

Project Management Plan of Vista Cement Plant Project

Prepared by:

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Executive Summary

Cement is a strategic commodity, essential for Canada's economic security and infrastructure renewal and expansion. Cement industry is an important economic presence in communities across Canada. The industry is responsible for over \$8.8 billion in sales, contributing over \$3.2 billion to Canada's Gross Domestic Product. The Canadian cement industry is comprised of 15 fully operational cement production plants which consist of 14 gray clinker production plants and one plant which produces white cement.

The feasibility study conducted by the project team indicates that the national demand for cement products is increasing. This finding is supported by the approval of infrastructure projects (roads, bridges, and others) as well as the growing need for cement used in housing developments. The studies, conducted by several sources, indicate that if the production of cement does not increase, the supply will be insufficient during upcoming years.

The Vista Cement Plant project aims to construct a new cement production plant with two production lines, each with a production capacity of 3,500 tonnes of clinker per day. The total production capacity of the plant for different kinds of cement is planned to be 10,000 tonnes. This plant will especially produce white cement because there is only one plant in Canada that produces this type of cement. The plant is planned to be located at about 12 kilometers from Grande Prairie to Edmonton highway. The plant land area is 100 hectares with 200 meters distance from Vista mining area.

The purpose of the Vista Cement Plant project is to increase cement production capacity to supply the national demand for cement and its products. By completing this project, the country will be able to use the opportunity of exporting cement to other countries. Furthermore, this project will develop economy of the region by creating job opportunities as well as rising living standards and preventing migration to larger cities. It is expected that the project implementation will result in the creation of about 190 new jobs.

The project management plan presented here will describe the project manager's approach and the general responsibilities of the project team. In addition to the project management plan, several other documents will be developed and used to ensure compliance with project requirements as well regulations and industry specific standards. The specific plans will include processes, flow diagrams, responsibility matrices, organizational charts, and other pertinent information to guide the project staff.

1. Initiating Process

1.1. Background

The cement industry is an important economic presence in communities across Canada. The Canadian cement industry is comprised of 15 fully operational cement production plants. The Canadian cement plant network consists of 14 gray clinker production plants and one plant which produces white cement. The table below shows the number of plants in each province and their production capacities.

Province	Number of Plants	Clinker Production Capacity (Million tonnes/Year)
Alberta	2	2.47
British Columbia	3	2.61
Nova Scotia	1	0.51
Ontario	6	7.53
Quebec	3	3.07

Concrete outperforms wood as a construction material, and won't burden building owners with constant repair and maintenance costs. Versatile, long-lasting, and durable concrete is a cost-effective, sustainable choice for both residential and commercial buildings. The demand for cement and its products is increasing due to following advantages:

- **Durable:** Concrete's 100-year service life conserves resources by reducing the need for reconstruction. It resists weathering, erosion and natural disasters, needs few repairs and little maintenance, adding up to a solid investment.
- **Economical:** Operational energy requirements typically represent 85% of the total energy a building uses over its service life. Concrete provides one of the most efficient and cost-effective means of constructing energy-efficient structures. A sustainable concrete building can yield life cycle savings of more than 20% of total construction cost. Much of the savings come from concrete's thermal mass, which can harvest natural energy sources such as the sun, and can also capture thermal energy from lighting fixtures and other equipment in the building.
- **Safe:** Concrete is safe, secure, and healthy for building occupants. Being an inert construction material, concrete does not burn. It also does not feed rot and mildew. It does not off-gas any volatile organic compounds and provides excellent indoor air quality. Superior quality of construction helps prevent the entry of pollen, dust and other airborne pollutants.
- **Sustainable:** Environmentally-conscious builders look for durable building materials that leave the smallest environmental footprint. Produced from locally available, abundant materials, concrete's long lifespan helps make it the most responsible choice for a sustainable future. In concrete's life cycle, recycling is present from start to finish. Many wastes and industrial by-products that would end up in landfills are used in the cement kiln or can be added to concrete mixes to provide desirable characteristics. Used concrete is recyclable and serves as aggregate in roadbeds or as granular material in new concrete.

1.2. Business Need

Cement is a strategic commodity, essential for Canada's economic security and infrastructure renewal and expansion. When cement and concrete sales are taken together, the industry is responsible for over \$8.8 billion in sales, contributing over \$3.2 billion to Canada's Gross Domestic Product. Approximately, 28.1 million cubic metres of concrete (about one cubic metre per Canadian) are used each year in construction projects to:

- Pave roads, highways, sidewalks, and parking lots
- Build homes, apartments, and office towers
- Construct sewers and water treatment facilities
- Build storage and waste management facilities for agriculture
- Build bridges, ports, airports, dams, power plants and oil wells

Canada's cement demand is projected to annually climb by 2.6% each year. Growing population increases the demand for residential spaces, offices, recreational and educational facilities, and commonplaces. The country is facing massive number of construction, reconstruction, and temporary and complete renovations. In return, demand increase for cement is inevitable since cement is becoming one of the basic materials used in buildings. Growth in cement consumption shows that there is still a need for more cement in the country. If the growth in cement production does not rise as growth in consumption the country will suffer from lack of cement within a short time.

Canadian cement companies produce 15 million tonnes of cement, worth more than \$1.7 billion. The world's demand for cement is also predicted to rise by 4.1% annually. Countries which are expected to have a rise in cement demand include U.S., Japan, India, Spain, and Germany. A source of global demand for cement is because of increasing investments in infrastructure among developing countries, driven by economic growth and rising per capita income levels. Canada has the potential to increase its cement export to these countries, because it has enough mineral resources, but there is still demand for extra infrastructure and facilities to process the material and produce the cement.

Canadian cement plants make substantial contributions to their local economies through jobs, local, and taxes. Canadian cement plants are an important source of high quality jobs in their communities. The industry employs over 27,000 Canadians in the production of cement, ready mix concrete, and concrete construction materials. One of the industries that has a high potential to create new job opportunities is the cement production and distribution industry.

1.3. Project Charter

Project Title: Vista Cement Plant

Project Sponsor:

Date Prepared:

Project Manager:

Project Customer:

Project Purpose or Justification:

Justification:

- High growth in per capita cement consumption
- Strong demand from infrastructure and housing sector
- Capacity expansion by various industry sectors
- Incremental demand for commercial space

- High potential to export cement and its products to other countries (Europe and USA)
- Create economical growth and new job opportunities

Purpose:

- Increase cement production capacity to supply the national demand for cement and its products
- Increase the production capacity to use the opportunity of exporting cement to other countries
- Develop economy of the region by creating job opportunities as well as rising living standards and preventing migration to large cities

Project Description:

The objective of this project is to construct a new cement production plant with two production lines, each with a production capacity of 3,500 tonnes of clinker per day. The total production capacity of plant for different kinds of cement is planned to be 10,000 tonnes, especially white cement. The plant is planned to be located at about 12 kilometers from Grande Prairie to Edmonton highway. The plant land area is 100 hectares with 200 meters distance from Vista mining area.

Project and Product Requirements:

Primary crushing department: with two crushers (rotary hammer and roll) and total crushing capacity of 1600 tonnes per hour. In this department ore extracted from the mine turn into smaller size rocks for the transition into the next stage.

Raw material preparation department: This department has one stacker with capacity of 2,000 tonnes per hour, and two reclaimers with a capacity of 450 tonnes each. In this department there are 3 sets of ball mills, each with a production capacity of 160 tonnes cement per hour.

Clinker production department: This department has a pre-heater tower with heating capacity of 3,500 tonnes clinker per day. Also, there is a kiln with the capacity of 3000 tonnes per hour.

Cement production and packing department: This department has a finish mill and 4 loading lines, each with loading capacity of 200 tonnes per hour. It also has 4 cement packing machines. Each of these machines can pack 150 tonnes of cement per hour.

Acceptance Criteria:

Schedule: Meet or beat established project milestones considering allocated contingencies

Budget: Implementing the project within budget considering allocated contingencies

Scope: Conform to project requirements without adverse effects on milestones or budget

Safety: No recordable injuries more than the industry average

Legal compliance: Complete project without permit violations

Quality: passing the final inspection test according to CAC standards

Initial Risks:

- Fire and explosion which may occur because of using flammable liquids for engine combustion, plastics and combustible materials, welding works, heaters in warehouses, transformers for electricity supply, and compressors
- Catastrophic risks such as winds, storms, hurricanes and cyclones, ground subsidence, landslides and rock falls

Initial Risks:

- Defects in workmanship such as carelessness in handling equipment which may cause innumerable damages to the own work as well as to third parties
- Errors in calculation or design and employment of defective or inadequate material
- Accidents in plant site that may result in insufficient labour resources

Project Objectives	Success Criteria	Person Approving
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Scope:

To manage scope without adding unnecessary requirements to the project	Delivering fully operational cement plant satisfying client requirements	Project manager and project sponsor/customer
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Time:

To complete the project on time. Time ~ 40 months	Implementing the project on time considering allocated 10% contingency	Project manager
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Cost:

To stay under budget and incur as few incidental expenditures as possible Budget ~ \$200 million	Implementing the project within budget considering 10% contingency	Project manager
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Quality:

Conform to project requirements with high quality deliverables	Completing the project without permit violations and getting final operating license	Canadian Standards Association (CSA)
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Summary Milestones	Due Date
All industrial and government permits obtained	2014-11-30
All design and engineering plans documents are ready	2015-01-15
All contracts awarded & facility construction begins on site	2015-03-02
Facility construction ends	2016-04-29
Equipment installation ends and testing starts	2017-05-29
Final approvals and hand over to the client	2017-09-29

Estimated Budget:

This project is estimated to require \$ 200 million budget with 10% contingency. This estimation is obtained based on previously done similar project and meetings with subject matter experts.

Project Manager Authority Level

Staffing Decisions:

The project manager will have the authority to release or bring in any necessary resources to contribute to the project team.

Budget Management and Variance:

The project manager has authority to make decisions about controlling and allocating the project budget pending approval from the project sponsor.

Technical Decisions:

The project manager has the authority to make technical decisions about the project. However, all technical decisions will be made in advisement with the subject matter experts on the project.

Conflict Resolution:

The project manager will be expected to negotiate between stakeholders and resolve any conflicts that may arise during the project.

Escalation Path for Authority Limitations:

Any items or issues that are not resolved by the project manager or project team will be taken to the director level. If not resolved there, the issue will flow to the executive level.

Approvals:

Project Manager Signature

Sponsor or Originator Signature

Project Manager Name

Sponsor or Originator Name

Date

Date

1.4.Stakeholder Register

Please refer to the appendix.

2. Planning Process

2.1.Integration Management

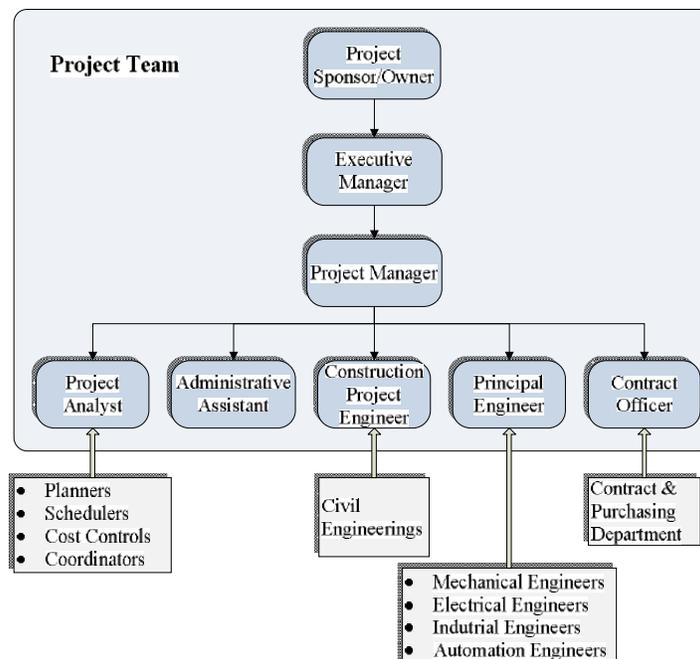
In this project, project manager is responsible for an effective project integration management as the success of the project is highly dependent to it and helps to satisfy the stakeholders.

2.1.1. Integration Management Approach

In the first step, the project manager developed the project charter to provide a formal authorization of a project through proper documentation of the initial requirements satisfying the needs and specifications of the stakeholders. After the project charter is signed by both the project manager and the project sponsor/owner, the project manger will use the project charter for organising all the required resources for the successful completion of the project. She will also determine the external as well as internal environment that can influence the project. Then, she will start to prepare a detailed documentation of project management plan which is beneficial for the project manager to understand the project and execute it properly. The project plan will guide the project manager as well as the team members for directing and managing the execution of the project properly. In the next steps, the project manager will direct and manage project execution, monitor and control project work, perform integrated change control, and finally close the project.

2.1.2. Project Team

In this project, Bruno Lafont, the CEO of Lafarge Cement Company, is the sponsor and owner of the Vista Cement Plant project. The project team is shown in the following diagram. The project analyst, construction project engineer, principal engineer, and contract officer are respectively representative of project support staff, civil engineering team, technology engineering team, and contract and purchasing department.



2.1.3. Manage Change

Project Changes: These are changes in activities done within the company and must be incorporated to allow the project to proceed on schedule and to provide a fully functional facility. The change may be generated as a result of differing site conditions, errors in the design, or changes in the equipment specifications. Funding for these changes is covered by the technical contingency funds and is managed by the project manager. These changes will receive top priority for implementation. Approval authority for these changes rests with the project sponsor and must be processed through the project manager.

Contract Changes: These are generally requests for changes to the contracts initiated by the sponsor/owner. Such changes after contract award are normally very expensive and may delay completion of the project. They should be held to a minimum. The project team will maintain a priority list of deferred changes with preliminary cost estimates. All requests for these changes will be submitted to the contract officer. When required, the PM, will provide a written scope of work, preliminary cost estimate and impact statement for the proposed program change. The PM will review the proposed change with the contract officer to determine if the change is out of project or contract scope, exceeds available funds or if the change should be deferred.

2.2. Scope Management Plan

2.2.1. Scope Statement

The scope for the Vista Cement Plant project is defined through a comprehensive requirements collection process. First, a thorough analysis was performed on the company's previous cement construction projects. The project description and deliverables are developed based on the requirements collection process and input from subject matter experts in the cement industry. This process of expert judgment provided feedback on the most effective ways to meet the original requirements of constructing a new cement plant.

Project Goal:

The goal of this project is to construct a new cement production plant to increase cement production capacity to supply the national demand for cement and its products; increase the production capacity to use the opportunity of exporting cement to other countries; and develop economy of the region by creating job opportunities as well as rising living standards and preventing migration to large cities.

Project Objective:

The objective of this project is to construct a new cement production plant with two production lines, each with a capacity of 3,500 tonnes of clinker per day. The total production capacity of plant for different kinds of cement is planned to be 10,000 tonnes. The plant is planned to be located at about 12 kilometers from Grand Prairie to Edmonton highway. The plant land area is 100 hectares with 200 meters distance from the Vista mining area.

Project Requirements:

- Getting initial permits, final tests, and getting final operating license;
- Subcontracting the construction of four major departments and some of the equipment;
- Purchasing other equipment and installation of equipment;
- This project requires about 200 in-field and office staff;

- Primary crushing department with two crushers (rotary hammer and roll) and total crushing capacity of 1600 tonnes per hour. In this department ore extracted from the mine turn into smaller size rocks for the transition into the next stage;
- Raw material preparation department with one stacker with capacity of 2,000 tonnes per hour, and two reclaimers with a capacity of 450 tonnes each. In this department there are 3 sets of ball mills, each with a production capacity of 160 tonnes cement per hour;
- Clinker production department with a pre-heater tower with heating capacity of 3,500 tonnes clinker per day. Also, there is a kiln with the capacity of 3000 tonnes per hour;
- Cement production and packing department with a finish mill and 4 loading lines, each with loading capacity of 200 tonnes per hour. It also has 4 cement packing machines. Each of these machines can pack 150 tonnes of cement per hour.

Assumptions:

- Staff and trade with required expertise will be available (or be hired);
- A large percentage of the staff has enough experience so training is not required;
- Material and equipment will be available (or be ordered);
- Latest technology will be used to deliver the best quality with minimum negative environmental impact;
- The client/sponsor or his representative will be available for interaction;
- Enough information will be available for initial budget and schedule forecast;
- The detailed description of the project based on client requirements is in place;
- Required infrastructure to support the project is ready prior to the start of the project;
- Adequate funding has already been obtained for the project.

In Scope	Out of Scope
<ul style="list-style-type: none"> • Getting industrial permits • Soil mechanic studies, topographic maps, and land preparation • Civil, structural, and technological design • Subcontract civil and technological constructions • Select equipment, procurement, and installing equipment • Final tests and getting operating license 	<ul style="list-style-type: none"> • Construction of a road from Grand Prairie to the plant site; • Construction of a road from the plant site to the mining area, or building a conveyor belt which will transport the raw material from the mine; • Providing infrastructure such as water pipelines, power transmission lines, telecommunication lines, and fuel supply; • Construction of supporting side buildings;

2.2.2. Work Breakdown Structure (WBS)

Please refer to the appendix.

2.2.3. Scope Management Approach

For this project, scope management will be the sole responsibility of the project manager. The scope for this project is defined by the scope statement and Work Breakdown Structure (WBS). The project manager and sponsor will establish and approve documentation for measuring project scope which includes deliverable quality checklists and work performance measurements. Proposed scope changes may be initiated by any member of the project team. All change requests will be submitted to the Project Manager who will then evaluate the requested scope change. Upon acceptance of the scope change request the PM will submit the scope change request to the project sponsor for approval.

2.3. Time Management

2.3.1. Develop Schedule

The overall duration of the project is estimated at 40 months, with start and end dates of June 1, 2014 and September 29, 2017, respectively. The network diagram shown in the appendix presents the project schedule. Activity sequencing is used to determine the order of work packages and assign relationships between project activities. Activity duration estimating is used to calculate the number of work periods required to complete work packages.

2.3.2. Control Schedule

Once a preliminary schedule has been developed using Primavera P6, it will be reviewed by the project team and any resources tentatively assigned to project tasks. The project team and resources must agree to the proposed work package assignments, durations, and schedule.

The project schedule will be reviewed and updated as necessary on a bi-weekly basis with actual start, actual finish, and completion percentages which will be provided by task owners. The project manager is responsible for holding bi-weekly schedule updates/reviews; determining impacts of schedule variances; submitting schedule change requests; and reporting schedule status in accordance with the project's communications plan. The project team is responsible for participating in bi-weekly schedule updates/reviews; communicating any changes to actual start/finish dates to the project manager; and participating in schedule variance resolution activities as needed. The project sponsor will maintain awareness of the project schedule status and review/approve any schedule change requests submitted by the project manager. A variance of +/- 0.1 in the schedule performance index will change the status of the schedule to cautionary as indicated in the following table.

Between 0.9 and 1.1	Green
Between 0.9 and 0.8 or Between 1.1 and 1.2	Yellow
Less Than 0.8 or Greater than 1.2	Red

2.4. Cost Management

The project manager will be responsible for managing and reporting on the project's cost throughout the duration of the project. During the monthly project status meeting, the PM will meet with the sponsor and executive manager to present and review the project's cost performance for the preceding month. Performance will be measured using earned value. The PM is responsible for accounting for cost deviations and presenting the project sponsor with options for getting the project back on budget. The project sponsor has the authority to make changes to the project to bring it back within budget.

2.4.1. Estimate Costs

The budget for this project is detailed below.

Description	Estimated Budget (\$)
Initial Proceedings, Design & Engineering	1,000,000
Salon 1 Construction	5,000,000
Metal Structures	7,000,000
Primary Rotary Hammer Crusher	11,000,000
Secondary Roll Crusher	13,500,000
Proportioning Equipment 2	11,000,000
Grinding Mill (Rawmill)	15,000,000
Pre-heater tower	20,000,000
kiln	30,000,000
Clinker Cooler	15,000,000
Salon 4 Construction	5,000,000
Proportioning Equipment 4	11,000,000
Finish Mill	18,000,000
Cement Storage Silos	12,000,000
Packing Equipment	6,000,000
Final Proceedings	1,500,000
10% contingency	18,000,000
Total	200,000,000

2.4.2. Control Costs

Performance of the project will be measured using Earned Value Management. The following four Earned Value metrics will be used to measure project cost performance:

- Schedule Variance (SV)
- Cost Variance (CV)
- Schedule Performance Index (SPI)
- Cost Performance Index (CPI)

A variance of +/- 0.1 in the cost performance index will change the status of the cost to cautionary. If the CPI has a variance of between 0.1 and 0.2 the PM must report the reason for the exception. If the CPI has a variance of greater than 0.2 the PM must report the reason for the exception and provide management a detailed corrective plan to bring the projects performance back to acceptable levels.

2.5. Quality Management

2.5.1. Assure Quality

Quality assurance is the responsibility of the project manager. Prior to substantial completion and final acceptance of the plant, periodic conformance inspections will be conducted on an department-by-department basis or on a functional basis by the PM. The purpose of these conformance inspections is to minimize delays and insure efficient turnover. The contractors should correct any construction deficiencies identified during these visits before a final turnover is scheduled. The following metrics will be used on the project:

- Completion and documentation of all quality review processes.
- 100% compliance with American Concrete Institute Codes (ACI)
- 100% compliance with American Society for Testing and Materials Codes (ASTM)

- 100% compliance with Canadian Standards Association (CSA) standards
- Written acceptance by the project sponsor

2.5.2. Control Quality

The project manager will use the following checkpoints to monitor project quality, and will provide detailed feedback to the project sponsor concerning the audit and review results as defined in the communication plan.

- **Progress reviews:** Progress documents should be reviewed by the project team on regular basis.
- **General building inspections:** The construction project engineer will be dedicated full time on this project for construction inspection and coordination. The project team will make periodic site visits to observe compliance.
- **Testing:** These testing will be done during installation of equipment. Testing will be in accordance with the contract documents, including in-house-made equipment, electrical instruments, and imported mechanical equipment.
- **Code compliance:** Cement Association of Canada (CAC) will perform plan reviews and required inspections of the buildings and equipment prior to issuing the final permit. They will try to assess the plant according to Canadian Standards Association (CSA), American Concrete Institute (ACI) and American Society for Testing and Materials Codes (ASTM) standards.
- **Final Inspections:** Parties included in the key final inspections will include the project manager, project sponsor, principal engineer, construction project engineer, and appropriate project team members. Additional participants may include certain contract representatives.
- **One year warranty inspection:** This inspection will be scheduled with the contractor representatives 11 months after substantial completion.

2.6. Human Resource Management

2.6.1. Roles and Responsibilities

Role	Major Responsibilities
Project Sponsor/Owner	<ul style="list-style-type: none"> • Make decisions on key business issues
Executive Manager	<ul style="list-style-type: none"> • Representative of the sponsor/client when he is not available • The primary point of contact representing user requirements • Support the PM in coordinating and validating user requirements and requests for changes • Attends all design and project review meetings, contractor selection activities, and the government's conformance review meetings
Project manager	<ul style="list-style-type: none"> • Ensure project is managed properly to achieve goals • Prepare Project Management Plan • Coordination among teams, and mentoring and coaching of team members • External Communications and communication with executive-level management • Forecasting issues before they become issues and dispute resolution • Process and negotiate change orders

Project analyst	<ul style="list-style-type: none"> • Project documentation • Performance measure and project status reporting • Budget reporting and payments • Schedule analysis and reporting • Risk identification and analysis • Ensure compliance with State and federal laws and regulations
Administrative Assistant	<ul style="list-style-type: none"> • Developing, preparing and distributing reports • Assisting in all administrative matters. • Support entire project team • ensure office and staff follow established procedures including employee orientation and training • Mail distribution • Vehicle coordination • Office supplies and all other office functions.
Contract Officer	<ul style="list-style-type: none"> • Representative of the contract and purchasing department • Responsible for all contractual obligations • Process bid proposals • Ensure compliance with Project, State, and Federal requirements
Construction Project Engineer	<ul style="list-style-type: none"> • Coordinates project field activities • Performs regular site visits • Observes the progress of in-place construction elements for conformance with contract requirements • Propose schematic design of the buildings • Preparing bid documents including specifications • Providing cost estimates • Support quality audits • Ensure environmental and safety compliance
Principal Engineer	<ul style="list-style-type: none"> • Representative of engineering group that includes electrical, mechanical, and automation engineers • Conceptual design of mechanical equipment and electrical instruments based on requirements, • Preparing bid documents including specifications • Providing cost estimates • Assisting in providing project observation for in-place elements for review of conformance. • Design-side quality audits

2.6.2. Manage Staffing

In this project for activities which are not contracted out, the project staff will consist entirely of internal resources. The PM will negotiate with functional and department managers in order to identify and assign resources in accordance with the project organizational structure. All resources must be approved by the appropriate functional/department manager before the resource may begin any project work.

The PM will review each team member's assigned work activities at the onset of the project and communicate all expectations of work to be performed. The project manager will then evaluate each team member throughout the project to evaluate their performance and how effectively they are completing their assigned work. Prior to releasing project resources, the project manager will meet with the appropriate functional manager and provide feedback on employee project performance. The

functional managers will then perform a formal performance review on each team member. Although the scope of this project does not allow for ample time to provide cross-training or potential for monetary rewards there are several planned recognition and reward items for project team members.

2.7. Communications Management

2.7.1. Communication Matrix

What (Content)	Audience	When/How Often	How	Who (Provider)
Project Progress	project team, project sponsor, executive management	Bi-weekly	project progress report, progress meeting	project manager project analyst
Project Status	project manager, project sponsor,	monthly	project status meeting	project team
Project Deliverables Review	project analyst	end of each department completion	project review meeting	project manager
Subcontract Compliance	project manager contract officer	weekly	vendor meeting	vendor representative, project team
Project Risks and Issues	project team	as needed	risk register and issues log	project manager, project team
Project Changes	project sponsor executive management	as needed	project change request	project manager
Public Input or Notifications	Public	as needed	public meeting	executive manager
Notifications	employees who may be affected	as needed	email	responsible individual

2.8. Risk Management

This section defines how risk management will be structured and performed on the project. The project team will use the risk register on to store project risks, including their definition, category, probability of occurrence, and potential impact.

2.8.1. Risk Management Approach

The approach taken to manage risks for this project included a methodical process by which the project team identified, scored, and ranked the various risks. The most likely and highest impact risks should be added to the project schedule to ensure that the assigned risk managers take the necessary steps to implement the mitigation response at the appropriate time during the schedule. Upon the completion of the project, during the closing process, the project manager will analyze each risk as well as the risk management process. Based on this analysis, the project manager will identify any improvements that can be made to the risk management process for future projects. These improvements will be captured as part of the lessons learned knowledge base.

2.8.2. Identify Risks

Following methods are used by the PM to identify the risks associated with this project.

- **Expert Interview:** Two Expert Interviews were held for this project. The interviews revealed several risks which were then mitigated by making changes to the project plan. The remaining risks are included in the Risk Register.
- **Risk Assessment Meeting:** A risk assessment meeting was held with key team members and stakeholders. The risks identified during this meeting were added to the project plan and Risk Register.
- **Historical Review of Similar Projects:** The project team reviewed the history of similar projects in order to determine the most common risks and the strategies used to mitigate those risks.

2.8.3. Risk Register

Please refer to the appendix.

2.8.4. Monitor and Control Risks

The project manager will maintain the risk register on the project website. Risks that the team has identified as high risk will be monitored weekly by the project manager. All risks will be reviewed monthly at a project team meeting and with project sponsors. At the end of the project, risks will be reviewed and entered as lessons learned as appropriate.

The most likely and greatest impact risks should be added to the project plan to ensure that they are monitored during the time the project is exposed to each risk. During the bi-weekly project team meeting the PM will discuss the status of risks; however, only risks which fall in the current time period will be discussed. Risk monitoring will be a continuous process throughout the life of this project. As risks approach on the project schedule the PM will ensure that the appropriate team member provides the necessary status updates which include the risk status, identification of trigger conditions, and the documentation of the results of the risk response.

2.9. Procurement Management

This procurement management plan sets the procurement framework for this project. It will serve as a guide for managing procurement throughout the life of the project and will be updated as acquisition needs change. This plan identifies and defines the items to be procured, the types of contracts to be used in support of this project, the contract approval process, and decision criteria.

2.9.1. Procurement Management Approach

The PM is ultimately responsible for managing vendors. In order to ensure the timely delivery and high quality of products from vendors the PM will meet weekly with the contract officer as the representative of the contract and purchasing department and each vendor to discuss the progress for each procured item. The meetings can be in person or by teleconference. The purpose of these meetings will be to review all documented specifications for each product as well as to review the quality test findings. This forum will provide an opportunity to review each item's development or the service provided in order to ensure it complies with the requirements established in the project specifications. It also serves as an opportunity to ask questions or modify contracts or requirements ahead of time in order to prevent delays in delivery and schedule. The PM will be responsible for scheduling this meeting on a weekly basis until all items are delivered and are determined to be acceptable.

2.9.2. Contracting Process

All items and services to be procured for this project will be solicited under firm-fixed price contracts.

Step 1: The project team especially SMEs will work with the contracts and purchasing department to define the item types, quantities, services and required delivery dates.

Step 2: The contracts and purchasing department will then solicit bids from various vendors in order to procure the items within the required time frame and at a reasonable cost under the firm fixed price contract once the vendor is selected. This contract will be awarded to the winning contractor.

Step 1: The project team especially engineers and SMEs will work to determine what items or services will require procurement from outside vendors. This will be determined by using design documents and conducting a cost analysis of products or services which can be provided internally and compared with purchase prices from international or domestic vendors.

Step 2: Once cost analysis is complete and the list of items and services to be procured externally is finalized, the project team will send the results to contraction officer. Contraction officer is the connection point between project team and purchasing and contracts department.

Step 3: The purchasing and contracts department will complete solicitations and send out Request for Proposals (RFP) to outside vendors. The department will start collecting the proposals.

Step 4: Once proposals have been received by all vendors the approval process begins. A review of all vendor proposals will be conducted to determine which meet the criteria established by the project team and the purchasing and contracts department. The criteria for the selection and award of procurement contracts under this project will be based on the following decision criteria:

- Ability of the vendor to provide the service by the required delivery date
- Quality
- Cost
- Expected delivery date
- Comparison of outsourced cost versus in-sourcing
- Past performance

Step 5: All purchases require the approval of the project manager and the Contract Review Board. The Contract Review Board consists of representatives from the project team, purchasing and contracts department, finance, and the project manager.

2.9.3. Procurement Risks and Constrains

Risks:

Project risks will be managed in accordance with the project's risk management plan. However, for risks related specifically to procurement, there must be additional consideration and involvement. The project team will include the project sponsor and a designated representative from the contracting department in all project meetings and status reviews. Additionally, any decisions regarding procurement actions must be approved by the project sponsor or. Any issues concerning procurement

actions or any newly identified risks will immediately be communicated to the project's contracting department point of contact as well as the project sponsor.

- Unrealistic schedule and cost expectations for vendors
- Manufacturing capacity capabilities of vendors
- Conflicts with current contracts and vendor relationships
- Configuration management for upgrades and improvements of purchased technology
- Potential delays in shipping and impacts on cost and schedule
- Questionable past performance for vendors
- Potential that final product does not meet required specifications

Constraints:

There are several constraints that must be considered as part of the project's procurement management plan. These constraints will be included in the RFP and communicated to all vendors in order to determine their ability to operate within these constraints. These constraints apply to several areas which include schedule, cost, scope, resources, and technology:

- ***Schedule:*** Project schedule is not flexible and the procurement activities, contract administration, and contract fulfillment must be completed within the established project schedule.
- ***Cost:*** Project budget has contingency and management reserves built in; however, these reserves may not be applied to procurement activities. Reserves are only to be used in the event of an approved change in project scope or at management's discretion.
- ***Scope:*** All procurement activities and contract awards must support the approved project scope statement. Any procurement activities or contract awards which specify work which is not in direct support of the project's scope statement will be considered out of scope and disapproved.
- ***Resources:*** All procurement activities must be performed and managed with current personnel. No additional personnel will be hired or re-allocated to support the procurement activities on this project.
- ***Technology:*** Parts specifications have already been determined and will be included in the statement of work as part of the RFP. While proposals may include suggested alternative material or manufacturing processes, parts specifications must match those provided in the statement of work exactly.

2.9.4. Contract Changes

The change management process will document all changes to the contract in accordance with project and all standard policies and procedures, for example, change must be written and oral orders will not be used. Changes will include change orders and claims resulting from either the design or construction phases of the contract. During issue initiation, potential changes are identified, a technical review is completed, change approval is granted based on the value of the change, and approval is issued to the contractor to proceed with the change. The contract and purchasing department, in conjunction with the project team, will evaluate change proposals

2.10. Stakeholder Management Plan

2.10.1. Manage Stakeholder Expectations

As part of identifying all project stakeholders, the project manager will communicate with each stakeholder in order to determine their preferred frequency and method of communication. This feedback will be maintained by the project manager in the project's Stakeholder Register. Standard project communications will occur in accordance with the Communication Matrix; however, depending on the identified stakeholder communication requirements, individual communication is acceptable and within the constraints outlined for this project.

In addition to identifying communication preferences, stakeholder communication requirements must identify the project's communication channels and ensure that stakeholders have access to these channels. If project information is communicated via secure means or through internal company resources, all stakeholders, internal and external, must have the necessary access to receive project communications.

Once all stakeholders have been identified and communication requirements are established, the project team will maintain this information in the project's Stakeholder Register and use this, along with the project communication matrix as the basis for all communications.

2.10.2. Stakeholder Engagement Matrix

Stakeholder	Target Level	Actions
Project Sponsor/Owner	High Interest High Power	<ul style="list-style-type: none">• Weekly Meeting one-on-one.• Invite to weekly project briefings.
Project Team Members: <ul style="list-style-type: none">• Project Analyst• Principal Engineer• Construction Project Engineer• Administrative assistant	High Interest Medium Power	<ul style="list-style-type: none">• Weekly one-on-one meetings to discuss project status.• Discuss their roles and power.
Vendors/ Subcontractors	Medium Interest High Power	<ul style="list-style-type: none">• Discuss weekly status meetings.• Increase one-on-one meetings.• Suggest coffee after next status meeting.• Arrange vendor site visit for January.
Regulatory bodies	Non-essential Neutral	<ul style="list-style-type: none">• Discuss role of the body in future planning sessions.• Invite as observer.

3. Executing, Monitoring and Controlling Process

The execution and monitoring process ensures that planned project activities are carried out in an effective and efficient way while ensuring that measurements against project plans, specifications, and the original project feasibility concept continue to be collected, analyzed and acted on throughout the project lifecycle.

3.1. Performance Data Gathering

During the project life cycle data will be collected about the project. The data will be collected from many sources, following sources and some of them:

- Team members feedback
- Progress reports
- Change requests
- Risk identification reports
- Schedule variances
- Vendors performance report

It is the project manager's responsibility to analyze the data to compare the project status with whatever planned parameters to insure deliverables are achieved. Weekly report should be done by the project manager presenting actual project performance vs. planned. During the project team biweekly meetings the report should be presented and discussed among the team members.

3.2. Performance Measurement

The project manager has the main responsibility to measure actual performance as compared to planned performance. For example, actual project schedules will need to be reviewed periodically and compared to baseline schedules in order to discern if the project is performing according to plan. If the project is not performing according to baseline, steps will be taken to get the project back on track. The same monitoring and analyzing should take place on budgets, quality, risks, scope, etc. While the Project Manager is responsible for relaying project status to parties outside the project team, the project team is expected to report status to the Project Manager. This includes communicating information on both a formal and informal basis. Please refer to the appendix for an example.

3.3. Project Status Reports

Status reporting is an integral part of the project management processes. It is the means by which the project team, the stakeholders, and executive management stay informed about the progress and key activities required to successfully complete the project. The purpose of the status report, like the status meetings, is to develop a standard format for the formal exchange of information on the progress of the project.

The status report should be tailored to the project, but should be the same form for the full team. Status reports should be prepared by the project team detailing activities, accomplishments, milestones, identified issues, and problems. Status reports should follow a standard template so all reports are in the same format. The status report should be used to report key information including:

- Current status
- Significant accomplishments for the period
- Scheduled activities
- Issues

Along with the Status Report form, the following may be attached:

- Updated Gantt charts

senior management's appreciation openly expressed, and such recognition is a motivation to other projects to be successful.

4.3.Lessons Learned

The project manager should facilitate the meeting of lessons learned. Lessons learned should draw on both positive experiences– good ideas that improve project efficiency or save money, and negative experiences– lessons learned only after an undesirable outcome has already occurred. Lessons learned sessions are a valuable closure mechanism for team members, regardless of the project's outcome.

The lessons learned session is typically a meeting that includes the project team, stakeholder representation including external project oversight, auditors, and/or QA, executive management, maintenance and operations staff, project support staff.

Lessons learned and comments regarding project assessment should be documented, presented, and openly discussed with the intent of eliminating the occurrence of avoidable issues on future projects.

4.4.Contracts Closure

Project manager will work with the purchasing and contracts department to ensure formal closing of all contracts associated with the completed project which includes activities and interactions needed to settle and close any contract agreements established for the project

Contract closure involves verification that all work has been completed correctly and satisfactorily, updating of contract records to reflect final results, and archiving information for future use. Among other activities contract closure includes:

- Confirming the project has addressed the terms and conditions of the contracts
- Confirming completion of exit criteria for contract closure
- Formally closing out all contracts associated with the completed project

The project manager will estimate how much has to be paid or deducted from contractors. The project manager has to submit these documents to contractors within two weeks after closing the project.

4.5. Administrative Closure

The administrative closure process defines activities, interactions, and related roles and responsibilities of the project team members and other stakeholders involved in executing the administrative closure procedure for the projects. Performing the administrative closure process includes integrated activities to collect project records, analyze project success or failure, gather lessons learned, transfer the project products or services to production and/or operations, and archive project information for future use by the organization. Among other activities administrative closure includes:

- Confirming the project has met all sponsor, customer, and stakeholder requirements
- Verifying that all deliverables have been delivered and accepted
- Validating exit criteria have been met

Appendix

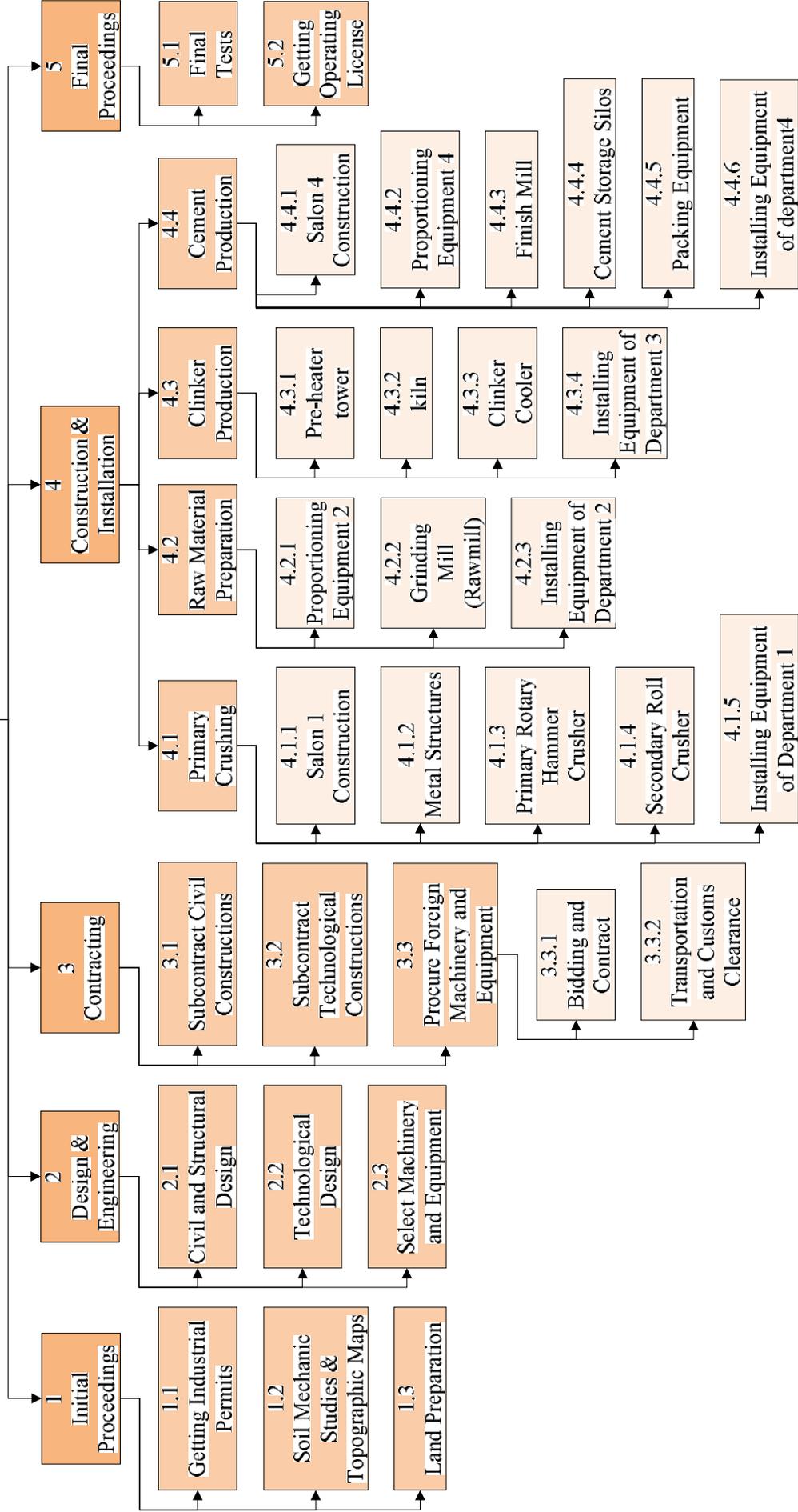
Stakeholder Register

Position	Role	Communication Requirements	Expectations	Classification Influence
Project sponsor	Provide funding and approvals	Monthly meeting, Weekly telephone and email updates	<ul style="list-style-type: none"> Project delivery based on requirements 	Internal Positive
Project manager	Drive overall project direction and plans to effectively complete deliverables	Emails, face-to-face meetings, weekly regular meetings, phone, progress reports, status reports	<ul style="list-style-type: none"> Collaboration from everyone in the project team 	Internal Positive
Project team	Support project manager through project control processes	Weekly meetings, status reports, presentations, progress reports	<ul style="list-style-type: none"> Motivation from the project manager 	Internal Positive
Contracting Officer	Representative of the purchasing and contracts department	Bi-weekly meetings, status reports, presentations	<ul style="list-style-type: none"> Precise design requirements documents from the project team Durable relations with subcontractors and suppliers 	Internal Positive
Contractor Companies & suppliers	Continued collaboration and interest in providing more material services to the company	Meetings, emails, phone	<ul style="list-style-type: none"> Timely orders Invoices paid according to negotiated terms 	External Positive
Local Communities	Participation in the stakeholder consultation process	Advertising	<ul style="list-style-type: none"> New job opportunities Repair and improvement of roads quality Reduced vehicle traffic and dust generation as a result of the use of an enclosed belt conveyor instead of heavy trucks for limestone transportation 	External Neutral
Government authorities & other regulatory bodies	Participation in the process of project approval and issuing of necessary permits	Quarterly email updates , end of project report	<ul style="list-style-type: none"> Tax payments to the city and municipal budgets New job creation Compliance with government and municipal legislation 	External Neutral

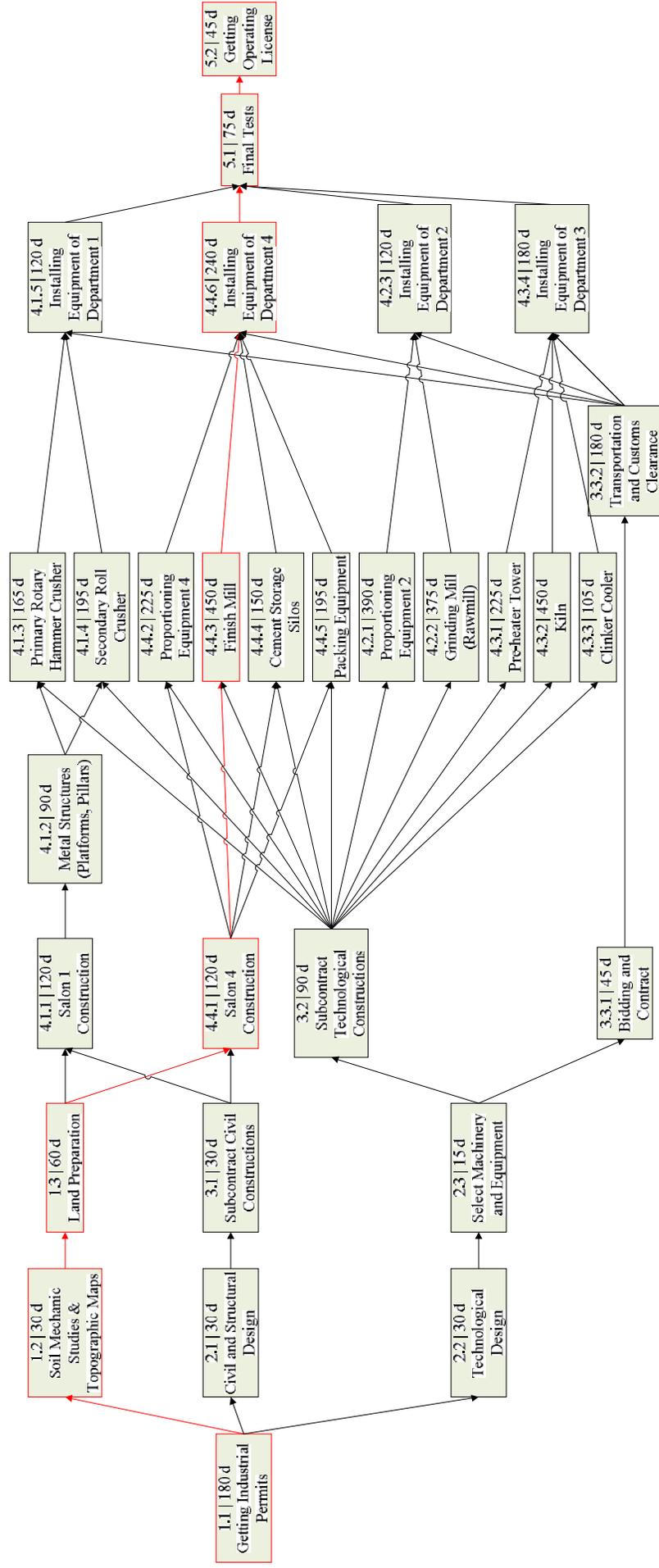
Environmental unions	Participation in the process of project approval and the issuing of necessary permits, oversight of environmental compliance	Quarterly email updates , end of project report	<ul style="list-style-type: none"> • Compliance with the environmental legislation • Reduction of air emissions • Implementation of a energy efficient cement production line 	External Negative
Cement plant employees	Participation in the project implementation	Regular meetings	<ul style="list-style-type: none"> • Job creation • Professional and career growth • Improvement of working conditions 	Internal Neutral
Customers for cement	Customer	Once in a while meetings	<ul style="list-style-type: none"> • Expansion of products' range • Improvement of products' quality, packaging, and delivery • Products certification in accordance with the relevant National and international standards • Possibility of increased competition as a result of the cement production expansion 	External Positive
Mass media (magazines, newspapers, TV and radio channels, news agencies)	Informing stakeholders on the progress of the project implementation	Interview meetings	<ul style="list-style-type: none"> • Timely information about the project 	External Neutral

Work Breakdown Structure (WBS)

Vista Cement Plant



Network Diagram



Risk Register

Risk Category	Risk ID	Risk Statement	Possibility	Impact			Score	Response
				Scope	Quality	Schedule		
Natural Risks	1	Earthquake	1	3	1	3	2.5	Mitigate
	2	Winds, storms, hurricanes and cyclones	1	3	1	3	2.5	Mitigate
	3	Ground subsidence, landslides and rock falls	2	1	1	2	3.5	Mitigate
	4	Unexpected weather conditions	3	3	1	2	5.25	Mitigate
Organizational Risks	5	Project not finished in time	2	1	1	2	3.5	Transfer
	6	Availability of finances	1	3	2	3	2.75	Avoid
	7	Ineffective resource planning	2	1	2	2	4	Transfer
	8	Project not finishing within budget	1	3	1	2	1.75	Transfer
Technological Risks	9	Errors in calculation or design	1	1	1	2	1.75	Transfer
	10	Inadequate material or technology	1	3	2	2	2	Mitigate
	11	Unexpected obstacles on site	1	1	1	2	1.75	Mitigate
Socio-Political & Socio-Economical Risks	12	Unstable government policies	1	3	1	2	1.75	Avoid
	13	Public safety in danger	1	3	1	3	2.5	Mitigate
	14	Change in economic parameters	2	3	2	3	5.5	Mitigate
	15	Change in material price	3	1	3	2	6.75	Transfer
Ecological Risks	16	Damage to environment & wildlife	1	3	1	2	1.75	Transfer
	17	Damage to natural resources	3	1	1	2	5.25	Transfer
Safety Risks	18	Fire and explosion	3	3	1	3	7.5	Transfer
	19	Defects in workmanship	2	1	1	2	3.5	Mitigate

