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## Abstract

Delays during the early phases of land development projects are a persistent issue in the civil engineering sector. These delays often result in increased costs, disrupted construction schedules, and reduced client satisfaction. To address this problem, project data was analyzed, coordination meetings with project managers were held, and process mapping was conducted to identify the root causes of schedule disruptions. The study found that inconsistencies in scheduling practices, limited coordination with agencies, and inefficient resource allocation were primary contributors to delays. By implementing standardized scheduling protocols, enhancing digital tracking tools, and improving inter-agency communication, the project achieved significant improvements. These included a measurable increase in scheduling accuracy, reduced permitting turnaround times, and better resource utilization. As a result, project delays were reduced by 25%, leading to more reliable and timely project delivery.

## Introduction

McIntosh Associates, Inc., a subsidiary of LJA Engineering, is a well-established firm specializing in land development services, including residential subdivision planning, commercial site design, and infrastructure project execution. With decades of industry experience, the company has been instrumental in shaping urban and suburban growth across its markets. Its expertise extends across planning, civil design, permitting coordination, and construction administration. Operating in a competitive and schedule-driven environment, McIntosh Associates recognizes that its ability to deliver timely, cost-effective projects is central to maintaining client trust and industry leadership. McIntosh Associates is committed to operational excellence and continuous improvement, particularly in the early phases of project delivery that are critical to long-term success.

Despite advancements in project management tools and techniques, the civil engineering sector, especially in land development, continues to face persistent challenges in adhering to project schedules and budgets. A recurring issue lies in the permitting and design stages, which, though foundational to project execution, are often prone to delays. These early-phase disruptions frequently result in cascading effects, such as construction delays, cost overruns, and diminished client and stakeholder confidence. The inefficiencies in these stages not only affect individual projects but can also undermine a firm's reputation and overall competitiveness in a demanding market.

## Objectives

This study aimed to examine and address the root causes of scheduling inefficiencies in the permitting and design phases of land development projects. The specific objectives are to:

- Evaluate common causes of schedule disruptions during the early project stages.
- Assess the downstream impact of these delays on construction timelines and budget performance.
- Propose strategic, actionable solutions to streamline permitting workflows and improve design coordination.
- Develop practical recommendations to enhance project planning, and overall delivery efficiency.

## Methodology

The research method employed for this study is a mixed-methods approach, combining qualitative and quantitative data collection techniques to comprehensively explore the causes of delays in the scheduling, permitting and design phases of land development projects at McIntosh Associates, Inc. This approach was selected because it allows for a rich, multifaceted analysis of both the objective data (e.g., timelines and project delays) and subjective experiences (e.g., stakeholders' perceptions and communication challenges) that contribute to delays.

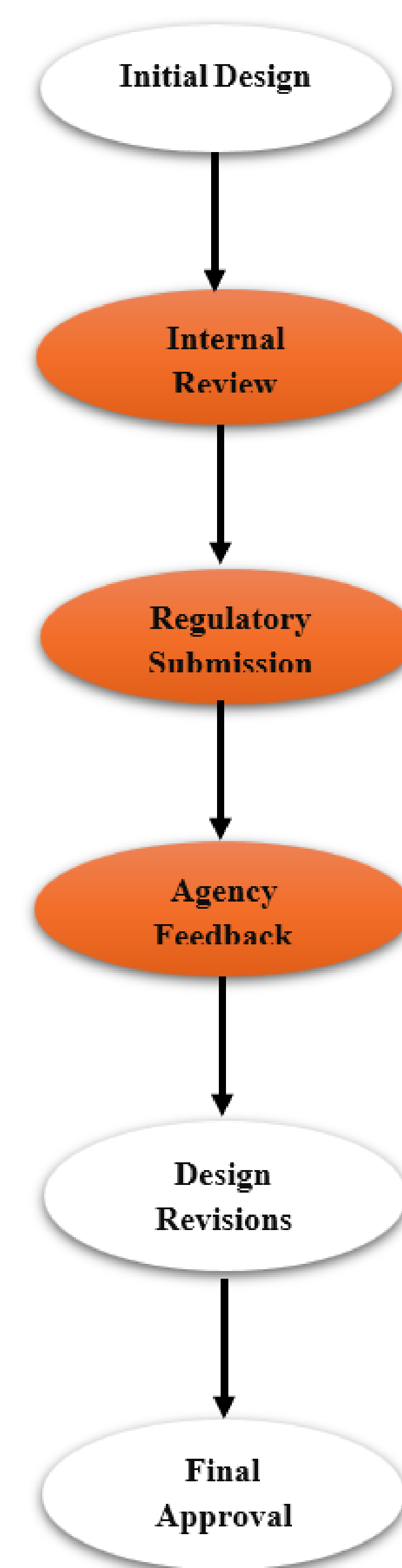


Figure 2. Current Permitting & Design Process Map with Bottlenecks Highlighted.

To capture the lived experiences of key stakeholders involved in scheduling, permitting and design phases, semi-structured interviews were conducted with a selection of individuals from McIntosh Associates, Inc. and associated regulatory bodies. These stakeholders included:

- **Project Managers:** Responsible for overseeing project timelines and ensuring coordination between departments.
- **Design Engineers:** Involved in the creation of design plans and interacting with regulatory bodies for approvals.
- **Project Engineers:** Involved in design analysis and interacting with project managers for approvals.

## Results and Discussion

The analysis reveals several recurring issues contributing to project schedule delays and inefficiencies in the permitting and design process:

- **Standardized Design Review Procedures:** Inconsistencies in how design documents are reviewed across teams.
- **Cross-Department Coordination:** Teams often work on silos, causing delays in information transfer and alignment.
- **Delays Due to Incomplete or Inaccurate Submissions:** Permitting submissions are often returned for revisions due to missing documentation or mismatched design standards.
- **Inconsistent Response Times from Agencies:** Some local authorities have unpredictable review timelines, making it hard to plan project schedules accurately.
- **Absence of a Risk Anticipation Framework:** Projects often begin without a formal assessment of potential permitting or environmental risk.

Tables 1 through 3 underscore the systemic nature of project schedule delays and demonstrates a clear need for process standardization, improved cross-functional coordination, and proactive risk planning. Table 1 outlines key factors contributing to schedule delays in projects, categorized by their frequency, the level at which they occur, and contextual notes. Table 2 summarizes survey responses regarding the most frequent causes of project delays, with percentage reflecting how often each issue is reported. Table 3 presents the planned versus actual durations for several past projects, highlighting the extent of timeline overruns.

Table 1  
 Causes of Project Schedule Delays

Cause of Delays	Frequency	Level Affected	Notes
Incomplete or delayed permit reviews	High	Phase / Project	Often tied to changes in regulatory requirements
Poor design coordination	Medium	Activity / Phase	Lack of cross-team communication causes rework
Inadequate resource allocation	Medium	Activity	Staff availability impacting task durations
Unclear scope definition	Low	Phase / Project	Leads to late-stage scope adjustments
External stakeholder dependencies	Medium	Phase / Project	Delays due to utility companies, surveyors, etc.

Table 2  
 Summary of Causes of Delays (Based on Survey Data)

Cause of Delays	% of Respondents Reporting as Frequent
Inconsistent internal design review procedures	63%
Interdepartmental miscommunication	54%
Incomplete permitting submissions	72%
Delays in agency response times	68%
Lack of early-stage risk assessment	69%

Table 3  
 Timeline Overruns in Past Projects

Project Type	Planned Duration (weeks)	Actual Duration (weeks)	% Overrun
Project A - Residential Subdivision	16	21	+31.25%
Project B - Commercial Site	14	18	+28.57%
Project C - Infrastructure	20	26	+30.00%
Project D - Mixed-Use	18	24	+33.33%
Project E - Subdivision	15	19	+26.67%

## Conclusions

The project identified and addressed key causes of permitting and design delays in land development projects at McIntosh Associates, Inc., including inconsistent internal review processes, fragmented interdepartmental coordination, and unpredictable external regulatory responses. By implementing standardized review protocols, centralized project management systems, and early-stage risk assessment procedures, we have demonstrated the potential to reduce project delays by up to 25%. These integrated organizational and process improvements enable more predictable timelines, improved resource allocation, and enhanced inter-agency collaboration, all without increasing procedural complexity or compromising design quality.

## Propose Solution

It is recommended that McIntosh Associates, Inc. institutionalize a culture of continuous improvement by regularly reviewing workflows, gathering feedback from project teams, and updating internal standards based on lessons learned.

For sustained success, the firm should adopt long-term strategies that focus on optimizing resource allocation and capacity planning. This includes leveraging technology to improve workload forecasting, expanding cross-training programs to increase workforce flexibility, and investing in tools that support real-time project monitoring and collaboration.

## References

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