Construction of Warehouse Building for WUS Logistics (Pvt) Ltd.

Project Management Theory & Practices

Presentation Outline

- Background of the project.
- Comparison of project life cycle.
- Suitable project life cycle to conduct warehouse project.
- Seven principles of project management.
- Seven processes to manage the project successfully.
- Project management tools and techniques.
- Challenges and limitations of conducting the project.
- Recommendations

Background of the project

- WUS Logistics Pvt Ltd is constructing warehouse building which is considered as the largest single roof warehouse in Sri Lanka.
- Project commencement date – 01 Sep. 2021 Project completion date – 01 Oct. 2022
- Project location – Ekala
- Estimated budget – Rs. 3,735,528,964.57
- Objective of the project is to build single roof warehouse within estimated time period and budget.
- Project scope covers constructing warehouse building and office building spanning over 430000 sq. ft. Facility equips with 50 loading bays and it has capacity to handle 720 20-foot container units.
- Project sponsor – WUS Logistics Pvt Ltd. Main contractor – Access Engineering PLC

Comparison of project life cycle

	Linear	Scrum	Adaptive	Agile
Definition	Linear life cycle is set of related activities that follow each other in an order from developing initial concept to the deployment of an final outcome (PMI,2017).	Scrum or incremental project life cycle means project deliverables are produced by series of iterations that sequentially add functionality within a determined time period. The deliverable comprises the necessary and sufficient capability to be complete only after the final iteration (PMI, 2017).	Adaptive or iterative life cycle means project scope is determined in early stage and project elements, cost and time estimations are modified throughout the project process according to required changes (PMI,2017).	Agile or evaluation life cycle means project conducted based on structured series of stages that a product goes through as it conducts from start to end (Certwise, 2020).
Suitable situation	Structured & stable. Small and simple projects	Dynamic Complex projects.	Dynamic Complex projects.	Highly dynamic Complex projects. mainly software development projects.
Delivery	Single delivery	Frequent smaller deliveries	Single delivery	Frequent smaller deliveries
Advantage	Low cost Easy to manage.	Easy to measure the progress.	Accuracy of solutions. Easy to control risks.	Achieve customer value. Focus on competitiveness.
Disadvantage	Not suitable for complex projects in uncertain environment.	**Constant management requires.**	Constant management requires. Highly qualified specialties require.	Requires highly-skilled professionals and client-oriented people.

Suitable project life cycle to implement warehouse construction project

- Traditional methods such as linear project life cycle can not be used to complex projects operate in dynamic environment (Wirkus, 2016).
- Adoptive or iterative project life cycles are mainly used for software development projects. However, adoptive life cycle can be applied to complex construction projects with the adjustments (Wirkus, 2016).
- Due to uncertainty of construction cost, uncertainty of micro and macro environment, adoptive or iterative project life cycle can apply for this project (Certwise, 2020).
- Iterative or adaptive project life cycle can apply to this construction project in term of set of iterations which means parts of the construction such as architecture & design, Excavation and Earthworks warehouse floor & FM2, roofing, mechanical, electrical and plumbing (MEP), other constructions etc.
- Iterative life cycle applies below characteristics project management process.

  Create milestones throughout the project life cycle.

  Conduct risk management throughout the project life cycle.

  Conduct meeting with project team and project executives regularly.

7 Principles of project management

PRINCE2 principles	Description	Application to the warehouse construction project
Continued business justification	Project should be justified based on the cost benefit analysis. Project justification should be revalidated time to time and reasons should remain valid.	▪ Once the project is completed , warehouse will have capacity to handle 720 twenty feet container units with all supporting equipment. ▪ Feasibility studies are conducted at the early stage and when significant changes occurs in environment changes. ▪ Cost benefit analysis is conducted.
Learn from experience	Learning from previous and similar project and learning from experts at the beginning of the project. Seeking opportunities, external experience to learn and improve the project within project life cycle. At the end of project, learned lesson should be passed for future projects.	▪ Lesson log book should be maintained. ▪ Access Engineering has long term experience in constructing industry. ▪ Appointed project executives and project manager have experiences in warehouse construction projects. ▪ Prepare the lessons report with identified issues and corrective action plans.
Focus on product	Quality requirements of the product should be maintained. Not compromising quality.	▪ Quality register is maintained. ▪ Access Engineering follows ISO 9001:2015, ISO 14001:2015 and ISO 45001:2018 standards for quality, environmental, and health and safety management systems. ▪ Quality planning, assurance and control tools and techniques are used. ▪ Regular quality circle meetings are conducted.

7 Principles of project management cont..

PRINCE2 principles	Description	Application to the warehouse construction project
Defined roles and responsibilities	The primary stakeholders Project sponsors, users, suppliers, project manager and team managers.	▪ Project sponsor is WUS Logistics Pvt. Ltd. ▪ Project users is WUS Logistics Pvt. Ltd. ▪ Main contractor is Access Engineering PLC. Thus, project manager and project team consist with employees of Access Engineering PLC. ▪ Suppliers including subcontractors.
Manage by stages	Project is planned, implemented, monitored and controlled stage by stage.	▪ Project is managed in terms of different iterations such as architecture & design, warehouse construction (Excavation & earth work, concrete, reinforcement, masonry work, roofing etc.), MEP & HVAC works, other construction, equipment installation etc.
Manage by exceptions	Project tolerances have been defined for project objectives to determine limits.	▪ + 10% contingency budget is being allocated. ▪ Additional 3 months time is allocated to complete the project. ▪ Tolerance levels and trigger point are defined for each identified risk.
Tailor to suit the project	Project management method should be aligned with the business processes which facilitate to project such as procurement, HR, finance etc.	▪ Project controls should be applied according to project scope, scale, complexity, risk and team capacity. ▪ Project team applies adaptive approach as much as possible to PRINCE2 model.

7 Processes of Project Management

7 Processes	Application to the warehouse construction project
Starting up the project	▪ Project executive and project manager are appointed. ▪ Identifies learned lessons of previous projects. ▪ Conduct financial and non financial feasibility studies. ▪ Select members for project management team. ▪ Develop the business case. ▪ Select suitable project methodology. ▪ Assemble project brief.
Directing the project	▪ Approve project and project initiation. ▪ Approve management stages. ▪ Authorize exception plan. ▪ Provide guidelines to implement the project. ▪ Allocate resources and funds to conduct the project.
Initiating the project	▪ Finalize the tailored requirements. ▪ Design risk management plan. ▪ Design change management plan. ▪ Design quality management plan. ▪ Design communication management plan. ▪ Develop project plan.

7 Processes of Project Management cont..

7 Processes	Application to the project
Controlling the project	▪ Deliver the work packages to project manager, authorize work packages, review the progress of work packages and received the report of completed work package. ▪ Review the progress of management stage. ▪ Prepare the highlight report. ▪ Update checkpoint report. ▪ Identify, assess issues and risks and corrective actions taken.
Managing project deliveries	▪ Develop and execute work packages for each stages. ▪ Conducts quality checkups. ▪ Creating check point report.
Managing stage boundary	▪ Plan out next management stage ▪ Update the project plan and business case. ▪ Report end of management stage and finish the report of management stage completion. ▪ Develop an exception plan.
Closing the project	▪ Prepare planned closure. ▪ Benefit realization. ▪ Evaluate the project and pass the learned lessons.

Project Management tools and techniques

User stories

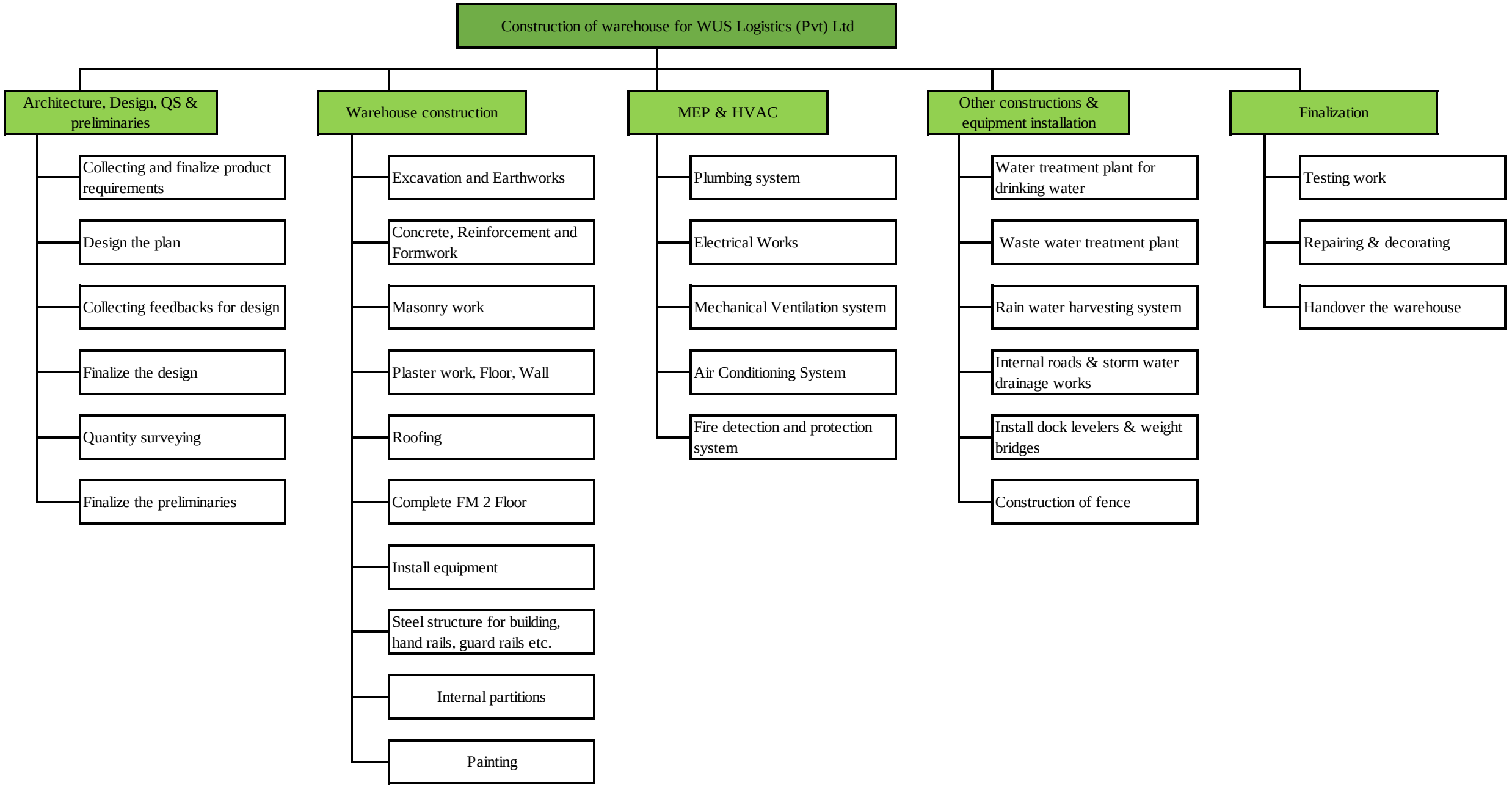
This is a feature of agile framework, mainly used for software development projects. It means informal or general explanation of product features that end users expect in end product. This method can also be used for construction project to identify project requirements.

MoSCoW prioritization

MoSCoW prioritization is also agile project management technique which uses to categorize project requirements based on prioritization.

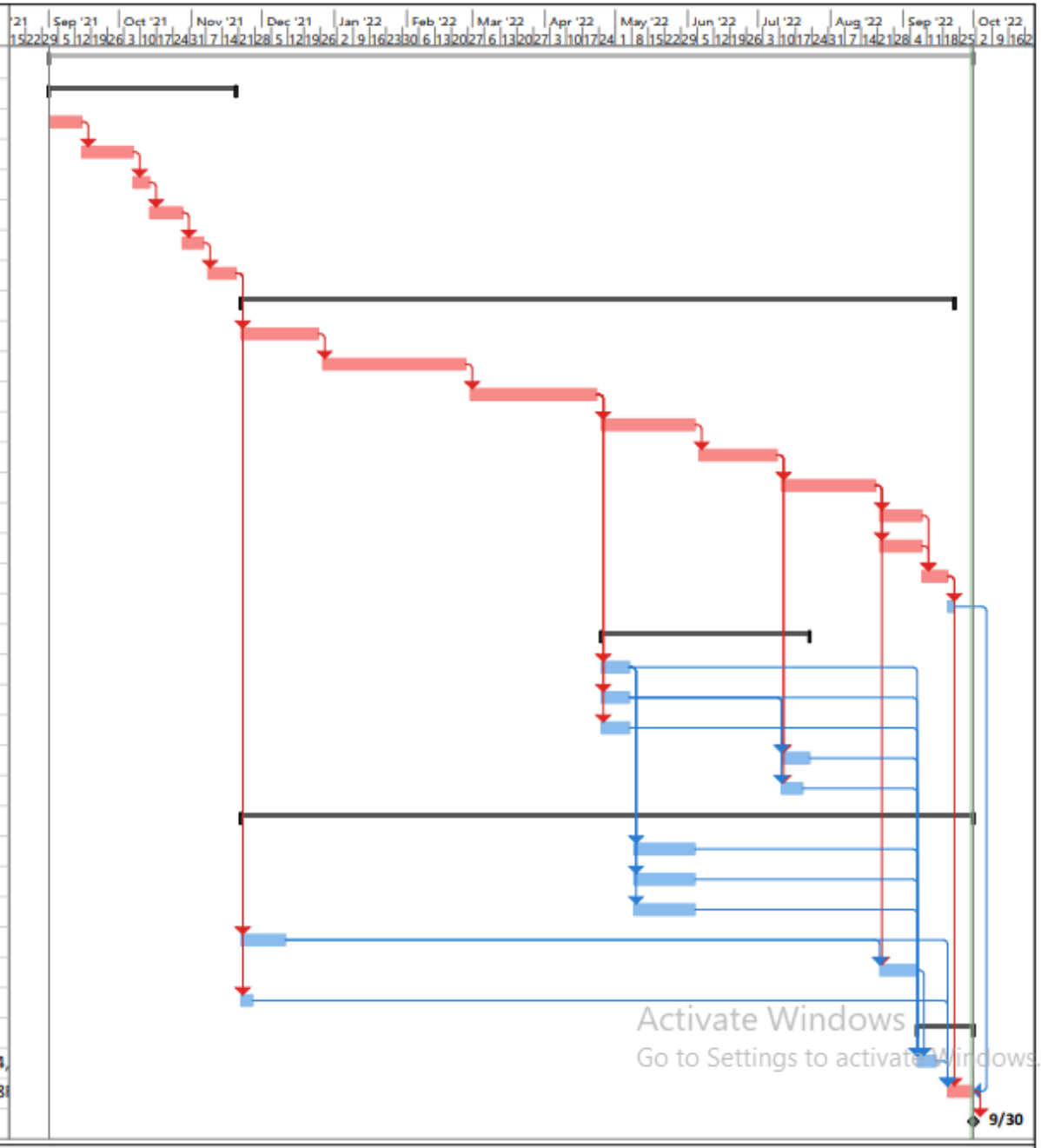
Must have	Should have	Could have	Won't have this time
Warehouse building – 430,000 sq. feet. Office space – 32000 sq. feet. 50 loading bays Internal roads & water drainage Weight bridges Fence	Water treatment plant for waste water and drinking water. CCTV system and security systems.	Air conditioners Rain water harvesting system	Business center Research & development center for logistics.

Work Breakdown Structure (WBS)



Gantt chart

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
0		**Construction of warehouse for WUS Logistics (Pvt) Ltd**	**283 days**	**Wed 9/1/21**	**Fri 9/30/22**	
1		**Architecture, Design, QS & preliminaries**	**58 days**	**Wed 9/1/21**	**Fri 11/19/21**	
2		Collecting and finalize product requirements	10 days	Wed 9/1/21	Tue 9/14/21	
3		Design the plan	16 days	Wed 9/15/21	Wed 10/6/21	2
4		Collecting feedbacks for design	5 days	Thu 10/7/21	Wed 10/13/21	3
5		Finalize the design	10 days	Thu 10/14/21	Wed 10/27/21	4
6		Quantity surveying	7 days	Thu 10/28/21	Fri 11/5/21	5
7		Finalize the preliminaries	10 days	Mon 11/8/21	Fri 11/19/21	6
8		**Warehouse construction**	**219 days**	**Mon 11/22/21**	**Thu 9/22/22**	
9		Excavation and Earthworks	25 days	Mon 11/22/21	Fri 12/24/21	7
10		Concrete, Reinforcement and Formwork	45 days	Mon 12/27/21	Fri 2/25/22	9
11		Masonry work	40 days	Mon 2/28/22	Fri 4/22/22	10
12		Plaster work, Floor, Wall finish	30 days	Mon 4/25/22	Fri 6/3/22	11
13		Roofing	25 days	Mon 6/6/22	Fri 7/8/22	12
14		Complete FM 2 Floor	30 days	Mon 7/11/22	Fri 8/19/22	13
15		Install equipment	14 days	Mon 8/22/22	Thu 9/8/22	14
16		Steel structure for building, hand rails, guard rails etc.	14 days	Mon 8/22/22	Thu 9/8/22	14
17		Internal partitions	7 days	Fri 9/9/22	Mon 9/19/22	15,16
18		Painting	3 days	Tue 9/20/22	Thu 9/22/22	17
19		**MEP & HVAC**	**65 days**	**Mon 4/25/22**	**Fri 7/22/22**	
20		Plumbing system	10 days	Mon 4/25/22	Fri 5/6/22	11
21		Electrical Works	10 days	Mon 4/25/22	Fri 5/6/22	11
22		Mechanical Ventilation system	10 days	Mon 4/25/22	Fri 5/6/22	11
23		Air Conditioning System	10 days	Mon 7/11/22	Fri 7/22/22	21,13
24		Fire detection and protection system	7 days	Mon 7/11/22	Tue 7/19/22	21,13
25		**Other constructions & equipment installation**	**225 days**	**Mon 11/22/21**	**Fri 9/30/22**	
26		Water treatment plant for drinking water	20 days	Mon 5/9/22	Fri 6/3/22	20
27		Waste water treatment plant	20 days	Mon 5/9/22	Fri 6/3/22	20
28		Rain water harvesting system	20 days	Mon 5/9/22	Fri 6/3/22	20
29		Internal roads & storm water drainage works	15 days	Mon 11/22/21	Fri 12/10/21	7
30		Install dock levelers & weightbridges	12 days	Mon 8/22/22	Tue 9/6/22	14,29
31		Construction of fence	5 days	Mon 11/22/21	Fri 11/26/21	7
32		**Finalization**	**18 days**	**Wed 9/7/22**	**Fri 9/30/22**	
33		Testing work	6 days	Wed 9/7/22	Wed 9/14/22	20,21,22,23,24,
34		Repairing & decorating	9 days	Tue 9/20/22	Fri 9/30/22	33,17,31,29,18
35		Handover the project	0 days	Fri 9/30/22	Fri 9/30/22	34



Business case

Business case is the document which provides justification to conduct the project. It evaluates the costs, benefits, associated risks, possible disadvantages of the project. Project viability is justified and continuing viability is tested using business case (Axelos, 2017).

Highlight report

Highlight report is the document which provides to project board and other key stakeholders a summary of the management stage status at regular intervals defined by project team (Axelos, 2017).

Checkpoint report

This document provides the progress of the work package at the intervals defined in the work package (PMI, 2017).

Risk register

This is the document which project team uses to identify potential risks, evaluate risks and record risk response strategies and individuals who has responsibility to manage particular risk (PMI, 2017).

Issue register

This is the document which uses to capture and keep track of all the issues formally managed throughout the project life cycle (Axelos, 2017). Issue register is used to assess the issues and record the corrective action plans.

Quality register

Quality register is the document which provides summary of quality management action plans which were conducted throughout project life cycle. It issue an unique ID for each quality activity (Axelos,2017).

Challenges and Limitations

- The most of project management methodologies, tools and techniques specifically developed to software development projects. Therefore, it is challenging to adopt these methodologies, tools and techniques for construction projects.
- Resistance of project teams to shift to agile project management methodologies.
- Modern project management methodologies are complex applied different principles, processes and documentation process.
- Lack of awareness and technical knowledge of employees to apply modern project management methodologies.
- Difficult to estimate the budget due to high inflation of the country and disruption to operation due to economic crisis.

Recommendations

- Apply agile project management methodologies, tools and techniques to construction projects as much as possible to improve flexibility.
- Enhance awareness of applicability of modern project methodologies to construction projects.
- Use project management system which support to documentation process.
- Form Project Management Office (PMO) to provide central support to project management process.
- Use proper risk management system to evaluate risks.
- Conduct regular meetings with project sponsor.

References

- Axelos, 2017 . *Managing Successful projects with PRINCE2.* 6th ed. Norwich : tso .
- Certwise, 2020. The Certwise learning system for PMP Exam preparation. Available at: https://www.certwise.com/wp-content/uploads/2017/03/CW_PMP_Reading-Sample.pdf Access on 23th Sep 2022.
- Project Management Institute , 2017. *A guide to the project management body of knowledge PMBOK Guide.* 6th ed. Pennsylvania : PMI.
- Wirkus, M. 2016. Adaptive management approach to an infrastructure project, Procedia - Social and Behavioral Sciences 226 (2016) 414 – 422.

Thank you