CONSTRUCTION TECHNOLOGY AND MANAGEMENT CE 308

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PREFACE

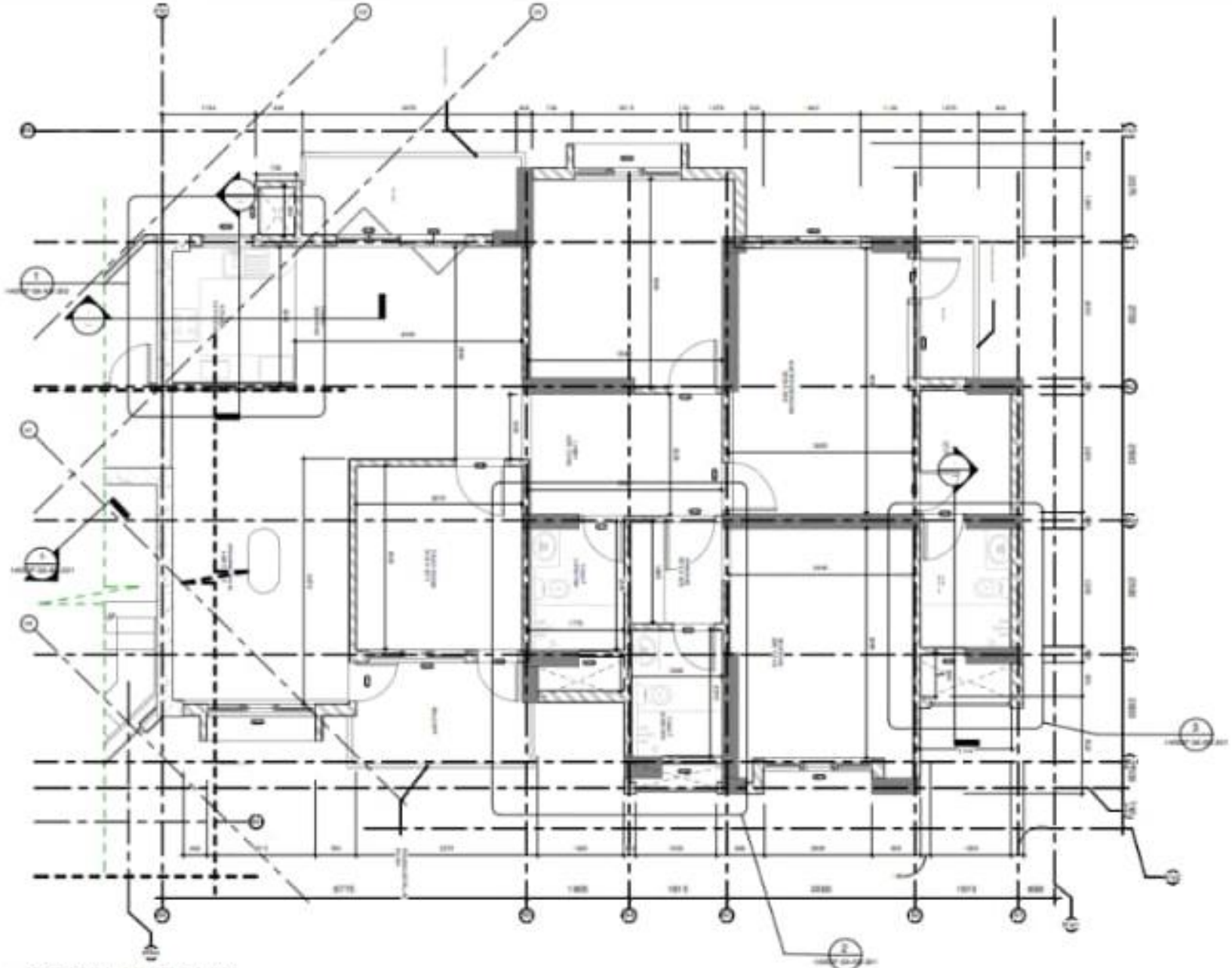
This project serves as an introductory gateway into the realm of construction technology and management, a domain where creativity meets functionality, and where meticulous planning intertwines with practical execution. The landscape of construction technology and management is ever-evolving, driven by advancements in materials, techniques, and methodologies.

Within these pages, readers will embark on a voyage through the various facts of construction, delving into topics such as project planning, scheduling, cost estimation, budgeting, construction methods

Moreover, this preface recognizes the pivotal role played by practitioners, educators, researchers, and industry professionals in advancing the frontiers of construction technology and management. Their expertise, insights, and contributions are invaluable in driving innovation, fostering excellence, and nurturing the next generation of talent in this field.

Cost Estimation of Faculty Residence (F-Type)

AA ELEVATION AA
1 : 100



1 TYPICAL UNIT PLAN
1 : 50

DATE	REV	REV. BY	DESCRIPTION	DATE	ROS	ISSUED TO

ARCHITECT
SURESH GOEL & ASSOCIATES
ARCHITECTS . ENGINEERS . PLANNERS

DWG ISSUED 27/07/14 AT : NEW DELHI

Name: SKU	Name: SKG	Name	PROJECT CODE: 14002
Originated by Architect	Checked by Architect	Validated by Architect	BUILDING CODE: 14002 - F

PROJECT
ST GUWAHATI TYPE - F HOUSING

C-85, SHIVALIK
NEW DELHI-110017
TEL:011-26676254,41034456
MAIL:mail@hgadesignlab.com

Ar. Sandeep Goel
GOEL ARCHITECT

"WORKING DRAWING"

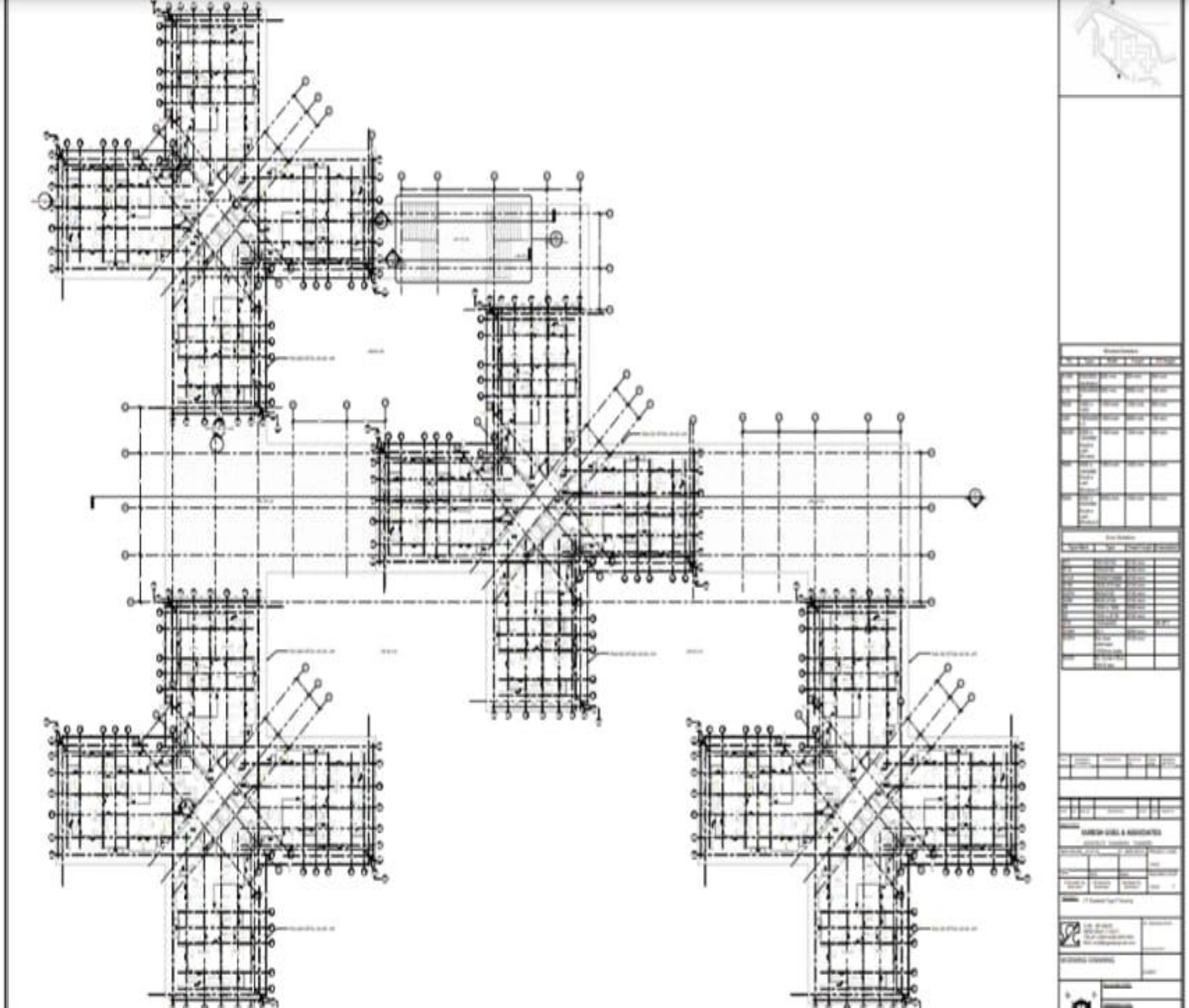
CLIENT:

BUILDING TYPE:

DRAWING TITLE:
TYPICAL UNIT PLAN

DRAWING NUMBER:
14002F-SK-AP1

SCALE : 1 : 50 | SHEET SIZE : A2 | SHEET NO.:

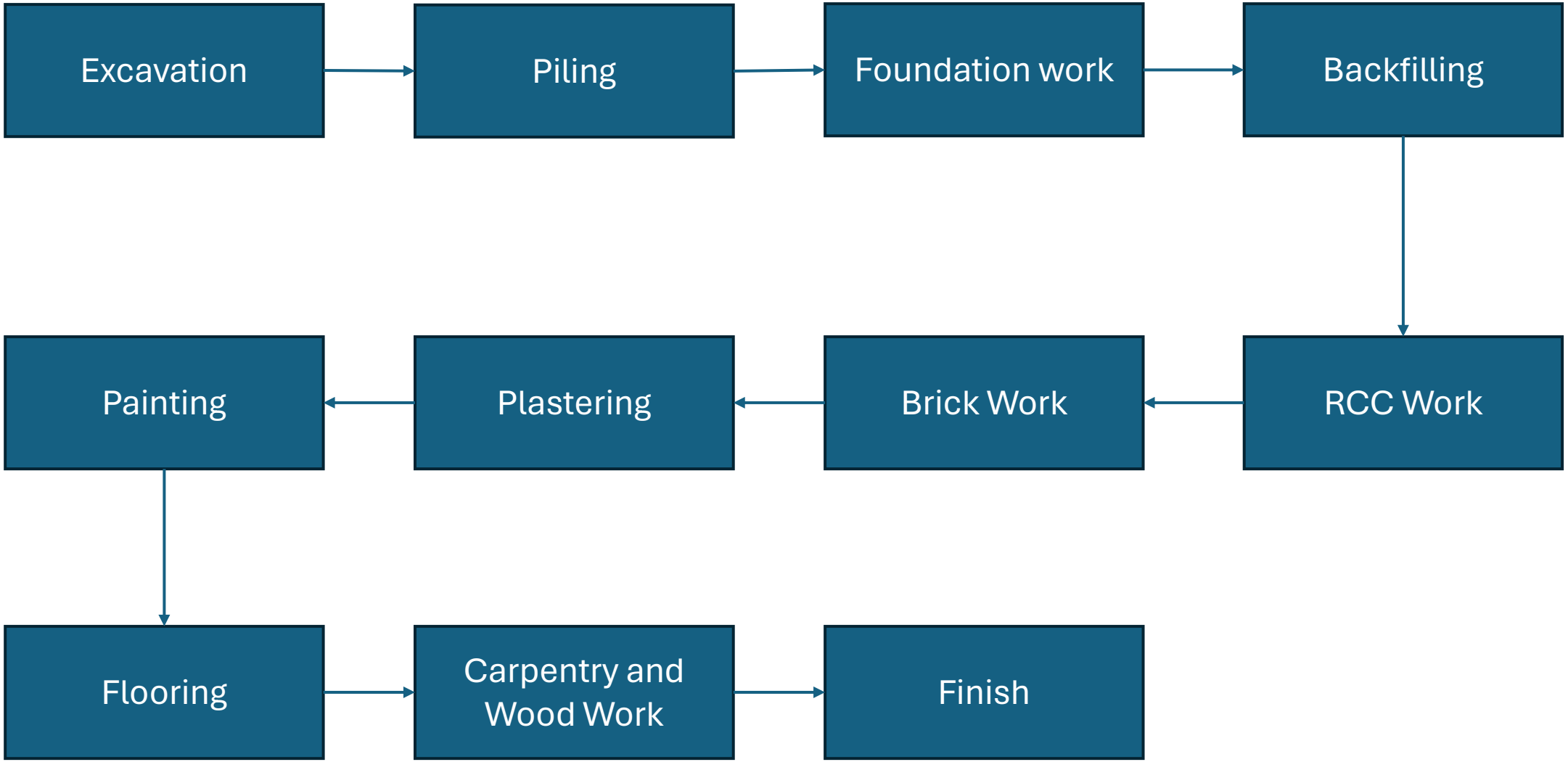


Activity Involved in Construction

- Excavation
- Pilling
- Foundation Work
- Backfilling
- RCC Work
- Brick Work
- Plastering
- Painting

Flooring

Carpentry and Glass work


Excavation
Piling
Foundation work
Backfilling
RCC Work
Brick Work
Plastering
Painting
Flooring
Carpentry and Wood Work
Finish

Duration and Cost Estimation of Activities

=> Excavation (Soft Soil)

Area = 1000m^2

Depth of excavation =1.5m

-Resources required

1. Mazdoor-750 (Rs. 645/day)
2. Mason-75 (Rs. 749/day)

-Cost estimation and Resource Planning

Total Duration=25 Days (3Mason and 30 Mazdoor per day)

Total cost of activity(Labour)=Rs. 4,28,000

=>**Piling**

600 mm. Diameter

26 m. Depth

volume= 36.75 m^3

-Resources required

Steel cost= Rs 8,66,000

1. Mazdoor-20 (Rs. 645/day)
2. Mason-2 (Rs. 749/day)

-Cost estimation and Resource Planning

Total Duration=2 Days (1Mason and 10 Mazdoor per day)

Total cost of activity(Labour)=Rs. 11,400

=>Pile Cap

0.6 m , 610m^3

Total volume (pile cap + piling)= 647m^3

-Resources required

Steel cost= Rs 62,25,000

1. Mazdoor-1294 (Rs. 645/day)
2. Mason-110 (Rs. 749/day)
3. Bhisti-583 (Rs. 714/day)
4. Mixer-46 (Rs. 784/day)

-Cost estimation and Resource Planning

Total Duration=22 Days (5Mason, 59Mazdoor, 27Bhisti, 2Mixer per day)

Total cost of activity(Labour)=Rs. 13,70,000

-Material Cost

1:2:4(Ratio of Mixture)

Cement=92.4m^3=>Rs. 4,10,000

Coarse=370m^3=> Rs. 5,18,000

Sand=185m^3=> Rs.2,77,500

Total cost of Material=Rs. 12,05,500

-Transportation Cost

Total=> Rs 1,38,000

=>**Backfilling and Ramming**

Volume of Fill= 1485 m^3

-Resources required

1. Mazdoor-223 (Rs. 645/day)
2. Mason-18 (Rs. 749/day)

-Cost estimation and Resource Planning

Total Duration=9Days (2Mason and 25 Mazdoor per day)

Total cost of activity(Labour)=Rs. 1,57,500

=>RCC

Volume= 2041m^3

-Resources required

1. Mazdoor-4082 (Rs. 645/day)

2. Mason-350 (Rs. 749/day)

3. Bhisti-1837 (Rs. 714/day)

4.Mixer-143 (Rs. 784/day)

-Cost estimation and Resource Planning

Total Duration=70 Days (5Mason, 60Mazdoor, 27Bhisti, 2Mixer per day)

Total cost of activity(Labour)=Rs. 44,30,370

-Plants and Machine

Concrete Mixer-143(Rs. 500/day)

Needle Vibrator-143(Rs. 350/day)

Total Cost=Rs.1,64,500

-Material Cost

1:2:4(Ratio of Mixture)

Cement=292m^3=>Rs. 12,90,000

Aggregate=1170m^3=> Rs. 3,95,000(Fine)+Rs. 12,28,500(Coarse)=Rs. 16,23,375

Sand=585m^3=> Rs.8,77,500

Total cost of Material=Rs. 12,05,500

-Transportation Cost

Total=> Rs3 ,25,500

=>Brick Work

-Resources required

1. Mazdoor-2250 (Rs. 645/day)
2. Mason-750 (Rs. 749/day)
3. Bhisti-300 (Rs. 714/day)

-Cost estimation and Resource Planning

Total Duration=75 Days (10Mason, 30Mazdoor, 4Bhisti per day)

Total cost of activity(Labour)=Rs. 24,41,500

-Cement Mixing

Mazdoor-210 (Rs. 645/day)

Bhisti-20 (Rs.714/day)

=>Total Duration =21 Days(10 Mazdoor and 1 Bhisti)

=>Total Cost(Labour)=Rs. 1,49,730

-Material Cost

1:2:4(Ratio of Mixture)

Cement=>Rs. 2,07,500

Aggregate=> Rs. 3,50,000

Brick =>Rs.28,00,000

Total cost of Material=Rs. 33,57,500

-Transportation Cost

Total=> Rs. 3,11,000

=>Steel Cost

Volume of steel in Column=15.2 m^3 (Rs. 75/kg)

Volume of steel in Beam=0.48 m^3 (Rs. 75/kg)

Volume of steel in Slab=214.5 m^3 (Rs. 65/kg)

Total Cost of Steel=Rs. 92,81,000(Column and Beam)+Rs. 10,95,00,000(Slab)= Rs. 11,87,81,000

=>Plastering

6400 m^2 area(Interior), 6400 m^2 area(Exterior) and 10725 m^2 area(Ceiling)

=>Cost(Interior)

Total Duration=60 Days

1. Mason=1370(Rs. 749/Day)=> Rs. 10,27,000
2. Mazdoor=1713(Rs. 645/Day)=> Rs. 11,04,000
3. Bhisti=1713(Rs. 714/Day)=> Rs.12, 23,000

Total Cost(Labour)=> Rs. 33,54,000

=>Cost(Exterior)

Total Duration=30 Days

1. Mason=334(Rs. 749/Day)=> Rs. 2,88,000
2. Mazdoor=640(Rs. 645/Day)=> Rs. 4,13,000
3. Bhisti=640(Rs. 714/Day)=> Rs.4,57,000

Total Cost(Labour)=> Rs. 11,58,000

⇒ Cement cost=Rs. 8,47,000

⇒ Transportation Cost= Rs. 25,000

⇒ **Flooring**

Total Area =9750 m^2

Total Volume=780 m^3

Mason-172(Rs. 749/day)=> Rs.1,29,000

Bhisti-78(Rs. 714/day)=> Rs.56,000

Mazdoor-172(Rs. 645/day)=>Rs. 1,11,000

⇒ **Cutting, Grinding and Polishing**

Mazdoor-390(Rs. 645/day)=>Rs. 2,51,000

Machine-312(Rs.1000/day)=>3,12,000

=>Tile and Material Cost

Cost per sq. feet(Tile)=Rs. 250

Total Cost(Tile)=Rs.2,63,00,000

Cost of Cement=Rs.5,60,000

=> Transportation Cost= Rs. 16,000

⇒ **Whitewashing**

No. of Lime coat=3

Total duration=15 days

Washer=472=Rs. 3,52,000

Mazdoor= 236=Rs. 1,53,000

No. of Colour coat=2

Total duration=30 days

Washer=708=Rs. 5,28,000

Mazdoor= 236=Rs. 1,53,000

No. of Distemper=3

Total duration=30 days

Painter=1888=Rs. 14,06,500

Mazdoor= 944=Rs. 6,08,800

Thickness of 1 Coat=0.00015m.

Total Surface Area=23,600 m^2.

⇒ Material Cost

Whitewashing=Rs. 22,65,600(Rs. 32/m^2)

Distemper=Rs. 42,48,000(Rs. 60/m^2)

Colourwash=Rs. 28,32,000(Rs. 60/m^2)

=>Carpentry

Door Area=1190 m^2

Total Volume of Door=60m^3

1. Carpenter=1200(Rs. 1200/day)=>Rs. 14,40,000
2. Mazdoor=120(Rs. 645/day)=>Rs. 77,400

Resource Planning=> 30 days and (4 Mazdoor and 40 Carpenter per day)

-Material Cost(Door and Chaukat)=> Rs. 17,85,000

Window Area=940 m^2

1. Carpenter=846(Rs. 1200/day)=>Rs. 10,15,200
2. Mazdoor=94(Rs. 645/day)=>Rs. 60,630

Resource Planning=> 30 days and (3 Mazdoor and 28 Carpenter per day)

-Material Cost=> Rs. 2,11,500

=>Glass Work

Area=800 m^2

1. Glazier=188(Rs. 2000/day)=>Rs. 3,76,000
2. Mazdoor=10(Rs. 645/day)=>Rs. 6,450

Resource Planning=> 10 days and (1 Mazdoor and 19 Glazier per day)

- Material cost

Glass Cost=Rs. 4,80,000(Rs. 600/m^2)

Project1 - Project Professional

GANTT CHART TOOLS

FILE | TASK | RESOURCE | REPORT | PROJECT | VIEW | FORMAT

Sign in

Team Planner (View) | Assign Resources | Resource Pool (Assignments) | Add Resources (Insert) | Information | Notes | Details (Properties) | Level Selection | Level Resource | Level All | Leveling Options | Clear Leveling | Next Overallocation (Level)

TIMELINE

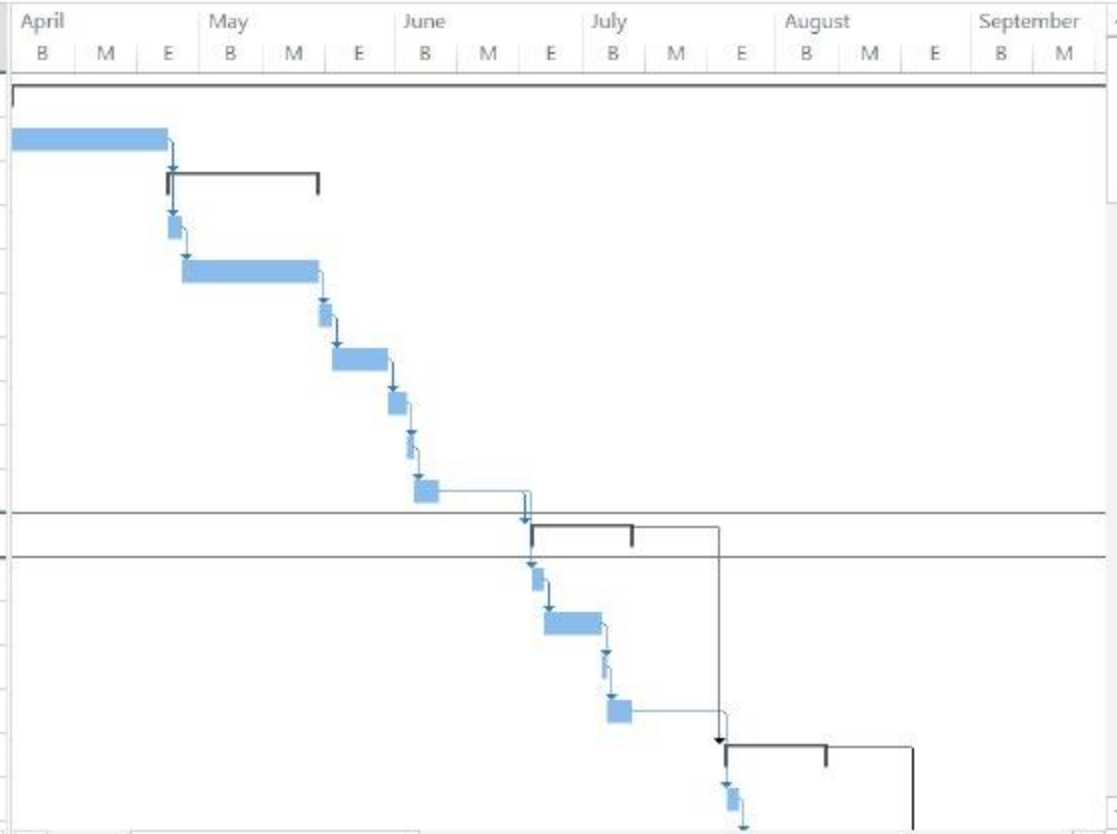
Mon 01-04-24 | Today | Mon 23-09-24

2nd Quarter | 3rd Quarter | 4th Quarter | 1st Quarter | 2nd Quarter | 3rd Quarter

Start Mon 01-04-24 — Add tasks with dates to the timeline — Finish Sat 13-09-25

GANTT CHART

		Task Mode	Task Name	Duration	Start	Finish	Predecessors
1			**Building Estimation**	**531 days**	**Mon 01-04-24**	**Sat 13-09-25**	
2			Excavation	25 days	Mon 01-04-24	Thu 25-04-24	
3			**Pilling Work**	**24 days**	**Fri 26-04-24**	**Sun 19-05-24**	**2**
4			Pilling	2 days	Fri 26-04-24	Sat 27-04-24	2
5			Pile Cap	22 days	Sun 28-04-24	Sun 19-05-24	4
6			Column	2 days	Mon 20-05-24	Tue 21-05-24	5
7			Backfill	9 days	Wed 22-05-24	Thu 30-05-24	6
8			Foundation	3 days	Fri 31-05-24	Sun 02-06-24	7
9			Beam	1 day	Mon 03-06-24	Mon 03-06-24	8
10			Slab	4 days	Tue 04-06-24	Fri 07-06-24	9
11			**1st floor**	**16 days**	**Sun 23-06-24**	**Mon 08-07-24**	**10**
12			Column	2 days	Sun 23-06-24	Mon 24-06-24	10FS+15 days
13			Brickwork	9 days	Tue 25-06-24	Wed 03-07-24	12
14			Beam	1 day	Thu 04-07-24	Thu 04-07-24	13
15			Slab	4 days	Fri 05-07-24	Mon 08-07-24	14
16			**2nd floor**	**16 days**	**Wed 24-07-24**	**Thu 08-08-24**	**11FS+15 days**
17			Column	2 days	Wed 24-07-24	Thu 25-07-24	15FS+15 days



READY | NEW TASKS : MANUALLY SCHEDULED

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Project1 - Project Professional

GANTT CHART TOOLS FORMAT

FILE | TASK | RESOURCE | REPORT | PROJECT | VIEW

Team Planner (View) | Assign Resources | Resource Pool (Assignments) | Add Resources (Insert) | Information | Notes | Details (Properties) | Level Selection | Level Resource | Level All | Leveling Options | Clear Leveling | Next Overallocation (Level)

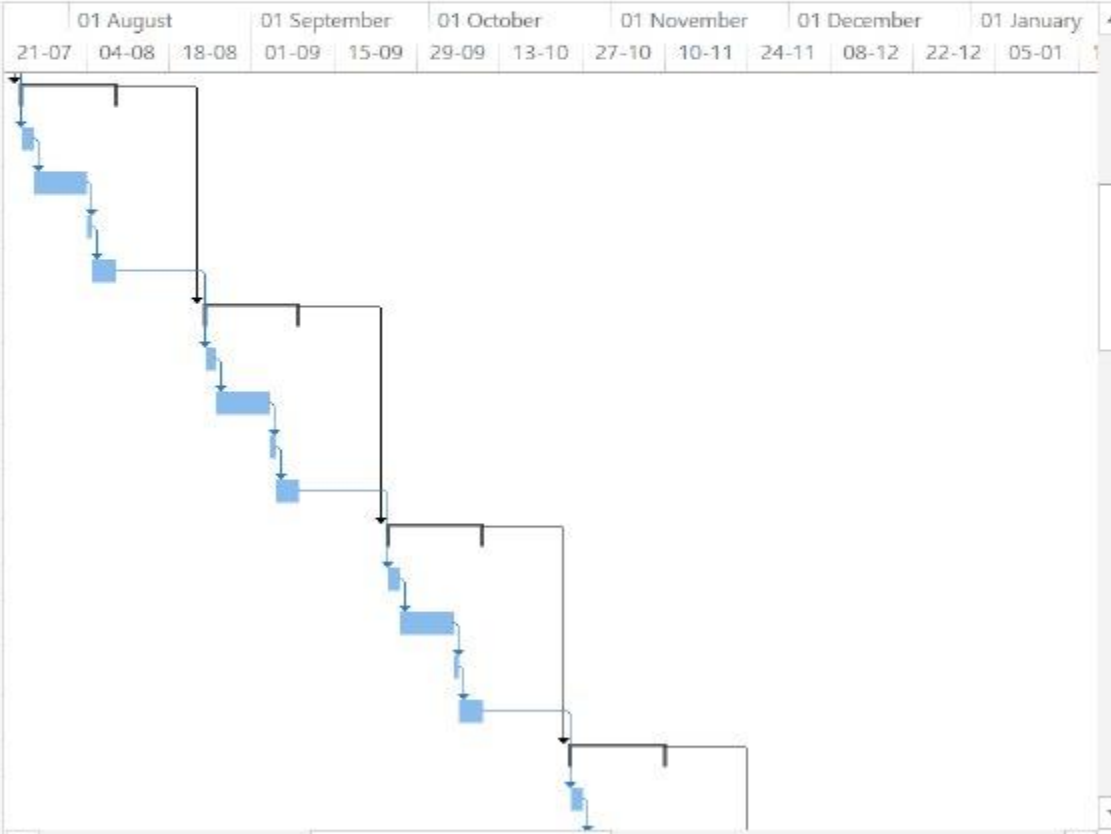
TIMELINE

Today | Sun 21-07-24 | Wed 22-01-25 | 2nd Quarter | 3rd Quarter | 4th Quarter | 1st Quarter | 2nd Quarter | 3rd Quarter

Start Mon 01-04-24 — Add tasks with dates to the timeline — Finish Sat 13-09-25

GANTT CHART

	Task Mode	Task Name	Duration	Start	Finish	Predecessors
16		**2nd floor**	**16 days**	**Wed 24-07-24**	**Thu 08-08-24**	**11FS+15 days**
17		Column	2 days	Wed 24-07-24	Thu 25-07-24	15FS+15 days
18		Brickwork	9 days	Fri 26-07-24	Sat 03-08-24	17
19		Beam	1 day	Sun 04-08-24	Sun 04-08-24	18
20		Slab	4 days	Mon 05-08-24	Thu 08-08-24	19
21		**3rd floor**	**16 days**	**Sat 24-08-24**	**Sun 08-09-24**	**16FS+15 days**
22		Column	2 days	Sat 24-08-24	Sun 25-08-24	20FS+15 days
23		Brickwork	9 days	Mon 26-08-24	Tue 03-09-24	22
24		Beam	1 day	Wed 04-09-24	Wed 04-09-24	23
25		Slab	4 days	Thu 05-09-24	Sun 08-09-24	24
26		**4th floor**	**16 days**	**Tue 24-09-24**	**Wed 09-10-24**	**21FS+15 days**
27		Column	2 days	Tue 24-09-24	Wed 25-09-24	25FS+15 days
28		Brickwork	9 days	Thu 26-09-24	Fri 04-10-24	27
29		Beam	1 day	Sat 05-10-24	Sat 05-10-24	28
30		Slab	4 days	Sun 06-10-24	Wed 09-10-24	29
31		**5th floor**	**16 days**	**Fri 25-10-24**	**Sat 09-11-24**	**26FS+15 days**
32		Column	2 days	Fri 25-10-24	Sat 26-10-24	30FS+15 days



READY | NEW TASKS : MANUALLY SCHEDULED

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Project1 - Project Professional

FILE | TASK | RESOURCE | REPORT | PROJECT | VIEW | TIMELINE TOOLS FORMAT

Team Planner (View) | Assign Resources | Resource Pool (Assignments) | Add Resources (Insert) | Information | Notes | Details (Properties) | Level Selection | Level Resource | Level All | Leveling Options | Clear Leveling | Next Overallocation (Level)

TIMELINE

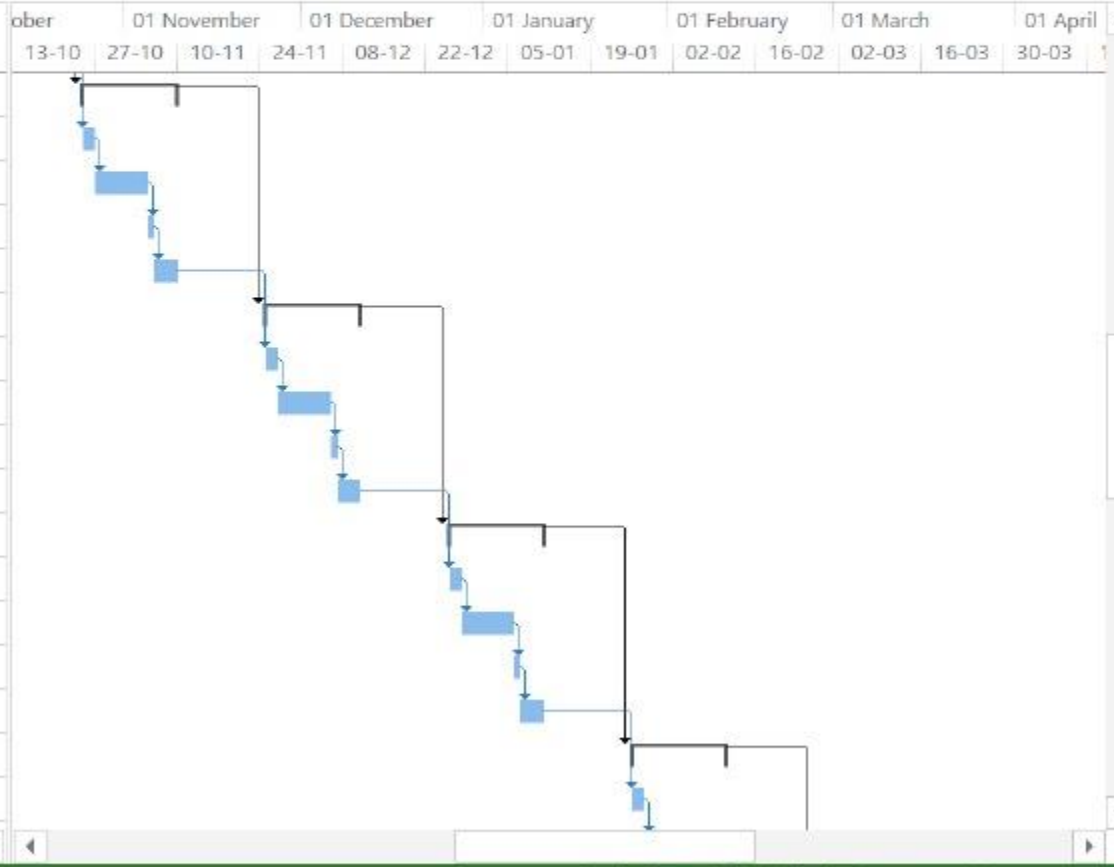
Today | Sun 13-10-24 | Wed 16-04-25

2nd Quarter | 3rd Quarter | 4th Quarter | 1st Quarter | 2nd Quarter | 3rd Quarter

Start Mon 01-04-24 — Add tasks with dates to the timeline — Finish Sat 13-09-25

GANTT CHART

	Task Mode	Task Name	Duration	Start	Finish	Predecessors
31		**5th floor**	**16 days**	**Fri 25-10-24**	**Sat 09-11-24**	**26FS+15 days**
32		Column	2 days	Fri 25-10-24	Sat 26-10-24	30FS+15 days
33		Brickwork	9 days	Sun 27-10-24	Mon 04-11-24	32
34		Beam	1 day	Tue 05-11-24	Tue 05-11-24	33
35		Slab	4 days	Wed 06-11-24	Sat 09-11-24	34
36		**6th floor**	**16 days**	**Mon 25-11-24**	**Tue 10-12-24**	**31FS+15 days**
37		Column	2 days	Mon 25-11-24	Tue 26-11-24	35FS+15 days
38		Brickwork	9 days	Wed 27-11-24	Thu 05-12-24	37
39		Beam	1 day	Fri 06-12-24	Fri 06-12-24	38
40		Slab	4 days	Sat 07-12-24	Tue 10-12-24	39
41		**7th floor**	**16 days**	**Thu 26-12-24**	**Fri 10-01-25**	**36FS+15 days**
42		Column	2 days	Thu 26-12-24	Fri 27-12-24	40FS+15 days
43		Brickwork	9 days	Sat 28-12-24	Sun 05-01-25	42
44		Beam	1 day	Mon 06-01-25	Mon 06-01-25	43
45		Slab	4 days	Tue 07-01-25	Fri 10-01-25	44
46		**8th floor**	**16 days**	**Sun 26-01-25**	**Mon 10-02-25**	**41FS+15 days**
47		Column	2 days	Sun 26-01-25	Mon 27-01-25	45FS+15 days



READY | NEW TASKS : MANUALLY SCHEDULED

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Project1 - Project Professional

GANTT CHART TOOLS

FILE | TASK | RESOURCE | REPORT | PROJECT | VIEW | FORMAT

Sign in

Team Planner | Assign Resources | Resource Pool | Add Resources | Information | Notes | Details | Level Selection | Level Resource | Level All | Leveling Options | Clear Leveling | Next Overallocation

View | Assignments | Insert | Properties | Level

TIMELINE

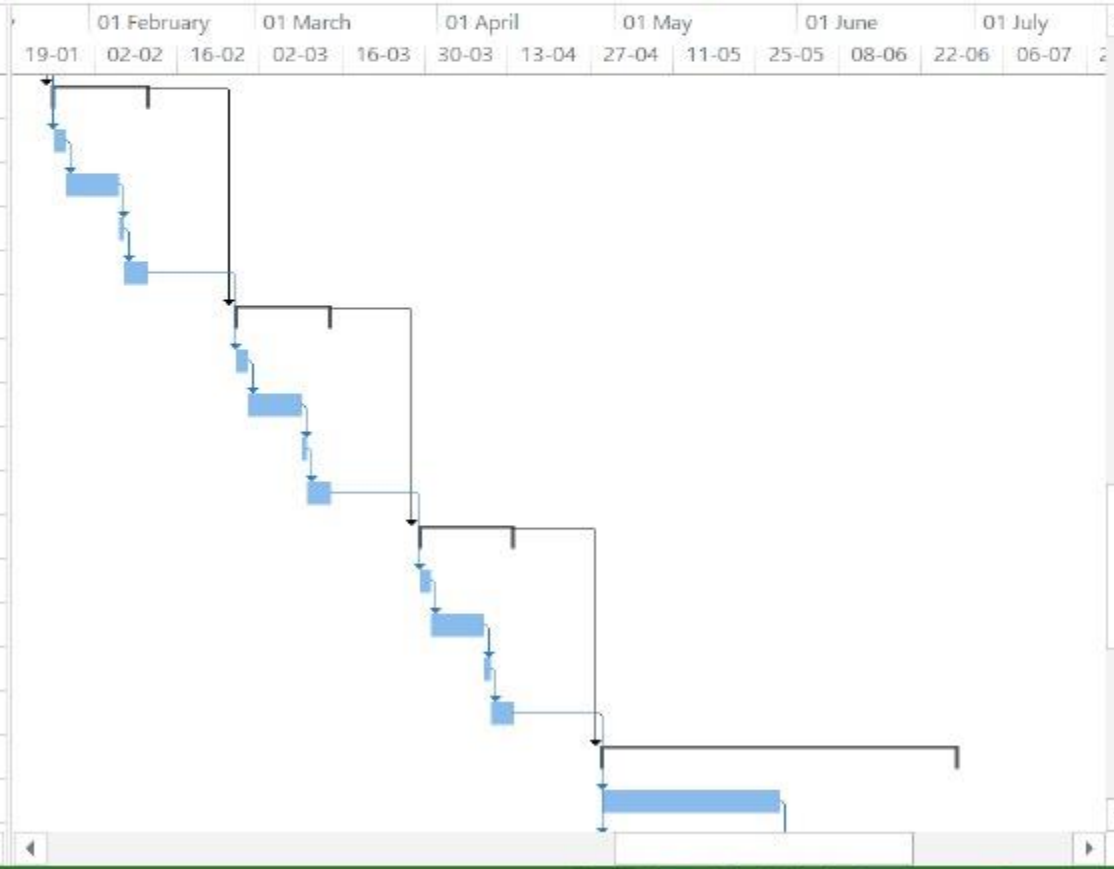
Today | Sun 19-01-25 | Wed 23-07-25

2nd Quarter | 3rd Quarter | 4th Quarter | 1st Quarter | 2nd Quarter | 3rd Quarter

Start Mon 01-04-24 | Add tasks with dates to the timeline | Finish Sat 13-09-25

GANTT CHART

		Task Mode	Task Name	Duration	Start	Finish	Predecessors
46			**8th floor**	**16 days**	**Sun 26-01-25**	**Mon 10-02-25**	**41FS+15 days**
47			Column	2 days	Sun 26-01-25	Mon 27-01-25	45FS+15 days
48			Brickwork	9 days	Tue 28-01-25	Wed 05-02-25	47
49			Beam	1 day	Thu 06-02-25	Thu 06-02-25	48
50			Slab	4 days	Fri 07-02-25	Mon 10-02-25	49
51			**9th floor**	**16 days**	**Wed 26-02-25**	**Thu 13-03-25**	**46FS+15 days**
52			Column	2 days	Wed 26-02-25	Thu 27-02-25	50FS+15 days
53			Brickwork	9 days	Fri 28-02-25	Sat 08-03-25	52
54			Beam	1 day	Sun 09-03-25	Sun 09-03-25	53
55			Slab	4 days	Mon 10-03-25	Thu 13-03-25	54
56			**10th floor**	**16 days**	**Sat 29-03-25**	**Sun 13-04-25**	**51FS+15 days**
57			Column	2 days	Sat 29-03-25	Sun 30-03-25	55FS+15 days
58			Brickwork	9 days	Mon 31-03-25	Tue 08-04-25	57
59			Beam	1 day	Wed 09-04-25	Wed 09-04-25	58
60			Slab	4 days	Thu 10-04-25	Sun 13-04-25	59
61			**Plastering**	**60 days**	**Tue 29-04-25**	**Fri 27-06-25**	**56FS+15 days**
62			Interior	30 days	Tue 29-04-25	Wed 28-05-25	60



READY | NEW TASKS : MANUALLY SCHEDULED

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Project1 - Project Professional

FILE | TASK | RESOURCE | REPORT | PROJECT | VIEW | GANTT CHART TOOLS FORMAT

Sign in

Team Planner (View) | Assign Resources | Resource Pool (Assignments) | Add Resources (Insert) | Information | Notes | Details (Properties) | Level Selection | Level Resource | Level All | Leveling Options | Clear Leveling | Next Overallocation (Level)

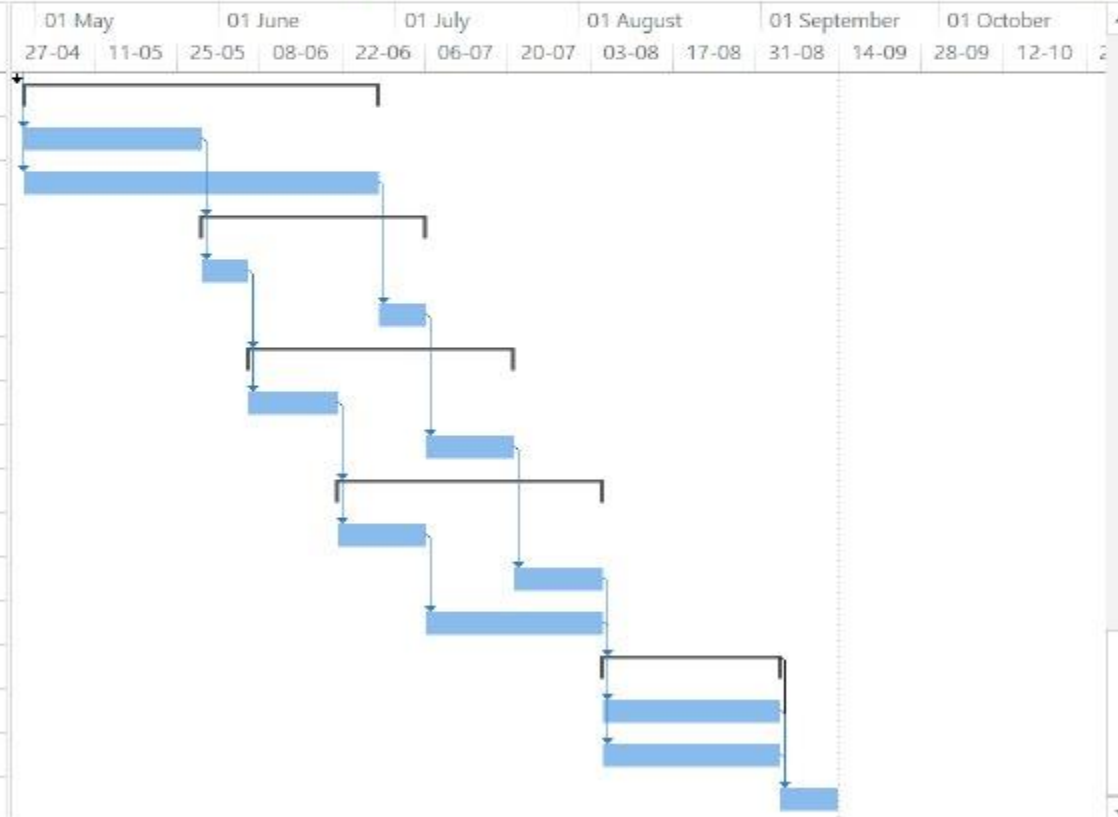
TIMELINE

Today | 2nd Quarter | 3rd Quarter | 4th Quarter | 1st Quarter | 2nd Quarter | 3rd Quarter

Start Mon 01-04-24 — Add tasks with dates to the timeline — Finish Sat 13-09-25

GANTT CHART

		Task Name	Duration	Start	Finish	Predecessors
61		**Plastering**	**60 days**	**Tue 29-04-25**	**Fri 27-06-25**	**56FS+15 days**
62		Interior	30 days	Tue 29-04-25	Wed 28-05-25	60
63		Exterior	60 days	Tue 29-04-25	Fri 27-06-25	60
64		**Whitewash**	**38 days**	**Thu 29-05-25**	**Sat 05-07-25**	**62**
65		Interior	8 days	Thu 29-05-25	Thu 05-06-25	62
66		Exterior	8 days	Sat 28-06-25	Sat 05-07-25	63
67		**Distemper**	**45 days**	**Fri 06-06-25**	**Sun 20-07-25**	**65**
68		Interior	15 days	Fri 06-06-25	Fri 20-06-25	65
69		Exterior	15 days	Sun 06-07-25	Sun 20-07-25	66
70		**Paint**	**45 days**	**Sat 21-06-25**	**Mon 04-08-25**	**68**
71		Interior	15 days	Sat 21-06-25	Sat 05-07-25	68
72		Exterior	15 days	Mon 21-07-25	Mon 04-08-25	69
73		Tiles	30 days	Sun 06-07-25	Mon 04-08-25	71
74		**Carpentary**	**30 days**	**Tue 05-08-25**	**Wed 03-09-25**	**73**
75		Door	30 days	Tue 05-08-25	Wed 03-09-25	73,72
76		Window	30 days	Tue 05-08-25	Wed 03-09-25	73,72
77		Glass work	10 days	Thu 04-09-25	Sat 13-09-25	74,75,76



READY | NEW TASKS : MANUALLY SCHEDULED

ENG IN 13:00 01-04-2024

⇒Total Cost of Project=Rs. 18,80,06,100

⇒After Sundries@2%,G.S.T.@18%,Cess@1% and Contractor’s profit@15%=Rs. 25,56,88,296

⇒Duration of Project=531 days(1year, 5months, 16days)

⇒Note(cost of wiring, plumbing, interior furnishing, elevator ,stairs, and connecting corridor are not taken into account due to lack data)

⇒Hence the real cost of project =Rs.30,00,00,000

⇒Our cost estimation of project=Rs25,56,88,286

Conclusion

The budget estimation report for the new residential building(F-Type) provides a comprehensive overview of the anticipated costs associated with its design, construction, and completion. Through meticulous analysis of various factors such as materials, labor, equipment, permits, and contingencies, we have generated realistic projections

The findings of this project underscore the importance of careful planning and strategic decision-making in managing the financial aspects of a construction project of this scale. By accurately estimating costs and identifying potential cost-saving opportunities, stakeholders can mitigate risks, optimize resources, and ensure the successful execution of the project within budgetary constraints.

It is important to note that while every effort has been made to provide accurate estimations, unforeseen circumstances or changes in market conditions may impact actual costs during the course of the project

In closing, I would like to express my gratitude to all team members who contributed their expertise, dedication, and support to the success of this project as well our team like to thank **Dr. Santu kar** course instructor of CE308 for giving us this wonderful project which helped us to learn and understand many new concept of construction technology and management(CE 308) . Together, we have demonstrated the power of teamwork, innovation, and perseverance in achieving our goals.