Planning of School Building-Kadavoor Government VHSS

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Abstract - *The goal of this project is to learn more about campus planning and how to apply planning ideas to it. We will achieve a wonderful outcome in terms of function, economy, and aesthetic value by implementing planning concepts for campus planning. The objective of a master plan or campus plan document is toprovide a foundation for future structures' architectural character, composition, and typology. AutoCAD is the most extensively used CAD software, with over 3 million licences sold globally. With 750 training facilities across the world, AutoCAD is utilised by a wide range of businesses, including architects, project managers, and engineers, among others. It is not difficult to construct an architectural structure without utilising software. In this assignment, we use the AutoCAD software to create a school building Master Plan. Vocational Higher Secondary School, Kadavoor. Our description will include the overallmasterplan design for the building based on the requirements of the relevant authority.*

***Key Words*: Plan, AutoCAD, Aesthetic value**

1. INTRODUCTION

In the process of social transformation, institutions act as a catalyst. Any structure used for school, college, or day-care purposes falls into this category. Drawing allows you to avoid mistakes, calculate the outcome, and complete the task exactly as you wanted. AutoCAD software makes this process a lot easier. The Master Plan is the campus community's physical embodiment of its beliefs. In the construction of a school building, there are specific infrastructure requirements that must be considered before using an alternative material. GVHSS Kadavoor is located in Kadavoor village, Kothamangalam Block, Ernakulam District, Kerala, India.

The school covers a total of 2 acres and 96 cents in size. The current school design is very ancient, and the maintenance work is inadequate. All of the truss works have rusted. Asbestos sheet is used for the roofing. When speaking with school officials, it was discovered that the site was prone to landslides and flooding. As a result, the school was used as a relief camp, and the planning should take this into account as well. The main constraint throughout the design process was that the front section of the site was a public meeting area, therefore it could not be used for building. As a result, proper planning is required.

The school's needs are well known, and planning is carried out in accordance with the building code's criteria. AutoCAD software was used to create the master plan for the school building

Kerala Municipality Building Rules(KMBR)

According to the Kerala Municipality Act, 1994, one of the key obligatory functions of Municipal Corporations (MCs) is to regulate building construction (Act). In exercising the powers provided by the Act, the State Government enacted the Kerala Municipality Building Rules, 1999 (KMBR) for the purpose of planned development of the area concerned as well as the safety and well-being of tenants. The rules were effective on October 1, 1999. Prior to that, the Kerala Building Rules, 1984 audit report (LSGIs) for the year ending 31 March 2007 54 governed the erection of buildings(KBR).

As per the KMBR, no person shall construct/reconstruct any building, make additions/extensions to an existing building, or develop or redevelop any parcel of land in the area concerned without first obtaining an authorization from the MC in order to ensure planned development that takes into account aesthetics, ecology, and pollution constraints.

However, KMBR does not apply to operating government constructions like as railways, national highways and waterways, aerodromes, and so on. Similarly, permits are not required for minor works such as installing and removing partition windows, doors, and ventilators,

painting, tiny repairs, and so on that do not otherwise contravene KMBR requirements. The Standards also establish specialised and distinct parking places, open areas, fire escapes, ventilators, sanitary facilities, front and back yards, and other requirements for each type of structure based on its occupancy.

According to KMBR, educational building comes under Group B occupancy.

1.2 IS: 8827- 1978

The Indian Standards Institution adopted this Indian Standard on February 27, 1978, after the Civil Engineering Division Council approved the draught submitted by the Requirement Specification in Buildings Sectional Committee. The method of giving education grows increasingly involved as a student progresses from preschool to greater tiers. Depending on the level and type of the school, this necessitates the addition of a variety of facilities to the basic class room unit.

In light of the changing educational landscape, it is vital to codify the necessary standards in a national standard. As a result, the standard is meant to establish the minimum standards for school buildings, subject to local constraints. The goal of this standard is to provide requirements for both spatial and scientific development of the basic classroom and linked spaces, rather than to provide architectural solutions for educational facilities.

Objectives

- To develop a plan and estimate for the Kadavoor Vocational Higher Secondary School in Paingottoor Grama Panchayat.
- To thoroughly examine the school's current shortcomings as well as the school's management's requirements for facilities.
- To construct the school building in a sustainable manner that does not result in significant environmental damage
- To prepare the school's Master Plan in accordance with the Kerala Municipal Building Rule and the International Standard Code.

2. LITERATURE REVIEW

a. Dinesh Ranjan S , Aiswarya Lakshmi IDL, Vol 1 Issue 2, March 2017 : An Institutional Building's Design is performed.Drawing of the planned building layout in AUTOCAD and the planning is carried out in accordance with the provisions of the IS Code.

b. Akshay Chaudhary, Payal Sachdeva, Maninderpal Singh, IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE): Design of Reinforced Building: A Case Study. The plane shape should be basic, with a length-to-width ratio of no more than 1. Along each major axis, the building construction should be as symmetrical as possible.

c. Anoop C K, Nihal Noom,Maria James, Princy N Paul,R Harikrishnan , IRJET Volume: 05 Issue: 04 April-2018: Technological and green solution for rural house construction- A review. Every component should be planned ahead of time, and the design process should be rationalised. Material waste due to unanticipated demolition is reduced by planning each and every component.

3. SITE VISIT

The location was visited, and the current school building's condition was assessed.

Cracked building blocks:

Fig -1 Crack

The existing school building was in really poor condition. The majority of the structure was cracked. The construction isn't designed to take a lot of weight. As a result, there was no choice for rehabilitation.

Corroded truss work: Steel corrosion in reinforced concrete structures causes reinforcement area loss and concrete degradation in the surrounding area. Increases in deflections, fracture widths, and stresses, as well as a reduction in bearing capacity, may occur as a result, depending on the structural design and redundancy.

Fig -2 Corroded roof

Unhygienic Conditions: The school's toilet and wash room was found to be filthy. The wash region was discovered to be quite slippery.

Fig 3 Toilet

Fig 4 Wash area

4. SANITATION

Sanitation facilities

Occupancy	Built-up area in sq. metres/person
Group B	5.9

Table 1: Sanitation facilities calculation

Sanitation Requirements

SI NO	Fitments	Sanitation Requirements
1	Water Closet	1 per every 40 boys and 1 per every 25 girls
2	Urinals	1 per every 50 boys
3	Wash Basin	1 per every 40 boys and 1 per every 40 girls

Table 2: Sanitation requirements [Source: KMBR 2019]

- **Ground Floor :**

Built up area =1609.17 m2

Occupancy load =built up area/5.9

= 1609.17/5.9
=273

Number of boys =273 x (2/3)
= 182

Number of girls =273 x (1/3)
= 91

Number of water closet for boys=182/140
= 4 nos

Number of water closet for girls
= 91/25
= 4nos

Number of urinals
= 182/50
=4 nos

- **First Floor :**

Built up area = 1499.62 m2

Occupancy load =built u area/5.9
= 1499.62/5.9
=254

Number of boys =254x(2/3)
= 169

Number of girl =254x(1/3)
=85

Number of water closet for boys
=169/40
=4nos

Number of water closet for girls
=85/25
=4nos

Number of urinals =169/50
=4nos

❖ **Second Floor:**

Built up area = 1609.17 m2
Occupancy load =built up area/5.9
=1609.17 /5.9
= 273
Number of boys =273x(2/3)
= 182
Number of girls =273x(1/3)
=91
Number of water closet for boys =182/40
=4nos

Number of water closet for girls=91/25 =4nos

Number of urinals =182/50 =4

4.3 Sanitation requirements for each floor:

Sl No.	Floor Name	Boys Water Closet		Boys Urinal		Girls Water Closet	
		Required	Provided	Required	Provided	Required	Provided
1.	Ground Floor	4	4	4	4	4	6
2.	First Floor	4	4	4	7	4	9
3.	Second Floor	4	4	4	8	4	9

Table 3: Sanitation requirements for each floor

5. EXIT WIDTH

No. of Occupants per unit exitwidth of Stairway	No. of Occupants per unit exitwidth of Doors
25	75

Table 4: Occupants per unit exit width

- **First floor**

Total built up area =1499.62 m2

Number of occupants=1499.62/4=374

Number of occupants per unit exit width (50 cm) of stair =25 Required exit width for stairs=7.48m

Hence provided 4 flight each of 2m width

- **Second floor**

Total built up area =1609.17 m2

Number of occupants= 1609.17 /4=402

Number of occupants per unit exit width of stair width (50 cm) =25 Required exit width for stairs =8m

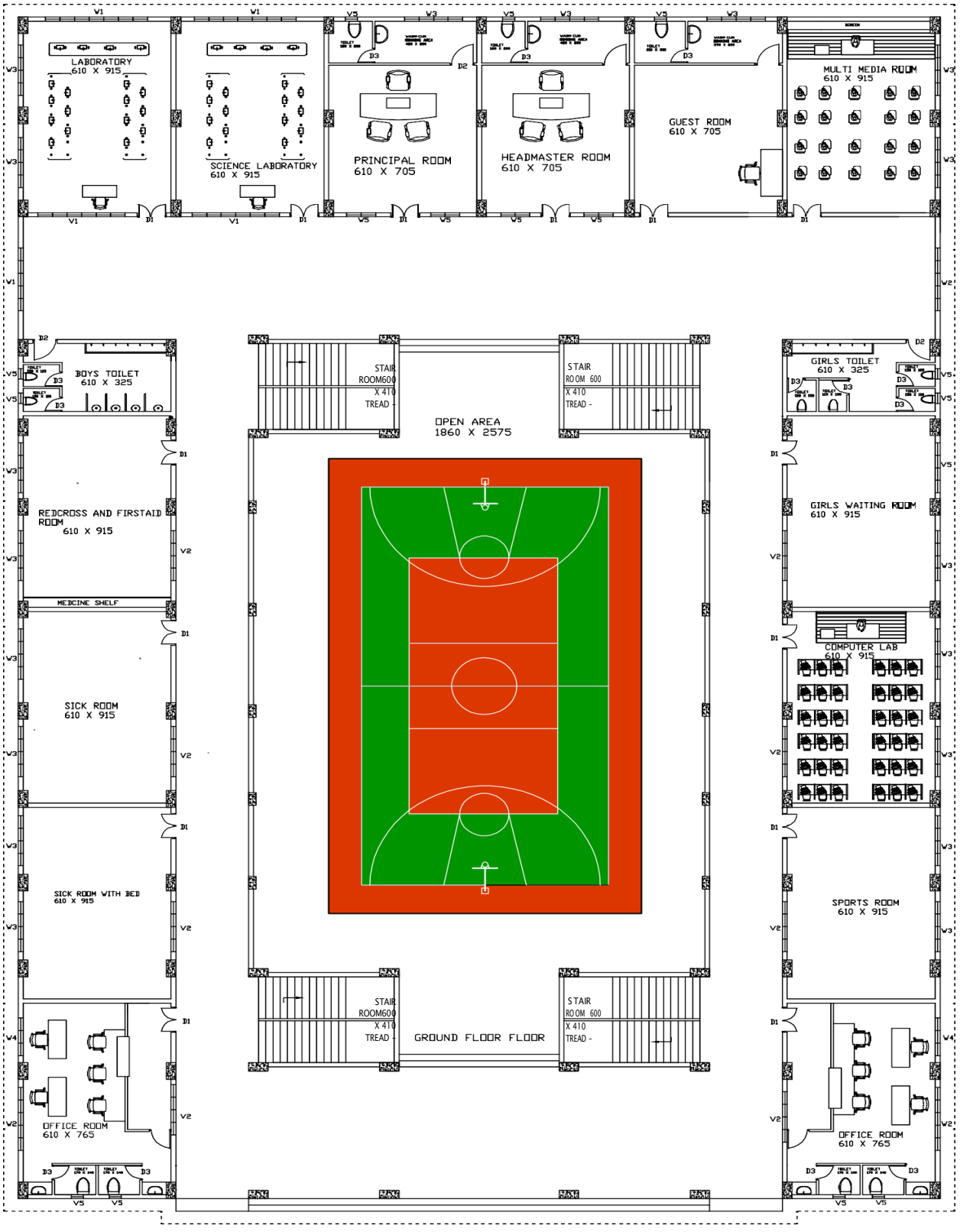
Hence provided 4 flight each of 2m width

Floor space index (F.S.I.) means the quotient obtained by dividing the total built up area by the area of the plot (This word is synonymous with FAR)

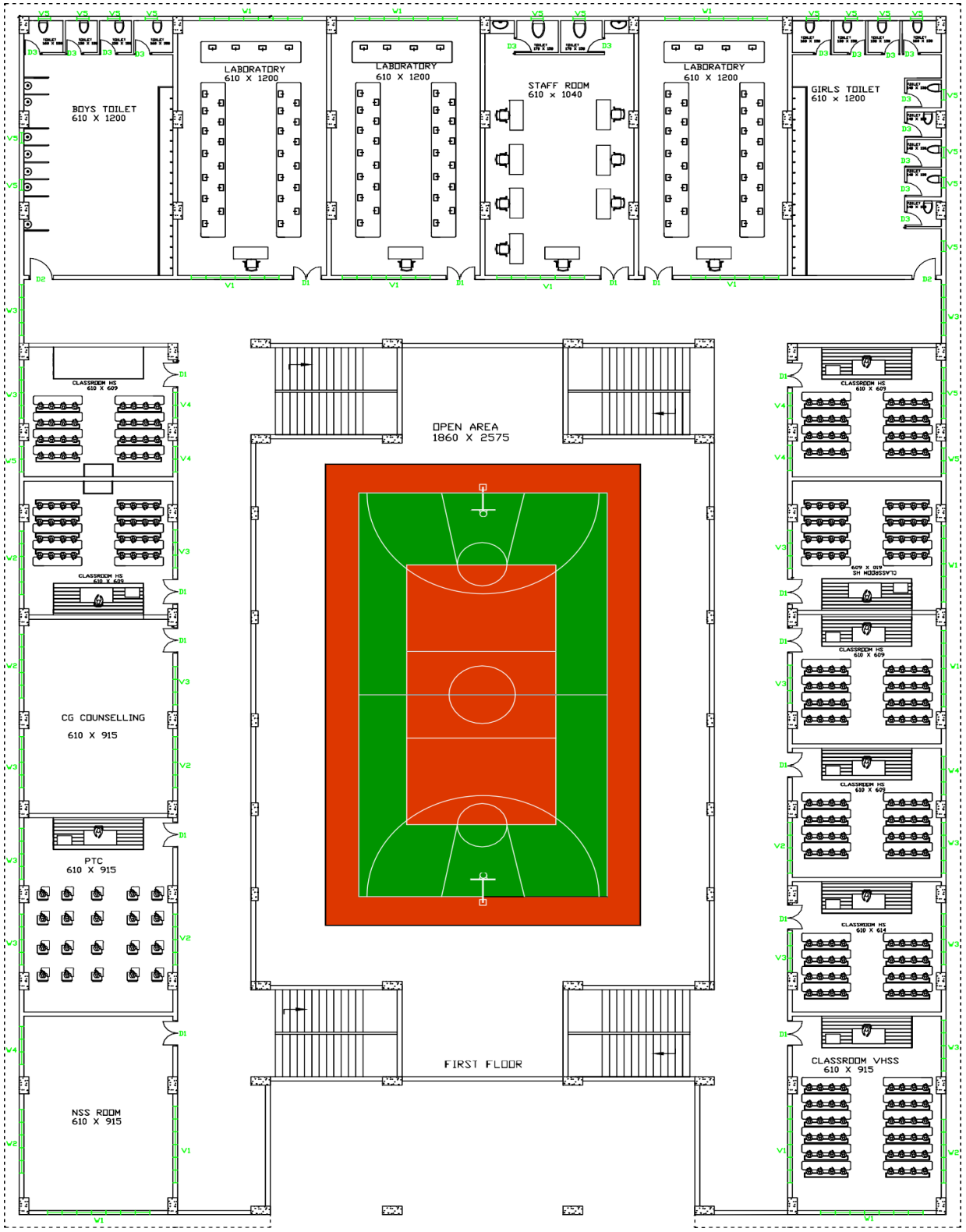
F.S.I. = Total built-up area/Plot area
= 4816.36/11987.3552
=0.4<2.5 [KMBR 2019]

6. PLAN

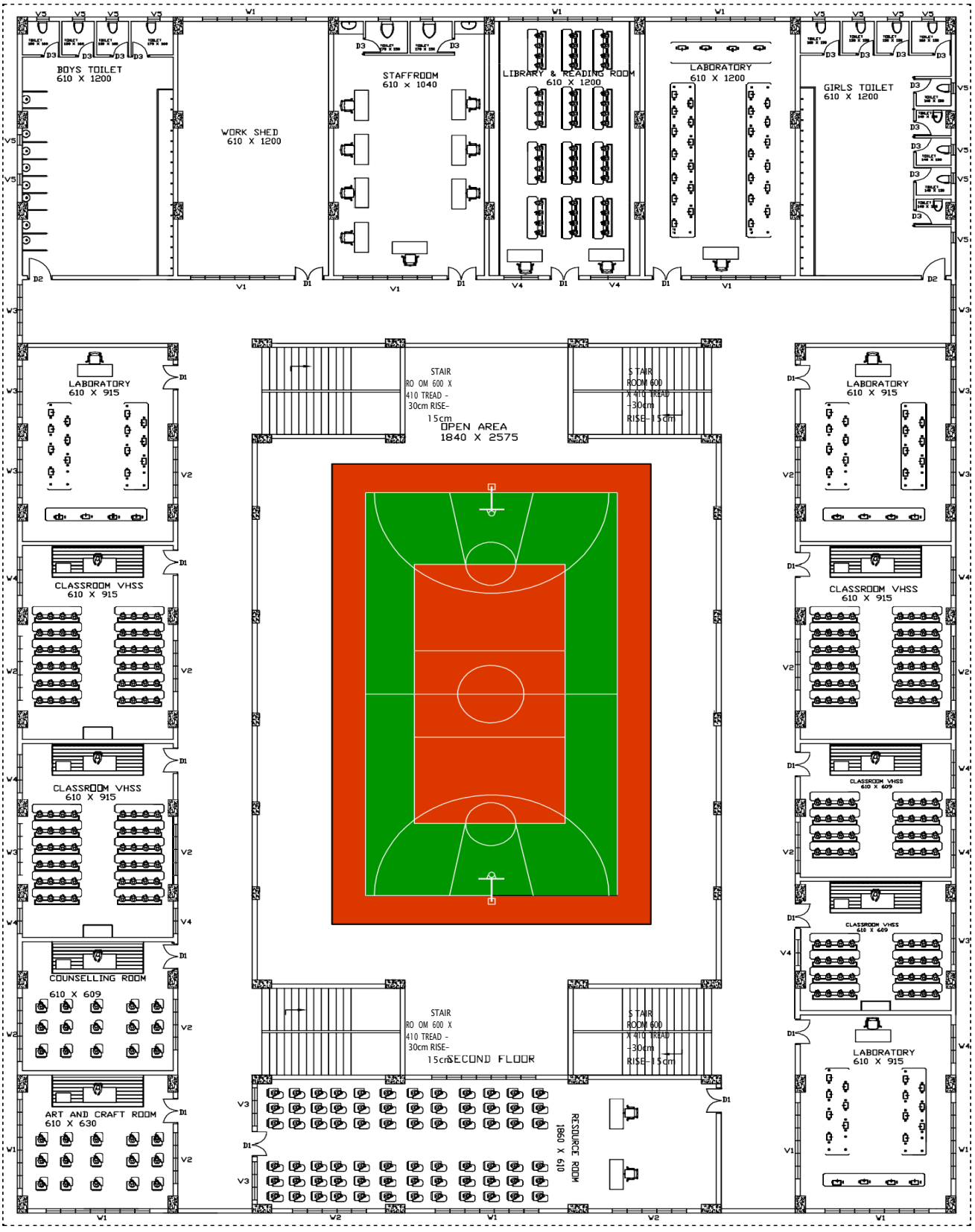
Ground Floor



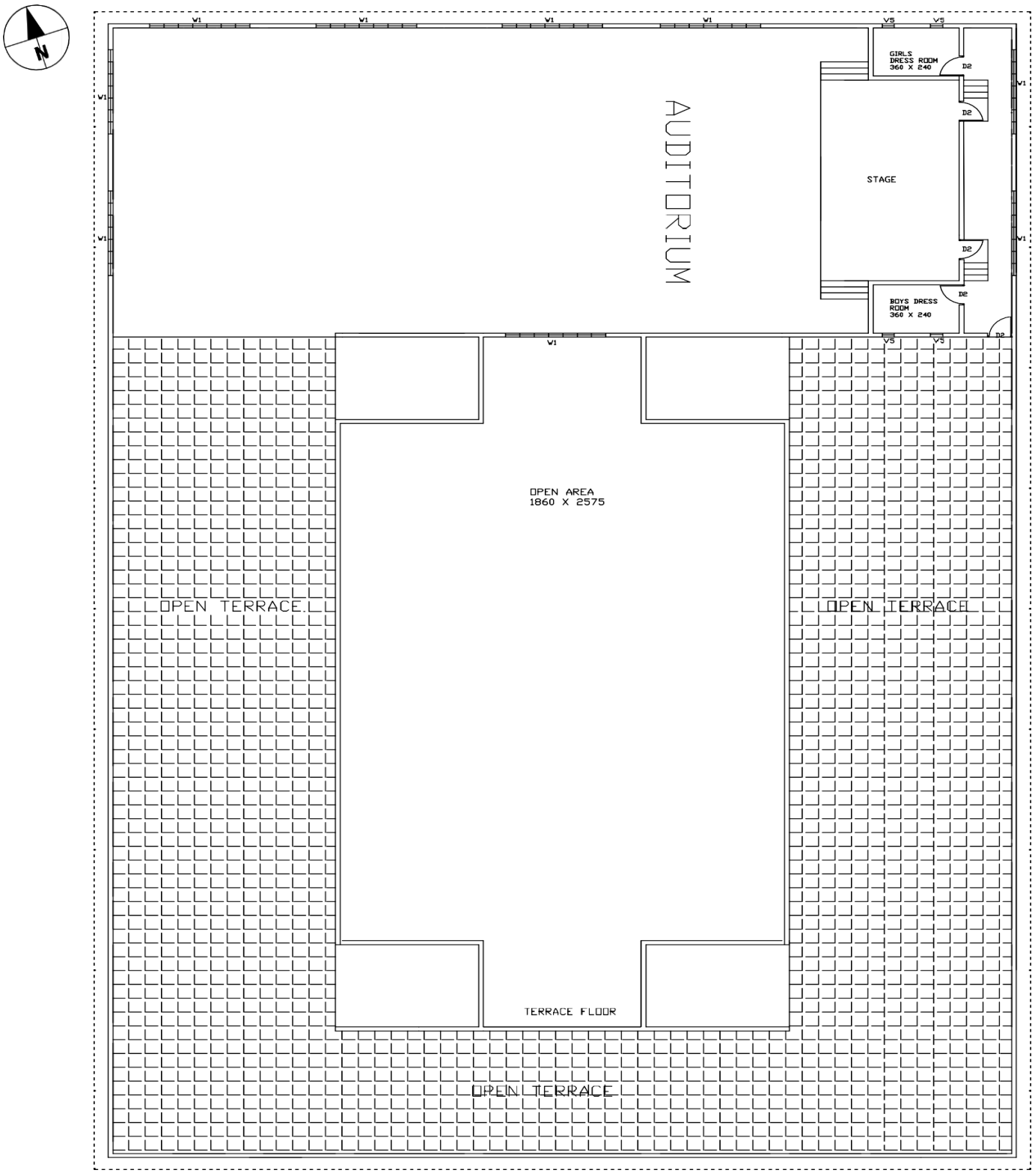
First Floor


BOYS TOILET
610 X 1200
LABORATORY
610 X 1200
LABORATORY
610 X 1200
STAFF ROOM
610 x 1040
LABORATORY
610 X 1200
GIRLS TOILET
610 x 1200
OPEN AREA
1860 X 2575
CG COUNSELLING
610 X 915
PTC
610 X 915
NSS ROOM
610 X 915
FIRST FLOOR
CLASSROOM VHSS
610 X 915

Second Floor



Terrace Floor



7. CONCLUSION

The school's construction plan was created in accordance with KMBR 2019 and IS 8827. The proposed building had a total size of 4816.36 m^2, with a total of 13 classrooms, laboratories, and a library. Proper ventilation and occupant comfort are well-served by the proposed plan. A total of 450 students may be seated in the classrooms.

As a result, the decision was made to transform the current VHSE building into a kitchen and dining hall. While communicating with school officials, it was discovered that the site was prone to landslides and flooding. Due to this reason, the school was also used as a relief camp. To meet this need, numerous additional rooms were built with the capability of being converted to a classroom at any moment. Our proposed concept meets all of the requirements and addresses all of the issues with the current structure.

8. REFERENCES

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[3].Design and Estimation of Reinforced Building: A Case Study Akshay Chaudhary1, Payal Sachdeva, Maninderpal Singh IOSR Journal of Mechanical and Civil Engineering (IOSR- JMCE).

[4].IS8827-1978