

اسم المشروع

Design & Develop 33kV Grid Substation to Feed Metro Station#02 in Riyadh City

رقم المجموعة 6

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15. Project Design

15.1 Triple constraint:



Figure 1. Triple constraint of the project

- **COST:**

The cost of the project includes the sum of all required materials, labor, and any additional elements required to complete the scope of the project within the required timeframe.

- Added deliverables
- Staffing & Recruiting
- Changes to supplier pricing

- **TIME:**

For any assigned project, the time constraint refers to the expected project delivery date by the client. Time constraints within the project management triangle are often some of the most difficult obstacles for project managers to overcome.

- Delays on resources
- Underestimating task duration
- Added deliverables from client

- **SCOPE:**

The scope of a project refers to any of the work required for the project to be successfully completed. This is why identifying and documenting the scope of the

project from the onset is an essential practice for project managers and stakeholders.

- Understaffing
- Cost miscalculation
- Underestimating work required

15.2 Project success factors

Factor	Definition of Success Factor
Satisfaction of Stakeholders	Measuring whether or not our stakeholders are satisfied is important as they have a vested interest in our success
Target Project Objectives Met	Knowing if our project has met the objectives that were set is crucial and the product requirements been delivered and success criteria been met as promised
Budget	A third success factor to look at is budget and whether we delivered the project for the budget stated at the outset. The hope is that our company or client got good deals through the process of the project.
Target Delivery	Measuring success includes time management. Hard deadlines are important as they affect others as well.
Quality	If our project is of good quality then we have a higher success factor. We want to understand and meet the stakeholder's expectations for quality and how to know if we have reached the standard expected.
Team Success	How our team feels about the process and outcome. Looking at trust levels, contentment, and satisfaction all play into success
Client Analysis	Seeing evidence and having the data in front of us means, we can see strengths and weaknesses. This pinpoints what can be improved upon.
Management Feedback	Feedback from our team is important but it is also important to know what management thinks as well. Knowing what they saw as successful and what may have been problematic is important

Table 1. Project success factors

15.3 Work breakdown structure,

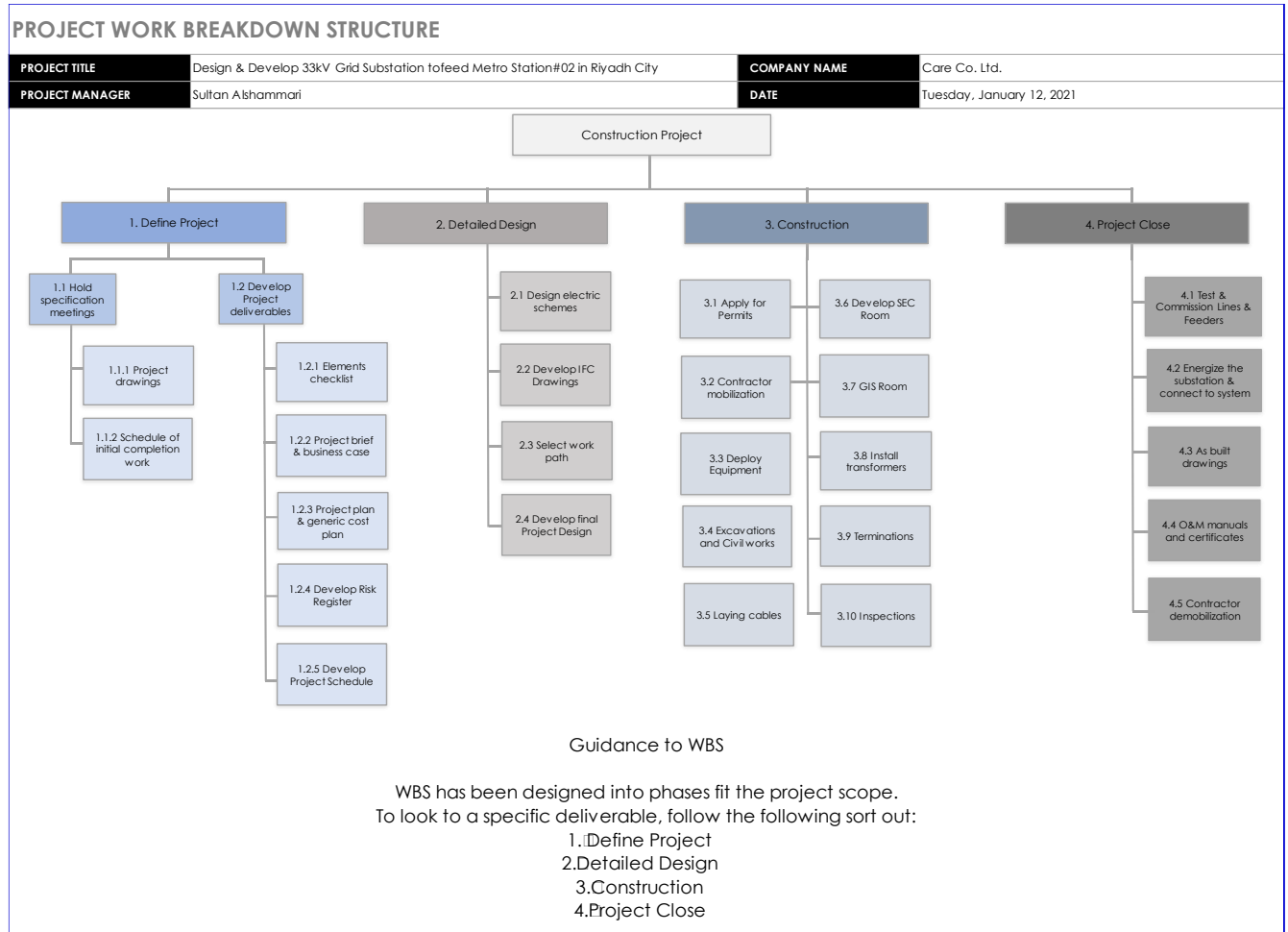


Figure 2. WBS

16. Requirements and objectives

16.1 Requirement traceability matrix

ID	ASS.ID	Requirement Description	Business Need, Justification	Project objective	Requested By	Specification	Design	Test case
1	1.1	Hold specification meetings	To get to know the main requirements of the project	Building substations With high voltage	Saudi electricity company	Finished	Finished	1003
1	1.1.1	Project drawings	for consultant to collect main drawings layout	Building substations With high voltage	Saudi electricity company	Finished	Finished	1004
1	1.2	Develop Project deliverables	discuss the deliverables with project team	Building substations With high voltage	Saudi electricity company	Finished	Finished	1005
1	1.2.1	Elements checklist	It's important to read full scope and tender documents	Building substations With high voltage	Saudi electricity company	Finished	Finished	1006
1	1.2.2	Project brief & business case	Management will set up a meeting of a final plan for business case	Building substations With high voltage	Saudi electricity company	Finished	Finished	1007
1	1.2.3	Project plan & generic cost plan	To study all costs and suppliers' quotations	Building substations With high voltage	Saudi electricity company	Finished	Finished	1008
1	1.2.4	Develop Risk	return to all old risk	Building substations	Saudi electricity	Finished	Finished	1009

		Register	registers and collect new risks from experts	With high voltage	company			
1	1.2.5	Develop Project Schedule	Meeting with planning engineers to set-up a schedule	Building substations With high voltage	Saudi electricity company	Finished	Finished	1010
2	2.1	Design electric schemes	Is to Collect SEC main drawings specs and standards	Building substations With high voltage	Saudi electricity company	Finished	Finished	1011
2	2.2	Develop IFC Drawings	To use the existing initial IFC Drawings	Building substations With high voltage	Saudi electricity company	Finished	Finished	1012
2	2.3	Select work path	Meet with the team to select a proper path	Building substations With high voltage	Saudi electricity company	Finished	Finished	1013
2	2.4	Develop final Project Design	Getting approval for the project design	Building substations With high voltage	Saudi electricity company	Finished	Finished	1014
3	3.1	Apply for Permits	assign permit issuer with all drawings to apply permits	Building substations With high voltage	Saudi electricity company	Finished	Finished	1015

3	3.2	Contractor mobilization	Issue request to mobilize equipment	Building substations With high voltage	Saudi electricity company	Finished	Finished	1016
3	3.3	Deploy Equipment	for assigning site offices	Building substations With high voltage	Saudi electricity company	Finished	Finished	1017
3	3.4	Excavations and Civil works	Deploy JCBs to excavate	Building substations With high voltage	Saudi electricity company	Finished	Finished	1018
3	3.5	Laying cables	Allowing the installation of panels and preparing pulling machines and crew	Building substations With high voltage	Saudi electricity company	Finished	Finished	1019
3	3.6	Develop SEC Room	For Building SEC room using approved IFC drawings	Building substations With high voltage	Saudi electricity company	Finished	Finished	1020
3	3.7	GIS Room	Build GIS room using approved IFC drawings	Building substations With high voltage	Saudi electricity company	Finished	Finished	1021
3	3.8	Install transformers	prepare installations equipment	Building substations With high voltage	Saudi electricity company	Finished	Finished	1022
3	3.9	Terminations	Prepare joints and	Building substations	Saudi electricity	Finished	Finished	1023

			terminations with welders	With high voltage	company			
3	3.10	Inspections	QA/AC engineer works	Building substations With high voltage	Saudi electricity company	Finished	Finished	1024
4	4.1	Test & Commission Lines & Feeders	Use all testing machines and set- up calibration	Building substations With high voltage	Saudi electricity company	Not started	Finished	1025
4	4.2	Energize the substation & connect to system	Connect station to system	Building substations With high voltage	Saudi electricity company	Not started	In progress	1026
4	4.3	As built drawings	Prepare As built drawings	Building substations With high voltage	Saudi electricity company	Not started	Not started	1027
4	4.4	O&M manuals and certificates	Submit O&M manuals and certificates	Building substations With high voltage	Saudi electricity company	Not started	Not started	1028
4	4.5	Contractor demobilization	Contractor demobilization	Building substations With high voltage	Saudi electricity company	Not started	Not started	1029

Table 2. Requirement traceability matrix

16.2 Methods used in requirement collection.

Brainstorming

Brainstorming was used in collecting requirements to get as many ideas as possible from stakeholders. In which we have identified possible solutions to the project and clarified details of opportunities.

Document Analysis

Reviewed the documentation of our existing system and drove gap analysis for scoping of migration projects. In which, we would even be reviewing the project requirements that prompted the creation of the current system. It's a starting point for documenting current requirements.

Focus Group

gathered of stakeholders who are representative of the users or customers of a metro to get feedback. The feedback can be gathered about needs/opportunities/ problems to identify requirements or can be gathered to validate and refine already elicited requirements.

16.3 Hierarchical structure

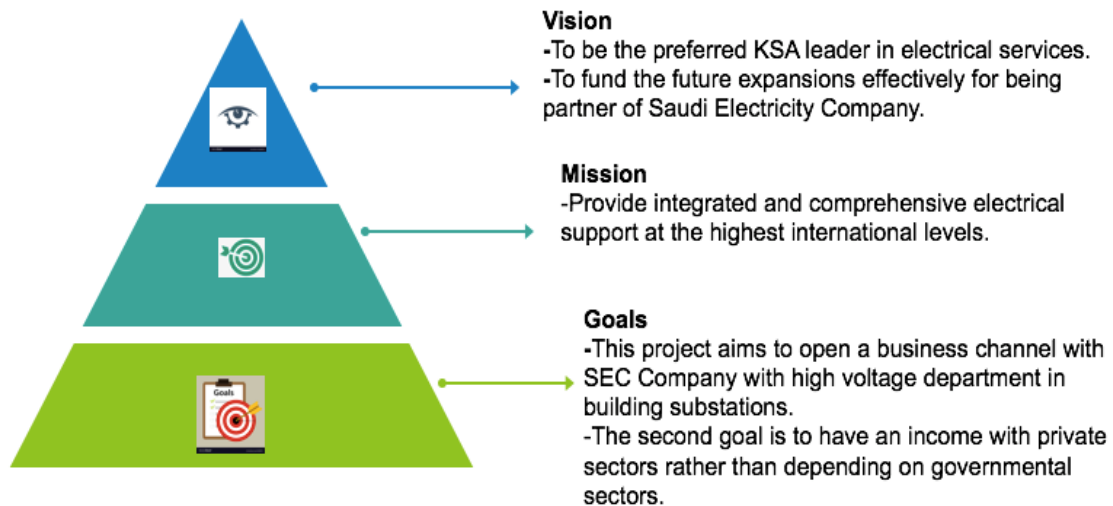


Figure 3. Hierarchical structure

17. Scope

17.1 Scope statement

The project's scope will be looking at the project's aim, which is initiated to provide integrated and comprehensive electrical support internationally. Its preferred leaders are KSA, which aims to fund the future expansion of being a partner with Saudi Electricity Company.

The project aims to achieve the business's success by delivering a 33kV grid substation used to generate a power station in Riyadh city. The project starts on 30th October 2021, and it will have a total cost of 35million for the whole project to be completed.

The team is tasked to give a solution that will start a business operation with electrical companies to develop a power substation to achieve the objectives and goals of the company in the future five years to come. This goal will help in the development of suitable customers internationally.

The major deliverables for the project is a 33/13.8kV grid substation with 3-phase transformers with capabilities of 45 MVA for each, 2 connected underground cables feeding on station#8071 in Malaga Neighborhood, 2X13.8kV connected feeders to feed metro station#02, 10 protection panel, GIS room build to connect all breakers and disconnectors with SF6 insulation part and finally FM200 fire extinguishers systems

The millstones for the completion of the deliverables should be finished by 30-oct- 2021. The major constraints of the project are changes in load forecast, delay in the delivery of materials outside of KSA, delay for approval of design and documentation, the resignation of project managers and other major team members, loss of funds and liquidity, failure of test or FAT at commission stage, lack of spare parts and objections at excavation stage with water pipes.

17.2 Scope creep

Scope creep when the project stakeholders come up with additional requirements to be included in the project that was not in the planning stage. This requirement usually explains how the project requirements tend to grow uncontrollably based on what the stakeholders may include. The scope creep is caused by the lack of a clearly defined and controlled scope. The second cause is

when there is the absence of strong leadership, most clients will try to change the scope and, finally, the different opinions of the stakeholders.

An example is a building construction company giving a complete building plan to the clients to look at before the construction begins next month. However, the clients decide to put another extra room with another door and windows, which directly changes the whole initial plan for the project.

The scope creep can be managed and controlled by determining the degree of the changes made from the original plan with the crept one. The second one is through managing the changes required based on the recommendations made in the project plan. The third way to manage it is by monitoring the project and its baselines.

17.3 Product analysis management.

Product analysis is used to define products and services. This particular project focuses on the breakdown structure of a developed 33/13.8kV grid substation. The product breakdown to

- 3 phase transformers with capabilities of 45MVA each,
- To develop two underground cables feeding on station #8071 in Malaga Neighborhood
- To connect 2X13.8kV, which will generate power to station #02
- To provide ten protection panels for three transformers, two inner U/G cables, and 2- outer U/C substations buildings

- To provide FM200 fire extinguishers
- To test and commission all electrical parts

17.4 Work Breakdown Structure to activities.

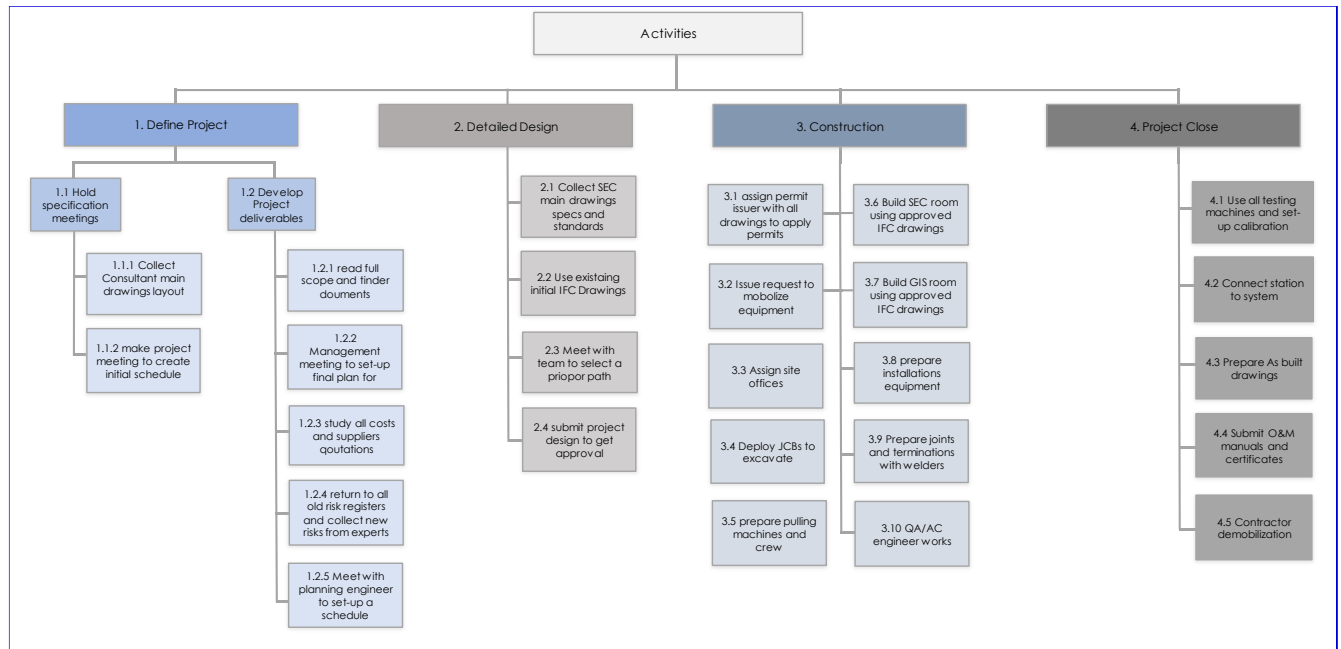


Figure 4. WBS to Activities

18. Time

18.1 Develop the functions list

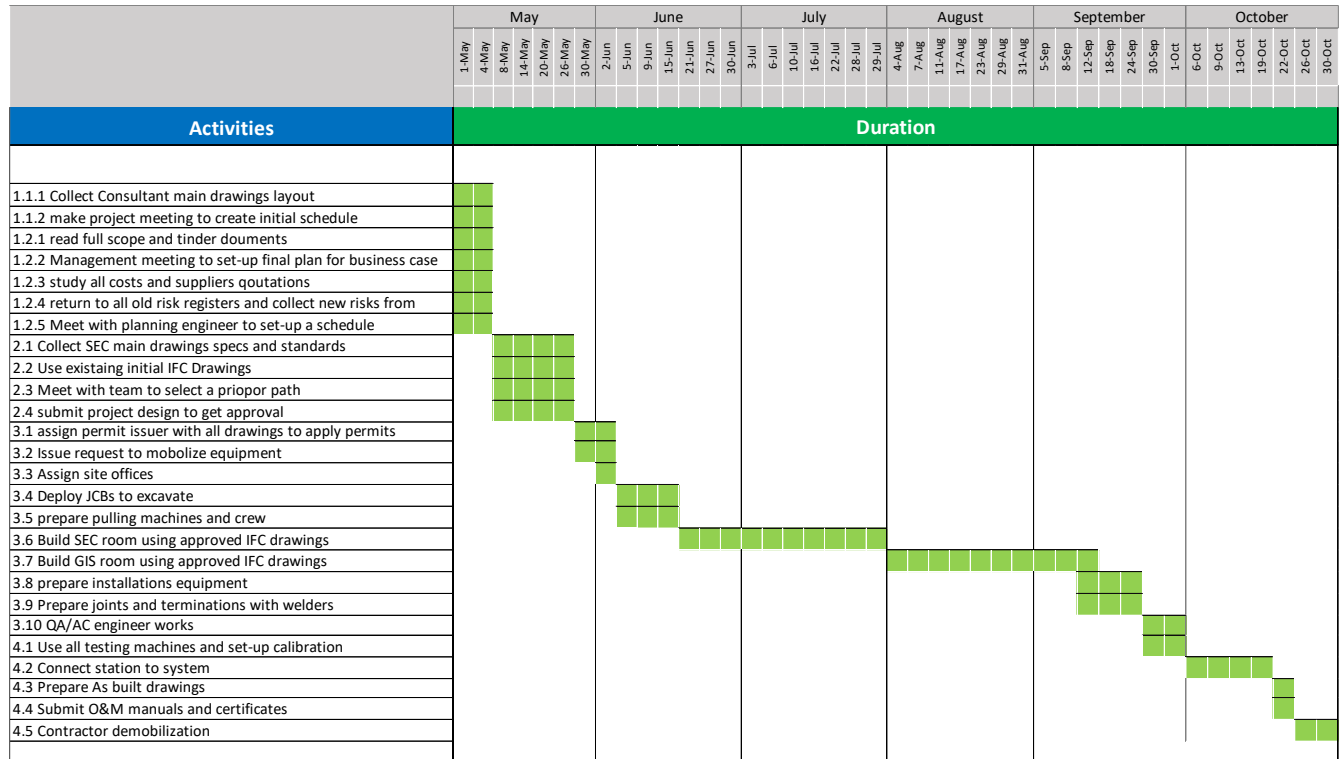


Figure 5. Develop the functions list

18.2 Relationships between the activities

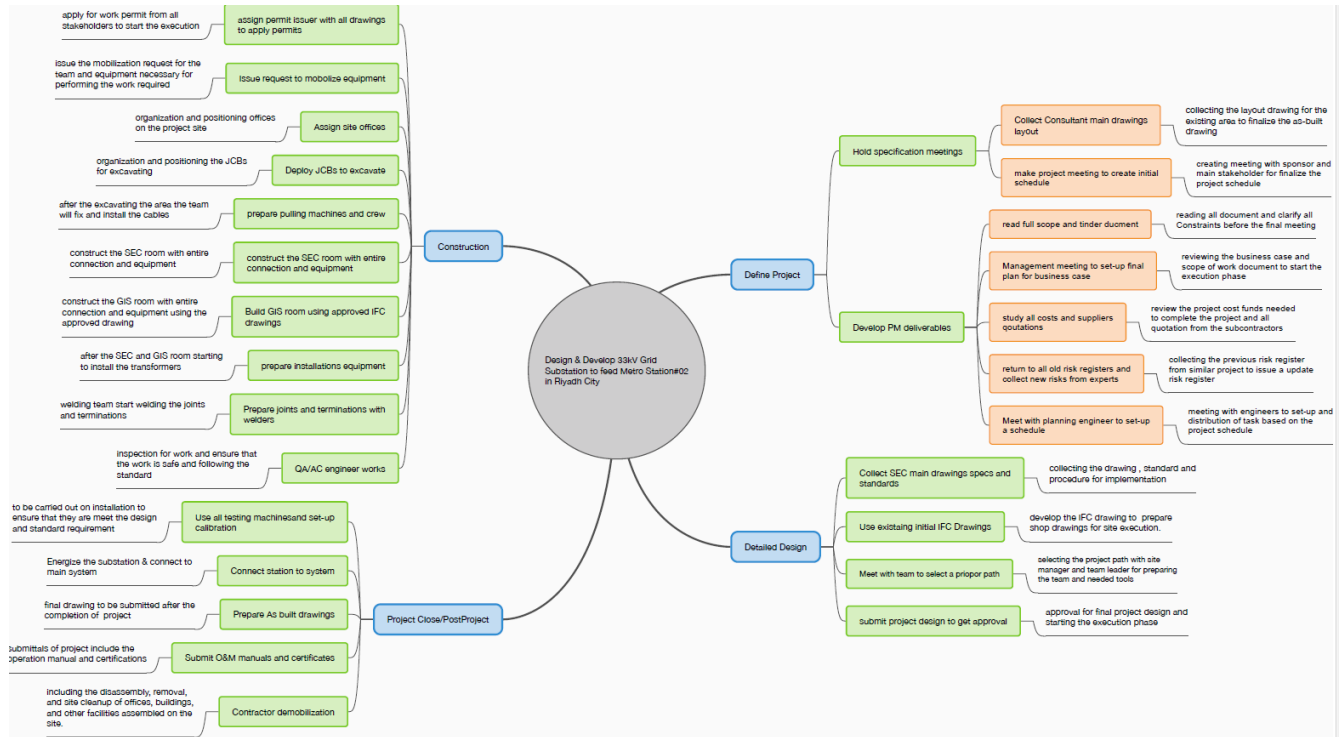


Figure 6. Relationships between the activities

18.3 Logical diagram



Figure 7. Logical diagram

18.4 Gantt chart

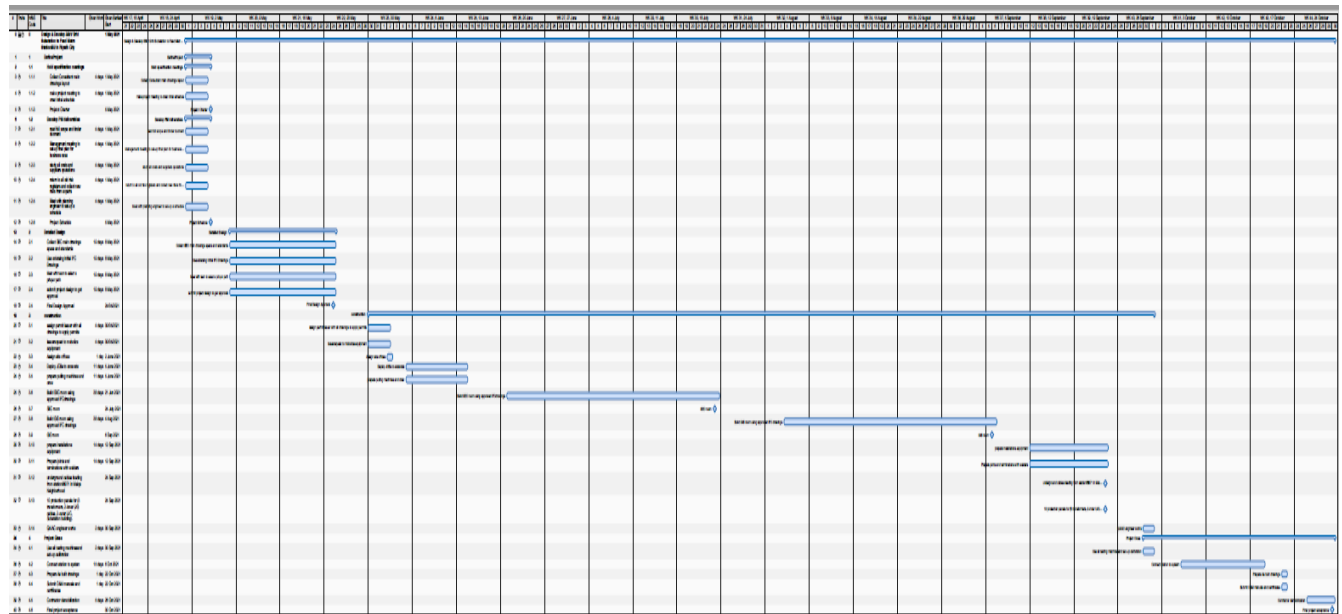


Figure 8. Gantt chart

19. Quality

19.1 Model for quality.

A THEORY OF QUALITY MANAGEMENT UNDERLYING THE DEMING MANAGEMENT METHOD

In its current form, the Deming management method contains a prescriptive set of 14 points that serve as guidelines for appropriate organizational behavior and practice regarding quality management.

Despite the apparent effect of these 14 points on both the industrial world and the practice of management theory around the world, there is little evidence of the role of the Deming management method in the formalization and advancement of

management theory. Although its impact on management practice is clear, neither its theoretical contribution nor its theoretical base has yet to be articulated. Yes, there is a theory of quality management underlying the Deming management method, but at present, this theory is presented in the prescriptive form of these 14 points. We propose and articulate a theory of quality management to describe and explain the effects of adopting the Deming management method. This theory is based on the conceptual synthesis of Deming's writings, literature on the Deming management method, observations of practice, and, more specifically, the results of a Delphi study involving a panel of experts on the Deming management method. We trace the development of this method, position it within the context of theory, describe our theory formulation process, propose and explain an underlying theory of quality management, and offer implications for practice and further research.

The Deming Management Method:

Point 1. Create constancy of purpose toward improvement of product and service with the aim to become competitive and to stay in business, and to provide jobs.

Point 2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership of change.

Point 3. Cease dependence on mass inspection to improve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.

Point 4. End the practice of awarding business on the basis of price tag alone. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.

Point 5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.

Point 6. Institute training on the job.

Point 7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul, as well as supervision of production workers.

Point 8. Drive out fear, so that everyone may work effectively for the company.

Point 9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and use that may be encountered with the product or service.

Point 10. Eliminate slogans, exhortations, and targets for the workforce asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the workforce.

Point 11. a. Eliminate work standards (quotas) on the factory floor. Substitute leadership. b. Eliminate management by objective. Eliminate management by numbers, numeric goals. Substitute leadership.

Point 12. a. Remove barriers that rob the hourly worker of his [or her] right to pride of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality. b. Remove barriers that rob people in management and in

engineering of their right to pride of workmanship. This means, inter alia, abolishment of the annual or merit rating and of management by objective. Point Point 13. Institute a vigorous program of education and self-improvement. Point 14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody's.

19.2 SIPOC model, and Ishikawa

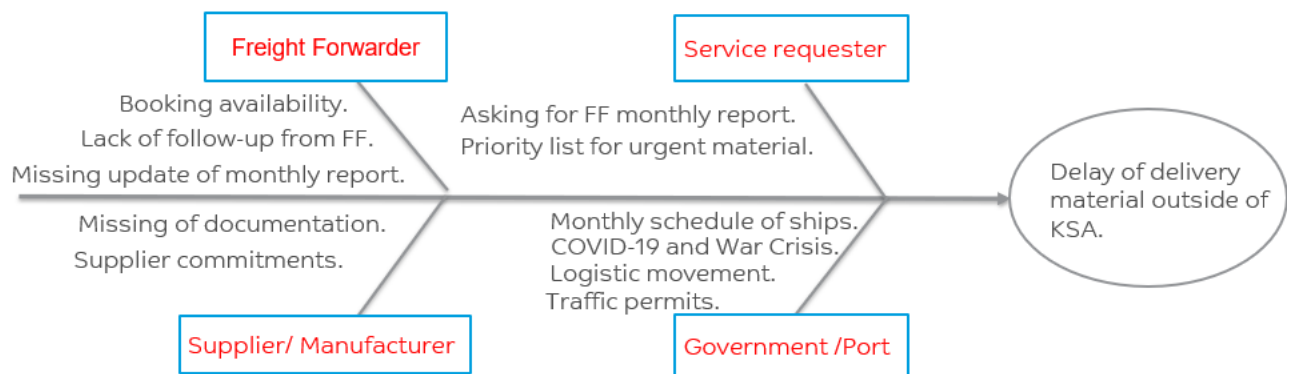


Figure 9. Ishikawa Model

Freight Forwarder

Lack of follow-up from freight forwarder.

Missing the update of monthly report.

Government /Port

COVID-19 and War Crisis.

Monthly schedule of ships.

Logistic movement.

Traffic permits.

Supplier/ Manufacturer

Supplier commitments.

Missing of documentation.

Service requester

Asking for updated monthly report.

Priority list for urgent material.

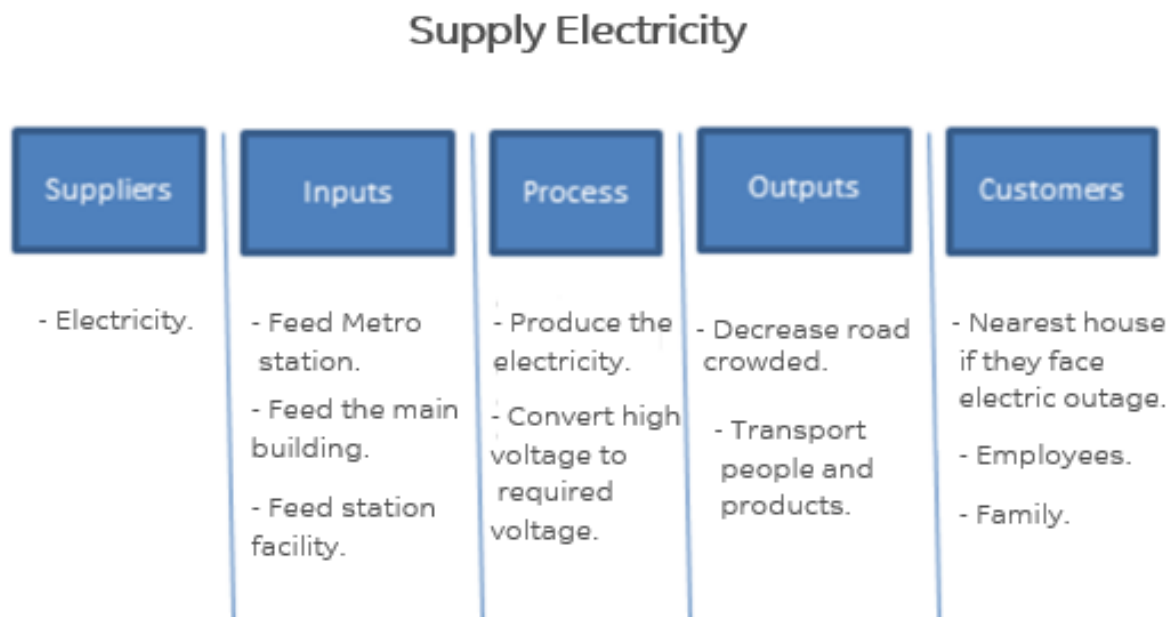


Figure 10. SIPOC Model

20. Finance

20.1 Cost Breakdown Structure

S/N	MATERIAL Description	Qty	Duration	Price	
				U. Price	T. Price
1	Define Project				
1.1	Define Project				
1.1.1	Project drawings	45	7D	1,022.00	45,990.00
1.1.2	Schedule of initial completion work	1	7D	20,000.00	20,000.00
1.2	Define Project				
1.2.1	Elements checklist	1	7D	120,055.00	120,055.00
1.2.2	Project brief & business case	1	7D	80,000.00	80,000.00
1.2.3	Project plan & generic cost plan	1	7D	50,000.00	50,000.00
1.2.4	Develop Risk Register	1	7D	20,000.00	20,000.00
1.2.5	Develop Project Schedule	1	7D	35,000.00	35,000.00
2.0	Detailed Design				
2.1	Design electric schemes	19	15D	1,250.00	23,750.00
2.2	Develop IFC Drawings	24	15D	4,250.00	102,000.00
2.3	Select work path	1	15D	300,000.00	300,000.00
2.4	Develop final Project Design	1	15D	20,000.00	20,000.00
3.0	Supply & Construction				
3.1	Apply for Permits	8	7D	60,000.00	480,000.00
3.2	Contractor mobilization	1	7D	2,200,000.00	2,200,000.00
3.3	Deploy Equipment	8	4D	1,600,000.00	12,800,000.00
3.4	Excavations and Civil works	216	15D	1,455.00	314,280.00
3.5	Laying cables	216	15D	420.00	90,720.00
3.6	Develop SEC Room	1	45D	1,350,000.00	1,350,000.00
3.7	GIS Room	1	44D	6,300,000.00	6,300,000.00
3.8	Install transformers	3	11D	460,550.00	1,381,650.00
3.9	Terminations	6	11D	1,050.00	6,300.00
3.10	Inspections	1	7D	780,000.00	780,000.00
4	Project Close				
4.1	Test & Commission Lines & Feeders	6	7D	1,200,000.00	7,200,000.00
4.2	Energize the substation & connect to system	1	21D	630,000.00	630,000.00
4.3	As built drawings	45	3D	50,010.00	2,250,450.00
4.4	O&M manuals and certificates	25	3D	36,000.00	900,000.00
4.5	Contractor demobilization	1	7D	800,000.00	800,000.00
Total in SAR					
				38,300,195.00	

Table 3. Cost Breakdown Structure

20.2 Earned Value Management

S/N	MATERIAL Description	Estimated Cost	Duration	Budget Reserve	Project Budget
1	Define Project				
1.1	Define Project				
1.1.1	Project drawings	459,990	7	20,000.00	479,990.00
1.1.2	Schedule of initial completion work	20,000	7	1,500.00	21,500.00
1.2	Define Project				
1.2.1	Elements checklist	120,055	6	12,000.00	132,055.00
1.2.2	Project brief & business case	80,000	6	3,000.00	83,000.00
1.2.3	Project plan & generic cost plan	50,000	5	3,000.00	53,000.00
1.2.4	Develop Risk Register	20,000	5	1,000.00	21,000.00
1.2.5	Develop Project Schedule	35,000	7	6,000.00	41,000.00
2.0	Detailed Design				
2.1	Design electric schemes	23,750	4	1,000.00	24,750.00
2.2	Develop IFC Drawings	102,000	4	12,000.00	114,000.00
2.3	Select work path	300,000	3	20,000.00	320,000.00
2.4	Develop final Project Design	20,000	1	1,000.00	21,000.00
3.0	Supply & Construction				
3.1	Apply for Permits	480,000	7	40,000.00	520,000.00
3.2	Contractor mobilization	2,200,000	7	120,000.00	2,320,000.00
3.3	Deploy Equipment	12,800,000	4	600,000.00	13,400,000.00
3.4	Excavations and Civil works	314,280	15	18,000.00	332,280.00
3.5	Laying cables	90,720	3	8,000.00	98,720.00
3.6	Develop SEC Room	1,350,000	16	120,000.00	1,470,000.00
3.7	GIS Room	6,300,000	4	200,000.00	6,500,000.00
3.8	Install transformers	1,381,650	6	23,000.00	1,404,650.00
3.9	Terminations	6,300	5	1,000.00	7,300.00
3.10	Inspections	780,000	7	29,000.00	809,000.00
4	Project Close				
4.1	Test & Commission Lines & Feeders	7,200,000	4	300,000.00	7,500,000.00
4.2	Energize the substation & connect to system	630,000	11	34,000.00	664,000.00
4.3	As built drawings	2,250,450	1	20,000.00	2,270,450.00
4.4	O&M manuals and certificates	900,000	1	88,000.00	988,000.00
4.5	Contractor demobilization	800,000	4	30,000.00	830,000.00
Total in SAR		38,714,195	150	1,711,500.00	40,425,695.00
Cost Budgeting = = (40425695+1200000)=41,625,695SAR					

Table 4. Project Cost

20% of project's period can be calculated as follow:

20% multiply by 180 days (project duration) = 36 days.

EV Of 5-% project complete = $(38,300,195) * 50\% = \text{SR}19,150,097.5$.

Cost and schedule variance analyses.

1. Scheduled variance

The project duration is 180 days and the project are 20% of project period.

$PV = 20\% = 36 \text{ days}$.

$EV = 50\% = 90 \text{ days}$.

So, the $SV = EV - PV = 90 - 36 = 54 \text{ days}$. It indicates that the project is ahead of schedule.

2. Cost Variance

The $CV = EV - AC$

$EV = \text{SR}19,150,097$ and the $AC = \text{cost spent}$ and it is $8,085,139$.

So, $CV = 19,150,097 - 8,085,139 = 11,064,958 \text{ SAR}$, It indicates project is under budget.

Scheduled and Cost Performance Indices as follow:

$SPI = EV / PV = 90 / 54 = 1.7$ (Ahead of schedule).

$CPI = EV / AC = 19,150,097 / 8,085,139 = 2.4$ (Under Budget).

21. Resources

21.1 Resource Leveling and Smoothing.

Resource leveling is a technique used during the project management process that helps resolve overallocation or scheduling conflict to ensure that a project is complete with the available resources initially allocated. The resources include time duration for the completion of the project and materials needed. Resource leveling is developed to help use the limited resources to attain the aim of the project's time, cost, and scope constraints. The resource leveling helps get the most out of the limited resources provided at hand to use in a project.

Resource smoothing is a technique used during project management to adjust schedule activities to meet the project's requirements by ensuring that the resources do not exceed the required limits set during the initial planning stage. Resource smoothing is used when time constraints take important priority in project planning, and it aims to finish the project within the given time and avoid peaks and troughs. The project smoothing helps the management team adjust within the time frame to deliver the available resources without additional or more resources that may take time to purchase and are costly.

21.2 Distributing the project resources

The distribution of equipment and tools resources involves assigning and scheduling the resources to fit the project. It entails using scarce resources that are available to effectively and economically distribute it to the activity. When looking

at the distribution of project resources, one should estimate the available resources based on expert judgment on the type of work that should be done. This estimation will help in planning for the resource budget and the equipment that will be of use. The other important factor to consider is the estimated time duration of the project to perfectly budget and distribute the equipment and tools. The estimated time in most cases helps to ensure that the resources distribution is done at the right moment to avoid delays of materials on the site.

22. Procurement

22.1 Procurement execution process,

First of all, suppliers must admit to ethics and integrity in every transaction of business. We are always looking to work with suppliers who share our values. We require that you operate on similar ethical principles and that you conduct your business in an economically, environmentally and socially responsible manner.

Supply is an economic term that refers to the amount of a given product or service that suppliers are willing to offer to consumers at a given price level at a given period. When the price of a product is low, the supply is low. When the price of a product is high, the supply is high. This makes sense because companies are seeking profits in the market place. They are more likely to produce products with a higher price and likelihood of producing profits than not. By this once having direct buying in addition to open Reverse Bidding for sure will add great value and

let all supplier showing other competitors' rates. Therefore, the power and the one will win that provide better rate.

The United Nations Standard Products and Services Code (UNSPSC) a [taxonomy](#) of products and services for use in [E-Commerce](#). It is a four-level hierarchy coded as an eight-digit number, with an optional fifth level adding two more digits. UNSPSC is one of world-class method to classify the products and services for requester as buyer in addition to provider is supplier with same international number for a products and services or nearest group of services.

One of the main pillars is to have a list of preferred suppliers in addition to well sorting of supplier capabilities based on their commodities. This we will leverage bidding cycle processes, Cost optimization by inviting more potential suppliers and avoiding brokers and increase the competitiveness in benefit of project especially with new suppliers. By the end using UNSPSC will lead to increasing productivity, reducing organizational costs, and improving supply chain efficiency

22.2 Scoring Model

Below is real module used to develop clear plan for PPE's scoring. The utilization of PPE's at KSA as of today 75% PPE's market for normal PPE and rest for advance PPE. For local PPE's that can be produce on Saudi Arabia, Nusaned supported on of local manufacturer by 250+ MSAR to cover 25% from local demand out of that 90% guaranteed to be delivered to local market and rest for export it to international market as factory already build on international standard.

- Nusaned one of local content initiative support Saudi Arabia's economic development.

Commodity:		Personal Protective Equipment's		Scoring Image			Supplier		
Category	Question	3	2	1	A	B	C	D	E
Operation	lead time	3 days	2 days	1 Day	3	3	2	1	1
	Location	KSA	GCC	Overseas	3	3	2	2	3
	Cost	>1000	<999	<500	3	2	2	1	3
Quality	ISO Standers	Yes		No	3	3	1	1	3
	QMS	Yes		No	3	3	3	1	3
	Insurance	>3 Years	2 Years	Zero	3	3	2	3	1
EHSS	Lost Time Injury (LTI)	>8	4	0	2	3	3	1	1
	Fatal Accident Rate	3	1	0	2	3	2	1	3
	No. of incident per 1000 hours worked	3	2	0	2	3	1	1	2
TOTAL					24	26	18	12	20
Notes				%age	89%	96%	67%	44%	74%

Figure 11. Scoring Model

23. Plan and control

23.1 Agenda- Invitation



Meeting Agenda

MEETING AGENDA	Project Name: Design & Develop 33kV Grid Substation to Feed Metro Station#02 in Riyadh City Date: Sunday, November 14, 2021 Time: 10:30am-1:00pm
INVITEES:	SULTAN ALSHAMMARI, PMO MANAGER , AHMED, K , KHALID, M
Meeting Objective: To discuss status updates and team tasks for the Project. Topics to cover: 1. Review PM Meeting Agenda example 2. Review Customer variation requests 3. Discuss whether to proceed with HITACHI Company: • Cost of purchasing 72,000 SAR 4. Are there any other issue in the exception phase. 5. Status Updates on Action Items: • change request • delivery of materials • work permits for excavation	

Figure 12. Meeting agenda

23.2 Performance measurement course

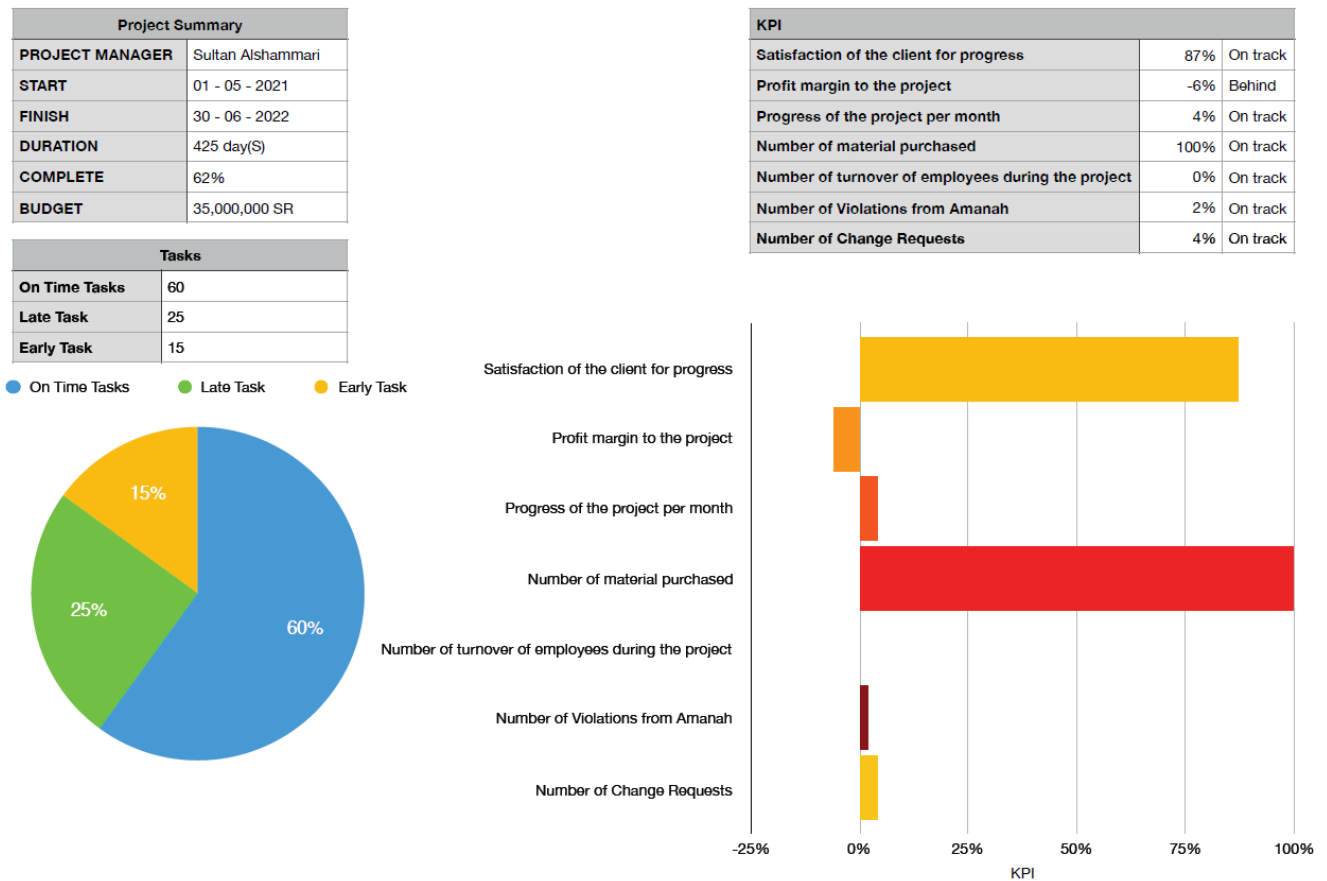


Figure 13. Performance measurement course

23.3 Change Request model



Change Request Form

Project Name	Design & Develop 33kV Grid Substation to Feed Metro Station#02 in Riyadh City		
Requested by	Project Manager Sultan Alsham-mari	Date	15/11/2021
REQUESTED NO	CRF00234	Name of Request	Add protection panel
CHANGE DESCRIPTION	The addition of a protection panel to the transformer. supply and installation including testing and commission		
change reason	This is a new requirement from the project sponsor		
impact of change	ground work required , but estimate the panel cost 40,000 SR. additionally , the completion of the project will be delayed by 1 week to complete this work		
proposed action	Accept the change and cost associated with however. complete this work after receiving the new panel from supplier.		
status	IN REVIEW	APPROVED	REJECTED
Approved date	16/11/2021		
approved by	CEO - AHMED, K		

Figure 14. Change Request model

24. Risk and opportunities (All tasks are in the same table below)

24.1 Risks (threats) and opportunities

24.2 Risk register

24.3 Qualitative Risk Analysis

24.4 Risk response strategies.

Definition:

Risk is an uncertain event or condition that, if it occurs, has an impact on at least one project objective. In project, terms an opportunity is something (tangible or an "effect") identified within the project deliverables that could unlock or otherwise facilitate a positive or beneficial effect.

Action Description	Type	Likelihood	Impact	Response Strategies	Action Owner	Expected Action Completion Date
Electromagnetic Waves	Opportunity	Medium	High	Changing the routes of transport lines passing through safe areas of the population is an opportunity to avoid negative effects that may affect human health	Collaboration between SEC & Ministry of Municipal Rural Affairs and Housing	15-Jan-22
Leakage of magnetic flux and lack of grounding of coils and iron coils resulting from eddy currents	Risk	Medium	High	Raising the efficiency of electrical transformers	Contracted Maintenance Company	30-Dec-21
The emergency exit is closed because the doors do not match the specifications	Risk	High	High	Submit a request to the competent authority to conform to the specifications for all doors	Safety and Security Department	As soon as possible

Table 05. Risk & Opportunities Register

25. Stakeholder

25.1 Stakeholder engagement assessment matrix.

Stakeholder	Power/Interest	Unaware	Resistant	Neutral	supportive	leading
Saudi Electricity Company	High/High				C D	
E&Q Engineering Consultation Company	Low/High				C D	
Sultan Alshammari	High/High				C	D
Project Team	Low/High			C	D	
Municipality of Riyadh	High/Low			C D		
Ministry of energy	Low/Low		C	D		

Table 06. Stakeholder engagement assessment matrix.

- **Recommendations:**

It is recommended that the project team shall follow the main strategy of the project and reflect the main goal into achievement. All the models and data are based on experience of the team and resources that fed this project and the final result with required input. Also, based upon the discussion in the negotiations, it is recommended that prices matter but not as main business case of this project. As profit is gained in winning the reputation of the company in the new field. The team has verified that this company has past experience offering this type of work, as evidence by past contracts of greater or equal value.

- **Summary:**

This project aims to open a business channel with SEC Company with high voltage department in building substations.

The purpose to align with the company vision and strategy for next 5 years in expanding business variation and with sustainable customers like SEC.

The second goal is to have an income with private sectors rather than depending on governmental sectors.

- **References:**

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- **<https://supplier.sabic.com/COC/Supplier%20Code%20of%20Conduct%20-%20English.pdf>**
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- **Jin, L., Chen, C., Yu, J., Wang, X., & Miao, Q. (2021). The Compliance Risk Assessment of Electric Power Market based on Bayesian Comprehensive Evaluation Model. IOP Conference Series: Earth and Environmental Science (Vol. 647, No. 1, p. 012150). IOP Publishing.**

- **Attachments**

- Task 41 - WBS
- Task 48 - Activities
- Task 49 – Activities Duration
- Task 50 - Relationships between the activities
- Task 51- Logic Diagram
- Task 52 - Gantt chart