DELHI CENTRAL JAIL, NARELA

THESIS

Submitted in partial fulfillment of the requirements for the award of the degree Of

BACHELORS OF ARCHITECTURE

By

ANKIT LINGWAL

SCHOOL OF ARCHITECTURE

GALGOTIAS UNIVERSITY

GREATER NOIDA

UTTAR PRADESH

CANDIDATE DECLARATION

I hereby certify that the work that is being presented in this dissertation, entitled "DELHI CENTRAL JAIL, NARELA" in partial fulfillment of the requirements for the award of the Bachelors of Architecture submitted to the School of Architecture of the Galgotias University Greater Noida, India, is an authentic record of my work carried out during the period December 2013 to May 2014, under the guidance of prof. KUSUM HUDDA, Associate Professor of School of Architecture, Galgotias University, Greater Noida.

The matter embodied in this has not been submitted for the award of any other degree.

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CERTIFICATE

This is to certify that the above mentioned statement made by the candidate is correct to the best of my knowledge.

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The culmination of this *DISSERTATION* on the "**REINTERPRETING CREMATORIUM AND ITS PRECINCTS**" has brought me one step closer to the completion of the Bachelors of Architecture. The dissertation has led me to the acquisition of specialized and state of the art knowledge, required for the development of my dissertation thesis, and it was also an opportunity to improve my lecture presentation performance and research skills. Therefore through this I would like to show my appreciation to everyone that made this possible:

To my Supervisor, Professor, Galgotias School of Architecture, prof. _____, who provide me invaluable guidance and assistance in the preparation of this seminar report.

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TABLE OF CONTENTS

Contents

LIST OF FIGURES

LIST OF TABLES

1. Introduction

Correctional facility is a term that may be used to refer to a jail, prison, or other place of incarnation by government officials. They serve to confine and rehabilitate prisoners and may be classified as minimum, medium or maximum security facilities, or certain separate divisions for such categories of prisoners.

With the numbers of crimes increasing day by day, the criminal count is increasing too. Rehabilitation does not seem to be well attained due to persistent crimes committed by persons even after being punished and rehabilitated formerly.

Prisons are not just meant to punish the convicted, but also make them feel blameful of the offenses he/she has committed. **Punishment is not the sole aim, reformation and rehabilitation follow it too.**

Prison have been one of the most neglected sector in term of architecture. Most of the prison in our country have been functioning the way they used to since the old times. In terms of infrastructures the prison need tremendous up gradation. As one enters a space, whether positive or negative, his/her psychology affected by that space.

1.1 AIM

The Design of Delhi Central Jail at Narela has been proposed in this project. It intends to contribute to the understanding of how architecture endeavours fit into the wider policy & context of Prison facility. Solving the efficiency & security related problems encountered by the Prison inmates & Staffs in previous projects that have been identified and probable measures that might be taken to resolve these concerns. Also to discover the concerned parties that might affect design and highlight possible issues in realization of this project to reach its desired goals and values.

1.2 OBJECTIVE

Participation of the concerned parties in the conceptualization & designing phase. The concerned parties must be identified and questioned. As Concerns and other factors might be highlighted in this.

To contribute to the understanding of Designer's (Architect) knowledge base & work outside of design or prior to design & construction phase; regarding the day to day workings and matters of the prison.

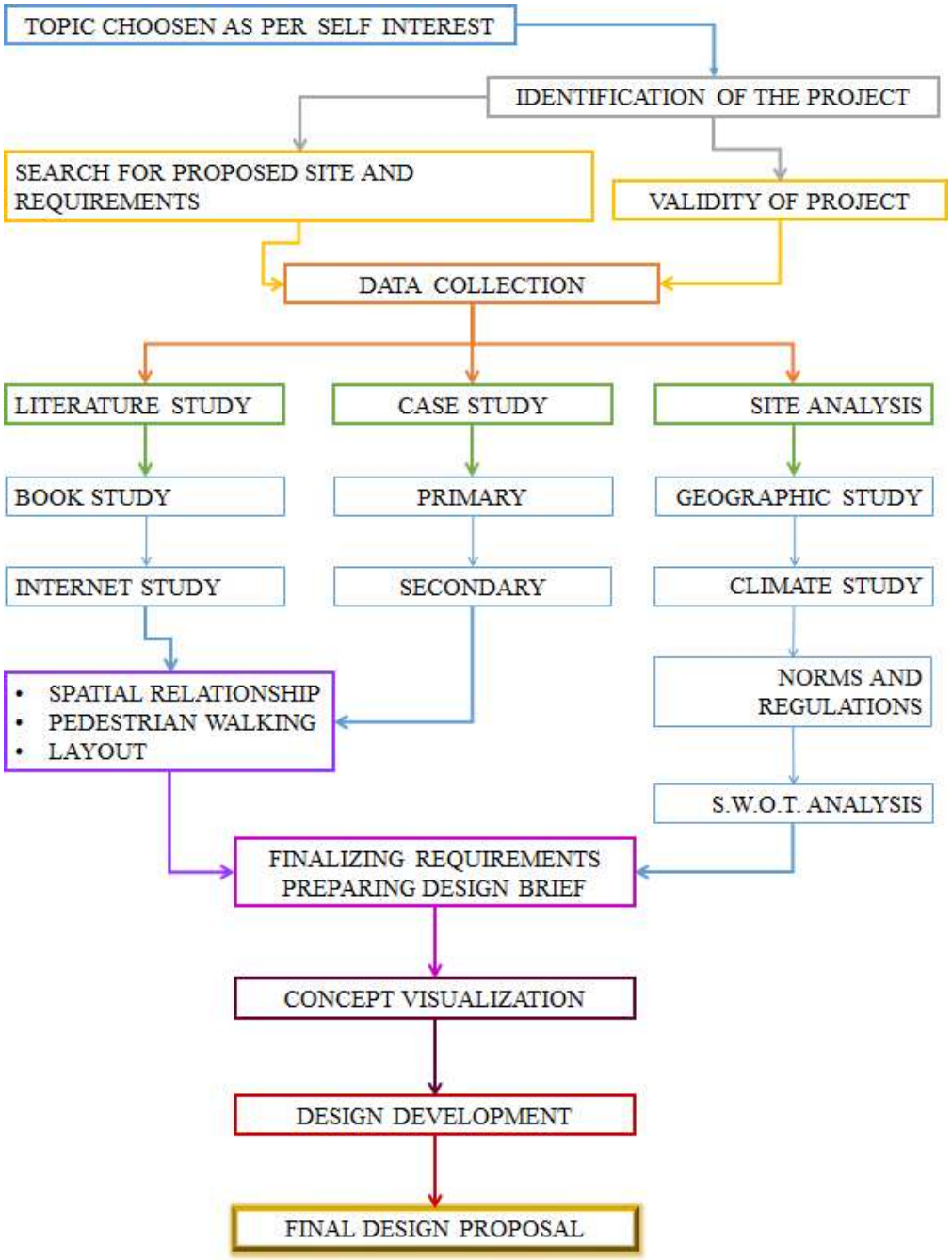
Was there any security concern in the previous prototypes of such kind of architecture? Identifying different Security measures that can be adopted & understanding their impact on design.

Can there be any way for the improvement of the facilities provided for the betterment of the inmates? Identifying possible drawbacks in previous prototypes of such projects is also a must concern.

Sanitation issue in such facilities are often given a last priority, which might result in the neglected security loophole, which otherwise might not have been thought of.

How does staff function in the constant stressed (constant vigil & monitoring) environment of the prison? How the staff does relieves the stress? Such questions often takes a backseat in the mind of the concerned parties. It becomes imperative to address such issues during designing phase.

1.3 METHODOLOGY



1.4 PROJECT DETAILS

- Location of site – Tikri Khrud , Narela, New Delhi.
- Site area acquired for the project – 40 acres (16 hectares)
- Site falls under the zone p1 of Master Plan Delhi 2021.
- Proposed Land Use: Public\semipublic building.

- Proposing Authority: Delhi government.

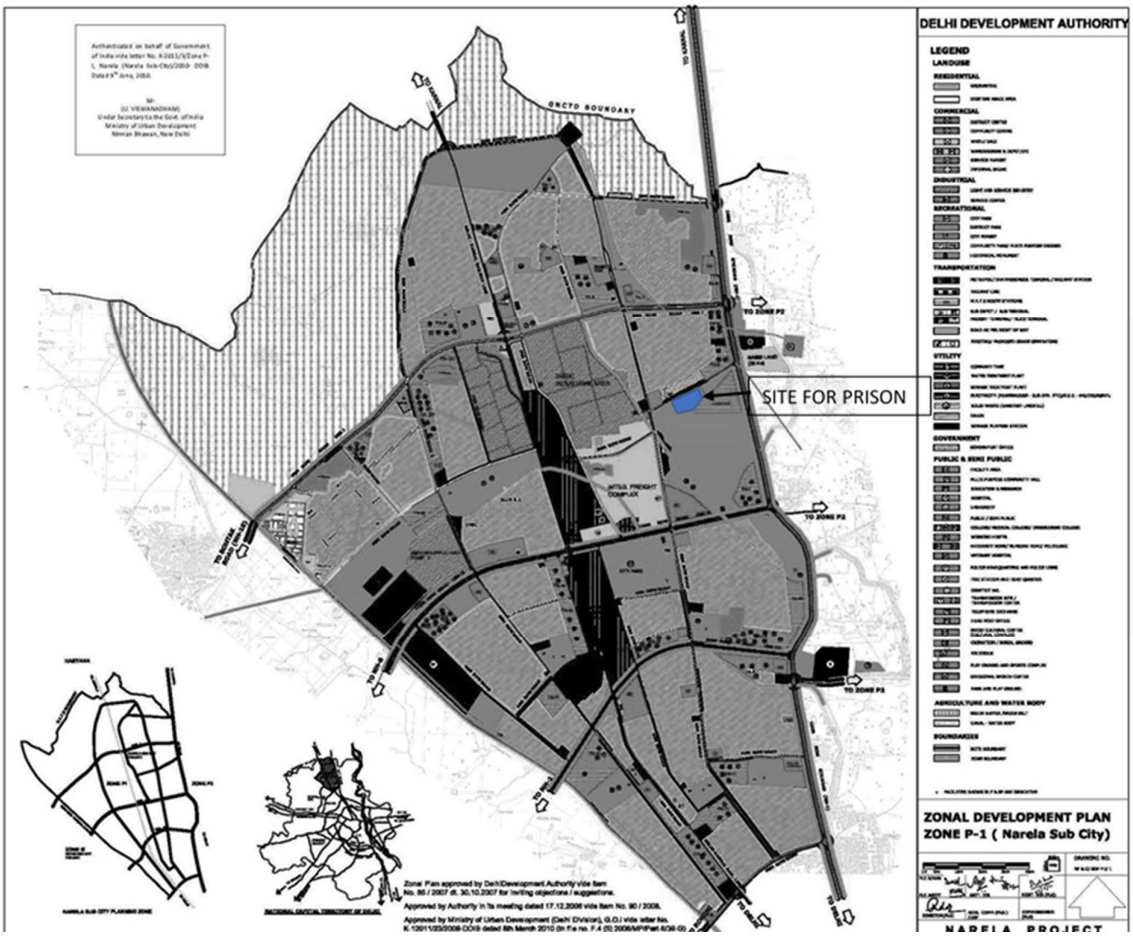


Figure 1 Delhi Master Plan (Zone - P1)

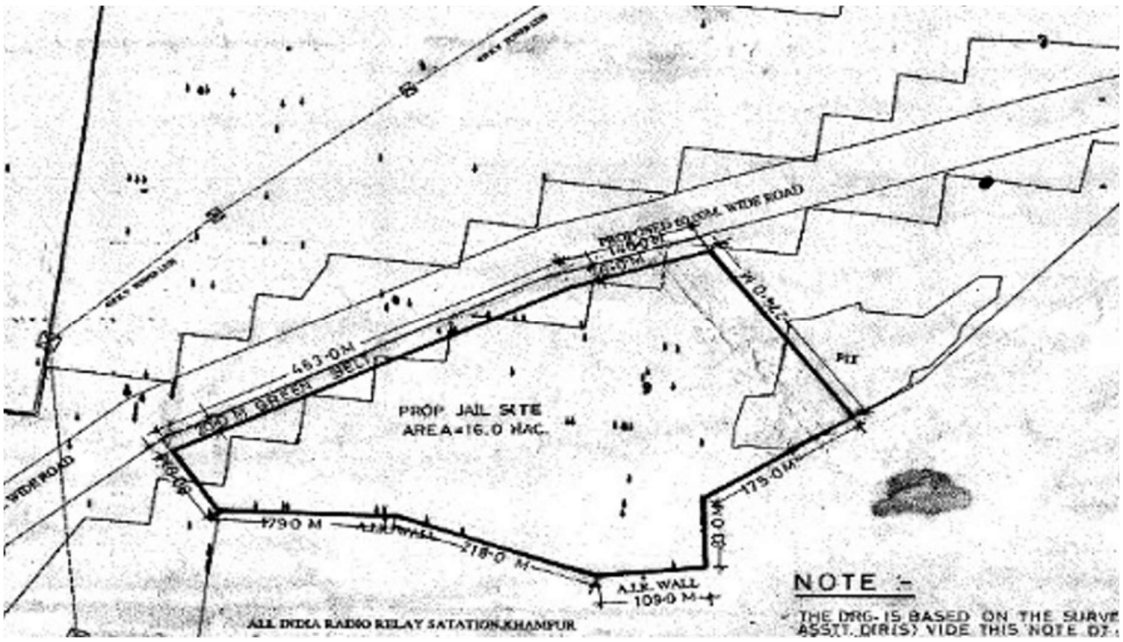


Figure 2 Site for Central Jail

2. STUDY

2.1. INTRODUCTION

Prison, an institution for the confinement of persons who have been remanded (held) in custody by a judicial authority or who have been deprived of their liberty following conviction for a crime. A person found guilty of a felony or a misdemeanour may be required to serve a prison sentence. The holding of accused persons awaiting trial remains an important function of contemporary prisons, and in some countries such persons constitute the majority of the prison population.

Figure 3 Man behind bars

A prison or jail is such an institute in which the main function is to reform 'convicts', though, this has not always been the case. Initially, prisons were designed to segregate the criminals from society as a form of punishment. They were held in small, poorly lit spaces and in some cases were treated inhumanly. In such situations, those that served their time and returned to society could not adapt easily and often returned to confinement.

Society's notion of criminals has shifted from a firm black & white to different shades of grey. The image of a prison is now seen as a place to rehabilitate those who could not reform to society. In prison's which propagate this ideology, various initiatives have been taken like engaging the nmates in sports, academics and are made to feel productive by employing then in various activities.

2.2. HISTORY

Prison is a facility where convicts or inmates are forcibly confined within and denied a variety of freedom under an authority. Such facilities may also be known as Correctional facilities

or Jail or Detention centre or Remand centre or Penitentiary. These are often used as a tool of political repression to punish political crimes.

The prisons or jails can be traced back to ancient times, corresponding with the evolution of society and formation of legal codes. Earliest known legal code is "Code of Hammurabi", written in Babylon around 1750BC

It entailed the concept of "lextalionis" where the convicts were punished often by the victims themselves, as a form of vengeance [] First use of prisons as a form of punishment was introduced by Romans. Metal cages, basements of public buildings and quarries were among the various existing structures to be used for such purposes. Best known form of Roman prisons during that time (around 640BC) was established within a sewer system beneath ancient Rome, known as Martine Prison

During Middle Ages (till 17th century) castles and fortresses, dungeons were used as detention centres or galley slavery which involved chaining of convicts in the bottoms of ships and forming them to now navy/ merchant vessels.

Public execution and torture was popularly resisted in Europe and in United States during 17th to 18th century, even for petty crimes. Thus leading to rise of Prison Reform movement influenced by two philosophies though they are somewhat contradictory.

First philosophy that of "utilitarianism and rationalism" suggested that Jail as a mere effective tool rather than public corporal punishments. Second philosophy that of "rehabilitation" suggested jails as a tool where convicts can be instructed in morality, obedience and proper behaviour.

However, a well organised system of prisons is known to have existed in India from the earliest time. It was a common practice to keep the prisoners in solitary confinement so as to afford them an opportunity of self-introspection.

The object of punishment during Hindu and Mughal period in India was to deter offenders from repeating crime. The recognised modes of punishment were death sentence, hanging, whipping, flogging, branding or starving to death.

2.2.1 HISTORY OF THE PENAL SYSTEM

Period	Nature of Social relationship	Sanctions	Form of punishment
500,000-20000.000 b.c. Appearance of homogeneous	Pre-tribal	_____	Personal retribution
2000,000-25000 b.c. Appearance of early modern man	Incipient group and tribal	Incipient customs and mores	Injury, torture and death.
25000-3000 b.c. Development of first criminal codes	Intermediate group and tribal	Intermediate customs and more	Torture, injury, Death, banishment, forfeiture.
400b.c-500 a.d Development of roman laws	Advanced group and tribal, incipient state	Customs and rudimentary lows	_____
500- 1750a.d Medieval and feudal justice	Feudal and intermediate organized state	Custom and common laws	Deportation, banshment, forfeiture, Torture, injury, death.
1750-Present	Advanced organized state	Custom and common laws Slate retribution, reformation, rehabilitation, reintegration	Fine, supervision, incarceration, death.

Table 1-History of prison and form of punishment

2.2.2 Development of modern prison

Being heavily influenced by the philosophy of utilitarianism of Jeremy Bentham, lead to the development of theory of modern prison system, in London.

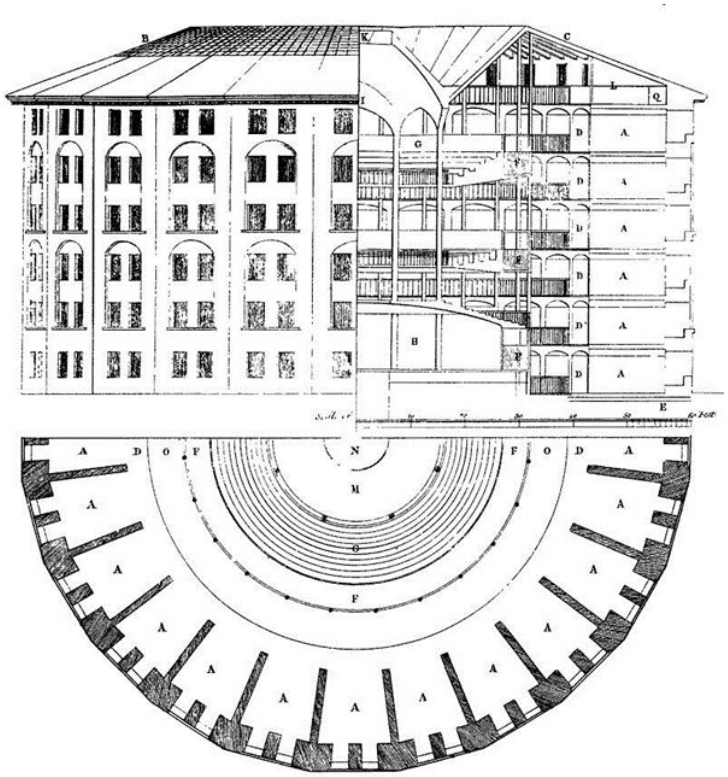


Figure 4: Eastern State Penitentiary (American Prison)

It introduced the concept and principles of Observation and Control, which lays the foundation of design of modern prison complex. Capital punishments for relatively petty offences were discouraged at that time. Hence correction or rehabilitation held great appeal.

It can be said that use of prisons in Europe was never as popular as it became in English – speaking world.

Another prominent prison reformer who made important contributions was Alexander Paterson who advocated for necessity of Humanizing and Socializing methods within prison system in Great Britain and America.

2.2.3. CLASSIFACTION OF PRISON

Indian Prison establishments comprise of 8 categories. Most common and standard jail institutions are Central Jails, District Jails and Sub-Jails. Other types of jail establishments are Women Jails, Borstal Schools, Open Jails and Special Jails.

2.2.3.1. CENTRAL JAIL

Long term imprisonment prisoners are confined in Central jails, having larger capacities in addition to rehabilitation facilities. For example- 11 central jails in Madhya Pradesh and 9 central jails in Tamil Nadu, Punjab, etc.

2.2.3.2. DISTRICT JAIL

Wherever there is no provision of central jail, district jails serve the purpose. Uttar Pradesh has highest number (57) of district jails.

2.2.3.3. SUB-JAIL

Correction facilities situated at a sub-divisional level in the States. Maharashtra has highest number (100) of sub-jails, revealing a well organised setup even at low formation.

2.2.3.4 WOMEN'S JAIL

Prison complex which exclusively house women prisoners, are called Women's Jail. Most of the staff working in such jails are also women. Maharashtra, Kerala and Tamil Nadu each have 5, 3 and 3 women jails respectively.

2.2.3.5. BORSTAL SCHOOL/ CORRECTION FACILITY

Minors or Juveniles prisoners are detained in youth detention centres, which are often a type of Borstal Schools. It caters primary goal of cars, welfare and rehabilitation of young offenders in suitable environment for children and away from contagious atmosphere of the prison. Vocational training and education, training etc. conducive to reformation and correction, is also provided.

2.2.3.6. OPEN JAILS

Open Jails are prisons without walls, bars and locks. Open Prisons is a trust based system where the prisoners are allowed liberty and free from restraint imposed through confinement. Prisoners with good behaviour satisfying certain norms prescribed in prison rules are admitted in open jails, which have minimum security. Prisoners are often engaged in agricultural activities.

Unlike Closed Prisons, Open Prisons do not have huge boundary walls, tall watch towers or massive metal gates to confine prisoners.

Rajasthan has highest number of 29 open jails.

2.2.3.7. SPECIAL JAILS

High security facilities have specialized arrangements for keeping convicts of serious or

heinous crimes. Provided for confinement of particular classes of prisoners is done in special jails such as:

- Prisoners who have committed serious violations of prison discipline.
- Prisoners showing tendencies towards violence and aggression.
- Difficult discipline cases of habitual offenders.
- Difficult discipline cases from a group of professional/ organized crimes.

2.3. PRISON REFORMS IN INDIA

In view of various International obligations and guidelines with respect to care of prisoners, various steps being taken towards prison reform in India. Keeping in mind the general problems face in Indian prisons and understanding the challenges in maintaining the mental health.

2.3.1. PRISON REFORMS IN INDIA - A BRIEF BACKGROUND AND OVERVIEW

The history of prison establishments in India and the subsequent reforms are presented in brief here in below.

It is believed that the Modern prison in India originated with the Minute by TB Macaulay in 1835. In here, Prison Discipline Committee was appointed which recommended increased rigorousness of treatment while rejecting all humanitarian needs and reforms for the prisoners.

Also in 1864, the Second Commission of Inquiry into Jail Management and Discipline made similar recommendations in addition to suggestions regarding improvement in diet, clothing, bedding and medical care of prisoners.

Further, in 1888 the Fourth Jail Commission was appointed which lead to the creation of consolidated prison bill. Provisions regarding the jail offences and punishment were specially examined.

2.3.2. PRISONS ACT 1894

The Prisons Act 1894 form the basis on which the present jail management and administration works in India. This Act has hardly undergone any substantial changes but, the process of review of prison problems has continued thereafter. In the report of Indian Jail Committee 1919-20, reformation and rehabilitation" of offenders were identified as main objective of prison administrator.

Further, in 1951, the Government of India invited the United Nations expert on correctional work, Dr. W.C. Reckless, to undertake a study on prison administration and to suggest policy reform. His report „Jail Administration in India" emphasized on transforming jails into reformation centres and recommended on revision of out-dated jail manuals.

As a result, the Indian Government thereby appointed All India Jail Manual Committee in 1957 to prepare a model prison manual and also formulating a uniform policy in relation to jail administration, probation, after-care and remand homes, etc.

In 1980, the Government of India set-up a Committee on Jail Reform called The Mulla Committee under the chairmanship of Justice A. N. Mulla whose main objective was to review the laws, rules and regulations keeping in view of protecting society and rehabilitating offenders.

Further, in 1987, the Government of India appointed The Krishna Iyer Committee under the guidance of the Justice Krishna Iyer to undertake a study on the situation of women prisoners in India and has recommended induction of more women in the police force in view of their special role in tackling women and child offenders.

The All Indian Committee in Jail Reforms (1980-1983), the Supreme Court of India and the Committee of Empowerment of Women (2001-2002) have all highlighted the need for a comprehensive revision of the prison laws but the pace towards any change has been lacking so far.

2.4 EVOLUTION OF FORMS OF PRISON

Since 1830, a lot of experiment had been done evolving the layouts of prison, the following type were the success out of those and influenced the prison architecture the most.

2.4.1. Telephonic Pole Prison:

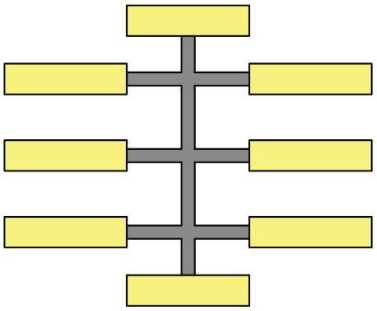


Figure 5: Telephonic Pole Prison

This was a breakaway design to emerge in the history of Prison. This was introduced by M.F. Poussin at Fresres. This type of prisons has a central corridor linking of series of rectangular cell houses arranged perpendicular to the corridor on both the sides. Each cell house was a separate unit which guaranteed a better classification of inmates. Lighting and ventilation were improved and supervision also become easier. This kind of layout was suitable for maximum, minimum or medium security prisons.

2.4.2. Courtyard with Barracks:

This layout has cells arranged around a central courtyard blocks are connected through long corridors. These pnsons are successful in terms of ease of segregation and classification and they also provide space for interaction in the grounds. It is used for maximum and medium security prisons.

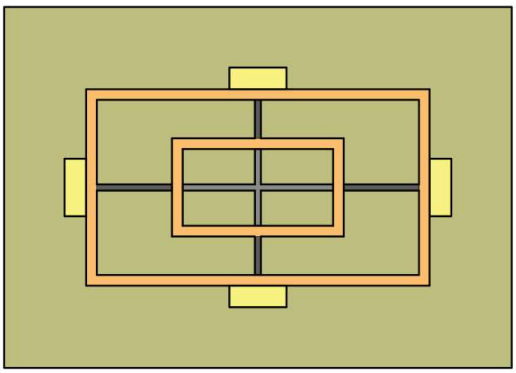


Figure 6: Courtyard with Barracks

2.4.3. Self-Enclosed Prisons:

Where the prison building itself becomes the outer boundary wall with a courtyard. This kind of layout is used for high security.

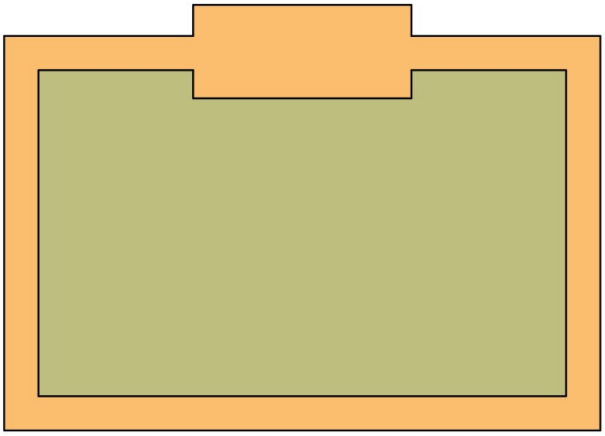


Figure 7: Self-Enclosed Prison

2.4.4. Open Campus:

These are essentially separate cell houses or cottages planned to enclose one or a series of courts, usually for minimum security prisons. This layout stresses on the fact that large number of low risk prisoners can benefit from the more open and normal conditions.

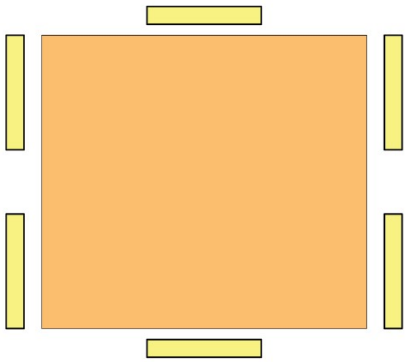


Figure 8: Open Campus

2.4.5. Free Layout:

They grows organically and are most often built in phases as and when it was required

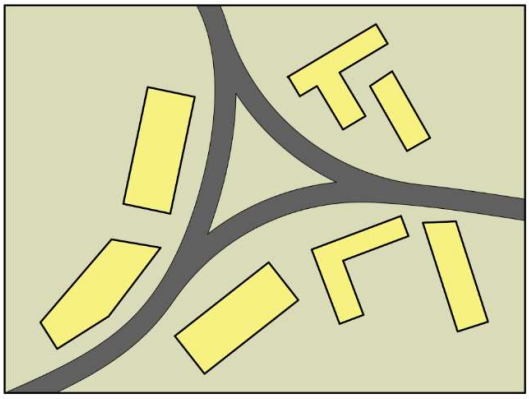


Figure 9: Free Layout

2.5. PROBLEMS RELATED TO INDIAN PRISONS

Various problems related to Indian prisons are as follows:

- The problem of overcrowding in prisons
- Government's discretion in early release of prisoners
- The problem of criminality in prison
- Inadequate prison programs

2.5.1. THE PROBLEM OF OVERCROWDING IN PRISONS

It is a known fact that the Indian prisons are overcrowded, for instance there are 8500 prisoners in Tihar Jail of Delhi (in 1995) against the capacity of 2500 persons. The result of overcrowding does not permit to segregation among convicts whether they are punished for serious offences or for minor offences.

Thus, the juvenile offenders who are kept in jails because of inadequacy of space come into contact with the hard criminals, are therefore, likely to become professional offenders later on and might cause harm in society.

Prison population statistics. As of 31 December 2014, there are 1387 functioning jails in India having a total capacity to house 356,561 prisoners. As of the same date, there were 418,536 inmates in jails across in India.

Type	Number	Total Capacity
Central Jails	134	159,158
District Jails	379	137,972
Sub Jails	741	46,368
Women Jails	18	4,748
Open Jails	63	5,370
Borstal Schools	20	1,830
Special Jails	43	10,915
Other Jails	3	420
Total	1387	366,781

Table 2: Number of Prisoners in Prison of India

2.5.2. INADEQUATE PRISON PROGRAMMES

Despite the problems of overcrowding, manpower shortage and other administrative difficulties, various innovative initiatives have been undertaken in some prisons. For instance, the Art of Living has been carrying out a SMART program in Tihar Jail that includes two courses per month and follow-up sessions every weekend.

Many prisons also provide various vocational training courses with the intention of rehabilitation and to strengthen their will to work, self-improve and cooperate with each other. Few options available to female workers in regard to vocational training include tailoring, embroidery, agriculture, cleaning, and kitchen work.

Figure 10: Various Activities in Jail

3. PRISON DESIGN

3.1 PRISON FUNCTIONAL REQUIREMNTS

Jail is a single building made up of many small components that have different functions or activities. Together these components satisfy the needs of inmates, staff and public users of the jail.

The selection of components, the details of their development, and their arrangement in relationship to each other on a selected site are what make each jail design unique and responsive to local conditions.

It is critical to develop a working knowledge of the various components needed by jurisdiction in terms of their function, interrelationship and impact on design in order to meet the local jail needs.

The major functional requirements are described herein below.

- Master control
- Intake – Realse
- General housing
- Heath care
- Visiting area
- Recreational / exercise area
- Food service.
- Admistrative/Public
- Staff
- Storage
- Supervision

3.2. MASTER CONTROL

The basic function of Master Control is monitoring and control of all communications, life-safety and security systems, and all general building movement patterns, including entering and exits through main security envelope of the jail.

In small jails, Master Control is also known as Central Control. This may also function as a point from which some inmate housing units or other inmate or public areas are monitored.

The following functional issues should be considered in the development of Master Control component:

- Use of Master Control centre should be principally limited to Master Control Staff- it also includes routine communication and contact between Master Control and other officers should be accomplished through intercoms, pass-through, etc.. It should not serve as a focal point for staff breaks or periods of inactivity.
- Master Control functions must be identified and priorities set in terms of tasks and workload responsibilities such as monitoring electronic surveillance systems, controlling entries, monitoring various building systems, various law enforcement related functions such as radio dispatching of patrol cars, dispatching ambulance services.
- Master Control should be able to control the entire facility if necessary in case of an emergency such as fire emergency, equipment breakdown and should be operational capability to override the controls if needed.

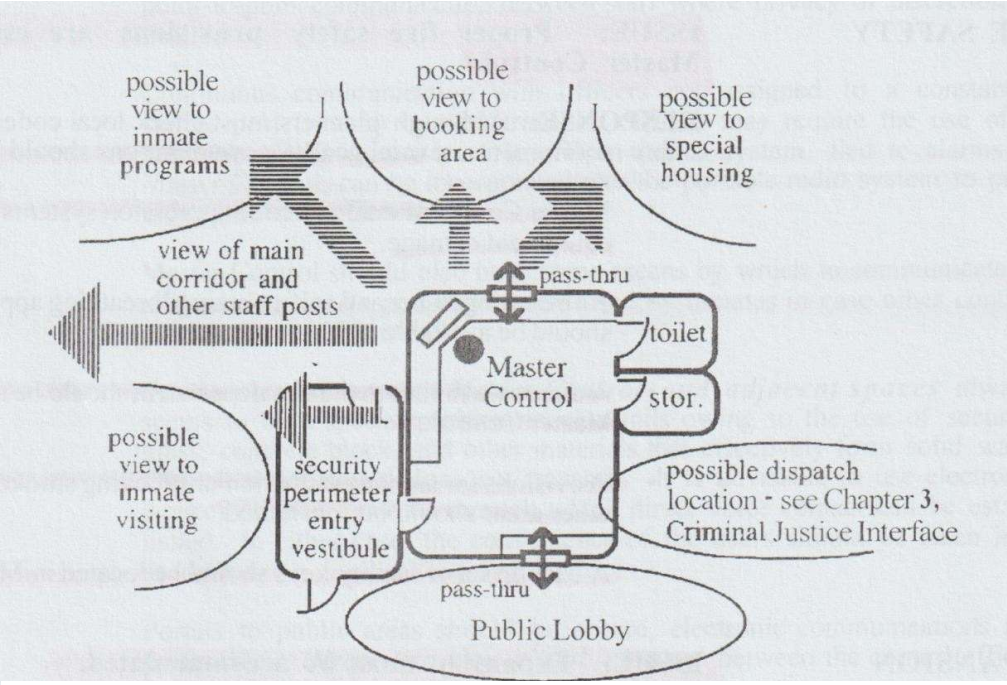


Figure 11: Relationship of Master control with other areas

- Master Control must be of fundamentally secure construction to preclude access by inmates and the public. In other words, creation of a physically secure space is vital that is the walls, floor and ceiling of this room must be constructed of secure material.
- All power, communication and computer lines outside the Master Control space must be secured.
- The design should allow effective visual observation of areas where monitoring is desired that is, a direct line of sight to that area should be created wherever possible.
- The design of Master Control room must be laid out efficiently- control panels can be organized independently of each other by function. It is important to the design to determine whether staff will or stand.
- Master Control is not easy to expand because of its nature and central location in the jail. If workload demands are likely to increase to the point where two positions are needed rather than one, then it would be wise to design Master Control as a two-position space.

3.3. INTAKE-RELEASE

The intake-release area of jail often referred to as booking, admissions or receiving area. It is an active and vital component and also performs three key roles:

- Intake activities involved in initially receiving arrestees or inmates from court or other facilities, secure entry/ verify arresting authority, frisk, receive and temporarily store selected property.
- Intake activities involved in initially admitting arrestees or inmates into residency in a housing unit such as exchange clothing, shower/ decontamination, orient to facility rules

- Intake activities involved in initially releasing arrestees or inmates from either the receiving area or a housing unit such as verify identity, execute release paperwork, exchange clothing, return property, provide secure exit.

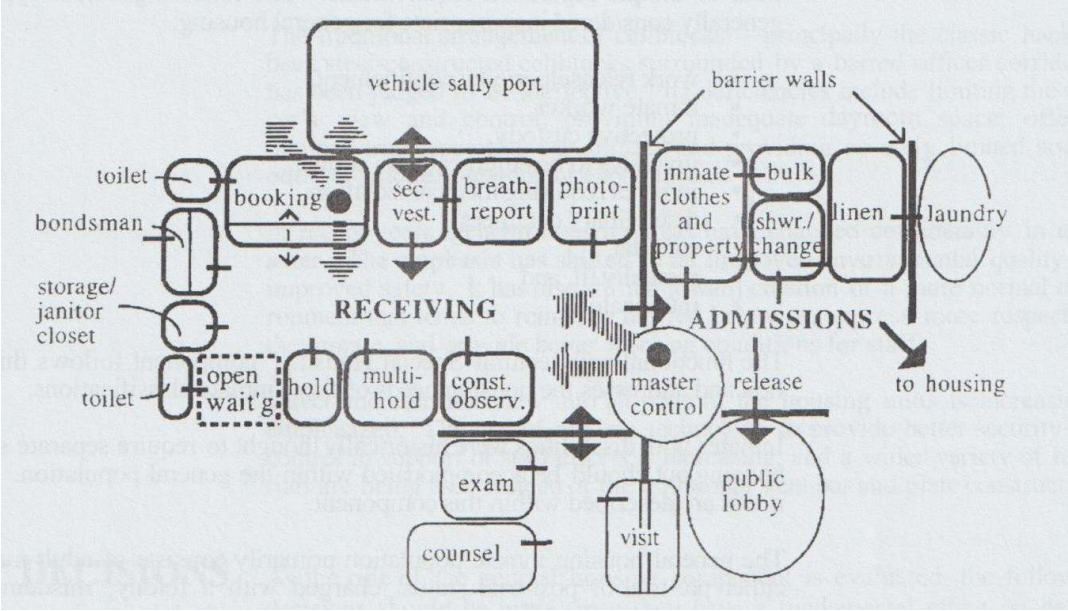


Figure 12: Relationship of Intake – Release with other areas

- The intake-release environment should help reduce tensions and create a calm, orderly and secure intake process. The appearance and character of the area can be improved like using warm and bright colours, providing maximum freedom in holding accommodation.
- Intake-release functions require close security and control given their sensitive and difficult nature. The entry sequence to the receiving area should be within the direct line of sight of the intake-release officer.
- Facilities should be provided to allow the inmate to shower and change clothing.
- Multi-purpose secure waiting space is needed for holding during mass arrests and staging for court or other transport.

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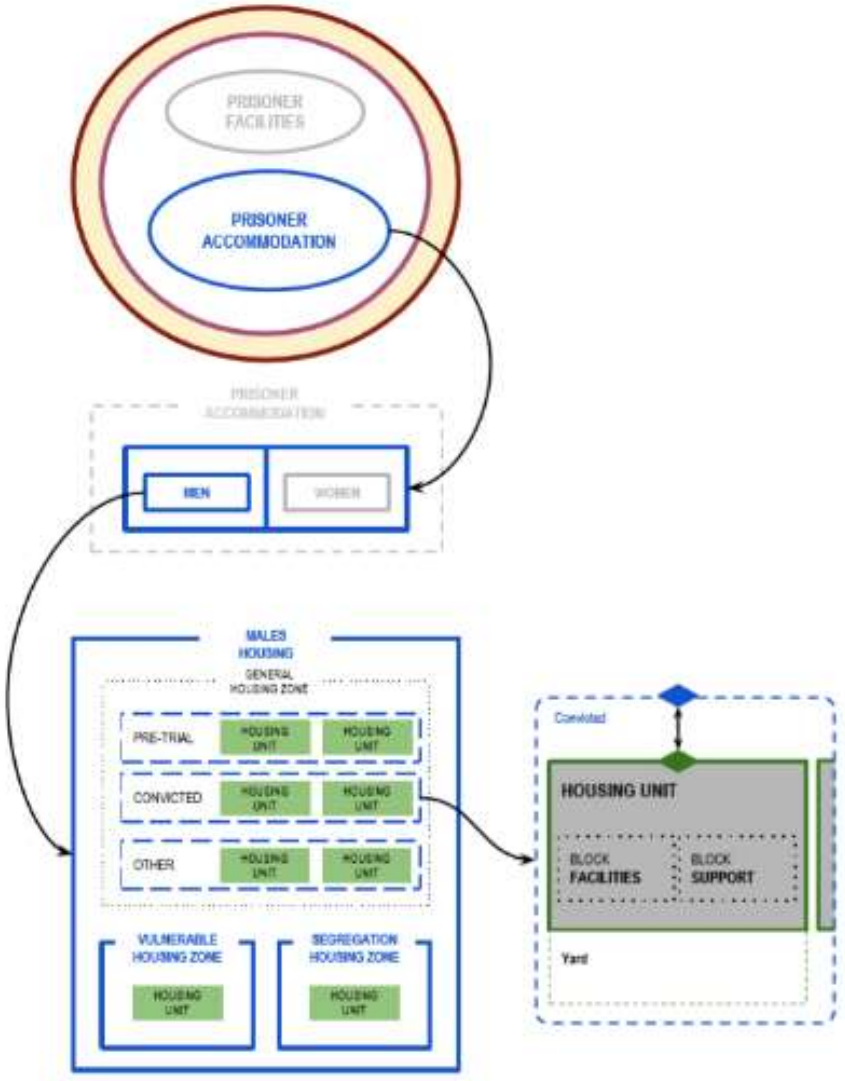


Figure 13: Relationship of Inmate Housing with other areas

3.4. GENERAL HOUSING

The general housing area of jail consists of those areas that accommodate the inmate. The inmates can be of the following types such as inmate worker, protective custody, juveniles, mentally ill and intoxicated. This area normally includes types of space such as inmate cells or dormitories, dayrooms, staff control posts, security vestibules, storage, janitor closet, etc. The following design and functional issues related to general housing are discussed herein below:

- Housing unit activities must be identified as variety of activities occur within a housing unit such as sleeping, attending to personal hygiene, dressing, talking with other inmates, communication with staff, cleaning and maintaining the area, must

acknowledge the potential for less common events such as vandalism act, escape attempts, assault on inmates, etc.

- Changes in the makeup of the average daily population must be accommodated.
- Providing adequate housing capacity and environments for female inmates in small and medium-sized jails presents special problems.
- The degree of movement between housing units and other areas of the facility must be identified. It is noted that it is beneficial to minimize the amount of movement that occurs in a facility. As the security level of inmates increase the management benefits of limited movement also increase.
- Movement within the housing units and to and from other areas of the facility should always be under staff control. In other words, to facilitate staff control of movement within the housing area, all cell, dayroom and related housing spaces into which inmates move should be controlled through doors with remotely operated locking systems.
- Differences in security and custody levels should be considered in the design of the physical environment.
- Physical safety of staff must be provided by way of direct visual backup of staff entering or working around housing units, design of locking systems to minimize escape.
- The need for natural light in housing areas should be balanced against security concerns. The greatest problem occurs with cell windows since cells are less observable part of housing area by placing the windows high in the wall and to minimize escape potential and eliminate view conflicts.
- The environmental quality oh housing areas can make them more liveable and influence inmate behaviour such as sound quality is one of the most difficult environmental problems resulting from electric locks, slamming doors, showers, toilets, TVs, radios. Providing night lighting capabilities in cells and dayrooms that allow primary lighting to be shut off. Cells are made of hard cold surfaces, do not have individual temperature control and are on exterior wall. In addition, the heat source is at the front of the cell.

The following functional issues to be considered when designing sleeping areas both cells and dormitories:

- Sleeping area occupancy includes the options of single occupancy, double occupancy and multiple occupancy (ranging from 3 to 50).
- Sleeping area size is shaped by activities, equipment and individual needs like bed size, bed arrangement, desk surface, etc.
- Psychological needs involve the sense of confinement created by the cell space in particular and these concerns can be minimized by using ceiling heights moderately higher than typical 8 feet, avoiding unusually narrow cells that disproportionally accentuate room length.

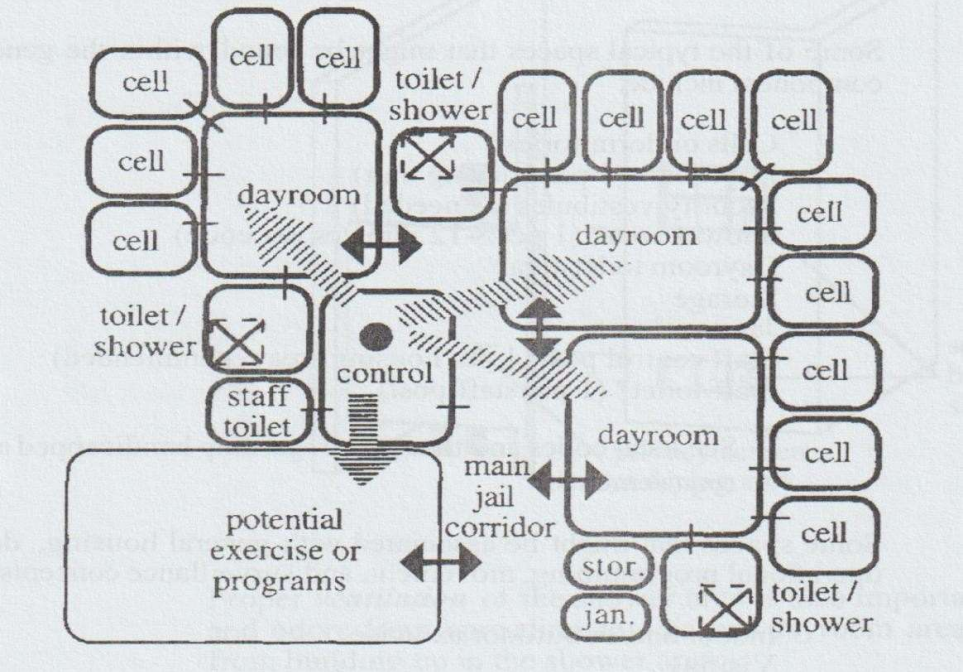


Figure 14: Relationship of Master control with other cells

The following functional issues to be considered while designing dayrooms:

- Dayrooms should be located adjacent to and immediately accessible from the cells they serve. There should be one dayroom for each group of cells.
- The size of dayrooms is considered by the activities to occur, functionality and aesthetic concerns for proportion.
- Furniture and equipment should be considered for proper placement in the dayrooms.
- Certain special requirements should be met in the housing units such as all doors leading to housing area and the cell must be wide enough to allow passage of a wheelchair, toilet and sink fixtures in the cell should be separate fixtures that accommodate the needs of the disabled inmate, ramps at point of entry should be provided and features such as intercoms and telephones should be accessible to wheelchair-bound inmate.

The following issues are to be considered for staff control post design:

- The staff in charge of observing and supervising housing units have a variety of responsibilities like writing reports, record keeping, responding to inmate complaints, communicating with other staff members via intercom, managing the supply needs of the housing units, etc.
- It is important to note that with direct supervision there is no need for a separate staff space and the control post work surface has a limited number of controls. When the staff post in remote surveillance setting are frequently the largest as the staff space must function as a self-contained operation wherein the control panels are used to manage

locks, lights, alarm systems, etc.

3.4.1. TYPES OF HOUSING

3.4.1.1. Single and shared cells

Cells are rooms that are typically designed to sleep one or two prisoners.

Specifications:

- Floor area (net): At least 5.4m2, for single cell accommodation (ICRC) At least 3.4m2 per person, for shared accommodation.
- Distance b/w walls: At least 2.15m (ICRC)
- Height of the room: At least 2.45m, but more may be needed in warmer climates (ICRC)
- Ventilation area: At least 4% of the net floor area (IBC) where infeasible, must be greater than .1m2/person.
- Day lighting area: Total clear glazed window area, at least 8% of the net floor area. (IBC) Where infeasible, must be greater than .1m2/person.

3.4.1.2. Dormitories

Dormitories are spaces that house groups of prisoners. Bunk beds are often used to maximize the floor space available for prisoner use.

The size of the dormitories will largely depend upon the number of prisoners to be housed within them, and the level of risk those prisoners pose to the good order and discipline of the prison. Dormitories housing between 4 and 25 prisoners are easier to manage and control than larger ones.

Specifications:

- Floor area (net): (ICRC)3.4m2 per person for dormitories containing single beds; 2.6m2 per person for dormitories containing double bunk beds; and 2.3m2 per person for dormitories containing triple bunk beds.
- Height of the room: At least 2.45m, but more may be needed in warmer climates or if triple bunks are used (ICRC)
- Distance b/w walls: At least 2.15m (ICRC) Min. vertical space between beds: 1.2m (ICRC)
- Height of the room: At least 2.45m, but more may be needed in warmer climates (ICRC)
- Ventilation area: At least 4% of the net floor area (IBC) Where infeasible, must be greater than .1m2/person.
- Day lighting area: Total clear glazed window area, at least 8% of the net floor area. (IBC)

Where infeasible, must be greater than .1m2/person.

Space calculations: Minimum floor area (net m²)

Number of prisoners	m² single beds	m²/person, single beds	m² double bunks	m²/person double bunks	m² triple bunks	m²/person triple bunks
1	5.4	5.4				
2	6.8	3.4	5.4	2.6		
3	10.2	3.4			7.0	2.3
4	13.6	3.4	10.4	2.6	9.3	2.3
6	20.4	3.4	15.6	2.6	14.0	2.3
12	40.8	3.4	31.2	2.6	28.0	2.3
18	61.2	3.4	46.8	2.6	42.0	2.3
24	81.6	3.4	62.4	2.6	56.0	2.3
36	122.4	3.4	93.6	2.6	84.0	2.3

Table 3: Area of Cell according to number of Beds

3.5. HEALTH CARE

Adequate health care services are essential to the well-being of arresters and inmates and viewed as a basic human right. The activities necessary to carry out a complete health care program include medical screening at intake to identify illness or injuries prior to admission, alcohol or drug detoxification, testing for infectious diseases, temporary care of individuals with mental illness, isolation of those with infectious diseases, etc.

The various fundamental issues related to exam areas are as follows:

- All the activities to occur in medical examination spaces should be identified depending on the availability of resources such as initial screening, routine health assessment, responding to inmates health complaints, first aid, record storage, minor laboratory work, minor x-ray work etc.
- The type of examination activities and the projected workload must be identified like the differences in need of functions and equipment needs, variety of tasks to be performed.
- The size of examination rooms also varies with the level of care provided depends upon the needs of basic first aid and basic physical exams. The space with minimum equipment like examination table and chair, examination light, countertop with sink, lockable storage cabinets and drawers, trash cans, refrigerator with specimens, etc.

- A space as small as 80 net square feet can be adequate to meet minimum functions.
- A space of 100 net square feet can be more comfortable and more typical of standard examinations.
- A space of up to 180 net square feet can be required in case of minor emergencies and additional treatment procedure.

- Examination rooms should be located at a point within the jail that complements safety, security and service delivery needs
- The security of medical personnel in examination areas should be assured and equipment and supplies must be secured as well.
- The security of medical personnel in examination areas should be assured and equipment and supplies must be secured as well.
- Two-way communications between the examination area and a constantly staffed post and to parties outside of the facilities should be provided via intercom that notifies the staff of completion of exams, to request next patient, etc.
- Basic environmental needs of examination areas should be accommodated such as sufficient lighting in order to conduct required exams, natural light, acoustic privacy for

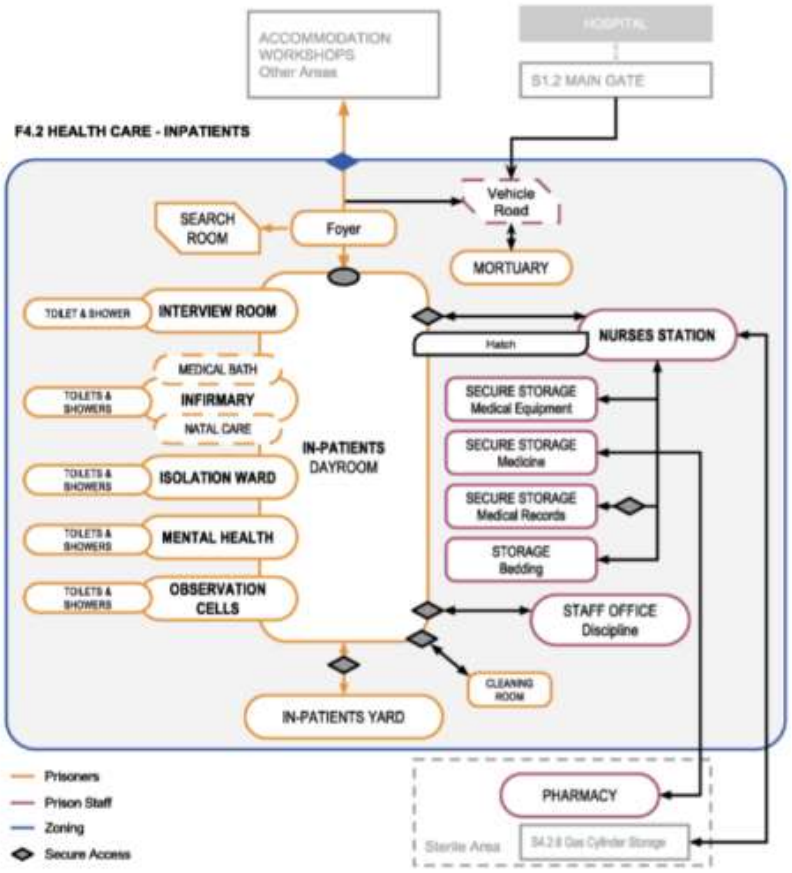


Figure 32: Functional diagram – healthcare, inpatients

confidential health care discussions, temperature levels, etc.

- The medication storage and distribution needs should be determined and also the size of area needed for medical storage and distribution.

3.6. VISITING AREAS

Visiting areas is one of the crucial links between inmates and the community. Visiting is extremely important to inmates because it enables them to keep in touch with family members, friends, business associates, etc. In older jails, visiting commonly occurred at the cell blocks rather in areas set aside specifically for visiting. These cell block areas were characterized by a complete lack of privacy; physical conditions dangerous for staff, visitors and inmates; and poor security features.

In modern designs, visits with friends and family usually occur in private and varied spaces are needed for visiting which includes visiting facilities that accommodate the disabled; a visitor reception desk adjacent to public lobby; a visiting waiting area with public restrooms, telephone and drinking water; a storage area for visitor's personal property, etc.

The following functional issues are to be considered in the development of visiting areas are described below:

- It must be determined how basic activities will be accommodated, which staff members will conduct or supervise them and were they will take place such as when visitors arrives they are registered and screened by staff; staff determines whether the visit will be allowed; visitor is directed to waiting area and is informed of rules and length of visits; staff determines the location of inmate and communicates with other staff who will escort the inmate to visiting area; staff supervises the visit; staff observes inmate return to the housing area and visitors return to the waiting area.

Figure 15: Relationship of Health Care - Inpatients

- Facility design is also influenced by the type of provision for visiting areas. There can be 2 types of designing, each with a different impact.

    - Moving Inmate to the visitor. This requires the inmate movement from their living areas to the public area of visit.

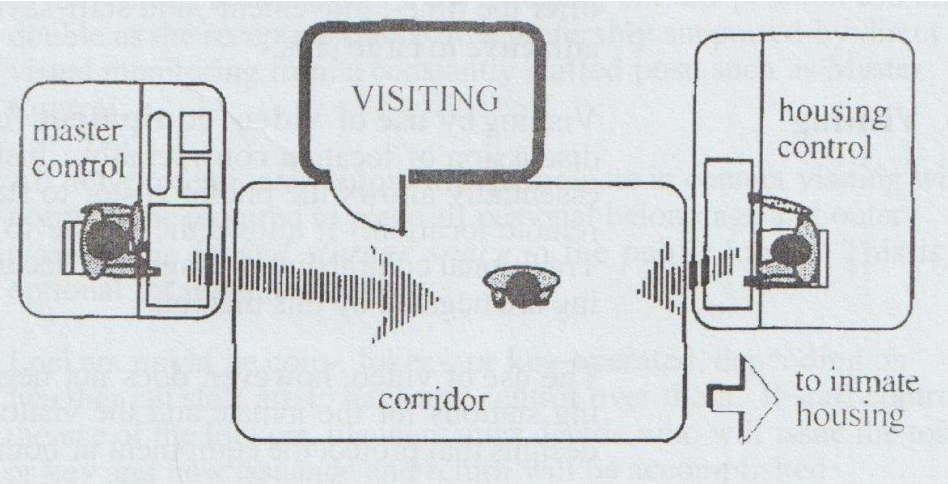


Figure 16: Relationship of Visiting with other areas

- Moving Visitor to the inmate, done via separate circulation corridor from public lobby to visiting stations, adjacent to inmate housing. Inmates enter the visiting booth directly from their dayroom without staff escort.
- However, visiting at the housing units presents special problem. The visitor must move deep into the facility to reach the housing units for meeting the inmates. A totally secure second visitor (above primary inmate corridor) corridor must be created to ensure jail's security envelope is not violated.

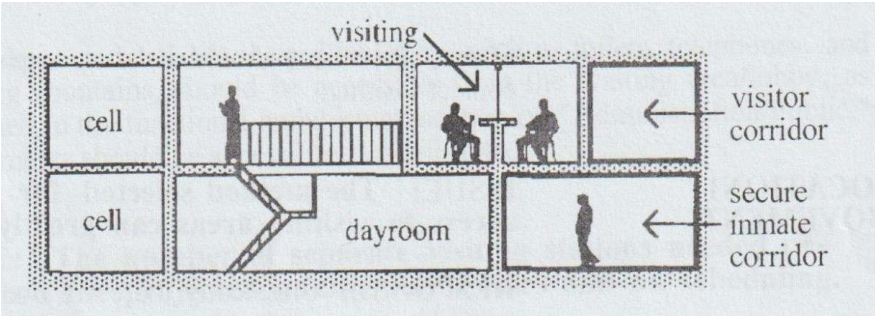


Figure 17:Relationship of Visiting in section drawing

- The size of visiting spaces is determined by the number of users and by human comfort and security considerations such as :
  - There should be enough width to comfortably accommodate more than one visitor seeing an inmate at the same time.
  - There should be enough depth to allow visitors to sit rather than stand and move more comfortably around and behind the sitting space.
  - It is also recommended to give a small counter surface with sufficient depth for leaning or writing.
- If there is need for separate visiting stations, which can be determined by the anticipated number of visitors and on scheduling. Factors to be considered are :
  - How long the visits will be allowed;

- How many hours per week will be set aside for visitation etc.

- Certain safeguards must be implemented to prevent the passage of the contraband during visitation such as all visitors should be required to pass through a frisking point to screen for weapons and nay other illegal item prior to entering the visiting area of the jail, staff should be posted to visually monitor the visiting area and security vestibule physically or via CCTV.

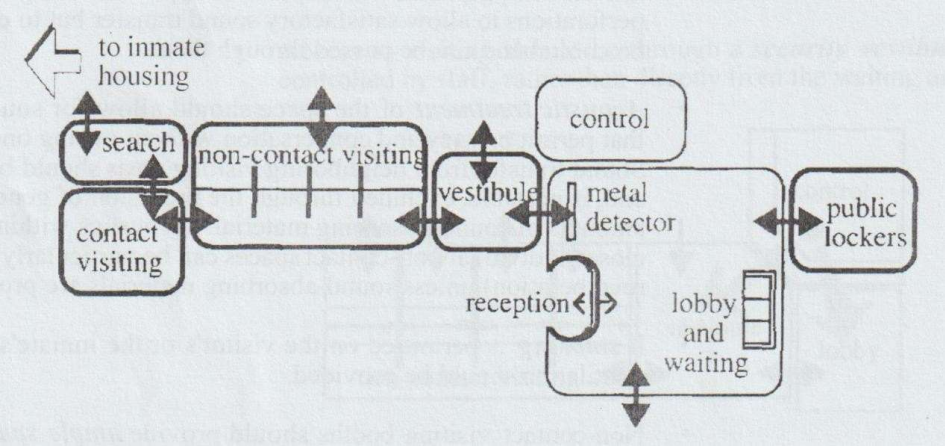


Figure 18Relationship of Visiting area

3.7. EXERCISE AREAS

Active indoors and outdoor exercise outside the housing units is important for the physical and mental well-being of the inmates and to provide facility for security. The provision of indoor and outdoor exercise areas in new jails has generally become an expected practice by way of providing active exercise through basketball, volleyball, weightlifting, yoga, etc.

The following functional issues which are considered in the development of exercise areas are described below:

- The number and types of people to use exercise areas should be determined because of separation and supervision concerns also keeping in mind the capacity expansion in case some day larger group is accommodated.
- The size of exercise areas should be based on activities and group sizes.
  - For instance, a small half-court basketball area requires 1,600 to 2,688 net square feet with a ceiling height of 15 to 20 feet while calisthenics areas require only about 300 net square feet and a 9-foot ceiling height for same number of users.
- Space should be provided for staff who supervises exercise areas in several ways such as an enclosed or open / counter control post adjacent to but separate from the exercise area; an enclosed or open- counter post in visual contact with but separate from the exercise area and also monitoring the other area such as housing. It is important to provide the officer with a communication link to master control and backup monitoring

by C.C.T.V. may be useful to ensure the safety of officer.

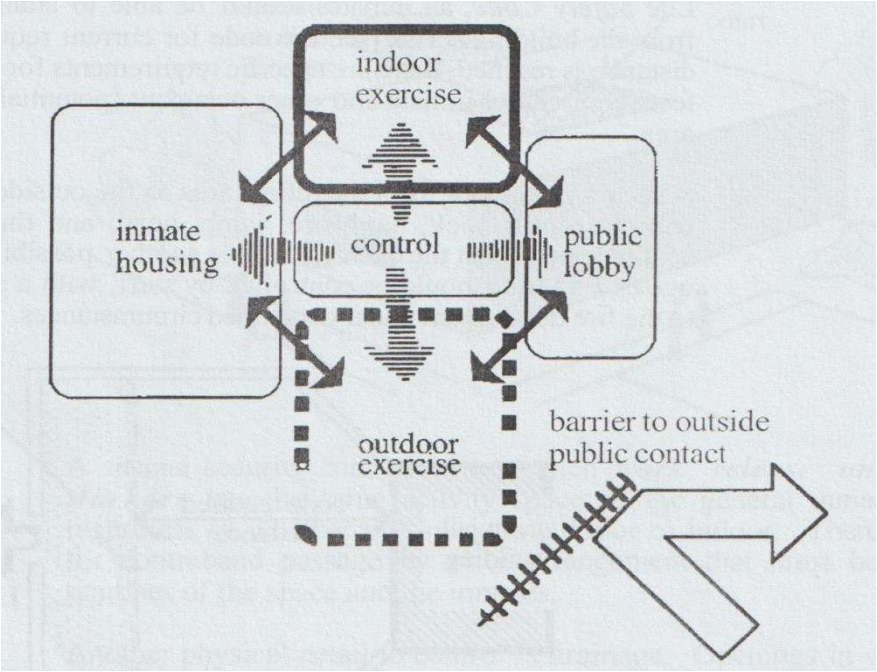


Figure 19Relationship of Exercise Areas with other areas

A

lockable area adjacent to open area is provided for storage of exercise equipment and others. While shower areas are typically not necessary for inmates, since they can use their facilities provided to them in their housing units.

Providing a means of communication between staff and inmates in the exercise area via intercom, public address speaker or direct voice communication in the open area.

Public use of an exercise area requires secure access that does not compromise perimeter security, movement paths separate from those used by inmates, and precautions to prevent contraband passage. If the public is to use an inmate open area for program purposes, secure access should be provided by locating the area near the lobby and thus creating a monitored security vestibule entry along the routes that are separate from those used by inmates.

3.8. FOOD SERVICE

Food service has a major impact on daily jail operational routines, annual operating costs and initial construction cost. The quantity, quality and means of preparing and serving food have often been an issue. It comprises of various basic activities such as menu planning and ordering, receiving and storing foods and other supplies [] food/ beverage preparation and delivery, dining, clean up and dishwashing after meals, disposal of waste and record keeping.

The following functional design issues should be considered in development of food service areas:

- The location of inmate dining and the method of food delivery must be established.
- Food preparation and storage area size and layout should be adequate to allow the efficient preparation and assembly of meals.
- Adequate provisions must be made for cleanup and waste handling.
- The jail should have a delivery area that functions like a security vestibule. Controlled by Master Control food deliveries are unloaded into this room. Before the delivery person leaves the food service staff, verify the contents of delivery. In sizing and designing the deliver vestibule various issues are considered such as the method of delivery, temporary storage requirements, the need to store hand trucks and pallets and the type and size of access doors.
- Security precautions which must be taken in case inmates work in kitchen. The kitchen area should be provided with alarms and/or audio monitoring.

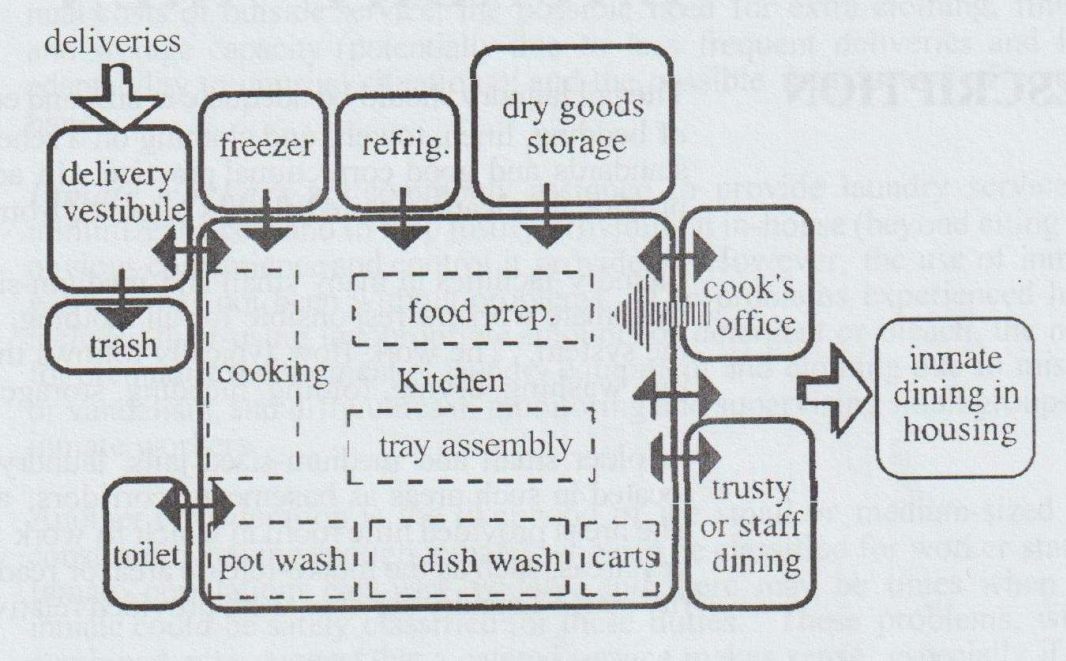


Figure 20: Relationship of Food Service with other areas

3.9. ADMINISTRATION/ PUBLIC

The administration and public areas of the jail are essential to the organization and management of daily business. They are also essential to accommodate the public"s need for access to the facility and to information about inmates and other aspects of jail operation. The various activities in this area are:

- Managing the business affairs of the jail, including general accounting, ordering of supplies and goods.
- Receiving and distributing mails, packages and clothing for inmates.
- Accommodating outside groups for tours and presentations.
- Maintaining security and restraint equipment unless it is located elsewhere in the facility.

The following issues should be considered in the development of the administration/ public areas are described below:

- Administrative staff deals with the public, salesperson, media and others on daily basis. Therefore, access to the administration area must be convenient and as direct as possible. Thus, it requires that the administration area should be adjacent to public area.
- Since the public should not have access to the jail security perimeter, so to provide proper location and security is to locate the administration area outside the main security perimeter but adjacent to it.
- It is desirable to locate the staff areas and the administration areas adjacent ot each other for the convenience related to staff briefings, for enhanced management of staff activities, etc.. Also the administration areas in particular the record area should be as accessible as possible to Master Control/ dispatch and intake-release areas for convenient transfer of records.
- The impression left by the public lobby and reception experience greatly influence the image of jail as it is the primary point of contact for all public and official visitors of the jail.
    - The lobby area should be sized to provide at least 15 square feet per person, keeping in mind whether the lobby will be used only for inmate-visitor waiting or it must accommodate visitors waiting for general business.
    - Acoustic treatment should be provided to improve the quality of the space.
    - View conflicts between lobby area and the jail perimeter should be avoided.
- A method of accommodating contact with public 24 x 7 must be established. Contact can be made with inmate"s family members, bondsperson, attorneys and others. Communication would be generally made from 9am to 5pm scheduling it between Monday through Friday
- The means by which packages, clothing, money, and other items that will be given to public or received by them should be convenient and properly scrutinised and secure. The public brings variety of items to the facility which will be permitted as the jail rules. The proper way to treat this is to provide a dedicated staff which will accept parcels and items only at day and packages will be carried forward for checking and then will be send to inmates housing.
- Public lobby space and its equipment should be properly provided with drinking water,

toilets (handicapped accessible), clock, bulletin board for display of proper rules and regulations, furniture, locker area, proper light and ventilation.

- Work areas for clerical, record and other staff functions associated with facility administration should be of sufficient size and should have required equipment. The clerical staff is the core for administration of facility; a primary variation is whether the staff will be involved in public dealing or not. They also have a primary responsibility to answer telephone calls during the day. Answering of facilities interconnected telephones is also a hustle during their work time. Clerical staff typically perform activities :
    - Entering data,
    - Maintaining files,
    - Establishing and maintaining records,
    - Collating reports,
    - Logging and sorting of messages,
    - Purchasing of different items,
    - Maintaining accounts, and
    - Controlling inventory of administration supplies.

- Equipment associated with typical clerical staff activities :
    - Desk and chair,
    - Computer,
    - Printer,
    - Computer station,
    - Photocopier,
    - Work space for collating reports and messages,
    - Postage scale,
    - Binding machine,
    - Telephone,
    - Intercom unit,
    - Waste basket,
    - File cabinets,
    - Fax machine,
    - Safe, and
    - File server.

- Administrator’s area must be placed so that it‟s convenient to both clerical staff and jail area. It will be useful if the administrator‟s office is within the jail security perimeter, hence giving and ability to provide a key area for observation of jail area and other areas.

- Administrator's area should be designed to accommodate different needs such as a private toilet, a small secure storage closet for storing sensitive items, a restroom. The office area should be fitted with alarm, burglar resistance windows to prevent attacks from outside, locked file cabinets, facility intercom, telephone line, acoustic treatment for sound absorption, a duplicate C.C.T.V. monitoring system and a jail staff wireless radio.
- Conference area should have characteristics conducive to meeting area. It can be provided in administration area with staff briefing, staff training and multipurpose area.

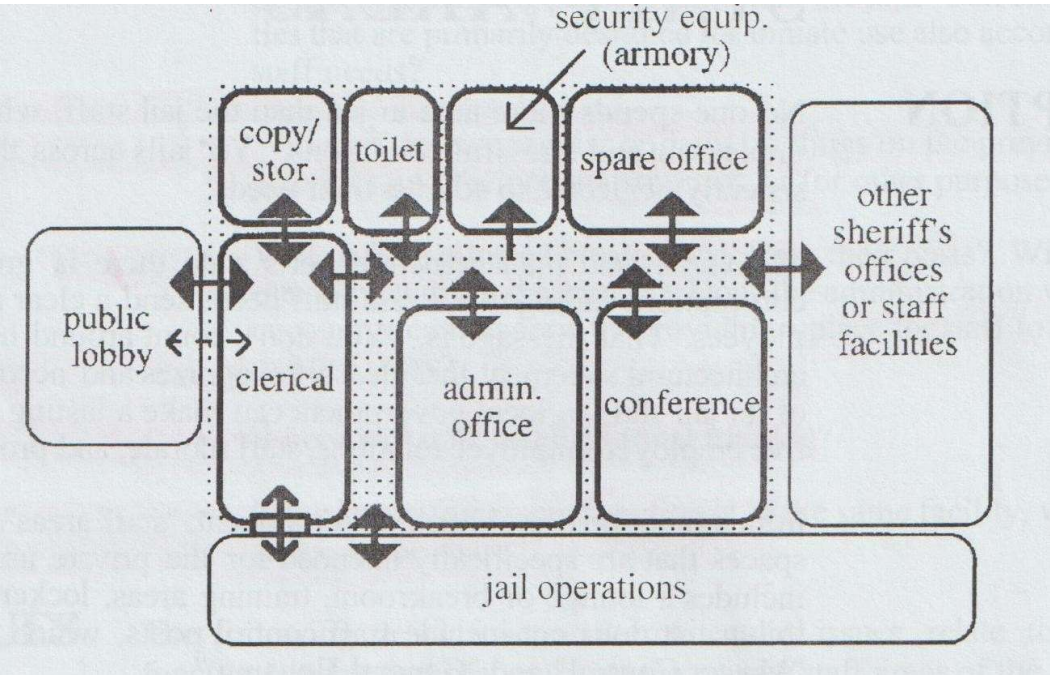


Figure 21: Relationship of Staff Adminstrative with other areas

- Conference area should have facilities ;
  - Presentation board,
  - Variable lighting arrangements,
  - Storage for audio visual equipment,
  - Telephone,
  - Data and cable TV connection,
  - Good acoustical qualities, and
  - If possible natural lighting.

- Security equipment storage facility must be taken into account. The facility shall be made for a variety of equipments such as helmets, batons, shields, chemical agents and stun guns. Also, such type of facility should be in a controlled perimeter just outside the

main security office. The most common locations for such area can be :

- Secured armory locker in vehicle sally port; law enforcement weapons armory; secure armory locker in jails administration area.

3.10. STAFF AREAS

Staff spends more time in jail than anyone else. Staff areas are often neglected with their demands on spaces or services. They often work under stressful and unpleasant conditions yet they are always in front for their duties.

Motivation and some comfort can be given to jail staff through the architectural spaces satisfying their needs hence creating a long lasting contribution towards an employer – employee relation increasing their morale thus increasing their productivity.

- Multipurpose rooms can be given for staff different activities such as space for their uniform changes and locker rooms, shower areas, etc. There can be a proper facility for their physical conditioning. Space for their daily briefings or meetings; Space for their dining in between of their shifts
- Staff areas should be enclosed in the security perimeter of jail yet will be separate from currently going operations of jail , because off duty officers can distract attention of on duty staff and should be near to access point in the secure perimeter to avoid unnecessary delay in moving to posts and into jail in case of an emergency.
- Staff areas should be separate from public area to avoid any unnecessary public traffic. Staff parking and it"s entry should be given in adequate amount and can be accessible through pass card or master control. Parking should be fenced and should be separate from visitors parking. Shifts overlap should be majorly considered for designing adequate parking rather parking their vehicles on street or any other places other than staff parking areas.
- Conveniently located place such as locker area for staff, prior to entering the jail security area, should be available for use. Staff areas should be located near to both jail and their residence. Area for their storage of extra uniforms and equipment is an important part of staff area
- Staff locker room is a little different from the activities that are conventionally performed in public facilities such as dressing and undressing, storage for clothes and spare uniforms, storage for documents and policy manuals; showering and drying; toilet and storage for clean and dirty towels.

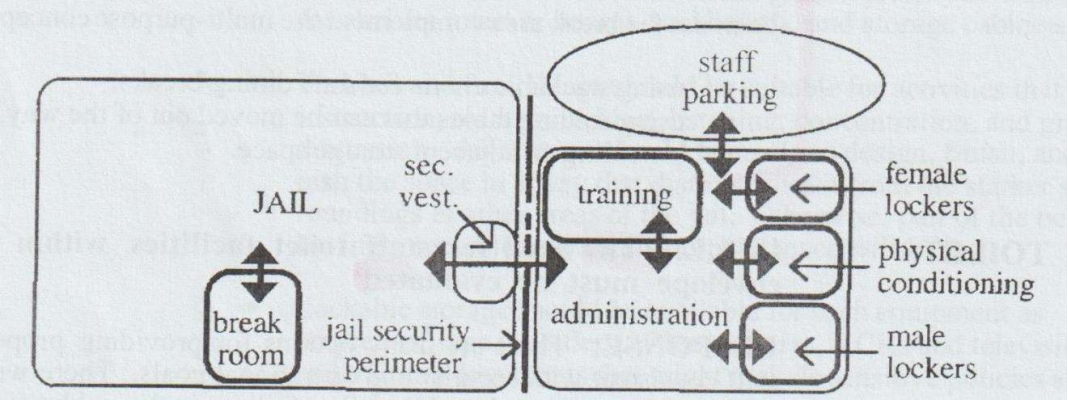


Figure 22: Relationship of Staff Area with other areas

- Separate areas for female staff should be considered as female officers are employed at jails in greater numbers than before. Female staff can clearly share break rooms, physical fitness and training areas with male staff, they should be given privacy of separate showers and lockers.
- Staff needs a space apart from inmates area for their meals and breaks during shifts. The area of break rooms depends on its users and activities which includes;
  - Storage for personal meals and food stuff
  - Refrigeration of sack lunches and perishable snacks
  - Dining area for their meals in between of shift
  - Recreational reading
  - Space for conversation with one another
  - Space for coffee or tea machine
  - Space for cold beverages

3.11. STORAGE AREAS

Storage space is needed everywhere because it is vital for achieving efficiency and convenience. The presence of files, goods, mattresses etc.. needs to be stored somewhere, hence important while designing. This aspect of the design should not be overlooked. Following decisions should be made, which can have great impact.

- Looking for an opportunity for shared storage space between the jail and law enforcement operation ?
- Items that can be grouped together for general purpose storage & what can be stored separately ?
- Whether the storage space be centralized or as per convenience such as linens, toiletries, etc…

- Will the purchase of needed goods be made through wholesale ?
- Storage needs for Replacement parts such as locks, hinges, security glass panels, toilet fixtures, door handles & closures etc…as a precaution against damage that compromises the effective operation of the facility.
- Storage spaces for mattresses are important. It depends upon the facility"s approach to its distribution to inmates. This area should be near the area where mattresses can be cleaned and disinfected thoroughly at regular periods.
- Storage for equipment"s such as lawn mowers, ladders, yard tractors, rakes, hoes etc. needed for gardening purposes. These should not be stored in vehicle sally port.
- Storage for cleaning supplies is necessary. Every facility needs to maintain cleanliness. This involves keeping the floors, furnishings and windows clean by the use of mops, buckets, cleaning fluids, cloths, floor buffers etc. Storage of such types should be kept throughout the facility. Cleaning supplies are generally stored in in janitor"s closet.

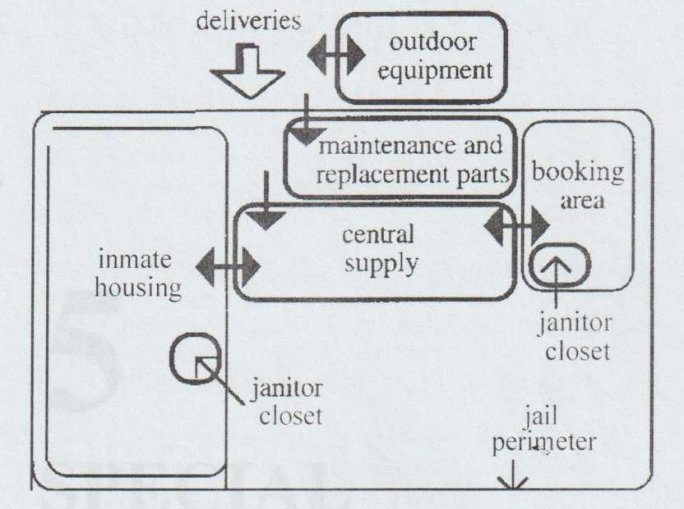


Figure 23: Relationship of Storage Area

3.12.SUPERVISION

A key operational decision that will have a major impact on facility design is the method of inmate supervision or surveillance to be used. The degree of safety and security of the facility depends greatly on the following points and how they are perceived.

There are 4 basic approaches to supervising inmates, 2 out of them require constant staff"s presence.

Direct Supervision : Jail staff is constantly positioned within the inmate's housing.

Figure 24: Direct Supervision in a housing unit

Remote Supervision: Here the specific areas for supervision rings the central control station constantly. The staff is stationed outside the housing units rather than inside. Staff constantly overlooks the inmate's cells, activities area, thus maintaining constant vigil. The staff here is only an observer. Direct interaction with inmates is accomplished through roving officers, who moves in and out of the housing areas.

Issues related to it in designing are :-

- Most challenging task of this is to provide officers the full view of all areas while avoiding conflicts between individual housing units associated with that post.
- Number of staff posts that are required for proper balance between security and economy. Careful consideration is to be given to the evaluation for the type & number of inmates to be monitored from a single post.

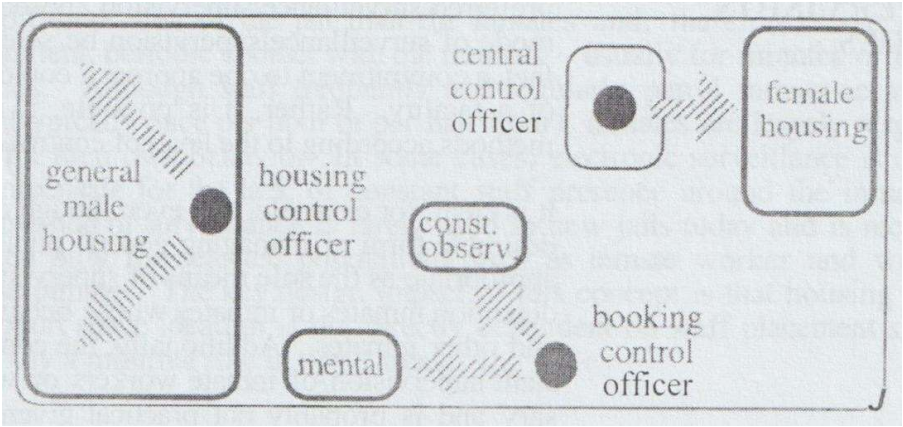


Figure 25: Relationship Remote Supervision in Housing Unit

- Subdividing the corridor within the area to create visually and acoustically separate subparts. Manipulating the location of dayroom side and front walls to get side-to-side view between units. Also housing units can be placed over one over the other.
- Other important issue is that whether an enclosed staff space is a better choice than an open staff. Better ability to smell, hear or see is important. Type of barrier
- Dayrooms are monitored, but that is not sufficient. Cell interiors should be visible to some degrees too, providing security and privacy all at same time.
- If open counter approach is used at the control post, the post may be operated somewhat like a direct-supervision unit. That is, the officer at the remote surveillance post has to have limits on what is controlled at that position in order to reduce his/her risk. A way to limit risk would be to :
    - Maintain control of the access to and exits from the overall housing area at master control.
    - Have backup controls at Master control to assume control of the area in the event of an emergency.
    - Provide means by which the housing officer can stay in constant communication with master control as he/she moves around in the housing area.

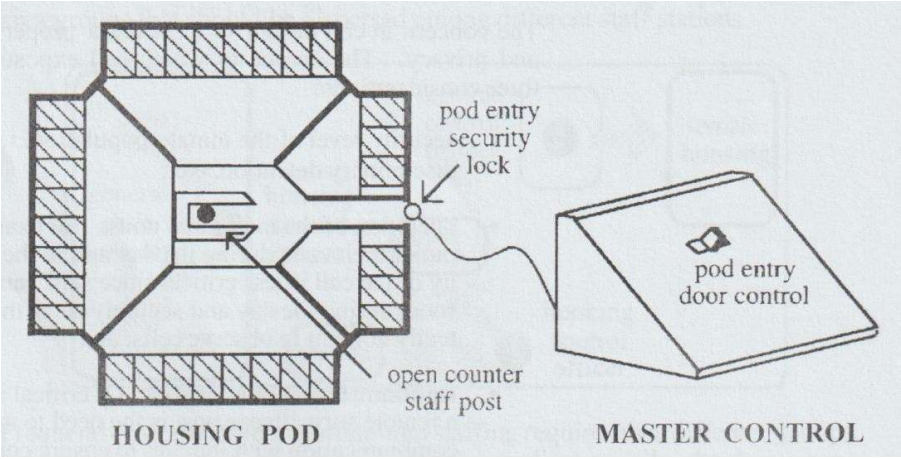


Figure 26: Planning of Remote Supervision in a Housing Unit

- It requires fixed staff posts in a position to look down key areas & other key security positions in jail.

Intermittent Surveillance : Staff is posted in different areas of the jail, thus has intermittent contact with the inmates. Inmates are responsible for their own behaviour. It is not recommended as primary method of housing area control for following reasons :-

- Inmates are more responsible the this type of surveillance than staff.
- Inmate control leads to coercion, intimidation, violence and damage to the facilities.

- Discipline is difficult to achieve since rule violators can"t be easily identified.
- Efficiency of the officers in making rounds, to view different areas. Traditional arrangements of housing areas and corridors should be considered.

Electronic Surveillance : It consists of CCTV or Audio surveillance or both. It doesn"t require constant staff monitoring. Monitoring center is not even in the same building. This should not be considered as a primary source of surveillance.

- Almost total lack of supervision over inmates for significant portions of time.
- Dangerous conditions created by malfunctioning or inoperable equipment.
- Lack of staff to respond to problems in cases where insufficient staffing originally resulted in reliance on the electronic surveillance.
- Vulnerability when inmates determine what is not monitored.
- Inability to monitor areas constantly and effectively due to fatigue, preoccupation with other activities, or too many cameras and monitors to manage.

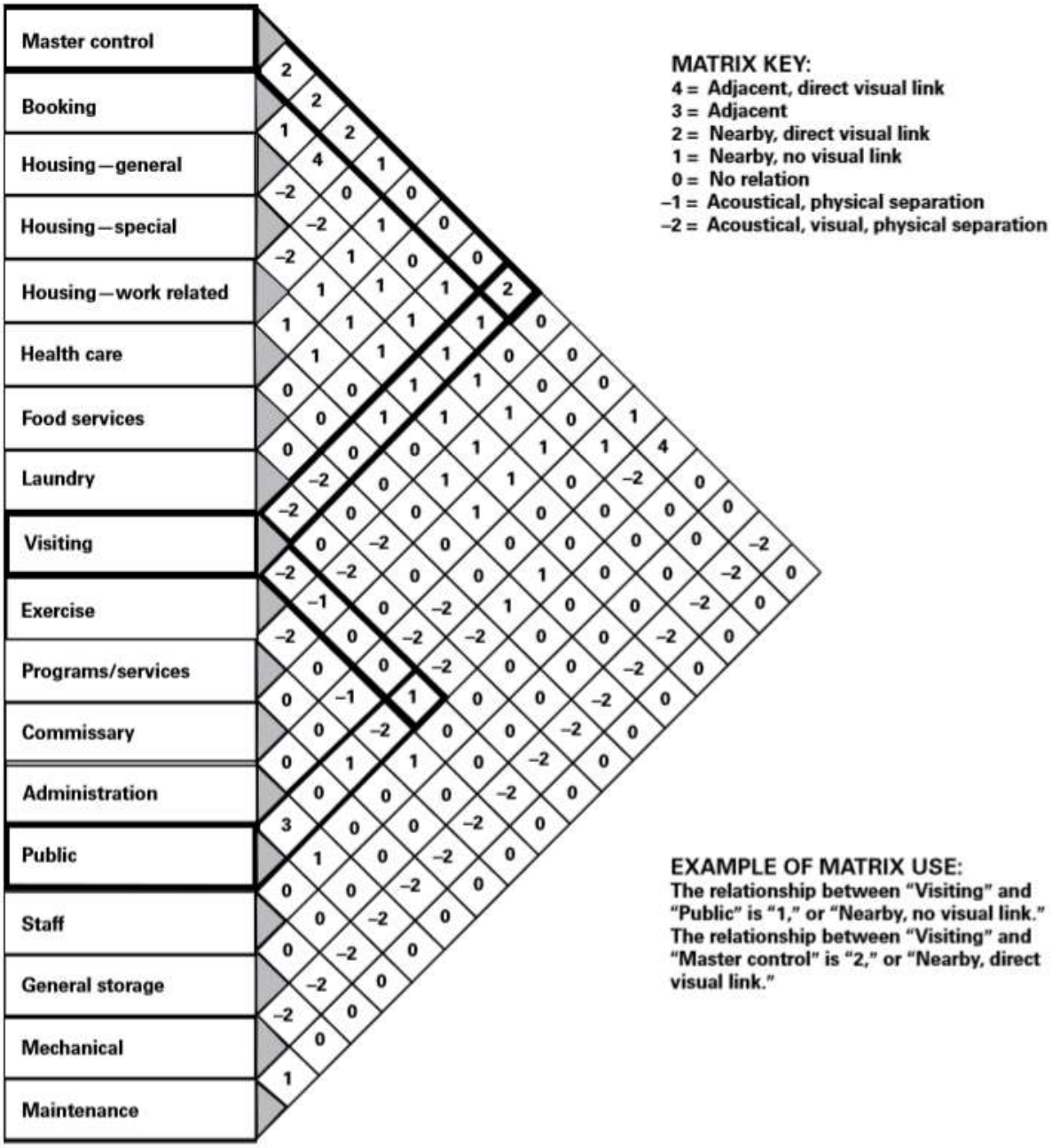


Figure 27: Matrix diagram for level of Supervision in areas of Jail

3.13. SECURITY PERIMETER

Escape and Contraband are deeply troubling words for jail authorities. They representation of basic security defects within the jail physical plant or problems with its operation. Many breaches in jail security results from human errors in recruitment and selection and

supervision of jail staff or a lack of adequate training and written policies and procedures. The failure to define and establish, through planning and design, a clearly identifiable and reliable security perimeter (envelope) is a primary contributor to problems in small & medium sized jails.

4 major ingredients involved in providing building security: Denial, Detection, Assessment & Response.

Denial: It means restricting inmates access to unauthorized internal areas or the outside, separating different groups of inmates, controlling inmate movement & eliminating the presence and passage of contraband in jail.

Detection: If the denial element fails or is compromised, then detection is necessary. It might also mean that an officer observes an inmate scaling a fence or bolting through a door to an unsecured area. In modern jails, detection can involve sophisticated technology such as perimeter sensing devices to detect attempts at escape or intrusion.

Assessment: It is simply an evaluation of the problem that has been detected. It is largely a matter of determining the nature and degree of situation such as escape attempt, window tempering, unauthorized movement in a secure room.

Response: After Detection & Assessment, the response is the action taken by the staff to counteract the problem. This may include triggering the alarms, lighting the selected areas, closing gates and initiating evacuation procedures.

3.13.1. DIFFERENT KINDS OF PERIMETERS AND ZONES

Different kinds of Perimeters and zones that might be created to assist staff in denying escape and contraband passage, are described below :-

1. Main Security Perimeter

This is the fundamental barrier that is intended to preclude escape, unauthorized ingress or egress and contraband passage. It might best be thought of as a security envelope because the main security perimeter is a three-dimensional rather than a two-dimensional element.

2. Perimeter Fence or Wall

This is a secondary or support element that compliments the main security perimeter of the jail. The element normally consists of fences that define large outdoor exercise and garden areas and that inhibit access to the main security perimeter.

3. Primary Internal Security Zones

These are three-dimensional areas within the main security perimeter that provide for basic

security separation and control of primary movement routes within the jail, denying or delaying access to other zones.

Figure 28: Shita (Shata) Prison in Israel surrounded by a perimeter of high walls, razor or barbed wires & guard towers.

Typical examples of primary security zones in a small and medium sized jail include:

- Master Control;
- General population male housing areas
- Female housing areas
- Program and support areas
- Special housing areas, especially those for work release or periodically confined inmates
- Visiting areas, especially those accessible to the public
- Access to these areas is typically controlled remotely by Master control. In some cases, selected primary internal security zones coincide with fire and smoke containment zones within the overall structure.

4. Secondary Internal Security Zones

These are three-dimensional areas within both the main security perimeter and the primary internal security zones. Their purpose is typically to preclude unauthorized and uncontrolled access between functional components (e.g.: laundry and food services) or between areas that are part of functional components (e.g.: separate housing units)within a primary internal security zone. Access to these zones is typically controlled remotely by master control, or

remotely or directly by other facility staff.

5. Tertiary Internal Security Zones

Zoning may go to third level since individual spaces, such as cells and medication storage, frequently require fully secure protection from outside intrusion, escape attempts, and uncontrolled access within a secondary internal security zone.

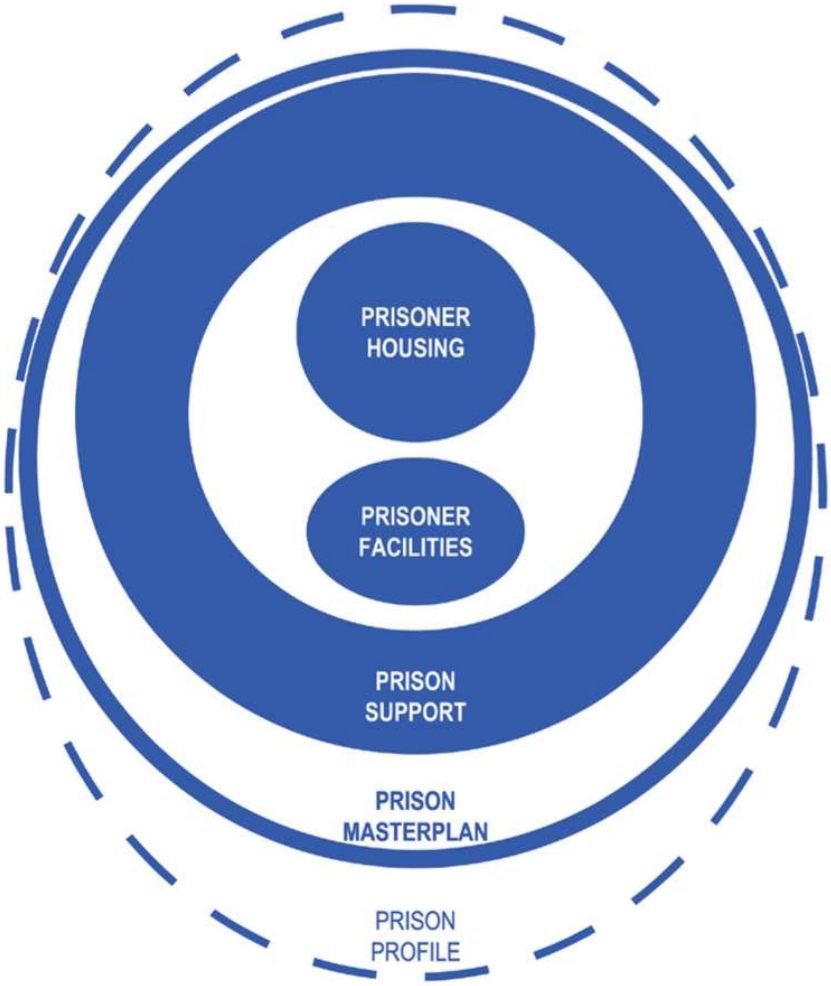


Figure 29: Planning of prison according to level of Security

3.14. GENERAL DESIGN CONSIDERATIONS

From an operational view point, a good perimeter and good internal zoning may allow for an unescorted inmate movement between different points in the facility without fear of a successful escape attempt. A key consideration in the development of an effective security

envelope and effective internal security zones is the creation of master control position. This position must be able to :

- Monitor all the security systems (CCTV, alarms, pressure-sensitive movement detectors)
- Communicate with control and monitor or directly observe people at the doors or gates that help define internal security zones and inhibit movement between them.
- Communicate with facility staff wherever they are located in the facility

In creating the security envelope and internal security zones, it is important that materials, finishes & hardware in perimeter and zone barriers are compatible and comparable, such as providing a high security lock with a light weight hollow metal door and door-frame is inappropriate. Other incompatible elements are concrete floors and reinforced concrete masonry unit walls combined with light weight suspended metal acoustics ceiling panels that lead to unsecured ceiling plenums.

A variety of design considerations that address the development of main security envelope to prevent escape and contraband passage :-

- The number of access points must be limited to the minimum necessary for the efficient operation of the building, separation of conflicting traffic flows and compliance with life safety codes.
- All access points into the main security perimeters should be through a security vestibule with interlocking doors which have the capability of being over-ridden in an emergency.
- Access points into the main security perimeter should have a key over-ride capability.
- Metal detectors should be available at all access points used by the public & outside service providers and depending on the policy of jail administration at access points used by jail staff & other officials.
- All access points should be securely constructed. For an instance swing or sliding doors of 12 or 14 – gauge steel; frames grouted & anchored securely to the wall; vision panels, if used, employing the strongest security glass products.

4. PSYCHOLOGY OF JAIL

Figure 30: Prisoner behind Bars

Keeping that many people in jail is not only expensive; it is also psychologically damaging a large group of people in our community, in particular our most vulnerable including those who are marginalised, homeless, living in poverty and suffering from mental health and/or addiction issues. In response to our “tough on crime” conservative movement, critics argue our penal system no longer focuses on rehabilitation. Instead punishment is the primary response to crime.

Overcrowded prisons are harder places to manage. Segregation has become the norm instead of an exception as correction workers try to handle a wide range of institutional problems.

Hall continues, cramming vulnerable and unwell people together in a confined space only serves to exacerbate prisoner’s psychological distress. Combine that with the exploitative nature of our prison culture and more and more inmates are suffering from new or worsening anxiety and depression among other psychological problems as a result.

However, at the same time Hall points out government resources are increasingly becoming scarce and “mental health services for inmates – including treatment and withdrawal programs for drug and alcohol addicts – are massively overstretched.” Because of this inmates tend to become more aggressive, which leads to conflicts among inmates, as well as between prisoners and staff. It also serves to lead to a significant increase in self-harm and suicide rates among inmates.

These conditions not only impact those incarcerated. They also have a “dehumanizing” effect on correctional staff as they fight to keep up. This type of environment is counterproductive to effective corrections.

Long waiting lists for most health needs, including mental illness also does not help.

Why should we care about the mental health of prisoners?

The treatment of prisoners is not just a public policy issue; it is also a human rights issue. Regardless of the offences committed, all prisoners are citizens and as such still have "the **right to be treated with humanity, dignity and respect while in detention."** This includes being safe from harm, having their basic needs met, and being provided with opportunities for rehabilitation.

- Safety – prisoners, particularly the most vulnerable, are held safely.
- Respect – prisoners are treated with respect for their human dignity.
- Purposeful activity – prisoners are able, and expected, to engage in activity that is likely to benefit them.
- Resettlement – prisoners are prepared for their release into the community and helped to reduce the likelihood of reoffending.

4.1. Human psychology and architecture

- Human psychology is directly related with architecture.
- Appropriate use of various architectural components [such as colour of the walls] has the capacity of enlightening the atmosphere whereas inappropriate use does the opposite.
- For example: a room with white coloured walls reflects light and makes the space brighter and more pleasurable to be inside.

Some of the components of architecture which affects human psychology are:

- Building forms
- Positive and negative spaces
- Colours
- Openings
- Lighting
- Acoustics
- Sound construction
- Green techniques
- Landscapes

4.2. Design guide for designing a reforming prison

Key issues for design consideration that will significantly affect the health and wellbeing of all people in the prison environment. It is important to emphasise that design solutions should address all design parameters holistically.

The design guide is organised into three tiers:

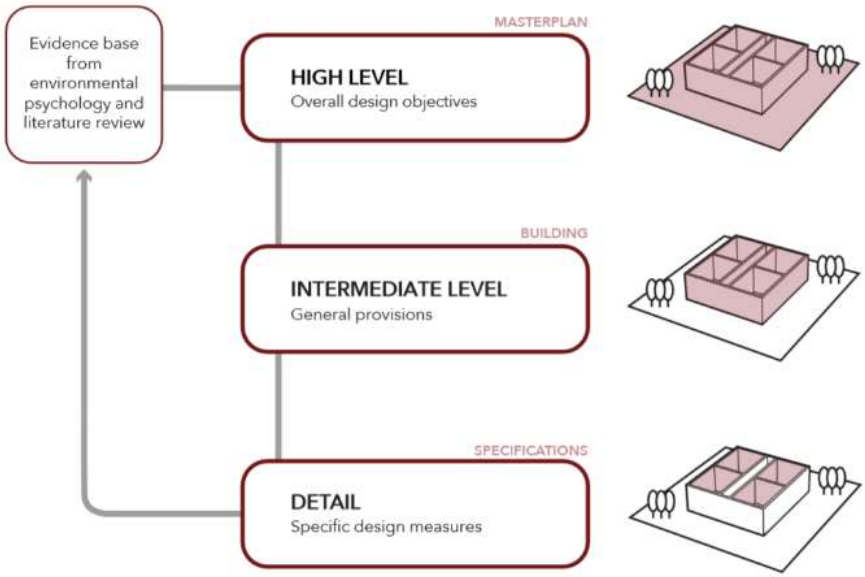


Figure 31: Guide for Designing Prison

4.2.1. High level

At the high level, there are overall objectives in three core areas that outline the issues affecting the whole prison. These form design principles that should be the starting point in the planning and site layout process. These principles are derived from both direct environmental psychology evidences and a much broader base of evidence of comparable settings.

1.Legibility

Disorientating prison layouts can contribute to stress for all prison users. Being able to easily navigate through a space with clear views of entrances and corridors has direct links to the perception of safety. Legible environments that enable orientation are less stressful.

2. Diversity

Whilst spatial familiarity is linked to way-finding and orientation, diversity is important in allowing people to identify different areas within the prison and to support their own identity in relation to their environment. Legibility and diversity are related, but can also be contradictory and a balance needs to be struck to generate identifiable, diverse and legible environments within an institutional setting.

3. Autonomy

People in custody should be given a greater autonomy to promote collective efficacy and self-efficacy. The possibility of achieving this should be explored through removal of barriers and use of electronic tracking devices and other forms of security technology. Such measures also support better relationships between staff, officers, visitors and people in custody.

4. Relationships

Interpersonal relationships are vital to an individual's wellbeing. In an exceptionally confined environment, negative relationships can be especially harmful. The design of the layout and configuration should aim to be conducive to positive relationships, in particular by allowing sufficient amount and types of different spaces. Barriers and thresholds should be carefully considered so as to not inhibit interactions and prevent relationship building, whilst enabling individual privacy and security.

5. Outlook

Prisons are isolating environments, which can contribute to poor health and wellbeing. Where possible, habitable spaces should have views of natural elements (landscapes, trees etc), either within, or beyond the walls of the prison. Habitable spaces should have views that enable orientation within the wider prison and where appropriate, beyond the prison walls

6. Location

Engagement during the briefing and design process should be worked through the design to ensure that the building supports relationship-building with local communities, external providers, local employers, visitors etc. The approach, entry sequence and visitor facilities are particularly important, as are training, health, education and other facilities.

7. Exterior space

Planted recreational spaces are a great asset to environmental psychology, providing a wide range of health and wellbeing benefits. Spaces should be cultivated and abundant, to provide for sufficient outdoor physical activity. The scale and form should suit its function and should be located for ease of access and maintenance.

8. Adaptability

Most prisons have been expanded and adapted since they were originally built and consideration should be given to enabling future expansion and adaptation within the secure perimeter without compromising the external spaces and facilities. The potential for re-rolling should be considered, but should not compromise the environment for the originally intended use, through inappropriate levels of security.

9. Atmosphere

Ventilation, heating, lighting and acoustics are important preconditions for health and wellbeing conducive environments, but are frequently very poor in prisons. The environmental strategy for ensuring decent atmospheric conditions should be established early in the design process, with measurable performance targets and then followed through the detailed design and delivery. ‘Soft landings’ and post-occupancy processes should incorporate testing against these targets

10. Privacy and personal space

Privacy and personal space are both important functional factors for creating comfortable environments. Having adequate interpersonal distances is important to wellbeing especially in the confined environment of prisons. Design should seek to give both people in custody and people working in prisons and other users privacy and adequate personal space. Overcrowding is highly likely to be a strong impediment to rehabilitation

11. Aesthetics

Aesthetic design of prisons can have a strong effect on the health and wellbeing of all prison-users as they are exposed to the same environments for long periods of time. The use of colour, shapes, materials and variety can provide positive enhancements to the environment and can alleviate the effect of a large-scale institution.

12. Facilities

Establishment-wide facilities such as toilets, showers, drinking fountains, kitchenettes and rest areas are basic requirements for decent conditions for all prison users and their lack or inadequacy can be detrimental to morale in the longer term. Whilst levels of provision are

generally specified for predicted populations in custody, they are often inadequate for officers, staff and external service-providers, limiting their effective ability to support rehabilitation. Standards for the provision of basic facilities for workers in the prison environment should be established and implemented.

13.Accessibility

The prison environment should be non-discriminatory where possible and should be equally accessible to all users. There is a growing population of older men in custody in the UK which reflects a greater need for accessible living units, facilities and access. Current accessibility standards should be reviewed in prisons to ensure that future needs can be met.

4.2.2. INTERMEDIATE LEVEL

At the intermediate level, these are more concerned with general provisions related to specific buildings and functions in the prison. The prison environment comprises many different functions that must work together and independently to be fit for purpose; that is to protect those that are outside prisons and rehabilitate those within. These general provisions are aimed at improving the health and wellbeing in these different building typologies.

1. Outlook

- Windows from house blocks that have views to natural elements and offer good prospect have multiple health and wellbeing benefits
- Non-facing windows that are at least perpendicular as required in typical housing standards
- Greater privacy reduces use of curtains allowing more day lighting.

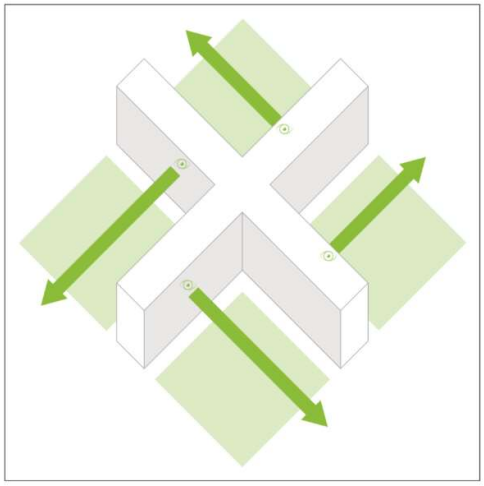


Figure 32: Cell blocks with proper view

2. Outdoor spaces

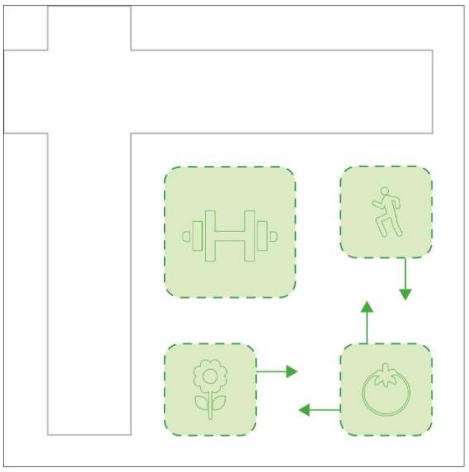


Figure 33: Outdoor space can be planned for various use

• Positive and clearly defined external spaces with good prospects, which can be easily maintained

• Spaces that are sized and proportioned according to the number of users and types of activities

3. Autonomy

- Degrees of free movement should be enabled through use of electronic control devices and other measures
- Interaction between people should be promoted by removing unnecessary fences, gates and barriers
- Flexibly controlled freedom to move between facilities and house blocks enables best use of time and resources.
- Removal of barriers gives men in custody more trust to develop self-efficacy.
- Enhances the legibility of the prison layout and makes it easier to navigate between buildings.

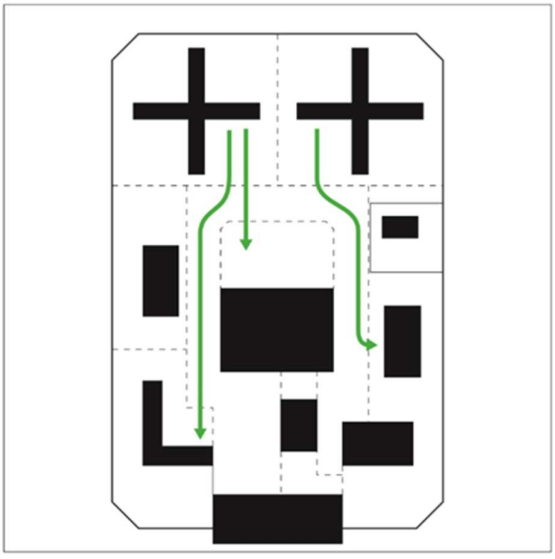


Figure 34: Freedom of movement in Prison block

4. Three dimensional form

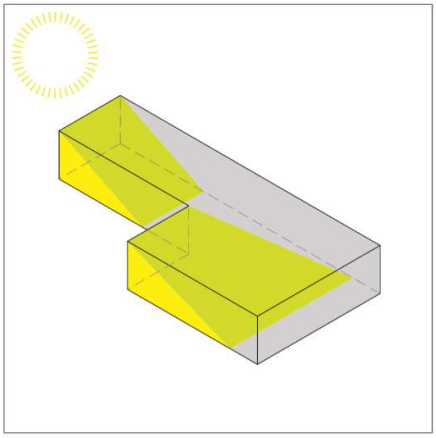


Figure 35: Natural or Diffused light in Blocks

Staggered and varied plan forms can increase the opportunities for natural daylight penetration.

• Reduces the need for artificial lighting.

• Dynamic and diffused natural light supports health and wellbeing.

5. Three dimensional form - Personal space

- Considering all aspects of the three-dimensional form can create varied environments that ease personal space bubbles
- Minimum floor finish to ceiling finish for habitable spaces should meet housing standards (2.5m)
- Varied corridor widths provide varied association spaces
- Varied corridor widths add diversity reduce the institutional effects of repetition.

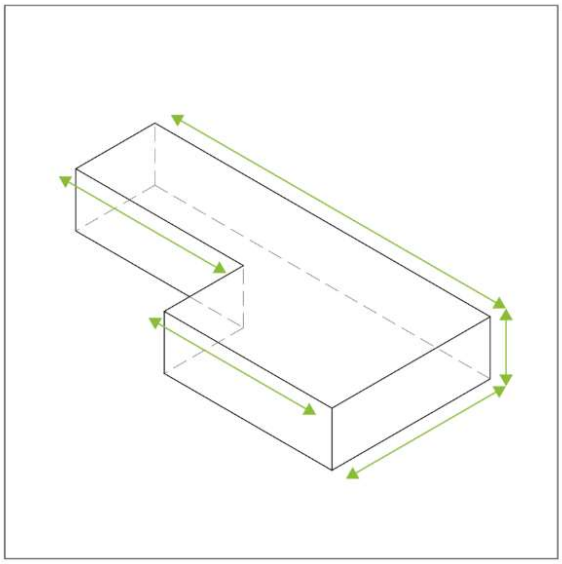


Figure 36: Creating different spaces for different environment

6. Three dimensional form – Interactions

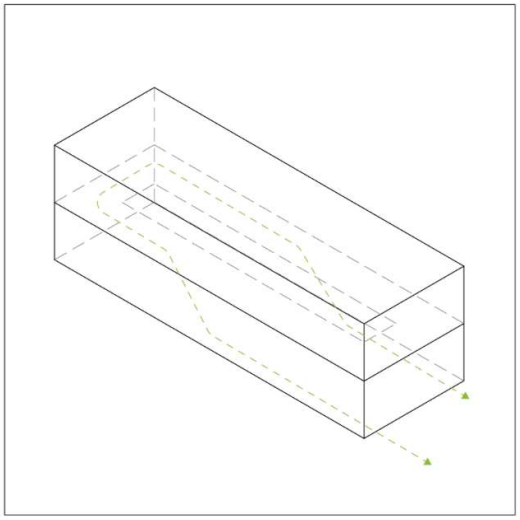


Figure 37: Different level increases interaction

• 2-tier wings can enable round trips, encouraging spontaneous interactions

• 2-tier wings have a layout that induces more physical activity, increasing general fitness levels

• Similar outcomes can be achieved in flat layouts, through variation in plan.

7. Relationships

• Reduced buffer zone creates closer relationships. Security barriers that are kept out of the way during normal use encourage more interactions

• Lines of sight remain important for safety and security. 'Panoptican' style observation can be mitigated through plan configuration.

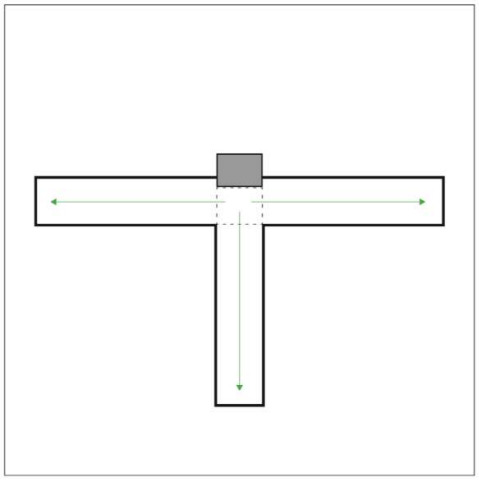


Figure 38: Less buffer zone in cells

8. Adaptability

• A variety of forms and colours helps to create diverse and interesting environments that increase legibility and give a sense of identity to the built environment. Forms and colours should be carefully chosen to work together, whilst avoiding institutional aesthetic

• Within a coherent set, individual colours and forms can support identity within a larger institutional environment.

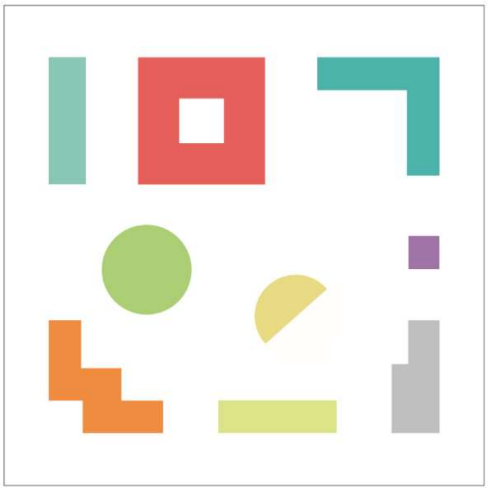


Figure 39: Different from create different environment

9. Ventilation

• Providing good level of temperature and air quality is a basic need for facilitating wellbeing

• Natural ventilation should be provided to all habitable spaces and individually controllable where possible

• Environmental design of buildings should be thoroughly integrated in the design process to ensure effectiveness and robustness in a prison environment Environmental performance standards, equivalent to other institutions such as schools should be adopted.

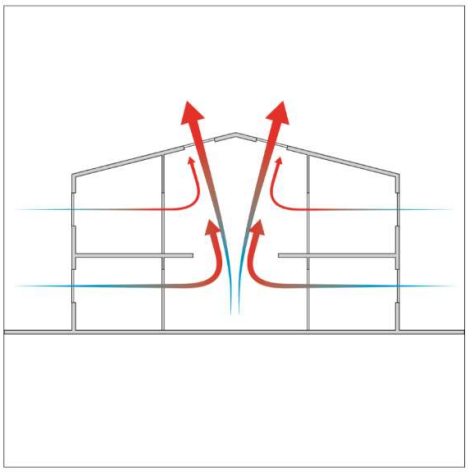
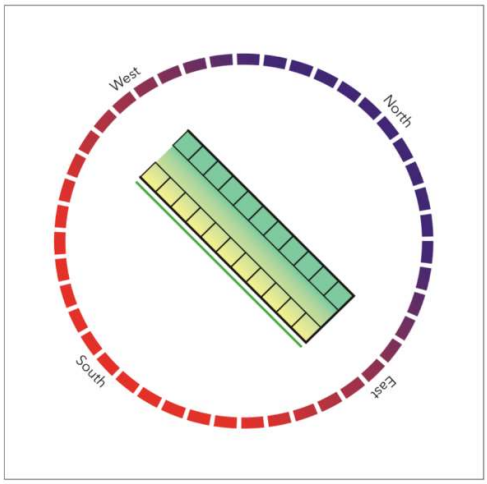


Figure 40: Flow of Air Circulation

10. Environmental strategy



• An environmental strategy that considers natural ventilation, overheating and cooling at the layout stage of the design will help to make the habitable spaces more comfortable

• Shading devices can alleviate issues with solar gain and glare.

Figure 41: Orinatation of Blocks

11. Multiple needs

• Accessibility and dementia audits should be undertaken on design proposals, taking into account the higher needs of the prison population.

• Adaptability for varying needs should be taken into account.

• Evidence generally supports the advantages of single cell occupancy but a small portion of double occupancy cells may also be needed for more vulnerable people. This is one area that contradicts the Mandela Rules and should be carefully considered according to needs.

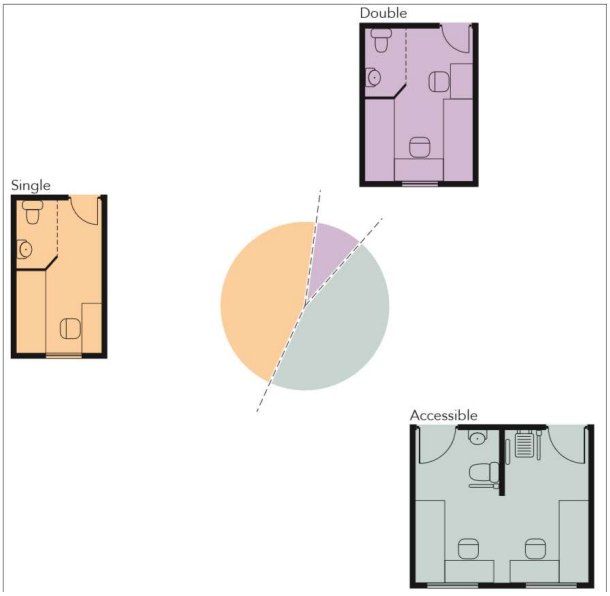


Figure 42: Different type of cells according to needs

• The proportion of each room types should be reviewed to reflect the balance of needs, now and anticipated in the future.

4.2.3. DETAIL LEVEL

Finally, the detail level looks at specific design issues, starting with typical current situations and suggesting possible design responses that incorporate the principles previously outlined. These are aimed at encouraging design innovation through drawing out the complexities of the requirements that have to be met.

1. Windows 1 - Plan format

• Horizontal ventilators at the head and base of the window allow for convectional ventilation much like Victorian sash windows, providing greater levels of airflow.

• Opportunities for 'bay' windows to enable views and prevent overlooking should be explored.

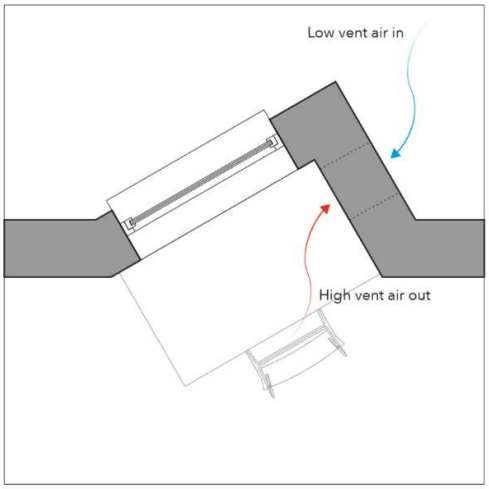


Figure 43: Fixed window with ventilator at the head of window

2. Windows 2 - Sectional form

Full height windows allow for increased daylight penetration enhanced views of the outside from association spaces and a sense of open-ness.

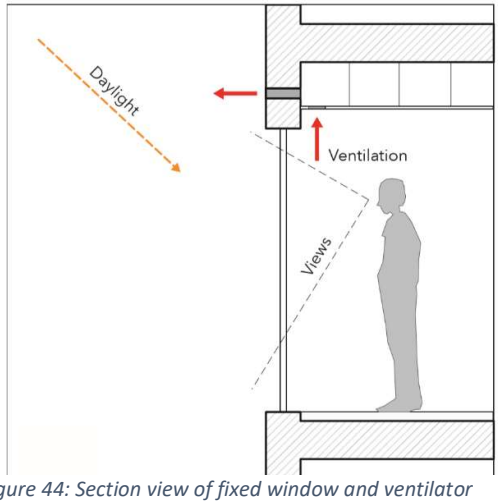


Figure 44: Section view of fixed window and ventilator

3. Cell separation

• Natural ventilation should be enabled between common parts and cells. Fire collars can be incorporated in vents if necessary

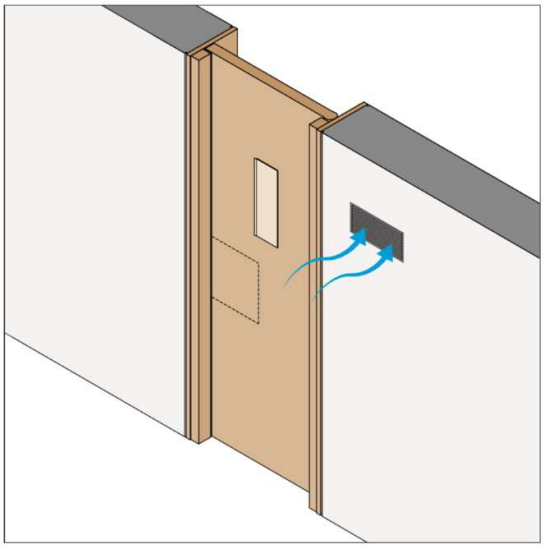


Figure 45: Vents in cells for ventilation

5. Case study

5.1 MANDOLI PRISON COMPLEX

5.1.1. INTRODUCTION

Figure 46: Mandoli Central Jail Complex view from outside.

Mandoli Jail Complex was built in response to the over-crowding problem of Tihar Jail & Rohini Jail. Tihar Central Prison Delhi and Rohini Central Prison. Tihar"s holding capacity was for 5,200 but with advancement in the rate of crime, its current population is 12,302. Same goes for Rohini Central Jail, which was initially built as a district jail. It was built for 1,050 prisoner capacity, but holds 1,881 prisoners. This overcrowding has led to incidences of violence and poor sanitation. Thus, the proposal was made in 1981 for construction of Mandoli Prison Complex. Mandoli"s construction began in May 2008. The project is laid out in 68 Acres of spread of land, with the total expenditure incurred Rs 340 Crores

Jail became operational on October 20, 2016, with the transfer of 500 inmates from Tihar prison complex. The prison Complex has 6 Jails, including one for women inmates. It can withhold the capacity of 3,776 inmates.

5.1.2. LOCATION

Central Jail Complex, Mangal Pandey Marg, Mandoli – Harsh Vihar, East Delhi-110093.

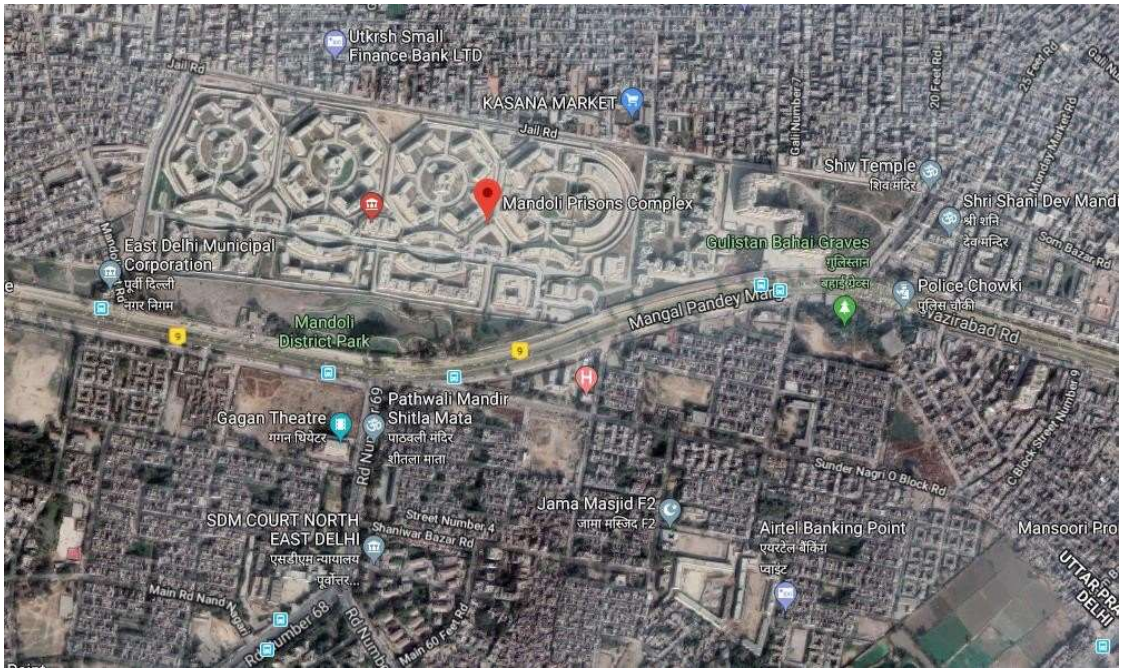


Figure 47: Mandoli prison complex view from Google Earth

5.1.3. PROXIMITY

All the surroundings are residential areas, with all the necessary facilities.

- On North Side : Kasana Market, Ambedkar Bhawan via Jail Road at 8 minutes travel , is 1.8 Km away.
- On South Side : Opposite Gagan Cinema via NH9 1.3 Km at a travel of 5 min .maximum.

SDM Court on road 69, 1.6 Km away.

- On East Side : Opposite side of South-East corner of the prison complex has Gulistan Bahai Graves, which is 1.0 Km away at a travel of 4 minutes. Tulsi Niketan Chowki & Faith Academy MDS Public School.

- On West Side : East Delhi Municipal Corporation Building; at the South-West corner of the complex; at a distance of 1 Km. Girls Sr. Sec School & MCD Park & Mandoli Extension residential Area.

Figure 49: Gagan Cinema opposite Mandoli Jail

Figure 48: SDM Court 1.8 Km to south of Mandoli Jail

5.1.4. CLIMATE

- Delhi experiences a hot summer during months of April to July, with average temperature varying from 25℃ to 45℃.
- Delhi witnesses the cold during the months from November till February, with lowest average temperature being 12℃ .
- Severe Cold is experienced during January, with lowest temperature being 2℃.

- Winters are accompanied by heavy fog.
- Monsoon arrives at the end of June.
- Months of July and August experiences heavy rainfall of about 200 mm. Average annual rainfall for Delhi is 886 mm.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	14.2	16.9	22.7	28.6	33.5	34.3	31.1	29.8	29.2	25.8	20.1	15.6
Min. Temperature (°C)	7.3	10.1	15.1	20.9	26.4	28.6	27.1	26	24.5	18.6	11.7	7.9
Max. Temperature (°C)	21.2	23.8	30.3	36.3	40.6	40	35.2	33.6	34	33	28.6	23.4
Avg. Temperature (°F)	57.6	62.4	72.9	83.5	92.3	93.7	88.0	85.6	84.6	78.4	68.2	60.1
Min. Temperature (°F)	45.1	50.2	59.2	69.6	79.5	83.5	80.8	78.8	76.1	65.5	53.1	46.2
Max. Temperature (°F)	70.2	74.8	86.5	97.3	105.1	104.0	95.4	92.5	93.2	91.4	83.5	74.1
Precipitation / Rainfall (mm)	15	10	14	3	11	42	205	246	112	26	3	6

Figure 50: Temperature Data

5.1.5. PRISON FACILITY

- Prison facility is spread in 68 Acres of land.
- It has 6 Jails with capacity of 3,776 inmates.
- Prison Complex comprising of following 6 Jails :
  - Under-Trial Jail
  - Short – Term Prison
  - Long – Term Prison
  - Mid – Term Prison
  - Women Prison
  - High Security Prison

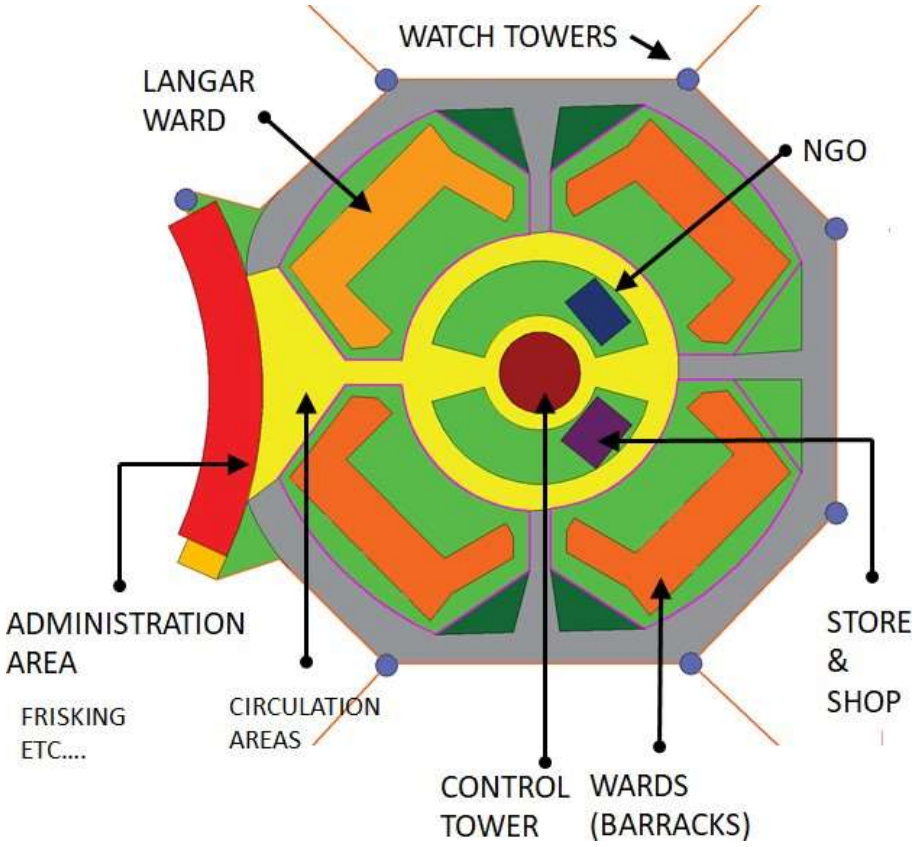


Figure 51: Elements inside in an individual Jail.

5.1.6. SITE PLAN

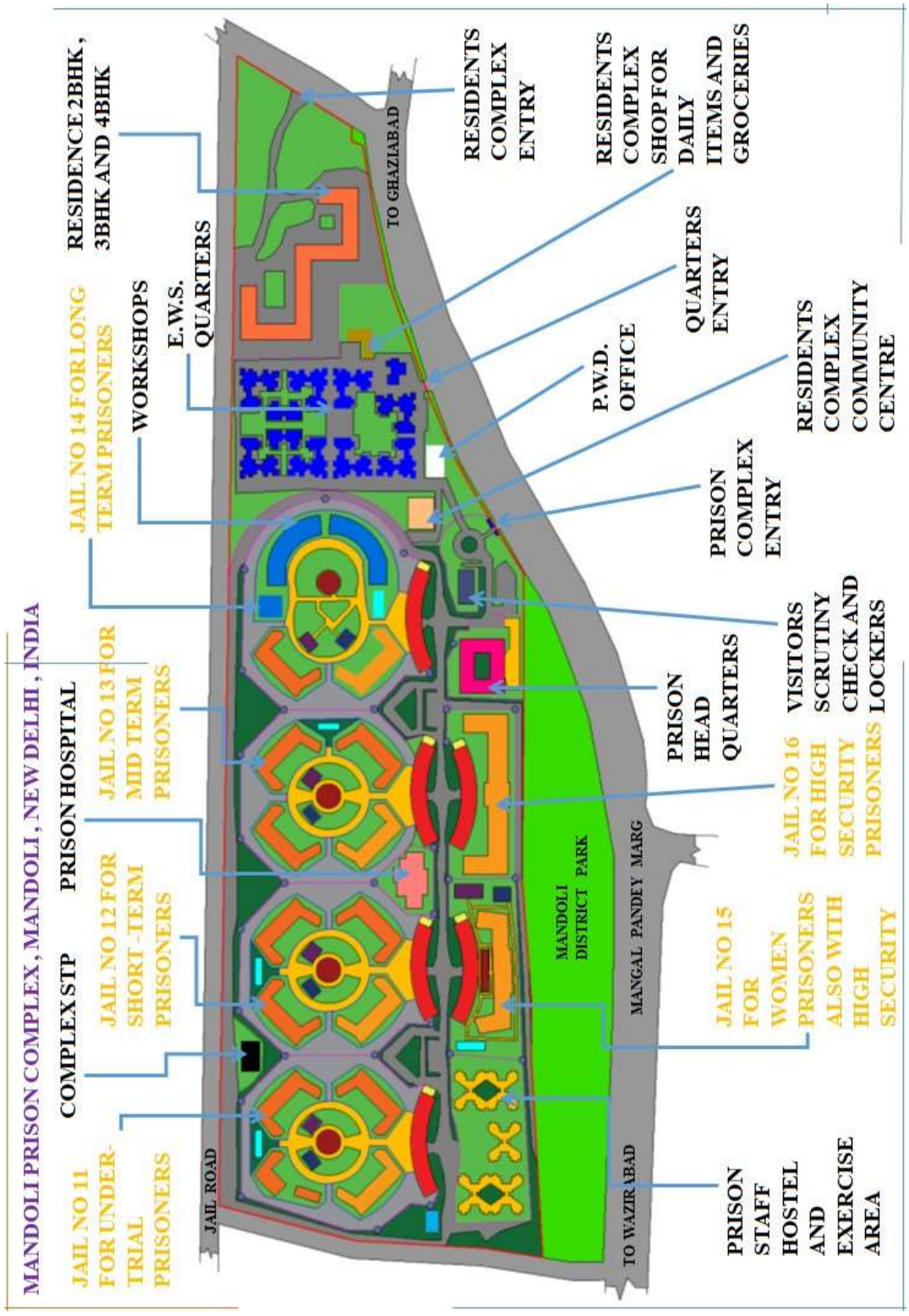


Figure 52:Mandoli - Prison Complex Layout depicting various elements.

Figure 54: View of Mandoli Prisons Public area at enterance.

Figure 53: Deodhy (Admin) Front view (It is same for every Jail within Prison Complex).

5.1.7. INFERENCES

- Concrete Paved area is quite large, which is responsible for harsh glare during hot summer day & also raising the micro-climate temperature.
- Public Restroom facility is not provided for the visitors, when in Public area near entrance.
- No food facility is provided in the Public area. Waiting time in queue is sometimes quite long waiting for one"s time for scrutiny and then proceeding to meet the inmate. The visitor needs a place to eat & drink while waiting for his/her turn.
- Jail Public area near entrance & Residential area of Staff is interconnected via a iron gate; which can act as a security loophole in case of nefarious elements.
- Headquarter Area near Public area is not needed, since it is already provided in Tihar Central Prison which is a headquarters in itself. Instead an elaborate Super-

Administration area with master control can be created.

- Hostel for personnel"s is provided in Public area, it should have a separate entry.
- Workshop is provided in Long – term Jail only. All the offenders except under-trials should be put on the payroll system & encouraged towards more socially ethical behaviour.
- Built-up covered area for the prison facility is more. This can be reduced by vertical development.
- No Washroom facility within the easy reach of individual barracks. This has led to a security loophole, since during night-time it becomes quite a disadvantage. The barracks cannot be locked or supervised during night-time, if inmates require to go the washroom frequently. Thus the whole Ward (housing many barracks) has to be locked down. What is going on inside the ward during night-time can only be supervised electronically.
- Planning & Zoning of the prison complex is good, since it differentiates the needs for various categories of inmates. Thus Classification of Prisoners/Inmates is achieved.
- Positioning of the wards is good, since they are centrally monitored by the Control tower in the centre.
- Control tower is circular with a ramp running along the outside wall, which obstructs the light, thus creating poor lighting inside the control centre. Also there is no proper utilization of space

Figure 55: Watch Tower, High Perimeter wall with barbed wires as Main security of Prison.

5.2. ROHINI PRISON COMPLEX

5.2.1. INTRODUCTION

Rohini Prison Complex was built in response to the over-crowding problem of Tihar Central Prison Delhi. Tihar"s holding capacity was for 5,200 but with advancement in the rate of crime, its current population is 12,302. This overcrowding had lead to incidences of violence and poor sanitation.Thus, Rohini Jail was constructed & then inaugurated on 14 December 2004.The project is laid out in 12 Acres of spread of land, with the total expenditure incurred Rs 14 Crores. The northern & western side of the prison complex borders Sewage distribution drain.

Jail became operational in December, with the transfer of 100 inmates from Tihar prison complex. The prison Complex is well lit and ventilated with a peaceful atmosphere. It can withhold the capacity of 1,050 inmates.

Figure 56: Rohini Central Jail Complex view from outside.

5.2.2. LOCATION

Rohini Prison Complex, Sector – 19, Rohini, near Haiderpur Metro Station.

Figure 57: Rohini Prison complex view from Google Earth.

5.2.3. PROXIMITY

All the surroundings are residential areas, with all the necessary facilities.

On North & West Side: Sewage Drain is running along that side. Beyond that is the residential area. 2.3 Km further towards the west is NCC Bhawan.

On South Side: Caspia Hotel across the road 450 m. away. Also Passport Seva Kendra, 600 m. away.

On East Side : Haider Pur Badli Mor Metro Station 1.9 Km away, travel of 5 minutes.

Outer Ring Road & NH9 on the eastern side.

Across the Road, opposite from the Prison facility is the Indraprastha Gas Limited CNG Pump and Naturopathy Hospital.

Figure 58: NCC Bhawan Rohini.

5.2.4. CLIMATE

Delhi experiences a hot summer during months of April to July, with average temperature varying from 25℃ to 45℃.

Delhi witnesses the cold during the months from November till February, with lowest average temperature being 12℃ .

Severe Cold is experienced during January, with lowest temperature being 2℃.

Winters are accompanied by heavy fog.

Monsoon arrives at the end of June.

Months of July and August experiences heavy rainfall of about 200 mm. Average annual rainfall for Delhi is 886 mm.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	14.2	16.9	22.7	28.6	33.5	34.3	31.1	29.8	29.2	25.8	20.1	15.6
Min. Temperature (°C)	7.3	10.1	15.1	20.9	26.4	28.6	27.1	26	24.5	18.6	11.7	7.9
Max. Temperature (°C)	21.2	23.8	30.3	36.3	40.6	40	35.2	33.6	34	33	28.6	23.4
Avg. Temperature (°F)	57.6	62.4	72.9	83.5	92.3	93.7	88.0	85.6	84.6	78.4	68.2	60.1
Min. Temperature (°F)	45.1	50.2	59.2	69.6	79.5	83.5	80.8	78.8	76.1	65.5	53.1	46.2
Max. Temperature (°F)	70.2	74.8	86.5	97.3	105.1	104.0	95.4	92.5	93.2	91.4	83.5	74.1
Precipitation / Rainfall (mm)	15	10	14	3	11	42	205	246	112	26	3	6

Figure 59: Temperature Data

5.2.5. PRISON FACILITY

- Prison facility is spread in 12 Acres of land.
- It is three-storied build to house capacity of 1,050 inmates.
- Prison Complex comprises of following :
  - Gymnasium
  - Open Air Theatre
  - Playground
  - Wards
  - Medical Ward
  - 9 High Security Cells
  - Library & Classrooms for prisoners

5.2.6. SITE PLAN

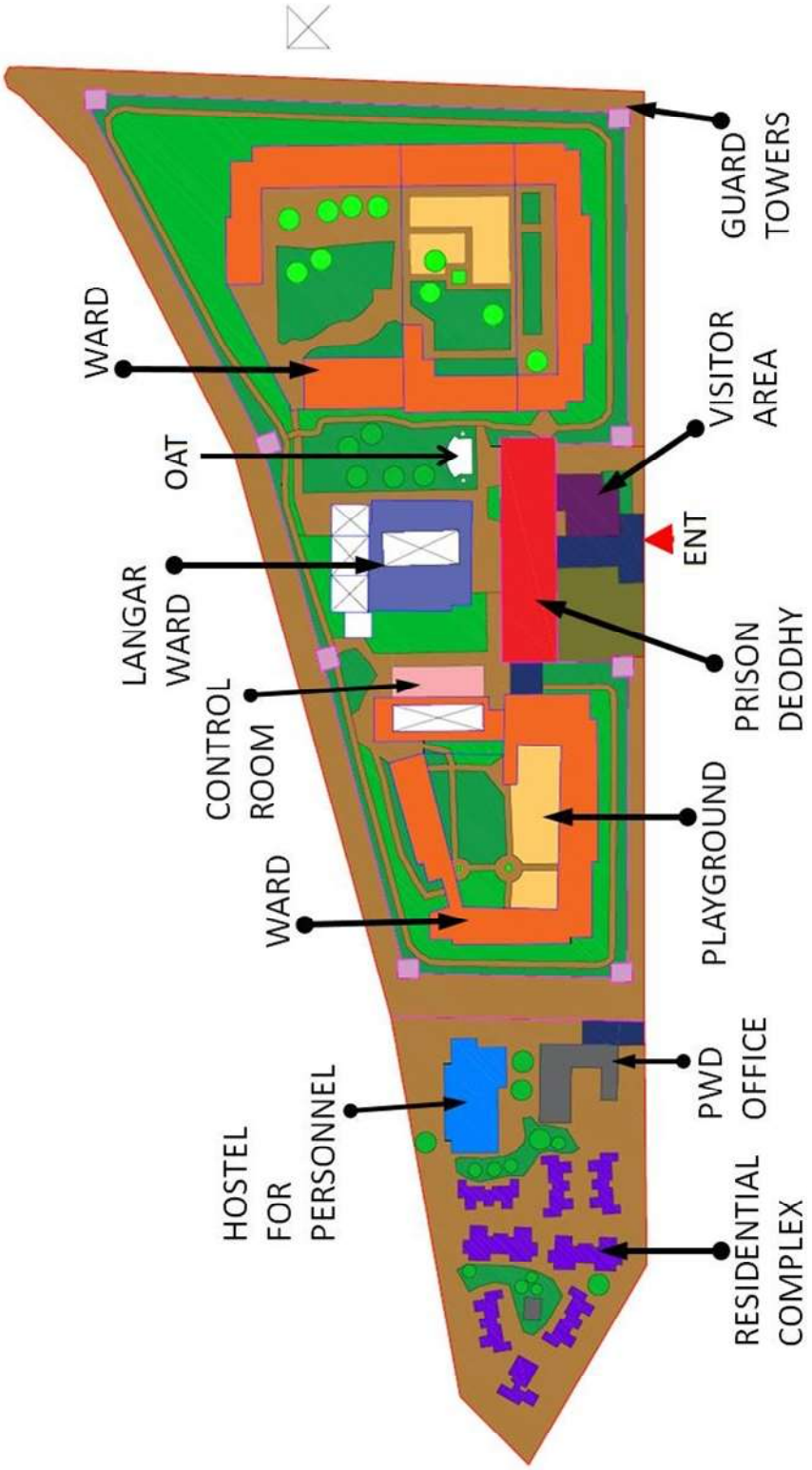


Figure 60: Rohini Prison Complex layout depicting its elements.

5.2.7. INFERENCES

- Wards are closely placed to eachother, which can create a security issue in case of panic situation.
- Not sufficient space for vehicle sally port or parking for the staff and visitors.
- Two or more wards have combined wall, which is a security loophole. It can lead to insufficient monitoring positions or spots.
- Control room & a Ward has a sharing wall, it should not happen since control tower should have 4 directional view. One ward is on the backside of the master control which has the sharing wall.
- Visiting area & Deodhy are not directly connected, one has to go from outside door towards the visitor"s area in case of any concern or issue.
- No community space in residential complex is provided. The blocks are closely placed, leaving little space for childrens" play area and for any kind of functions that staff family might want to organize.
- Dedicated staff areas for relieving the stress of the staff has not been into consideration.

6. LITERATURE STUDY

6.1. ADX FLORENCE

Figure 61: ADX Florence prison complex view

6.1.1. INTRODUCTION

The United States Penitentiary, Administrative Maximum Facility (ADX) is an American federal supermax prison for male inmates located in Fremont County, Colorado. It is unofficially known as ADX Florence, or the "Alcatraz of the Rockies."[25] It is part of the Florence Federal Correctional Complex, which is operated by the Federal Bureau of Prisons (BOP), a division of the United States Department of Justice. It houses the male inmates in the federal prison system who are deemed the most dangerous and in need of the tightest control. ADX also includes an adjacent minimum-security camp that, as of March 2014, houses more prisoners than the supermax unit.

The BOP does not have a designated "supermax" facility for women. Women in the BOP system who are classified as "special management concerns" due to violence or escape attempts are confined in the administrative unit of Federal Medical Center, Carswell in Fort Worth, Texas.

6.1.2. LOCATION

Fremont County, Canon City, near Florence, Colorado

Figure 62: ADX Prison Complex location on Google earth.

Figure 63: Aerial View of ADX Prison Complex.

6.1.3. PROXIMITY

- Covering an AREA of 620 Acres and having PERIMETER of 6,225 Meters.
- On North Side : Florence city, 4 Km away.
- On South Side : Barren Land & Highway connecting to another state.
- On East Side : Mountainous Range from North-East to South-West, ranging to 20 Km.
- On West Side : Church & Farms of people are present.

6.1.4. CLIMATE

- Fremont County, Colorado, gets 13 inches of rain per year.
- The US average is 39.
- Snowfall is 44 inches.
- The average US city gets 26 inches of snow per year.
- The number of days with any measurable precipitation is 36.
- On average, there are 260 sunny days per year in Fremont County, Colorado.
- The July high is around 89 degrees. The January low is 19.

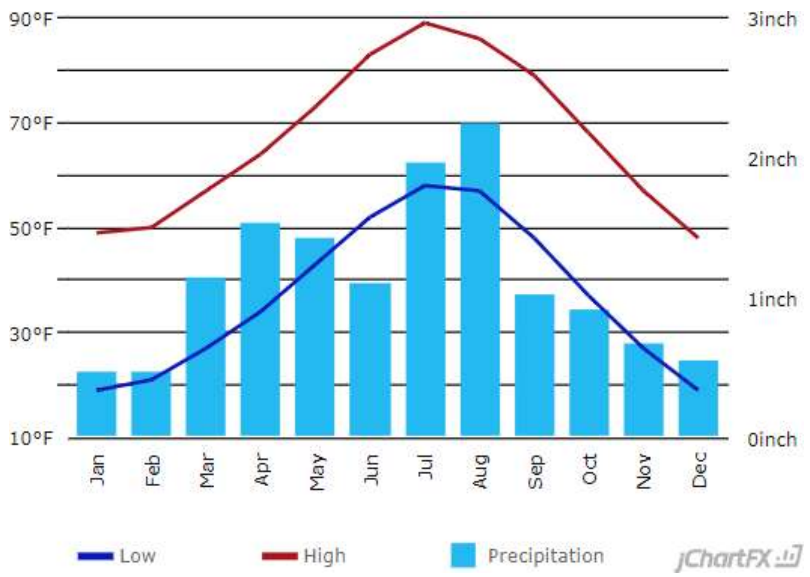


Figure 64: Climatic chart for Fremont County, Colorado.

6.1.5. PRISON FACILITY

It comprises three correctional facilities, each with a different security rating [ ]

The major part of the prison complex is above ground. There is an underground structure, a subterranean corridor that links cellblocks to the lobby. Inmates spend 23 hours a day locked in their cells and are escorted by a minimum of three officers for their five hours of

private recreation per week.

- Each cell has a desk, a stool, and a bed, which are almost entirely made out of poured concrete.
- Each cell contains a toilet that shuts off if blocked, a timer set shower to prevent flooding, and a sink lacking a potentially dangerous tap.

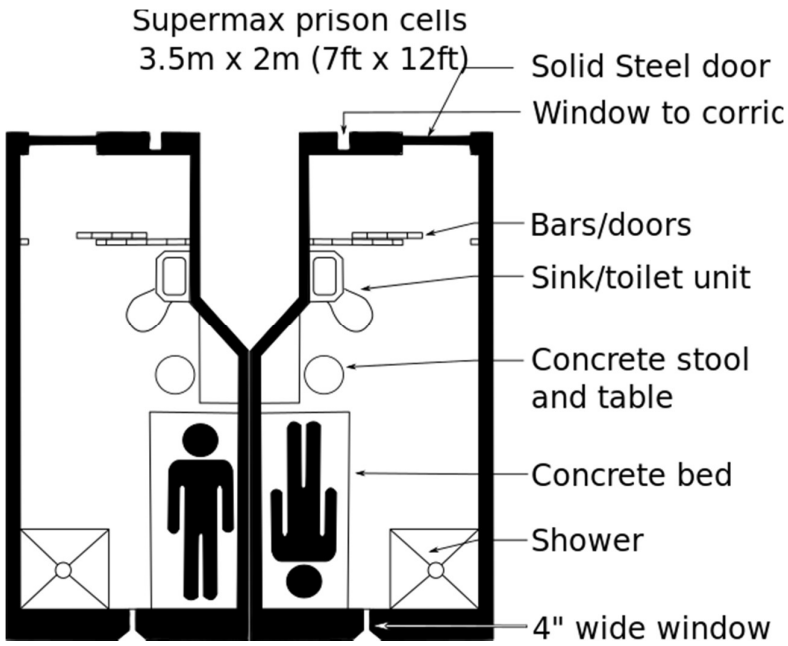


Figure 65: Design of an ADX Prison Cell.

- Rooms may also be fitted with polished steel mirrors bolted to the wall, an electric light that can be shut off only remotely, a radio, and on rare occasions, a black-and-white television that shows recreational, educational, and religious programming.

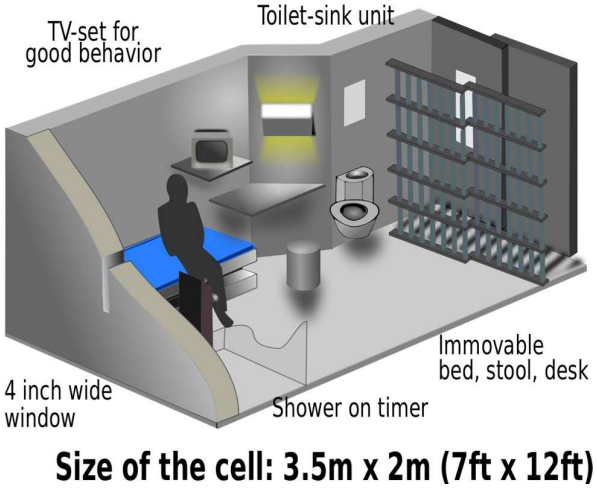


Figure 66: A 3D conceptual view of an inmate‟s cell of ADX Prison

- Also cells are soundproofed to prevent fellow prisoners from communicating with each other via Morse code.
- The 4 in (10 cm) by 4 ft (120 cm) windows are designed to prevent inmates from knowing their specific location within the complex.
- Inmates exercise in a concrete pit resembling an empty swimming pool, also designed to prevent them from knowing their location in the facility.[30] The pit is only large enough for a prisoner to walk 10 steps in a straight line, or 31 steps in a circle.
- Multitude of motion detectors, cameras, and 1,400 remote-controlled steel doors are provisioned in the facility for security purpose.
- Pressure pads and 12-foot-tall (3.7 m) razor wire fences surround the perimeter, which is patrolled by heavily armed officers with attack dogs.
- Each Z-Unit cell is equipped with a full set of body restraints that are built directly into the concrete bed.

6.2. LONG BAY CORRECTIONAL CENTRE

6.2.1. INTRODUCTION

Also known as Her Majesty's Australian Prison Long Bay, and nicknamed "Long Bay Hilton". It is an Australian maximum and minimum security prison for males and females. The complex is contained within a 32-hectare (79-acre) site. The facility is by Corrective Services NSW, a department administered by the Government of New South Wales.

Figure 67: Long Bay Prison view.

The Complex accepts sentenced and unsentenced felons under New South Wales and/or Commonwealth legislation and comprises three separate facilities including the Long Bay Hospital (a maximum security institution for medical and psychiatric cases); the Metropolitan Special Programs Centre (a maximum/minimum security institution); and the Special Purpose Centre (a maximum security institution for inmates requiring special protection).

6.2.2. LOCATION

It is located at Malabar, Sydney, New South Wales, Australia. The complex is located approximately 14 kilometres (8.7 mi) south of the Sydney CBD.

Co-ordinates : 33º 58′ 10″ S AND 151º 14′ 45″ E

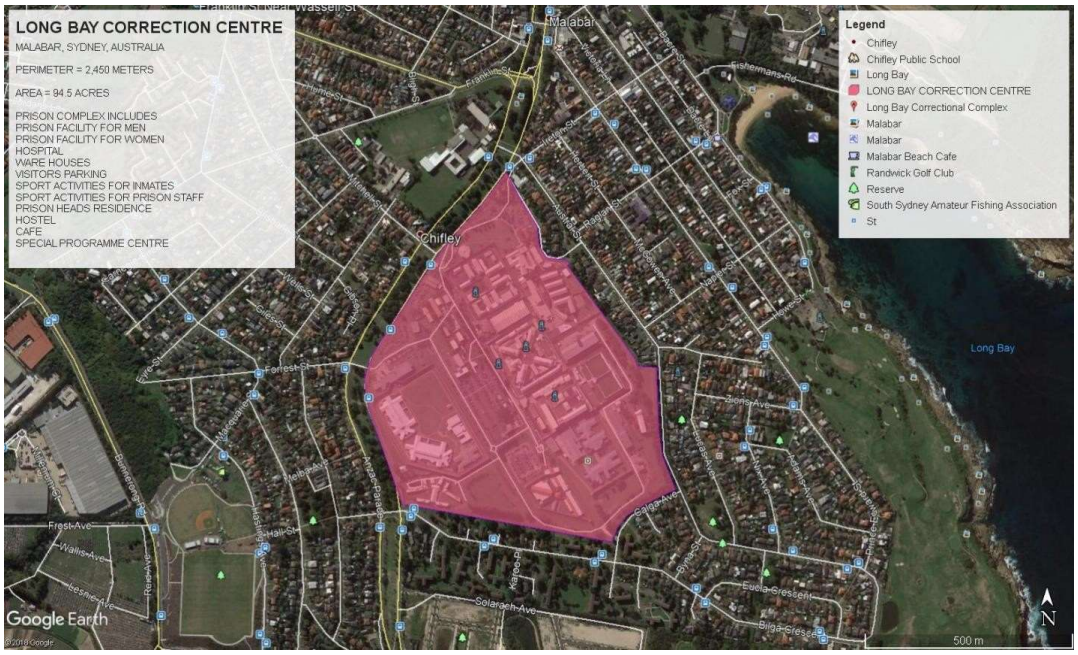


Figure 68: Long Bay Correctional Centre location on Google Earth.

6.2.3. PROXIMITY

- On North Side : Chiefly city residences & Matraville Sports High School
- On South Side : There are 2 residential areas viz, Little Bay & Phillip Bay and have their own Jetty Points. Also has 1 recreational area i.e. St. Michael Golf Club.
- On East Side : Chiefly local residence and then a long bay.
- On West Side : There is a Judicial Court, a Dockyard, some Warehouses & some Plantations

Figure 69: Long Bay Prison‟s Aerial View.

6.2.4. CLIMATE

- The highest rainfall (around 150 – 187 mm) in the months of December to March.
- Thunderstorms are a common feature of the rainfall season
- The winter season is around June to August with minimum temperature of 7℃.
- The February high is around 31℃. Average goes around 28℃.The July low is 11℃.
- The summer season falls from December to February.

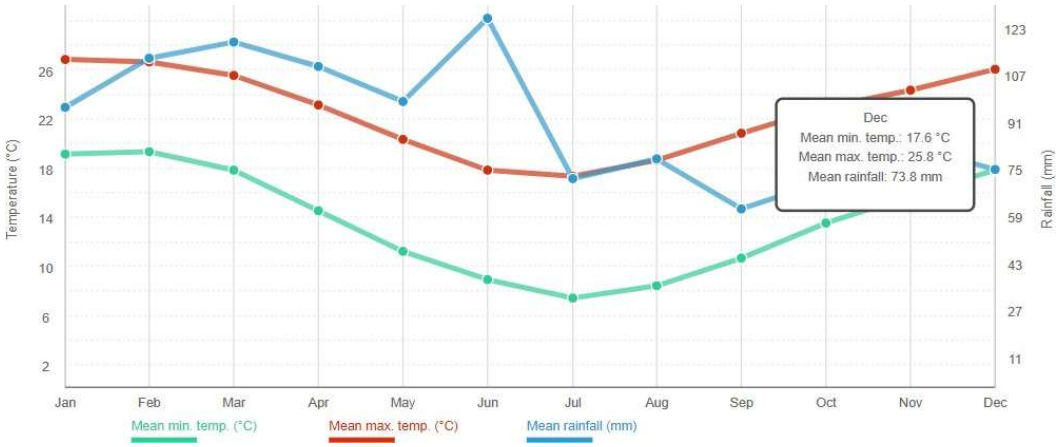


Figure 70: Climatic data for Malabar, New South Wales, Sydney.

6.2.5. PRISON FACILITES

In 1975 a prominent supermax prison block was completed, known as Katingal. It was designed to house terrorists as well as problematic prisoners which had been identified as difficult offenders within the NSW prison system, replacing the intractable section at Grafton Gaol. Michael Yabsley, Minister for Corrective Services, announced on 17 March 1989, that Katingal would be reopened as a correctional facility. When it was realised that the redevelopment of the site would cost double the A$8 million allocated, plans were put on hold until a feasibility study was completed on the entire Long Bay prison complex. Demolition of Katingal began in March 2006.[33]

As of May 2016 it was reported that the prison held approximately 1,200 prisoners with capacity estimated 1,000 [] resulting in over-crowding of the correctional centre.

1. LONG BAY HOSPITAL

The new Long Bay Hospital is a maximum security facility which holds a total of 120 inmate patients in four wards.

Department of Corrective Services and Justice Health (NSW Department of Health), both jointly administer this facility.

It is divided into 4 areas. Out of which, one of the ward is dedicated to medical cases & three others are for short and long term psychiatric cases.

Figure 71: Long Bay Forensic Hospital Ward

2. METROPOLITAN SPECIAL PROGRAMS CENTRE (MSPC)

- Until recently called the 'Malabar Special Programs Centre', the MSPC is a maximum through to minimum security facility which houses many types of inmates.
- It is the second largest goal in terms of inmate population in New South Wales.
- It holds remand inmates, medical transients (inmates undertaking medical treatment), inmates with short sentences and inmates undertaking therapeutic programs.
- The programs areas of the goal comprises the
    - Violent Offenders Therapeutic Program (VOTP)
    - Developmentally Delayed Program
    - Lifestyles Unit (for HIV-positive inmates)
    - the Kevin Waller Unit for at-risk female inmates (currently used as an assessment unit for aged male inmates)
    - Acute Crisis Management Unit (ACMU) for active suicidal and self-harmers,

- Multi-Purpose Unit or Segregation (high risk inmates on segregation orders and inmates requiring non association for safety)
- CUBIT (Custody Based Intensive Therapy) sex offender program.

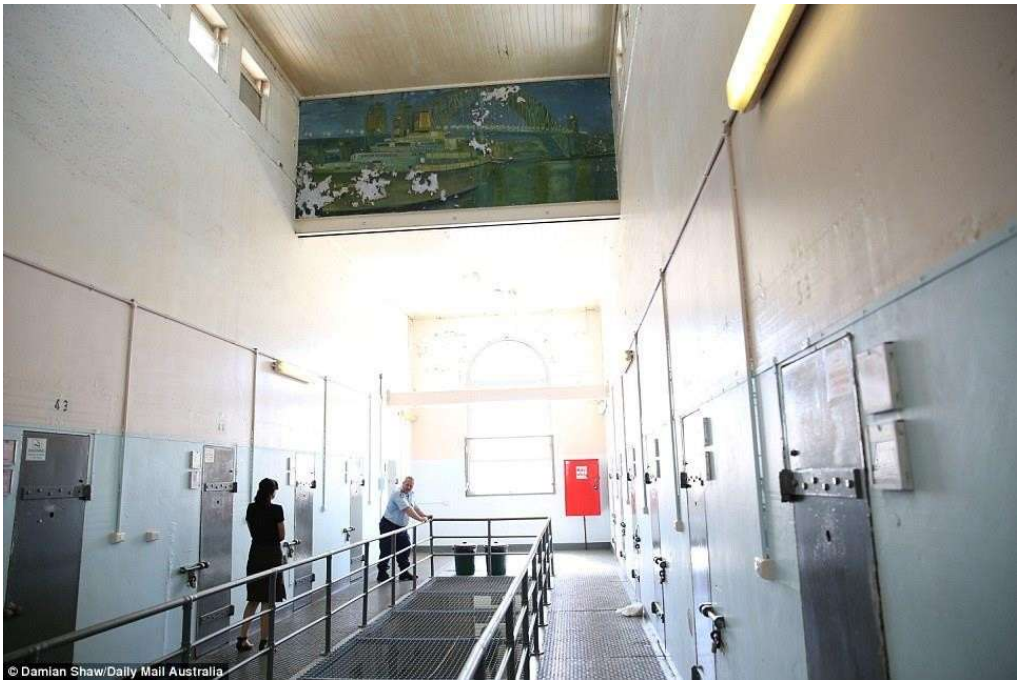


Figure 72: Tier of old wing which housed death cells at Long Bay Prison.

3. SPECIAL PURPOSE CENTRE (SPC)

- The Special Purpose Centre is a maximum security facility which holds inmates requiring special, or strict, protection.
- As of 2001, the SPC had the capacity to hold up to 65 inmates who are placed in this unit as selected by an Interdepartmental Committee that includes senior police and correctional personnel who authenticate the information supplied by the offenders to ensure that protection is warranted.
- Many of these offenders are informers who never return to mainstream prison population and are only ever referred to by a number (*such as CP01, Commissioners Pleasure 01*).
- Corrective Services NSW advises that there are, however, numerous examples of inmates who make the transition from the SPC to other centres.
- This Centre is often referred to as the *bomb shelter* or *super grass* by other inmates and houses police informants, inmates with bad debts and anyone else the commissioner of corrective services deems to be at risk and unable to be managed in standard protective custody.

Figure 73: Inside view of the Long Bay Prison.

Figure 74: Inside view of the Long Bay Prison.

7. SITE ANALYSIS

7.1. About

Narela sub-city is a tehsil, located in the North Delhi district of NCT of Delhi, and forms the border of the Delhi state with Haryana. Situated just off the Grand Trunk Road, its location made it an important market town for the surrounding areas, during the 19th century, which it still retains. It was developed as the third mega sub-city project of Delhi Development Authority (DDA) in the urban extension project of Delhi, after Rohini Sub City and Dwarka Sub City. and covering an area of 9866 ha. The 'Narela Industrial Area', started developing in the early 1980s and is today one of the important such complexes in Delhi.[3]

It is one of 12 zones of the Municipal Corporation of Delhi (MCD) and one of the three administrative divisions or subdistricts of the North West Delhi district, along with Saraswati Vihar and Model Town.

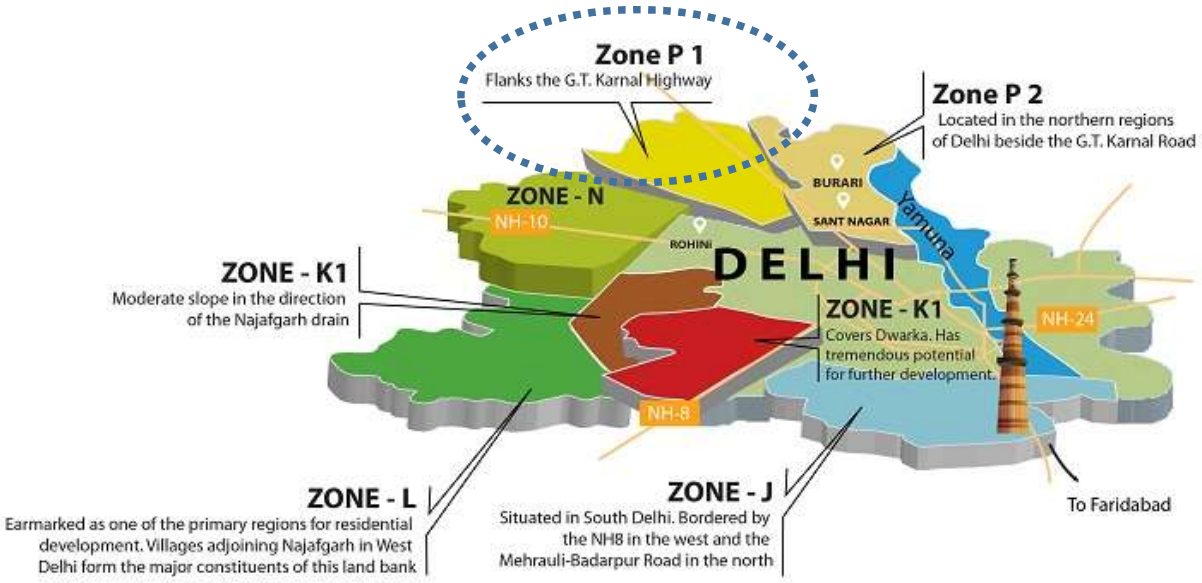


Figure 75: Delhi Master Plan

Narela comes under the zone p1 according to the master plan 2021 of Delhi master plan.

7.2. SITE AND ITS ANALYSIS

- Site is of an **Area 16 Hectares i.e. 39.53 Acres,** which has been allotted to develop a Narela Prison Complex.
- It has been approved & allotted by DDA.
- Site is near Grand Trunk Road connecting to Sonipat, passing through Singhu Border.

- On other side is Tikri Khurd Village & front of site is 60 m. wide road.
- Site is surrounded by both residential as well as commercial under-construction buildings which can be a major security setbacks for prisoners .

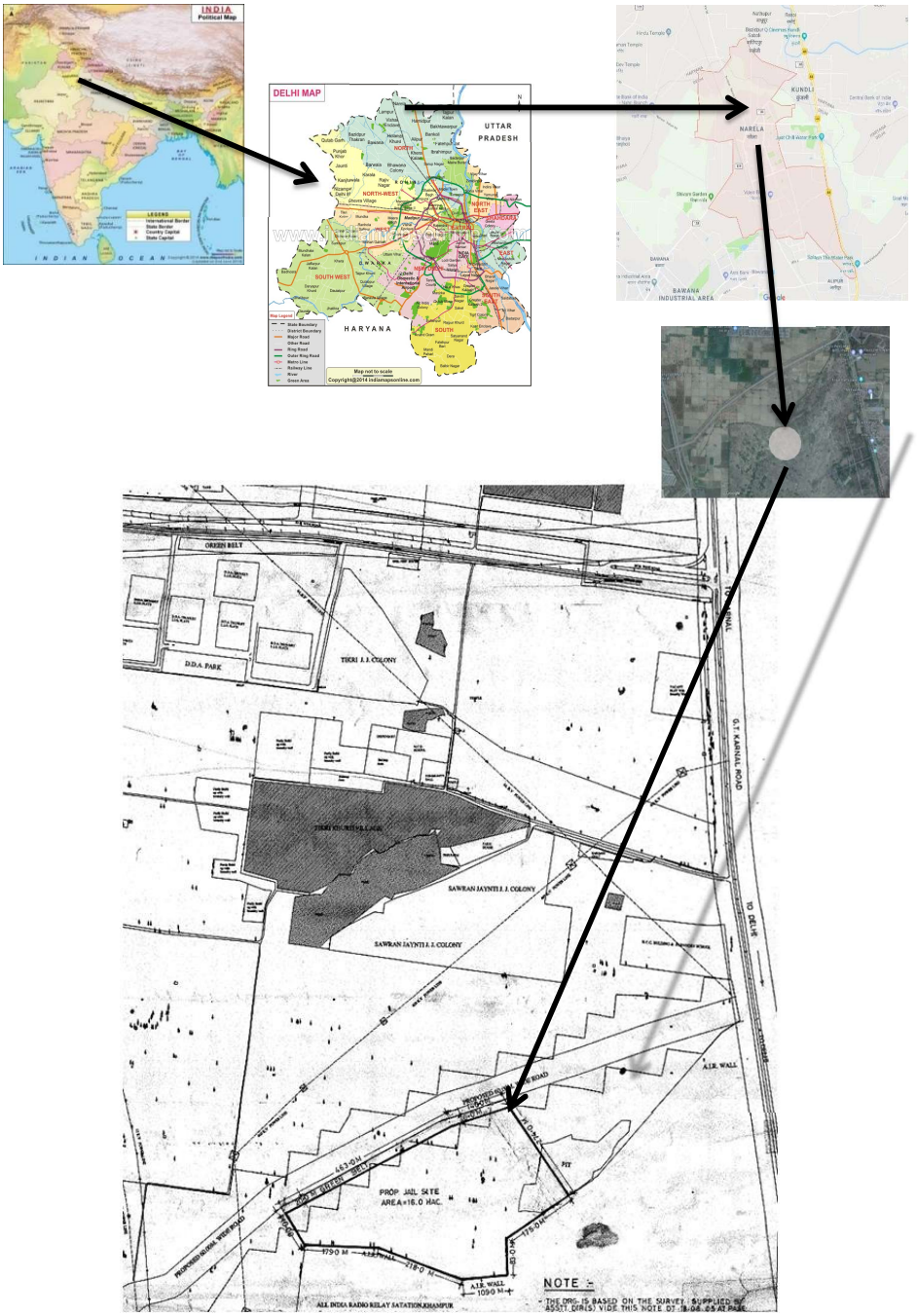


Figure 76: Loction of site

7.3. SITE ACCESSABILITY AND PROXIMITY

- Site is near well-developed area & distance to other prominent location of city are**:-**

Places	Distances
ALIPUR	9.9 km
MUKMELPUR	10.0 km
BAWANA	11.5 km
NARELA	14.0km
RAI	14.0 km
SONIPAT	26.0 km
PANIPAT	67.0 km
BADLI MOD METRO	17.5km
TIKRI DTC BUS STOP	3.0 km

Table 4: Nearby Area of Site

- Site is approached through NH44 GT karnal road with 60 m wide road in the front of the site. (north-west)

MEDIUM	DISTANCE FROM SITE	
	Tikhri dtc bus stop	3.0 KM
	Maharana Pratap ISBT	27.4 KM
	Anand Vihar ISBT	40 KM
	Indira Gandhi International Airport	40 KM
	Samaypur **B**adli metro station	19.9 KM
	Holambi Kalan railway station	4.8 KM
	Narela railway station	7.3 KM
	New Delhi Railway station	33 KM

Table 5: Medium of Transportation

7.4. SITE NATURE

TOPOGRAPHY	**Latitude = 28.85º Longitude = 77.10º**
GEOMORPHOLOGY	Yamuna Alluvial Soil.
NATURE OF TERRAIN	Site has slight undulations with slope coming towards to the centre of the site. Site is 15 feet below road level
SIESMIC ZONE	Zone – III
ELEVATION-	210 Meters above Sea Level

Table 6: About Site

7.5. SITE POTENTIAL

- Away from the Hustle-bustle of the city, thus the site remains calm, soothing and pollution free.
- Natural wild vegetation is present. Also the site is surrounded by farms.
- Site is well connected to city and is good from services point of view.
- Well connected to Delhi and Haryana through National Highway 44.
- Surrounded by many villages and hence the village sky line is low, which is good from security point of view.

7.6. SITE WEAKNESSES

- Site is near purposed Institutional Area and Upcoming Business sector, so there can be air and noise pollution and traffic congestion in future.
- Being near all India radio station & Transformers line, So radiations can be high.
- Nearness to the All India Radio Station and National Highway 44 , can lead to security risks.

7.7. SITE CONTEXT

Figure 77: Surrounding of Site

7.8. DEVELOPMENT RULES

DDA Rules are followed here according to which calculations are made.

- Total Site Area: 39.53 Acres = 1,59,972 Sq.m.
- Maximum Ground Coverage : 35 %
- Floor Area Ratio (F.A.R.) : 2.0
- Maximum Ground Coverage: 55,990 Sq.m.
- Maximum Height: 37 m.

So, Total Permissible area that can be achieved : 2 x 55,990 = 1,11,980 Sq.m.

7.9. CLIMATOLOGY

- The climate of Delhi is an overlap between monsoon-influenced humid subtropical and semi-arid.
- Summer season starts in early April and peaks in May, with average temperatures near 32 °C raises as high as 45 °C (114 °F) on some days.
- The monsoon starts in late June and lasts until mid-September, with about 797.3 mm (31.5 inches) of rain.
- The average temperatures are around 29 °C , although it can vary from 25 °C to 32 °C, depending on the season.
- Winter starts from mid-November and peaks in January, with average temperatures around 12–13 °C. But severe cold can be experienced during January with lowest temperature being 2℃.
- Winters are accompanied by heavy fogs, delaying flights and trains.
- Wind flows from North-West, but changes to South-East during July & August.

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature (°C)	14.2	16.9	22.7	28.6	33.5	34.3	31.1	29.8	29.2	25.8	20.1	15.6
Min. Temperature (°C)	7.3	10.1	15.1	20.9	26.4	28.6	27.1	26	24.5	18.6	11.7	7.9
Max. Temperature (°C)	21.2	23.8	30.3	36.3	40.6	40	35.2	33.6	34	33	28.6	23.4
Avg. Temperature (°F)	57.6	62.4	72.9	83.5	92.3	93.7	88.0	85.6	84.6	78.4	68.2	60.1
Min. Temperature (°F)	45.1	50.2	59.2	69.6	79.5	83.5	80.8	78.8	76.1	65.5	53.1	46.2
Max. Temperature (°F)	70.2	74.8	86.5	97.3	105.1	104.0	95.4	92.5	93.2	91.4	83.5	74.1
Precipitation / Rainfall (mm)	15	10	14	3	11	42	205	246	112	26	3	6

Figure 78: Temperature Data

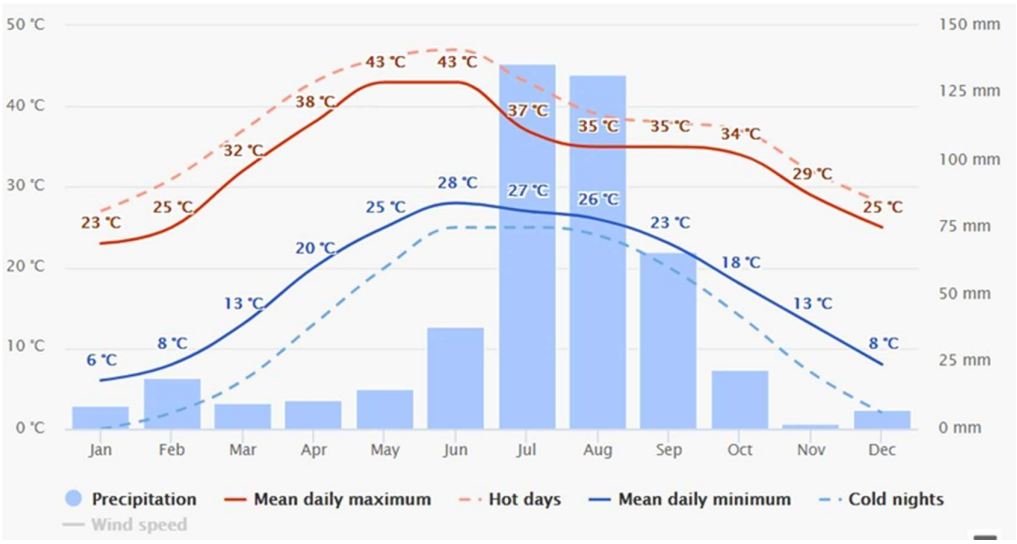


Figure 79: Climograph for Narela.

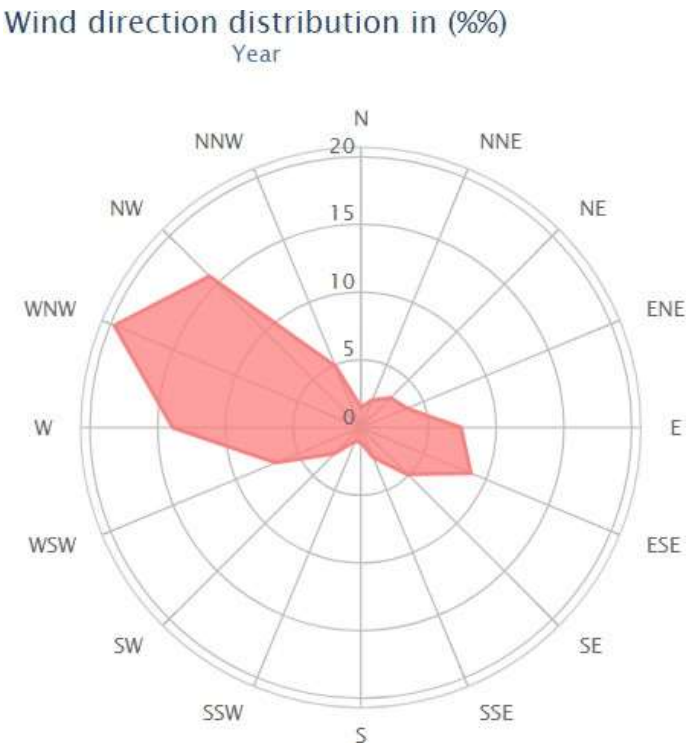


Figure 80: Directional-Graph for Wind.

7.9. Vegetation

Site Is currently used as agriculture land because of its fertility. Site is covered with patches of bushes with few trees.

Figure 81: Vegetation on Site

Figure 82: vegetation on site

8. Area statement

Visiting block

S. No.	Spaces	Areas
1.	Checking & permission	18 sqm
2.	Waiting area	80 sqm
3.	Inmate meeting cab	6.8 sqm
4.	Personal meeting room	22.44 sqm
5.	Control room	45 sqm
6.	Toilets	25 sqm

High security block

S. No.	Spaces	Areas
1.	Single occupancy cell	12 sqm 1.8 sqm (toilet)
2.	Kitchen & store	15 sqm
3.	Dayroom	80 sqm
4.	Staff post	6.5 sqm
5.	Dayroom toilet& shower	15 sqm

Medical centre-

S. No.	Spaces	Areas
1.	Reception / waiting	20sqm
2.	Medicine distribution	25 sqm
3.	Doctor clinic	30 sqm
4.	Dentist	30sqm
5.	Laboratory	20sqm
6.	I c u	34sqm
7.	General ward	50sqm
8.	Toilet	12sqm
9.	O.t	40sqm

Education block-

S. No.	Spaces	Areas
1.	Office	20sqm
2.	Multipurpose hall	190sqm
3.	Classroom	50 sqm
4.	Library	105sqm
5.	Toilet	10sqm

Administration -

S. No.	Spaces	Areas
1.	Reception & waiting area	15sqm
2.	Superintendent office	21 sqm
3.	Dyp. Supdt. Office	20 sqm
`4.	Staff lounge	60sqm
5.	Meeting room	20sqm
6.	Record room	86sqm
7.	Store	50sqm
8.	Armoury	12sqm
9.	Central monitoring cell	40sqm
10.	Photocopy	18sqm
11.	Staff work room	75sqm

12.	Pantry	9sqm
13.	Toilets	64sqm
14.	Officer duty	40sqm
15.	Office	45sqm
16.	Incharge	45sqm
17.	Staff room	40sqm

Solitary block-

S. No.	Spaces	Areas
1.	Single occupancy cell(1unit)	12sqm(incuding toilet)
2.	Kitchen & store	13 sqm
3.	Dayroom	300 sqm(3.25m per inmate)
4.	Staff post	16.5 sqm
5.	Dayroom toilet& shower	15 sqm

Undertrials block - 1280 inmates-

S. No.	Spaces	Areas
1.	Cell unit (3 inmate per cell)	17sqm 18sqm with lav.
2.	dayroom for 30 inmates	100 sqm 3.25 sqm per inmate
3.	Dayroom shower & toilet (1unit)	40 sqm
4.	Staff post	18 sqm
5.	Laundary	152 sqm
6.	Matresses storage	13 sqm
7.	Staff toilet (1 unit)	2.6 sqm
8.	Central staff monitor	468sqm
9.	Pantry storage	100 sqm
10.	Gym	152 sqm

Convicts block - 1050 inmates-

S. No.	Spaces	Areas
1.	Cell unit (3 inmate per cell)	17.2sqm 18 sqm with lav.
2.	dayroom for 30 inmates	100 sqm 3sqm per inmate
3.	Staff monitor	27 sqm
4.	Laundary	152 sqm
5.	Matresses storage	16 sqm
6.	Staff toilet (1 unit)	2.6 sqm
7.	Central staff monitor	468sqm
8.	Pantry storage	100sqm
9.	Gym	152 sqm

Table 7: Area chart

9. CONCEPT

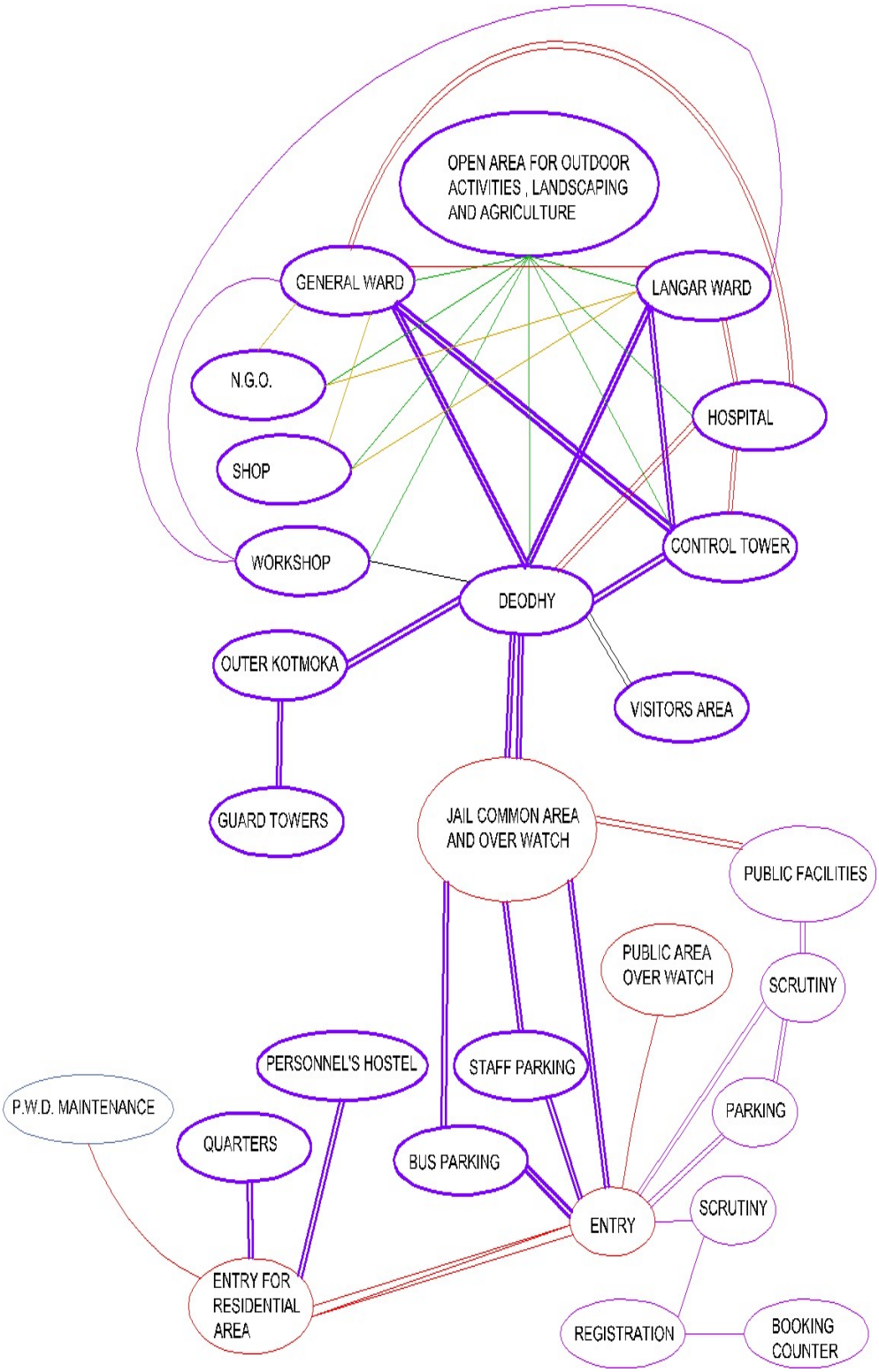


Figure 83: Bubble Diagram

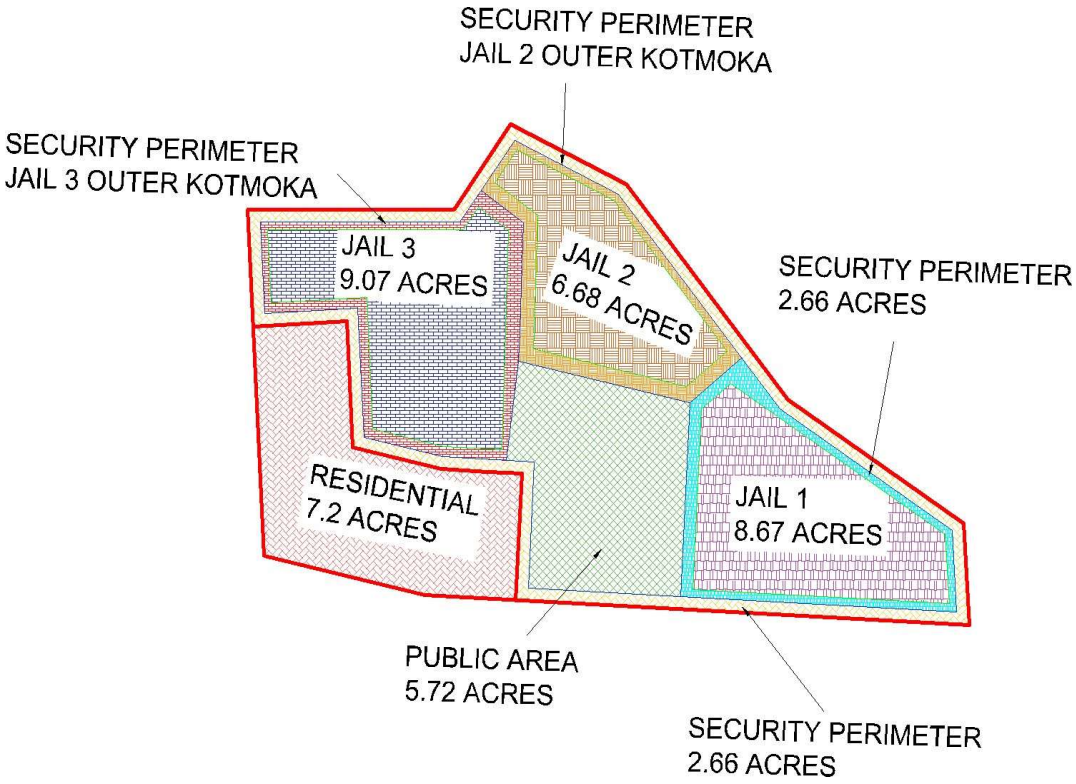


Figure 84: Divison of Areas on site

10. Drawings

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