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**Assessment of Delay Status, Major Factors, and Contract Management
Effectiveness in Local Government Road Projects: A Study from Sarlahi District.**

by

Anuj Dev

A THESIS

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OF MASTER OF SCIENCE IN CONSTRUCTION MANAGEMENT**


DEPARTMENT OF CIVIL ENGINEERING

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DECLARATION

I hereby declare that the thesis entitled “Assessment of Delay Status, Major Factors, and Contract Management Effectiveness in Local Government Road Projects: A Study from Sarlahi District” submitted to the Department of Civil Engineering in partial fulfillment of the requirement for the degree of Master of Science in Construction Management, is a record of an original work done under the guidance of Er.Subash Kumar Bhattarai, Institute of Engineering, Pulchowk Campus. This thesis contains only work completed by me except for the consulted material, which has been duly referenced and acknowledged.

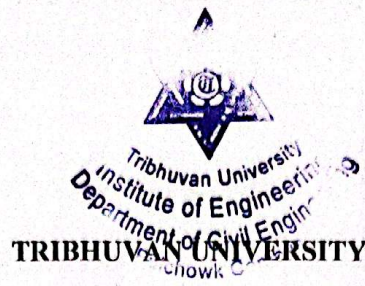


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CERTIFICATE OF THESIS APPROVAL

The undersigned certify that they have read and recommended to the Institute of Engineering for acceptance a thesis entitled "**Assessment of Delay Status, Major Factors, and Contract Management Effectiveness in Local Government Road Projects: A Study from Sarlahi District**" submitted by Anuj Dev in partial fulfillment of the requirements for the degree of Master of Science in Construction Management.

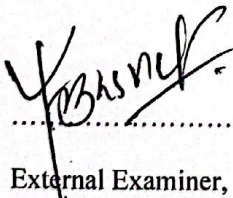

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ABSTRACT

Construction delays remain a persistent challenge in local government road projects in Nepal, particularly in Terai districts like Sarlahi, yet no systematic research has identified their major causes or evaluated whether contract management can mitigate delays. This study adopted a mixed-methods design, analyzing 21 projects, surveying 72 stakeholders using RII ranking of 37 delay factors and 20 contract management practices, triangulating with EOT letters and interviews, and conducting a comparative case study of delayed versus on-time projects. The findings revealed a 76.19% delay rate, with flexible pavements significantly more delayed than rigid pavements. The top delay factors were public disturbance, political interference, and end-of-fiscal-year budget release — predominantly external and owner-related. The most effective contract management practices were timely resource availability and liquidated damage clauses. The case study confirmed that early mobilization (20% vs 0%), enforcement of clauses, clear communication, and timely billing enabled on-time completion. The study concludes that while delays in Sarlahi are systemic, strong contract management can significantly reduce delays even under challenging conditions.

Keywords: Road construction delays, Relative Importance Index, contract management, local government, Sarlahi District, Extension of Time

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LIST OF ABBREVIATIONS

ASIP	Annual Strategic Implementation Plan
BS	Bikram Sambat
CAO	Chief Administrative Officer
CMIS	Crisis Management Information System
DoR	Department of Roads
EOT	Extension of Time
FY	Fiscal Year
GoN	Government of Nepal
KII	Key Informant Interview
LD	Liquidated Damages
LG	Local Government
LISA	Local Institutional Self-Assessment
M&E	Monitoring and Evaluation
MIS	Management Information System
MoFAGA	Ministry of Federal Affairs and General Administration
NCB	National Competitive Bidding

NPR	Nepalese Rupees
NPC	National Planning Commission
OCMCM	Office of the Chief Minister and Council of Ministers
PFM	Public Financial Management
PPA	Public Procurement Act
PPR	Public Procurement Regulations
PLGSP	Provincial and Local Governance Support Programme
PPIU	Provincial Programme Implementation Unit
RII	Relative Importance Index
SPI	Schedule Performance Index
SuTRA	Subnational Treasury Regulatory Application
TA	Technical Assistance
ToR	Terms of Reference
VO	Variation Order

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CHAPTER 1: INTRODUCTION

1.1 Background of the Study

Construction delay is a persistent and ancient issue in infrastructure delivery, occurring when a project fails to meet its contractual completion time. Aziz and Abdel-Hakam (2016) argue that road construction delays impact time, costs, and stakeholder performance, as every lost day disrupts work, money, and coordination. Rivera, Baguec, and Yeom (2020) further demonstrated that road project delays are common in developing countries, driven by poor management experience, weak planning, and land-related problems. Delay is not merely a matter of time—it is a development problem affecting works, workers, records, and public service. Importantly, delay has no single cause or victim. Late budget release, unresolved site clearance, political interference, or poor stakeholder management can each slow a project. Bhattarai (2023) identified poor planning, weak monitoring, material shortages, under-bidding, and political issues as common causes in Nepal. Thus, delay should be studied as a systems issue rather than a single-point error.

The construction sector plays a vital role in Nepal's development, building roads, schools, and health posts that connect people and markets. The National Planning Commission (2020) has prioritized infrastructure as a pillar of economic prosperity. Roads are particularly critical in Nepal's geography, as they determine access to markets, emergency response, and basic services. Subedi and Joshi (2020) found that weather, slow decision-making, land acquisition issues, poor coordination, and experience gaps are major causes of road delays in Nepal. Following the 2015 Constitution, federal restructuring gave local government stronger responsibilities for infrastructure planning and execution. However, Koirala and Shahi (2024) noted that while municipalities gained authority, they also revealed gaps in capacity and management. The PLGSP report (MoFAGA, 2021) confirmed that trained officials still operate under limitations in staffing, turnover, and delivery systems. Local government road projects now require independent research because they operate under different institutional constraints than centrally controlled works.

This research focuses on road construction projects in five municipalities of Sarlahi District: Kabilasi, Haripur, Balara, Malangwa, and Bagmati. For analysis, municipalities were categorized as Near Highway (Haripur, Bagmati) and Away from Highway (Balara, Malangwa, Kabilasi). Analysis of 21 reviewed projects revealed a delay rate of 76.19 percent—16 projects were late and only 5 completed on schedule. Average delay days ranged from 119 days in Balara to 878 days in Bagmati, with SPI values as low as 0.31, indicating severe schedule underperformance. Bagmati had 1 delayed project out of 1 reviewed (100% delay rate). The highest-ranked delay factors from primary data include public disturbance and site clearance issues (RII 0.756 and 0.739), political interference, end-of-fiscal-year budget release, unskilled contractors, poor owner communication, and weak site supervision. These findings shift focus away from a contractor-only failure narrative toward the intersection of administration, politics, public pressure, and contract execution. Critically, case comparison shows that effective contract management—including timely mobilization, variation control, payment discipline, and penalty enforcement—can alter delay outcomes even under similar disturbance conditions. Sarlahi is therefore not only a site of widespread delay but also a place where local government contract administration offers practical lessons for improvement.

1.2 Problem Statement

Road construction projects implemented through contractors in the local governments of Sarlahi District exhibit a serious pattern of delay. Out of 21 projects analyzed, 16 were late and only 5 completed on time, giving an overall delay rate of 76.19 percent. Delay durations were prolonged across several municipalities, with Bagmati experiencing a mean delay of 878 days. Schedule Performance Index (SPI) values further confirm poor performance: Bagmati (0.31), Haripur (0.55), Kabilasi (0.66), Malangwa (0.60), and Balara (0.76). These numbers indicate that delay in Sarlahi is not an isolated accident linked to a single unsuccessful contract. It is a recurrent feature of the project environment, suggesting underlying structural issues in how local road projects are planned, administered, and implemented. This pattern is consistent with findings from

developing countries where road project delays range from 60-80% (Rivera et al., 2020; Aziz & Abdel-Hakam, 2016).

Contractor performance is only one part of the problem. The highest-ranked delay factors include public disturbance and site clearance issues, political interference, end-of-fiscal-year budget release, owner decision delays, acceptance of unskilled contractors, lack of budget, weak owner communication, delayed commencement, poor site supervision, and local pressure or strikes. These factors were confirmed through secondary evidence including EOT letters and interviews. Thus, Sarlahi's delays result from a multi-relational effect involving owner-side issues, political and public actors, procurement and contractor selection, and contract management. When a road is delayed, the cause cannot be limited to inefficient labor or slow fieldwork alone—finance, administration, politics, and site management all play a role. Similar multi-relational causes of delay have been documented in Nepal by Bhattarai (2023) and Subedi & Joshi (2020).

Incomplete transparency in documentary records is another problem. Some EOT letters were vaguely worded (e.g., "miscellaneous"), but interviews revealed concealed problems such as public disturbance, political interference, site clearance difficulties, and owner-side approval delays. This creates an analytical vacuum. An extension may be recorded in official project files without identifying the actual cause. Consequently, delay may be normalized administratively but not substantively addressed. The same causes repeat under new project names unless stronger diagnostic evidence is provided. This is why mixed-method research is required—it allows ranked survey evidence, project records, and case comparisons to speak to each other rather than in isolation. Koirala & Shahi (2024) noted similar gaps in project documentation in rural Nepalese municipalities.

The fundamental problem is not merely that most contractor-implemented road projects in Sarlahi are delayed. Rather, delays are caused by a complicated combination of factors and unequal contract management practices, yet this pattern has not been properly researched in a district-specific manner. Local governments need evidence that distinguishes major from minor causes and determines whether delay can be minimized through stronger contract management, even under conditions of disturbance and pressure. This thesis addresses this gap by evaluating the present delay situation,

identifying and ranking key delay factors, and assessing the effectiveness of contract management practices in reducing delays in Sarlahi's local governments.

1.3 Research Objectives

The general objective of this study is to assess the delay status, identify and prioritize the major delay factors, and evaluate the effectiveness of contract management practices in road construction projects implemented through contractors in the local governments of Sarlahi District.

- To assess the current status and extent of delays in road construction projects implemented through contractors in the local government of Sarlahi District.
- To identify and prioritize the major delay factors affecting those projects.
- To evaluate the effectiveness of contract management practices in mitigating delays.

1.4 Significance of the Study

Academically, this study expands construction delay research into a district-based local government context that has been scarcely studied. While most Nepalese literature analyzes delays at the national level or within Department of Roads projects, this research provides empirical evidence from contractor-implemented road projects in Sarlahi's local governments. By categorizing municipalities as Near Highway (Haripur, Bagmati) and Away from Highway (Balara, Malangwa, Kabilasi), the study enables comparative analysis of delay patterns across different geographical contexts. Methodologically, it contributes through delay-status analysis, RII-based factor ranking, documentary triangulation, and comparative case studies—a combination rarely applied to local government road projects in Nepal.

Practically, this research benefits local governments and project stakeholders in Sarlahi. Municipal leaders can identify which delay factors require priority attention. Contractors can recognize weaknesses in mobilization, supervision, and coordination that increase project risks. Engineers and planners gain evidence to improve tender preparation, budgeting, site preparation, and contract management. The findings are particularly

valuable because they move beyond description—patterns such as public disturbance, political interference, budget release timing, owner decision delays, and weak variation control can be addressed through policy and managerial intervention. A municipality that understands its primary delay sources can reorganize its project implementation order, ultimately transforming diagnosis into decision.

1.5 Scope and Limitations of Study

This research focuses on contractor-implemented road construction projects in five municipalities of Sarlahi District, Nepal: Kabilasi, Haripur, Balara, Malangwa, and Bagmati. For analysis, municipalities are categorized as Near Highway (Haripur, Bagmati) and Away from Highway (Balara, Malangwa, Kabilasi). The study covers three aspects: (1) delay status and level quantified by project records, delay rate, duration, and SPI; (2) identification and prioritization of delay factors using questionnaire survey, RII ranking, and triangulation with EOT letters and interviews; and (3) effectiveness of contract management through RII-based analysis and comparative case study between delayed and on-time projects. Methodologically, the study employs a mixed-method, descriptive-analytical, and comparative case study design. It is not comprehensive to all districts of Nepal or all infrastructure sectors.

Several limitations must be acknowledged. First, out of 32 identified projects, 11 had unavailable records, narrowing the delay-status analysis sample. Second, some EOT letters contained vague terms like "miscellaneous," requiring interview-based clarification. Third, the comparative case analysis under Objective 3 is limited to few projects, making findings analytically sound but not statistically universal. Fourth, the research scope varies by objective—Objective 1 is restricted to 5 municipalities where complete records were available, while Objectives 2 and 3 cover 11 municipalities in Sarlahi District. Therefore, findings cannot be directly extrapolated to all local governments in Nepal. Fifth, politically or socially sensitive factors (e.g., public disturbance, political interference) may be underreported due to respondent caution. Despite these constraints, mixed methods, documentary triangulation, and multiple stakeholder groups enhance the study's credibility

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The chapter summarizes the literature that describes the reasons behind construction project delays, the impact of delays on project performance, and the importance of road construction under local governments to be empirically studied closely. The review switches between the concepts, theory, then empirical studies, policy setting, and the gap in the research that will be tackled in this thesis. This is required since delay is not an easy issue of slow work. It is a stratified issue which starts in planning, expands into contract administration and is manifested on the ground in unfinished pavement, blocked access, idled equipment, and increased cost. As Aziz and Abdel-Hakam (2016) explain, the issue of road construction delay is a recurrence phenomenon that is influenced by numerous factors that vary between parties and various projects. Rivera, Baguec, and Yeom (2020) also demonstrated that the presence of delay in the road projects in the developing nations has not only general causes but country-specific ones as well, implying that the general theory should be verified by the local data. In Nepal, Bhattarai (2023) contended that time delay is one of the key hindrances to successful construction delivery since it impacts time, cost, coordination, and the development outcomes. Koirala and Shahi (2024) went on to indicate that rural municipality projects experience severe time overrun and that they have concrete implications on quality, delivery, or management. That is why, the current chapter does not discuss literature as a list of summaries. It views literature as a piece of evidence that assists in explaining why the local government road projects under Sarlahi exhibit sluggishness and the need to research the delay using a variety of lenses.

The conceptual framework of this study was also informed by broader construction management literature that addresses delay classification, risk assessment, and contract enforcement. Key among these are Gajare, Patil, and others (2015) on delay typologies, Konior and Szostak (2020) on schedule performance measurement, and Kebede and Zhang (2020) on legal remedies for time overruns. Additionally, Enshassi, Kumaraswamy, and Jomah (2010) on penalty enforcement, Islam, Trigunarsyah, and

Hassanain (2019) on risk management, and Ramanathan, Narayanan, and Idrus (2012) on construction delay risks provided theoretical guidance for categorizing delay factors and evaluating contract management practices. Methodological references such as Polit and Hungler (1985) and Mouton (2001) supported the validity and reliability procedures described in Chapter 3. Although these studies are not cited in every empirical finding, they collectively shaped the research design and analytical approach of this thesis.

2.2 Conceptual Review

2.2.1 Construction delay concept

Construction delay is usually interpreted as the failure to complete a project within the agreed time or the scheduled time that was initially set to be delivered. This definition may seem easy to understand but when considered in terms of the actual consequences of the project, it becomes more comprehensive. A late road is not simply a road that is late. It is a highway that withholds service, adds vagueness and upsets the intended order of cost, supervision, and use. The thesis by Bhawani Dhakal categorized construction delay as time slipping or extension that impacts on the completion of agreed works. According to Aziz and Abdel-Hakam (2016), delay was among the most frequent and the most expensive issues in construction since it influences time, thus, money, coordination, and risk. Koirala and Shahi (2024) defined time overrun as delay of the critical path activities that causes the project to be finished later than the schedule it was planned to be. This explanation is important since not all minor inconsistencies are equal. Delay is particularly of concern when it touches on activities that influence the final date. Correction of a road shoulder can be done later but site clearance on the main alignment that is not resolved can halt the entire chain. The point of the contract date is still one point on paper, but the actual content of delay is shown by the effect of that missed date on work, money, and access by the people.

It has also been established in the literature that delay can be best described as a concept that is relational. It is not taken in isolation. It is compared with what had been promised, planned, contracted or anticipated. Untimely completion is another issue that Rivera et al. (2020) highlighted as a constant problem in road projects in developing countries. Bhattarai (2023) also associated construction delay with the inability to initiate or even

complete the project in the intended time in Nepal. This relational nature is significant since this links delay to responsibility. Delay cannot be distinguished easily without a schedule. Without a contractual expectation, extension of time cannot be interpreted properly. A project will go astray without scheduled milestones as it can seem to be in progress. The construct is thus based on the comparison of planned and real progress. A road construction can have people on the ground and still be behind schedule because the speed is not as per the schedule that had been approved. Schedule failure can be concealed in the surface activity. A truck might discharge aggregates but the clock of the contract might still be running. This is why delay is not a synonym of stoppage. It encompasses gradual advancement, discontinuous advancement, and non-aligned advancement that gradually cause the project to reach an agreed termination point (Rivera et al., 2020; Bhattarai, 2023).

2.2.2 Delays, cost overrun and time overrun

Time overrun is closely associated with delay; however, the emphasis is not the same. Delay is as a consequence of slippage against the agreed timeline. Time overrun indicates the quantifiable increase of the initial schedule. The two are actually used in tandem, however, in literature the use of time overrun is done to emphasize the magnitude and project performance. Koirala and Shahi (2024) presented the concept of time overrun as one of the most widespread in the construction sphere and demonstrated that it could go up to high percentages in the projects of rural municipalities. The work by Sudip Acharya in Syangja also concentrated on time overrun as one of the significant project problems and established that it has significant negative impacts which include rise in total cost of projects, contract schedule violation, conflicts, and arbitration. The thesis of Bhawani Dhakal also associated the delay with the time overrun and relied on the SPI to measure the schedule performance. These studies demonstrate that breaching the planned schedule puts the project in another risk category. The extension has ceased to be just a calendar issue. It transforms the economic and management structure of the project. The bills have different flow, the supervision is prolonged and the contractual claims are more probable. A program which appeared linear initially begins to curve with the continuous stress.

One of the most apparent impacts of delay is cost overrun since time in construction has a direct financial impact. Increase in labor cost may occur when project period is extended, material cost may vary, supervision is prolonged, equipment might not be fully utilized and administrative overhead is increased. Acharya discovered that the most significant impact of delay in the construction of rural municipalities is increase in the overall cost of the project. According to Koirala and Shahi (2024), cost overrun and time overrun were also characteristic of a significant portion of the projects of rural municipalities. Koirala and Bhusal (2026) also stated that schedule overrun, disruptions, and resource inefficiency are the relevant results of delays in municipal construction, particularly when underbidding and poor management are observed. This trend can be imagined on the site. The road base is open longer than desired. Bitumen rates shift. Labor waits. The office is yet to monitor, certify and process payments. Delay causes time to become cost, then and not in one way. This is due to the fact that the final bill can reflect only a portion of the damage, since some of the cost can be reflected in lost opportunity, diminished public value or skewed resource utilization instead of a single ledger entry.

2.2.3 Relative Importance Index as an analysis instrument

Relative Importance Index, which is often abbreviated as RII, is one of the most popular methods in construction management research that is used to prioritize the delay factors. It is attractive by its clarity. The factors are rated by the respondents using a fixed scale and the ratings are then translated into a value that would enable them to rank the factors as most important and least important. The thesis by Bhawani Dhakal was based on RII to prioritize causes of delays in road construction projects. Subedi and Joshi (2020) applied the same method to determine the key reasons behind the delay in the Gandaki road projects. According to Aziz and Abdel-Hakam (2016), RII was also used to rank a long list of delay causes in the Egyptian road construction. This method is applicable in comparative analysis because of its consistency in settings. It is possible to compare the position of political interference as the first and the second compared to weather, budget release in comparison with poor supervision. That does not imply that RII is telling the undisputed truth. It demonstrates that there is a structured perception and priority among informed actors. This is still useful since construction delay can have numerous potential

causes, and the management must have a means of determining which of them are worth prioritization at the moment. RII assists in transforming the list that is congested into a sequence.

The power of RII is in the prioritization, yet its boundaries should be comprehended as well. It is not a strict experimental sense of perceived importance, but direct causal force. One of the factors can be rated high due to many respondents experiencing it frequently, due to its extensive visible effect, or due to its representation of broader deficiency. Due to this reason, RII is more effective when used alongside other evidence. The thesis presented by Bhawani associated ranking with SPI and discussion of the project. The current Sarlahi research goes further to pair RII with EOT letters, interviews as well as case comparison. This is a significant mixed use. Even high-ranked factor like a public disturbance can turn into more credible when it is found in project documents and clarification of stakeholders. Even a minor factor like weather can have a significant impact on the chosen projects. RII therefore should be viewed as a rigorous initial filter and not as an ultimate explanation. It gives the researcher an idea of where to dig deeper. It does not preclude the importance of documentary reading, contextual interpretation, or the triangulation. A ranking table will be handy, yet the project file and the field narrative will have work to do next to the ranking table.

2.2.4 Contract control and time management

Contract management can be explained as the administrative and operational measures that are applied in order to transform a contract that is in paper promise into actual work. In the road construction, these are handover of sites, mobilization, document approval, supervision, billing, variation control, quality enforcement, penalty application and dispute resolution. These might sound procedural but the literature and the Sarlahi evidence indicates that they are at the core of delay mitigation. According to Om Prakash Giri and colleagues (2025), there is the need to plan better, enhance stakeholder cooperation, increase regulatory management, and practice better project management in order to minimize construction delay. The factors of delay in contracts and consultants were also included in the thesis of Bhawani, indicating that actions of the management are important as well as external conditions. This is very evident in case comparison 3 of

the current study. The mobilization was poor in the delayed project, there was poor handling of variations order, unnecessary payment, arbitration was created and poor management of site clearance. On-time case, there was more mobilization, greater variation order control, defect correction, and dispute did not escalate. This comparison of the two projects indicates that contract management does not remove the field pressure, it may just make sure that the pressure does not turn into the long delay.

The concept of delay mitigation therefore cannot be reduced to one slogan such as “better planning.” It entails realistic management of the project chain. Clearance of the sites should be taken care of before conflict hardens. Variation orders should be accepted legally and then they will not distort payment. The quality flaws should be rectified prior to their subsequent complaints. Discipline is necessary in the movement of bills to ensure a smooth running of work. The pressure of the mass media has to be addressed prior to halting access or advancement. Giri et al. (2025) viewed mitigation as a combination of planning, collaboration, regulation, and capacity. This perspective is helpful as road delay usually arises in the areas where these factors do not coincide. The area where alignment is put to test is the contract management. The contract is not a paper document lying in a file. It is a live control instrument, which should react to site reality without the loss of procedural integrity. When this control is lax, delay increases. Difficult projects can be kept closer to schedule with even difficult projects being kept on schedule when it is active and consistent.

2.3 Empirical Review

2.3.1 Foreign research on road construction delay

The international studies give a general perspective of the delay causes that are common in road projects and allow one to isolate common patterns and local ones. The authors Aziz and Abdel-Hakam (2016) research in Egypt investigated 293 causes of delay and ranked them with the help of RII. International evidence from diverse developing countries confirms that delay patterns are context-specific but share common themes. Aibinu and Jagboro (2002) found client-related delays significant in Nigeria, while Alaghbari et al. (2007) identified financial and coordination problems as primary causes in Malaysia. In road-specific studies, Alhomidan (2013) documented payment delays and

poor communication as key factors in Saudi Arabia, and Alnuaimi and Mohsin (2013) examined similar patterns in Oman. Baram and Cce (2000) further noted that disputes often originate from concurrent delay events. Collectively, these studies support the multi-causal nature of construction delays and the need for localized analysis. Their work highlighted that road construction delay is predetermined by numerous parties and procurement reform and stakeholder management play an important role in control. What is useful about this study is not just the list of causes but the bigger lesson, which is that road delay is multi-causal and highly contextual. In their research conducted among twenty-five developing countries, Rivera et al. (2020) have determined that the most notable contributors to delay were the lack of experience of the construction manager, poor planning and scheduling, and land influence along the road line. This is significant to their meta-comparative approach that demonstrates repetition and variation. The causes were similar in half of the countries, but still the local industries and socio-economic conditions were important. The moral of this thesis is obvious. It is possible to recognize recurrent structures in international literature, however, the analysis at the district level is still needed since the causes are ranked and articulated differently in different settings. Globally, large construction projects face systemic delays driven by contractor poor planning and owner payment issues (Assaf & Al-Hejji, 2006). In Malaysia, contractor financial problems and poor site management are primary delay causes (Sambasivan & Soon, 2007). Zambian road projects experience cost escalations and schedule delays due to inadequate contract administration (Kaliba, Muya, & Mumba, 2009). Across developing countries, delay causes vary significantly, with land acquisition and planning weaknesses being most critical (Mejía et al., 2020). In Nepal, the Narayanghat-Butwal road project faces public disturbance and stakeholder perception gaps (Shambhu, Awasthi, & Bohara, 2025), while retrofitting projects in Kathmandu Valley show 42-167% time overruns due to impractical schedules (Bhattarai et al., 2024). The World Bank (2019) confirms Nepal's infrastructure sector faces systemic challenges in contract management and enforcement.

2.3.2 Nepal wide research on delay in construction

The studies conducted nationwide in Nepal offer the general national picture within the framework of which the results of the study at the district level and in the city can be viewed. Based on descriptive review of the chosen journals, Bhattarai (2023) discovered that inadequate planning, poor monitoring, unfavorable site conditions, design changes, material shortage, equipment and manpower, low bidding, unrealistic time in the contract, poor coordination, quantity variation, inflation, natural calamities, and political and governmental factors were the key reasons behind construction delay in Nepal. His review is helpful as it collects common patterns that are repeated by numerous sources and provides them as a national image. Om Prakash Giri and others (2025) came up with similar findings on delay management as viewed by the Nepalese, albeit in residential projects on a small scale. They emphasized poor planning, shortage of labor, bureaucracy, weather and disruption in supply chain in addition suggesting measures to mitigate the problem as proactive planning, enhanced collaboration, enhanced regulation and enhanced skill of the workforce. Such studies are important in that they demonstrate that the delay in construction in Nepal has both structural and managerial origin. They also demonstrate that mitigation must be undertaken on a number of fronts and not a technical solution.

2.3.3 Nepal Rural municipality researches

The importance of rural municipalities studies is particularly significant since they are closer to the local government conditions than studies of the central road departments. The research by Sudip Acharya in the Syangja region has found that there are five primary delay causes based on RII; poor availability of local materials because of the extraction limitation, low bidding, hand-on number of running projects, consultant site staff absence, and delay in site mobilization. Other significant impacts that it experienced were rise in the overall project cost, stress to the team, schedule breach, disputes and arbitration. Koirala and Shahi (2024) examined the time overruns in Nepal rural municipalities and found that poor weather, less involvement of contractor head offices, lack of experience of consultants, poor site management and delayed site mobilization were significant causes of time overruns. They also indicated that over half of the

projects researched on had a time overrun, and some of these were extremely large. These researches indicate that a mix of contractor, consultant, environmental, and procurement factors has a tendency to delay the rural and local projects as opposed to an overwhelming single contributor.

The article by Amrit Kumar Shrestha on Ghiring Rural Municipality provides a stakeholder-based contribution to this body of literature. It discovered that lack of required equipment, bid low, unavailability of material, poor contractor planning and control as well as weaknesses of the consultant were some of the most important delay factors. This fact adds to Acharya and Koirala by demonstrating that rural municipality environment is frequently characterized by a combination of the lack of resources and poor planning and oversight. Weather and topography are not the only factors that determine the road in such settings. It is influenced by what the contractor is physically able to bring to the site and how the local system is favourable or manages that effort. The findings can be applied to the current thesis since Sarlahi has certain common features of local government with rural municipal work, despite being more socio-politically sharp in certain aspects. The rural literature demonstrates that the local-level delay in Nepal can frequently arise when the formal contract structure collides with the practical constraint in skill, equipment, management of the site and support systems.

2.3.4 City construction research in Nepal

Municipal studies assist in bridging the disparity between the general literature of the country and the particular facts of local governments. Koirala and Bhusal (2026) established that the soil conditions, slow release of budget, lack of communication between the client and the contractor, underbidding, materials unavailability and poor contract planning were highly associated with delays in municipal construction projects in Nepal. Their work in particular is particularly applicable in the sense that it addresses directly the municipalities and the publicly constructed under the NCB settings. It also focuses the importance of client-side and administrative factors, which is much more compatible with the current Sarlahi results. In the research on the delay of road construction in urban regions, Pramshu Nepal (2024) found that the frequent alternation of governments, change of project design, low productivity of labor, poor planning,

political interference, and the shortage of resources were the key causes. He also emphasized on public dissatisfaction and negative impacts on business, health, and safety. The importance of these studies is that they demonstrate that municipal delay is frequently associated with the context of the public administration and politics and social visibility rather than outright technical failure. The town road is near trade, village, and day-to-day traffic. Delay is therefore a social performance issue but not a project issue.

2.3.5 Comparison with context of the Department of Roads

The sample thesis by Bhawani Dhakal provides a valuable comparative case since it was a research on DoR-controlled roads in Bharatpur. It had the highest delay factors such as political interference, timely payment to labor, local and political pressure, contractor financial problems, poor communication, public disturbance, soil issues, consultant delay in inspection and release of budget at the end of the fiscal year. Its resemblances with Sarlahi are remarkable. Both settings feature public unrest, political meddling, and timing of the budget. However there are also differences. The findings made by Sarlahi are more emphasized on the owner side delay in decision making, acceptance of unskilled contractors, bad owner communication and site clearance problems, which are verified by documentary triangulation. The saved comparison document that was prepared in relation to this thesis also reveals that the local government situation in Sarlahi exhibits greater owner-side delay and socio-political delay than in the DoR case, whereas the study by Dhakal assigned a relatively high level of importance to the financial and coordination challenges of contractors. This difference is analytically handy. It implies that there is the issue of level of governance. As the implementing environment is altered, whereby the departmental supervision is replaced by the local government responsibility, there may be a shift in the balance of causes of delay.

2.4 Research Gap

Construction delay literature is quite substantial, but there is a significant gap. Repeated causes of road delays in most developing nations are explained in international studies. Nepalese literature describes delay in general national terms and in the chosen rural, municipal, and DoR situations. Examples of useful cases are found in Gandaki Province, Syangja, Ghiring, Shuklagandaki, Bharatpur and city-area road construction. The policy

documents describe how the roles of local governments have been transformed following the restructuring of the federal government. Nevertheless, none of them give a direct, district-based, mixed-method study of local government road projects being implemented by contractors in Sarlahi, which combine delay status, ranking factors, documentary triangulation, and contract management comparison. The omission is relevant since the project profile of Sarlahi is heavily influenced by the social unrest, political influence, owner-side delay, timing of budget and the unequal control of the contract. The combination of these forces in a single district can not be fully explained by a general Nepal study. A DoR study will never replace reality by local government. The socio-political texture of Sarlahi cannot be exhaustively represented in a rural Municipality study. The divide, thus, is geographical and analytical.

This thesis fills that gap by creating one design out of four strands of evidence. To begin with, it quantifies the present situation and level of delay by means of project records, delay rates, delay duration, SPI, frequency of EOT and analysis of pavement type. Second, it determines and establishes key delay factors by RII based on questionnaire data on various stakeholder groups. Third, it cross-tabulates those variables with EOT letters and stakeholder clarification, which is essential where the official records utilize ambiguous words like miscellaneous. Fourth, it measures the effectiveness of contract management by comparative case study of on-time and delayed project. This synthesis aspect is not present in the preceding literature on Sarlahi since it is mostly absent. The gap in research consequently explains the current thesis explicitly. It is not just another delay study. It is a local government road delay study based on the project experience of Sarlahi and influenced by a design that shifts between measurement, explanation, and managementinsight.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the study design, the people it studied, the data it used and the analysis of the data. A methodology is not a ritual section that is inserted between literature and findings. It is the work backbone of the thesis. When Chapter One spells out the problem and Chapter Two demonstrates what others have written, Chapter Three demonstrates how evidence was collected to answer the problem in a disciplined manner. The method in this research needed to correspond to the form of the issue itself. Slow road construction is not an isolated incident such as a broken slab or a lost drawing. It is a stratified situation that may be observed in files, in schedules, in responses to surveys, and in stories at the site level. That is why one approach would have been too limited. According to the Methodology document written in connection to this thesis, the study was designed based on a mixed-method that incorporated both a quantitative and a qualitative approach to measure the delay status, the key delay factors, and to evaluate the effectiveness of the contract management in the road construction project implemented by the local governments in the Sarlahi District under contractors. The identical document further indicates that descriptive-analytical framework was applied that was backed by comparative case study and triangulation of survey results with documentary proof and interviews with the stakeholders. These were not ornaments. The reason behind their selection is that the research problem itself has three interconnected components, which are the scale of delay, the causes of delay, and the management practices that can be used to reduce delay.

There is also a question that a methodology chapter must provide an answer to. Why must the reader have confidence in the way between data and conclusion? The question is relevant in this thesis since road delay can be disguised in mushy words, half-complete files, and selective accusations. A single extension letter can make a reference to miscellaneous when the real reason is public disturbance, political interference or unapproved variation order. A contractor can accuse budget release and an owner can accuse poor supervision of a site. Such a method, which gathers only a single voice, would give a thin picture. An approach that would scan one document would run the risk

of confusing official wording with causality. This is what made the research design to cross sources. It required project records of delay status, structured questionnaires of ranked factors, interviews to clarify and case comparison to determine how well the contracts were managed. The thesis by Bhawani Dhakal also demonstrates the worth of the systematic methodology chapter with clear sections on research approach, sample size, data collection, and analysis, although the current study does not follow this pattern but, instead, is more focused on local government context, triangulation, and management comparison instead of ranking and SPI only. The next chapter is then a procedural and analytical one. It notes what was done, but it also reasons why each of the methodological choices is appropriate to the problem under study.

This chapter describes the research design, study population, data collection methods, and analytical techniques employed in this thesis. A methodology is not a ritual section inserted between literature and findings; it is the backbone of the research. When Chapter One spells out the problem and Chapter Two demonstrates what others have written, Chapter Three demonstrates how evidence was collected to answer the problem in a disciplined manner.

The method in this research needed to correspond to the nature of the problem itself. Road construction delay is not an isolated incident such as a broken slab or a lost drawing. It is a stratified situation that can be observed in project files, schedules, survey responses, and site-level narratives. Consequently, a single approach would have been insufficient. This study was designed as a **mixed-method research**, incorporating both quantitative and qualitative approaches to address three interconnected objectives:

Objective 1 (Delay Status): To assess the status and magnitude of delay in local government road projects using project records, delay rates, duration, and Schedule Performance Index (SPI), analyzed through **chi-square tests and t-tests**.

Objective 2 (Delay Factors): To identify and rank 37 delay factors (grouped into 8 categories) using the **Relative Importance Index (RII)** based on questionnaire data from 11 municipalities, followed by triangulation with Extension of Time (EOT) letters and stakeholder interviews.

Objective 3 (Contract Management): To evaluate the effectiveness of 20 contract management practices (grouped into 4 categories) using RII, supported by a comparative case study of a delayed versus an on-time project, with findings compared against the ranked management practices.

A methodology chapter must answer a critical question: Why should the reader have confidence in the connection between data and conclusion? This question is particularly relevant in this thesis because road delay can be disguised in vague wording, incomplete files, and selective accusations. A single EOT letter may cite "miscellaneous" when the real reasons are public disturbance, political interference, or an unapproved variation order. A contractor may blame budget release, while an owner may blame poor site supervision. A method that gathers only a single voice would produce an incomplete picture. An approach that relies only on documents would risk confusing official wording with causality.

This is why the research design was built to cross-check sources. It required: (a) project records to quantify delay status, (b) structured questionnaires to rank delay factors and management practices, (c) interviews to clarify ambiguities in EOT letters, and (d) a comparative case study to assess how contract management practices differentiate delayed from on-time projects. This triangulation of primary and secondary data strengthens the validity of findings beyond what any single method could achieve.

The following sections present the research design, study area, population and sample, data collection instruments, validation and reliability procedures, and the specific analytical techniques applied for each objective.

3.2 Research Design

This study employed a **mixed-method research design**, incorporating both quantitative and qualitative evidence. The quantitative dimension measured and ranked delay status, delay factors, and contract management practices. The qualitative aspect described and interpreted findings that numbers alone could not fully capture. As stated in the

methodology framework, this design was structured to address the three specific objectives of the study: (1) assessing delay status, (2) identifying and ranking delay factors, and (3) evaluating contract management practices in road construction projects implemented by contractors in Sarlahi District's local governments.

The design incorporated three complementary components. **First**, a descriptive-analytical framework was applied to quantify delay status using project records, including delay rates, delay duration, and Schedule Performance Index (SPI) values. **Second**, a cross-sectional survey was conducted using structured questionnaires to collect primary data from 72 respondents across 11 municipalities, enabling the ranking of 37 delay factors (grouped into 8 categories) and 20 contract management practices (grouped into 4 categories) using the Relative Importance Index (RII). **Third**, a comparative case study was included to contrast a delayed project with an on-time project, allowing assessment of how contract management practices differ between the two outcomes.

A distinctive feature of this research design was **triangulation**. Primary survey data were compared and cross-verified with secondary documentary evidence, including Extension of Time (EOT) letters, project files, variation orders, and stakeholder interviews. This triangulation was essential because official documents sometimes use vague terms such as "miscellaneous" to mask politically or socially sensitive causes like public disturbance, political interference, or unapproved variation orders. By cross-checking multiple sources, the design reduces the risk of accepting official wording as causal explanation.

The mixed-method design was not selected generically; it was modelled to the architecture of the research questions. **Objective 1** (delay status) required descriptive quantification of delay rates, days, and SPI values. **Objective 2** (delay factors) required prioritization of 37 factors and documentary triangulation to validate perceived causes against recorded evidence. **Objective 3** (contract management) required comparative judgement between delayed and on-time projects to determine which management practices differentiate successful from unsuccessful outcomes. Each objective demanded a different evidentiary approach, and the mixed-method design provided the flexibility to address all three within a single coherent framework.

The value of this design lies in its ability to both measure and interpret delay. A delay rate of 76.19 percent is a powerful statistic, but it does not reveal whether weather, owner decisions, or public disturbance is the primary driver. An RII of 0.756 for public disturbance indicates high perceived importance, but it does not show how disturbance entered the file history of a specific project. A case comparison may demonstrate that an on-time project handled site clearance and variation orders more effectively, but it does not alone reveal the prevalence of such problems across the district. Each method answers a different part of the same puzzle, and the mixed-method design allows these answers to be integrated into a more complete understanding of delay in Sarlahi's local government road projects.

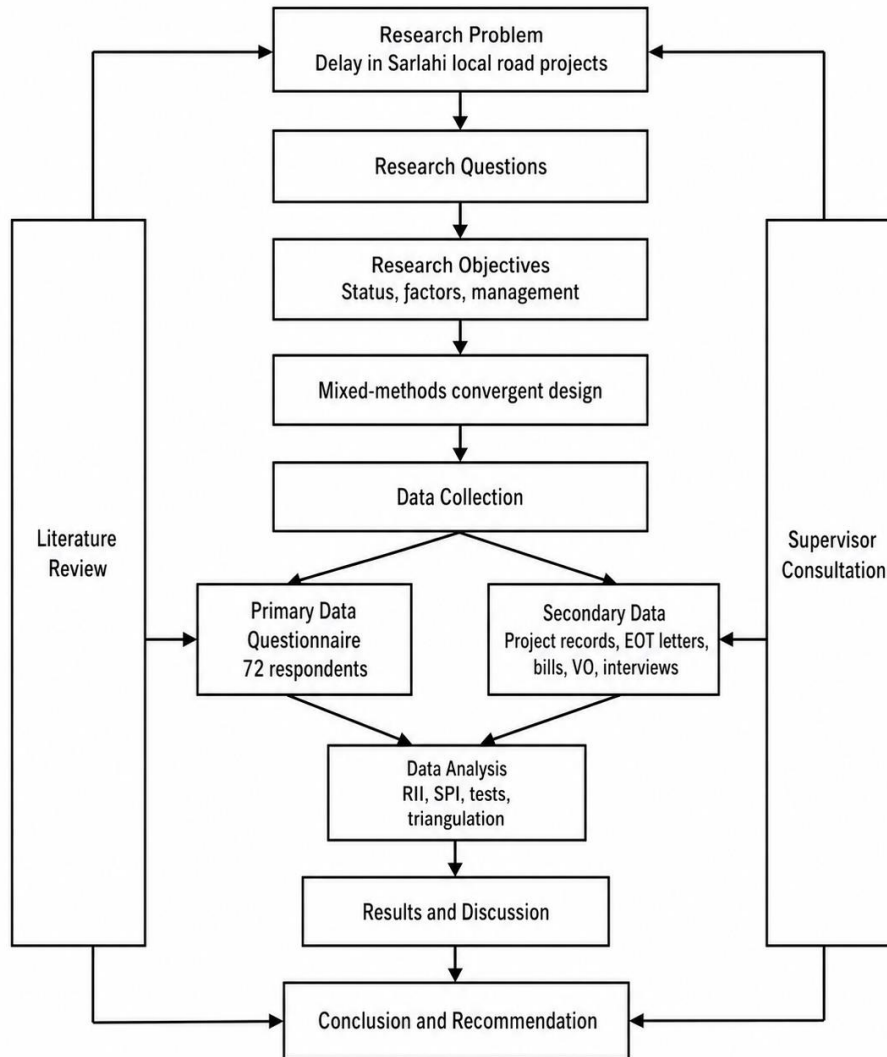


Figure 3.1 Research Design Framework

Figure 3.1 Research Design Framework

3.2.1 Conceptual Framework

A conceptual framework visually illustrates the relationships among the variables in a study. After the variables are identified, the framework helps examine the cause and effect connections between them. It highlights the main research objectives and shows how they integrate to produce meaningful results. Developing a conceptual framework prior to data collection is essential because it serves as a roadmap, guiding the researcher

on what information must be gathered to achieve the intended outcomes. Below given figure visually demonstrates the conceptual framework used in this study.

This conceptual framework illustrates the overall process undertaken in this study to assess delay status, identify and rank delay factors, and evaluate the effectiveness of contract management practices in road construction projects implemented by contractors under local governments in Sarlahi District. The framework begins by focusing on local government road construction projects in Sarlahi District, from which the issue of construction delay is recognized as a major challenge. To address this, two key inputs were used: delay factors and contract management practices were identified through an extensive literature review, which was then contextualized through stakeholder perspectives. These combined inputs helped establish a comprehensive list of 37 delay factors (grouped into 8 categories) and 20 contract management practices (grouped into 4 categories) contributing to road construction delays.

The next stage involved **Objective 1** of this research, which assessed the status and magnitude of delay in local government road projects. For this, project records from 21 projects across 5 municipalities were analyzed. Key parameters measured included delay rate (percentage of projects delayed), delay duration (number of days of extension), and Schedule Performance Index (SPI). To determine whether observed differences in delay status across municipalities and project categories (Near Highway vs Away from Highway) were statistically significant, chi-square tests and t-tests were conducted. This analysis provided a quantitative baseline of how severe and widespread the delay problem is in Sarlahi's local government road projects.

For **Objective 2**, the study proceeded to identify and rank 37 delay factors from the perspective of three stakeholder groups (clients, contractors, and consultants) across 11 municipalities. This ranking was carried out using the Relative Importance Index (RII) to determine which factors were perceived as most critical by each stakeholder group and their combined ranking across all respondents. The 37 factors were grouped into 8 thematic categories: project-related, owner-related, contractor-related, consultant-related, material and equipment-related, labor-related, design-related, and external factors. After ranking the factors, there was a need to understand whether the causes identified in

primary data matched the documented evidence in project files. To achieve this, triangulation was performed by comparing RII-ranked factors with secondary data from Extension of Time (EOT) letters, project records, and stakeholder interviews. This triangulation helped validate whether perceived causes (e.g., public disturbance, political interference) were actually recorded in official documentation or were masked by vague terms like "miscellaneous."

For **Objective 3**, the study evaluated the effectiveness of 20 contract management practices (grouped into 4 categories: planning and mobilization, resource and quality, financial and risk, and contract enforcement practices). Using the same RII methodology, these practices were ranked from the perspective of all stakeholder groups to determine which practices were perceived as most effective in reducing delays. To ensure the practical relevance of these rankings, a comparative case study was conducted contrasting a delayed project with an on-time project. This case comparison allowed the study to examine how actual contract management practices differed between the two outcomes. The findings from the case study were then compared against the RII rankings to validate whether the practices ranked as effective by survey respondents were actually associated with on-time completion in real project settings.

Following the case comparison, the study employed **triangulation** integrating quantitative findings (RII rankings, statistical tests), qualitative insights (stakeholder interviews, case study observations), and documentary evidence (EOT letters, project records, variation orders), all backed by literature review evidence. This triangulation strengthened the credibility and validity of the results by cross-verifying findings from multiple methods and data sources. A perceived cause that appeared in RII rankings gained credibility when it was also found in EOT letters. A management practice ranked highly gained practical significance when the on-time project demonstrated it and the delayed project neglected it.

Finally, based on the validated results, the study proceeded to develop evidence-based conclusions and recommendations for effective delay reduction in local government road projects in Sarlahi District. These final recommendations integrate stakeholder perceptions, categorized delay factors, ranked contract management practices, case study

findings, and triangulated evidence to propose a structured and evidence-based approach to minimizing road construction delays in the context of Nepal's local governments.

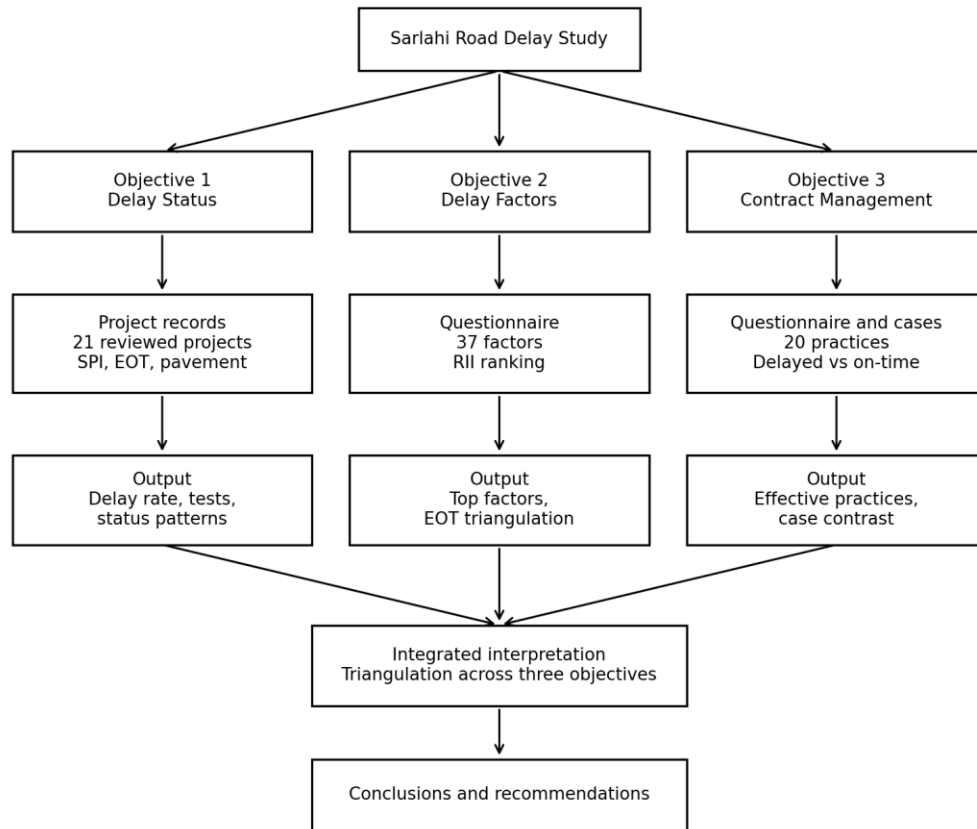


Figure 3.2 Objective-wise Analytical Flowchart

Figure 3.2 Objective-wise Analytical Flowchart

3.2.2 Questionnaire for Data Collection

The research mainly involved a mixed-method approach for data collection. For that, the questionnaire was prepared based on the objectives to be achieved. The questionnaire addressed all three objectives of the research: (1) To assess the status and magnitude of delay in local government road projects; (2) To identify, categorize, and rank the key delay factors contributing to road construction delays in Sarlahi District; and (3) To

evaluate the effectiveness of contract management practices in reducing delays and to compare delayed versus on-time project outcomes.

For **Objective 1** (delay status), no questionnaire was required. Instead, data were collected directly from project records including agreement dates, intended completion dates, Extension of Time (EOT) letters, bill payment records, and Schedule Performance Index (SPI) calculations from 21 projects across 5 municipalities in Sarlahi District.

For **Objective 2** (delay factors), a structured questionnaire was prepared to identify and rank 37 delay factors. These factors were grouped into 8 thematic categories: project-related factors, owner-related factors, contractor-related factors, consultant-related factors, material and equipment-related factors, labor-related factors, design-related factors, and external factors. The same questionnaire was used for further ranking of factors across 11 municipalities from the perspective of three stakeholder groups: clients (municipal engineers and officials), contractors (project managers and site engineers), and consultants.

For **Objective 3** (contract management practices), a separate section of the same questionnaire was prepared to evaluate 20 contract management practices grouped into 4 thematic categories: planning and mobilization practices, resource and quality practices, financial and risk practices, and contract enforcement practices. Respondents were asked to rate the effectiveness of each practice on a 5-point Likert scale.

For the validation of these questionnaires, five experts from the road construction sector were selected. These experts are engineers with more than 6 years of experience in road construction projects in Sarlahi District or similar local government contexts. Expert views were incorporated, following which a few variables were excluded due to redundancy or irrelevance to the local government road context, and two factors were added based on expert recommendations: "public disturbance during site clearance" and "political interference in contractor selection." The final questionnaire consisted of 37 delay factors and 20 contract management practices.

3.3 Study Area and Context

Sarlahi District, located in Madhesh Province, Nepal, was selected as the study area. The study used two coverage frames based on the research objectives. For Objective 1, project records from five municipalities—Kabilasi, Haripur, Balara, Malangwa, and Bagmati—were analysed for fiscal years 2077/78 to 2081/82. For Objectives 2 and 3, primary data were collected through a structured questionnaire from stakeholders involved in contractor-implemented road projects across all 11 municipalities of the district.

3.4 Population, Sample Size, and Sampling Technique

The study population comprised all stakeholders directly involved in road construction projects implemented through contractors under the authority of local governments in Sarlahi District. The population was defined at two levels: the project level (for Objective 1, delay status analysis) and the respondent level (for Objectives 2 and 3, factor ranking and contract management evaluation).

The project-level population consisted of road construction projects that met the following criteria: (a) implemented by a contractor under contract with a local government in Sarlahi District, (b) initiated between fiscal years 2074/75 and 2077/78, (c) either completed or sufficiently advanced to assess delay status, and (d) with available project records. A total of 32 projects were initially identified across five municipalities. However, complete records were available for only 21 projects, which formed the analytical sample for Objective 1.

The realistic population distribution accounts for both unique project-based respondents and shared Palika-level respondents, as detailed in Table 3.1. For 11 municipalities, the total realistic population (N) was 88 respondents.

Table 3.1: Research Population Distribution by Stakeholder Category

Stakeholder Category	Position	Per Project	Theoretical Total (11 Projects)	Realistic Count	Justification
1. Contractors	Contractor (Owner/Manager)	1	11	11	Unique per project
	Contractor's Engineer	1	11	11	Unique per project
Sub-total Contractors		2	22	22	
2. Local Level Employees	Engineer (Palika)	1	11	11	One per municipality
	Planning Officer (Palika)	1	11	11	One per municipality
	Account Officer (Palika)	1	11	11	One per municipality
	Chief Administrative Officer (CAO)	1	11	11	One per municipality
Sub-total Local Employees		4	44	24	
3. Elected Representatives	Mayor/Chairperson or Deputy Mayor/Vice-Chairperson	1	11	11	One per municipality

	Ward Chairperson (affected ward)	1	11	11	Unique per project (ward- specific)
Sub-total Elected Representative		2	22	22	
Total		8	88	88	Realistic respondent pool

Sample Size Determination

The sample size was determined using Yamane's formula for a finite population. The target population was finite and clearly defined by the stakeholders directly involved in contractor-implemented road projects across the 11 municipalities of Sarlahi District. Using a population size of 88 and a 5 percent margin of error, the required sample size was calculated as 72 respondents.

$$n = \frac{N}{1 + N(e^2)}$$

$$n = \frac{88}{1 + 88(0.05^2)}$$

$$n = \frac{88}{1 + 88(0.0025)}$$

$$n = \frac{88}{1 + 0.22}$$

$$n = \frac{88}{1.22}$$

$$n = 72.13 \approx 72$$

Accordingly, 72 respondents were included in the questionnaire survey. This sample size was considered adequate because it was drawn from a clearly identified stakeholder population and captured the principal groups relevant to the study objectives.

The use of Yamane’s formula was appropriate because the population was known, finite, and bounded within the stakeholder structure of the district-level road projects.

Table 3.2 Research Population, Sample Size and Sampling Logic

Item	Description
Target population	88 stakeholders linked with contractor-implemented local road projects
Main respondent groups	Contractors, local government employees, elected representatives
Sample size	72 respondents
Formula used	Yamane formula for finite population
Sampling technique	Stratified purposive sampling

3.5 Data Collection

3.5.1 Primary Data Collection

Primary data were collected through a structured questionnaire administered to 72 respondents. The questionnaire was organized into three main sections. Section A collected demographic and project-related information, including the respondent’s municipality, role, years of experience, type of project, and perceived delay status. Section B addressed Objective 2 and contained 37 delay factors grouped into eight categories: owner-related, contractor-related, consultant-related, labor-related, materials and equipment-related, design-related, public or political, and external factors. Section C focused on Objective 3 and consisted of 20 contract management practices categorized

into four groups: planning and coordination, resource management, financial and risk management, and accountability and enforcement.

3.5.2 Secondary Data Collection

The secondary data were gathered based on official and project-based sources. The primary sources singled out in the Methodology document include project completion records of the five municipalities between fiscal years 2077/78 and 2081/82, EOT request letters and approval or noting letters, project progress records, which are used to compute SPI, payment records, bill detail, variation order documents, and semi-structured stakeholder interviews, which are used to seek clarification. This source structure is the focal point of the study since it enabled Objective 1 to transcend to impression into written delay condition. It also enabled Objective 2 to compare high-ranking factors to actual project evidence. The road delay literature has a tendency to rely on perception of the surveys. That is a good thing, but another form of weight comes with project records. They demonstrate the number of projects that were presented to, the number of projects that were delayed, the duration of the delay, the frequency of EOTs and the difference between the patterns in pavement type and municipality. A delay study without this type of records runs the risk of flying above the project field. The analysis in this study was dragged to real project performance hard traces by the secondary data used.

Table 3.3 Objective-wise Methods and Data Sources

Objective	Data Source	Main Analysis	Expected Output
Objective 1	Project records from municipalities	Delay rate, SPI, EOT frequency, chi-square test, t-test, pavement analysis	Delay status and extent
Objective 2	Questionnaire, EOT letters, interviews	RII ranking, triangulation, comparison with Dhakal (2021)	Major delay factors

Objective 3	Questionnaire and comparative case records	RII ranking and delayed versus on-time project comparison	Contract management effectiveness
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3.5.3 Data Management and Preparation

The data were compiled, coded, tabulated, and prepared for analysis using Microsoft Excel only. Excel was used to organize project records, prepare descriptive summaries, calculate Relative Importance Index values, develop ranking tables, and compile comparative and triangulation sheets for the three objectives.

Separate Excel workbooks were maintained for expert validation, Objective 1 delay-status analysis, Objective 2 delay-factor analysis, and Objective 3 contract-management analysis. These workbooks served as the main working datasets for tabulation, ranking, interpretation, and appendix preparation.

3.6 Data Analysis

3.6.1 Objective 1 Analysis

Objective 1 was aimed at evaluating the present situation and level of delays in road construction projects utilizing contractors in the local governments of Sarlahi District. According to the Methodology document, frequency and percentage were applied in calculating the overall delay rate, the delay rate by municipality and delay rate by pavement type. The estimation of average, minimum and maximum delay in terms of days of delayed projects in every municipality was achieved through delay duration analysis. EOT frequency was also tabulated to display the total and percentage of projects which had zero, one, two or three EOTs. These techniques are quite close to the purpose since Objective 1 is descriptive, then explanatory. The first question it poses is the extent of delay, its location, its duration, and the distribution of the delay among the project

categories. The study was required to determine whether delay was sporadic or widespread before the causes were analyzed. The data obtained indicated a very obvious pervasive trend, which was to be complemented by more thorough analysis of factors and management.

One of the main elements of Objective 1 was the Schedule Performance Index (SPI). According to the methodology document, SPI values below 0.70 indicate severe delay, values from 0.70 to 0.85 indicate moderate delay, and values above 0.85 indicate minor or no delay. Bhawani Dhakal also used SPI in delay analysis and treated values below one as evidence that project progress lagged behind schedule. This common use supports the suitability of SPI for construction delay studies in Nepal.

3.6.2 Data Analysis for Objective 2

Objective 2 was aimed at recognizing and ranking the key delay factors on road construction projects undertaken by the contractors in the local governments of Sarlahi District. The Objective 2 document that was saved states that the objective was a mixed-method one that incorporated primary data collected through questionnaires and secondary data collected through analysis of EOT letters and interviews with stakeholders. On the quantitative part, the respondents were asked to rate 37 delay factors on a five-point Likert scale and RII was determined to rank the factors according to the perceived impact. According to the Methodology document, RII values take the value of 0 to 1, where higher values signify higher importance and the factors were ranked in a descending order. This analytical framework is suitable since it is not only aimed at enumerating potential causes. It is in order to give them priority. The local governments and contractors cannot do whatever they want to do and accommodate all the potential causes of delay simultaneously. Ranking technique is thus helpful as it shows where intervention can give the best value. The statistics indicated that the factors that were mostly critical were not technical and design-based. These were institutional, political, financial and stakeholder-centered.

The Relative Importance Index (RII) was calculated to rank the factors and practices according to their perceived importance. The RII is computed using the following formula:

$$RII = \frac{\sum_{i=1}^n W_i}{A \times N}$$

Where:

W_i = Weight assigned by the i th respondent to a particular factor (ranging from 1 to 5),

A = Highest weight given to the factor (i.e., 5 in this study),

N = Total number of respondents (72),

$\sum W_i$ = Sum of the weights given to that factor by all respondents.

Objective 2 analysis consisted of the second layer, which was qualitative and documentary. The Objective 2 file saved elaborates that the content analysis of EOT letters and thematic analysis of stakeholder interviews were employed to explain obscure entries and determine reasons of delay recorded in documentation like, public disturbance, political interference, weather effects, unapproved variation orders and delay in owner decision-making. Survey ranking was then triangulated with documentary and interview evidence to determine patterns of convergence, divergence and support. This is among the best aspects of the methodology since it rectifies a weakness that is evident in most studies on ranking. An informative factor is ranked high, but it is more powerful when it is also found in project files or local descriptions of file language. Public disturbance and clearing of the sites were the most prevalent in the survey of Sarlahi and were also common in documentary evidence and clarification of interviews. In second place was political interference, which also manifested itself in document reading through interviews. Therefore, the Objective 2 methodology did not end up at statistical priority. It questioned the possibility of tracing the ranked causes in actual project histories. The step renders the findings more believable and valuable.

3.6.3 Data Analysis for Objective 3

Objective 3 aimed to evaluate the effectiveness of contract management practices in mitigating delays in road construction projects implemented through contractors in the local governments of Sarlahi District.

The objective adopted a mixed-method approach combining quantitative ranking of contract management practices with qualitative comparative case study analysis and triangulation with secondary evidence.

On the quantitative part, respondents rated 20 contract management practices on a five-point Likert scale. The Relative Importance Index (RII) was calculated to rank the practices according to their perceived effectiveness in mitigating delays.

Comparative Case Study Analysis: A comparative case study was conducted on two road construction projects within the same municipality (Kabilasi): one significantly delayed (Road 1) and one completed on time (Road 2). Both projects shared identical procurement conditions, same flexible (blacktop) pavement type, same flat Terai terrain, and faced similar public disturbance challenges. The comparison was organized across all 20 contract management practice dimensions, with each practice classified into one of three categories based on secondary data availability: (1) practices with clear evidence of performance difference between Road 1 and Road 2, (2) practices where performance was documented as similar or not documented, and (3) practices where no secondary data was available for comparison.

3.6.4 Triangulation and Validity

Triangulation was used to compare questionnaire findings with documentary evidence from project records, Extension of Time letters, and stakeholder interviews. Validity was strengthened through expert review of the questionnaire, pre-testing with external senior engineers, and the use of multiple stakeholder groups and secondary sources.

For each of the 20 practices, primary RII rankings were triangulated with secondary evidence from the case study projects. Practices were categorized as:

CONFIRMED: Secondary data from Road 1 and Road 2 showed clear performance difference consistent with the RII ranking

INCONCLUSIVE: No secondary data was available to confirm or refute the ranking

Practices where secondary data was unavailable (e.g., well-maintained equipment, training programs for labor) were noted as inconclusive, acknowledging a data limitation. For practices where secondary data was available, the analysis compared whether the delayed project (Road 1) and on-time project (Road 2) exhibited behavior consistent with the perceived importance of each practice.

This analytical framework ensured that Objective 3 findings are not limited to statistical ranking but are grounded in observable project behavior and documented evidence, while also transparently acknowledging where secondary data was unavailable for verification.

The nature of the research problem also warrants the use of case study method. Local government roads projects are normally delayed in muddy field situations. The disturbance of the people, the timing of the fiscal and the slowness of the administration do not evaporate just because a contract is signed. The issue is whether the damage can be minimized by the management. An example of a case in comparison assists in responding to that due to the observation of management in constrained circumstances rather than in ideal situations. It does not purport experimental control. It provides explanatory opposition. This is a valid method of researching practice in construction management research since most of the project variables cannot be directly controlled. The approach instead seeks to find high disparity in the result when the conditions of the district and procurement are similar. In this work, the difference between the delayed and on-time projects provides it with sufficient form to be interpreted. It is not used to substitute district level survey results. It deepens them. The approach thus bridges the gap in the analysis of the thesis through prevalence to cause to practice.

3.7 Validity, Reliability, and Ethical Considerations

Validity was strengthened through expert review, literature alignment, and objective-wise structure. The questionnaire was validated by five engineers from local government settings. Forty-four delay factors were initially reviewed and 38 were retained after

validation. Taherdoost (2016) argues that validity and reliability are needed because poor instruments produce weak findings even when the analysis is correct.

Reliability was assessed using Cronbach’s alpha. The delay factors scale had alpha = 0.941. The contract management practices scale had alpha = 0.938. These values show strong internal consistency. Ethical care was also necessary because the study used municipal records and stakeholder responses that could contain sensitive issues.

Table 3.4 Validity and Reliability Summary

Component	Evidence in Study	Interpretation
Expert validation	Five local-government engineers reviewed the instrument	Content validity strengthened
Delay factor scale	Cronbach alpha = 0.941	Highly reliable
Contract management scale	Cronbach alpha = 0.938	Highly reliable
Triangulation	Survey, EOT letters, interviews, and case comparison	Findings checked across sources
Ethics	Confidential treatment of respondents and sensitive project records	Research risk reduced

3.8 Research Matrix

Table 3.5 Research Matrix

Objective	Variable	Data Source	Method	Analysis Tools	Expected Outcome
Obj 1: Assess delay status	Delay rate, delay duration, EOT frequency	Project records (21 projects, 5 municipalities)	Document review	Descriptive stats, SPI, Chi-square, T-test	Quantifies extent & severity of delays
Obj 2: Identify delay factors	37 delay factors (8 categories)	Stakeholders- 72 (clients, contractors, consultants) 11 Municipalities	Questionnaire survey + EOT + interviews	RII ranking + Triangulation	Prioritized & validated delay factors
Obj 3: Evaluate contract management	20 management practices (4 categories)	Stakeholders + case projects	Survey + comparative case study	RII + cross-case analysis	Effective practices to reduce delays

CHAPTER 4: RESULTS AND DISCUSSION

This chapter presents the findings of the study in the same order as the three research objectives. The analysis begins with the status and extent of delay in the reviewed road projects. It then moves to the major delay factors identified through the questionnaire survey and supported by documentary review. The chapter ends with an evaluation of contract management practices through ranking and case comparison. According to Koirala and Bhusal (2026), a results chapter in construction management research should do more than list numbers because the value of the chapter lies in linking measured patterns with institutional meaning. Bhawani Dhakal (2021) also showed that road delay analysis becomes stronger when project records, ranked factors, and discussion are read in one frame rather than in isolated blocks. Following that logic, this chapter integrates workbook-based analysis with project records, EOT letters, and the delayed versus on-time case comparison. The figures included in the chapter were prepared from the saved Excel workbooks and the cleaned project summaries used in this thesis. The discussion after each results section relates the Sarlahi findings to the wider Nepalese and international literature. This structure keeps the chapter empirical, but it also keeps the argument visible on every page.

4.1 Delay Status Assessment

The Objective 1 analysis began with data coverage. In the last five-year project record, 32 projects were identified across five municipalities. Full data were available for 21 projects. Data were missing or unavailable for 11 projects.

Table 4.1 Project Data Coverage

Description	Number	Percentage
Total projects identified	32	100.00%
Projects with data available	21	65.63%
Projects with data unavailable	11	34.37%



Figure 4.1 Reviewed and Missing Project Records

The reviewed projects showed a high delay rate. Sixteen of the 21 reviewed projects were delayed, while only five were completed on time. This produced a delay rate of 76.19 percent. Bhattarai (2023) argues that construction delay in Nepal weakens service delivery and public development outcomes.

Table 4.2 Overall Delay Status of Reviewed Projects

Status	Number of Projects	Percentage
Delayed	16	76.19%
On-time	5	23.81%
Total	21	100.00%

Delay Status of Reviewed Projects

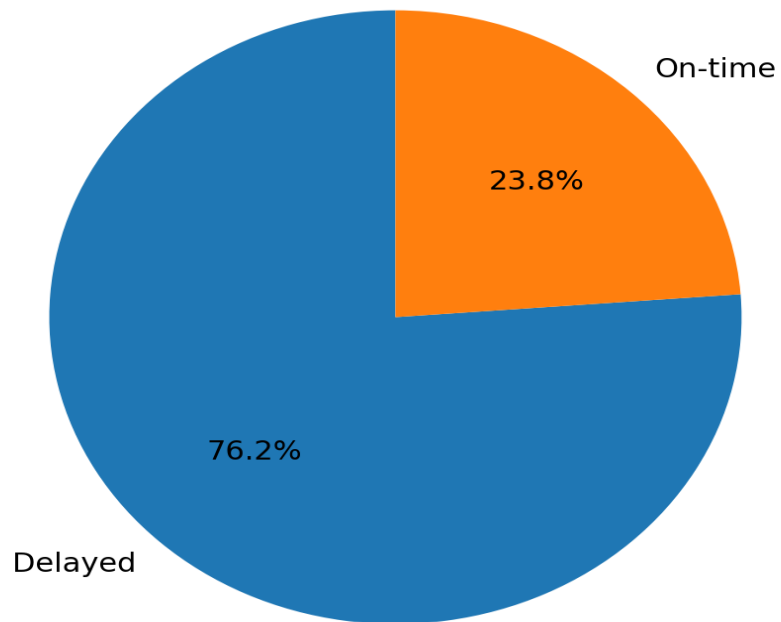


Figure 4.2 Overall Delay Status of Reviewed Projects

4.1.1 Category-wise delay status

Out of 21 projects, more than three-fourths were delayed. Projects near highways had a delay rate of 77.8%, while those away from highways had a delay rate of 75.0%.

A chi-square test was conducted to determine whether municipality location (near highway vs away from highway) affects delay status. The test yielded $\chi^2 = 0.0211$ with a p-value of 0.8846, which is greater than 0.05. Therefore, no significant relationship exists between municipality category and delay status.

In simple terms, whether a municipality is near the highway or away from it does not significantly affect whether road projects get delayed.

Table 4.3 Category Wise Delay Status of Reviewed Projects

Category	Delayed	On-time	Delay Rate
Near Highway	7	2	77.8%
Away from Highway	9	3	75.0%

4.1.2 Municipality Wise Delay Status

The municipality-wise delay pattern shows that delay was not restricted to one locality. Haripur had six delayed projects out of eight reviewed projects. Kabilasi had four delayed projects out of five. Balara had three delayed projects out of four. Malangwa had two delayed projects out of three. Bagmati had one reviewed project and that project was delayed.

Table 4.4 Delay Status by Municipality

Municipality	Reviewed	Delayed	On-time	Delay Rate
Haripur	8	6	2	75.0%
Bagmati	1	1	0	100.0%
Balara	4	3	1	75.0%
Malangwa	3	2	1	66.7%
Kabilasi	5	4	1	80.0%
Total	21	16	5	76.19%

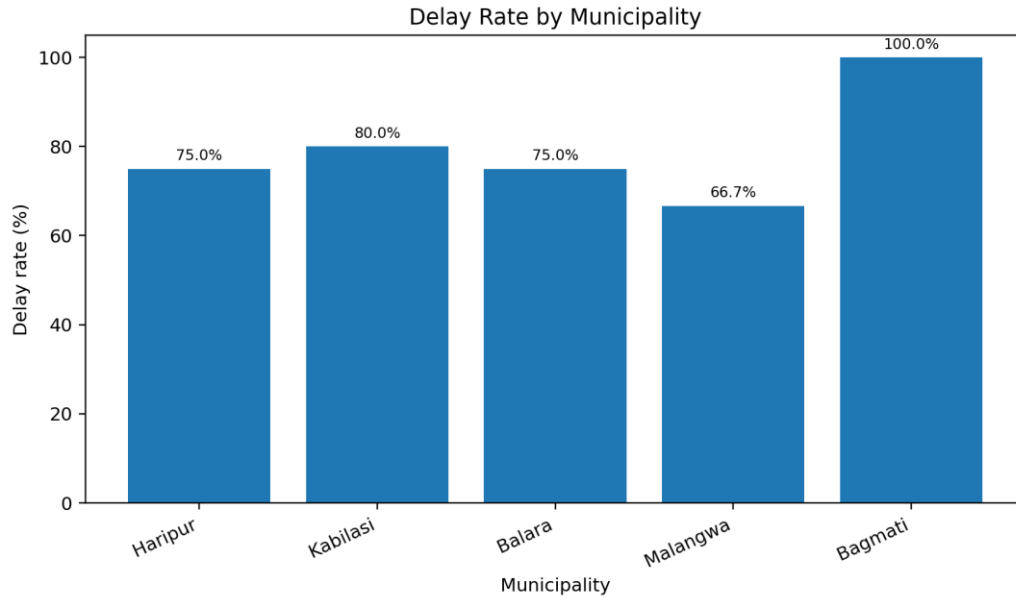


Figure 4.3 Delay Rate by Municipality

4.1.3 Average Delay by Municipality

Average delay days varied across municipalities. Among near highway municipalities, Haripur averaged 229 days and Bagmati averaged 878 days. Among away from highway municipalities, Kabilasi averaged 289 days, Balara averaged 119 days, and Malangwa averaged 195 days.

An independent t-test was conducted to determine whether proximity to highway affects delay duration. The test yielded $t = 1.074$ with a p-value of 0.48, which is greater than 0.05. Therefore, no significant difference exists in delay duration between near highway and away from highway municipalities.

In simple terms, whether a municipality is near the highway or away from it does not significantly affect how long road projects are delayed.

Table 4.5 Average delay duration by municipality

Category	Municipality	Average Delay (days)
Near Highway	Haripur	229
	Bagmati	878
Away from Highway	Kabilasi	289
	Balara	119
	Malangwa	195

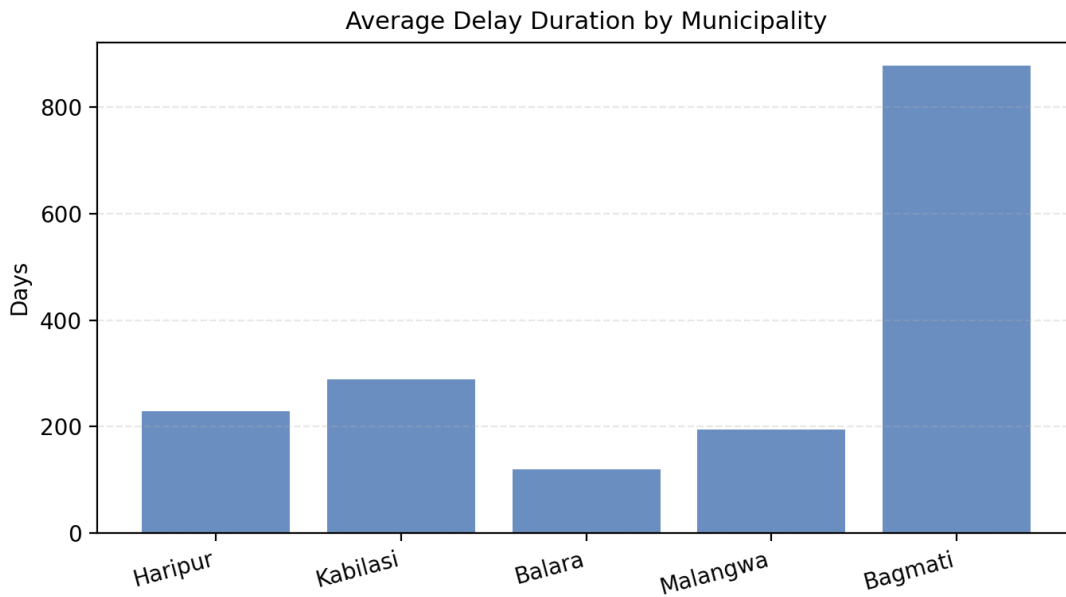


Figure 4.4 Average delay duration by municipality

4.1.4 Extension of Time (EOT) Frequency by Category

The frequency of Extension of Time (EOT) requests was analyzed to determine whether project location influences the likelihood of receiving a time extension. Among near

highway municipalities, 2 projects (22.2%) received zero EOTs, while 7 projects (77.8%) received one or more EOTs. Among away from highway municipalities, 3 projects (25.0%) received zero EOTs, while 9 projects (75.0%) received one or more EOTs. Overall, out of 21 projects, only 5 projects (23.8%) were completed without any EOT, whereas 16 projects (76.2%) required at least one extension.

A chi-square test of independence was conducted to examine whether there is a significant association between municipality category (near highway vs away from highway) and EOT frequency (0 EOT vs 1+ EOT). The test was performed at a 95% confidence level.

The calculated chi-square value was 0.0211, while the critical chi-square value at $\alpha = 0.05$ with 1 degree of freedom is 3.841. The p-value was 0.8846, which is substantially greater than the significance level of 0.05.

Since the calculated chi-square value (0.0211) is less than the critical value (3.841) and the p-value (0.8846) exceeds 0.05, the null hypothesis cannot be rejected. Therefore, there is no statistically significant relationship between municipality category and EOT frequency.

Table 4.6 EOT Frequency by Category

Category	0 EOT	1+ EOT	Total
Near Highway	2	7	9
Away from Highway	3	9	12
Total	5	16	21

4.1.5 Delay status by pavement type

The delay status of projects was analyzed based on pavement type to determine whether the choice of pavement material affects project completion timelines. Among flexible (blacktop) pavement projects, 12 out of 13 projects were delayed, resulting in a delay rate of 92.3%. Only 1 flexible pavement project (7.7%) was completed on time. Among rigid (RCC) pavement projects, 4 out of 8 projects were delayed, resulting in a delay rate of 50.0%, while the remaining 4 projects (50.0%) were completed on time.

This substantial difference in delay rates—92.3% for flexible pavements versus 50.0% for rigid pavements—suggests that pavement type may be an important factor influencing project delays in Sarlahi District.

Table 4.7 Delay status by pavement type

Pavement type	Delay rate (%)
Flexible (Blacktop)	92.3
Rigid (RCC)	50.0

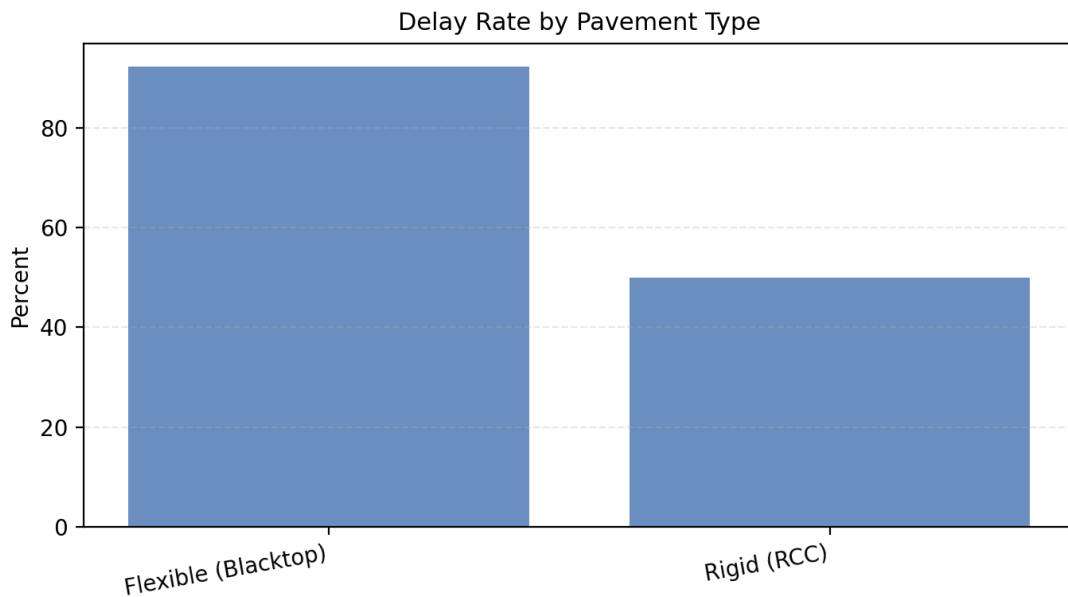


Figure 4.5 Delay status by pavement type

4.1.6 Schedule Performance Index Analysis by Municipality Category

Table 4.8 Schedule Performance Index by municipality

Municipality	Average SPI
Haripur	0.55
Kabilasi	0.66
Balara	0.76
Malangwa	0.6
Bagmati	0.31

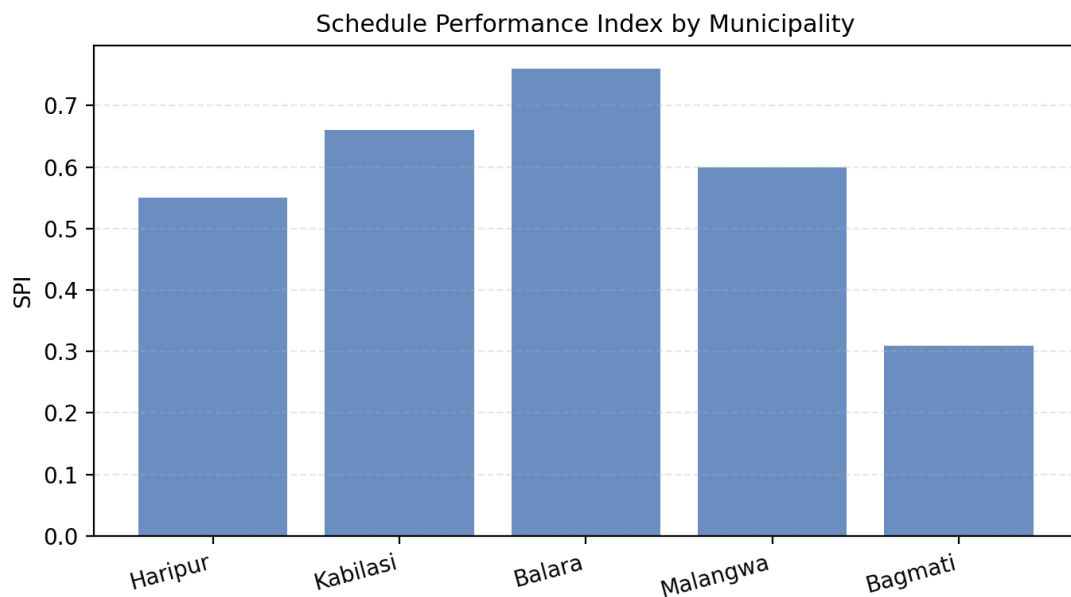


Figure 4.6 Schedule Performance Index by municipality

The Schedule Performance Index results confirm that the problem is not only visible in raw delay days. It is also visible in schedule efficiency. Bagmati recorded an average SPI of 0.31, which indicates severe delay. Haripur recorded 0.55, which signals moderate to severe schedule weakness. Kabilasi recorded 0.66 and Malangwa 0.60, both within a moderate delay band. Balara recorded 0.76, which is better but still below the threshold

of healthy schedule performance. Bhawani Dhakal used SPI in a comparable road-delay setting and treated values below one as evidence that projects were behind schedule. The Sarlahi results sit well below that threshold. The road programme is therefore not merely late at the end. It is running below schedule efficiency during execution. SPI is useful here because it shows the project as a moving performance problem, not just a finished calendar result.

4.1.7 Summary of Objective 1 Statistical Findings

The statistical analysis conducted under Objective 1 examined four key relationships: (1) delay status by highway category, (2) delay duration by highway category, (3) EOT frequency by highway category, and (4) delay status by pavement type. A summary of all statistical tests is presented below.

Table 4.9 Summary of Objective 1 Statistical Findings

Test Area	Statistic	p-value	Conclusion
Delay status by highway category	$\chi^2 = 0.0211$	0.8846	Not significant
Delay duration by highway category	$t = 1.074$	0.48	Not significant
EOT frequency by highway category	$\chi^2 = 0.0211$	0.8846	Not significant
Delay status by pavement type	$\chi^2 = 4.912$	0.0267	Significant

Three of the four tests showed no statistically significant relationship. Whether a municipality is located near a highway or away from it does not significantly affect delay status, delay duration, or EOT frequency. This suggests that highway proximity is not a determining factor for project delays in Sarlahi District.

However, pavement type showed a statistically significant relationship with delay status. Flexible (blacktop) pavements are significantly more likely to be delayed than rigid

(RCC) pavements. This finding has practical implications for local governments when selecting pavement technology for road projects.

While location relative to a highway does not matter for delays, the choice of pavement material does. Local governments in Sarlahi District should carefully consider the trade-off between flexible and rigid pavements, particularly in the Terai region where weather sensitivity of blacktop materials contributes to higher delay rates.

4.2 Major Delay Factors and Prioritization

This section presents the results for Objective 2, which identified and prioritised the major factors causing delay in Sarlahi's local government road projects. The analysis used the Relative Importance Index (RII) for 37 delay factors and then checked those ranked results against documentary evidence from EOT letters and clarifying interviews. This two-step approach is important because ranking alone shows perceived priority, while documentary analysis shows how those pressures appeared in actual project histories.

Aziz and Abdel-Hakam (2016) used RII to rank large groups of delay factors in Egyptian road construction and showed that such ranking is useful for management focus. Dhakal's road-delay study in Bharatpur and Subedi and Joshi's work in Gandaki also used RII in Nepalese road settings. The present study follows that tradition, but it goes further by testing whether the ranked causes appear in local project records. That is especially important in Sarlahi because some documentary reasons were softened or hidden under vague labels. A ranked list was therefore necessary, but not sufficient by itself.

4.2.1 Top 10 delay factors.

The ranking of delay factors was carried out through the Relative Importance Index. Thirty-seven validated factors were assessed, and the final ranked sheet showed a clear concentration at the top. Public disturbance or site clearance issues ranked first with a mean score of 3.778 and an RII of 0.756. Political interference ranked second with an RII of 0.739. Release of budget at the end of the fiscal year ranked third with an RII of 0.736.

Delays in owner decision-making ranked fourth with an RII of 0.733. Acceptance of unskilled contractors ranked fifth with an RII of 0.728. Lack of budget ranked sixth with an RII of 0.725. Poor communication of the owner with other construction parties ranked seventh with an RII of 0.714. Delay in commencement ranked eighth with an RII of 0.711. Poor site supervision and management by the contractor ranked ninth with an RII of 0.703. Strikes and local people pressure ranked tenth with an RII of 0.697. The top of the ranking is therefore not dominated by technical design or labor-productivity issues. It is dominated by owner-side, public-political, fiscal, and contract-entry conditions.

Table 4.10 Top ten delay factors in Sarlahi road projects

Rank	Delay factor	Mean score	RII
1	Disturbance by public activities	3.778	0.756
2	Political interference by political parties	3.694	0.739
3	Release of budget at end of fiscal year	3.681	0.736
4	Delays in decision making by owner	3.667	0.733
5	Acceptance of unskilled contractors	3.639	0.728
6	Lack of budget	3.625	0.725

7	Poor communication of owner with other construction parties	3.569	0.714
8	Delay in commencement	3.556	0.711
9	Poor site supervision and management by contractor	3.514	0.703
10	Strikes and local people pressure	3.486	0.697

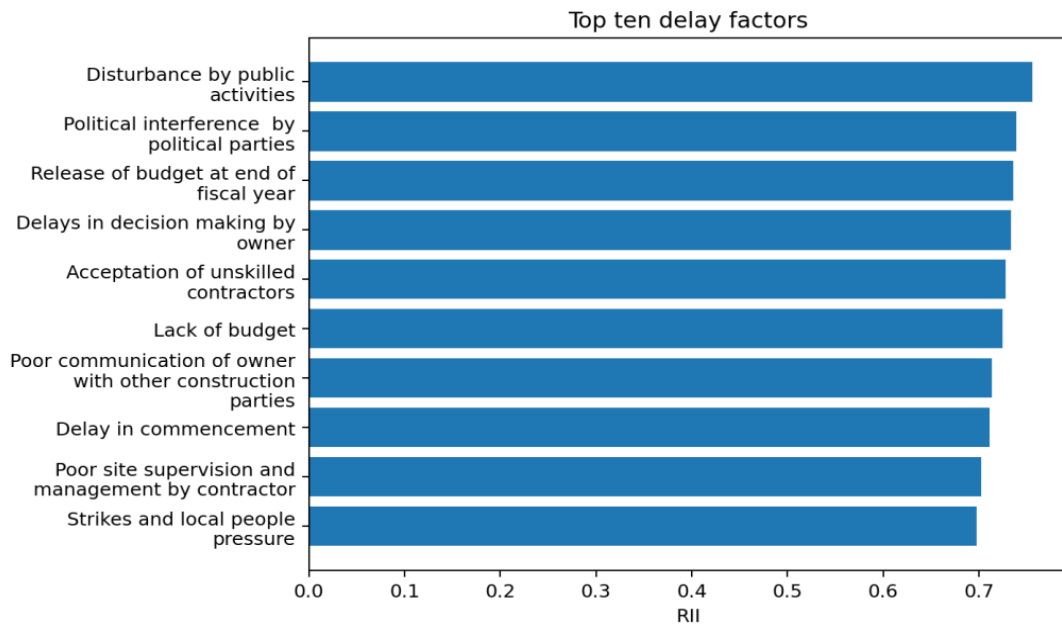


Figure 4.7 Top ten delay factors

Figure 4.7 makes the ranking hierarchy easy to read. The top two factors stand close to one another, and both sit above the rest of the field. Behind them comes a compact cluster of owner-side, fiscal, and contractor-entry factors. The visual pattern suggests that delay in Sarlahi is not driven by one overwhelming cause alone. It is driven by a tight group of critical pressures that reinforce one another. According to Rivera, Baguec, and Yeom (2020), road delays in developing countries often arise from a mix of planning weakness, land or public interface problems, and management limitations rather than from a single technical defect. The Sarlahi pattern aligns with that insight. The first ten factors show a project environment in which a road can be delayed before work gathers pace, while work is in progress, and even while administrative time is being formally extended.

4.2.2 Category-wise interpretation of delay factors

To read the ranking more clearly, the thirty-seven factors were grouped into eight analytical categories based on their code structure. The average RII was highest for owner-related factors, followed very closely by public-political and external pressure factors, then by project enabling factors. Contractor-related factors formed the next tier. Materials and equipment, labour, consultant-related factors, and design-related factors followed. Design-related factors were the lowest category by average RII. This category pattern is highly informative. It suggests that delay in Sarlahi is not chiefly a matter of poor drawing quality or technical design inconsistency. It is more strongly tied to owner decisions, fiscal timing, public disturbance, political pressure, site readiness, and contractor execution. According to Bhattarai (2023), delay in Nepalese construction usually emerges from inadequate planning, weak monitoring, low bidding, coordination problems, and political or administrative issues. The category averages in Sarlahi fit that broader national picture, but they do so with stronger emphasis on local-government enabling conditions and socio-political pressure.

Table 4.11 Average RII by delay-factor group

Factor group	Average RII
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Owner-related factors	0.703
External factors	0.703
Project enabling factors	0.687
Contractor-related factors	0.682
Materials and equipment	0.665
Labor-related factors	0.655
Consultant-related factors	0.644
Design-related factors	0.558

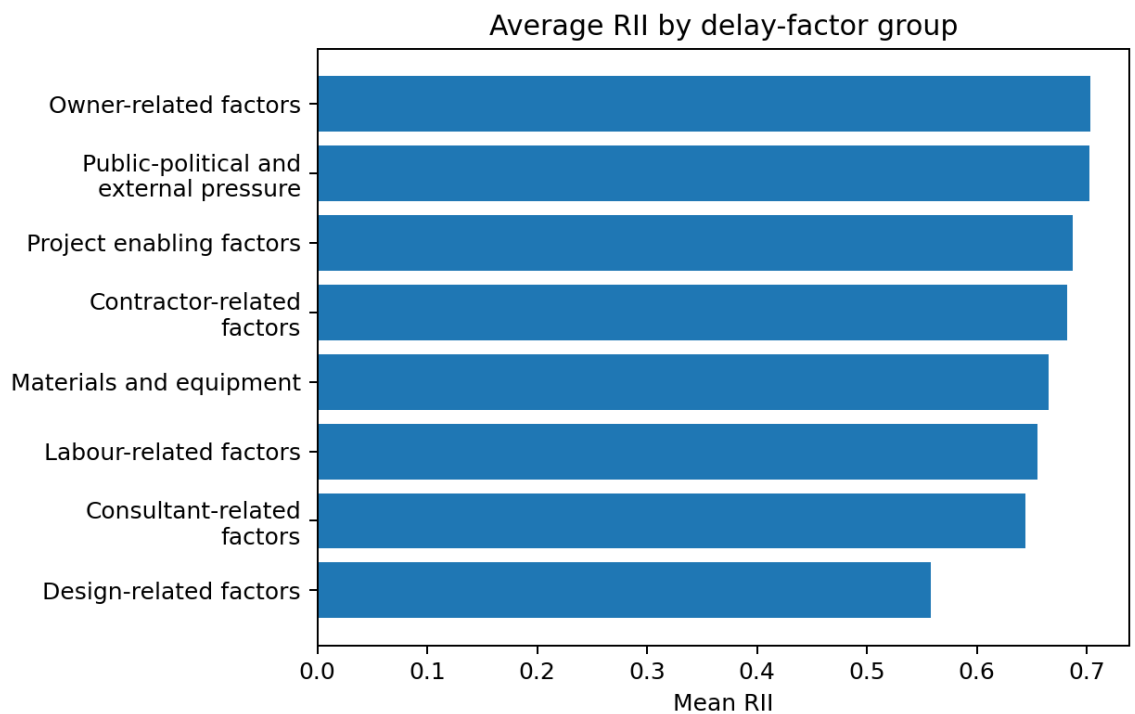


Figure 4.8 Average RII by delay-factor group

In Figure 4.8, the entire field of factors is condensed to a group view. The owner-related bar and the public-political bar are almost at the top whereas design is evidently the lowest. This is important since the interpretation at the group level prevents over-reading of any given item. When one of the factors of public disturbance comes up first, that is good. In case the entire owner and public-political groups are also high, the explanation is greater. It demonstrates that the highest point is not an accidental peak. It is enclosed within a broader pattern. Koirala and Bhusal (2026) also note that the delay in municipal construction in Nepal is usually influenced by the communication with clients, issuing of budget, underbidding, and ineffective project administration. The group averages at Sarlahi confirm that assertion, but at the same time they refreeze those averages by putting the disturbance of the populace and political interference in the same higher group with owner side delays. This makes the district unique to the Nepalese literature.

4.2.3 Municipality-Wise Top Three Delay Factors

Table 4.12: Municipality-Wise Top Three Delay Factors in Eleven Municipalities

S.N.	Municipality	1st Factor	2nd Factor	3rd Factor
1	Haripur	Political interference by political parties	Strikes and local people pressure	Weather effect on project area
2	Bagmati	Poor communication of consultant with other parties	Poor communication of owner with other parties	Weather effect on project area
3	Lalbandi	Political interference by political parties	Release of budget at end of fiscal year	Acceptation of unskilled contractors
4	Malangwa	Local and political	Delay in	Disturbance by

		pressure	commencement	public activities/site clearance
5	Kabilasi	Financial problem of owner	Political interference by political parties	Delays in decision making by owner
6	Balara	Release of budget at end of fiscal year	Lack of budget	Poor site supervision and management by contractor
7	Barathwa	Disturbance by public activities/site clearance	Delay in commencement	Poor site supervision and management by contractor
8	Hariwon	Disturbance by public activities/site clearance	Lack of budget	Delay in commencement
9	Godaita	Disturbance by public activities/site clearance	Weather effect on project area	Delay in commencement
10	Haripurwa	Acceptation of unskilled contractors	Delay in commencement	Poor site supervision and management by contractor
11	Ishworpur	Lack of budget	Acceptation of unskilled contractors	Political interference by political parties

The municipality-wise top-three table broadens the delay picture beyond the five reviewed status municipalities. Political interference appears as the first-ranked factor in Haripur and Lalbandi. Public disturbance and site clearance appear prominently in Barathwa, Hariwon, and Godaita. Budget release at the end of the fiscal year appears at the top in Balara and within the top three in several other municipal contexts. Delay in commencement and poor site supervision also appear repeatedly. This spread suggests

that the dominant factors identified in the district-level ranking are not artificial products of aggregation. They recur across multiple municipal settings. The pattern is therefore stable enough to support interpretation. Different municipalities may show different mixtures, yet the same broad cluster of political pressure, public disturbance, owner delay, budget timing, and contractor execution weakness continues to reappear. That repetition is important because it strengthens the practical relevance of the top-ten ranking.

4.2.4 Triangulation with Documentary and Interview Evidence

Table 4.13: Documentary and Interview Evidence from EOT Records

Project	Official EOT wording	Clarified cause	Inference
Road 1	Miscellaneous	Site clearance, public disturbance, unapproved VO, political interference	Sensitive causes softened in file language
Road 2	Public disturbance / site clearance	Public disturbance and site access problem	Direct documentary support for top-ranked factor
Road 3	Miscellaneous + unfavourable weather	Weather plus site clearance and public disturbance	Mixed contextual and public cause
Road 4	Miscellaneous + unfavourable weather	Weather plus site disturbance and site clearance	Mixed contextual and public cause

The documentary analysis adds a crucial layer to the ranking results. In the reviewed EOT cases, official wording sometimes used broad terms such as miscellaneous. When

those files were checked against stakeholder clarification, the hidden content became clearer. Public disturbance, site clearance problems, political interference, weather, and unapproved variation orders emerged as the underlying causes. This matters for two reasons. First, it confirms that the leading survey factors were not invented by perception alone. They were anchored in actual project histories. Second, it shows that official documentary language can understate or blur sensitive causes. That is a serious administrative issue. If files do not name the cause clearly, the system cannot learn from it clearly. The result is a project office that extends time on paper while leaving the underlying trigger weakly diagnosed.

4.2.5 Triangulation of Primary and Secondary Evidence

Table 4.14 Triangulation of primary and secondary evidence

Factor	Survey ranking	Secondary evidence	Triangulation result
Public disturbance / site clearance	1st	Strong	Strong convergence
Political interference	2nd	Strong	Strong convergence
Budget release at end of FY	3rd	Indirect but consistent	Partial convergence
Owner decision delay	4th	Strong through approvals/VOs	Strong convergence
Weather effect	27th	Present in selected cases	Project-specific support

Triangulation showed strong convergence for public disturbance and site clearance, political interference, and owner-side delay. Budget release timing also aligned with the

wider project story, although it appeared more strongly in the ranked survey and municipality-level factor profiles than in narrow EOT language. Weather, by contrast, was present in documentary evidence but did not rank as highly in the district-wide survey. This is an important nuance. Some factors are district-wide drivers. Some are project-specific intensifiers. The benefit of triangulation is that it separates those roles. Public disturbance and political interference appear to be structural forces in Sarlahi. Weather appears to be real, but more situational. This type of layered reading is methodologically stronger than taking either survey or documents in isolation. It allows the chapter to distinguish dominant mechanisms from supporting conditions

4.2.6 Compared to Bhawani Dhakal (2021)

Comparison with Bhawani Dhakal's study of DoR-supervised road projects in Bharatpur shows both similarity and difference. Public disturbance, political interference, and budget timing matter in both studies. This suggests that these are not accidental local concerns. They are wider road delivery pressures in Nepal. However, notable contextual differences exist. Sarlahi local government projects placed stronger emphasis on administrative and owner-side delays such as decision-making, commencement delays, and poor communication, while Dhakal's DoR projects gave higher importance to contractor financial problems. This suggests that municipal projects in Sarlahi are more vulnerable to local political interference, public pressure, and bureaucratic bottlenecks compared to centrally supervised projects. The implication is not that one system is simple and the other is complex. The implication is that governance level changes the balance of delay causes.

4.2.7 Summary of Objective 2 Findings

In summary, the delay factors in Sarlahi are predominantly external and owner-related, with public disturbance (RII = 0.756), political interference (RII = 0.739), and budget release timing (RII = 0.736) as the most critical drivers. Category-wise analysis shows owner-related and external factors share the highest average RII (0.703 each).

Municipality-wise analysis across eleven municipalities confirms that these factors recur across different local settings, though with varying mixtures. Triangulation with EOT letters and interviews validates that the highest-ranked factors are not only perceived as critical but are also reflected in actual project documentation. Comparison with Dhakal (2021) reveals that while similar pressures exist across governance levels, local government projects in Sarlahi face a denser mix of public interface and socio-political pressure.

4.3 Effectiveness of Contract Management Practices

This section presents the results for Objective 3, which examined whether contract management practices can reduce delay in local government road projects. This part of the analysis used two forms of evidence. First, the 20 management-practice items were ranked using RII. Second, a comparative case analysis examined one delayed project and one on-time project.

This section matters because the earlier findings could otherwise produce a pessimistic conclusion. If public disturbance, political interference, owner delay, and budget timing dominate the delay structure, one might assume that contractors and contract administrators have little room to change outcomes. The case evidence shows that this is not true. Management does not erase structural pressure, but it shapes how much damage that pressure can do. Giri, Pahari, and Lamichhane (2025) argued that stronger planning, coordination, regulatory discipline, and workforce readiness are central to delay mitigation. The present Sarlahi evidence supports that view strongly and shows it in project-level contrast rather than general principle.

4.3.1 Top Ranked Contract Management Practices

Table 4.15: Top Contract Management Practices by RII

Rank	Contract Management Practice	Mean	RII
1	Contractors ensure timely availability of skilled labor and materials.	3.53	0.706
2	Contracts clearly include liquidated damage clauses for delays and defects.	3.49	0.697
3	Contractors coordinate effectively with subcontractors and consultants.	3.44	0.689
4	Clear communication is maintained with the client.	3.43	0.686
5	Timely billing and documentation submission are ensured.	3.40	0.681
6	Contractors respond promptly to client feedback and change requests.	3.39	0.678
7	Equipment is well-maintained and available as per project needs.	3.33	0.667
8	Risks are proactively identified and managed throughout the project.	3.24	0.647
9	Issues and delays are discussed promptly in regular site meetings.	3.21	0.642
10	Regular site supervision ensures compliance with design and specifications.	3.18	0.636

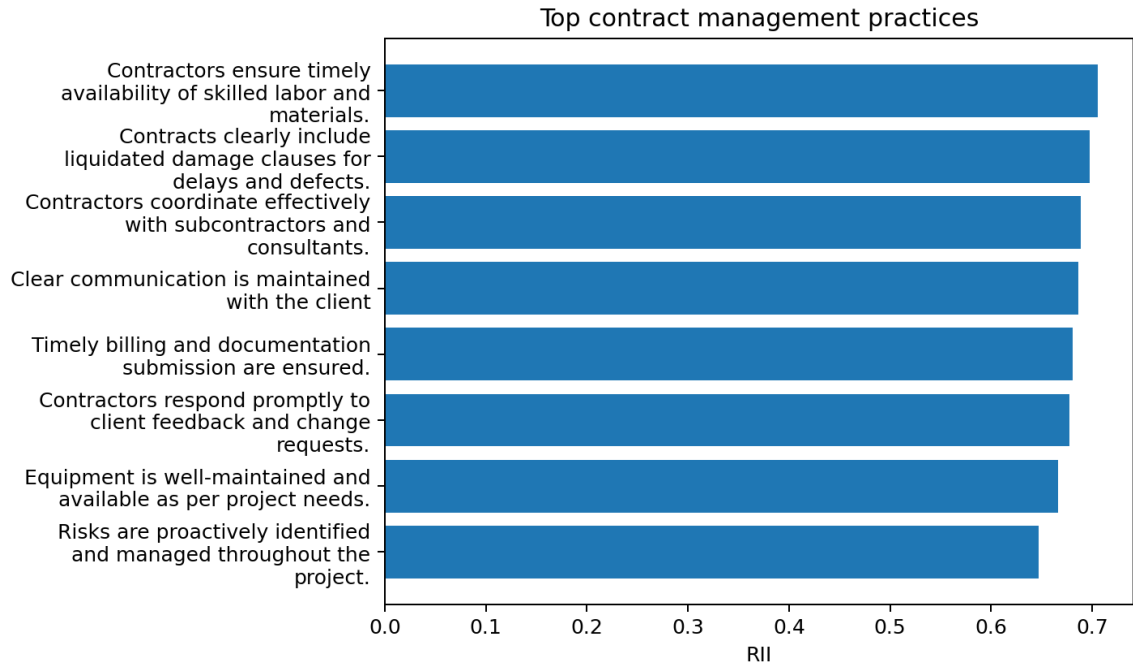


Figure 4.9: Top Contract Management Practices by RII

The highest-ranked contract management practice was timely availability of skilled labor and materials, with an RII of 0.706. Liquidated damage clauses ranked second with an RII of 0.697. Effective coordination with subcontractors and consultants ranked third. Clear communication with the client ranked fourth. Timely billing and documentation ranked fifth. Prompt response to client feedback, equipment readiness, proactive risk management, prompt issue discussion, and regular site supervision followed in the top ten.

The ranking is important because it shows that management effectiveness is not a vague moral category. It is built from specific operational habits. The best-rated practices are those that keep the project moving, clarify accountability, and prevent delay from turning into a loose and unpunished routine. This result also aligns with the report guideline, which required explicit treatment of liquidated damages and timely resource availability as leading practices.

4.3.2 Category-Wise Ranking of Contract Management Practices

Table 4.16: Average RII by Contract Management Category

Contract Management Category	Average RII
Planning and coordination	0.649
Resource management	0.643
Financial and risk management	0.640
Accountability and enforcement	0.618

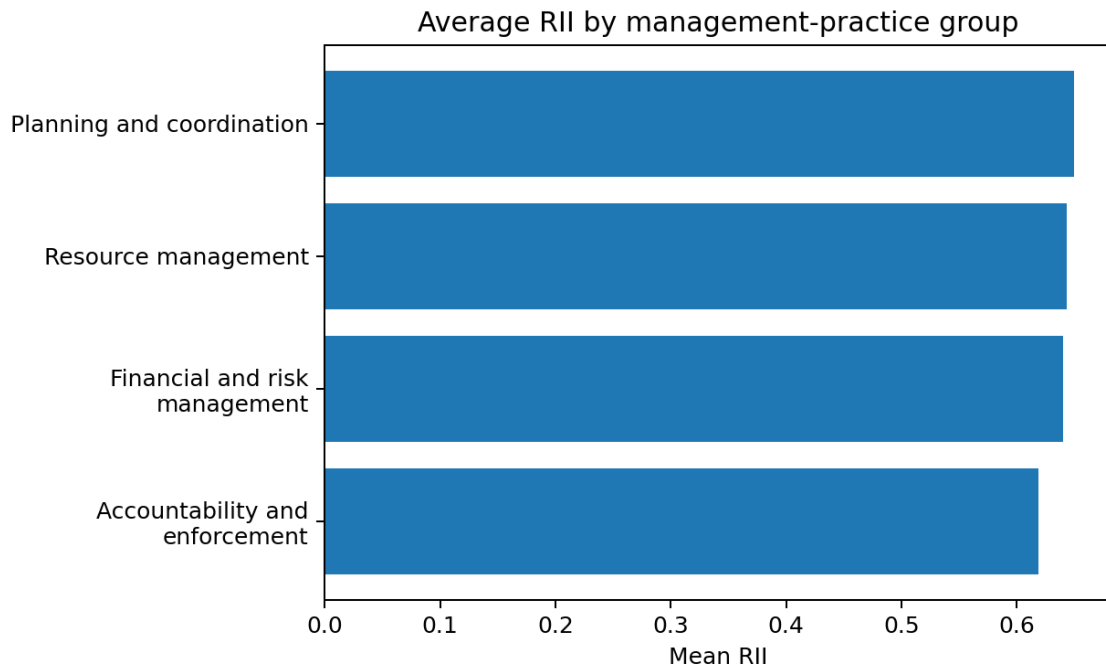


Figure 4.10: Average RII by Contract Management Category

Category-wise analysis shows that planning and coordination received the highest average RII, followed closely by resource management and financial-risk management, with accountability and enforcement slightly lower but still important. This pattern suggests that Sarlahi respondents do not view contract management narrowly as

punishment after failure. They view it more broadly as disciplined preparation, communication, resource readiness, and control.

That is a useful finding for practice. Local governments often concentrate on documentation after delay has already occurred. The ranking suggests that prevention begins earlier. It begins with schedules that are realistic, coordination that is active, resources that are available, and billing that is timely. Enforcement still matters, especially through liquidated damages and accountability, but the management chain starts before that final step. This reading is consistent with Giri et al. (2025), who placed strong emphasis on proactive control rather than reactive correction.

4.3.3 Comparative Case Study and Triangulation of Contract Management Practices

A comparative case study was conducted on two road projects within the same municipality (Kabilasi): one significantly delayed (Road 1, delayed by 12 months) and one completed on time (Road 2). Both projects shared identical procurement conditions, same flexible (blacktop) pavement type, same flat Terai terrain, and faced similar public disturbance challenges. The comparison was organized across all 20 contract management practice dimensions, and triangulation was performed by comparing primary RII rankings with secondary evidence from the case study projects.

Table 4.17: Triangulation of Contract Management Practices with Case Study Evidence

Rank	Practice	Road 1 (Delayed)	Road 2 (On-time)	Triangulation Finding
1	Timely availability of skilled labor & materials	0% mobilization → slow start	20% mobilization → faster start	CONFIRMED: Early mobilization enables timely resource

				availability
2	Liquidated damage clauses for delays/defects	Had clause but NOT enforced	Had clause and enforced	CONFIRMED: Clause existence alone is insufficient; enforcement matters
3	Effective coordination with subcontractors & consultants	Poor coordination (unapproved VO issued)	Better coordination (no VO issues)	CONFIRMED: Poor coordination leads to disputes and delays
4	Clear communication with client	Failed (unapproved VO, arbitration)	Followed (no disputes)	CONFIRMED: Clear communication prevents arbitration
5	Timely billing & documentation	Excess payment in early bills	Timely & accurate final bill	CONFIRMED: Timely billing prevents financial disputes
6	Prompt response to client feedback	Not responsive (arbitration filed)	Responsive (defects corrected)	CONFIRMED: Responsiveness prevents escalation
7	Well-maintained equipment	Not documented	Not documented	INCONCLUSIVE: No secondary data available
8	Proactive risk management	Failed (site clearance not handled)	Succeeded (site clearance handled)	CONFIRMED: Proactive risk management prevents delays
9	Prompt issue discussion in site meetings	Likely lacking (public disturbance)	Likely present (issues resolved)	CONFIRMED: Regular site meetings resolve issues early

		unresolved)		
10	Regular site supervision for compliance	Not enforced	Enforced (ravelling detected & corrected)	CONFIRMED: Regular supervision ensures quality compliance
11	Regular progress reviews & schedule updates	Ineffective (1 year delay)	Effective (on-time completion)	CONFIRMED: Regular reviews keep projects on schedule
12	Accountability for rework	Not enforced	Enforced (contractor paid for correction)	CONFIRMED: Accountability reduces rework costs
13	Accountability for delays/defects/non-compliance	No penalty imposed	Enforced effectively	CONFIRMED: Accountability is critical for on-time completion
14	Effective cash flow management	Poor (excess payment of NPR 76.38M)	Good (20% mobilization, timely bills)	CONFIRMED: Cash flow management prevents financial disputes
15	Realistic project schedules	2 years → delayed by 1 year	6 months → completed on time	CONFIRMED: Realistic schedules lead to on-time completion
16	Strict quality control	Not clearly enforced	Enforced (ravelling corrected)	CONFIRMED: Quality control prevents defective work
17	Training programs for labor	Not documented	Not documented	INCONCLUSIVE: No secondary data

				available
18	Adhere to contract provisions, minimize VOs	Failed (unapproved VO issued)	Followed (no VO issued)	CONFIRMED: Adhering to contract prevents disputes
19	Minimize unnecessary variations	Failed	Followed	CONFIRMED: Minimizing VOs prevents cost overruns
20	Enforce penalties (LD deductions)	Not enforced	Effectively enforced	CONFIRMED: Penalty enforcement is critical for on-time completion

The triangulation results reveal a clear and consistent pattern. For 17 out of 20 practices, secondary evidence from the case study projects confirmed the importance indicated by the RII ranking. Two practices (well-maintained equipment and training programs for labor) were inconclusive due to lack of documented evidence. The remaining practices showed strong convergence between what stakeholders perceived as important and what actually distinguished the delayed project from the on-time project.

Several findings are particularly noteworthy. First, the case comparison confirms that early mobilization is not just a procedural formality. Road 2 achieved 20% mobilization and started faster, while Road 1 had zero mobilization and a slow start. Second, liquidated damage clauses existed in both contracts but were enforced only in Road 2, proving that clause existence alone is insufficient—enforcement matters. Third, the delayed project suffered from poor coordination, unapproved variation orders, failed communication leading to arbitration, excess early payments, weak quality enforcement, and no penalty imposition. The on-time project showed the opposite pattern on every dimension.

This evidence is powerful because it moves the argument beyond perception. The difference between the two cases is not a slogan about good management. It is visible in concrete project practices. The road finished on time not because the context was ideal, but because contract control was tighter across multiple dimensions simultaneously—mobilization, coordination, communication, billing, supervision, accountability, and enforcement.

Two practices were inconclusive due to absence of secondary documentation. This highlights a data limitation rather than evidence of unimportance. Local governments should improve documentation of equipment maintenance and labor training to enable better verification of these practices in future project evaluations.

4.3.4 Comparison with Sah and Bhattarai (2021)

This case evidence also helps deepen the comparison with Sah and Bhattarai (2021), whose study found that 78.6 percent of respondents perceived inefficiencies in contract management practices in rural road projects, while only 21.4 percent viewed the process as efficient. Their study identified weak qualification screening, poor communication, inadequate monitoring, and slow decision making as major weaknesses.

The present Sarlahi study confirms that a similar pattern exists in local government road projects, but it extends the evidence in three ways. First, it ranks which contract management practices matter most, and shows that timely resource availability and liquidated damage clauses occupy the highest positions. Second, it provides comparative case evidence that strong contract management can improve completion outcomes under real field conditions. Third, it shows that the same general weakness identified in rural road studies persists in Sarlahi's local government projects, where the overall project delay rate is 76.19 percent. In that sense, the Sarlahi case does not contradict Sah and Bhattarai. It turns their concern into a more operational and evidence-based set of management lessons.

4.3.5 Discussion of Objective 3 Findings

The findings from Objective 3 demonstrate that contract management practices play a significant role in mitigating delays in local government road projects, even when external pressures such as public disturbance, political interference, and budget timing remain present. Three main insights emerge from the analysis.

First, the RII ranking establishes clear priorities for practice. Timely availability of skilled labor and materials (RII = 0.706) ranked as the most important practice, followed by liquidated damage clauses (RII = 0.697), effective coordination (RII = 0.689), clear communication (RII = 0.686), and timely billing (RII = 0.681). This ranking is valuable for local governments and contractors because it identifies where management attention should be focused first. Not all practices are equally important, and resource-constrained project teams cannot implement every improvement simultaneously. The ranking provides an evidence-based sequence for intervention.

Second, the case comparison proves that stronger management changes outcomes. The on-time project (Road 2) outperformed the delayed project (Road 1) on nearly every management dimension. Early mobilization (20% vs 0%), enforcement of liquidated damages, better coordination, clear communication, timely billing, regular supervision, accountability for defects, and penalty enforcement all distinguished the successful project from the failed one. This contrast is significant because both projects operated under the same district context, same procurement system, same pavement type, same terrain, and faced similar public disturbance challenges. The difference in outcomes cannot be explained away by external conditions. It is attributable to how each project was managed.

Third, triangulation confirms that perception matches practice. For 17 out of 20 practices, secondary evidence from the case study projects supported the RII ranking. This convergence strengthens confidence in the findings. The practices that stakeholders rated as most effective were precisely the practices that distinguished the on-time project from the delayed project. The two inconclusive practices (well-maintained equipment and training programs for labor) were not documented in project records, highlighting a data gap rather than evidence of unimportance.

Comparison with prior research reinforces these conclusions. Sah and Bhattarai (2021) found that 78.6% of respondents perceived inefficiencies in contract management practices in rural road projects, with weak qualification screening, poor communication, inadequate monitoring, and slow decision making identified as major weaknesses. The present study confirms that a similar pattern exists in Sarlahi's local government road projects, where the overall delay rate is 76.19%. However, the present study extends the evidence significantly. It ranks which practices matter most, provides case evidence that strong management improves outcomes, and shows that the same weaknesses identified in rural road studies persist in local government contexts.

The practical implication is clear. External pressures—public disturbance, political interference, budget timing, owner decision delays—are real and difficult to eliminate completely in the Terai context. However, the case comparison demonstrates that these pressures do not determine project outcomes by themselves. The on-time project succeeded not because it escaped these pressures, but because its management was tighter. Mobilization began early. Liquidated damages were enforced. Coordination was active. Communication was clear. Billing was timely. Supervision was regular. Accountability was applied.

In summary, Objective 3 achieves its aim. It identifies the most effective contract management practices through RII ranking, demonstrates their real-world impact through comparative case study, and validates the findings through triangulation. The evidence supports a clear conclusion: strong contract management reduces delays, even in challenging conditions.

4.4 Discussion of Key Findings

This chapter has presented the results for all three research objectives. The discussion now synthesizes these findings and interprets them in relation to the literature and the local government context of Sarlahi District.

4.4.1 Delay Status and Its Implications

The analysis of 21 projects across five municipalities revealed an overall delay rate of 76.19%, with only 23.81% of projects completed on time. This finding aligns with Rivera

et al. (2020), who reported delay rates of 60-80% in road projects across 25 developing countries, and with Bhattarai (2023), who documented systemic delays in Nepalese construction projects. The Sarlahi delay rate is also comparable to the 78.6% inefficiency perception reported by Sah and Bhattarai (2021) in rural road projects, suggesting that contract management weaknesses and project delays are closely correlated.

The statistical tests showed no significant relationship between highway proximity and delay status, delay duration, or EOT frequency. This is an important negative finding. It suggests that geographic location relative to a highway does not determine delay patterns. Projects near highways and away from highways experience similar delay rates and durations. Therefore, interventions should not be targeted based on highway proximity alone.

However, pavement type showed a statistically significant relationship with delay status ($\chi^2 = 4.912$, $p = 0.0267$). Flexible (blacktop) pavements recorded a 92.3% delay rate compared to 50.0% for rigid (RCC) pavements. This finding is consistent with Dhakal et al. (2021), who observed that flexible roads show higher delay rates due to material and weather sensitivity. In the Terai region, where Sarlahi is located, blacktop roads are vulnerable to rain, flooding, and temperature variations that affect laying, curing, and durability. Rigid pavements, while more expensive upfront, offer greater schedule reliability. Local governments should consider this trade-off when selecting pavement technology, particularly for projects where timely completion is a high priority.

4.4.2 The Dominance of External and Owner-Related Delay Factors

The RII ranking of 37 delay factors produced a clear pattern. The top five factors were public disturbance (RII = 0.756), political interference (RII = 0.739), end-of-fiscal-year budget release (RII = 0.736), owner decision-making delays (RII = 0.733), and acceptance of unskilled contractors (RII = 0.728). Category-wise analysis confirmed that owner-related factors and external risk factors shared the highest average RII (0.703 each).

This finding aligns with Dhakal et al. (2021), who identified political interference and public disturbance as critical factors in DoR-supervised projects. However, the Sarlahi

findings place stronger emphasis on local public disturbance and owner-side administrative delays. This difference is meaningful. It suggests that local government road projects operate under a denser mix of community interface, political pressure, and bureaucratic bottleneck than centrally supervised projects. Contractor financial problems, which ranked highly in Dhakal's study, were present but not dominant in Sarlahi.

The triangulation with EOT letters and interviews validated these findings. Public disturbance and site clearance issues appeared in at least three of four reviewed projects and were frequently hidden under the vague term "Miscellaneous." Political interference was explicitly confirmed in the Kabilasi delayed project. Unapproved variation orders linked to owner decision-making delays were also documented. This convergence between survey rankings and documentary evidence strengthens confidence in the findings.

The municipality-wise analysis across eleven municipalities revealed substantial variation. Public disturbance dominated in Barathwa, Hariwon, and Godaita. Political interference ranked first in Haripur, Lalbandi, and Kabilasi. Budget-related factors ranked first in Balara and Ishworpur. Bagmati was unique, with poor communication of consultant and owner as its top two factors. This variation confirms that while district-wide patterns exist, each municipality requires a tailored intervention strategy. A one-size-fits-all approach to delay mitigation is unlikely to be effective.

4.4.3 Contract Management as a Mitigating Force

The RII ranking of 20 contract management practices showed that timely availability of skilled labor and materials (RII = 0.706) and liquidated damage clauses (RII = 0.697) were perceived as most effective. Category-wise analysis indicated that planning and coordination ranked highest among management categories, followed by resource management and financial-risk management, with accountability and enforcement slightly lower but still important.

The comparative case study of two projects within the same municipality (Kabilasi) provided direct evidence that strong contract management reduces delays. The on-time project outperformed the delayed project on all five top-ranked practices: early

mobilization (20% vs 0%), enforcement of liquidated damages, better coordination, clear communication, and timely billing. Triangulation confirmed that 17 out of 20 practices showed convergence between RII ranking and case evidence.

This finding is consistent with Giri et al. (2025), who argued that stronger planning, coordination, regulatory discipline, and workforce readiness are central to delay mitigation. It also extends the work of Sah and Bhattarai (2021), who identified inefficiencies in contract management but did not rank practices or provide comparative case evidence. The present study shows that the same inefficiencies persist in Sarlahi, but it also demonstrates that stronger management can overcome them.

The practical implication is clear. External pressures such as public disturbance, political interference, and budget timing are real and difficult to eliminate completely in the Terai context. However, the case comparison demonstrates that these pressures do not determine project outcomes by themselves. The on-time project succeeded not because it escaped these pressures, but because its management was tighter across multiple dimensions simultaneously. The delayed project failed not because external pressures were uniquely severe, but because management was weak on multiple fronts.

CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

5.1.1 Conclusion for Objective 1: Delay Status and Extent

The first objective aimed to assess the current status and extent of delays in road construction projects implemented through contractors in the local governments of Sarlahi District.

The analysis of 21 projects across five municipalities revealed that delays are widespread. The overall delay rate was 76.19%, with only 23.81% of projects completed on time. Average delay durations varied considerably across municipalities, ranging from 119 days in Balara to 878 days in Bagmati. The Schedule Performance Index (SPI) values confirmed poor schedule performance, with Bagmati at 0.31 (severe delay), Haripur at 0.55 (moderate to severe), Kabilasi at 0.66 (moderate), Malangwa at 0.60 (moderate), and Balara at 0.76 (moderate). Two-thirds of projects (67%) required at least one Extension of Time.

Statistical tests showed no significant relationship between municipality location (near highway vs away from highway) and delay status ($\chi^2 = 0.0211$, $p = 0.8846$), delay duration ($t = 1.074$, $p = 0.48$), or EOT frequency ($\chi^2 = 0.0211$, $p = 0.8846$). This indicates that highway proximity does not determine delay outcomes. Projects in both location categories experience similar delay patterns.

However, pavement type showed a statistically significant relationship with delay status ($\chi^2 = 4.912$, $p = 0.0267$). Flexible (blacktop) pavements recorded a 92.3% delay rate, while rigid (RCC) pavements recorded a 50.0% delay rate. This difference is significant at the 95% confidence level.

Conclusion for Objective 1: Delays are systemic in Sarlahi's local government road projects. While highway proximity does not affect delay patterns, the choice of pavement technology does. Flexible (blacktop) pavements are significantly more likely to be delayed than rigid (RCC) pavements, likely due to material and weather sensitivity in the Terai region.

5.1.2 Conclusion for Objective 2: Major Delay Factors and Prioritization

The second objective aimed to identify and prioritize the major delay factors affecting road construction projects implemented through contractors in the local governments of Sarlahi District.

The RII ranking of 37 delay factors revealed that the top five factors were public disturbance (RII = 0.756), political interference (RII = 0.739), end-of-fiscal-year budget release (RII = 0.736), owner decision-making delays (RII = 0.733), and acceptance of unskilled contractors (RII = 0.728). Category-wise analysis showed that owner-related factors and external risk factors shared the highest average RII (0.703 each), while design-related factors ranked lowest (0.558).

Municipality-wise analysis across eleven municipalities revealed substantial variation. Public disturbance dominated in Barathwa, Hariwon, and Godaita. Political interference ranked first in Haripur, Lalbandi, and Kabilasi. Budget-related factors ranked first in Balara and Ishworpur. Bagmati was unique, with poor communication of consultant and owner as its top two factors.

Triangulation with EOT letters and interviews confirmed the survey findings. Public disturbance and site clearance issues appeared in at least three of four reviewed projects and were frequently hidden under the vague term "Miscellaneous." Political interference was explicitly confirmed in the Kabilasi delayed project. Comparison with Dhakal (2021) showed that while similar pressures exist across governance levels, Sarlahi local government projects face a denser mix of public interface and socio-political pressure than DoR-supervised projects.

Conclusion for Objective 2: The dominant delay factors in Sarlahi are predominantly external and owner-related, not technical or design-related. Public disturbance, political interference, budget timing, and owner decision-making delays are the most critical drivers. While these factors recur across municipalities, their relative importance varies, indicating the need for tailored local interventions rather than a uniform district-wide approach.

5.1.3 Conclusion for Objective 3: Effectiveness of Contract Management Practices

The third objective aimed to evaluate the effectiveness of contract management practices in mitigating delays in road construction projects awarded by the local government of Sarlahi District.

The RII ranking of 20 contract management practices showed that the most effective practices were timely availability of skilled labor and materials (RII = 0.706), liquidated damage clauses (RII = 0.697), effective coordination with subcontractors and consultants (RII = 0.689), clear communication with the client (RII = 0.686), and timely billing and documentation (RII = 0.681). Category-wise analysis indicated that planning and coordination ranked highest (0.649), followed by resource management (0.643), financial and risk management (0.640), and accountability and enforcement (0.618).

The comparative case study of two projects within the same municipality (Kabilasi) provided direct evidence that stronger contract management reduces delays. The on-time project (Road 2) outperformed the delayed project (Road 1) on all key management dimensions: early mobilization (20% vs 0%), enforcement of liquidated damages, better coordination, clear communication, timely billing, regular supervision, accountability for defects, and penalty enforcement.

Triangulation confirmed that for 17 out of 20 practices, secondary evidence from the case study projects supported the RII ranking. Two practices (well-maintained equipment and training programs for labor) were inconclusive due to lack of documented evidence. The remaining practices showed strong convergence between stakeholder perception and actual project outcomes.

Comparison with Sah and Bhattarai (2021) confirmed that similar inefficiencies exist across rural road contexts, but the present study extends the evidence by ranking practices and providing case evidence that strong contract management improves completion outcomes.

Conclusion for Objective 3: Strong contract management significantly reduces delays, even under challenging conditions. The most effective practices are timely resource

availability, enforcement of liquidated damages, effective coordination, clear communication, and timely billing. External pressures such as public disturbance and political interference are real and difficult to eliminate, but they do not determine project outcomes by themselves. The on-time project succeeded not because it escaped these pressures, but because its management was tighter across multiple dimensions simultaneously.

5.2 RECOMMENDATIONS

5.2.1 Recommendations for Local Governments

The findings from Objective 1 (delay status) and Objective 2 (delay factors) indicate that delays are systemic and driven predominantly by external and owner-related factors. The following actions are recommended for local governments in Sarlahi District:

- 1. Prioritize site clearance and public consultation before contract award:** Public disturbance ranked as the number one delay factor (RII = 0.756). Local governments should complete site clearance and conduct community engagement before tendering contracts. Proactive handling of potential public disturbances prevents escalation during construction.
- 2. Align contract awards with fiscal year start:** End-of-fiscal-year budget release ranked third (RII = 0.736). Local governments should front-load budgets and avoid the year-end rush that forces projects to start without adequate preparation.
- 3. Strengthen contractor pre-qualification criteria:** Acceptance of unskilled contractors ranked fifth (RII = 0.728). Local governments should move beyond lowest-bid-only selection and evaluate technical capacity, past performance, and financial stability before awarding contracts.
- 4. Consider rigid pavement for delay-sensitive projects:** Pavement type significantly affects delay status ($\chi^2 = 4.912$, $p = 0.0267$). Flexible (blacktop) pavements are delayed more often (92.3%) than rigid (RCC) pavements (50.0%). Local governments should

consider rigid pavement where schedule reliability is a high priority, despite higher upfront costs.

5. Tailor interventions to municipal context: Municipality-wise analysis revealed substantial variation in top delay factors. Balara needs budget front-loading. Malangwa needs contractor qualification screening. Bagmati needs improved consultant and owner communication. Local governments should develop municipality-specific delay mitigation strategies rather than applying a uniform district-wide approach.

6. Improve EOT documentation practices: Triangulation revealed that sensitive causes (public disturbance, political interference) are often hidden under vague terms like "Miscellaneous." Local governments should mandate specific cause reporting in EOT letters and prohibit vague categories. Without clear documentation, the same causes will repeat across projects without being properly addressed.

7. Strengthen monitoring and enforcement: The comparative case study showed that the delayed project lacked regular supervision, quality enforcement, and penalty application. Local governments should conduct regular joint progress reviews, enforce contract provisions strictly, and apply liquidated damages consistently when justified.

5.2.2 Recommendations for Contractors

The findings from Objective 3 (contract management practices) indicate that stronger contract management reduces delays. The following actions are recommended for contractors working in Sarlahi District:

1. Ensure minimum 20% mobilization before project start: The on-time project achieved 20% mobilization, enabling a faster start, while the delayed project had 0% mobilization and a slow start. Contractors should prioritize early mobilization to establish site presence and begin work immediately after contract award.

2. Deploy qualified site engineers and conduct regular progress reviews: Poor site supervision ranked ninth among delay factors (RII = 0.703). Contractors should deploy

qualified site engineers, conduct regular progress reviews, and update schedules proactively.

3. Avoid unapproved variations; follow contractual change procedures: The delayed project suffered from an unapproved variation order, leading to excess payment and arbitration. The on-time project had no variation orders. Contractors should follow contractual change procedures strictly and avoid unauthorized work.

4. Submit timely, accurate bills and maintain proper documentation: Timely billing ranked fifth among effective practices (RII = 0.681). The delayed project had excess payments in early bills, while the on-time project had timely and accurate final billing. Contractors should submit accurate bills on schedule to prevent financial disputes.

5. Rectify defective work at own cost as per contract terms: The on-time project corrected defective work (ravelling) at contractor cost, while the delayed project had no penalty enforcement. Contractors should take accountability for defects and correct them promptly to maintain schedule.

6. Communicate promptly with municipalities on site issues, variations, and potential delays: Clear communication ranked fourth among effective practices (RII = 0.686). The delayed project failed to communicate, leading to arbitration. The on-time project maintained clear communication and avoided disputes.

5.2.3 Recommendations for Policy Makers (Provincial/Federal)

The findings indicate that systemic issues at the local government level require policy-level support. The following actions are recommended for provincial and federal policymakers:

1. Revise procurement regulations to allow qualification-based contractor selection: The acceptance of unskilled contractors is a major delay driver. Policymakers should revise the Public Procurement Act and Regulations to allow greater use of qualification-based contractor selection for local government road projects, rather than relying solely on lowest-bid selection.

2. Mandate specific cause reporting in EOT letters: Vague terms like "Miscellaneous" hide sensitive causes and prevent organizational learning. Policymakers should issue national guidelines for standardized EOT documentation and prohibit vague categories.

3. Provide training and capacity building for municipal engineers: Contract management weaknesses identified by Sah and Bhattarai (2021)—lack of qualifications, poor communication, inadequate monitoring, slow decision-making—persist in Sarlahi. Policymakers should launch capacity-building programs for municipal engineers and contract administrators focused on project monitoring, variation control, dispute resolution, and enforcement.

4. Introduce incentives for on-time completion: Performance-based grants or incentives for municipalities that achieve on-time completion rates above 70% would encourage better contract management and delay mitigation.

5. Enforce liquidated damages consistently: The on-time project succeeded where penalties were credible, while the delayed project failed where penalties were not enforced. Policymakers should ensure that contract provisions for liquidated damages are enforceable and consistently applied.

6. Support research on pavement technology trade-offs: Flexible pavements are significantly more delayed than rigid pavements. Policymakers should support research on the life-cycle cost and schedule reliability of different pavement technologies in Terai conditions.

5.3 Recommendations for Future Research

Based on the limitations of this study, the following areas are recommended for future research:

1. Conduct comparative studies across multiple Terai districts: This study was limited to Sarlahi District. Future research should compare delay patterns and contract management effectiveness across multiple Terai districts to improve generalizability.

- 2. Quantify the cost overruns and quality deterioration associated with specific delay factors:** This study focused on schedule delays. Future research should quantify the cost impacts and quality consequences of the top delay factors identified in this study.
- 3. Evaluate the long-term effectiveness of improved contract management practices:** The comparative case study demonstrated short-term effectiveness. Future research should evaluate whether improved contract management practices sustain over multiple projects and over time.
- 4. Explore the political economy of delay and the use of vague terms like "Miscellaneous" in official records:** Triangulation revealed that sensitive causes are hidden in documentation. Future research should explore why this happens and how documentation practices can be reformed.
- 5. Investigate the correlation between contract management inefficiencies and delay rates:** Sah and Bhattarai (2021) found 78.6% perceived inefficiencies; this study found 76.19% delay rate. Future research should directly test whether improved contract management reduces delay rates in a statistically causal framework.
- 6. Study the transferability of findings to other infrastructure types:** This study focused on road construction. Future research should examine whether similar delay patterns and contract management solutions apply to buildings, bridges, water supply, and other infrastructure projects under local governments.

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APPENDICES

Appendix A. Expert Validation Sheets

The questionnaire was validated by five local-government engineers. Forty-four delay factors were initially reviewed and 38 were retained after validation. Six factors were removed because they were weak, repetitive, or less relevant to local road delay.

Appendix A.1 Expert Validation Summary

Item	Value
Experts involved	Five local-government engineers
Initial delay factors	44
Retained delay factors	37
Removed factors	7
Main validation focus	Clarity, local relevance, objective alignment and duplication control

Appendix B. RII Ranking Tables

Appendix B.1 Total 37 Delay Factors by RII

Rank	Factor Code	RII
1	B1_3_PublicDisturbance	0.756
2	B5_1_PoliticalInterference	0.739
3	B1_2_BudgetRelease_EndFY	0.736
4	B2_3_DelayDecisionMakingOwner	0.733
5	B5_2_AcceptationUnskilledContractors	0.728
6	B1_5_LackBudget	0.725
7	B2_4_PoorCommunicationOwner	0.714
8	B7_5_DelayCommencement	0.711

9	B7_6_PoorSiteSupervisionManagement	0.703
10	B5_4_StrikesLocalPeoplePressure	0.697
11	B2_2_DelayApprovalDocuments	0.689
12	B7_4_ConflictContractorsOtherParties	0.686
13	B3_1_MaterialsEquipmentPoorQuality	0.681
14	B2_1_OwnerFinancialProblem	0.678
15	B7_3_PoorCoordinationConsultantLaborClient	0.675
16	B3_3_ShortageConstructionEquipment	0.669
17	B7_2_ContractorSkillExperience	0.669
18	B8_2_ConsultantSkillExperience	0.667
19	B7_1_FinancialProblemContractor	0.664
20	B7_7_PoorConstructionMethod	0.664
21	B4_3_ConflictLaborsManagement	0.661
22	B4_5_WagesWorkingHoursLabors	0.661
23	B4_2_LaborSkillExperience	0.658
24	B4_6_TimelyPaymentLabors	0.658
25	B8_3_DelayInspectionConsultant	0.658
26	B4_4_LowProductivityLabors	0.656
27	B1_4_LocalPoliticalPressure	0.647
28	B5_3_WeatherEffect	0.647
29	B3_2_EquipmentBreakdown	0.644
30	B4_1_LaborEducationDuty	0.636
31	B8_4_ConsultantInitiatedVariations	0.633
32	B8_1_PoorCommunicationConsultant	0.619
33	B1_1_SoilCondition	0.572
34	B6_2_PoorDesign	0.572
35	B6_1_DetailedDrawingsNotAvailable	0.556
36	B6_3_DesignWithoutSpecification	0.556
37	B6_4_DiscrepancyDesignSpecification	0.550

Appendix B.2 Total 20 Contract Management Practices by RII

Rank	Factor Code	RII
1	Contractors ensure timely availability of skilled labor and materials.	0.706
2	Contracts clearly include liquidated damage clauses for delays and defects.	0.697
3	Contractors coordinate effectively with subcontractors and consultants.	0.689
4	Clear communication is maintained with the client	0.686
5	Timely billing and documentation submission are ensured.	0.681
6	Contractors respond promptly to client feedback and change requests.	0.678
7	Equipment is well-maintained and available as per project needs.	0.667
8	Risks are proactively identified and managed throughout the project.	0.647
9	Issues and delays are discussed promptly in regular site meetings	0.642
10	Regular site supervision ensures compliance with design and specifications.	0.636
11	Regular progress reviews and schedule updates are	0.625

	conducted.	
12	Contractors are held accountable for rework,	0.622
13	Contractors are held accountable for delays, defects, and non-compliance with contract specifications.	0.617
14	Contractors manage cash flow effectively to avoid financial disruptions.	0.614
15	Contractors prepare realistic project schedules before work begins.	0.606
16	Strict quality control is enforced to minimize rework.	0.606
17	Training programs are provided to enhance labor skills and productivity.	0.603
18	Contractors adhere to contract provisions and minimize unnecessary variation orders.	0.600
19	Contractors adhere to contract terms and minimize unnecessary variations.	0.581
20	Penalties (e.g., LD deductions) are actually enforced against underperforming contractors.	0.556

Appendix C. Case Comparison Tables

Appendix C.1 Delayed and On-time Project Comparison

Aspect	Delayed Project	On-time Project
Contract value	NPR 62,072,634.90	NPR 27,709,682.02
Planned duration	697 days	171 days
Delay status	Delayed with EOT	Completed on time
Mobilization	Weak / 0 percent advance reported	Stronger / 20 percent advance reported
Variation order	Unapproved variation issue	No variation order
Dispute	Arbitration claim	No major dispute

Appendix D.EOT Official Letters

Appendix D.1 EOT Request Letter from Road 1

कन्स्ट्रक्शन्

बागमती-५, मकवानपुर, नेपाल

पत्र संख्या :-

चलानी नं. :-

मिति. २०८०/१२/०६



श्री. मान. कार्यलय, प्यु. (च. स. यु.)
गा. पालीका, लल्लारी

विषय :- म्याद थप सम्बन्धमा

प्रति,
उपरोक्त सम्बन्धमा यस कार्यलय अन्त
गतको यस कार्यमा सम्झौता भएको डा. शालाको
घा. देवी पुलको सम्झौताको लागि लागू गरेको
कार्य (आ.न. (२०७८/७९) को काम उक्त सडकमा घा. तथा
टहरा पटेको र उक्त सडक क्लियर नभएको जग्गा नीकाद
ले गर्दा हालसम्म कार्य गर्न नसकेको र हालै आएर सहमती
भै सकेकोले म्याद थप गराई उक्त कार्य सम्पन्न गर्न
पटेको हुदा म्याद थपको निर्णय गरी म्याद थप को लागी बैंकको
लागी पत्र लेखाई पाउ भनि हार्दि र आभार गर्दैछु।

प्रियंक
कु. रू. कला
वागमती



Appendix D.2 EOT Request Letter from Road 2

श्रीमान. प्रमुख प्रशासकीय
अधिकृत जय
महाराष्ट्र

बिषय :- म्याद थप सम्बन्धमा

महोदय

उपोक्त सम्बन्धमा उ.वि.नं. २०६६/६२ समूहको

योजना मदनपुर कालीको प्राथमिक विद्यालयको अग्रगण्य
जडिमार्द-अन्तिम हुँदै विपरीत वडा समूह कालोपत्रे
सडक निर्माणको कार्य सम्पन्न गर्न पर्ने म्याद
२०६९/०३/३९ सम्म रहेको तर विभिन्न कारण
ले समयमा कार्य सम्पन्न हुन नसकेको र
आवृत्तिका रकमको विद्यमानता २०६४ को व.२
संसोधन बामोजीमा म्याद थप गर्न हुन
अनुसूचित गरिएको ।

श्री. यो ज्ञान
२०६९/११/१९



सिमाव सेवा जे.भी.
प्रमुख सहायक सहायक

चौमाला मापालिका कार्यालय
चौमाला, मलाना
वडा नं. ६८
वडा पतिक: ००६९/०३/१९

(Handwritten signature)

Appendix D.3 EOT Request Letter from Road 3



प.सं. :- २०७८/०७९
च.नं. :- [Redacted]

[Redacted] नगरपालिका नगर कार्यपालिकाको कार्यालय

[Redacted], सर्लाही
प्रदेश नं. २, नेपाल

फोन नं. :- ०४६-५७५,००५
फ्याक्स नं. :- ०४६-५७५,००५
website :- [Redacted]
email :- [Redacted]

मिति:- २०७८/०५/२९

विषय:- ताकेता सम्बन्धमा ।

श्री [Redacted] कन्स्ट्रक्सन ,
गोकर्णेश्वर-१२, काठमाडौं

उपरोक्त विषयमा यस नगरपालिकाको वार्ड नं. ०९,०७ मा [Redacted] सडक कालोपत्रे निर्माण गर्ने कार्यको लागि यस नगरपालिकाको कार्यालय र त्यस निर्माण सेवा बीच मिति २०७७/११/०७ मा भएको सम्झौता बमोजिमका कामहरू गर्न मिति २०७८/०३/२५ सम्म म्याद भएकोमा सो समय भित्र विविध कारण एवं मौसम प्रतिकूलताको कारणले गर्दा समयमा हुन नसकेको कार्यहरूको लागि मिति २०७८/०३/२४ गते बसेको नगरकार्यपालिकाको बैठकको निर्णयानुसार मिति २०७८/०७/३० सम्म म्याद थप गर्ने निर्णय भएको हुँदा मिति २०७९/०८/२९ गते सम्मको म्याद भएको परफरमेन्स बोंड (बैंक ग्यारेन्टी) पेश गर्न हुन र तोकिएको मिति भित्र पुनः ताकेता र म्याद थप गर्नु नपर्ने गरि कार्य सम्पन्न गर्न व्यवस्था हुनको लागि अनुरोध छ ।

[Redacted] श्रेष्ठ
२०७८/२/२५

[Redacted]
प्रमुख प्रशासकिय अधिकृत
प्रमुख प्रशासकिय अधिकृत

Appendix D.4 EOT Request Letter from Road 4



प.सं. :- २०७८/०७९
च.नं. :- ३३१७८

जनकपुर नगरपालिका नगर कार्यपालिकाको कार्यालय



फोन नं. :- ०३१-४४४००४
फ्याक्स नं. :- ०३१-४४४००४
website :- www.jankapur.gov.np
email :- jankapur@jankapur.gov.np


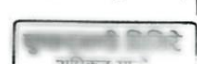
मिति:- २०७९/०२/११

विषय:- सम्झौताको म्याद थप सम्बन्धमा ।

श्री विष्णु कन्स्ट्रक्सन,
जनकपुर-०४, धनुषा ।

प्रस्तुत विषयमा त्यस निर्माण सेवा र यस कार्यालय बीच मिति:- २०७८/०३/२० मा तपसिल बमोजिमको ठेका सम्झौता भएकोमा उक्त ठेकाहरुको मिति:- २०७८/१२/०९ गते को निर्णय बाट कार्यको प्रगति हेरी मिति-२०७९/०३/३० सम्मको लागि म्याद थप भएको हुनाले तपसिलमा उल्लेख भए अनुसार समय मै कार्य सम्पन्न र बैक जमानतको म्याद थप गराई पेश गर्न हुन अनुरोध छ ।
तपसिल

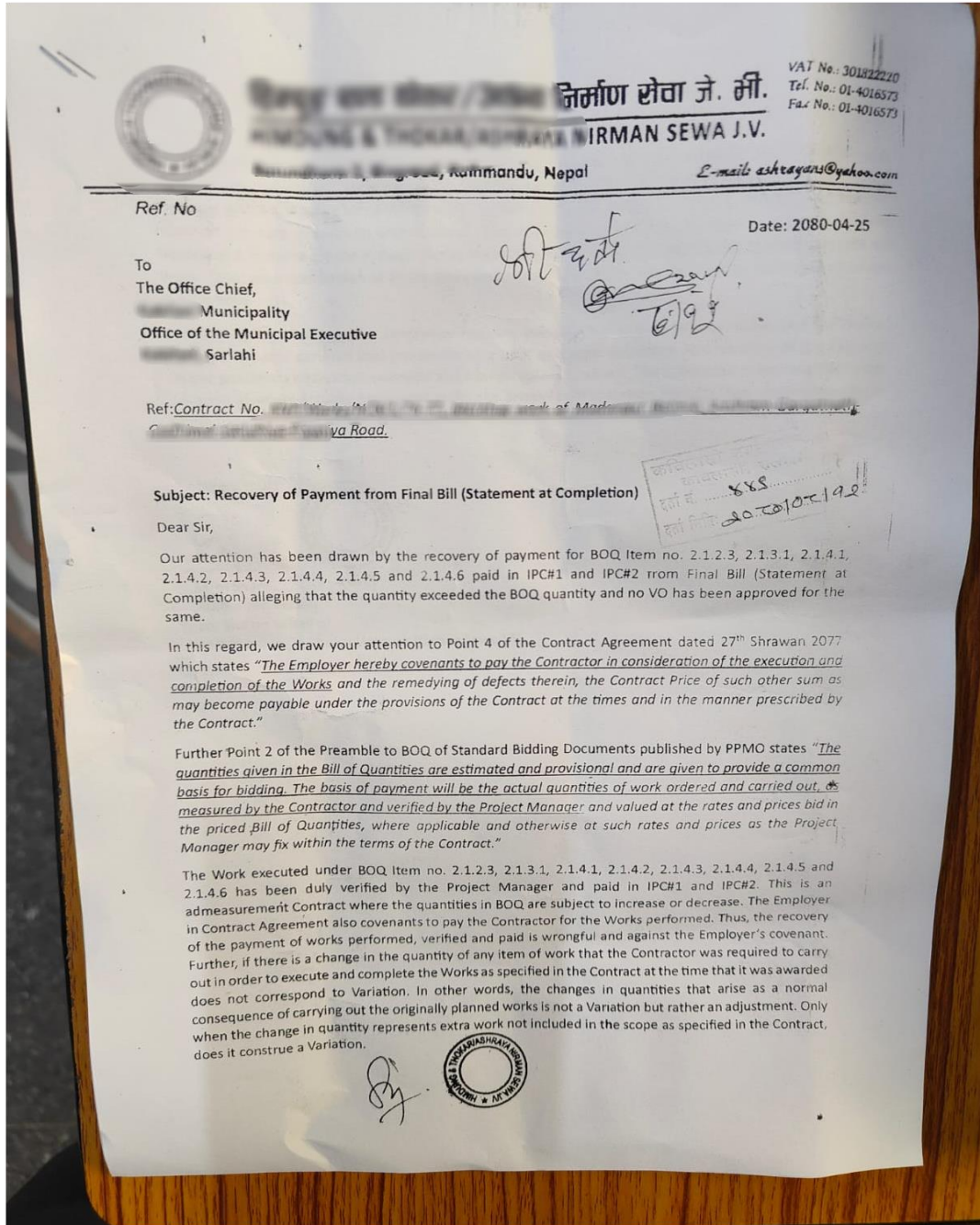
सि. न.	ठेका न.	कार्यको विवरण	रकम	जमानत न.	म्याद थप गर्नुपर्ने समय
१.	१८-०३३३३/०७८	जनकपुर नगरपालिकाको कार्यालय सडक कालोपत्रे	NB:006:PB:00316 /21	6,68,500.00	२०८०/०४/३०
			NB:006:PB:00315 /21	3,09,000.00	
			NB:006:PB:00317 /21	4,91,000.00	


२०७९/०२/११


बोधार्थ

श्री नेपाल बंगलादेश बैक लिमिटेड, शाखा कार्यालय जनकपुर, धनुषा ।

Appendix D.5 Letter for VO claim



Appendix D.6 Letter for Request to Appoint Arbitrator

हिमदुंग & थोकर / अश्रया निर्माण सेवा जे. भी.
HIMDUNG & THOKAR / ASHRAYA NIRMAN SEWA J.V.
Basundhara-03, Ring Road, Kathmandu, Nepal
VAT No: 301822220, Phone No. 01-4016573, Fax: 01-4016573

Ref. No.

29th Dec. 2025
(2082.09.14)

To,
The Office Chief,
Sarlahi Municipality,
Office of the Municipal Executive,
Sarlahi, Sarlahi

Handwritten signature and date: 29/12/2025

Sub: Request for the appointment of Arbitrator from your side.

Ref.: Blacktop work of M. [redacted]
Contract no.: K [redacted]

Dear Sir,

With reference to our letter dated 23rd Nov. 2025 (2082.08.07) registered at your office at 26th Nov. 2025 (2082.08.10) wherein we requested your good office for the settlement of dispute amicably. We regret to inform that no any response was obtained from your side.

Furthermore, through our subsequent letter dated 17th Dec. 2025 (2082.09.02) registered at your office at 22nd Dec. 2025 (2082.09.07) vides we duly appointed Mr. [redacted] as an Arbitrator on our behalf and requested to nominate the Arbitrator from your side. However, no response has been forthcoming from your side in this regard. Such continued inaction has caused unwarranted delay and is adversely affecting the timely resolution of the dispute.

In the view of above, we once again earnestly request your esteemed office to appoint an Arbitrator from your side at the earliest, so that both nominated Arbitrators will in turn, proceed to mutually appoint Presiding Arbitrator for the resolution of the dispute. We consider 7 days as a reasonable time for your valuable response and failing to receive your confirmation within this timeframe, we shall be constrained to approach Nepal Council of Arbitration (NEPCA) to request the appointment of Arbitrator on your behalf in accordance with Rule 18 (1) of the Arbitral Procedures Regulations of NEPCA, it being clearly stipulated under GCC Sub-Clause, 30.1 of the CoC that the arbitration shall be conducted under the procedures published by NEPCA.

Should any coordination or co-operation be required from our side to facilitate this process, we kindly request that your instructions be communicated to us without further delay. Please act soon in time and oblige.

With Regards,

Handwritten signature and date: 29/12/2025

.....
Mr. Saroj Shah
(Authorized Representative)
Himdung & Thokar/ Ashraya Nirman Sewa JV

Scanned with
MOBILE SCANNER

Appendix E. Questionnaire for Survey

Section B: Identifying Delay Factors in Road Construction Projects (Objective-1)

Instructions: Please rate your level of agreement with each statement using the following scale:

5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1 = Strongly Disagree

Section 1: Project Delay Factors

No.	Statement	5	4	3	2	1
1	Project delay due to issue related to soil condition					
2	Release of budget at end of fiscal year					
3	Disturbance by public activities					
4	Local and political pressure					
5	Lack of budget					

Section 2: Owner risk factors

No.	Statement	5	4	3	2	1
1	Financial problem of owner					
2	Delay in Approval of documents and required changes by owner/s					
3	Delays in decision making by owner					

4	Poor communication of owner with other construction parties					
---	---	--	--	--	--	--

Section 3: Materials and equipment risk factors

No.	Statement	5	4	3	2	1
1	Materials and equipment used is not of good quality					
2	Breakdown of site equipment					
3	Shortage of construction equipment					

Section 4: Labor Risk Factors

No.	Statement	5	4	3	2	1
1	Labor education to perform their duty					
2	Skill and experiences of labors					
3	Conflict of labors with management team					
4	Low productivity of labors					
5	Wages and working hour of labors					
6	Timely payment to labors					

Section 5: External Risk Factors

No.	Statement	5	4	3	2	1
-----	-----------	---	---	---	---	---

1	Political interference by political parties					
2	Acceptation of unskilled contractors					
3	weather effect on project area					
4	Strikes and local people pressure					

Section 6: Design Risk Factors

No.	Statement	5	4	3	2	1
1	Detailed drawings not available on time at work site					
2	Poor design					
3	Designing of work or drawing without specification					
4	Discrepancy between design specification and standard					

Section 7: Contractor Risk Factors

No.	Statement	5	4	3	2	1
1	Financial problem of contractor					
2	Contractor's skill and experiences					
3	Poor coordination among consultant, labor and client					

4	Conflict between contractors and other parties					
5	Delay in commencement					
6	Poor site supervision and management by contractor					
7	Poor construction method use by contractor					

Section 8: Consultant Risk Factors

No.	Statement	5	4	3	2	1
1	Poor communication of consultant with other working parties					
2	Consultant skill and experiences					
3	Delay in performing inspection by consultant					
4	Consultant initiated variations					

Section-C: Evaluating Contractor Management Practices & Contractual Enforcement in Road Construction Projects (Objective-3)

Instructions: Please rate your level of agreement with each statement using the following scale:

5 = Strongly Agree, 4 = Agree, 3 = Neutral, 2 = Disagree, 1 = Strongly Disagree

Section 1: Planning, Scheduling & Coordination Practices

No.	Statement	5	4	3	2	1
1	Contractors prepare realistic project schedules before work begins.					
2	Regular progress reviews and schedule updates are conducted.					
3	Contractors coordinate effectively with subcontractors and consultants.					
4	Clear communication is maintained with the client/user committee.					
5	Issues and delays are discussed promptly in regular site meetings.					

Section 2: Resource & Quality Management Practices

No.	Statement	5	4	3	2	1
1	Contractors ensure timely availability of skilled labor and materials.					
2	Equipment is well-maintained and available as per project needs.					
3	Strict quality control is enforced to minimize rework.					
4	Regular site supervision ensures compliance with design and specifications.					
5	Training programs are provided to enhance labor skills and productivity.					

Section 3: Financial & Risk Management Practices

No.	Statement	5	4	3	2	1
1	Contractors manage cash flow effectively to avoid financial disruptions.					
2	Contractors adhere to contract terms and minimize unnecessary variations.					
3	Risks are proactively identified and managed throughout the project.					
4	Timely billing and documentation submission are ensured.					
5	Contractors respond promptly to client feedback and change requests.					

Section 4: Contractual Compliance & Enforcement (PPA/PPR & Penalties)

No.	Statement	5	4	3	2	1
1	Contractors adhere to contract provisions and minimize unnecessary variation orders.					
2	Contracts clearly include liquidated damage clauses for delays and defects.					
3	Penalties (e.g., LD deductions) are actually enforced against underperforming contractors.					
4	Contractors are held accountable for rework,					
5	Contractors are held accountable for delays, defects, and non-compliance with contract specifications.					

ANNEXES

ANNEX-1: IOE GC 18 EDITOR DECISION

Notifications

x

[IOEGC18] Editor Decision

2026-04-27 09:45 PM

Anuj Dev:

We have reached a decision regarding your submission to 18th IOE Graduate Conference, "Assessment of Delay Status, Major Delay Factors, and Effectiveness of Contract Management Practices in Road Construction Projects Implemented through Contractors: A Study from Local Government of Sarlahi District".

Our decision is to: Accept Submission

With Warm Regards,
IOEGC-18 Editorial Team

ANNEX-2: PLAGIARISM REPORT SUMMARY



Similarity Report ID: oid:3117:584993993

PAPER NAME

Assessment of Delay Status, Major Factors, and Contract Management Effectiveness in Local Government Road Projects: A Study from Sarlahi District

AUTHOR

Anuj Dev

WORD COUNT

21030 Words

CHARACTER COUNT

122963 Characters

PAGE COUNT

85 Pages

FILE SIZE

1.8MB

SUBMISSION DATE

Apr 30, 2026 10:49 PM GMT+5:45

REPORT DATE

Apr 30, 2026 10:50 PM GMT+5:45

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