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Abstract

This study examines recurring delays affecting FEMA-funded historic revitalization projects in southern Puerto Rico, primarily concentrated during pre-construction phases. Using a qualitative multi-case analytical approach grounded in Engineering Management principles, the research identifies inefficiencies related to scope validation, documentation review cycles, interagency coordination, and the integration of historic preservation requirements. Based on these findings, an Efficient Management Model is proposed to restructure early project activities, reduce administrative rework, and improve schedule predictability while safeguarding historic resources.

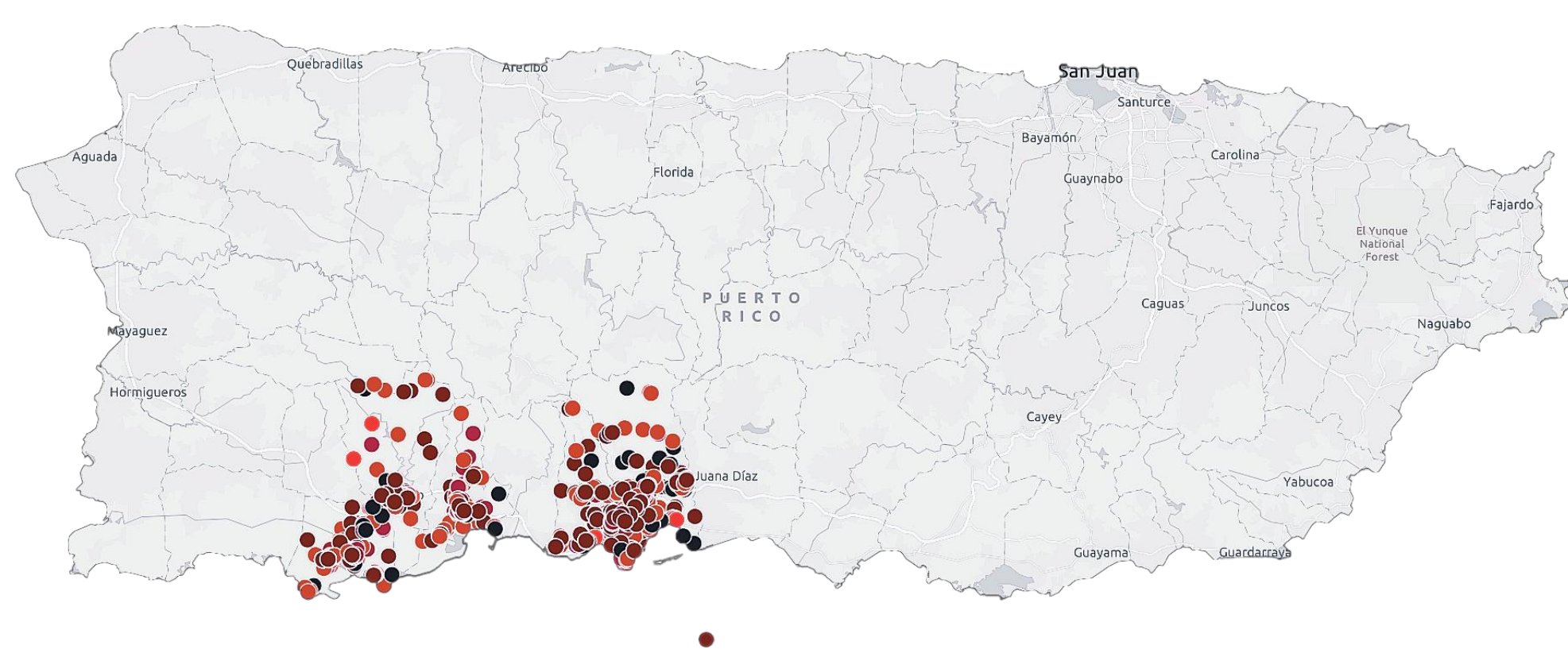
Introduction

In the southern region of Puerto Rico, numerous public and institutional buildings with historic or architectural significance remained in deteriorated condition years after the 2017 hurricanes and the 2020 earthquake sequence. Although federal recovery funds were allocated through FEMA, many revitalization projects experienced prolonged delays and remained stalled in planning or design stages. These delays were not primarily related to construction constraints, but rather to inefficiencies occurring during early project phases, including fragmented administrative workflows, repeated documentation reviews, and limited coordination among agencies. This situation revealed systemic challenges in managing FEMA-funded historic revitalization projects and highlighted the need for a more efficient and structured pre-construction management approach. [1, 2].

Literature Review

Post-Disaster Project Management

Post-disaster recovery projects frequently experience extended timelines due to the concentration of delays during pre-construction phases. Incomplete early damage assessments, evolving site conditions, and repeated administrative review cycles significantly affect project schedules. A substantial portion of overall project delays occurs before construction begins, underscoring the need for improved management of early-phase activities within FEMA-funded recovery programs. [1, 4].



Historic Rehabilitation Projects

Historic rehabilitation projects add complexity due to resource sensitivity and preservation requirements. Processes such as Section 106 consultation and interagency coordination can extend

pre-construction timelines, especially when preservation is addressed late, leading to sequential reviews and schedule impacts. [2, 3, 5].

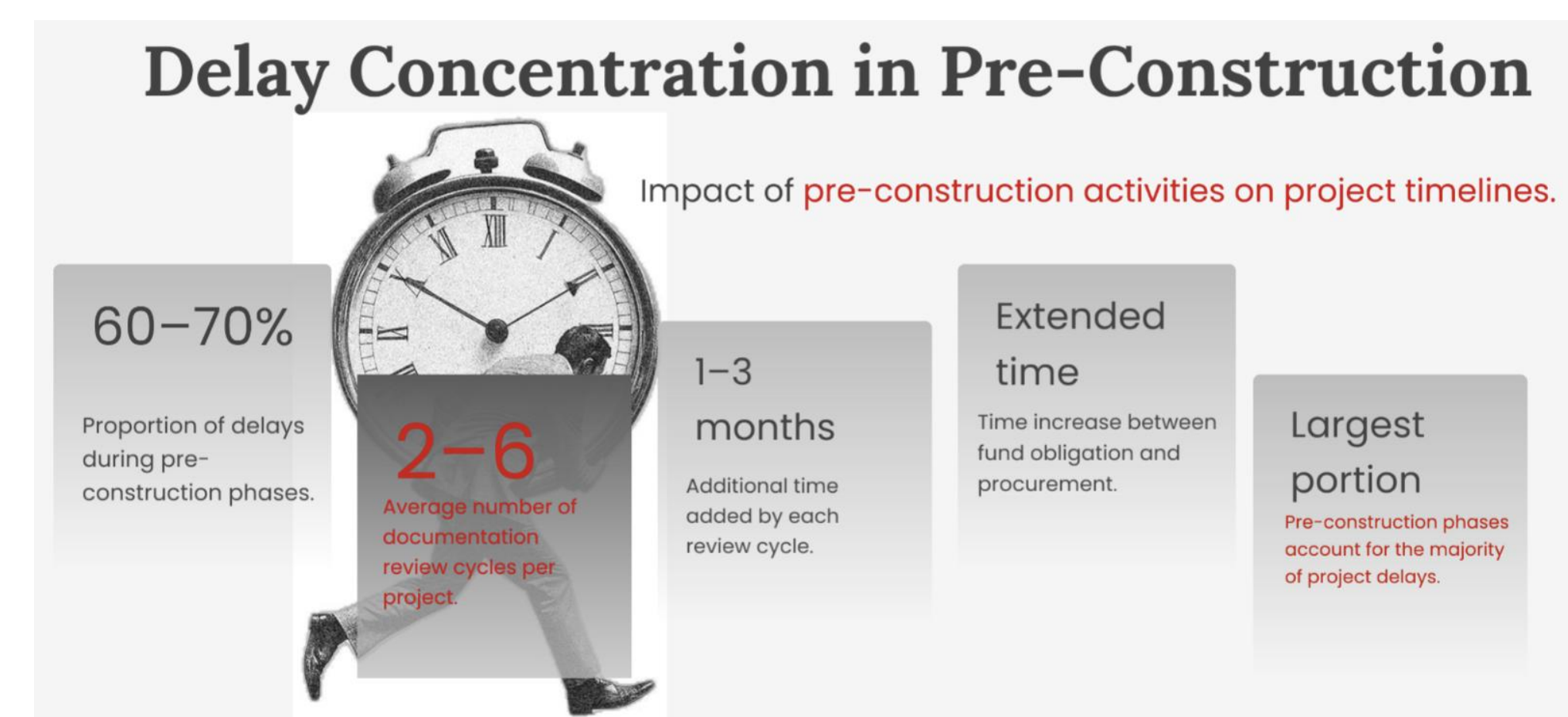
Section 106 & Interagency Coordination

Complexities of compliance and agency collaboration in project delays.



Limitations of Existing Approaches

Existing literature offers limited guidance on integrating disaster recovery, federal permitting, and historic preservation within FEMA-funded projects. The absence of standardized early-phase management frameworks contributes to fragmented workflows, repetitive reviews, and cumulative delays, supporting the need for an integrated management approach. [4, 5].



Methodology

- Qualitative multi-case analytical approach grounded in Engineering Management principles.
- Review of administrative records and technical documentation from FEMA-funded projects.
- Analysis of administrative workflows from fund obligation through pre-construction phases.
- Incorporation of professional observations related to project management and interagency coordination.
- Classification of delays according to pre-construction project phases.

Data Collection and Classification of Pre-Construction Delays

The identified delays were classified based on key pre-construction activities to enable consistent comparison across analyzed projects. This classification supported the identification of recurring delay patterns and the estimation of their relative impact on project schedules, allowing priority to be placed on early-phase activities with the greatest influence on overall timeline extensions.



Table 1. Preliminary Identification of Delay Factors and Estimated Timeline Impact in FEMA Historic Revitalization Projects in Southern Puerto Rico

Project Phase	Primary Issue Identified	Observed Impact on Project Timeline	Estimated Time Impact*
Pre-Construction	Incomplete or outdated scope validation	Multiple review cycles and re-submissions	2-4 months
Documentation Review	Inconsistent technical documentation across projects	Extended FEMA and COR3 approval timelines	1-3 months
Section 106 Coordination	Sequential review process among agencies	Delays prior to authorization to proceed	2-6 months
Site Conditions Assessment	Progressive deterioration not included in original scope	Scope revisions and cost re-estimation	1-2 months
Interagency Coordination	Limited standardization between municipalities	Unpredictable scheduling and approvals	1-3 months

Pre-Construction Delay Impacts

The greatest schedule impacts are concentrated in early pre-construction activities, particularly scope validation, documentation review, and interagency coordination. These phases account for a disproportionate share of overall project delays compared to later stages of project development.

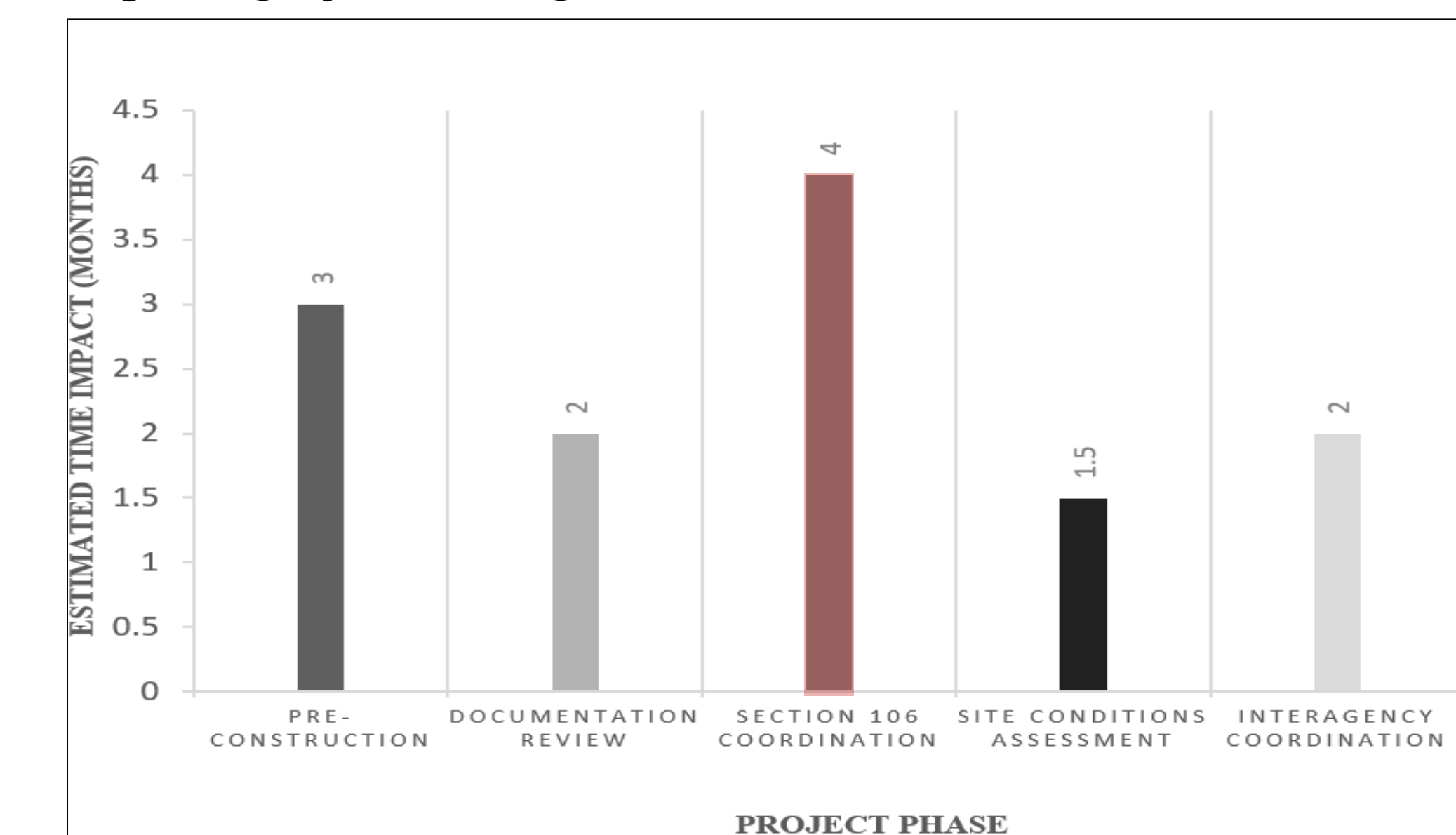


Figure 1. Estimated Pre-Construction Delay by Project Phase

Efficient Management Model for FEMA-Funded Historic Revitalization Projects

The proposed Efficient Management Model is structured around four sequential and interrelated pre-construction stages. These stages include early scope validation, standardized documentation coordination, integrated Section 106 compliance planning, and interagency workflow alignment. Together, these stages are intended to reduce administrative rework, improve coordination among stakeholders, and enhance schedule predictability while maintaining compliance with historic preservation requirements.

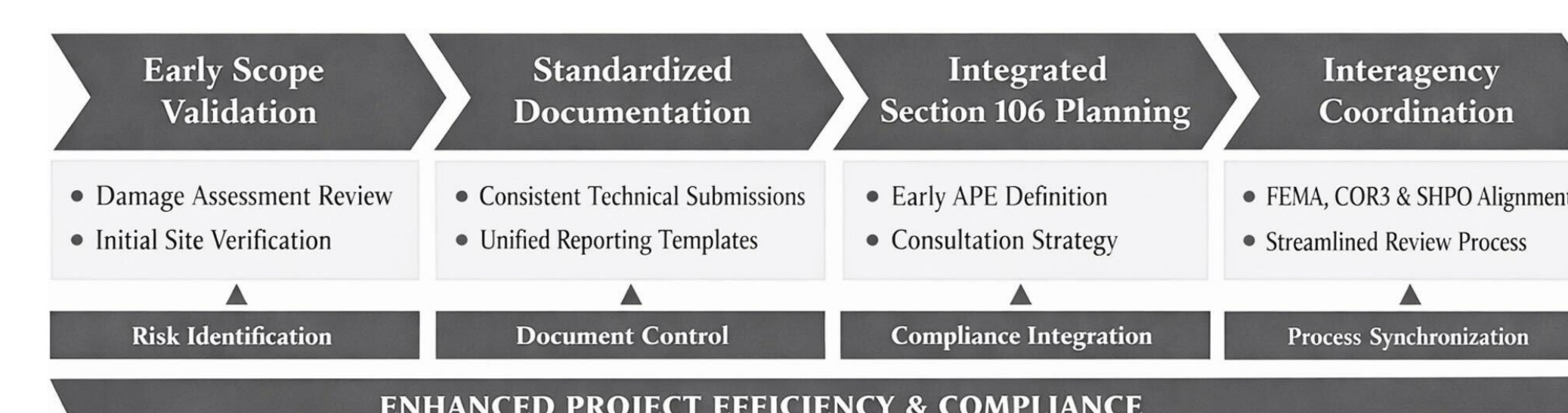


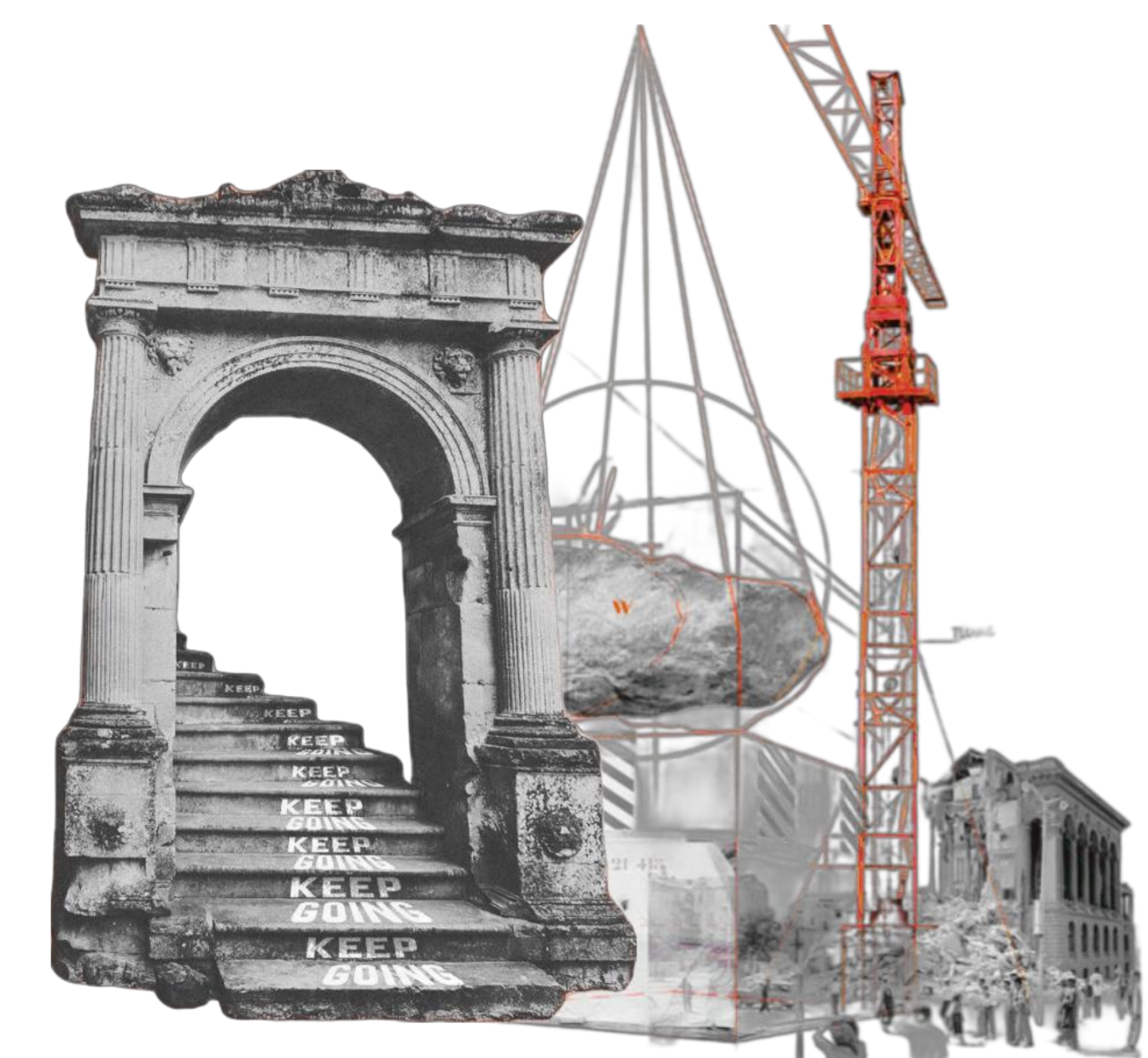
Figure 2. FEMA-Funded Historic Revitalization Model

Results

The analysis revealed consistent patterns contributing to extended pre-construction timelines in FEMA-funded historic revitalization projects. Incomplete or outdated scope definitions frequently required revisions as site conditions evolved, triggering additional administrative reviews and delaying approvals. Inconsistent documentation quality across projects and municipalities further increased review cycles and coordination demands among agencies. Historic preservation compliance was often addressed late in the project development process, increasing the likelihood of sequential reviews and late-stage modifications, confirming that project delays are systemic and concentrated in early pre-construction phases.

Conclusions

The findings demonstrate that delays in FEMA-funded historic revitalization projects are driven mainly by inefficiencies during early project phases rather than by construction-related constraints. Early scope validation, standardized documentation practices, and timely integration of historic preservation requirements emerge as critical factors for improving schedule predictability. The proposed Efficient Management Model provides a structured and replicable framework that aligns Engineering Management principles with regulatory compliance, reduces administrative rework, and strengthens interagency coordination while safeguarding historic resources.



References

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