in such a way that the nurse can keep a

direct eye on each dormitory. To avoid the patients playing mischief with the electric points, all the control-panels/switch-boards have been centrally located in the nursing station. The dormitories are designed as semi-open. The front wall of each dormitory, which faces the nursing station, has a six-foot-wide opening without door. On either side of this opening is a six-foot-high panel wall. This arrangement ensures requisite privacy to patients, visual check on patients, and adequate cross-ventilation in the dormitory. Circulation areas/day-spaces have been kept large for the patients to move about freely.



Figure 23: Approach to Intermediate unit



Figure 24: Visually linked dormitories and nursing station

## Forensic Ward

The Forensic Ward is planned to house mentally-ill offenders or criminals who are admitted to the hospital under law. Separate Ward blocks were required for such patients to safeguard the interests of other patients, and to ensure adequate security provided by the police. In the Male Section, the Forensic Unit is designed and constructed as double-storey structure with a covered area of 2660 square metres accommodating 80 patients. In the Female Section only a single-storey part of the Block has been constructed to house 20 patients for the time being. However, this Block can be expanded as and when required in future. The scope of work provided to the Architect, incorporated Nightingale-type Wards/Dormitories accommodating 10-12 beds each, police attendants rooms and provision for direct watch by the nursing staff, besides other requirements like dining hall, recreation space, doctor's rooms, interview-rooms, attendants' rooms, etc. In consonance with the peculiar requirements of this category of patients, the juxtaposition of Wards, Nursing Station and Recreation Space has been so planned as to facilitate the supervisory staff to monitor the patients' activities constantly and easily.

The typical floor plan contains two independent units of 20 beds each. The units are mirror-imaged and joined together, resulting in a highly-disciplined symmetrical structure encompassing enclosed and semi-enclosed courts. These courts are ideal places for patients' outdoor activities. They also afford the much-needed cross-ventilation in the building. The twin-unit draws access through a single entry point at the fag end of the vaulted corridor where one enters in a small stairs-lobby. From here the access corridor bifurcates to provide independent approach to each unit. The U-shaped staircase provides vertical access to the upper floor, and the two units at first floor are also similarly approachable.

The Form of this unit is a pleasant synthesis of fulfillment of functional needs of forensic patients and visually pleasing architectonics. This building thus portrays the Architect's firm belief in the dictum: "Form Follows Function".



Figure 25: Form follows function



Figure 26: Internal court - an ideal place for patients' outdoor activities

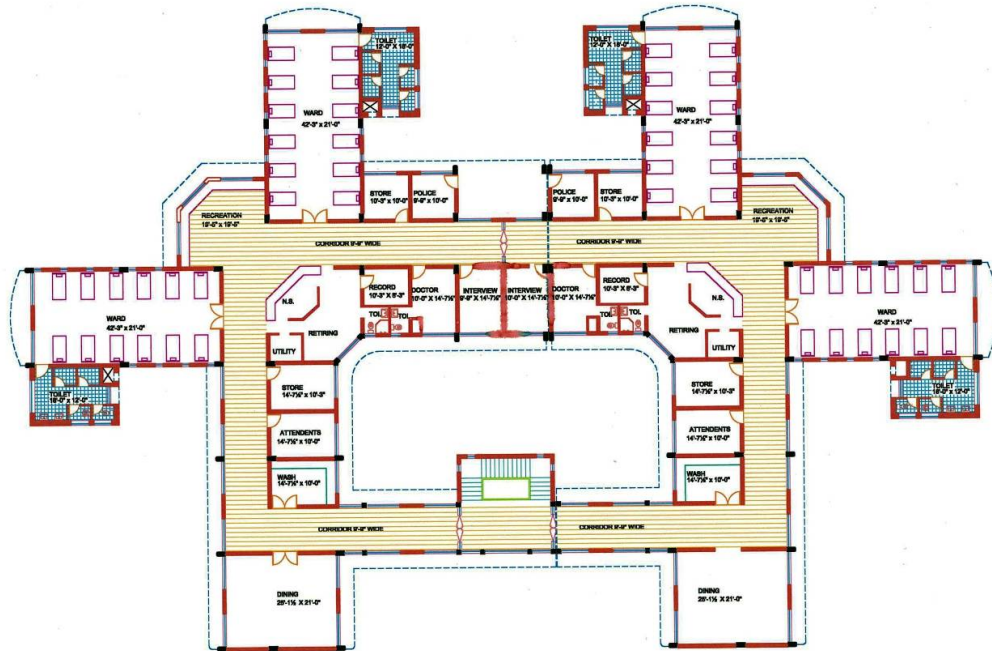


Figure 27: First floor plan of forensic unit



Figure 28: Approach to forensic unit



## Acute-Care Unit

Acute-Care Units accommodate those mentally-ill patients who are acutely serious, and need longer stay and special care in the hospitals. Since these patients are not expected to move upstairs, their Wards are designed as single-storey. Two units of 20-bed capacity each have been provided in the Male and the Female Sections. Each Unit has a covered area of 790 square metres, and the plan-form is almost identical to the typical floor plan of Intermediate/Improved Patients' Unit, which has been discussed above.

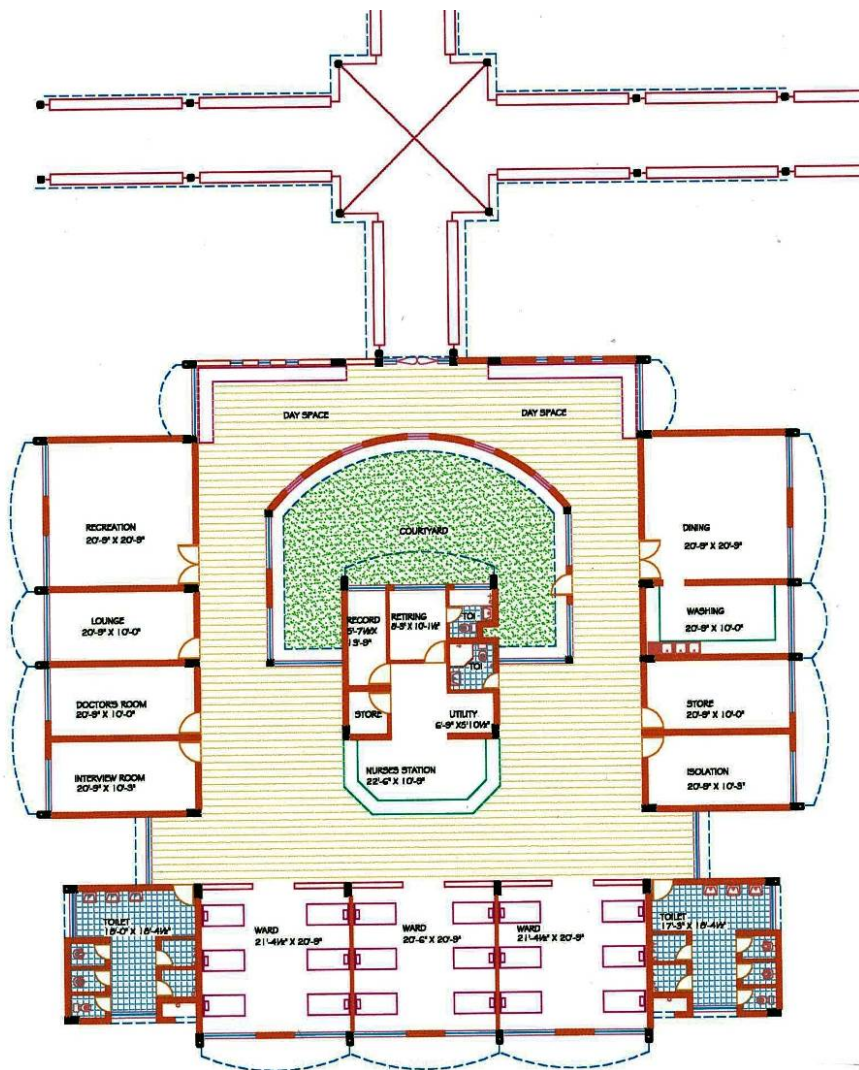


Figure 29: Ground floor plan of acute care unit



Figure 31: Single-storied acute-care units with ample open space around for patients



Figure 30: Informal interaction with patients

## Chronic-stay unit

Chronic Stay Units have been designed to house those chronically-ill patients who are unable to sustain lifestyle on their own, and, therefore, need external help to perform their daily chores. Majority of these patients are unlikely to be recovered and hence need hospitalization throughout the remaining part of their life. The User-Group's Brief given to the Architect for designing Wards for these patients includes single-storey dormitory-type accommodation with 10-12 beds each together with Nursing Station located strategically to keep direct watch on the patients. Furthermore, it was required to provide the patients their exclusive open space/court for outdoor activities. To translate Client's Brief into blueprint, cross-shaped twin units have been designed to accommodate 50 beds. These Units are juxtaposed in such a way that they enclose an adequate open space in between. Nursing Stations of both the Units are judiciously located to enable the attendants to keep an eye not only on the dormitories but also the central court. Each Unit has a covered area of 1180 square metres and it comprises, apart from two dormitories, a nursing station, a dinning hall, wash-room, recreation hall, doctor-room, interview-room, isolation-room, store, etc. Separate entries have been provided to both the Units for better management and control of chronic patients. The low-height buildings of Chronic Stay Units set amidst sprawling lawns are ideal homes away from the original homes of these under-privileged, pitiable persons.

Figure 32: Panoramic view of chronic-stay units and link passages



Figure 33: Ground floor plan of chronic-stay units

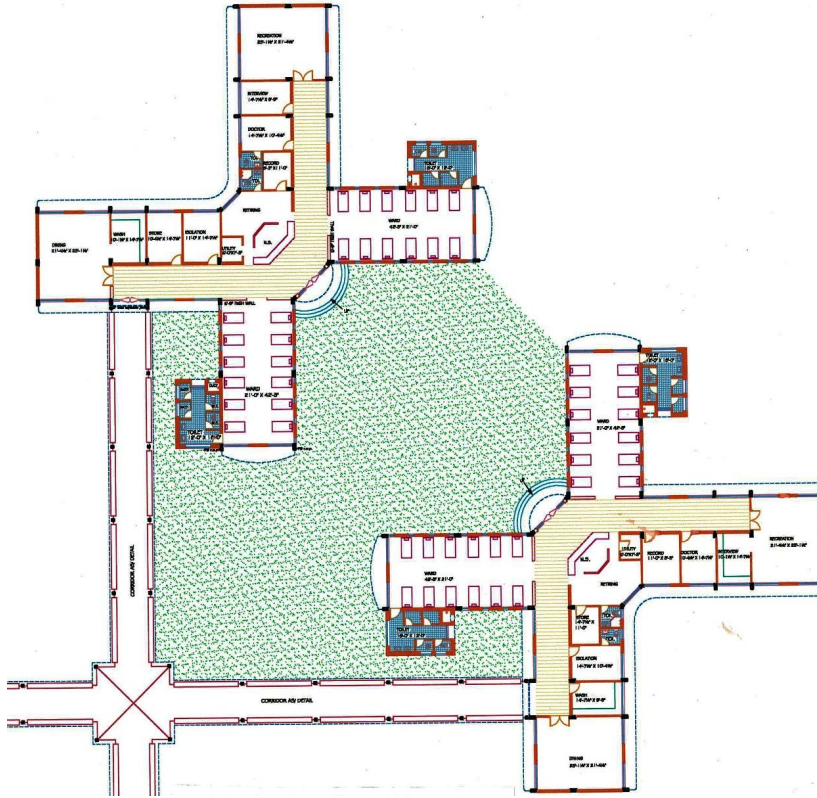


Figure 34: Approach to chronic-stay units





Figure 35: Low- height buildings of chronic-stay units set amidst sprawling lawns

Figure 36: Open space in between units



Figure 37: Access to open space in between units

## *Voluntary Unit*

UNLIKE the Wards in Inner Circle, where the patients are admitted under 'The Mental Health Act 1987', the Voluntary Unit is meant for any person who considers himself to be mentally ill, and desires to be admitted voluntarily. This unit is virtually a complete mental hospital in itself—a sort of micro-hospital in a macro-complex. It is designed to house 50 beds distributed on three floors. The ground and first floors each accommodate Wards for 20 beds, with 10 private rooms on the second floor. These paid-rooms are spacious enough to accommodate one family attendant with each patient. Each room has an attached toilet and a worktop for preparation of food. Apart from the in-patient wards/room, this Unit contains doctors-rooms, common-rooms, recreation-rooms, interview-rooms, psychology and therapy labs, dining hall, pantries, day-spaces, etc. Each floor has its own Nursing Station Unit located strategically in the centre so that the attendants can have direct watch on the patients.

Figure 38: Voluntary unit is well integrated with rest of the hospital complex.



The building is designed around a central court, which serves the purposes of an ideal day space, an effective ventilation-shaft, and a light-well. The main circulation corridor runs along this court, and provides access to various sedentary areas placed on the outer periphery.

The Voluntary Unit has a pleasing entry through an oval-shaped porch from where one enters a spacious foyer having reception-counter on one side and waiting-area on the other. A ramp and a staircase located at the end of this foyer provide vertical access to the upper floors. To enhance the efficiency in its working this Block is well integrated with the rest of the hospital complex. On one side it has a single-storey link-passage which connects it to the main OPD-cum-Administrative Complex, Occupational Therapy Units, and other hospital buildings. On the other side, a two-tier link-corridor connects it to the shopping arcade/cafeteria and serai building. The Voluntary Unit, shopping/cafeteria, and the serai building thus form a mini-complex. Relatives of patients' admitted in Voluntary Unit and other Wards can find their temporary abode in the serai. They can have meals in the adjoining cafeteria at first-floor level, and purchase the items of their daily needs from the shopping arcade at the ground-floor level.

Figure 39: Voluntary unit – view from cafeteria.



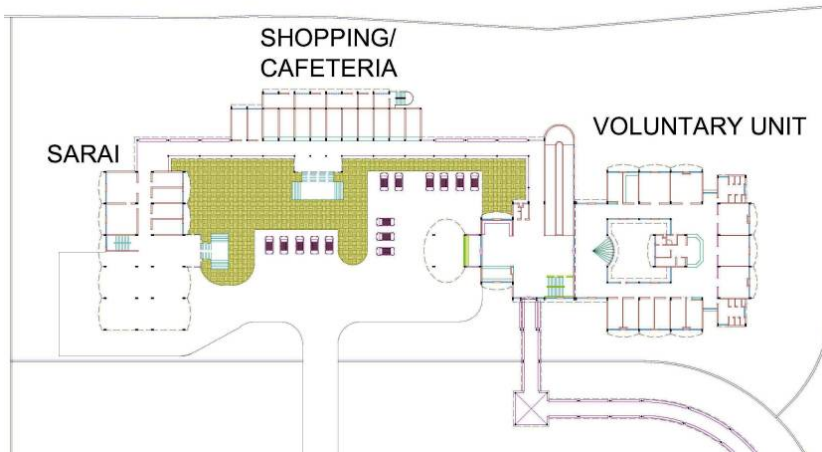


Figure 40: Part layout plan of voluntary unit, cafeteria and serai building.



Figure 41: Pleasing entry through an oval-shaped porch.





Figure 42: Detail of stairs in voluntary unit.



Figure 43: Well-lit spacious ramp in voluntary unit.

## *Shopping Arcade and Cafeteria*

**T**O cater to the daily needs of the large number of staff residing on the campus, their families, patients, their relatives, and other daily commuters, a shopping arcade and cafeteria have been provided there. It forms an integral part of a mini-complex comprising, apart from it, a serai and the Voluntary Unit. Located on the western fringe of the campus, it contains 10 shops, public toilets, and stores at the ground-floor level. The cafeteria is located at first-floor level. Both the shopping arcade and cafeteria have a two-tier covered link-passage to the Voluntary Unit on the north and serai on the south. The cafeteria also draws direct access through a wide flight of steps emanating from a large esplanade engulfed in-between serai, shopping arcade, and the Voluntary Unit. The large dining hall of the café can accommodate more than 100 persons at a time. This column-free hall has high ceiling and clerestory windows for effective light, and ventilation that creates congenial ambiance inside. The main kitchen and pantry are placed at the same level as the dining hall. For workers convenience and their outdoor working, a spacious terrace has been provided along side the kitchen. Workers stay-rooms, toilets, and stores are located at the ground-floor level abutting the rear wall of the shops. These are linked to the main kitchen through an open-to-sky concrete staircase. By virtue of its location and easy and inviting access, the shopping arcade and café form the hub of activities and a centre for pleasure shopping and relaxation



Figure 44: Two-tier link corridor connects shopping arcade/café with voluntary unit and serai building.



Figure 45: Pleasant walkway connects cafeteria, serai and voluntary unit.

## *The Serai Building*

At the time of inception of the project the User-Group, based on its past experience, was of the firm opinion that a serai building is a must to provide temporary abode to the relatives visiting their wards in the hospital. So considering it a vital component of the hospital complex, a four-storey serai has been provided. Designed to accommodate 76 persons both in dormitories and family suits, it has a covered area of 2366 square metres. The building is elevated on stilts to make room for covered car parking at ground-floor level. Some essential services, like electric sub-station, maintenance-room, and laundry have also been accommodated at this level. Main entrance to the serai is at the first-floor level. A wide flight of steps leads to the entrance foyer. This floor accommodates common facilities like a waiting lounge, reception, administration, cloakroom, telephone booth, snack bar, and two special family suites with attached kitchenette and toilet. The second floor contains eight dormitories, a lounge, and a store. Each dormitory accommodates five beds, and has an attached toilet. A sufficiently wide central corridor provides access to dormitories. Apart from dormitories, 16 family suites, a lounge, and a store have been provided at the third-floor level. Each family suite with attached toilet can accommodate a double-bed. Persons residing in the serai can have their meals in the adjoining cafeteria, which is accessible from it through a covered link-corridor.



Figure 46: View of court in between cafeteria, serai and voluntary unit.

## *Kitchen and Laundry Block*

**K**ITCHEN and Laundry Block is located on the extreme north of the campus at the culmination point of the central circulation-spine. Well-integrated with the rest of the hospital complex, it facilitates an all-weather access to and from the other buildings especially the Wards. Designed purely on functional and utilitarian basis, the Block is visually conceived as a submissive and insignificant structure. The long and linear building of 1670 square-metre area has a projecting roof-overhang, which runs all along the periphery to protect the fenestrations from the vagaries of weather. Entry to the building is in the centre where a spacious lobby divides it into two wings. The eastern wing accommodates kitchen, and the western wing contains laundry.

A state-of-the-art kitchen has been designed, built, and equipped to cater to the heavy load of supplying cooked food to 450 inmates three times a day. It comprises a large cooking area, spaces for trolley-loading, trolley-wash, dish-wash, pot-wash, besides a number of stores, and rooms for dietician, stewards, kitchen staff, store-keeper, etc. Special arrangement has been made to receive the raw material on the eastern end, which includes a parking lot, unloading platform and a large veranda. From here the raw material is carried to, and kept in, various stores. Cooked food is served to the Wards on trolleys through exit point just opposite the raw material entry. The flow-pattern of raw material and cooked food thus avoids criss-crossing of traffic and results in efficient working of the kitchen. To supply cooking gas to the kitchen, a separate gas-bank has been built adjacent to the cooking area. It can accommodate more than fifty gas cylinders, which are joined together in series and further to the central supply-line. Kitchen is well equipped with all types of latest gadgets to ensure efficient and hygienic cooking.

The western half of the Service Block contains a comprehensive mechanized laundry. Sequentially, it comprises spaces for receiving/sorting of dirty clothes, washing, drying, tailoring/ironing, store, and issue area. In addition to the above, it constitutes a staff room, supervisor's room, boiler-room, autoclave room, and a large open-to-sky drying platform. The laundry is fully equipped with ultra-modern gadgets to cope with the heavy load of washing and cleaning of clothes

of a large number of patients. By virtue of its location and meticulous designing the entire Service Block serves its assigned functions well.



Figure 47: A state-of-the-art kitchen.



Figure 48: Well equipped laundry with ultra-modern gadgets.

*Gallery of Other Infrastructure*



Figure 49: Quarters for class-III staff.



Figure 50: Quarters for class-III staff.





Figure 51: Quarters for class-IV staff.



Figure 52: Houses for senior medical officers.



Figure 53: Sculpturesque emblem in front of OPD block.



Figure 54: Sculpturesque check post at the main entrance.



Figure 55: Sculpturesque check post at the main entrance.



Figure 56: Security post at the entrance of male section.

Figure 57: A pleasant blend of covered and open spaces.





Figure 58: Sculpturesque over-head water reservoir.

## *Structural System*

Designing, laying / siting, and construction of such a large complex, especially when it is well integrated and unified, have always posed a great challenge to the architects and executors. The problem is even more aggravated when the site is uneven and low lying as in the case of this Institute. To cope with the above problems and to facilitate easy laying/siting and construction, the entire complex has been designed strictly on a grid-iron pattern with 6.55-metre spacing on both the axes. The structural members of all the buildings have been juxtaposed at the intersection of the grid lines. This arrangement ensured zero-error accuracy in laying out all the building components in the campus and their link-corridors.

According to the Indian Seismic Code, this area falls in Seismic Zone-IV, and is thus prone to earthquakes. Past experience showed that buildings constructed in load-bearing brick masonry walls are more likely to be damaged by the earthquakes as these walls have poor resistance to lateral forces. The roofs generally have a thick layer of mud for providing insulation and thus have a significant mass. During earthquakes they generate a very large inertial force, which leads to a partial or complete collapse of buildings where the weight of the roof is supported on masonry walls. Keeping in view these factors it was decided to adopt Reinforced Cement Concrete (RCC) frame-structure. The main structure consists of RCC columns, beams and slabs, which have more capacity to absorb seismic forces. Moreover, this system allows more flexibility in spatial organization, and can also adapt itself to unforeseen future changes. Footings of all RCC columns have been tied together by plinth-beams, which not only make the structural system monolithic but also help in dealing with substantial difference between natural ground level and plinth level. Keeping in view the magnitude of work and aesthetic considerations, rainwater disposal pipes have been embedded in external RCC columns. The other public-health service-pipes are housed in appropriate ducts accommodated inside the building-frames. To meet the special requirements of this Institute, floor-to-ceiling height has been kept 3.66 metres, a little on the higher side. Most of the RCC columns are of 305 mm by 610

mm and beams 305 mm by 535 mm size. Expansion-joints have been provided at requisite intervals and are ingeniously incorporated into, and integrated with, the entire complex.

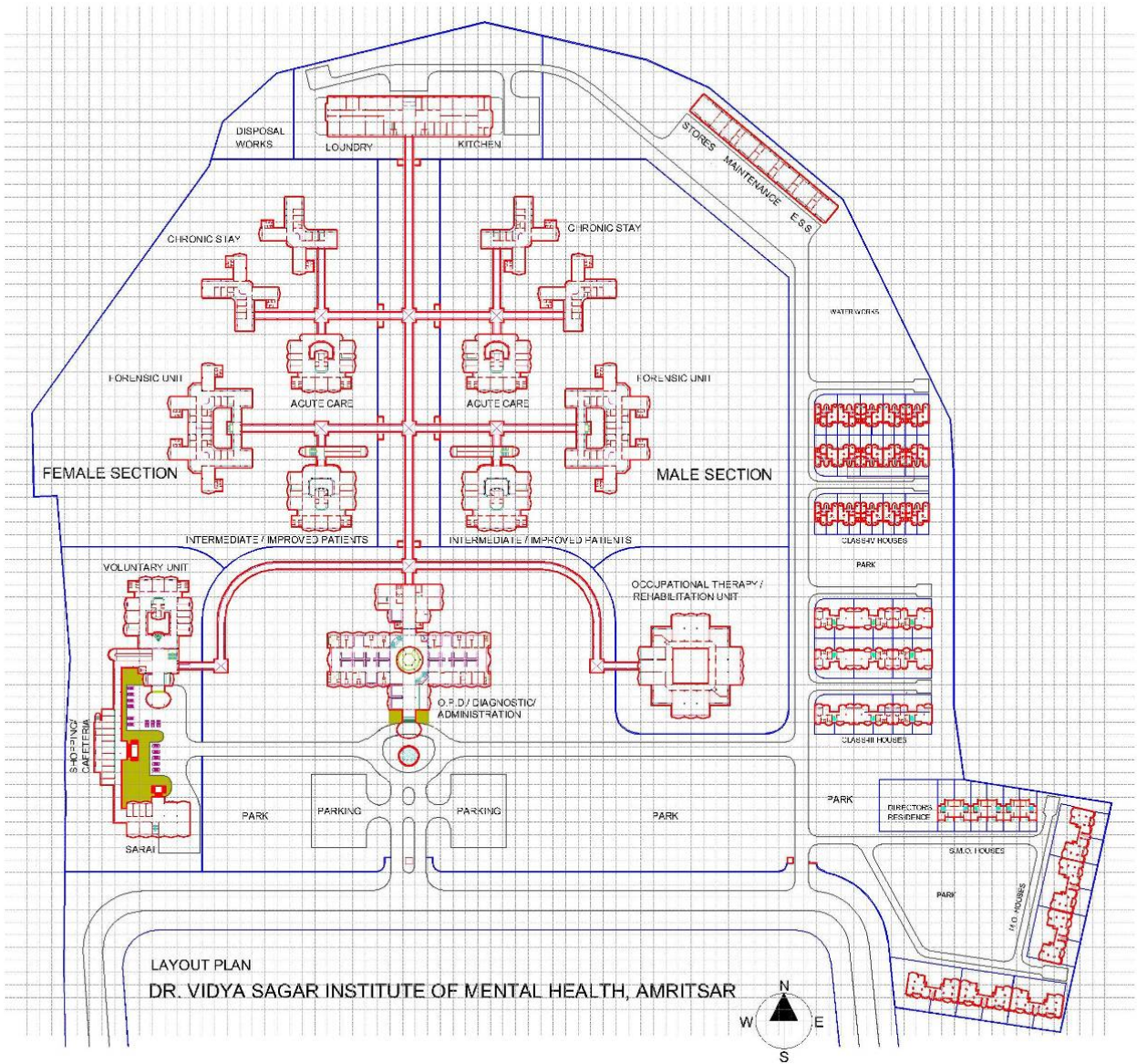


Figure 59: Layout plan showing structural grid.

## *Specifications*

Keeping in view special requirements of the Institute, all specifications have been decided meticulously. The governing factors for selection of materials were strength, durability, consistency, maintenance, cleanliness, etc. External surfaces of all the buildings in the institutional area have a combination of two materials: concrete and red sandstone. All the Reinforced Cement Concrete components on external side: columns, beams, fascias, lintels, ceilings, projections, etc., have exposed concrete finish with steel-shuttering pattern. External brick-wall surfaces are clad in red sandstone. The combination of concrete and red sandstone not only gives a unified and consistent character to the complex but also helps in achieving maintenance-free surfaces. External brick-wall surfaces in the residential complex are finished in roughcast plaster and cement-based paint. Components like ceilings, beams, and columns in the interiors have also been left in exposed concrete and painted off-white. Internal brick-wall surfaces are plastered and painted off-white. All the circulation areas, wet areas, and important public areas have kotah stone flooring. The remaining areas have terrazzo flooring. Ramps have rough red sandstone flooring, and all the internal courts have flooring of pre-cast cement tiles. To protect the walls against damage and to maintain cleanliness, all the areas accessible by patients have been provided with granite/ceramic-tile dado up to the levels of door-lintel or window-sill. Entire joinery [windows and doorframes] are in steel. The doors have factory-made flush shutters finished in synthetic enamel paint. Worktops and counters are finished in marble or granite.





*Gallery of Campus Life*

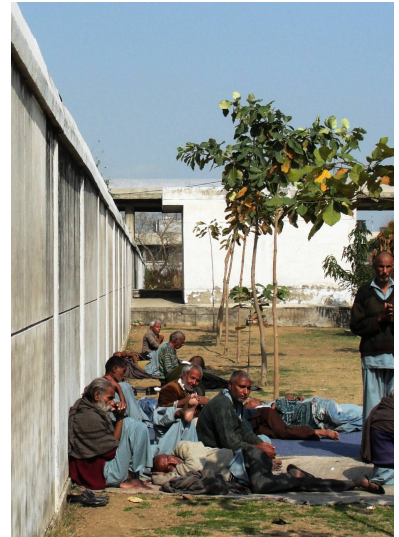




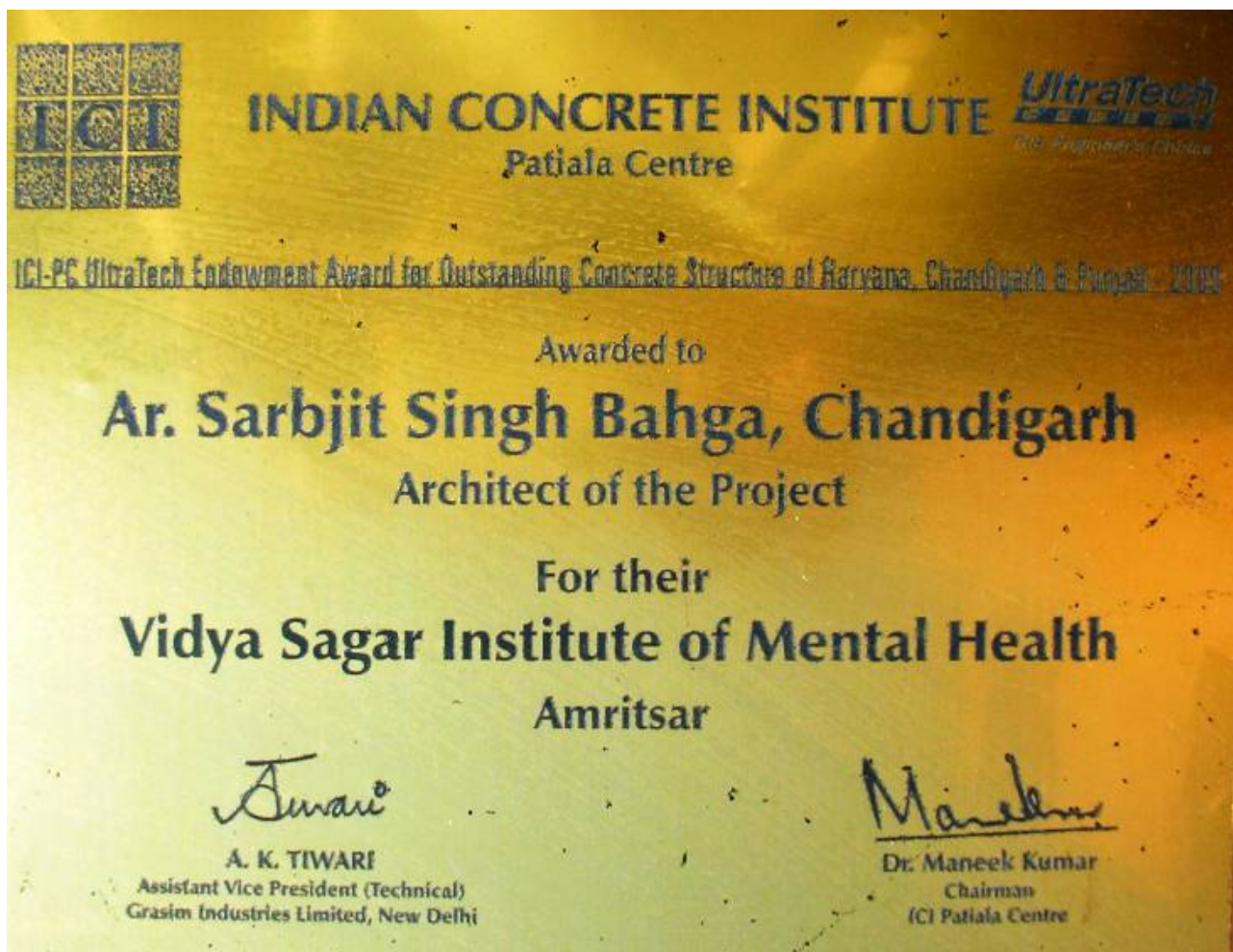








*Award to the Institute from the  
Indian Concrete Institute*







## *About Sarbjit Singh Bahga, Architect*

Sarbjit Singh Bahga (b1957) is a Chandigarh based architect, urbanist, author and photo-artist. He graduated in architecture from Panjab University, Chandigarh in 1979 and was conferred with Doctorate in Architectural Science (D.A.S.) in 2000. He works in the Department of Architecture, Punjab and has 32 years of practical experience in designing and supervision of various types of buildings, complexes and large campuses. He is presently working on deputation as Senior Architect in the Punjab Mandi Board, Chandigarh. His completed works include an eclectic and impressive range of medical, educational, administrative, commercial and residential buildings. His buildings are interesting and responsive to function, climate and materials. He is a staunch modernist and an ardent, yet not blind, admirer of Le Corbusier, Pierre Jeanneret and Louis Kahn.

Sarbjit is also a keen researcher, a prolific architectural writer, and a Fellow of United Writers' Association of India. He has three books to his credit. His books, *Modern Architecture in India: Post-Independence Perspective* (1993), *New Indian Homes: An Architectural Renaissance* (1996) and *Le Corbusier & Pierre Jeanneret: Footprints on the Sands of Indian Architecture* are considered as landmarks in the history of contemporary architecture of India.

Apart from this, he is a keen photo-artist especially in the field of architectural photography and has won many awards in this field. Bahga takes special interest in the overall development of profession of architecture and improvement of built-environment. He is an active member of many professional associations including the Indian Institute of Architects (A-11822). His contribution to architecture has been largely recognized and his buildings/articles have been widely published in many architectural journals and books.





# *Bahga's Architecture, Work Ethic, Philosophy, and Methodology*

by *Dr. S.S. Bhatti*

Far from pursuing the wayward fancies of followers of fashion, Sarbjit Bahga has turned his Architecture into a highly disciplined creative activity that is built on a sound Philosophy, sustained by a healthy Work Ethic, and shaped by a clear-cut Methodology. These Four Pillars of his work are discussed under: Architecture, Philosophy of Building Design, Work Ethic, and Design Methodology.

## **Architecture: salient features**

### *Courtyard planning*

North India, in general and Punjab, in particular, have hot and arid as well as hot and humid climate for seven to eight months in a year. In response to this climate, the central court has been developed as an effective constituent of architecture which has stood the test of time remarkably well. Sarbjit has consciously adopted in his architecture central or internal courts which, provide welcome shade in hot summers, ensure cross-ventilation particularly in hot and humid conditions, and act as lungs to facilitate the buildings' breathing. Internal courts are ideal places for sit-outs protecting as they do the users from hot winds in summer and chilly winds in winters. Buildings designed by Sarbjit reveal that he often plays with size and shape of the internal courts which, according to him, give distinct identity to the built-environment without adding to the cost of construction.

### *Open spaces*

Architecture, among other things, is a play aimed at the creation of interconnected spaces and spatial sequences: covered and open. Covered spaces become built-up masses which have tangible qualities which



Figure 60: Internal courtyard in Yatri Niwas, Talwandi Sabo, Punjab.

are capable of leaving their photogenic impress on the users'/viewers' minds. Open spaces, on the other hand, have something intangible about them. This curious quality can be felt or experienced only by getting involved with them. These spaces by themselves have no tangible aspect but can enable the viewers just the same to appreciate the beauty of physical massing of their counterparts. One without the other has little or no relevance in Architecture or Urban Design. The intimacy and quality of relationship between the covered and open spaces is a key to Architecture in which one can feel this palpable relationship.

The "negative" or open spaces, if blended creatively and harmoniously with "positive" or covered spaces, can relieve the harshness of Built-Environment while enhancing its aesthetic charm. Sarbjit is conscious of this vital attribute of Architecture and uses it effectively in his buildings. The Vidya Sagar Institute of Mental Health, Amritsar, and The State Institute of Paramedical Sciences, Badal, are apt examples of this architectural ideology.

### *Strict geometric order*

India has a history of Architecture replete with strictly geometrically-shaped plans of buildings, as can be seen especially in Islamic Architecture. Sarbjit's fascination for strict geometric ordering has led him to continue the age-old tradition into the contemporary context. Most of his buildings have strict Cartesian Pattern in plans. He is an ardent admirer of Louis Kahn. An overview of his building-plans reveals his affinity with the Master Architect. The presence of geometric shapes in his buildings springs from the structural systems adopted by him, so much so that Sarbjit, while designing his buildings, seems always to keep Le Corbusier's dictum in mind: "Man needs order, without it all his actions lose their concordance, logical interplay. The more perfect is the order, the more comfortable and confident is man. He makes mental constructs on the basis of the order that is dictated to him by the needs of his psychology—this is the creative process. Creation is an act of ordering."

### *Proportions*

Having worked for many years with those Architects who had worked directly with Le Corbusier and Pierre Jeanneret, Sarbjit imbibed the virtues of Le Corbusier's Le Modulor proportions. Though he is not following exactly the mathematical dimensions suggested in the Master Architect's "Scale of Dimensions based on Anthropometrics and the Golden Section" for determining the right overall proportions of his buildings, his humanist approach to the creation of beauty in his

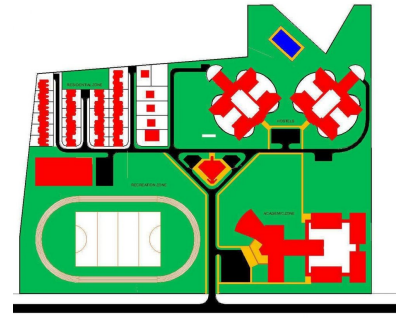


Figure 61: Layout plan of State Institute of Nursing and Paramedical Sciences, Badal, Punjab, showing creative play of open spaces.

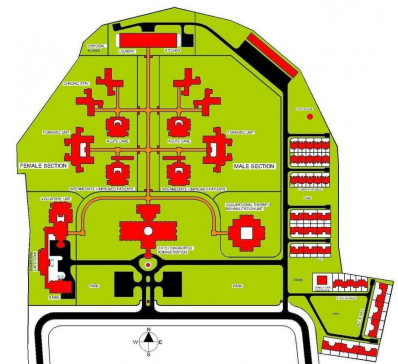


Figure 62: Layout plan of Vidya Sagar Institute of Mental Health, Amritsar, showing strict geometric order.



Figure 63: Punjab Mandi Board Head Office, Ajitgarh—a well proportioned building

buildings conveys his sense of, and liking for, Le Corbusier's "Le Modulor", just the same.

### *Symmetry*

The plans of most of the buildings designed by Sarbjit reveal that the rules of symmetry are generally the guiding principles for him. He always remembers L. Tarasov's words: "Symmetry is encountered everywhere in nature, engineering, arts, and science, for example, the symmetry of the butterfly and maple leaf, the symmetry of a car and plane, the symmetry of a verse and tune, the symmetry of patterns and borders, the symmetry of the atomic structure of molecules and crystals. The notion of symmetry can be traced down through the entire history of human creative endeavors. It has its beginnings in the well-springs of human knowledge and it has widely been used by all the modern sciences. So, principles of symmetry dominate in physics and mathematics, chemistry and biology, engineering and architecture, painting and sculpture, poetry and music. The laws of nature, which govern the infinite variety of phenomena, in turn, obey the principles of symmetry."

Sarbjit's buildings remind me of the words of the German mathematician Hermann Weyl that through symmetry man always tries to "perceive and create order, beauty and perfection". Sarbjit feels that strong geometrical and symmetrical plans have more acceptance than asymmetrical plans. This is due to the persistence of such liking as besets the common human mind-set. Architecturally speaking, such plans are less vulnerable to undesired changes suggested or attempted by some clients at later stages.

### *Clarity in structural systems and services*

Apart from their functional appropriateness, Sarbjit's buildings show clarity in structural systems and services. The load-bearing structural components and services are generally stacked vertically—with very little staggering. The clarity thus evolved is truthfully expressed in the building Form. His buildings seem to follow the dictum of "Form Follows Function" plus Structure and Services. His buildings are thus free from applied frills, cosmetic treatment, and superfluous additives.

### *Use of contemporary materials and technology*

Sarbjit moves with the times and works with contemporary materials and technology. The structural systems of his buildings generally include Reinforced Cement Concrete (RCC) column-beam-slab construction for large buildings. In small buildings he uses load-bearing



Figure 64: Symmetrical front view of Market Committee Office, Lehragaga, Punjab.



Figure 65: Symmetrical view of Office Building, Fruit and Vegetable Market, Patiala, Punjab.



Figure 66: Front facade of Civil Hospital, Samana, Punjab, showing clarity in structural system.

brick walls and RCC. slabs. When the project demands he uses conventional steel structures fabricated at site, or sometimes pre-engineered, hi-tensile steel structures. He feels that, in the remote areas where he works, there is a lack of talent and skill required for the design of structures, and their execution at site. The contractors, masons, and fabricators lack professional zeal that discourages the construction of structurally-innovative buildings. Simplicity of design quickens the successful completion of buildings. So while designing he bears in mind the ability of structural engineers, contractors, masons, besides the factors of economy, maintenance, and sustainability. He avoids large cantilevers and projections, and prefers simply-supported slabs which are easy to construct and are safe during earthquakes. His completed projects in remote areas bear testimony to this significant understanding of stated ground realities.

### *Energy-efficient architecture*

- *Thick outer envelope:* Analysis of Sarbjit's architecture reveals that his buildings are responsive to climate and are well protected from the vagaries of weather—sun, rain, heat, etc. He provides thick outer envelope with deep recessed fenestrations or protects the interiors by roof overhangs or chhajjas. Ducts and storage cupboards, placed along the outer periphery, act as cavity-walls and protect the interiors from external heat, which results in their natural cooling in summers. Judicious use of glass is another tool in his repertoire. He feels that an excessive use of glass is not suitable for our climate, economy, and middle-class mindset.
- *Mutual shade:* He tries to shape the plans of his buildings in such a way that most of their parts remain in mutually created shade. His buildings thus remain cool in summers.
- *Emphasis on natural lighting:* He is very conscious about natural light in his buildings. He locates the fenestrations judiciously so that almost all the areas in the building get adequate natural light. He avoids very deep areas, too far away from external glazing/windows. Whenever and wherever necessary, he uses skylights or cut-outs in slabs. He feels that as the Sun is the source of all energy, one should be able to have a glimpse of sunshine outside while sitting inside! This way one remains cheerful throughout the day. Obviously, such interiors are well protected from the vagaries of the changing seasons.
- *Ventilation:* He incorporates simple and manageable methods of ventilation and lighting. He is always conscious about bringing



Figure 67: Pre-engineered steel structure of Multipurpose Sports Stadium, Bathinda, Punjab.



Figure 68: Citrus Estate, Abohar, Punjab. Ducts and storage cupboards, placed along the outer periphery, act as cavity-walls and protect the interiors from external heat.



Figure 69: Zila Mandi Bhawan, Fardikot, Punjab. Most of the external surfaces remain in mutually created shade.

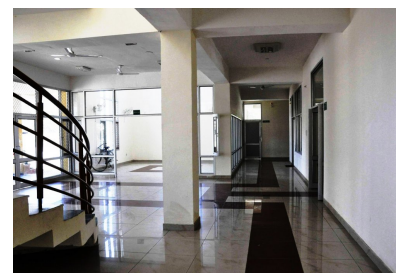


Figure 70: Interior of Regional Mandi Bhawan, Jalandhar, with ample natural light.

in breeze as he feels that it is like breathing in human body—no breathing; no life!

## Work ethic: basic tenets

### *User-friendly buildings*

Sarbjit works for the Government or Semi-Government agencies. They are his indirect clients who, in certain cases, may not eventually be the actual users of the buildings designed by him. The end-users are thus different people, more often than not the common man. Quite frequently, the investment agencies do not go into the depth of users' needs, and many a time even the exact scope-of-work is not provided in black and white. Understanding the needs, aspirations, and feelings of the real users thus becomes architect's additional responsibility. Interestingly, these users are not always normal human beings. Instead, at times, they include insane patients, animals like cows, or even birds, and so forth. While designing, he imaginatively steps into the users' shoes, and tries to visualize vicarious use of the building for the intended purpose. Constant involvement in such a pre-design process helps him rationalize the concept of his projects. The success of this empathic exercise lies in the fact that almost negligible amendments have been made in his buildings over the past 30 years. And what is more is that all these structures are User-Friendly Buildings!

### *Respect for budgetary constraints*

Sarbjit feels that to work within the budgetary constraints is an Architect's prime responsibility, and is never a handicap in the creation of good Architecture. He always adjusts the scale and size of the building so as to ensure its full completion within a stipulated budget. Resultantly, all the buildings designed by him are fully built, and no building of his till date has been left incomplete.

### *Love of odds*

He loves all odds: odds in shape and size of plots, odds in requirements, odds in budgetary provisions, even odds in clients' or users' mental makeup! His conviction is that it is these odds that give birth to unique or exclusive Architecture, for he has uncanny creative ability to turn these odds to his design advantage.



Figure 71: Model of modern cow sheds in Punjab—a user-friendly architecture.



Figure 72: A low-cost cafeteria at Chandigarh Lawn Tennis Association Complex.



Figure 73: Market Committee Office, Fazilka.



*Against use of excess glass*

He is against excessive (for him, excess in any form is vulgar) use of glass in this hot and arid climate. Glass boxes with air-conditioned interiors are not for the general masses. Putting glass on the facades for its own sake is architectural slavery to the ugliness of fashion.

### **Philosophy of building design: A pragmatic approach**

Sarbjit is a hardcore modernist, and an ardent admirer of Le Corbusier, Pierre Jeanneret, and Louis Kahn. He loves clear, seamless, bold, and bare facades. He hates chaotic, haphazard, and jumbled lines or the so-called broken geometry in plans or in 3-Dimensions. He is against all sorts of superfluous elements which serve no practical purpose in this Age of Reason. He never makes a fanciful use of arches, domes, chhatris, eaves, etc. which he feels create applied archaeology rather than architectural aesthetics. He loves straight lines both in plans and elevations, and believes: "why use two lines if one can serve the purpose". This belief is taking him towards "LESS IS MORE", the famous dictum of Mies van der Rohe. Majority of Sarbjit's buildings are designed for the middle-income stratum of the Punjabi society. His buildings echo the simplicity and down-to-earth approach of Pierre Jeanneret, and Kahnian Order in the juxtaposition of spaces and structural elements. He loves the monumentality and plasticity of Le Corbusier's architecture, but has never imitated it on account of budgetary constraints, lack of engineering skills, and constructional difficulties in remote rural areas.

*Endurance and sustainability*

Sarbjit's emphasis is on such architectural design as would allow his buildings to keep their original appearance intact for a much longer time. This design philosophy directs his Building Design, and the selection of suitable materials and apt technology. As a result most of his buildings have retained their original charm and appearance for the past 2-3 decades, and are likely to do so for a long time in the future too.

*Minimum use of water as landscape element*

He feels that it is very costly and difficult to build and maintain water-bodies, and, therefore, asserts that water-bodies should be provided in those complexes where the budget is generous, and it is possible to maintain them.



Figure 74: Soil Testing Laboratory, Nawanshahar, Punjab.



Figure 75: Agri Bhawan, Ajitgarh—a simple straight-lined architecture.



Figure 76: Regional Mandi Bhawan, Jalandhar, is designed for endurance and sustainability.



Figure 77: Landscape of Yatri Niwas, Talwandi Sabo, Punjab.

### *Moods and feelings*

Sarbjit strives to design a building or complex that would evoke cheerful moods, bring in positive feelings, and provide memorable experiences. He feels that the organization of internal spaces should be such that it leaves a permanent impact on the minds of the users and visitors alike. A walk through the spaces in Vidya Sagar Institute of Mental Health substantiates this crucial point.

### **Design methodology: Adapting to technological tools**

Gio Ponti's quote: "Think about architecture during the night and work on it during the day" has inspired Sarbjit to evolve his own style of working. Having comprehended and assessed the site conditions, scope-of-work, users' special needs, he takes a few days to think, churn ideas in his mind, and rationalize the conception of building-Form. When the shape, size, scale, and juxtaposition of various spaces becomes clear in his mind, he transfers them to his sketch-book, subsequently sits on the computer, and works at feverish speed. After putting his ideas in shape he leaves everything for a few more days for feeling the embryonic building as a user, thereby tries to understand his difficulties, and thus makes necessary modifications. While designing, he acts as an architect, thinks like a user, and keeps in mind engineering and construction aspects as well.

Moving with time, his thinking and techniques have changed with time. He started his career with a drawing-board, but now he has fully switched over to computers. He is capable of taking big decisions, single-handedly designing big things, and producing computer-drawings on his own.



Figure 78: Link corridors in Vidya Sagar Institute of Mental Health, Amritsar, provide a memorable experience.



Figure 79: Hockey Stadium at Punjab Agriculture University, Ludhiana.



Figure 80: Hockey Stadium, Fardikot, Punjab.



# Index

- Architectural interpretation, 13  
Atrium, 19, 23  
Award from the Indian Concrete Institute, 63  
Awasthi, Ajit, 13
- Bahga, Sarbjit Singh  
  Architecture, 67  
  Biography, 65  
  Design methodology, 73  
  Philosophy of building design, 72  
  Work Ethic, 71  
Bhatti, S.S., 67  
Blocks, *see* Units  
Building-in-the-garden, 14
- Campus life, 57  
Cartesian pattern, 14, 68  
Client's brief, 13, 27, 34  
Corbusier, 65, 68, 72  
Corridors, 14, 15, 18, 53  
Courtyard, 25, 67
- Earthquake safety, 53  
Expansion-joints, 54  
External finish, 15
- Female section, 10, 13, 28, 30, 32  
Form and function, 30
- General psychiatric services, 9
- Government Mental Hospital, Amritsar, 9
- History of modern psychiatry, 7  
Human Rights Commission, Punjab, 9  
Humane architecture, 5
- Inner Circle, 13, 15, 37
- Jeanneret, Pierre, 65, 68, 72
- Kahn, Louis, 65, 68, 72  
Kulhara, P., 13
- Lowther, Matthew, 5
- Male section, 10, 28, 30, 32, 51  
Master plan, 13, 15  
Mental asylums in India, 7  
Mental Hospital, Lahore, 9
- Natural environment, 15  
Nursing Station, 27, 28, 34
- Open spaces, 14, 15, 18  
Outer Circle, 13, 25
- Pedestrian, 15, 27  
Ponti, Gio, 73
- Ramp, 19, 22, 38, 40, 55  
Reinforced Cement Concrete, 53, 55, 69
- Specifications, 55  
Structural system, 53, 69  
Symmetrical juxtaposition, 14
- Traffic, 15
- Units  
  Acute-care, 32, 33  
  Cafeteria, 13, 38, 39, 41-44  
  Chronic-stay, 34-36  
  Diagnostic, 13, 19  
  Forensic, 30, 31  
  Inpatient, 27  
  Intermediate/Improved patients', 28, 29  
  Kitchen, 14, 27, 41, 45, 46  
  Laundry, 14, 27, 43, 45, 46  
  Nightingale-type, 30  
  Occupational Therapy and Rehabilitation, 13, 25  
  OPD-cum-Administrative, 13, 19  
  Serai, 13, 14, 38, 39, 42-44  
  Shopping, 10, 13, 38, 41, 42  
  Voluntary, 37-40  
Unity and Consistency, 15
- Ventilation, 25, 29, 30, 67
- Wards, *see* Units  
Wings, *see* Units

