

Planning and Scheduling of Resort Construction Using MS Project

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Abstract

Construction project success largely depends on effective planning, scheduling, and resource management. This project, titled “Planning and Scheduling of Resort Construction Using MS Project,” focuses on analyzing a resort construction project that commenced in 2016 but remains incomplete as of 2025. The prolonged duration of the project indicates significant challenges in project management, scheduling, and execution. The primary objective of this study is to identify the factors responsible for delays and to develop an optimized construction schedule using Microsoft Project software. A detailed assessment of the existing project schedule was carried out by collecting project data, reviewing work progress, and analyzing the sequence of construction activities. The study revealed several critical issues, including extended periods of inactivity, improper task sequencing, inadequate coordination among project activities, and inefficient utilization of resources. These factors collectively contributed to substantial delays in project completion. To address these challenges, a revised project schedule was developed using Microsoft Project. The proposed schedule incorporates improved task dependencies, resource allocation strategies, and concurrent execution of compatible activities to minimize idle time and enhance productivity. The results demonstrate that through proper planning and systematic scheduling, the remaining construction work can be completed significantly earlier than projected under the existing plan. This study emphasizes the importance of modern project management tools in improving construction efficiency, reducing delays, optimizing resource utilization, and ensuring the timely completion of large-scale construction projects.

Keywords: Construction schedule, gaps in work, improved schedule, MS Project, proper planning, project completion, project delays, scheduling tools, time-saving

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INTRODUCTION

In a world where technology is constantly pushing us forward, it is evident that construction, a process that can often feel stuck in the past, needs to catch up. For a country like India, with big dreams of becoming a developed nation by 2047, getting our construction game up to speed with modern, data-driven methods is not just an option—it is essential [1].

This research aims to address this issue. We are diving deep into historical project scheduling data from a major resort construction project, which commenced in 2016 and is slated for completion in 2026. Our goal is to pinpoint where things went wrong—the inefficiencies, the bottlenecks, the patterns of delays—so we can learn from them [2].

We used Microsoft Project (2016) as our main tool. It has everything we need: comprehensive planning features, is easy to use, and is great for analyzing data. This allows us to delve into key activities such as electrical work, plumbing, blockwork, swimming pool installation, parking development, and plastering. By understanding what happened in the past, we can build smarter, more realistic, and ultimately faster schedules for the future [3].

Ultimately, this project aims to do more than just complete a resort on time. It is about optimizing timelines, boosting efficiency, and ensuring that projects are completed when they are supposed to. This proactive approach can significantly reduce delays and cost overruns, paving the way for India's infrastructure development and economic growth [4].

FORMULATION OF THE PROJECT & IDENTIFICATION OF THE PROBLEM

Identification of the Problem

As part of our assigned task to identify and analyze a real-time construction project, we initiated site selection. During this phase, we visited several potential locations and engaged with local contractors. One site, in particular, caught our attention: a resort construction project that commenced in 2016 and is still ongoing. The contractor shared numerous challenges faced on-site, including stakeholder conflicts and unforeseen construction issues. We conducted multiple site visits to observe the project's progress and interact with the site in charge and workers. Based on our observations and interactions, we identified a range of issues that impacted the project timeline and quality. Consequently, we decided to undertake a detailed study of site construction management, with the aim of enhancing efficiency using project management tools [5].

Research Gap

Despite extensive studies on construction project management, a key issue remains in the context of large-scale, long-term projects such as resort construction. Specifically, there is often a lack of parallel management and coordination, which leads to project delays and cost overruns. This gap was also observed in the current study.

PROJECT MANAGEMENT OF RESORT CONSTRUCTION

The Sheer Complexity and Scale

Resort construction is not like building a single house. It often involves multiple types of structures (guest rooms, restaurants, pools, spas, and recreational facilities), intricate infrastructure (water treatment, power grids, and landscaping), and a vast network of subcontractors and suppliers.

Project Management as Navigator: Without robust project management, navigating this complexity is impossible. It provides the structure to break down the monumental task into manageable components, assign responsibilities, and track progress across numerous, interconnected work streams. This ensures that the left hand knows what the right hand is doing, preventing costly delays and errors [6].

The High Stakes and Financial Implications

Resort developments represent significant capital investment. Delays, cost overruns, and quality issues directly impact the return on investment and financial viability of the entire venture.

Project management as the financial guardian: Effective budget management, a core component of project management, is paramount. It provides tools and processes to meticulously track expenditures, forecast potential deviations, and implement cost-saving measures. This ensures that the project stays within its financial boundaries and delivers the expected profit [7].

The Criticality of Timely Completion

Resorts often operate on a seasonal schedule. Missing a key opening date can result in substantial revenue losses. Furthermore, delays can impact marketing campaigns, staffing plans, and the overall market perception of resorts.

Project management as the timekeeper: Planning and scheduling, which are central to project management, establish realistic timelines and critical path analyses. This helps identify potential bottlenecks and allows for proactive measures to keep the project on track for a timely launch. It is about capitalizing on market opportunities and minimizing lost revenue [8].

The Interdependence of Quality and Reputation

The quality of construction directly influences the guest experience and the long-term reputation of the resort. Substandard work can lead to safety issues, increased maintenance costs, and negative reviews, ultimately impacting profitability [9].

Project management as the quality champion: Quality control processes embedded within project management ensure that construction meets the required standards at every stage. Regular inspections and adherence to specifications guarantee a high-quality final product that delights guests and builds a positive reputation for the establishment.

Construction projects rarely proceed as planned. Unexpected challenges, such as adverse weather, material shortages, and design changes, are common.

Project management as the agile problem-solver: Risk management and stakeholder communication, key aspects of project management, equip the team to anticipate potential problems, develop mitigation strategies, and adapt effectively to unforeseen circumstances. Clear communication ensures that stakeholders are informed and can participate in finding solutions to minimize disruptions [10].

The Importance of Stakeholder Alignment

Resort projects involve a diverse range of stakeholders with potentially conflicting interests: investors focused on ROI, architects on design integrity, contractors on efficiency, local communities on environmental impact, and future guests on overall experience.

Project management as the collaborative hub: Effective stakeholder communication ensures that all parties are informed, their concerns are addressed, and their expectations are managed. This fosters a collaborative environment and increases the likelihood of a successful outcome that satisfies everyone involved (Figures 1–8 and Tables 1–5).

Project Details

Project name: NeonZ Resort; Location: Dabhoi, Anand; Contractor name: BuildQuick Infra.

Lag Days

The project has encountered lag days, which have contributed to delays in the construction schedules. The following table details the lag days.

- Holi vacation (160 days), Poonam (44 days)
- Aamash (43 days)
- Other delays (1732 days) Diwali vacation (160)

Table 1. Diwali vacation (160 days).

Year	Duration
2016	Oct 24–Dec 3
2017	Oct 12–Nov 21
2018	Nov 2–Dec 11
2019	Oct 18–Nov 26

Table 2. Holi vacation (160 days).

Year	Duration
2016	Mar 4–Apr 12
2017	Apr 4–May 13
2018	Feb 21–Apr 2
2019	Mar 12–Apr 23

Table 3. Poonam (44 days).

Year	Date	Year	Date
2016	Sep 17	2017	May 9
	Oct 16		June 7
	Nov 14		July 6
2017	Jan 12		Aug 5
	Feb 10		Sept 3
	Mar 11		Oct 3
	Apr 9		Nov 2

Table 4. Poonam (44 days).

Year	Date	Year	Date
2016	Sep 17	2017	May 9
	Feb 16		June 7
	Oct 16		July 6
	Nov 14		Aug 5
2017	Jan 12		Sept 3
	Feb 10		Oct 3
	Mar 11		Nov 2
	Apr 9	2019	Mar 18
2017	Dec 2		Apr 16
2018	Jan 1		May 15
	Jan 31		June 13
	Mar 2		July 13
	Apr 1		Aug 11
	May 30		Sept 9
	June 28		Nov 7
	Aug 26		Dec 6
	Sept 24	2020	Jan 10
	Oct 23		Feb 9
	Nov 21		Mar 9
	Dec 20		
2019	Jan 18		

Decomposing into tasks: Each major delivery was further divided into specific activities or tasks required to produce it.

Creating subtasks: Where necessary, tasks were broken down into smaller, more granular subtasks to allow for better control and assignment.

Utilizing the outline structure: Microsoft Project's outlining capabilities allowed us to easily indent and outdent tasks to reflect the hierarchical relationship within the work breakdown structure (WBS). This visual representation provides a clear understanding of how individual tasks contribute to overall project goals.

Table 5. Aamash (43 days).

Year	Date	Year	Date
2016	Sept 16	2018	Jan 1
	Oct 15		Feb 28
	Nov 13		Mar 29
	Dec 13		Apr 27
2017	Jan 12		May 27
	Feb 10		June 25
	Mar 12		July 25
	May 9		Sept 22
	June 8		Oct 22
	July 8		Nov 21
	Aug 6		Dec 20
	Sept 5	2019	Jan 19
	Oct 5		Feb 18
	Nov 3		Mar 19
	Dec 3		Apr 17
2019	May 17		Nov 9
	June 16		Dec 8
	July 15	2020	Jan 7
	Aug 13		Feb 5
	Sept 12		Mar 6
	Oct 11		

Numbering and naming conventions: We adopted consistent numbering and naming conventions for WBS elements to ensure clarity and ease of reference throughout the project lifecycle.

By implementing a comprehensive WBS in Microsoft Project, we established a clear roadmap of all the work required, preventing scope creep and ensuring that no critical activities were overlooked.

Establishing the Project Calendar

A realistic project schedule must account for working days, non-working days (such as weekends and holidays), and any project-specific exceptions. Microsoft Project allows us to define and apply project calendars to accurately reflect resource availability and working time.

How we used it: We configured the project calendar to align with our specific needs.

Selecting a base calendar: Microsoft Project offers several base calendars (e.g., Standard, 24-Hour, Night Shift). We selected a base calendar that most closely matched our typical work schedule.

Functions Used in Microsoft Projects

Structuring the Project with the Work Breakdown Structure

The foundation of any effective project schedule lies in a well-defined WBS. The WBS is a hierarchical decomposition of the total scope of work to be performed by the project team to accomplish the project objectives and create the required deliverables. In Microsoft Project, we visually represented it using an outline format.

How we used it: We meticulously broke down the project deliverables into smaller and more manageable tasks and subtasks. This involved:

Identifying major deliverables: We started by listing the key outputs or results that our project needs to achieve. *Defining Non-Working Days:* We explicitly marked weekends and any anticipated company holidays or other non-working periods in the calendar. This ensures that task durations and resource assignments are calculated accurately, excluding these times from the calculations.

Creating custom calendars (If needed): For resources or specific phases with unique working hours, we created custom calendars. For example, if a particular team worked on a different schedule or if a specific project phase required extended hours, we defined a tailored calendar and assigned it accordingly to the team.

Setting working time: We verified and adjusted the default working hours for each day to match the operational schedule.

By accurately setting the project calendar, we ensured that our schedule reflected the realistic availability of time for project work, leading to more accurate start and finish dates for tasks.

Defining Task Dependencies

Project tasks rarely occur in isolation. Often, the start or finish of one task depends on the completion of another task. Microsoft Project allows us to define these dependencies and create a logical flow for the project schedule.

How we used it: We established relationships between tasks to reflect their sequential or parallel nature:

Identifying predecessor and successor tasks: For each task, we determined which tasks needed to be completed before it could start (predecessors) and which tasks could start only after they were completed (successors).

Using different dependency types: Microsoft Project offers four types of task dependencies:

Finish-to-start (FS): The successor task cannot start until the predecessor task is finished (the most common type).

Start-to-start (SS): The successor task can start as soon as the predecessor task begins.

Finish-to-finish (FF): The successor task cannot be completed until the predecessor task is completed.

Start-to-finish (SF): The successor task cannot be completed until the predecessor task starts (less common).

Linking tasks: We used Microsoft Project's intuitive interface (e.g., dragging between task bars in the Gantt Chart view or using the Predecessors and Successors columns in the Task Sheet view) to establish these links.

Lag and lead time: In situations where a delay or overlap was necessary between dependent tasks, we incorporated lag (positive delay) or lead time (negative delay) into the dependencies.

By defining task dependencies, we created a realistic project flow, ensuring that tasks were executed in the correct order and that the schedule accurately reflected these interrelationships.

Estimating Task Durations

Accurately estimating the time required to complete each task is crucial for developing a reliable project schedule. Microsoft Project allows us to input task durations into various units (e.g., days, hours, and weeks).

How we used it: We estimated the effort required for each task:

Collaborative estimation: We involved team members with relevant expertise in estimating the duration of their assigned tasks. This fosters ownership and improves accuracy.

Considering task dependencies and resource availability: We took into account any dependencies on other tasks and the availability of assigned resources when estimating durations. Using Different Estimation Techniques: Depending on the nature of the task and available information, we employed various estimation techniques, such as:

Past experience: Drawing on similar tasks from previous projects.

Expert judgment: Seeking input from individuals with specific knowledge.

Three-point estimating: Calculating an average based on optimistic, pessimistic, and most likely estimates: $(\text{Optimistic} + 4 \times \text{Most Likely} + \text{Pessimistic})/6$.

Entering durations: We entered the estimated durations for each task in the Duration column of the Task Sheet view in Microsoft Project.

Realistic duration estimates form the backbone of project schedules, influencing overall project timelines and resource allocation.

Setting Constraints and Deadlines

In many projects, certain tasks or the overall project has specific start or finish dates that must be adhered to. Microsoft Project allows us to set constraints and deadlines to reflect these requirements.

How we used it: We incorporated schedule limitations:

Setting start and finish constraints: For tasks with fixed start or finish dates, we applied constraints such as "Start No Earlier Than" or "Finish No Later Than." This ensures that the task adheres to the date restrictions during the schedule calculations.

Defining project start and finish dates: We set the overall project start date, which serves as an anchor for the entire schedule. We also defined a mandatory project completion date.

Using deadlines: For important milestones or deliverables, we set deadlines. While deadlines do not directly impact schedule calculations, like constraints, they provide a visual indicator of when these items are expected to be completed and highlight potential slippage.

By setting constraints and deadlines, we ensured that the project schedule aligned with mandatory dates and provided clear targets for key milestones.

Utilizing the Gantt Chart View

The Gantt Chart view is the primary visual representation of the project schedule in Microsoft Project. It displays tasks as horizontal bars along a timeline, illustrating their duration, start and finish dates, and dependencies.

How we used it: We leveraged the Gantt Chart for visualization and analysis:

Visualizing the schedule: The Gantt Chart provides a clear graphical overview of the project timeline, making it easy to understand the sequence and duration of tasks.

Identifying critical path: Microsoft Project automatically highlights the critical path, which is the sequence of tasks that directly impacts the project's overall finish date. Understanding the critical path allows us to focus our monitoring and management efforts on these activities.

Tracking progress: As the project progressed, we updated the task completion percentages, which were visually reflected in the Gantt Chart, providing a clear picture of the project's status.

Analyzing schedule impacts: By changing task durations, dependencies, or resource assignments, we can instantly see the impact on the overall schedule in the Gantt Chart.

The Gantt Chart served as our central hub for viewing, analyzing, and communicating the project schedule Figures 1–8.

OPPORTUNITIES AND CHALLENGES.

Opportunities

1. Investigate the specific functionalities and features of MS Project that enable effective parallel work management, including task dependencies, critical path analysis, and scheduling optimization.
2. Analyze the benefits and potential challenges of implementing parallel work management strategies in resort construction using MS Project.
3. Explore how MS Project facilitates comprehensive resource and cost management, including allocation, leveling, tracking, budgeting, earned value management, and variance analysis, and then analyze the concept of 'forward integration'.

Challenges

Delays in Material Delivery

Common causes include supply chain disruptions, logistical issues, and unreliable vendors, which lead to schedule extensions and increased costs.

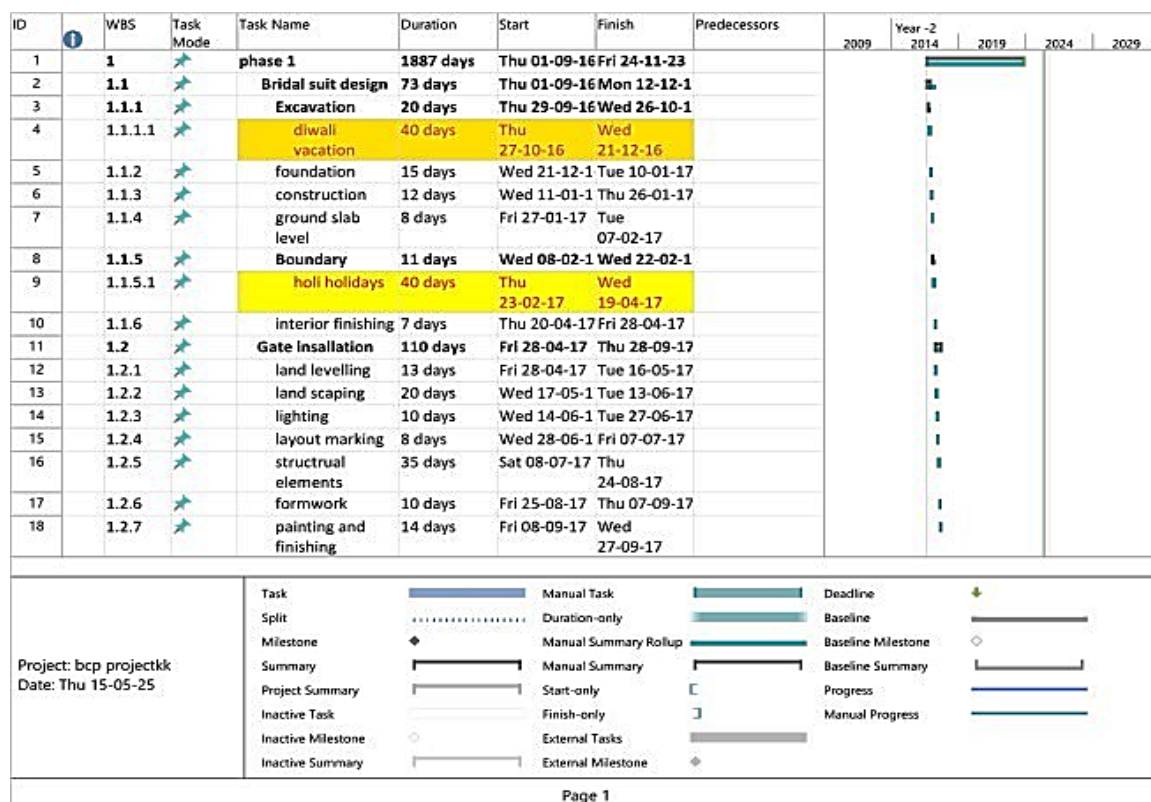


Figure 1. MSP Report (page 1).



Figure 2. MSP Report (Page 2).

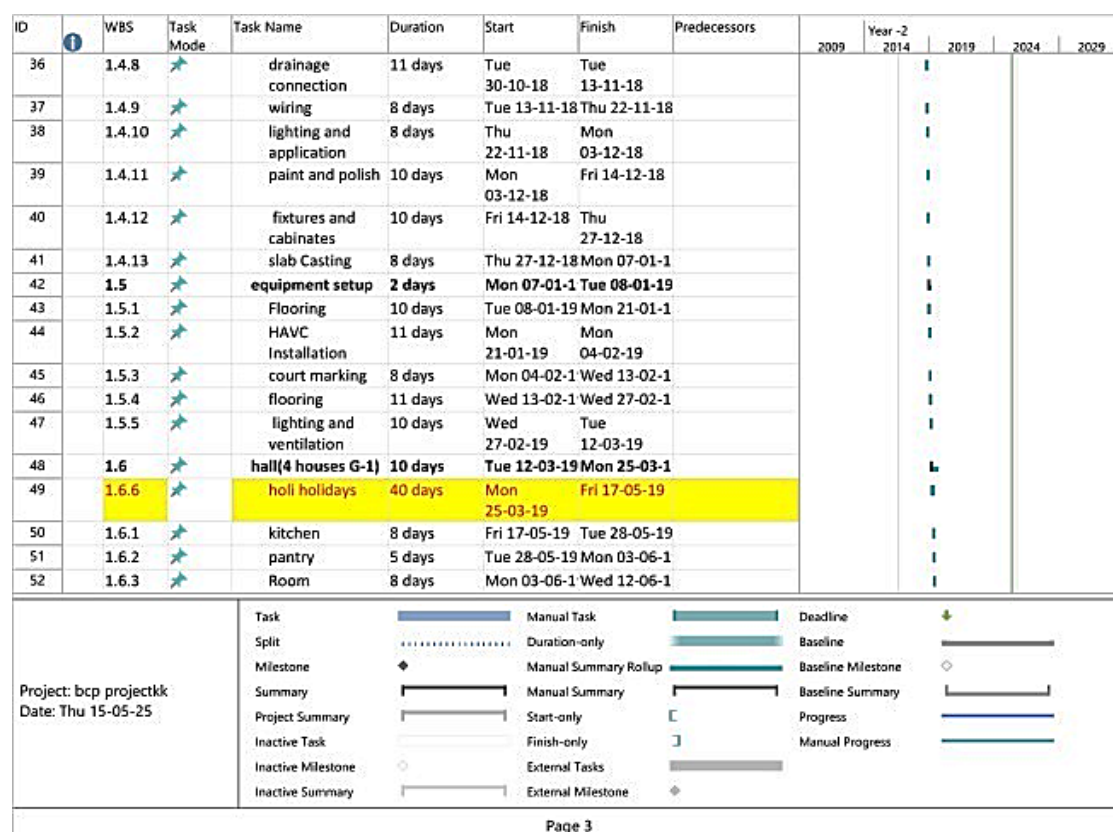


Figure 3. MSP Report (Page 3).

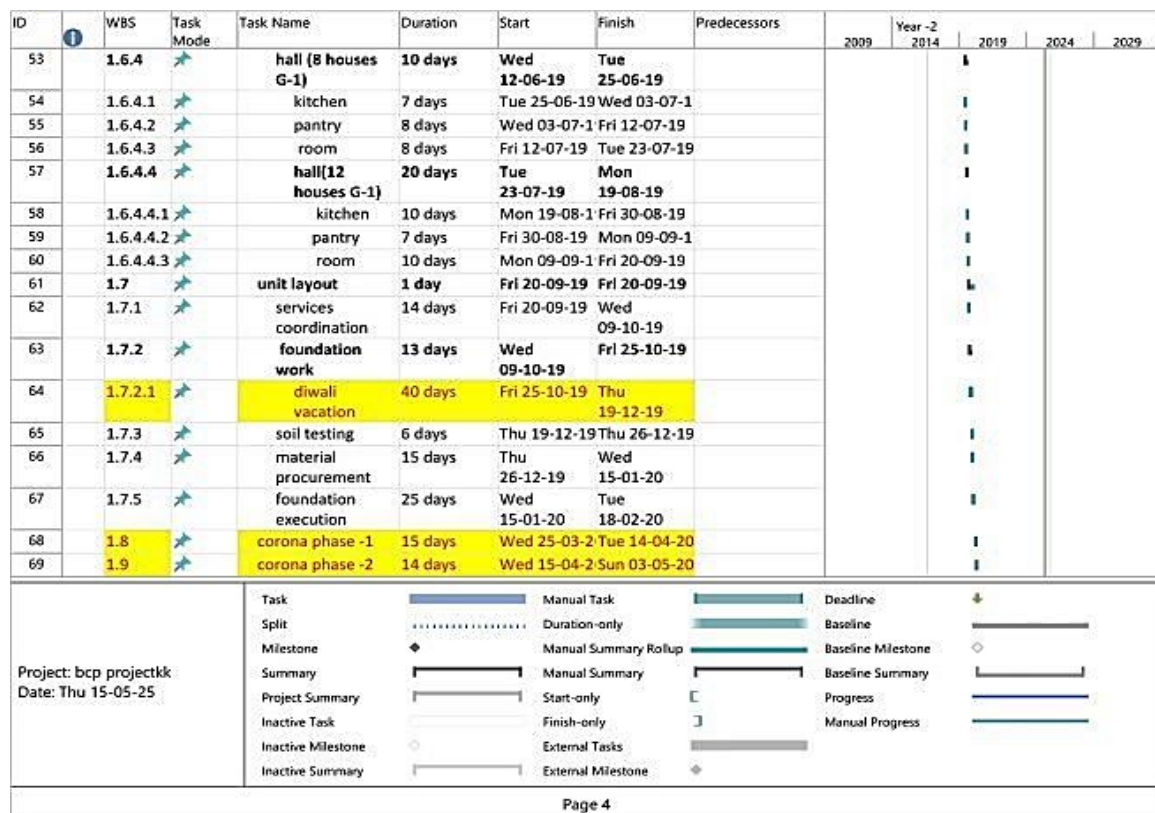


Figure 4. MSP Report (Page 4).



Figure 5. MSP Report (Page 5).

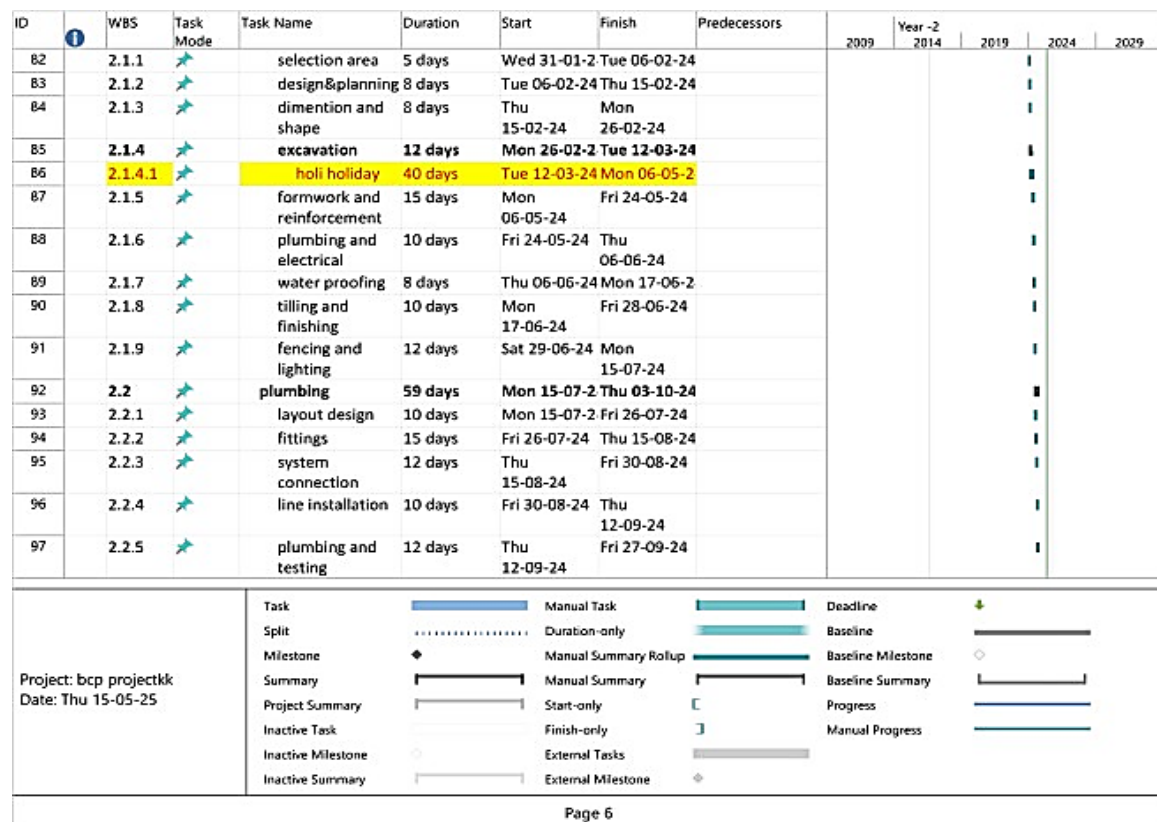


Figure 6. MSP Report (Page 6).

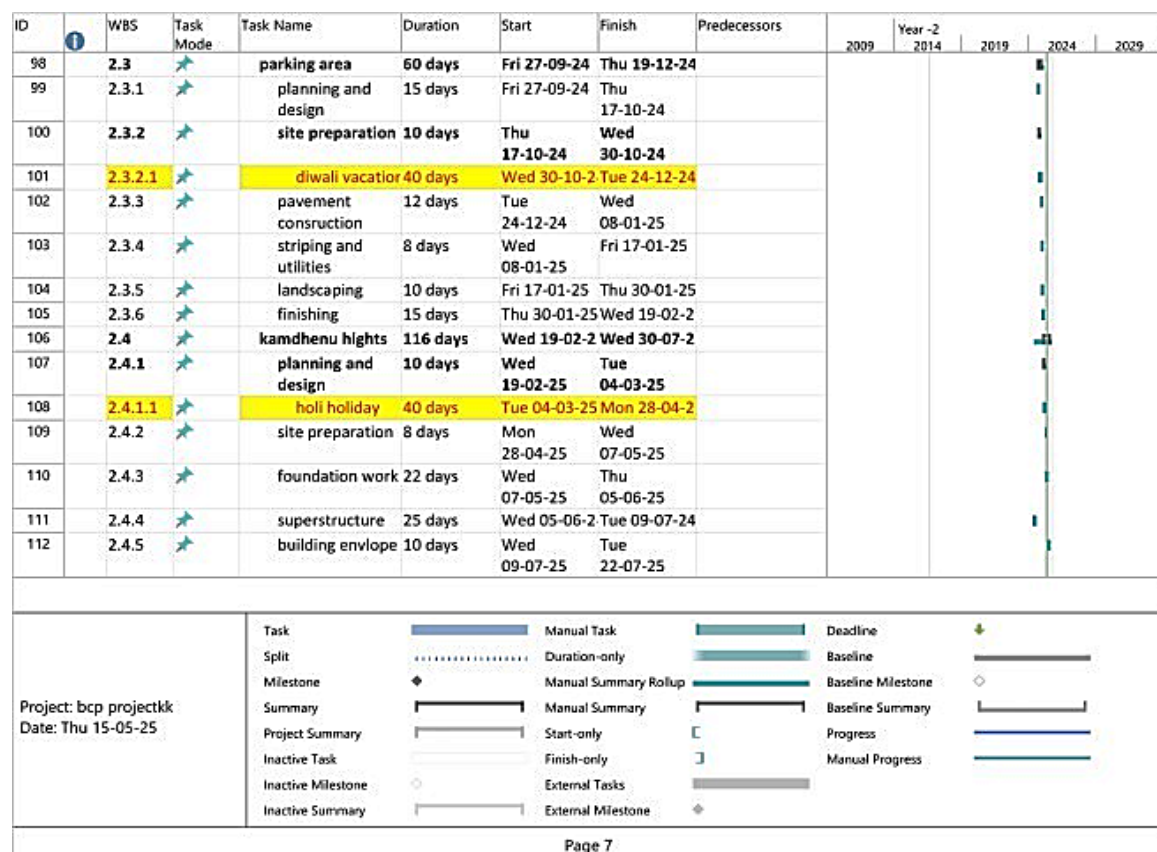


Figure 7. MSP Report (Page 7).

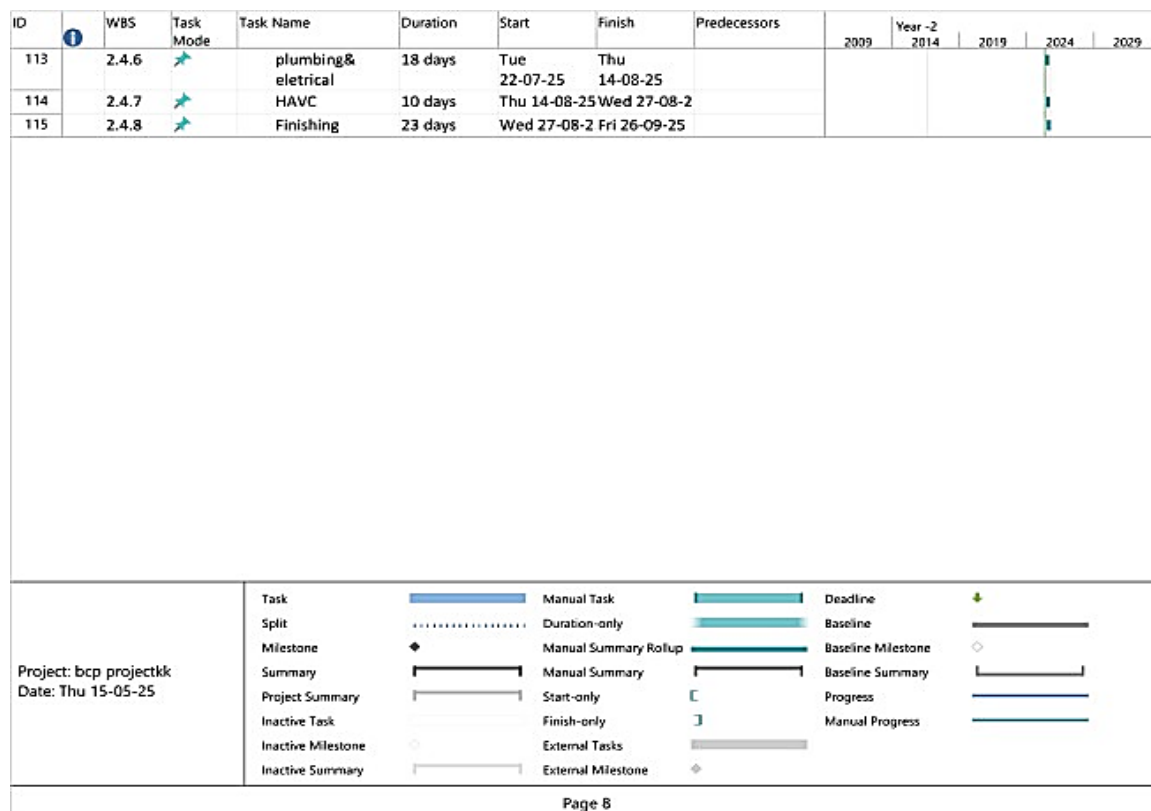


Figure 8. MSP Report (Page 8).

Unexpected Site Conditions

Unforeseen issues, such as geological surprises, archaeological finds, or undisclosed utilities, can cause redesigns, delays, and budget increases.

Coordination Issues Between Subcontractors

Problems arise from poor communication, unclear work scopes, and scheduling conflicts, resulting in rework and inefficiency.

Weather-Related Disruptions

Adverse weather (heavy rain, extreme temperatures, and high winds) can halt work, damage structures, and lead to delays and increased expenses.

Changes in Design Specifications

Modifications requested by clients, regulatory changes, or unforeseen issues can significantly impact project budgets and schedules.

Future Scope

Based on the identified opportunities and recurring challenges, future construction projects can leverage these data to achieve greater effectiveness and efficiency. By proactively addressing known pitfalls and integrating advanced methodologies, project outcomes can be significantly improved in the future.

Proactive risk mitigation: The consistent identification of challenges, such as material delays, unexpected site conditions, and weather disruptions, highlights the need for more robust, data-driven risk assessment and mitigation strategies from project inception. Future projects should integrate advanced predictive analytics to anticipate these issues and develop comprehensive contingency plans.

Enhanced digital integration: The benefits of BIM for visualization, coordination, and data tracking underscore the importance of full digital integration across all project phases. Future projects should aim for a higher level of BIM adoption, extending their use to facility management and lifecycle costing, and creating a truly interconnected digital twin of the project.

Improved supply chain resilience: Recognizing material delivery delays as a significant challenge necessitates focusing on building more resilient and transparent supply chains. This includes diversifying suppliers, implementing real-time tracking systems, and fostering stronger and more collaborative relationships with vendors.

Adaptive planning and communication: The prevalence of coordination issues and design changes emphasizes the need for flexible project plans and streamlined communication protocols. Future projects should prioritize agile methodologies, continuous stakeholder engagement, and clear and consistent information exchange to minimize misunderstandings and adapt quickly to changes.

Data-driven decision-making: The collective experience of these challenges provides invaluable data. Future projects should establish mechanisms for capturing, analyzing, and applying lessons learned from past projects to inform future planning, improve estimation accuracy, and refine best practices. This continuous learning loop is crucial for fostering a culture of continuous improvement in project execution.

CONCLUSION

Both phases of the project experienced significant timeline overruns. Phase 1 faced multiple delays due to national holidays (Holi and Diwali), the COVID-19 pandemic, and the client's financial crisis, considerably extending its duration. Phase 2, currently underway, is also under time pressure, with its projected completion now pushed to March 2026, an eight-month delay from the original June 2025 estimate. This means that the project is expected to finish substantially later than the ideal target of July 2025, highlighting that external events and management decisions have been the primary drivers of these timeline deviations.

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