



DESIGN AND CONSTRUCTION OF A SEEPAGE INTERCEPTION SYSTEM FOR A MINE TAILINGS FACILITY

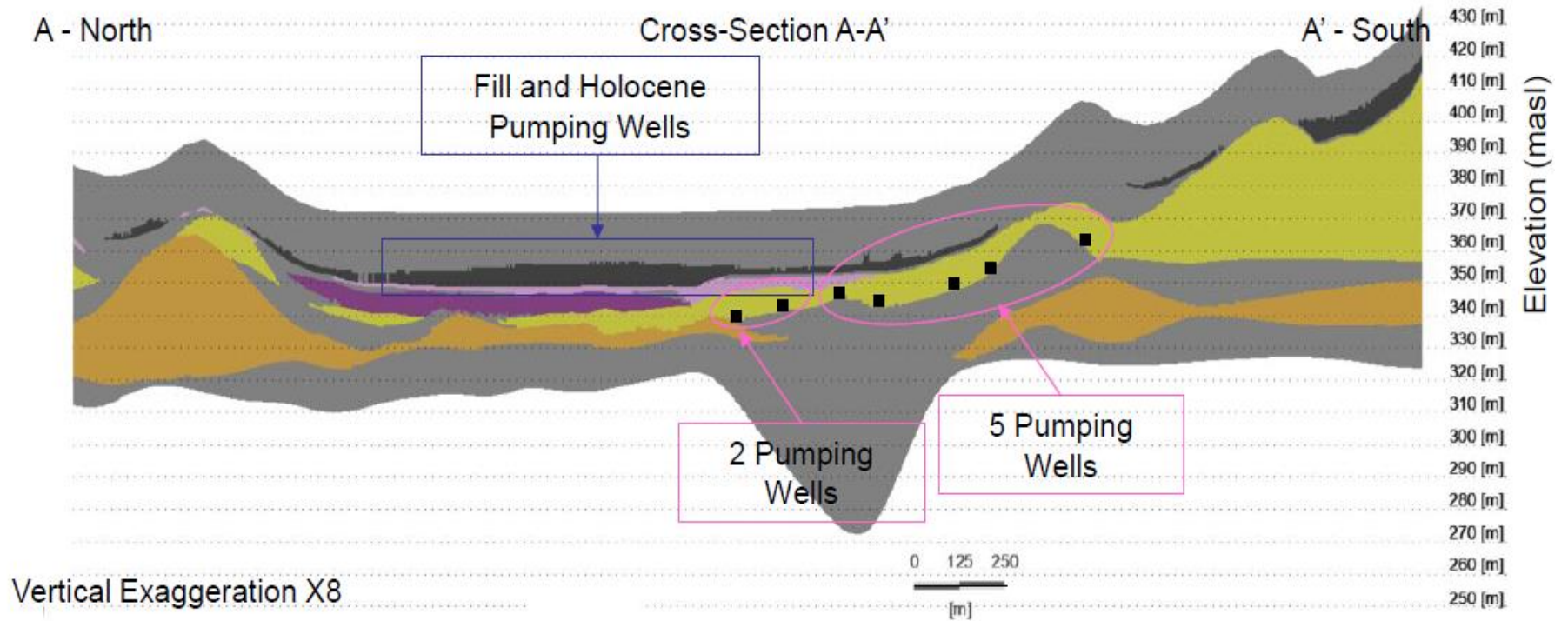
Trevor Carlson, Jennifer Pretorius &
Emmanuel Olisa

STEP 1: PROBLEM DEFINITION



- The objective was to design and implement groundwater interception system at an open pit mine.
- An interim groundwater interceptor system was in place.
- A more permanent system was needed to mitigate the risk of contaminant migration

STEP 2: SOLUTIONS IDENTIFICATION



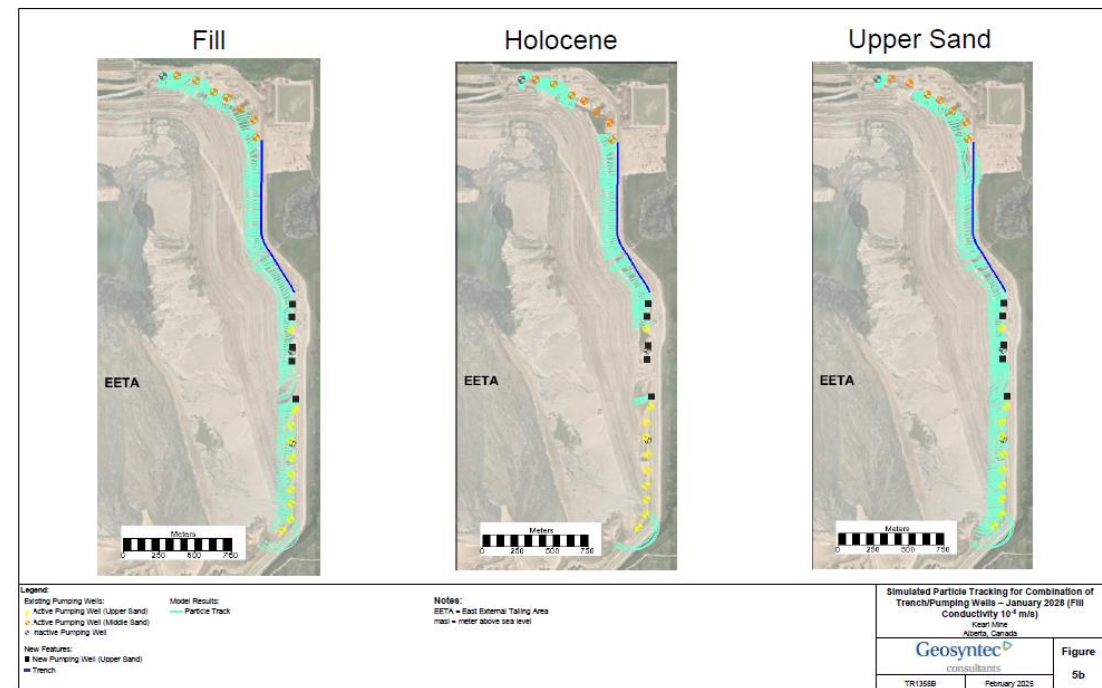
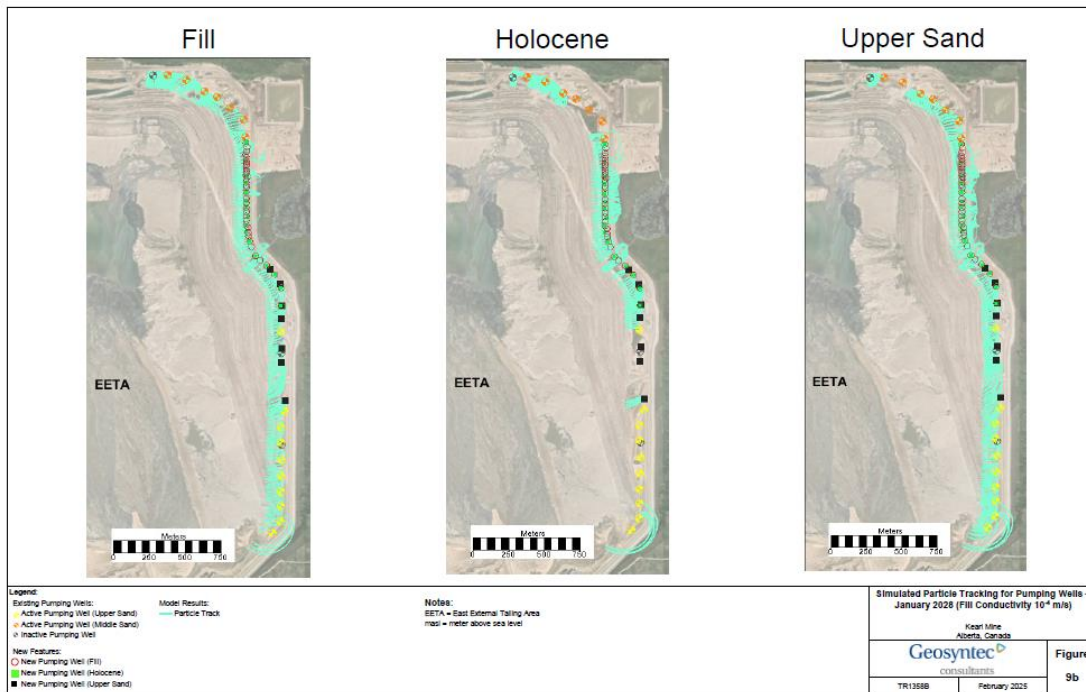
Scenario Modelling to Identify the Solution

LOOK AT
MULTIPLE
SOLUTIONS



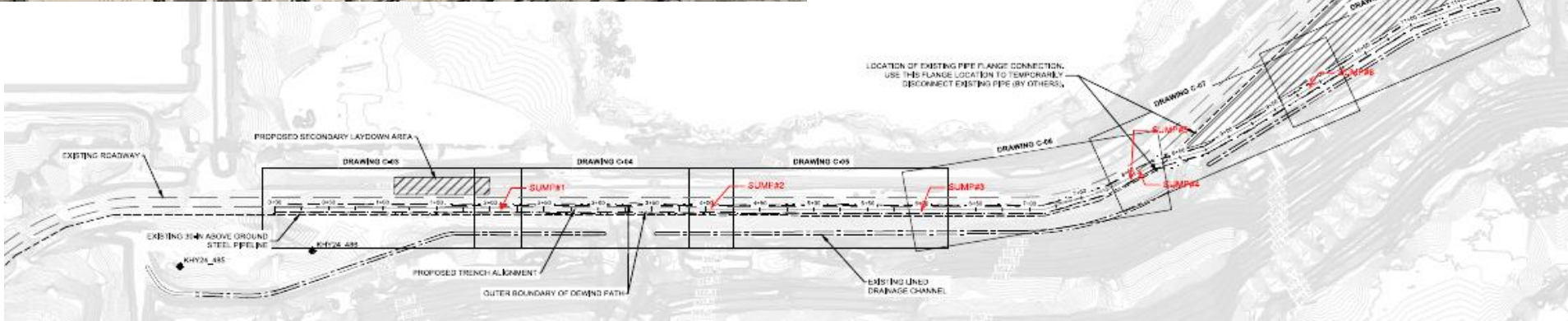
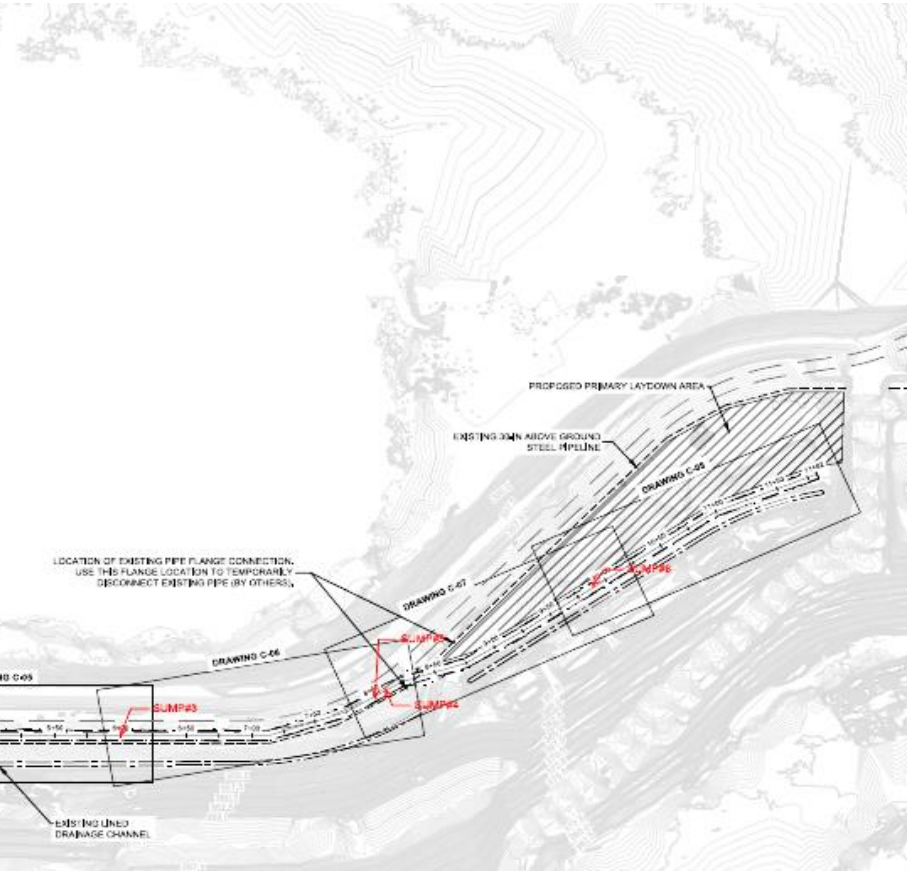
EVALUATE OPTIONS

56 Pumping Wells ~700-900 m³/d vs.
 Combination of Trench 900 to 1,200 m³/d and 5 Pumping Wells 250 to 270 m³/d



STEP 3: DESIGN ACTIVITIES

“CONCEPT TO CONSTRUCTION”



DESIGN WITH STRATEGY EMPLOYED

The Strategy: Divide specialized technical tasks into four key pillars, unified by Central Project Management to ensure seamless coordination and risk mitigation

Teams :

- Hydrogeology Team: Groundwater modeling and water balance
- Geotechnical Team: Soil stability and foundation integrity
- Engineering – Subsurface: Underground infrastructure and geohazards
- Engineering – Surface: Site grading and drainage systems

Central Oversight:

- Aligns timelines across all disciplines.
- Eliminates communication silos.
- Prevents rework through proactive conflict resolution.

CONSTRUCTABILITY & OPERATIONS REVIEW

Over the duration of the project, the design was reviewed by client and contractor stakeholders



Goal: Bridge the gap between design theory and site reality.

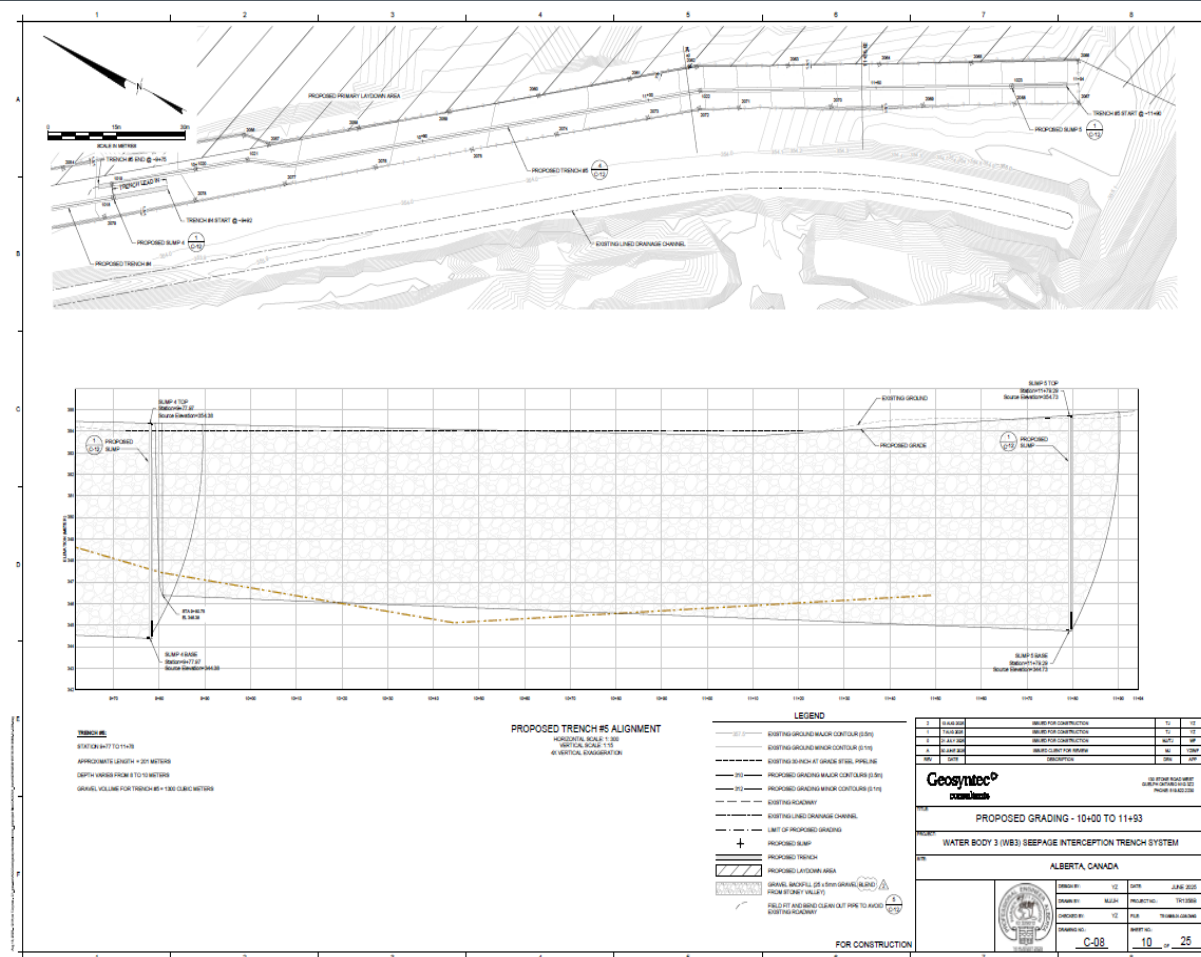
IDENTIFY LOGISTICAL "BLIND SPOTS" EARLY

KEY FACTORS

- **Operational Alignment:** Ensure the final build meets long-term maintenance and site access requirements.
- **Risk Mitigation:** Review safety, staging, and equipment constraints before breaking ground.
- **Value Engineering:** Leverage field expertise to find cost-effective alternatives without compromising quality.

The Outcome: A buildable, maintainable design that prevents costly rework.

ISSUE DESIGN FOR CONSTRUCTION



STEP 4 CONSTRUCTION

One-Pass Seepage Interception Trenching Execution

Project: Waterbody 2 (WR2) One-Pass Seepage Interception Trench Installation
 Location:
 Date: July 24, 2025

1. Objective

Install a continuous 1.2 km long one-pass interception trench to intercept the migration of contaminated groundwater. The trench is aggregate and equipped with 6" SDR11 HDPE slotted pipe and 18/20" carbon steel casing will be installed as per site-specific design. Sump pumps will be installed after installation is complete to pump nearby lined channel.

A separate Execution Plan will be developed for the trench installations.

2. Key Stakeholders and Responsibilities

Party	Main Role & Responsibilities	IOL PM	IOL Tailings	IOL MPP	Geosyntec
Tailings / Imperial Project Manager	Provide imperial equipment and management of Trenching mobilization				
Dewind	Area Lighting				
CRC	Site preparation, C-handling, dust control				
Ketek (managed by tailings)	Pump setup and water management System (WPVS)				
Geosyntec	Engineering oversight, QA, QC, documentation, etc.				

Scope	IOL PM	IOL Tailings	IOL MPP	Geosyntec
Overall				
Project Management				
Interface agreement				
Site Access and Trainings	X			
Laydown Yard Cleanup	X			
Ground Scan				
Handheld Radios (From Ketek)		X		
Equipment Rentals (Execution)		X		
Fuel (For Dewind)		X		
HDPE/Sumps	X	X		X
Pipe Fusing	X			
On-site Project Oversight	X			
Aggregate Delivery at Site				
Aggregate Management				
Sieve Analysis (On-site)		X		
Civil Scope				
Dust Control	X			
Rigging Equipment for Trencher			X	
Trenching			X	
QA/QC (Trench)			X	
Site Alerts / Road Closure				
Procure Pumping Systems				
Concrete barriers w/ Flags (Material)	X	X		
Concrete barriers w/ Flags (Installation)			X	
Cones (Cable)				
Pipe Sleeves and Rip Rap (Materials)				
Pipe Sleeves and Rip Rap (Installation)			X	
Operate Pumping Systems	X			
Waste Bins	X			
Washrooms		X	X	
Drone Video				
Material Pass	NA	X		
Lunch Trailers				
FIT testing and Mask availability	NA	X	X	
Area Lighting				
Site preparation, C-handling, dust control	NA			
Pump setup and water management System (WPVS)			X	
Engineering oversight, QA, QC, documentation, etc.				X

Construction – Starts with Planning



Emergency Response Handout

Emergency Contact Information

Emergency Number: 780-762-8888
Emergency: Channel #16
Non - Emergency Number: (780) 762-8886

Dayshift First Call:
Brandon Gunia 616-403-9930
Mike Taylor 616-218-2798

Emergency Transfer Points / Location of Helipads:

- Located in each piece of equipment
- Located in DeWind Labor trucks
- Located at each water crossing

EMERGENCY RESPONSE GUIDELINES

Activate ERP: Event Occurs
 Perform Initial Response using the following sequence:

- Notify DeWind Superintendent(s) on shift
- Use **Channel 16** on any frequency of a **Mine Radio** to contact Emergency Services: "Emergency, Emergency, Emergency"
- Call the Site Emergency Phone Number **780-762-8888**

EMERGENCY RESPONSE GUIDELINES

First Aid Kits:

- Office Trailer, Light Duty Pick-Ups

Fire Extinguishers:

- In All Equipment and Light Duty Pick-Up



Part A – PROJECT/TASK INFORMATION

Revision No.: R01
 Revision Date: 2025-07-14
 Owner (Dept.): Safety

Construction
 BTR 074
 Water Recovery Trenches Construction

TASK HAZARD ANALYSIS

(Rev. 1.1, 1-4-2007)

Project Number/Org.:	Office Phone	Cell Phone
TR13588	306 800 2412	306 850 2549
	306 808 0449	306 223 7380
	306 800 2412	306 890 1546
	306 808 0449	306 224 7380
	519 515-0857	519 994-1249
	519 512-0647	519 493-0034
	811-378-4420	813-240-9231
	567-962-1126	
	Australia: 800-551-1182 or 800-811-011	
	Ireland: 800-772-55286 or 800-500-009	
	+871 234 8883	

Work task and contact information for each Geosyntec subcontractor below:

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Work task and contact information for each Geosyntec subcontractor below:

BREAK CONSTRUCTION IN MANAGEABLE TASKS

Pumping Wells - Drilling, installation and testing

Trench Construction Oversight – Document & Validate

Construction QA QC

Design	As-Built	As-Built	Well Information	
(mbg)	(mbg)	(mas)	Well ID:	KHY25_818_PW
Top of Pipe	-1.675	356.99	Project Name:	169524745
Ground	0.00	355.34	Date Installed:	3/24/2025
Top of Bentonite	0.00	355.34	Weather:	-2C overcast
			Drilling Company:	Mikkiew ConeTec
			Rig Type / No.:	Dual Rotary 15
			Borehole Diameter (mm):	406.4
			Well OD (mm):	262
			Well ID (mm):	255
			Rig Monitor:	T Clemit
			Location Information	
			Location:	ETA
			Northing:	6364541.968
			Easting:	499302.179
			Ground Elevation:	355.338
			Water Levels	
			Design:	
			End of Installation:	0.47 mbtcc
			Date and Time:	3/24/2025 23:00
			End of Development	2.14 mbtcc
			Date and Time:	3/25/2025 8:20
			Measurements	
			Post Install PW Bottom	12.56 mbtcc
			Date and Time:	3/25/2025 8:15
			Materials Used	
			Item	Description
			Bentonite Chips	Enviro-plug 7 bags
			Bentonite Pellets	3/8" 10 bags
			Filter Sand	12-20 15 bags
			Fill Sand	(Target) 0 bags
			Solid Riser	Steel 4 pieces
			0.017 Screen	Stainless Steel 1 piece
			Bottom Cap	Steel 1 piece
			Top Cap	Aluminium 0 pieces
			Quad Assembly	Labelled 1 piece
			Buggy Whip	Complete 1 piece
			Beacon Light	Complete 1 piece
			Legend	
				Riser
				Bentonite Chips
				Filter Sand
				Screen
				Bentonite pellets
				Target sand

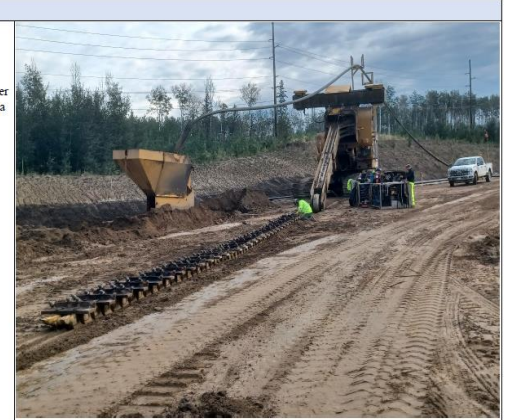
Comments:
 1. Design Depth based on observed geology and IOL design specifications.
 2. Bottom of well was dipped at 12.56 mbtcc, hard landing.
 3. Bentonite chips/pellets were hydrated as they were placed.
 4. Bucket used as top cap

PHOTOS

Photograph No. 1

Direction: East

Description: The trencher chain was replaced with a new one by DeWind.



PHOTOS

Photograph No. 2

Direction: East

Description: The laser system was recalibrated before trenching commenced to verify accuracy. A 3.8% slope consistent with the design drawing was confirmed, ensuring continuity from the previous day's setting.



STEP 5 COMMISSIONING WITH A PLAN

Commissioning & Operational Validation

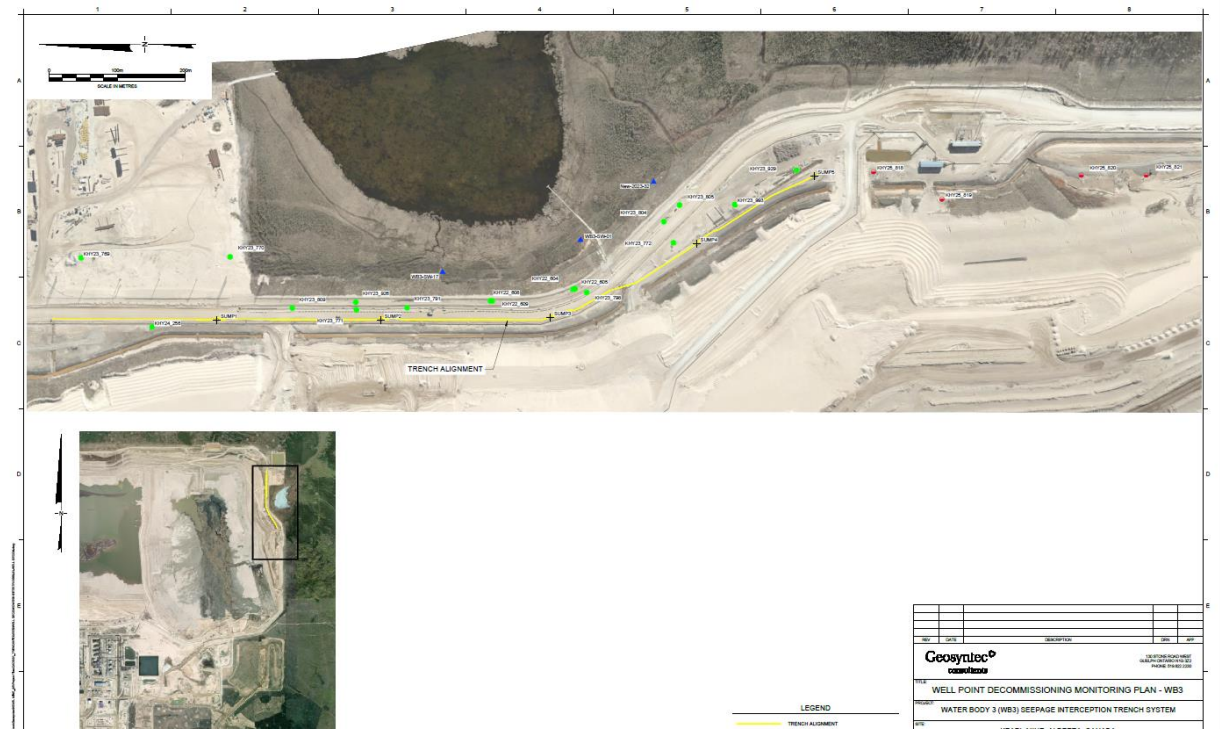
- As Built Preparation
- Operational Management and Maintenance Manual Preparation



STEP 6: POST COMMISSIONING MONITORING

Monitoring Program:

Validate operational performance, meet regulatory requirements, and guide the phased decommissioning of the temporary system



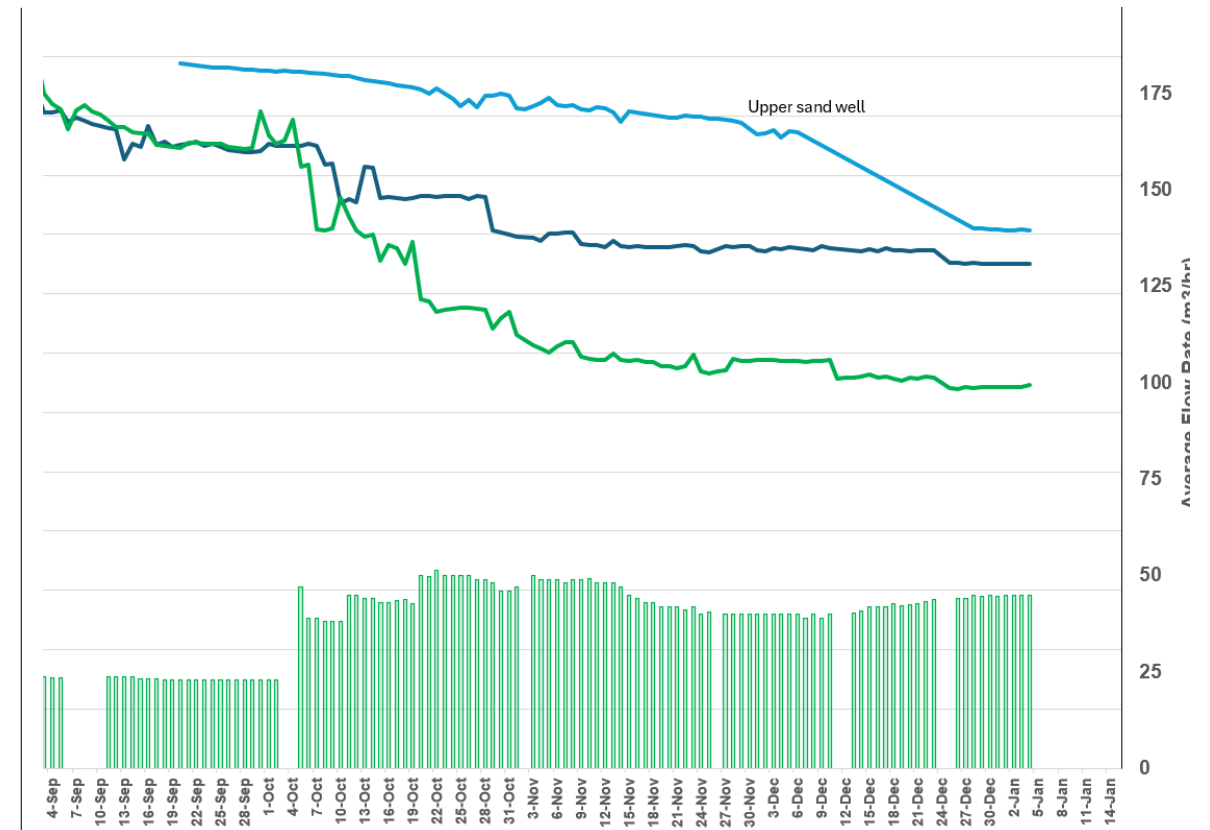
COLLECT AND REVIEW KPI OPERATIONAL DATA

Operational Validation KPIs

- Groundwater elevation
- Pumping rates
- Surface elevation measurement
- Turbidity measurement
- Groundwater Quality

Develop Trigger Value Framework

- Have contingencies available



PROJECT SUMMARY

Project Success Summary: 2024–2025

"On Time. On Budget. Zero Harm."

Project Timeline

- **Dec 2024:** Project Kick-off
- **Jan 2025:** Design Phase Commenced
- **Aug 2025:** Construction Phase Commenced
- **Sep 2025:** Commissioning & Completion

By The Numbers

40+ Team Members: Specialized sub-teams under central project management.

Hundreds of Labor Hours: From complex modeling and design to site supervision.

Perfect Safety Record: Zero injuries or first aid incidents.

The Key to Success: Total Collaboration

This project's success was driven by a seamless partnership between **Client, Consultant and Contractor**. Without the active engagement of the Client's stakeholders and the technical expertise of the Contracting teams, this delivery would not have been possible.



FACTORS THAT LED TO PROJECT SUCCESS

Key Factors Driving Project Success

- Leveraged a **multidisciplinary team** to address complex challenges
- Set and achieved **critical milestones on schedule**
- Maintained the **budget within established limits**
- Upheld **rigorous safety standards with zero incidents**
- Optimized system performance for **smooth and efficient operations**
- Delivered the project as planned, generating **positive outcomes and measurable results**





QUESTIONS

Thank you!