

# CONCEPTUAL PLAN

### 1.0 INTRODUCTION

Improvements in national economy and literacy rates have changed the patterns and extent of use of health services in the country. Now, people are increasingly becoming concerned about their health and are acquiring the ability to make a deliberate choice of the health services they need. Also, staffs benefits in government, trade and industry and third party financing of Medicare through voluntary and social insurance are further augment this demand.

Moreover, India is a signatory to the "Alma Ate' declaration (1978) and is committed to attain the global objective of "Health for All by Year 2000 A.D. Thus, in order to augment and back up balanced development of health care services in the country, to achieve the above objective, private investment in health care is being welcomed especially at the tertiary level and upgraded secondary level care where investments are highly capital intensive.

It is in this scenario that the proposed Phular Medical College & Research Centre will have social relevance and develop lead models for delivery of high quality medical-care, which are efficient, affordable and humane.

**Proposed Phular Medical College & Research Centre** has proposed 650 bedded Hospital including, Recreational Facilities and Site infrastructure development work which include road, sewer line, Drainage work, parking Area, Landscaping, electrification, water supply, waste disposal system etc. as per standard laid down.

#### ***Features of the project are:***

- ❖ In-patient services: Proposed 650 No of beds
- ❖ Proposed Medical College Building
- ❖ Proposed Hostel for patients Attendants/Residence for essential staff building
- ❖ Out-patient & ambulance services
- ❖ Operation Theatre, labor room & Diagnostic services
- ❖ Help desk
- ❖ Solid /Biomedical/Waste water Treatment Facility
- ❖ Rain Water Harvesting Facility

### 1.1 SITE LOCATION AND SURROUNDINGS

The site is located at Bishunpur Aima, Marwan, Subdivision West, Thana No. 134, District Muzaffarpur, Bihar The proposed project consist of 650 bedded Medical College & Research Centre, Recreational Facilities and Site infrastructure development work which include road, sewer line, Drainage work, parking Area, Landscaping, electrification, water supply, waste disposal system etc. as per standard.

Project site is located at Mauza Bishnupur Aima, Khata Nos. 164, 17, 272, 57, 216, 88, 238, 63, , 250, 250, 222, 202, 37, 119, 52, 227, 19, 78, 52, 266, 134, 81, 230, 222, 222, 222, 230, 233, 277, 244, 130, 250, 78, 79, 101, 101, 233, 190, 231, 277, 233, 233, 244, 244, 176, 52, 119, 111, 52, 119, 126, 194, 158, 68, 289, 295, 187, 244, 217, 217, 18, 266, 272, 250, 170, 216, 109, 128, 128, 192, 11, 11, 70, 25, 161, 272, 133, 88, 89, 227, 227, 156, 227, 195, 17, 230, 167, 16, 16, 16, 16, 16, 133, 128, Khesra/Plot Nos. 1465, 1569, 1357, 1585, 1467, 1455, 1463, 1458, 1358, 1360, 1442, 1354, 1341, 1344, 1345,

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1351, 1352, 1359, 1374/1841, 1374/1841, 1437, 1438, 1441, 1442, 1442, 1442, 1443, 1444, 1445, 1446, 1447, 1449, 1452, 1578, 1579, 1581, 1582, 1583, 1586, 1587, 1589, 1590, 1591, 1593, 1594, 1728, 1730, 1732, 1733, 1734, 1456, 1457, 1460, 1461, 1463/1328, 1464, 1466, 1467/1830, 1570, 1570, 1571, 1572, 1573, 1574, 1575, 1467, 1443, 1468, 1468, 1750, 1596, 1597, 1435, 1434, 1727, 1450, 1454, 1604, 1608, 1356, 1451, 1602, 1576, 1462, 1569, 1724, 1747, 1595, 1603, 1722, 1723, 1729, 1454, 1468, Block Marwan, Subdivision West, Thana No. 134, Muzaffarpur Dist., State Bihar at Latitude 26° 7'25.73" N & Longitude 85°13'30.28"E. Land documents are attached as Annexure I. Layout Plan is attached as Annexure 2.

### 1.2 CONNECTIVITY

Project site is accessible and is well connected via network of rail & road. It is connected by a network of state and roads to the neighboring states. Connecting Roads are NH 722.

Nearest Railway Station is Kanti, which is at distance of 10 km in NW direction. The NH 722 is also located within the study area. Project site is also connected with Muzaffarpur Airport, at a distance of 8.38 km and Patna Airport at a distance of 68.0 km.

### 1.3 AREA STATEMENT

Total plot area for development of proposed project is 74573.63 Sq. M. (18.42 Acres)  
Statement of area detailing the propose development is given below:

|                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Proposed capacity/area/length/tonnage to be handled/command area/lease area/number of wells to be drilled | Total Built-up Area: <b>1,25,013.80 Sq. M.</b><br>Total Plot Area: <b>74573.63 Sq. M. (7.45 Ha. / 18.42 Acres)</b><br>Permissible Far = <b>1.68</b><br>Proposed Ground Coverage = <b>24.32%</b><br>No. of beds = <b>650</b><br>OPD= <b>1200</b><br>Medical College Student seats: <b>150</b><br>Boys/Girls Hostel: <b>600</b><br>Residential Quarters : <b>60 nos.</b><br><b>Built-up Area Details are as under ;</b> |
|-----------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

#### Area Statement

| BUILDING             | GROUND FLOOR                 | 1st FLOOR | 2nd FLOOR | 3rd FLOOR | 4th FLOOR | 5th FLOOR | 6th FLOOR | TOTAL           |
|----------------------|------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------|
|                      | <b>Built-up Area in Sqm.</b> |           |           |           |           |           |           |                 |
| Hospital             | 7151.06                      | 8005.95   | 7571.26   | 7571.26   | 7571.26   | 7571.26   | 7571.26   | <b>53013.31</b> |
| Medical College      | 3588.80                      | 4047.75   | 3050.60   | 3588.80   | 3588.80   | 3050.60   | NA        | <b>20915.35</b> |
| Nursing Staff Hostel | 1563.00                      | 1563.00   | 1563.00   | 1563.00   | 1563.00   | 1563.00   | 1563.00   | <b>10941.00</b> |

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|                                           |        |        |        |        |        |        |        |                    |
|-------------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------------------|
| Girls PG Hostel                           | 762.00 | 762.00 | 762.00 | 762.00 | 762.00 | 762.00 | 762.00 | <b>5334.00</b>     |
| Girls Hostel                              | 993.22 | 993.22 | 993.22 | 993.22 | 993.22 | 993.22 | 993.22 | <b>6952.54</b>     |
| Dining & Sports Block                     | 784.63 | 903.96 | 784.63 | 784.63 | 784.63 | 784.63 | NA     | <b>4827.11</b>     |
| Boys Hostel - 1                           | 558.38 | 558.38 | 558.38 | 558.38 | 558.38 | 558.38 | 558.38 | <b>3908.66</b>     |
| Boys Hostel – 2                           | 558.38 | 558.38 | 558.38 | 558.38 | 558.38 | 558.38 | 558.38 | <b>3908.66</b>     |
| Boys PG Hostel                            | 888.06 | 888.06 | 888.06 | 888.06 | 888.06 | 888.06 | 888.06 | <b>6216.42</b>     |
| Staff Quarters - 1                        | 570.00 | 570.00 | 570.00 | 570.00 | 570.00 | 570.00 | 570.00 | <b>3990.00</b>     |
| Staff Quarters - 2                        | 715.25 | 715.25 | 715.25 | 715.25 | 715.25 | 715.25 | 715.25 | <b>5006.75</b>     |
| <b>TOTAL Built-up Area</b>                |        |        |        |        |        |        |        | <b>1,25,013.80</b> |
| <b>Ground Coverage (24.32%)</b>           |        |        |        |        |        |        |        | <b>18136.31</b>    |
| <b>F.A.R. 1.68%</b>                       |        |        |        |        |        |        |        |                    |
| <b>Height of The Buildings : 35-40 m.</b> |        |        |        |        |        |        |        |                    |
| <b>No. of Floors : G + 6</b>              |        |        |        |        |        |        |        |                    |
| <b>No. of Buildings : 11 Nos.</b>         |        |        |        |        |        |        |        |                    |

| <b>Land Area Utilization</b> |                       |               |
|------------------------------|-----------------------|---------------|
| Components                   | AREA IN SQ.M.         | PERCENTAGE    |
| BUILDING AREA                | <b>18132.78 Sq.M.</b> | <b>24.32%</b> |
| OPEN AREA                    | <b>3040.58 Sq.M.</b>  | <b>4.08%</b>  |
| PAVED AREA                   | <b>4446.60 Sq.M.</b>  | <b>5.96%</b>  |
| GREEN AREA                   | <b>14936.65 Sq.M.</b> | <b>20.03%</b> |
| ROAD AREA                    | <b>20400.70 Sq.M.</b> | <b>27.36%</b> |
| PARKING AREA (OPEN)          | <b>12745.48 Sq.M.</b> | <b>17.09%</b> |
| SERVICES                     | <b>870.84 Sq.M.</b>   | <b>1.17%</b>  |
| <b>TOTAL AREA:</b>           | <b>74573.63 Sq.M.</b> | <b>100%</b>   |

### 1.3 ESTIMATED POPULATION

Estimated population at project site is **2146** including patients, staff and visitors. Details of population are given below in **Table 3**.

**Table 3 Estimated Population for project**

| <b>S. No.</b> | <b>Category</b>                                           | <b>Nos./Capacity</b> |
|---------------|-----------------------------------------------------------|----------------------|
| <b>1.</b>     | Senior Management principal/Vice Principal/CMS/HR-Head/NS | 10                   |
| <b>2.</b>     | Qualified Doctors                                         | 200                  |
| <b>3.</b>     | Nursing Staff                                             | 650                  |
| <b>4.</b>     | Paramedical Staff (Technician/ Pharmacist)                | 100                  |

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|    |                      |    |
|----|----------------------|----|
| 5. | Administrative Staff | 50 |
|----|----------------------|----|

### 1.4 PROJECT COST

Total cost of the project including land & development cost is Rs. 140 crore.

### 1.5 WATER REQUIREMENT

During construction phase water supply will be taken from local water supply. During operation phase, water will be taken from local water supply.

Total water requirement is approx. 467 KLD out of which 237 KLD is fresh water requirement for domestic use and 160 KLD water requirement for Flushing (Recycled water) Purpose.

**Table 4 :Wastewater Calculations**

| Details                                                                     | Water (KLD)                                                                                                                                                                      |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Water requirement for domestic purpose                                      | 355                                                                                                                                                                              |
| Wastewater generated from domestic use (@85% of domestic water requirement) | 255                                                                                                                                                                              |
| Water requirement for Flushing Purpose                                      | 176                                                                                                                                                                              |
| Wastewater generated from Flushing (@ 100% of flushing requirement)         | 176                                                                                                                                                                              |
| Total Wastewater generated                                                  | 431                                                                                                                                                                              |
| <b>Recycled water form STP @ 85% of wastewater generated</b>                | <b>431 KLD</b>                                                                                                                                                                   |
| <b>Use of Recycled Water</b>                                                | Landscape/Horticulture and DG set: 64 KLD<br>Flushing : 176 KLD<br>Fire Tank: 100 KLD<br>Total : 340 KLD<br>Rest of recycled water . will be discharge through govt. sewer line. |

### Wastewater Generation & Treatment

Water requirement during the operational phase of the proposed project of fresh water 355 KLD will be met through Ground water. This will be withdrawn only after getting permission of CGWB. The total water requirement for the proposed project has been estimated 704 KLD. This includes domestic water requirement, flushing, landscaping, Construction Activity. Total wastewater generated will be 431 KLD. After Treatment ~349 KLD water will be used for Flushing and Horticulture, and other Construction activity.

### 1.6 RAIN WATER HARVESTING

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Storm water harvesting system will be provided within the project site as per CPCB guideline on Rainwater Harvesting & Artificial Ground water Recharge. Storm water from roof-top & surface will be collected via storm water drainage network and will be led into recharge pits proposed to be provided at various locations. Storm water drainage will be designed in line of existing drainage pattern and considering the natural flow direction of water. First flushing system will be provided to prevent water from first rain to enter the ground as it is believed to contain several impurities. Rain water harvesting system is designed considering maximum peak hourly rainfall (90 mm/hr). Thus pits are designed to capture the maximum possible rainfall which could occur. De-silting chamber is provided with each RWH pit. Oil trap is provided to remove oil & grease, if any in the storm water. Periodic cleaning & maintenance of RWH system will be done. 10 Nos. recharge pits will be provided in the proposed project.

Conceptual design for rain water harvesting pit is given in **Figure: 6**.

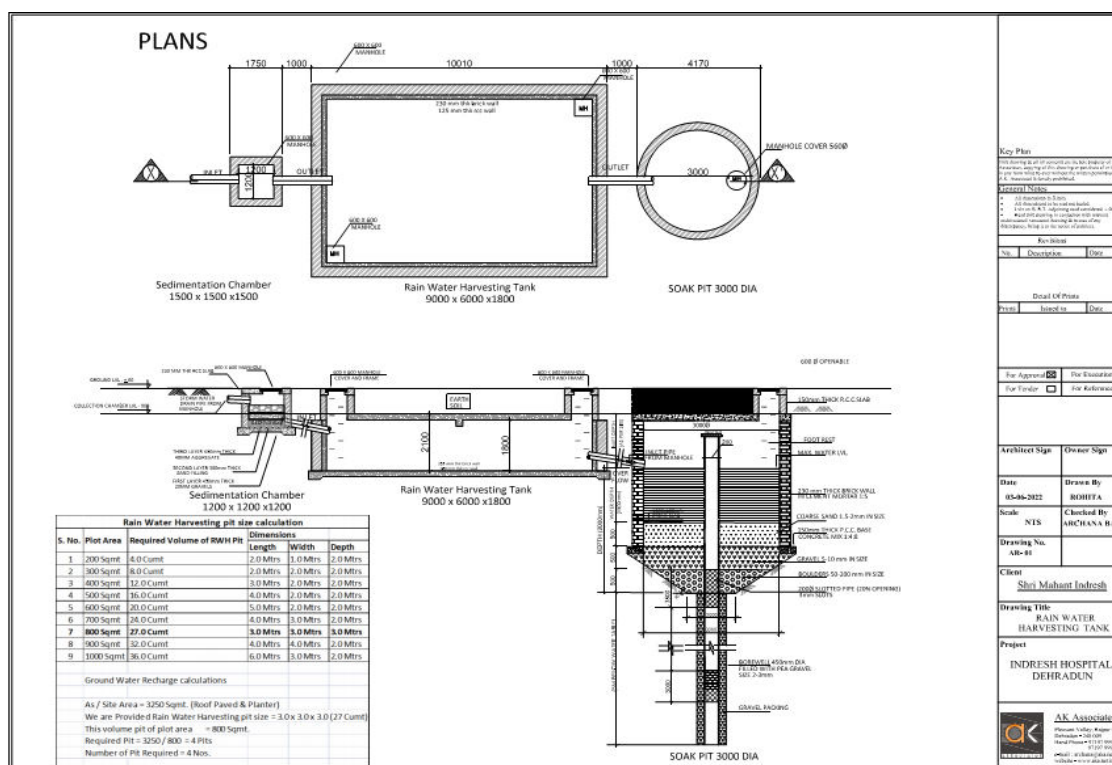


**Figure 6: Schematic Diagram of Rain Water Harvesting Pit**

The project within the project premises. The proposed rainwater will be recharged to the ground water level.

In general the rainwater from terraces and other-elevated open areas shall be collected through Rainwater down "take pipes and connected to catch basins. The Rain water from hard courts and landscaped area shall be collected by catch basins through a RCC pipe network/or open drains with gratings and connected to the storm water manholes/channels in the complex. The collected water from the catch basins will be diverted to rain water harvesting pits. Provision shall be made for Rain Water Harvesting as required by the Codes.

The rain water harvesting pits will contain circular RCC retention tanks of 2.5 m radius. It will be fitted with RCC lids and will be provided with separate inlet and outlet (overflow)

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pipes. The base of the retention tank will be filled with coars sand of 1.5-2 mm dia, gravel of 5-10mm dia and finally by boulders of 5-15 mm dia laid one

This provides a natural filtration to the incoming rain water. A 153 dia PVC pipe with 1.55 slots at the bottom is provided for percolation.

### 1.7 VEHICLE PARKING FACILITIES

Adequate parking is provided to accommodate the expected vehicles during operation phase of the project. Proposed parking is 1,062 nos.

### 1.8 POWER REQUIREMENT

Maximum power demand for the project will be 1000 KW Power supply will be taken from BSEB. **Electrical system is designed as per following standards:**

- National Building Code of India – 2005
- National fire Codes 2000
- Relevant Bureau of Indian Standard
- Indian Electricity Supply Rules & Act

#### Details of D.G Sets

DG sets of total capacity 4 X 125 KVA & 2 X 250 KVA will be used as power backup during power failure. DG sets are open to air & will be provided with acoustic enclosure.

### 1.9 SOLID WASTE GENERATION AND MANAGEMENT

Solid waste would be generated both during construction as well as during operation phase. Solid waste expected to be generated during construction phase will comprise of excavated materials, used bags, bricks, concrete, MS rods, tiles, wood etc. **Table 6** details the solid waste management plan during construction phase

**Table 6: Solid Waste Management during Construction Phase**

| S. No. | Solid waste                                                                                 | Solid waste Management                                                                                                                                                                                                                                                          |
|--------|---------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Waste materials like MS Rods, bricks, concrete, broken tiles, wood pieces, cement bags etc. | Material would be segregated. Recyclable material will be sold to authorize dealers. Rest will be used within project site for filling & leveling purpose. Remaining will be sent for disposal through government authorized vendors. Cement bags will be used for road making. |
| 2      | Excavated Soil                                                                              | Top soil will be stored in covered areas and will be later used for landscaping purpose. Remaining soil will be used for back filling & leveling of site. Un-used soil will be disposed off to designated side through authorized vendors on payment basis.                     |

Once the Complex is completely occupied the Proposed project at 100% occupancy is expected to generate about 1140 Kg/per day of municipal solid waste.

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| Category                                  | Capacity<br>(Nos.)/Area | Waste<br>Generation<br>(Kg/day/capita)<br>Max <sup>m</sup> . | Waste<br>generated<br>(kg/day)<br>Max <sup>m</sup> . | Bio<br>Degradable<br>Waste<br>(Kg/day/capita)<br>Max <sup>m</sup> . | Bio<br>Degradable,<br>Max <sup>m</sup> . | Non<br>Degradable,<br>Max <sup>m</sup> . |
|-------------------------------------------|-------------------------|--------------------------------------------------------------|------------------------------------------------------|---------------------------------------------------------------------|------------------------------------------|------------------------------------------|
| Patient (650 beds Proposed)               | 650                     | 0.36                                                         | 234                                                  | 0.25                                                                | 163                                      | 72                                       |
| Attendant with Patient                    | 650                     | 0.36                                                         | 234                                                  | 0.25                                                                | 163                                      | 72                                       |
| OPD Visitors                              | 1200                    | 0.36                                                         | 432                                                  | 0.25                                                                | 300                                      | 132                                      |
| Hospital Staff                            | 100                     | 0.36                                                         | 36                                                   | 0.25                                                                | 25                                       | 11                                       |
| Kitchen & Pantry                          | 50                      | 0.45                                                         | 23                                                   | 0.30                                                                | 15                                       | 8                                        |
| Medical College (150 Seats per year)      | 150                     | 0.36                                                         | 54                                                   | 0.25                                                                | 38                                       | 17                                       |
| Medical College Staff                     | 50                      | 0.36                                                         | 18                                                   | 0.25                                                                | 13                                       | 6                                        |
| Residential Quarters                      | 224                     | 0.45                                                         | 101                                                  | 0.36                                                                | 81                                       | 20                                       |
| Greenbelt and Landscape Area/ Development | 14936 Sqm. OR 1.5 Acres | 5 Kg/acres/day                                               | 8                                                    | ---                                                                 | 8                                        | ---                                      |
| Total Municipal waste generation          |                         |                                                              | 1140 Kg/Day                                          |                                                                     | 804 Kg/day                               | 336 Kg/day                               |

### Solid Waste Management during Operational Phase

#### Waste Segregation, Collection & Disposal

1. Different color bins will be provided in each section & floor for collection of different type of waste. Three color bins will be provided in wards (green, red & blue) for collection of food waste, medical waste like bandages, medicine covers, soiled waste etc and sharps separately. Visual message for usage of different bins for different purpose indicating its significance will be placed for awareness in all the sections. In pathology lab, Operation Theater, mortuary, pathology lab, medicine room, plaster room different color bins will be provided for collection of different waste as given below in **Table 8**.

**Table 8: Bio-medical Waste Collection System**

| Color Code | Waste Category                                                                                 | Treatment                                                                       |
|------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Yellow     | Human anatomical waste, animal waste, Micro biology waste & bio-technology waste, soiled waste | Incineration<br>Deep Burial                                                     |
| Red        | Microbiology & Biotechnology waste, soiled waste, solid waste (other than sharp)               | Autoclave<br>Microwaving<br>Chemical treatment                                  |
| Blue/White | Waste Sharp                                                                                    | Autoclave<br>Microwaving<br>Chemical treatment                                  |
| Black      | Discarded medicines & Cytotoxic waste, Chemical waste                                          | Chemically treated<br>Disposal in secured landfill<br>Returning back to vendors |

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2. Waste will be collected at common place regularly from the localized collection points. Food waste, landscape waste & other municipal waste will be handed over to Municipal Corporation. STP sludge will be used as manure for landscape area.
3. Recyclable waste like plastics, paper, Thermacol, glass etc will be collected & sold to authorized vendors.
4. Bio-Medical waste will be collected in Bio-medical waste storage room & will be handed over to authorized vendors for treatment & safe disposal.
5. Trolleys with bins will be provided for transportation of bio-medical waste from generation points to storage points to protect waste handler from direct exposure.
6. E-waste generated will be stored separately & will be sold to authorized vendors periodically

### 1.10 GREEN AREA/LANDSCAPING

Total area measuring **20 %** of the plot area is proposed to be put under green cover. Evergreen trees, ornamental trees & shrubs have been proposed to be planted inside the premises. Proper aftercare and monitoring of developed green belt will be done. Trees to be planted are given in **Table 9**.

**Table 9: Trees to be planted**

| S. No. | Scientific Name           | Family        | Common Name          | Hindi Name |
|--------|---------------------------|---------------|----------------------|------------|
| 1      | <i>Azadirachta indica</i> | Meliaceae     | Indian Lilac         | Neem       |
| 2      | <i>Alstonia scholaris</i> | Apocynaceae   | Blackboard Tree      | Chitvan    |
| 3      | <i>Cocos nucifera</i>     | Arecaceae     | Coconut Palm         | Nariyal    |
| 4      | <i>Cassia fistula</i>     | Fabaceae      | Golden Shower Tree   | Amaltas    |
| 5      | <i>Delonix regia</i>      | Fabaceae      | Royal Poinciana      | Gulmohar   |
| 6      | <i>Ficus benghalensis</i> | Moraceae      | Banyan Fig           | Bargad     |
| 7      | <i>Ficus virens</i>       | Moraceae      | White Fig            | Pakhad     |
| 8      | <i>Ficus racemosa</i>     | Moraceae      | Cluster Fig          | Gular      |
| 9      | <i>Mangifera indica</i>   | Anacardiaceae | Mango Tree           | Aam        |
| 10     | <i>Monoon longifolium</i> | Annonaceae    | False Ashoka         | Ashoka     |
| 11     | <i>Psidium guajava</i>    | Myrtaceae     | Guava Tree           | Amrud      |
| 12     | <i>Saraca asoca</i>       | Fabaceae      | Ashoka Tree (Sacred) | Ashok      |
| 13     | <i>Syzygium cumini</i>    | Myrtaceae     | Java Plum            | Jamun      |
| 14     | <i>Dalbergia sissoo</i>   | Fabaceae      | Indian Rosewood      | Shisham    |
| 15     | <i>Butea monosperma</i>   | Fabaceae      | Flame of the Forest  | Palash     |
| 16     | <i>Terminalia arjuna</i>  | Combretaceae  | Arjun Tree           | Arjun      |
| 17     | <i>Tectona grandis</i>    | Lamiaceae     | Teak                 | Sagwan     |

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### **1.11 MATERIALS USED FOR CONSTRUCTION**

Table 10 below lists the construction material

**Table 10: List of Construction Materials**

| <b>S. No</b> | <b>Type of Construction</b>                                                                                   |
|--------------|---------------------------------------------------------------------------------------------------------------|
| <b>1.</b>    | <b>Walls:</b>                                                                                                 |
| <b>a</b>     | Brick: (Fly-ash bricks-Fal G)                                                                                 |
| <b>b</b>     | Plastered both side - 114 mm                                                                                  |
| <b>c</b>     | Plastered both sides -228 mm                                                                                  |
| <b>d</b>     | Autoclaved Aerated Concrete blocks-230 mm (AAC blocks)                                                        |
| <b>e</b>     | Autoclaved Aerated Concrete blocks-150 mm (AAC blocks)                                                        |
| <b>f</b>     | Tiles or slates on Boarding and felt with plaster ceiling                                                     |
| <b>2.</b>    | <b>Roofs Flat:</b>                                                                                            |
| <b>a</b>     | Reinforced Concrete slab, 120 mm, screed 120 mm= brick coba and thermal insulation layer underneath roof slab |
| <b>3.</b>    | <b>Floors:</b>                                                                                                |
| <b>a</b>     | Concrete on stilt floor hardcore fill                                                                         |
| <b>b</b>     | Vitrified /Ceramic tile finish                                                                                |
| <b>c</b>     | Kota stone /Granite                                                                                           |
| <b>4.</b>    | <b>Windows: Aluminum</b>                                                                                      |
| <b>5.</b>    | Exposure all sides                                                                                            |
| <b>6.</b>    | Single glazing using e-glass                                                                                  |

### **LIST OF MACHINERY USED DURING CONSTRUCTION**

- Dumper
- Concrete mixer with hopper
- Excavator
- Concrete Batching Plant
- Cranes
- Road roller
- Bulldozer
- Tower Cranes
- Hoist
- Labor Lifts
- Concrete pressure pumps
- Mobile transit mixer

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