

Building Better Mine Rock Stockpiles

Source Control Project Phase 3 Proposal Review



Mike O'Kane, Okane Consultants
Virtual Attendance
May 3, 2023

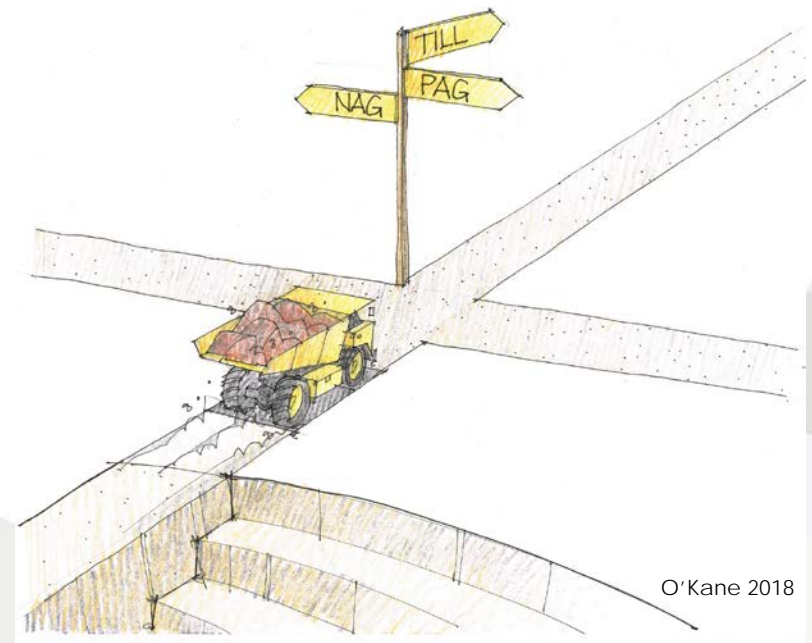
Land Acknowledgement

- Treaty 7 Territory
- Traditional and ancestral territory of the Blackfoot Confederacy:
 - Kainai, Piikani and Siksika, and the
 - Tsuu T'ina Nation and Stoney Nakoda First Nation
- This Territory is home to
 - Métis Nation of Alberta, Region 3, and within the
 - Historical Northwest Métis Homeland



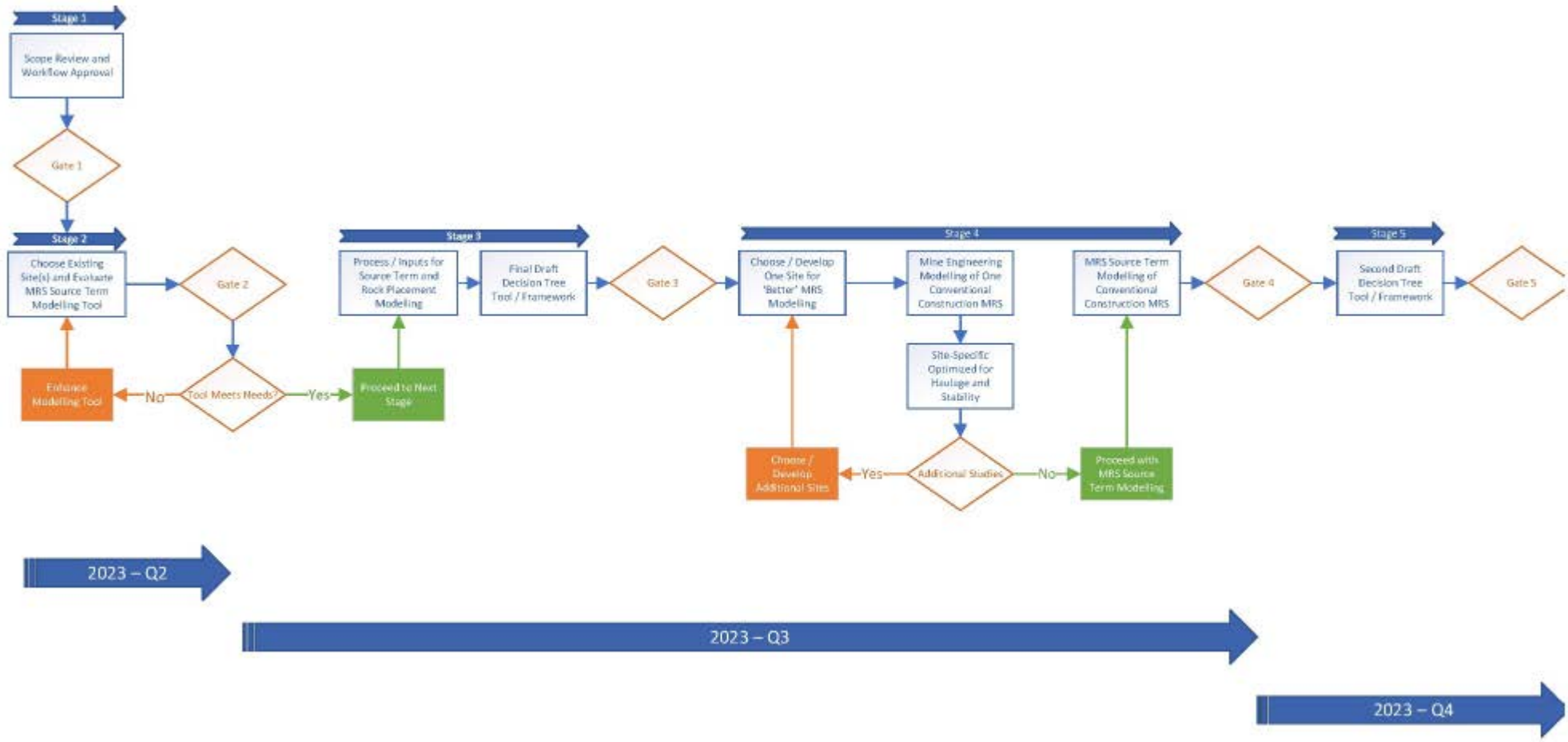
Discussion Points

- **Summarize Proposed Scope of Work**
 - Five (5) Stages
 - Steering Committee for Decision Making
 - Technical Resource Allocation
 - Cost Estimate Summary
- **Context / Content / Deliverables**
 - Technical Resource Allocation
- **Discussion**
 - Open Discussion Throughout



O'Kane 2018

Scope of Work - Overview



Technical Resource Allocation

Task	Work Performed, Activity or Decision	Individual	Wille Osborne	Andrew Robbley	Rachael Sawyer	Emma Inuz	Tyler Selton	Rima Boulbanga	Sarah Robertson	Katharine Raymond	Joshua Paulsen	Robert Shumak	Joel Stevens	Lynndey Torson	Hal Cooper	Josh Trevarthen	Luke Bagnall	Project Administration
			Senior Technical Advisor	Project Technical Lead	Senior Geotechnical Engineer	Senior Mine Engineer	Junior Engineering Training	Engineer-Training	Senior Geoscientist	Intermediate Geoscientist	Junior Geoscientist	Senior Geotechnical Engineer	Intermediate Geoscientist	Senior Engineering Technologist	Senior Technician	Senior Closure Lead	Project Administration	
		Rate (\$USD/hr)	\$275	\$190	\$190	\$170	\$125	\$120	\$170	\$145	\$120	\$190	\$145	\$135	\$156	\$156	\$215	\$95
Stage - Gate 1																		
Evaluation of MRS Source Term Model																		
1	Prep for scope review		1	1	1	2	4		1	2	4	1	2	4	1		1	
2	Click-off meeting		1	1	1		1		1			1					1	
3	Meeting minutes		1				2											
4	Contingency Hours for re-scoping / costing			2	2		4		2			2			2		2	
	TASK TOTAL		3	4	4	2	11	0	4	2	4	4	2	4	4	0	4	0
Stage - Gate 2																		
Pre-read for MRS decision workshop																		
1	Pre-read for MRS decision workshop		1	4	1	4	16		1	4		1	4		1	8	1	
2	Decision workshop		2	2	2	2			2	2		2						
3	Source term numerical modelling of MRS		2	2	2	4	8		4	8		8	80	80				
4	Stage Gate meeting with Steering Committee		4	4		4	4		4	4		4						
5	Summarizing memorandum		2	2			16		4	4		4	8	8				
	TASK TOTAL		11	14	5	10	44	0	15	22	0	19	92	88	1	8	1	0
Stage - Gate 3																		
Preparation of first draft decision free tool																		
1	Preparation of first draft decision free tool		2	2	2	2	16	24	2	8	16	2	8	8	2	8	8	
2	Stage Gate meeting with Steering Committee		4	4			4		4	4		4						
3	Summarizing memorandum		2	2	2		8	8	2	2		2			2		2	
	TASK TOTAL		8	8	4	2	28	32	8	12	16	8	8	8	4	8	10	0
Stage - Gate 4																		
Pre-read package for workshop #1																		
1	Pre-read package for workshop #1		1	4	1	4	4	12	1	4		1	4		1	8	1	
2	Workshop #1		2	2	2	2			2	2		2						
3	Pre-read package for workshop #2		1	4	1	4	4	12	1	4		1	4		1	8	1	
4	Workshop #2		2	2	2	2			2	2		2						
5	Numerical modelling of conventional MRS rock placement		4	4	16	120	120	40	8	8		8			4	8	8	
6	Steering Committee to review modelling		2	2	2	2			2	2		2						
7	Stage Gate meeting with Steering Committee		2	2	2	2			2	2		2						
8	Summarizing report		2	2	8	16	40	40	2	2		2			2	16	4	
	TASK TOTAL		16	22	34	152	168	104	20	16	0	20	8	0	8	40	14	0
Stage - Gate 5																		
Draft final report																		
1	Draft final report		4	4	4	16	40		4	16	40	4	16	40	4	16	4	
2	Preparation of second draft decision free tool		2	2	2	2	16		2	8	16	2	8	16	2	4	4	
3	Stage Gate meeting with Steering Committee		4	4		4			4	4		4						
4	Final report		2	2	2		16		2	2		2		16			4	
	TASK TOTAL		12	12	8	18	76	0	12	28	56	12	24	72	6	20	12	0
Project Management and Coordination																		
1	Twice monthly 45min coordination meetings (assume 1 hr)		14				14											28
	TASK TOTAL HOURS		14				14											28

Stage 1

- **Stage 1 – Scope Review and Project Kick-Off**

- ~4-week period
- 52 hrs
- ave. charge out rate: ~\$165/hr

- **Context / Content / Deliverables**

- Confirm scope of work through structured feedback and discussion with Steering Committee
- Revise as required
- Kick-off meeting minutes
- Week of May 29, 2023

Stage 2

- **Stage 2 – Evaluation of MRS Source Term Model**

- ~10-week period
- 330 hrs
- ave. charge out rate: ~\$152/hr

- **Context / Content / Deliverables**

- Collaborative workshop for choosing an MRS for Source Term Modelling
- Confirm utility and use of proposed MRS Source Term Model
- Week of Jul 24, 2023

Source Term Control Model Overview

A key aspect of delivering on this scope of work will be the ability to complete simulations, or predictions, in relatively short time frames to evaluate source term control for differing MRS configurations. Okane has developed a proprietary suite of modelling tools within the GoldSim software framework. Collectively, Okane refers to this suite of tools as the: Mine Rock and Tailings Geo Evolution (MIRTAGE) model. The model allows for coupled gas, thermal, and water flow / transport modelling of a mine landform as it is being constructed, using site-specific data inputs.

Stage 3

- **Stage 3 – First Draft Decision Tree Tool / Framework**
 - ~4-week period
 - 164 hrs
 - ave. charge out rate: ~\$152/hr
- **Context / Content / Deliverables**
 - Collaborative and structured brainstorming workshop
 - High level screening for efficacy of MRS with focus on source term control
 - Week of Aug 28, 2023

Stage / Gate 3 – First Draft Decision Tree Tool / Framework

The ultimate deliverable arising from completion of all work during Phase 3 is a 'tool' that allows for high-level screening of the efficacy for building an MRS with a focus on source term control, which can be used by projects / sites to support informed decision making. This type of tool (i.e., a Decision Tree Tool / Framework) is a key attribute within INAP's Global Cover System Design Guidance document⁷ because it allows an operator, or designer, to apply a robust conceptualization of cover system design and performance, prior to undertake numerical modelling. In addition, it allows for the opportunity to 'start off' cover system numerical modelling on the basis of a robust site-specific conceptual model.

Stage 4

- **Stage 4 – MRS Modelling**

- ~12-week period
- 622 hrs
- ave. charge out rate: ~\$154/hr

- **Context / Content / Deliverables**

- Choosing an MRS to model throughout Phase 3
- 2 x Collaborative workshops – opportunity framing + scenario planning
- MRS modelling (Deswik) – optimize w/o source term modelling
- Week of Nov 20, 2023

Stage / Gate 4 – MRS Modelling

Numerical modelling to optimize costs for construction of a conventional MRS, as well as source term modelling of this MRS, will be the primary activity during Stage 4. Prior to this modelling however, the Project requires a site with a proposed, or existing MRS, to model. Okane's experience is that 'landing on' a site, and use of that site's data is a common impediment to advancement of projects similar to INAP's source term control MRS project.

Stage 5

- **Stage 5 – Second Draft Decision Tree Tool / Framework**
 - ~3-week period
 - 268 hrs
 - ave. charge out rate: ~\$148/hr
- **Context / Content / Deliverables**
 - Report preparation
 - Decision tree tool / framework
 - Draft and final report
 - Week of Dec 11, 2023

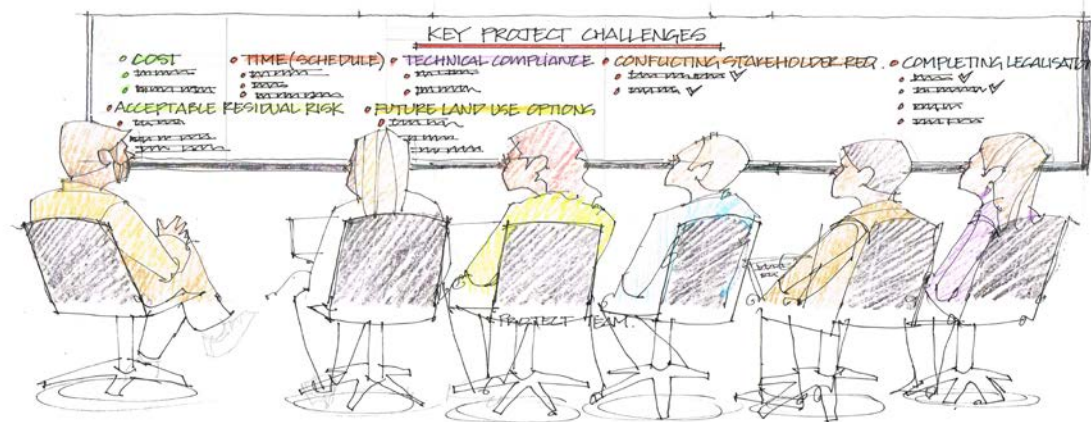
Stage / Gate 5 – Second Draft Decision Tree Tool / Framework

The draft Decision Tree tool developed during Stage 3, will be updated, and refined as required, using information developed during Stage 4. The second draft of the Decision Tree tool envisioned for the Phase 3 project as a whole will be delivered.

The Steering Committee Stage Gate 5 meeting is planned to be conducted over two sessions, or a longer meeting than for previous stage gate meetings, in order to ensure sufficient time for review of Phase 2023 work product and outcomes, as well as discuss scope for 2024.

Discussion Points - Summary

- **Okane is prepared and ready to begin execution of scope**
 - Okane Ops Resource Manager has confirmed availability of all resources over time frames within current schedule
- **In collaboration with Project Steering Committee, Decisions...?**
 - Scope
 - MRS source term model
 - MRS to model
 - Decision tree tool / framework



Thank you!

Okane Consultants

www.okc-sk.com

info@okc-sk.com

