Spring 5-4-2024

MPEM Capstone Presentation

Kaelin Newman

MPEM Capstone

Kaelin Newman

Spring 2024

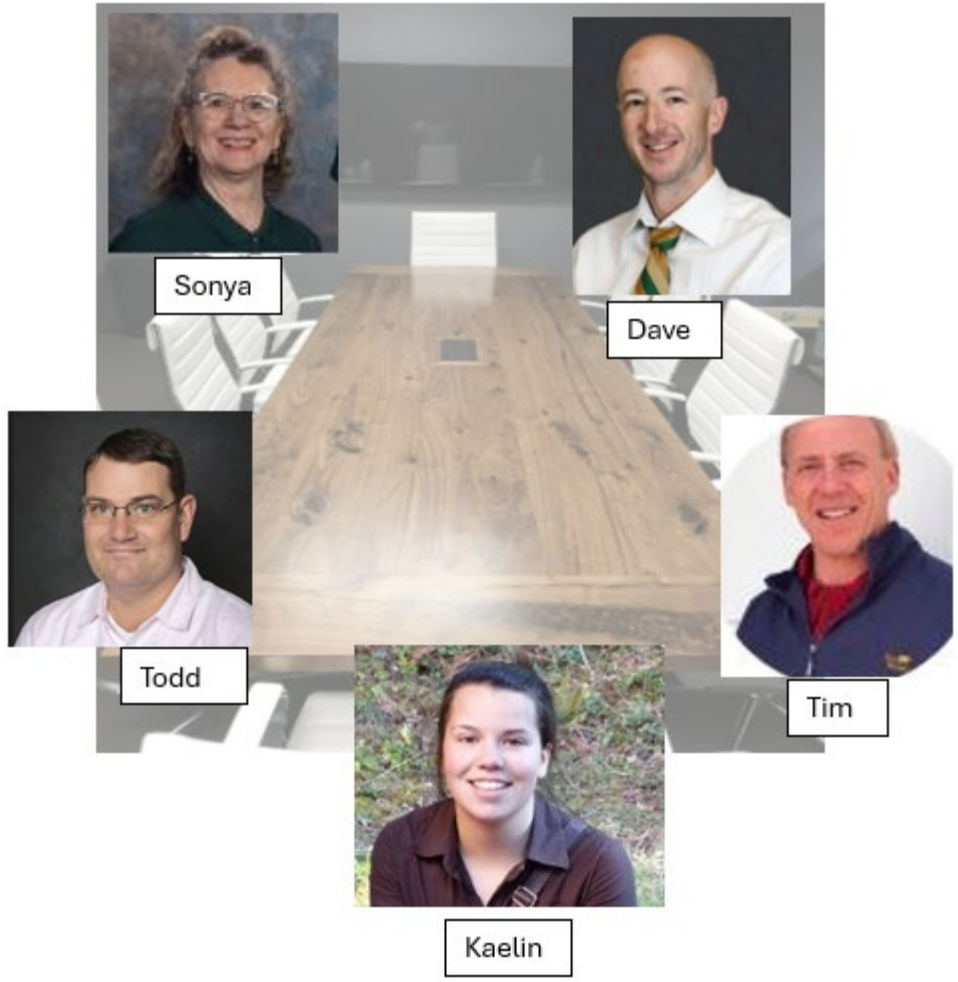
MONTANA TECHNOLOGICAL UNIVERSITY GRADUATE SCHOOL

MONTANA TECHNOLOGICAL UNIVERSITY

Agenda

1. Intros
2. Why MPEM?
3. Answers to Q’s
4. Group Discussion
5. Thoughts on MPEM

Meet the committee



Kaelin Bio

Experience

- 2016: B.S. Geology, WWU
- 2016: Consulting Industry
- 2020: Started MPEM
- 2021: Promoted to PM
- 2021: L.G. in WA

Why MPEM?

- **Gain skills**
- **Learn + implement**

Benefits of MPEM in my career

- **Well-rounded**
- **Increased responsibilities:**
  - Invoicing
  - Scoping and managing new projects

MPEM courses completed

courses: **REQUIRED COURSES**

Course #	Title of Course	Term	Credits
MPEM 5010	Entrepreneurship & Economic Feasibility	Fall '20-'21	3
MPEM 5020	Project & Engineering Management	Spring '20-'21	3
MPEM 5030	Legal Issues Related to PE & M	Spring '21-'22	3
MPEM 5040	Financial Management of Tech Enterprises	Fall '22-'23	3
MPEM 5050	Management, Economics, & Accounting	Spring '20-'21	3
MPEM 5060	Advanced Management Seminar		

Replaced with BMGT 426W Spring '24

ELECTIVES

MPEM 5100	Pollution Prevention		3
MPEM 5110	Energy Conversion	Fall '20-'21	3
MPEM 5120	Application & Design of Industrial Experiments		3
MPEM 5130	Hazardous Waste Engineering		3
MPEM 5140	Systems Safety & Management		3
MPEM 5150	Information Technology for Managers		3
MPEM 5160	Managerial Communication for Project Managers	Spring '22-'23	3
MPEM 5900	Analysis of US Energy Policies		3
MPEM 5900	Technical Communication for Controversial Proj.		3
MPEM 5180	US Energy Policy	Summer '23	
BGEN 432	Property and Probate Law	Fall '23-'24	

MPEM Courses by Committee Member

Sonya

- MPEM 5020, Project and Engineering Management

Tim

- MPEM 5010, Entrepreneurship and Economic Feasibility
- MPEM 5040, Financial Management of Technological Enterprises
- MPEM 5050, Management, Economics, and Accounting

Dave

- MPEM 5160, Communication for Managers
- MPEM 5180, US Energy Policy and Energy for Sustainability

Todd

- MPEM 5160, Communication for Managers

Question Structure

- **Define**
- **Answer**
- **Discuss**

Question Order

- **Tim**
- **Sonya**
- **Dave**

Tim's Question:

Create a cash budget

10 questions

Reference: bingimagecashbudget.com

1. Develop a cash collections forecast

Answer: calculate % of cash collected each month

Information needed:

- **Expected sales**
- **Collections summary patterns**

1994 Cash Collection Forecast												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1994 forecasted sales	$ 116,400	$ 116,400	$ 110,200	$ 133,800	$ 145,500	$ 128,000	$ 81,400	$ 81,400	$ 116,400	$ 133,800	$ 145,500	$ 87,300
Cash Collections Summary for November									$ 5,060	$ 58,150	$ 56,925	
% Cash Collected in Same Month	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%
% Cash Collected from previous Month	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
% Cash Collected from previous 2nd Month	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Cash Sales Collected in Same Month	$ 52,380	$ 52,380	$ 49,590	$ 60,210	$ 65,475	$ 57,600	$ 36,630	$ 36,630	$ 52,380	$ 60,210	$ 65,475	$ 39,285
Cash Sales Collected from Previous Month	$ 37,950	$ 58,200	$ 58,200	$ 55,100	$ 66,900	$ 72,750	$ 64,000	$ 40,700	$ 40,700	$ 58,200	$ 66,900	$ 72,750
Cash Sales Collected from Previous 2nd Month	$ 6,325	$ 3,795	$ 5,820	$ 5,820	$ 5,510	$ 6,690	$ 7,275	$ 6,400	$ 4,070	$ 4,070	$ 5,820	$ 6,690
Forecasted Cash Received	**$ 96,655**	**$ 114,375**	**$ 113,610**	**$ 121,130**	**$ 137,885**	**$ 137,040**	**$ 107,905**	**$ 83,730**	**$ 97,150**	**$ 122,480**	**$ 138,195**	**$ 118,725**

2. Develop a cash payments forecast

Answer: calculate % of cash spent each month

- **COGS**
- **Salaries**
- **Payroll taxes**
- **$10,000 min account balance**

1994 Cash Payment Forecast

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Forecasted sales	$ 116,400	$ 116,400	$ 110,200	$ 133,800	$ 145,500	$ 128,000	$ 81,400	$ 81,400	$ 116,400	$ 133,800	$ 145,500	$ 87,300
COGS	$ 69,840	$ 69,840	$ 66,120	$ 80,280	$ 87,300	$ 76,800	$ 48,840	$ 48,840	$ 69,840	$ 80,280	$ 87,300	$ 52,380
Cash to purchase computer components (half of 59% of COGS)	$20,603	$20,603	$19,505	$23,683	$25,754	$22,656	$14,408	$14,408	$20,603	$23,683	$25,754	$15,452
Remaining computer components to purchase in the following month	$13,434	$20,603	$20,603	$19,505	$23,683	$25,754	$22,656	$14,408	$14,408	$20,603	$23,683	$25,754
Direct Labor	$17,460	$17,460	$16,530	$20,070	$21,825	$19,200	$12,210	$12,210	$17,460	$20,070	$21,825	$13,095
Overhead	$11,174	$11,174	$10,579	$12,845	$13,968	$12,288	$7,814	$7,814	$11,174	$12,845	$13,968	$8,381
Salaries	$18,417	$18,417	$18,417	$18,417	$18,417	$18,417	$18,417	$18,417	$18,417	$18,417	$18,417	$18,417
Payroll Tax	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500	$1,500
Car Ins/Lease	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500
Office Exp.	$2,708	$2,708	$2,708	$2,708	$2,708	$2,708	$2,708	$2,708	$2,708	$2,708	$2,708	$2,708
Fixed. Office Rent	$2,458	$2,458	$2,458	$2,458	$2,458	$2,458	$2,458	$2,458	$2,458	$2,458	$2,458	$2,458
Total Quaterly Sales from Previous 3 Months	$318,700			$343,000			$407,300			$279,200		
Office Rent - 1% quarterly sales	$3,187	$-	$-	$3,430	$-	$-	$4,073	$-	$-	$2,792	$-	$-
Sales Commission - 3% paid during month following the original sale	$1,139	$1,746	$1,746	$1,653	$2,007	$2,183	$1,920	$1,221	$1,221	$1,746	$2,007	$2,183
Bonuses	$-	$-	$-	$-	$-	$11,050	$-	$-	$-	$-	$-	$11,050
Tax	$9,000	$-	$-	$10,500	$-	$-	$10,500	$-	$-	$10,500	$-	$-
Cash [illegible]	$-	$42,500	$-	$-	$-	$26,000	$-	$-	$35,000	$-	$-	$-
Total Cash Payments:	**$(103,580)**	**$(141,669)**	**$(96,547)**	**$(119,269)**	**$(114,819)**	**$(146,713)**	**$(101,165)**	**$(77,644)**	**$(127,449)**	**$(119,822)**	**$(114,819)**	**$(103,497)**

3. Develop a cash budget

Cash Budget - 1994		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	Total Forecasted Cash **Received** (from cash collection forecast Q1)	$96,655.00	$114,375.00	$113,610.00	$121,130.00	$137,885.00	$137,040.00	$107,905.00	$83,730.00	$97,150.00	$122,480.00	$138,195.00	$118,725.00
	Total Forecasted Cash **Paid** (from cash payment forecast Q2)	$(103,580.33)	$(141,669.33)	$(96,546.73)	$(119,269.13)	$(114,819.43)	$(146,713.33)	$(101,164.53)	$(77,644.33)	$(127,449.33)	$(119,821.53)	$(114,819.43)	$(103,497.23)
Q#3b - Cash on Hand after net cash used by Ops has been calculated	**Q#3b - Cash on Hand after net cash used by Ops has been calculated**	$(6,925.33)	$(27,294.33)	$17,063.27	$1,860.87	$23,065.57	$(9,673.33)	$6,740.47	$6,085.67	$(30,299.33)	$2,658.47	$23,375.57	$15,227.77
Q#3a - Cash on Hand at beginning of each month	Cash on Hand at beginning of each month	$15,000.00	$10,000.00	$10,000.00	$10,000.00	$10,000.00	$22,770.03	$13,096.70	$19,837.17	$25,922.83	$10,000.00	$10,000.00	$21,657.53
	Net Balance [cash + surplus(deficit)]	$8,074.67	$(17,294.33)	$27,063.27	$11,860.87	$33,065.57	$13,096.70	$19,837.17	$25,922.83	$(4,376.50)	$12,658.47	$33,375.57	$36,885.30
Q#3c - New borrowing required in any month	Borrowings	$1,925.33	$27,294.33	$(17,063.27)	$(1,860.87)	$(10,295.53)	$-	$-	$-	$14,376.50	$(2,658.47)	$(11,718.03)	$-
Q#3e - Ending balance for each month	**Closing Balance**	**$10,000.00**	**$10,000.00**	**$10,000.00**	**$10,000.00**	**$22,770.03**	**$13,096.70**	**$19,837.17**	**$25,922.83**	**$10,000.00**	**$10,000.00**	**$21,657.53**	**$36,885.30**
Q#3d - Any cumulative amount borrowed, less payment, in each month	Cumulative Borrowing	$1,925.33	$29,219.67	$12,156.40	$10,295.53	$-	$-	$-	$-	$14,376.50	$11,718.03	$-	$-
Q#3f - Cash available for short term loan in each month	**Cash available**	**$-**	**$-**	**$-**	**$-**	**$12,770.03**	**$3,096.70**	**$9,837.17**	**$15,922.83**	**$-**	**$-**	**$11,657.53**	**$26,885.30**

4. Which short-term borrowing arrangement should Mike choose?

a. Revolving Credit

b. Line of Credit

c. One-year Loan

- Variable interest
- Only take a loan when needed
- No commitment fee

5. What short-term, liquid investments (marketable securities) are best for PCI?

a. AAA rated bonds

b. Treasury bills

c. Growth stocks

- No risk of default
- Safe
- Liquid
- Quick maturity period

6. Use a computer spreadsheet program to create the collections and payments worksheet, and cash budget

Answer: shown before

7. What info is needed for a weekly/biweekly cash budget?

- Cash receipts and payments
- Estimate of sales and COGS

8. Other accounting reports to track the day-to-day status of PCI?

- Overhead budget
- Labor budget
- Trend Analysis
- NPV Analysis

9. Changing product mix so raw materials cheaper, but specialized labor and overhead more $. PCI's cash needs over the next several years?

If labor and OH 

Then cash needs 

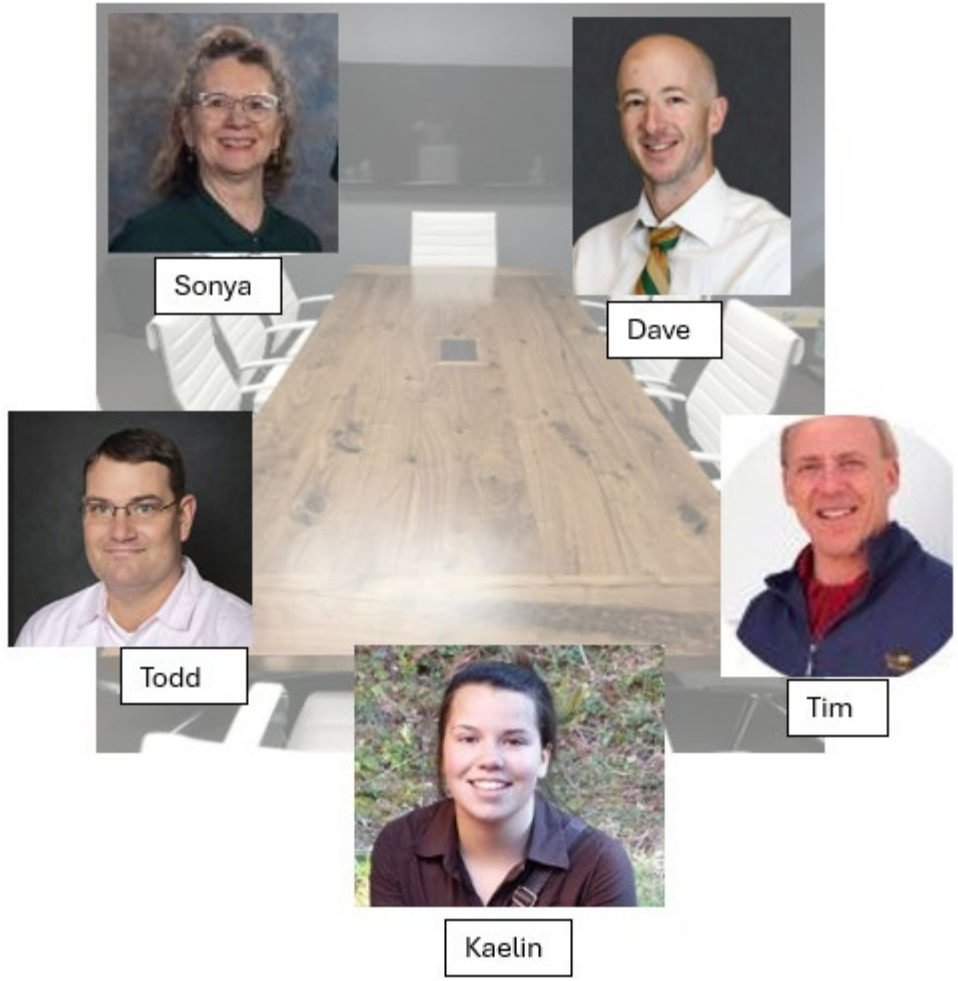
10. Sensitivity analysis – how can it model cash flow?

Answer: provides insight into the various aspects of a cash flow forecast.
Goal: Ensure positive cash flow

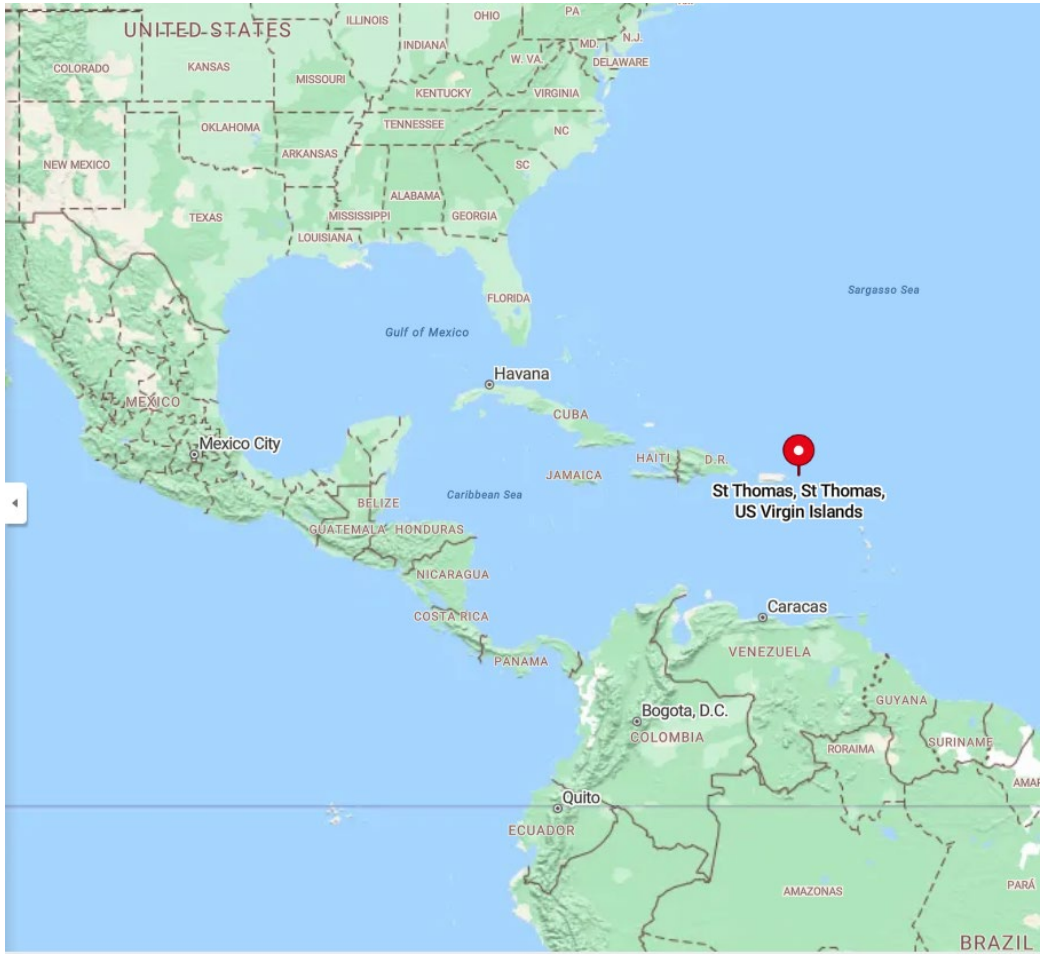
1. Identify Key Variables:
    - sales volume, price changes, COGS, etc.
2. Create a Base Case:
    - Establish a baseline scenario
3. Run the Analysis:
    - Change key variables to see impact on cash flow.
4. Make strategic decisions:
    - Securing additional financing?
    - Adjust pricing strategies?
    - Cut costs?

Group Discussion:

PCI Project



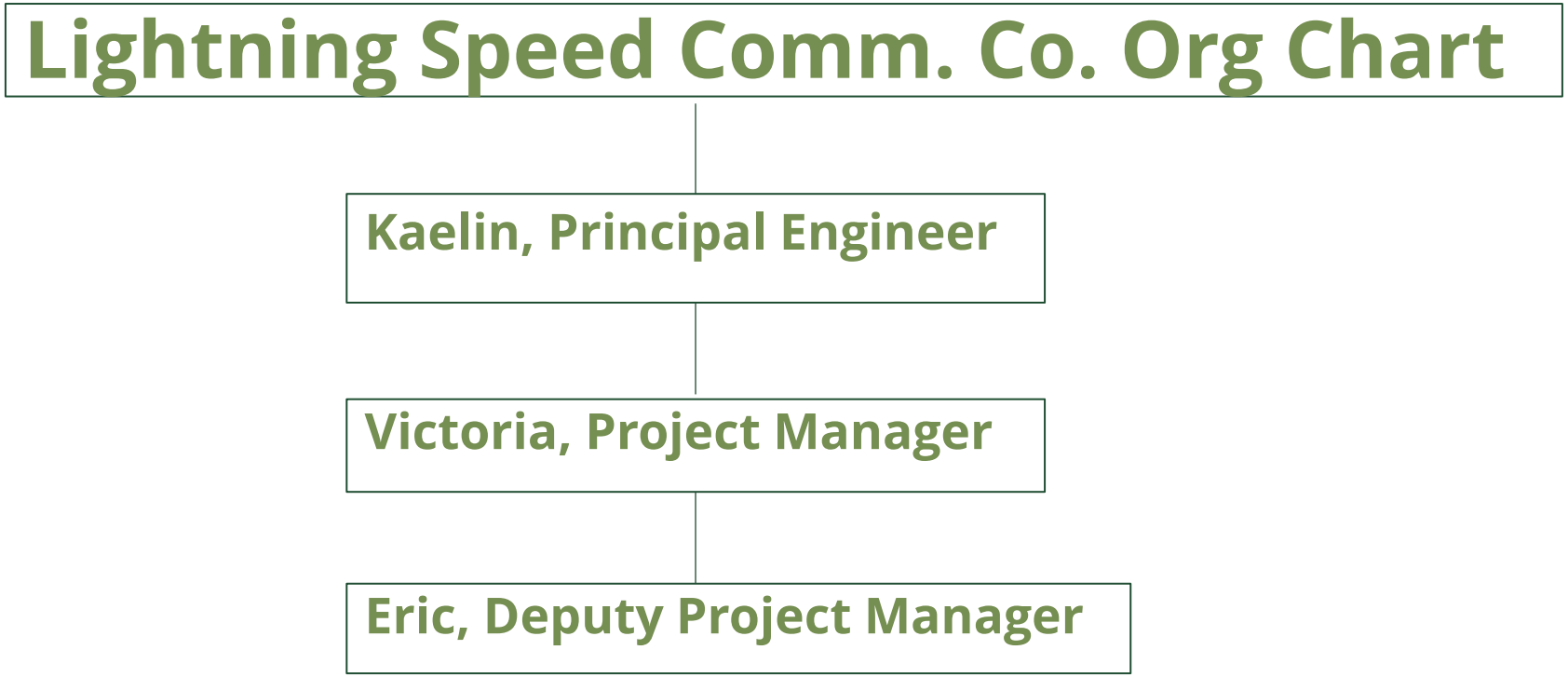
Sonya's Question: Install a strategic communication device on St. Thomas Island.



https://th.bing.com/th/id/OIP.yPALW08ueClHnCgg5YIRawHaEK?rs=1&pid=ImgDetMain

Reference: st thomas island - Search (bing.com)

Mission: Install a strategic communication device on St. Thomas Island.



Mission: Install device on St. Thomas Island.

Q1: How will you issue the project to Victoria and Eric?

Answer: Kickoff meeting

- Outline
- Answer questions
- Encourage communication

Install communication device

Q2: Roles between team members

Kaelin – Principal Engineer	Victoria - PM	Eric – Deputy PM
Encourage, empower, offer support	Oversee scope, schedule, and budget	Assist Victoria in managing the project
Confirm communication between team members	Delegate tasks to Eric	Complete tasks assigned by Victoria
Communicate to client	Ask questions/identify problems/communicate to Kaelin	Communicate everything to Victoria

Install communication device

Q2b: Issues in their working relationship?

- Language
- Communication style
- Similar roles

Q3: How will the presentation to the Board be planned and conducted?

Reference: bing image presentation.com

Planning

- K – empower and assist
- V – Ensure that it aligns with objectives
- E - Technical aspects
- All – collaborate and support

Conducting

- Organize into clear structure
- V – design presentation
- Practice and give feedback

Install communication device

Q3b: Who is presenting what material during board meeting?

Intro: K

Project Plan: V

Technical Details: E

Risk Assessment: K

Group Q&A: V and E (I will support)

Install communication device

Q4: How will you interact with V and E during PEP preparation?

- Open lines of communication
- Encourage, empower, and support
- Hold weekly meetings
- Check in individually
- Provide clear direction
- Allocate responsibilities

Install communication device

5. Prepare a Project Execution Plan

Project Execution Plan

Project Execution Plan Headings	Specific Content
Project Name	St. Thomas Communication Device
Project Location	St. Thomas
Client Information	St. Thomas Authorities
Project Overview	Brief description of the project, its goals, and objectives Lightning Speed must install a communication system in the fastest time and to the very highest quality standards to St. Thomas.
Project Scope	Lightning Speed will commission a communication device on the remote island of St. Thomas. Lightning Speed Communication is being sole-sourced by St. Thomas to provide the strategic communication device. Other competitors are 'on standby'. Milestones for the project include: • Conducting a site inspection with a local company representative and a St. Thomas government representative to confirm the final location for the communication device. • Presenting to the Lightning Speed's Board about how your approach to this project and how it will satisfy their strategic requirements. • Preparing a Project Execution Plan (PEP) outline for the St. Thomas authorities to approve. The business objective of the project is to plan, install, and commission the communication device. This will increase the company's revenue and secure a new client. The PEP must be submitted to authorities within 45 days to receive their approval to proceed. Lightning Speed's Technical, Legal staff, and Board must have final approval of the PEP before it is issued to the St. Thomas authorities.

Project Execution Plan (pg 2)

Project Execution Plan Headings	Specific Content
Project Goals	First, The PEP must be submitted to authorities within 45 days to receive their approval to proceed. Lightning Speed's Technical, Legal staff, and Board must have final approval of the PEP before it is issued to the St. Thomas authorities. The goal of Lightning Speed is to install a communication system in the fastest time and to the very highest quality standards to St. Thomas.
Quality Specifications	Lightning Speed's Technical, Legal staff, and Board must have final approval of the PEP before it is issued to the St. Thomas authorities. During Eric's first visit onsite to discuss the location with St. Thomas authorities, he can record the specifications of the client. If Eric installs a temporary or test device, then he can record any of the product's malfunctions or inconsistencies and then report back to the manufacturer or Lightning Speed's team with these details to ensure that the reported defects are fixed and that a final communication product meets the client's requirements or specifications.
Technical Specifications	The owner's manual for each communication device will provide technical specifications. Lightning Speed's Standard Operating Procedures will provide technical specifications for all deliverables including a presentation
Resource Allocation	A resource plan outlines the resources needed for this project including people, tools, and materials. This plan helps a project manager manage resources and adjust the schedule and includes the following: Resource requirements: A list of all the resources including their number, roles, and responsibilities. Project schedule: A detailed schedule including task start and end dates as well as critical milestones. Resource gaps and risks: An analysis of the resource needs that cannot be met internally and a plan to deal with resource risks. Resource management: A plan about how to monitor resource utilization and workload. Monitoring and control plan: A plan to share resource planning and management updates with stakeholders, team members, and management. A full resource plan is shown at the end of this table.

Project Execution Plan (pg 3)

Project Execution Plan Headings	Specific Content
Schedule	Event: Site inspection, Projected Start:, Projected End: Event: Test a communication device, Projected Start:, Projected End: Event: The PEP must be submitted to authorities within 45 days to receive their approval to proceed. Lightning Speed's Technical, Legal staff, and Board must have final approval of the PEP before it is issued to the St. Thomas authorities. Projected Start:, Projected End:
Budget	A detailed breakdown of costs, including labor, materials, and other expenses, including a contingency plan for unexpected expenses.
Procurement / Contracting Plan	Outlines the process of acquiring goods and services from external suppliers necessary for a project.
Quality Management Plan	A plan for ensuring that the project meets the required quality standards including quality objectives, quality metrics, and quality assurance activities.
Communication Plan	A plan for communicating with stakeholders, team members, and customers. This plan will include a list of communication channels, communication frequency, and communication protocols.
Risk Management Plan	A plan for identifying, assessing, and mitigating risks associated with the project. This should include a list of potential risks and their potential impact on the project.
Change Management Plan	A plan for managing changes to the project scope, schedule, budget, or resources. This should include a process for requesting, reviewing, and approving changes, as well as a plan for communicating changes to stakeholders.
Project Closure Plan	A plan for closing out the project, including a list of tasks required to complete the project, a plan for transitioning deliverables to the customer, and a plan for archiving project documents.

RACI Matrix

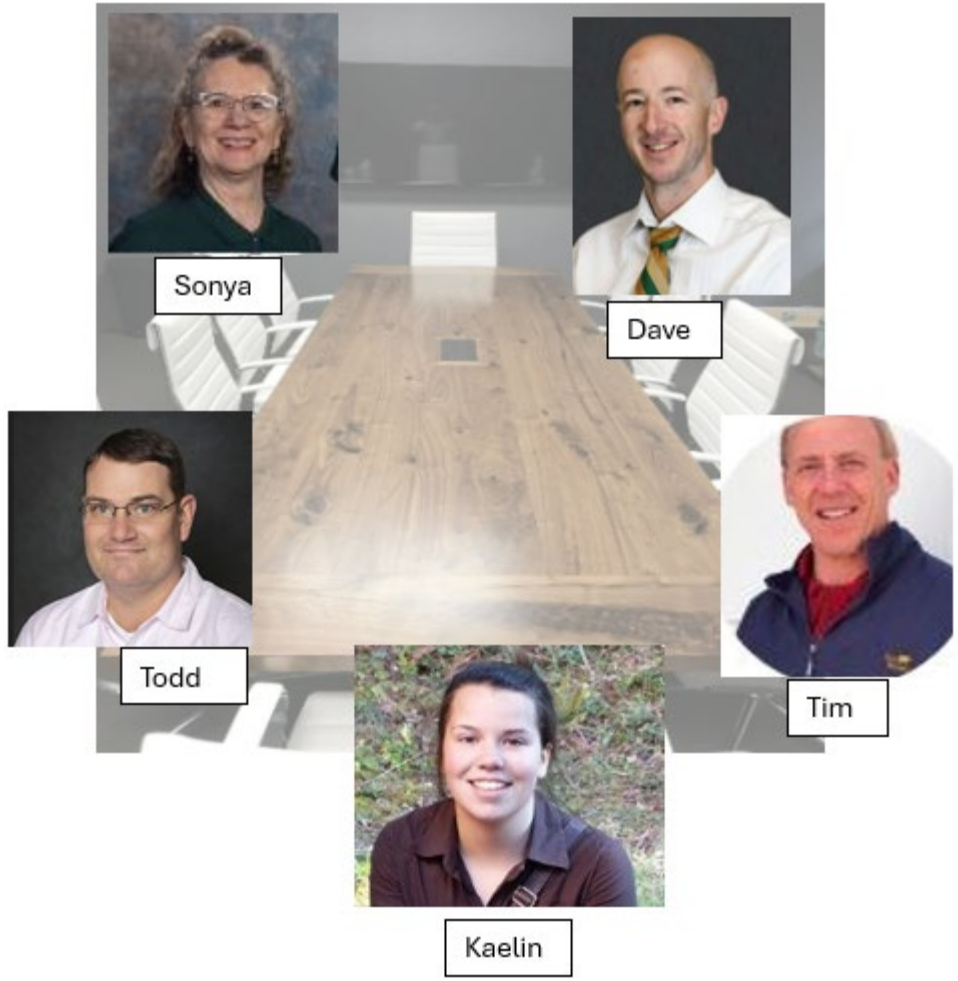
		Deliverables by Project Phase																											
		Initiation			Planning										Execution							Monitoring & Control								
R	**RESPONSIBLE** Person responsible for completing the assigned deliverable	Project Proposal–Submission Form	Sizing Matrix	Initiation Business Case	Kickoff	SharePoint Site Set-up	Project Charter	Risk Management Workbook	SR/ITPL/DPR Project Initiation Requests	Communication Request Form	Business Brief (Marketing Project)	Marketing Brief (Marketing Projects)	Planning Bus. Case	Measurement Plan	Vendor Design Document (Vendor)	System Documentation (Vendor)	IT Network & Systems Diagrams	IT Tech Specifications	IT Operational Guide	Project Closure Workbook	Measurement Plan Execution	Change Management Plan	Resource Plan	RACI Workbook	Issue Management	Financial Management	Risk Management Plan	Toll Gate Workbook (Planning, Execution, Closure)	Control Log	Monthly Status Report
A	**ACCOUNTABLE** Ultimate Owner, Accountable for final decision																												
C	**CONSULTED** Person consulted before action or decision taken																												
I	**INFORMED** Person informed after action or decision taken																												
Project Participants																													
Principal Engineer			I	I	R	R A	R	R	R	R	I	I	R	I	I	I	I	I	I	R		R	R	R	R	R	R	R	R
Project Manager					C	I	C	C	C				C		A	A	I	I	I	C		I	C	C	C	C	I	I	C	C
Deputy Project Manager			I		I	I	I	C							I	I	R	R	R			I	C	I	C	I	I	I	C	I
Lightning Speed Board of Directors			I	C	C	I	C	C	C				C			I		I	I	C		I	C	I	C	I	I	I	C	C
Business Project Manager			C	C	C	I	C	C	I				C			I		I	I	C		I	C	C	C	I	I	I	C	C
Technical Writer																				C										
Project Reviewer			I		I	I	I	I								I		I	I	C		I	I	I	I	I	I	I	I	I

Resource Allocation Plan

Resource	Team	Total Hours of Effort	Rate	Cost	1-Jan	2-Jan	3-Jan	4-Jan	5-Jan	6-Jan	7-Jan	8-Jan	9-Jan	10-Jan	11-Jan	12-Jan	13-Jan	14-Jan
Kaelin	**Design/ Development**	**18**	**$300**	**$5,400**														
Board Presentation		4					4											
Plan and Conduct PEP		4						4										
Manage Site Visit		10								10								
Manage Installation of Device																		
Victoria	**Design/ Development**	**21**	**$150**	**$3,150**														
Board Presentation		4									2			2				
Plan and Conduct PEP		5												1	1	1	1	1
Manage Site Visit		4																
Manage Installation of Device		8																
Eric	**Design/ Development**	**21**	**$500**	**$10,500**														
Board Presentation		5					3	2										
Plan and Conduct PEP		8						2	2					2	2			
Conduct Site Visit		4															2	2
Complete Installation of Device		4																

Group Discussion:

St Thomas Device



Mission: Build sporting complex

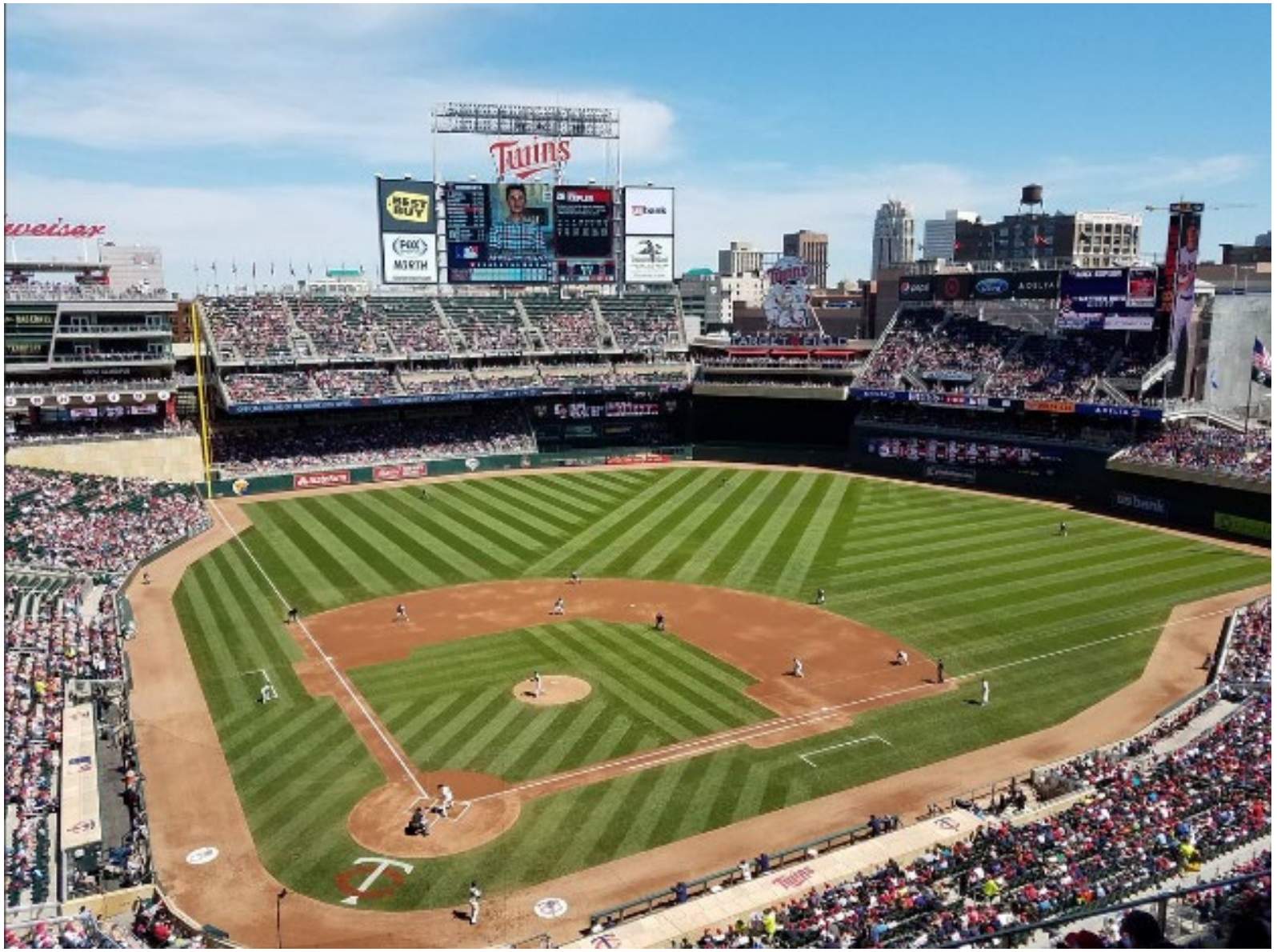
Toronto Pan Am Centre (LEED)

Reference: https://thevarsity.ca/2022/10/24/toronto-pan-am-centres-leed-certified-facility-leads-u-of-t-to-sustainable-design/

Manticore Developments to build Rutes Sporting Complex

T-MOBILE ARENA BECOMES FIRST LEED CERTIFIED SPORTS AND ENTERTAINMENT FACILITY IN LAS VEGAS

Reference: https://populous.com/t-mobile-arena-becomes-first-leed-certified-sports-entertainment-facility-las-vegas

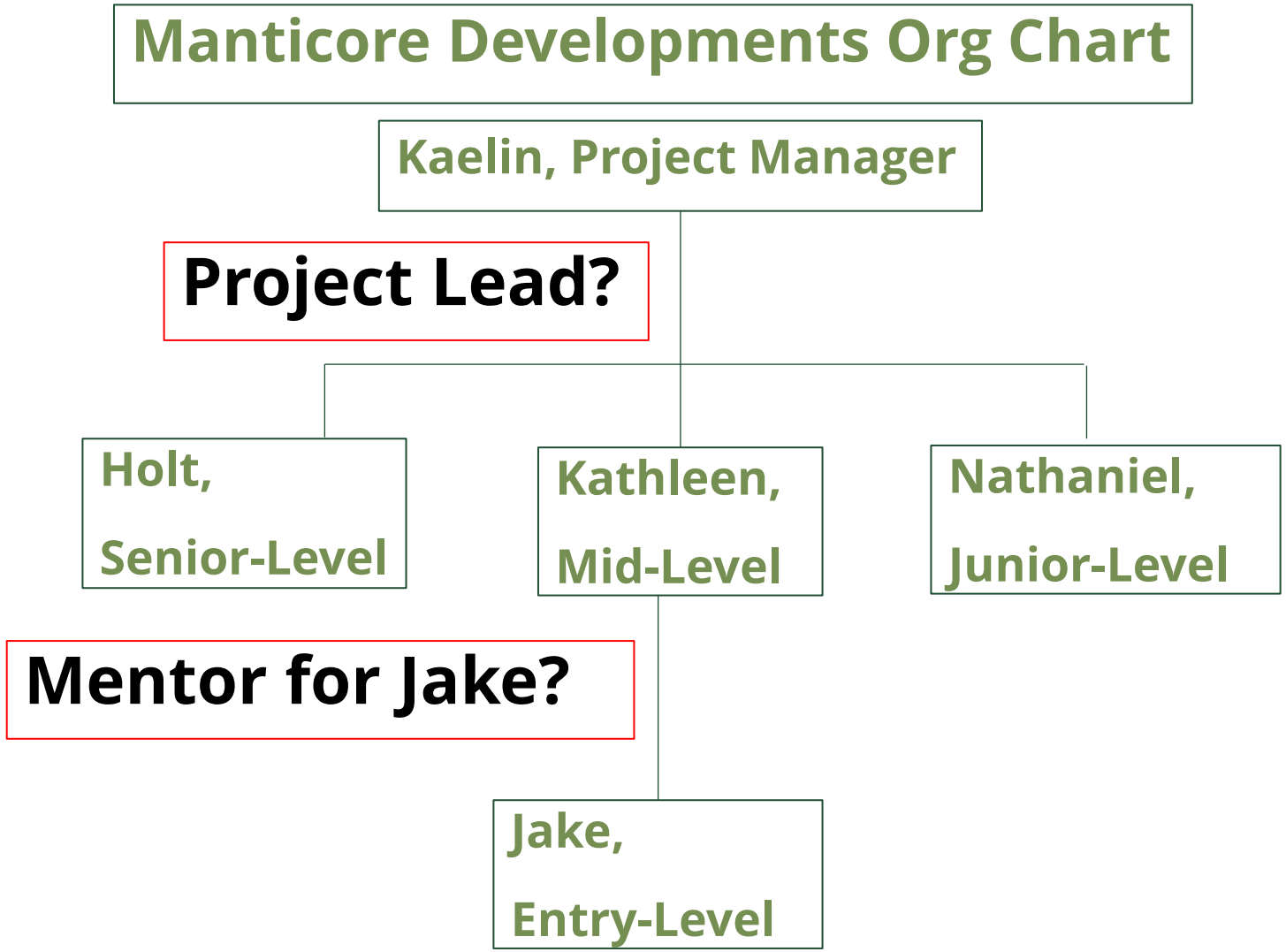


Target Field Minneapolis, Minnesota

- Leed Certified
- Brownfields Contaminated Site

Reference: https://www.tripadvisor.com/Attraction_Review-g43323-d1840178-Reviews-Target_Field-Minneapolis_Minnesota.html

Rutes Sporting Complex



Mission: Build sporting complex with sustainable aspects, keep within budget

Q1: Assign the project lead

A: Senior-level Holt

Owner of a small engineering firm

- Communication
- Manage clients and employees
- Manage scope, schedule, budgets
- Meet small budgets
- Meet timeline constraints

Q1b: Problems from conflicting points of view

- Miscommunication
- Tension and discomfort
- Analysis paralysis
- Reduced collaboration

Q2: Who will be Jake's mentor?

A: Mid-level Kathleen

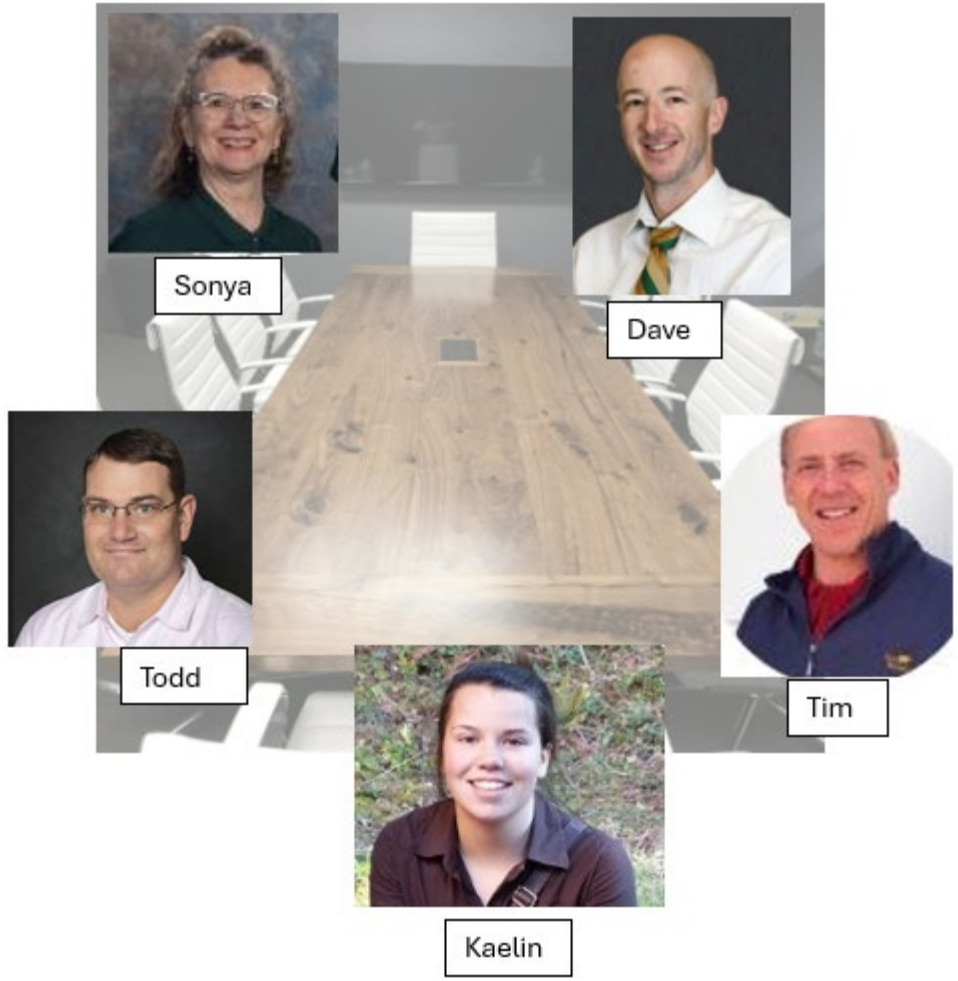
- Experience on similar projects
- LEED
- Advocate for Jake's ideas

Q3: Communication issues and how to approach them?

- Cultural
- Expectation
- Trust

Group Discussion

Sporting Complex



MPEM Improvements

Offer more core courses

Bring in industry professionals

Summary

1. Intros
2. Why MPEM?
3. Answers to Q’s
4. Group Discussion
5. MPEM improvements

Thank you

Questions/comments?

Cumulative

Group Discussion