TROILUS GOLD

New Troilus Project

Water Management Workshop

Summary of workshop held with land users and the Troilus project development team and engineering consultants on the water management plan held on November 14th and 15th 2022.

December 2022

Summary of workshop held with land users and the Troilus project development team and engineering consultants on the water management plan held on November 14th and 15th 2022.

Table des matières

Disclaimer

The information provided by the Troilus Gold team summarized in this report is based on “forward-looking statements” within the meaning of Canadian securities legislation.

The information presented in the presentations are based on general design options and should not be considered as final designs.

All information presented in the presentations is subject to change.

Confidentiality

The information presented in this report is sent to participants of the workshop for confirmation of the exactitude of their comments and questions. The report should not be distributed to other parties not present at the workshop as most information is preliminary and was presented in order to gather initial thoughts, concerns and questions.

Context

In an effort to inform, discuss and gather initial thoughts on the preliminary design of the water management plan for the new Troilus mining project a workshop was held with members of the impacted families for the Troilus project hereafter called '' Land users''.

The workshop included members of the Troilus engineering team, environmental department and community relations as well as their engineering and mining design consultants.

Troilus Gold understands the importance of the water management design on the land user's traditional activities, health and safety. As such, Troilus gold wanted to include land users in the water management design discussion as early as possible to ensure that all their considerations could be taken into account while the water management plan is in elaboration.

In order to facilitate comprehension plans and maps were presented but these remain preliminary and field investigations and additional studies must still be carried out to confirm each options viability.

Follow up meetings will be held to discuss advancement in the water management design plans.

All presentations were conducted in English as all participants were fluent in English.

List of Participants

Land users

- Charlie Awashish, Tallyman M-34
- Eugene Neeposh, Tallyman M-39A
- George Awashish, Tallyman M-34
- Kenny Awashish, Tallyman M-34
- Samantha Awashish, Tallyman M-34

Troilus gold

- Daniel Bergeron, Vice-President operations Québec
- Ian Pritchard, Senior Vice-President Technical Services
- Jacqueline Leroux, Vice-President Environment and Permitting
- Mathieu Michaud, Environmental Coordinator

WSP/Golder

- Jennifer Lallier, Hydrogeology engineer
- Lauerent Gareau, Senior geotechnicien (online)
- Mathieu Gosselin, Gelogical engineer
- Sophie Bainbridge, Senior Geotechnical engineer
- Vlad Rojinschi, Senior Water Resources Engineer

Blumetric

- Ali Nowamooz
- Rich Schmidt
- Vincent Maklar (online Monday the 14th of November)
- Sara Magdouli (online)

AGP

- Willie Hamilton
- Gordon Zurowski (online)

Workshop Organization

The water management workshop was held over two days. The first day (November 14th 2022) was concentrated on opening remarks and presenting the information that contributed to developing the different water management options.

The second day (November 15th 2022) focused on separating all participants in smaller sub groups where all groups discussed and commentated on the pro's and con's of the 3 different options. The subgroups were separated in a way that all groups had representatives from Troilus Gold, WSP/Golder and land users present.

The presentations are presented in Appendix 1 in the order they were presented to the participants.

In order to facilitate comprehension and increase participation and discussions, comments and questions were taken throughout the presentations.

At the end of the second day, all subgroups presented their discussion notes on the three options including the perceived pros and cons of each option. The options presented as well as the pros and cons noted for each option are found in the ***water management section***. The presentations are present in Appendix 1 and discussion notes are presented in Appendix 2.

Welcoming remarks

The Workshop opened with a prayer from George Awashish.

It was expressed that some participants hesitated to participate as this could be a difficult exercise, and that it was emotional, and the trust has to be established to continue a meaningful relationship with the land users and Troilus.

It was expressed how the land was important and precious to the land users, and that Water and the waterways are vital to the Cree way of life.

Troilus Gold informed land users that the plan presented were preliminary plans and as such will change as new information, comments and preoccupations are gathered.

Land users noted the importance of water to their traditional activities, their heath and well being as well as the importance of maintaining the territory in a state that allowed the practice of their traditional activities and the health and safety of all people and species in the territory.

Closing remarks

Land users mentioned that they appreciated the fact that Troilus Gold was consulting them at this preliminary stage and that they believed the relation between Troilus gold and the land users was heading in the right direction. Transparency and respect are very important to maintain good relations between Troilus and the Cree community.

Cree prayer that underlined the importance of respecting the environment and all the animals on the territory.

Troilus Gold and the consultants present will work to develop the water management plan according to the comments and suggestion received and another water management workshop will be held to inform and discuss the changes brought to the water management plan.

Highlights of the discussions

- No name stream should be named '' Bibou Stream'' .
- Avoid dam construction in water management plan.
    - How would water management plan look without a dam on Lake Amont?
- Stream deviation should be done once at beginning of project and left as is afterwards.
- Always present actual and future infrastructures on map and plans to help facilitate comprehension.
- Avoid Cyanide in the recovery process as much as possible.
    - Cyanide is included in the process but in a closed circuit.
- Proposed infrastructure such as overburden piles are way too close to Cree camps and should be displaced.
- How will fish be impacted by the different proposed water management options?
- Make sure of taking into consideration proximity of overburden stockpiles to the tailings pond for future use.
- Consider and develop progressive closure in the planning.
- Take the current iron content in the water into consideration.
- Take the current exfiltrations into consideration – what is to be done with them?
- Design in a way to not push the machinery to the extreme of its capacity.

Questions from participants

Questions raised by particpants are in italics. Information provided by Troilus Gold or consultants present are reported in roman type. In cases where no answers were given, additional research or studies were needed for Troilus Gold to provide more information. A follow up will be given in subsequent workshops.

General Questions

Is there a possibility to do a site visit to a similar mine to what Troilus is proposing?

Yes, Troilus gold will look into this possibility in 2023. All mining projects are different but some will have similar exploitation (open pit), production output, residue type, etc..

Why are the CNM and CNG representatives not present at this meeting?

For the question as to why the Chief and Council was not invited to that workshop. Jacqueline Leroux answered that this was an in-detail and in depth look at the water management on site, with the experts

(consultants and land users) and we required hands on knowledge. Jacqueline said that for the future workshop and any or all other meetings with Troilus, the invitees are free to relay this invitation to whom see appropriate or simply want to be present.

It was also conveyed by Samantha Awashish that a workshop like this helps build trust and that they will continue their involvement in that format.

How will the proposed type of residue (thickened tailings) deposited in the tailing's storage facility influence the vegetation program and dust control?

This will be addressed in impact study when discussing variants for the project.

Possibility to restore site progressively using overburden thus limiting creating new overburden piles?

Yes that is a possibility, it will be examined in impact study.

Is the relocation of our camps next to Lake A further downstream near Lake Boisfort a possibility? Could a compensation plan be put forward?

Troilus Gold will put forward all possible measures to reduce impact on land users near Lake A so operations do not affect their access to resources. As of now this possibility hasn't been examined.

Water management plan questions

Can we buttress the SW dam?

Yes, a buttress could be added to the design. The way the dam it has been designed, it does not require a buttress but one could be added for increased safety.

What happens if the SW dam core fails?

Catastrophic failures such as a dam collapse are evaluated in the impact study. All safety measures will be applied so that the dam construction meets safety regulations and norms, water level at the Amont lake would have to be monitored and annual inspections by a qualified geotechnical technician would also take place. An emergency measures plan will be elaborated during the impact study all the steps in case of a catastrophic failure will be detailed.

What would be the effect of modifying the Bibou Creek on the fish and spawning areas?

This will have to be validated with aquatic biologists.

<u>New information provided by biologists:</u>

<u>Most fish species found on the Troilus mine site do not use the stream to travel from one lake to another. However, they do go up or downstream during their spawning period. Most fish will travel less than 1 km from lakes until they find a suitable location in the stream to spawn. The biologists believe that the fish would avoid the Bibou stream until sediment and flow conditions allow it to be used as a</u>

spawning area again. Until then, fish would spawn in other streams where sediment and flow conditions are ideal for spawning.

What would be the Impacts of waterways on the Rupert River?

This will have to be addressed during impact study but based on the past exploitation we do not anticipate impacts on the Rupert river.

What is the migration pattern for fish between Lake A and Lake Amont?

A lot of fish habitat characterization studies and inventories have been carried out on Bibou Stream. We will discuss with aquatic biologists on their findings and fish migration patterns and relay the information back to you. Will also be described in impact study.

Can fresh water for concentration plant be taken from sediment ponds or pits?

Technically yes, Troilus plans on reusing the water from the pond that will be located on the tailings pond. As for the possibility for taking water from the pits, the present mining plan is anticipating that all three pits be exploited simultaneously so that condition does not allow the pit water to be used for the concentration process during exploitation. However, the mining plan is still subject to change so this will be looked at in greater detail going forward.

How would water management plan look without a dam on Lake Amont?

The proposed dam is there to limit excavation depth at different points especially near the proposed J pit. Without it excavation at some points would require blasting and could prevent animals such as Moose and bears from crossing it because of the slopes. Another point to consider is as the depth of the stream bed increases there is additional risks of contact water infiltrating in the stream.

Can the pits be future fish habitats and if so, can aquatic vegetation be planted in them?

Yes, but they will have to be backfilled, so they are less deep. Aquatic vegetation could be planted in them to reduce time before they present the right conditions for fish to survive in them at closure.

Could it be dangerous to exploit one of the 87 or J pits while the other is filling up with water?

The geotechnical stability will be addressed in the impact study. In addition, both pits could be exploited simultaneously so that both pits are empty during operation therefore limiting the risk. Geotechnical monitoring has improved a lot over the past 20 years so a lot can be done to limit risk and protect workers.

Land user general comments

Comments from land users on a variety of issues are presented in no general order in this section.

- ***Project needs to have long term regional benefits.***
- ***Ensure water management plan allows future land use; fishing, travelling, hunting.***
- ***River displacement should happen before year one and should not be modified afterwards.***
- ***Studies should be done on fish migration.***
- ***Avoid cyanide and mercury use in the process plant.***
- ***Thickened tailings could be interesting if closure aspects can be respected, dust control and vegetation.***
- ***Make sur slopes are not to steep so that animals can pass through the site and get to their feeding zones.***
- ***Important to concentrate on the safety and health of workers and land users.***
- ***Avoid dam and construct stream so that it is permanent.***
- ***Cree training programs must be put in place. Cree training is essential to the project's acceptability. In the past project non natives and natives working together helped community relations.***
- ***Water quality and quantity very important for traditional activities and land users mental and physical health.***
- ***Importance of dust control; must be addressed so past impacts are not reproduced.***
- ***Tailings Storage facility should be restored first at closure.***
    - ***Bring overburden piles closer to tailings storage facility.***

Water management options

On November 15th, discussions were held in subgroups about three options as reported by Golder in their notes of the workshop (Appendix 2). The three options presented on a map and the pros and cons discussed for each option are presented below.

Option description

Option1 :

Construct dam on lake Amont to raise water level by 4 meters to allow stream to be diverted to the western limit of the water basin. Stream does not have to be modified during mine life.

Option 2:

Keep stream in its original state as far as possible. When enlarging pits J4 and 87 water from stream could be pumped into Lake A or into pits. Reconstruct stream at closure so that it flows naturally into Lake A (either through pits 87 and J4 or directly through newly constructed stream bed).

Option 3:

Create diversion channel that would bring water from lake amont into different watershed.

Troilus-Water management options

Table of the pros and cons discussed for the three river displacement options presented

Options	Pro's	Con's	Comments
#1	Separate contact water from clean water	Costly (10 km of excavation required)	Consider optimization of waste rock placement to reanalyze channel diversion option.
	Stream could be kept as is for closure.	Dyke construction on lake Amont (stability, fish barrier)	Consider backfilling of the pits for Fish habitat creation.
	Water management is simplified around southwest pit.	Risk that beavers dam river and water flows into valley low point.	
		Risk of water infiltration depending on ground permeability	
		Impact on fish in Lake Amont	
#2	Keeps original stream channel as is.	Does not separate contact water from clean water	Other infrastructure is moved so that water management is priority.
	No dam and reduces fish habitat destruction.	Changes stream location (path) over time.	
	Most of fish habitat is maintained during operation.	Lose TSF buttress. Reduced TSF stability.	
#3	Very little water management required.	Stream will need to be constructed to deal with mining effluents.	
	Reduced excavation costs.	Permitting process complicated and highly costly.	
	Less restrictions in regard to infrastructure placement.	Lake A loses its main water source.	
		2 watersheds will be impacted.	
		Water management still necessary during operation and closure.	
		Fresh water intake point?	

Summary of issues raised

Aspect	Subcategory	Issue raised
Environmental	Physical	Influence of tailings disposition option on dust control and vegetation.
		Slopes must allow safe passage for animals across mine site.
		Avoid dam construction on Lake Amont.
		Dyke/Dam stability is very important .
		Water quality improved quickly after closure, during operation water quality in Lake A was so-so.
	Biological	Fish migration between Lake A and Lake Amont.
		Impact of Bibou stream modification on fish and fish spawning
		Possibility of pits being fish habitat at closure.
		No differences noted in fish quality during past operation
	Proposed mitigations	Influence of residue type on vegetation will be looked at in impact study.
		Closure plan will be developed with land users to ensure that traditional activities can be practiced on site and that no risks are present for both animals and humans.
		Fish migration and potential habitats for compensation projects will be examined during impact study.
		Use waste rock dump as additional buttress to increase TSF stability.
Cultural	Characteristics of the territory	Future land use must be considered.
		Water is of great cultural importance.
		Importance of fishing as food source and traditional activity

	Impacts	River displacement will have cultural and environmental and impacts.
	Proposed mitigations	Future land use including access to natural resources such as drinking water, are examined in impact study.
		River displacement is a very important part of the project; all impacts will be taken into consideration including cultural and environmental. Protective and mitigation measures will be put in place to reduce impacts as much as possible.
Social	Training	Cree training programs are essential to the project, the past project had very good success with Cree training programs.
	Relations	Emphasis on transparency and honesty throughout mine development, construction and operation.
	Proposed mitigations	A lot has been done over the past year to improve community relations (HR, regular Mistissini visits, planned and informal meetings, open communication line). Through feedback and continued communication, we believe we are heading in the right direction, but we will continue improve through initiatives like this workshop.
Safety and health	Impacts	Avoid using cyanide in the process.
		Dam security and Dam collapse
	Proposed mitigations	Cyanide use is planned in last gold concentration phase and will be used in a closed circuit.
		A complete monitoring and emergency measures plan will be elaborated to ensure dam integrity and proper emergency measures are applied.

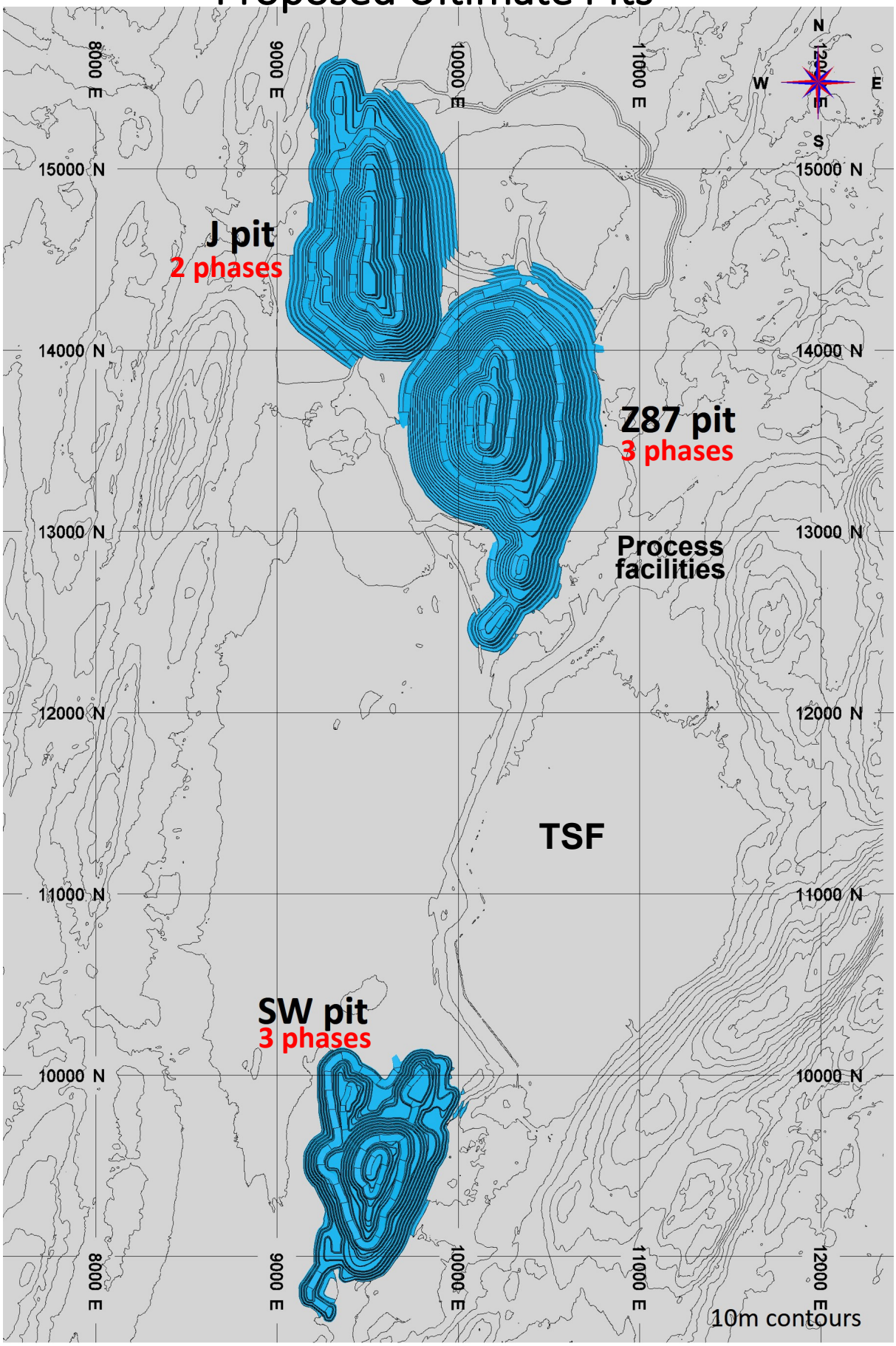
Appendix 1 (Workshop presentations)

Summary of workshop held with land users and the Troilus project development team and engineering consultants on the water management plan held on November 14th and 15th 2022.

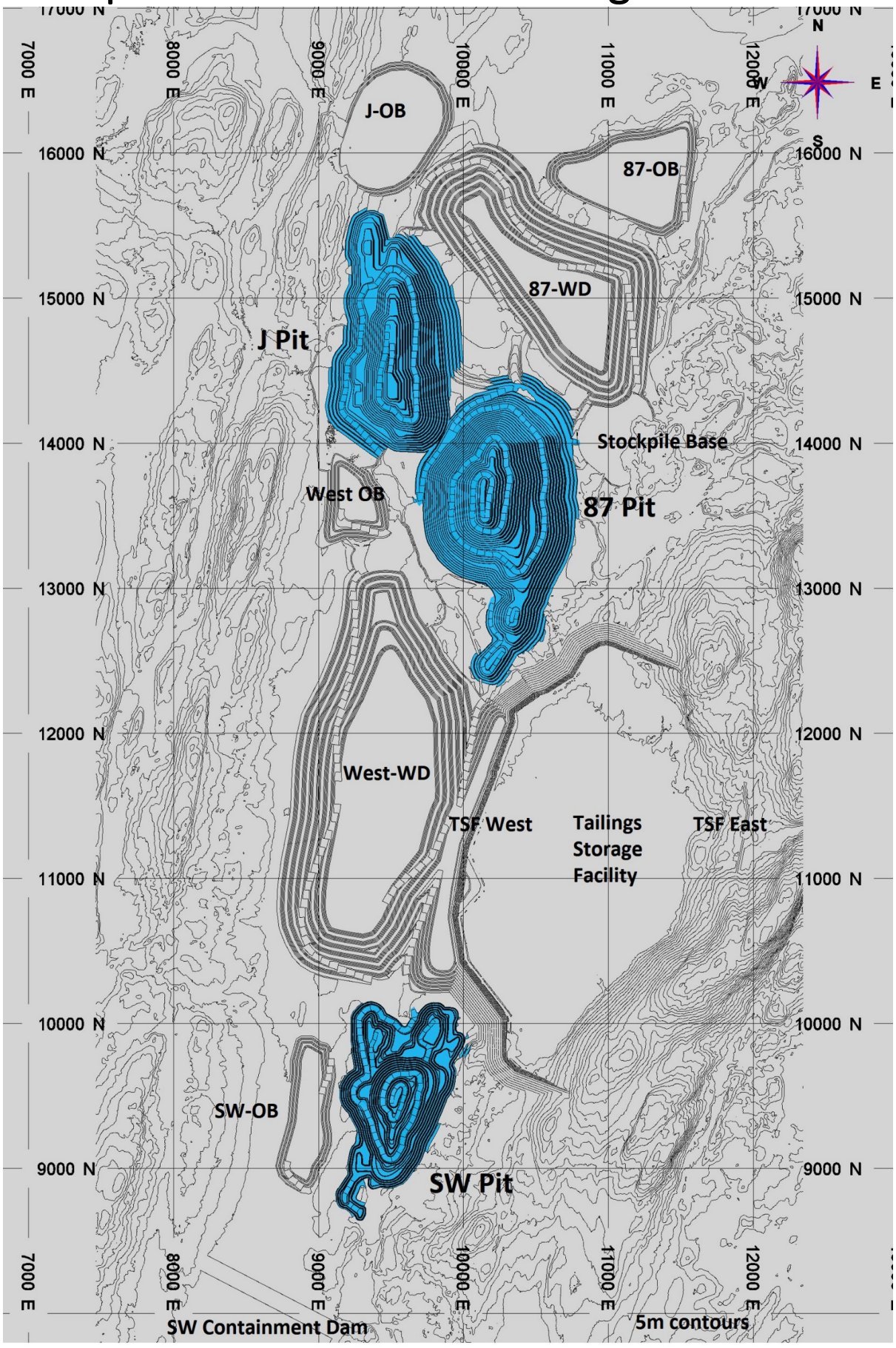
Mining Sequence

Nov 14, 2022

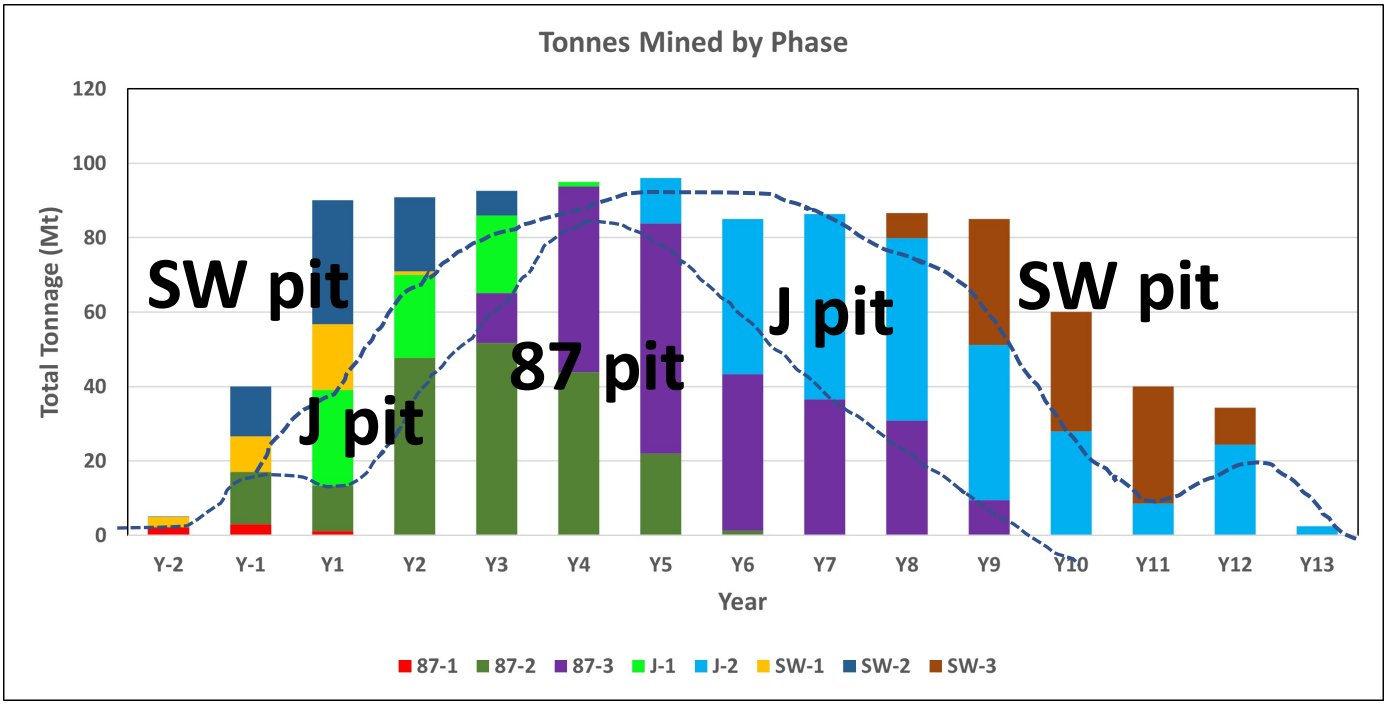
Proposed Ultimate Pits

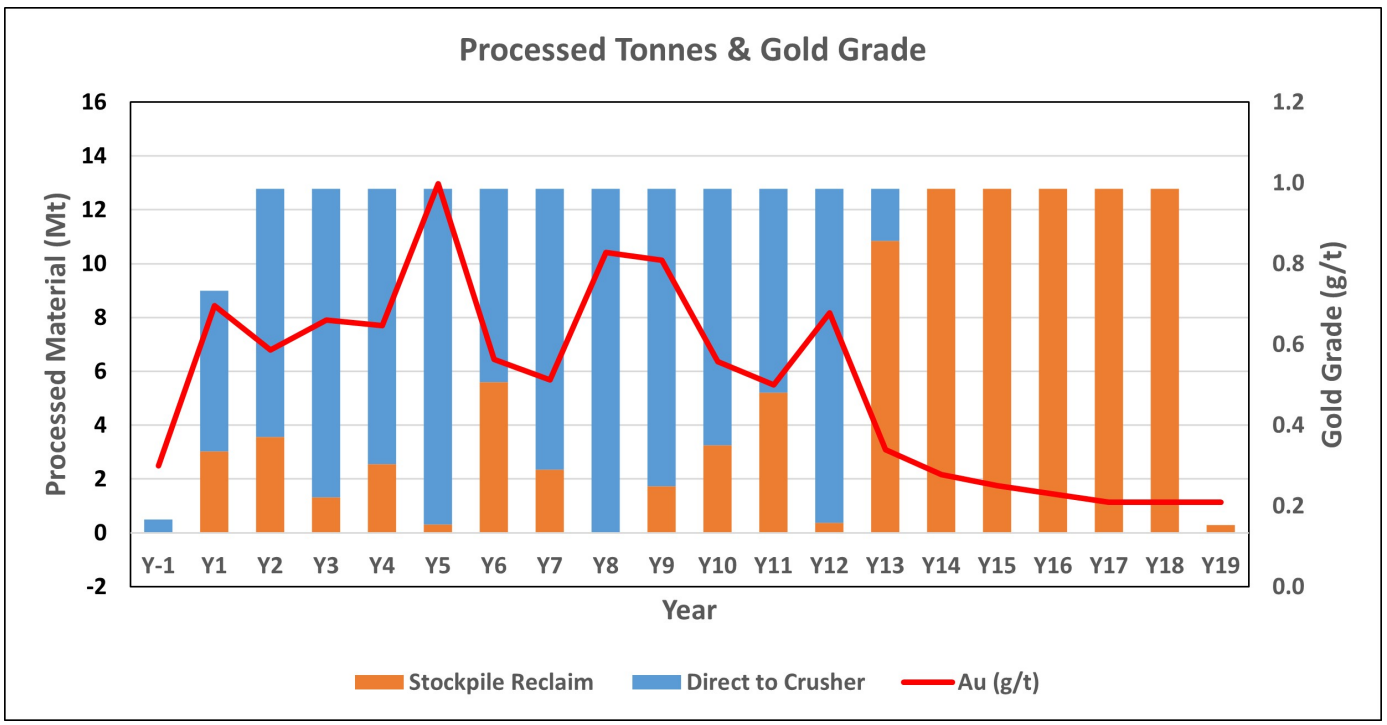


Proposed Pit and Waste Storage Facilities



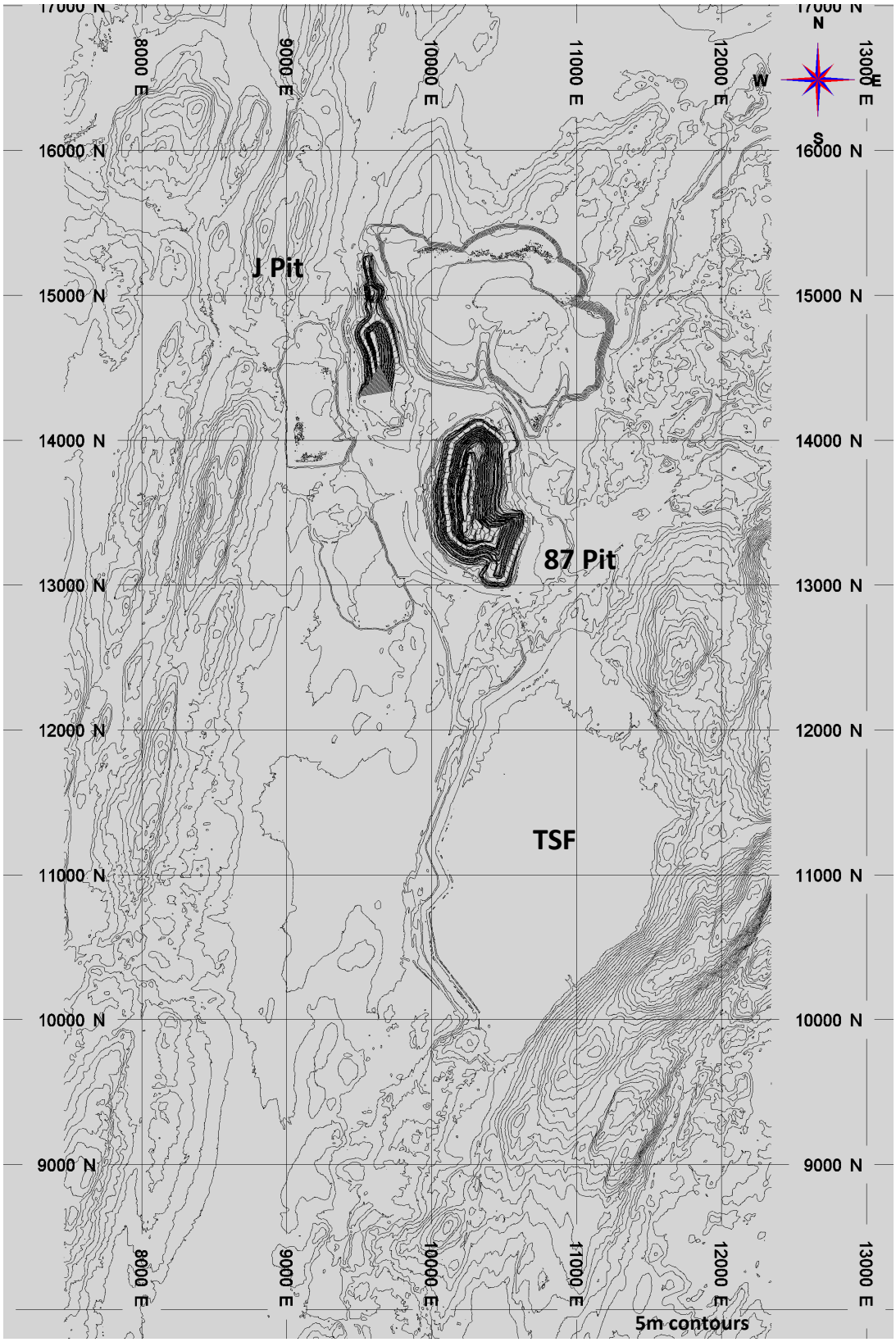
Mined and Process Tonnages



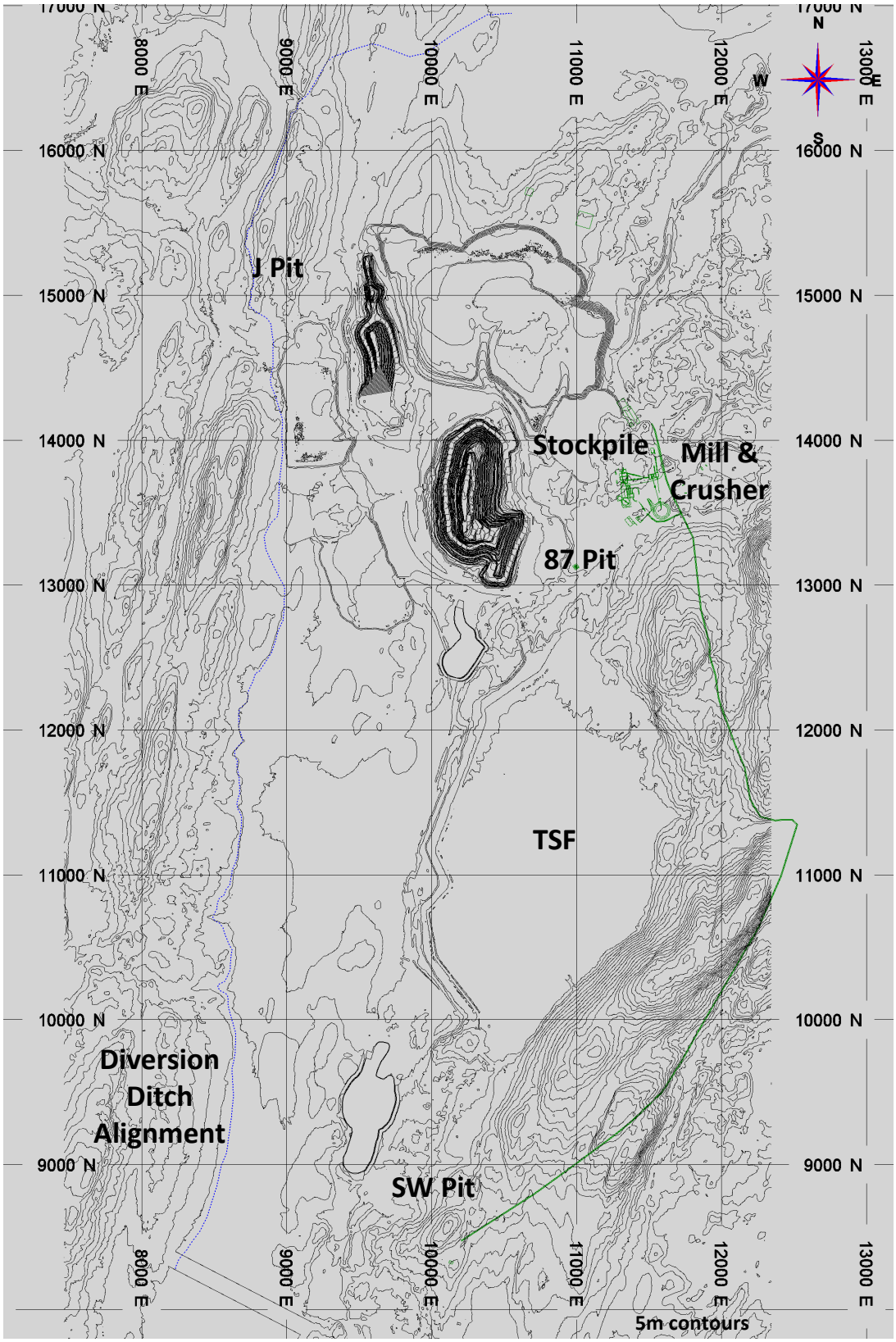


Troilus Project
Annual Progress Maps

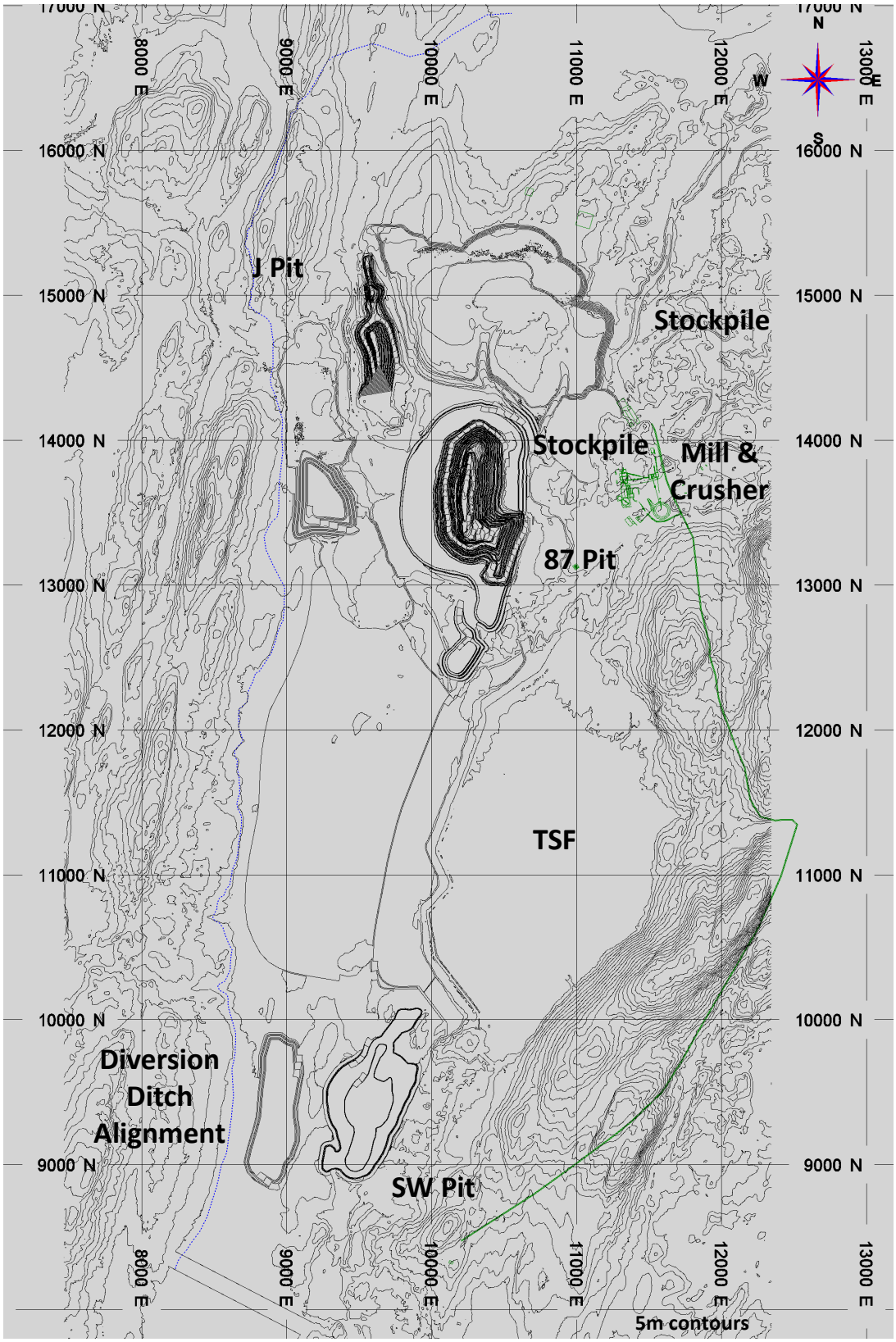
before mining



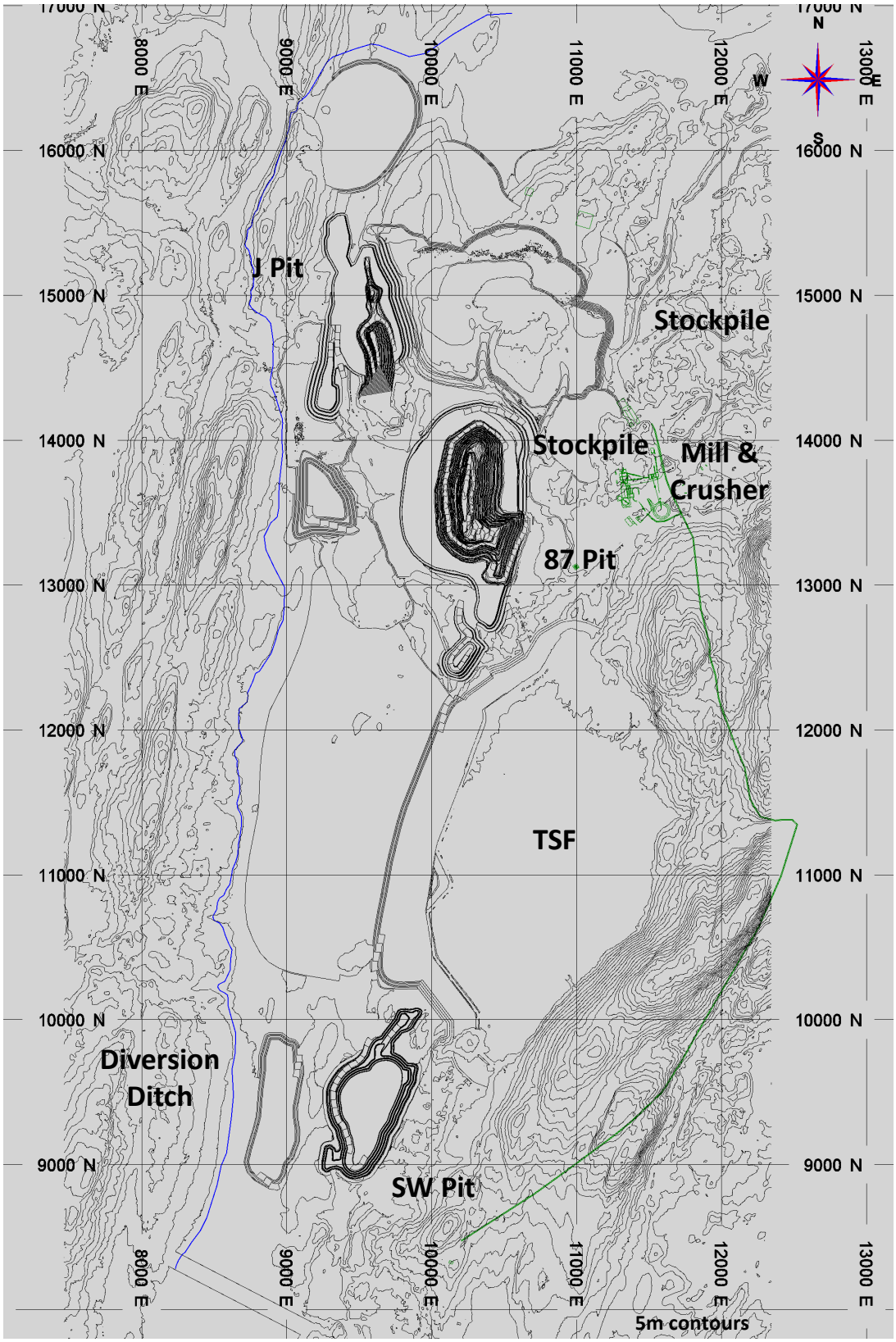
Year -2


J Pit
Stockpile
Mill &
Crusher
87 Pit
TSF
Diversion
Ditch
Alignment
SW Pit
5m contours
N
S
W
E
17000 N
16000 N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E

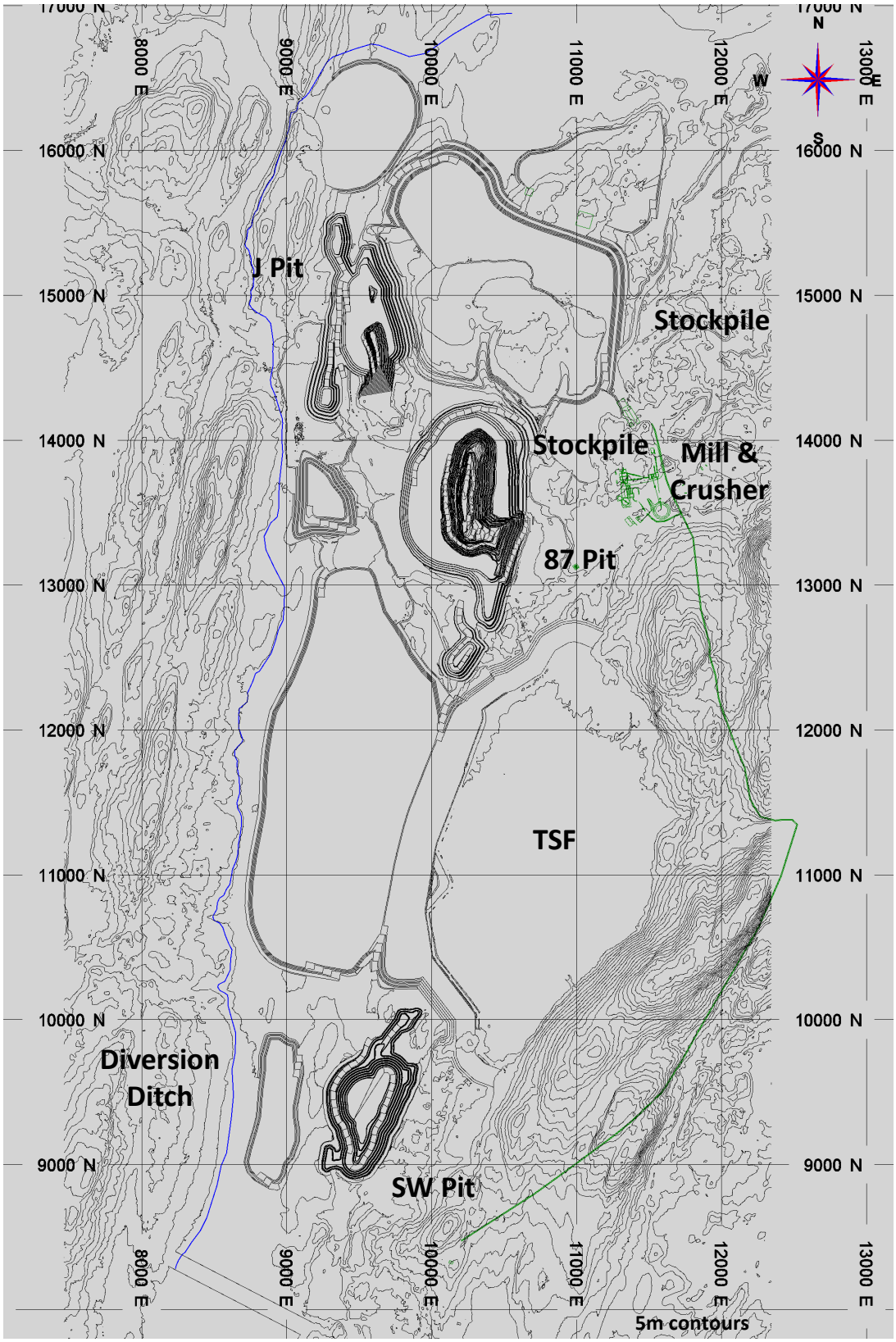
Year -1


17000 N
16000 N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E
N
S
W
E
J Pit
Stockpile
Stockpile
Mill &
Crusher
87 Pit
TSF
Diversion
Ditch
Alignment
SW Pit
5m contours

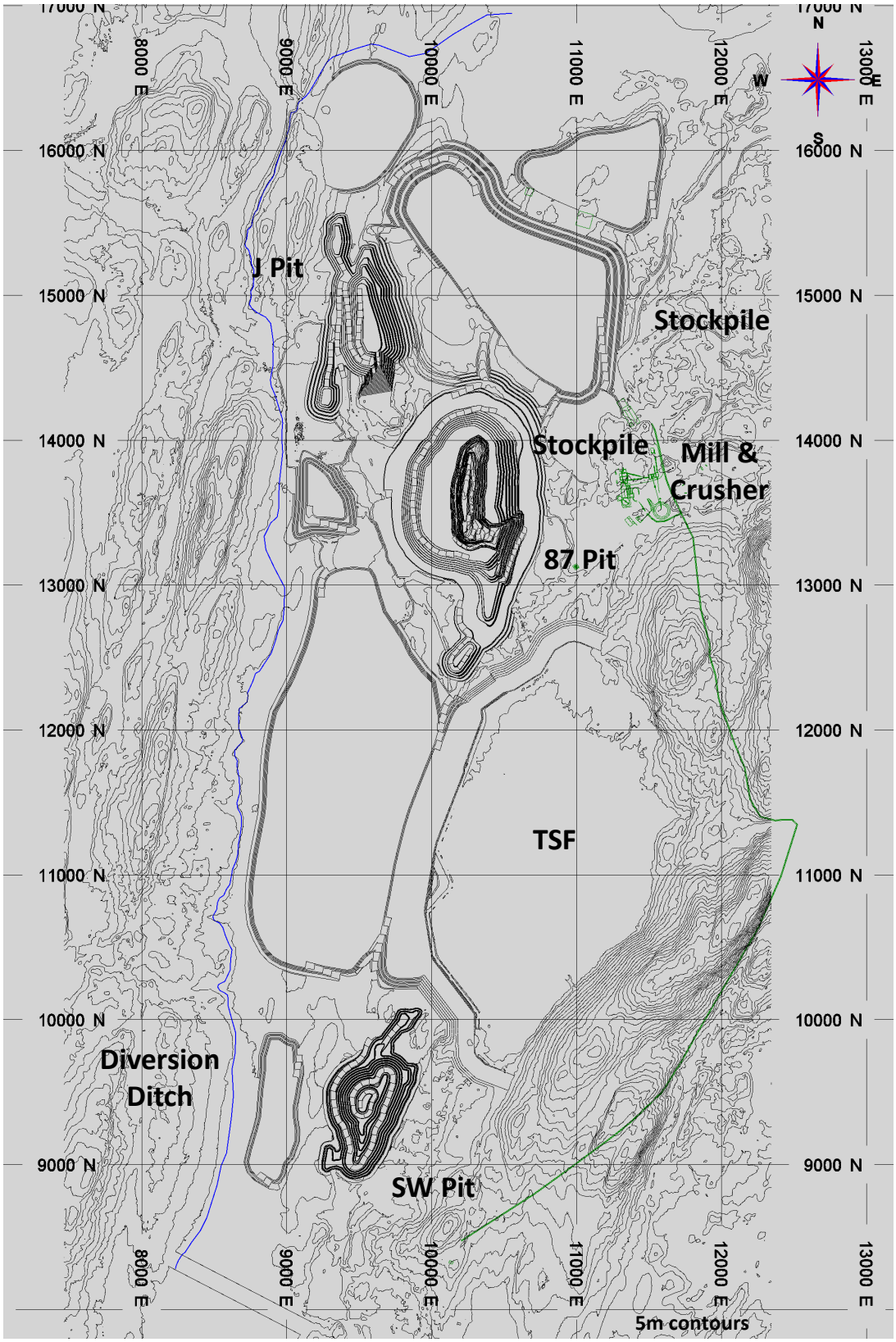
Year 1
J pit starts



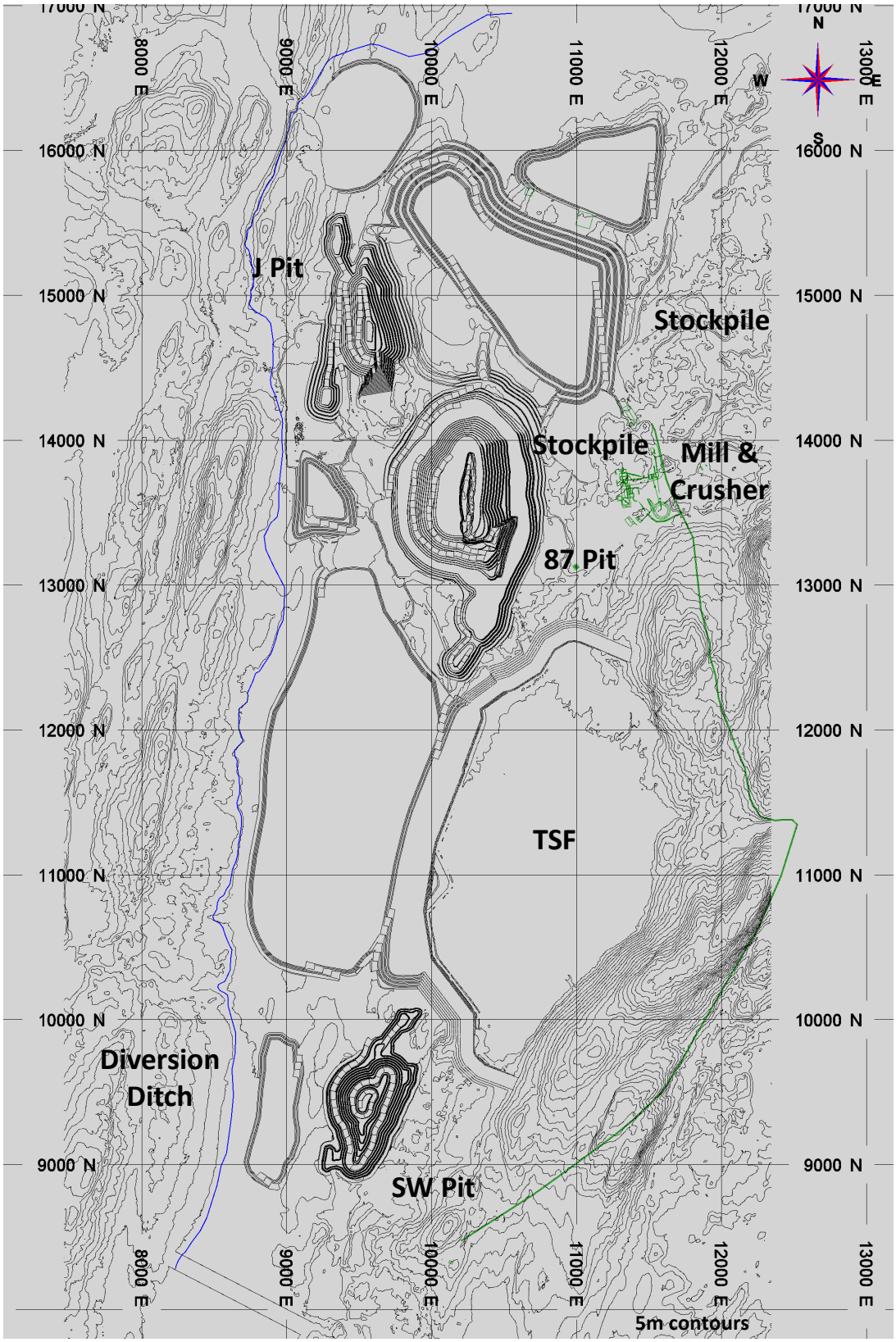
Year 2


17000 N
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E
N
W
E
S
16000 N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
J Pit
Stockpile
Stockpile
Mill &
Crusher
87 Pit
TSF
Diversion
Ditch
SW Pit
5m contours

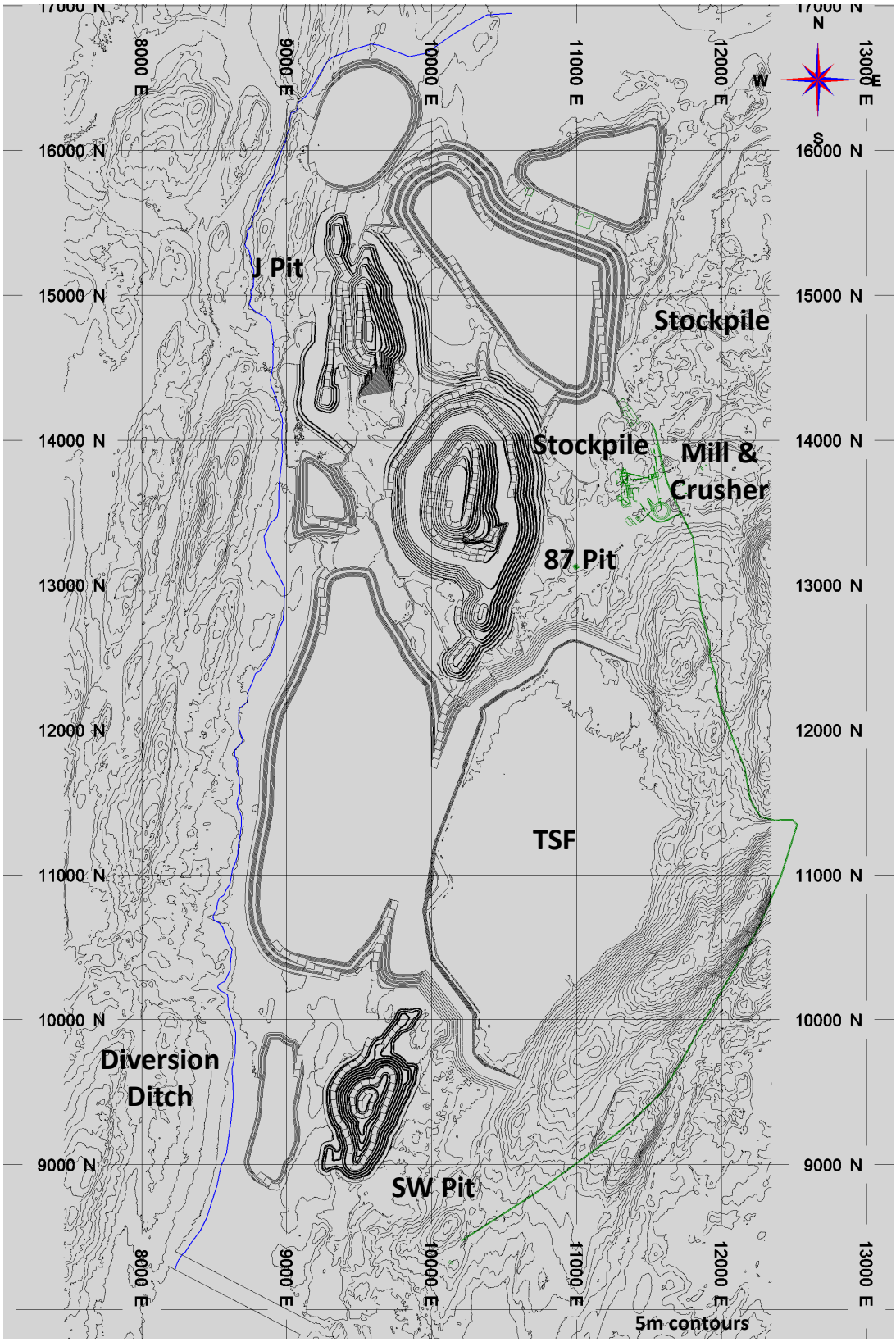
Year 3


17000 N
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E
N
W
E
S
16000 N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
J Pit
Stockpile
Stockpile
Mill &
Crusher
87 Pit
TSF
Diversion
Ditch
SW Pit
5m contours

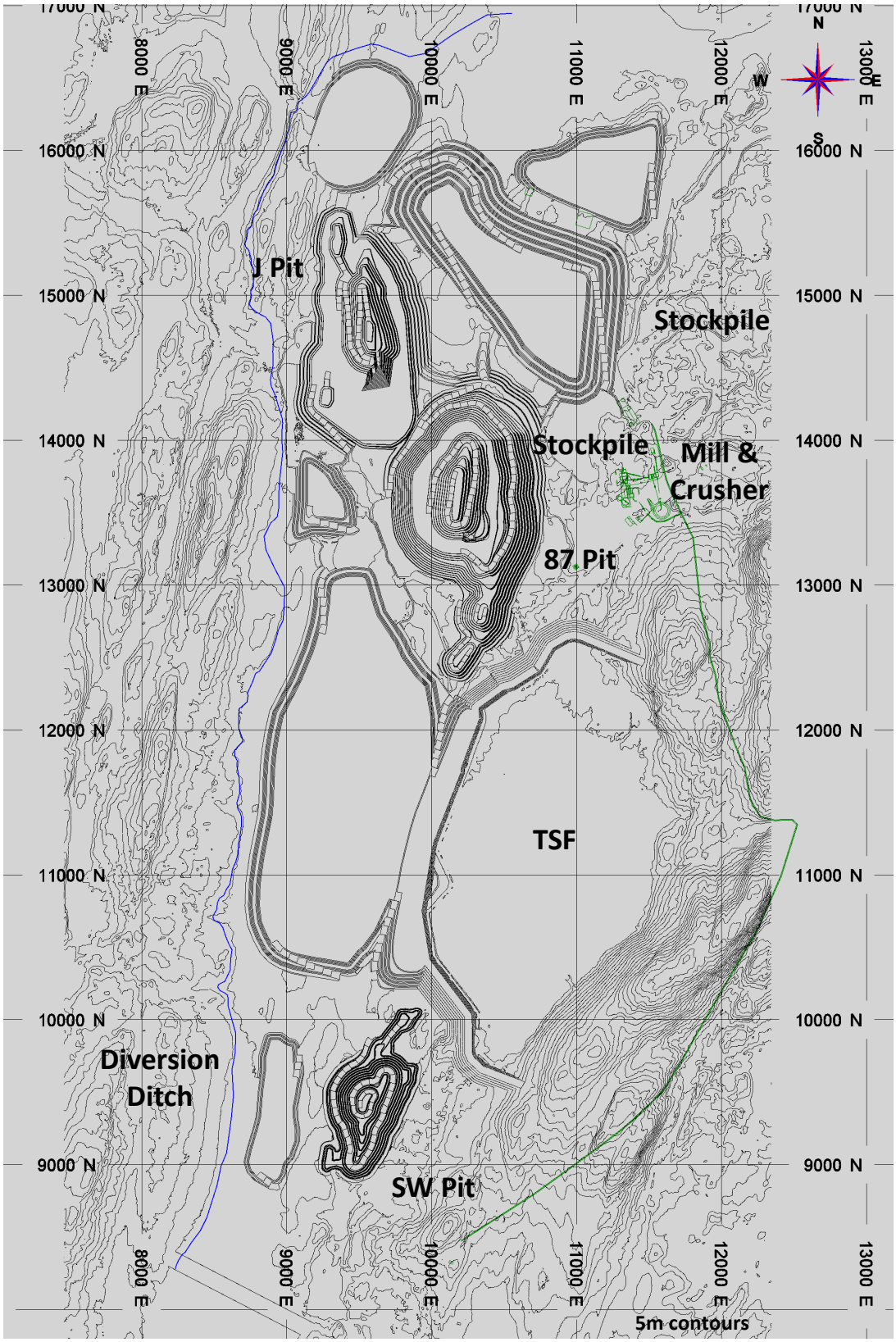
Year 4


J Pit
Stockpile
Stockpile
Mill &
Crusher
87 Pit
TSF
Diversion
Ditch
SW Pit
5m contours
N
S
W
E
17000 N
16000 N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E

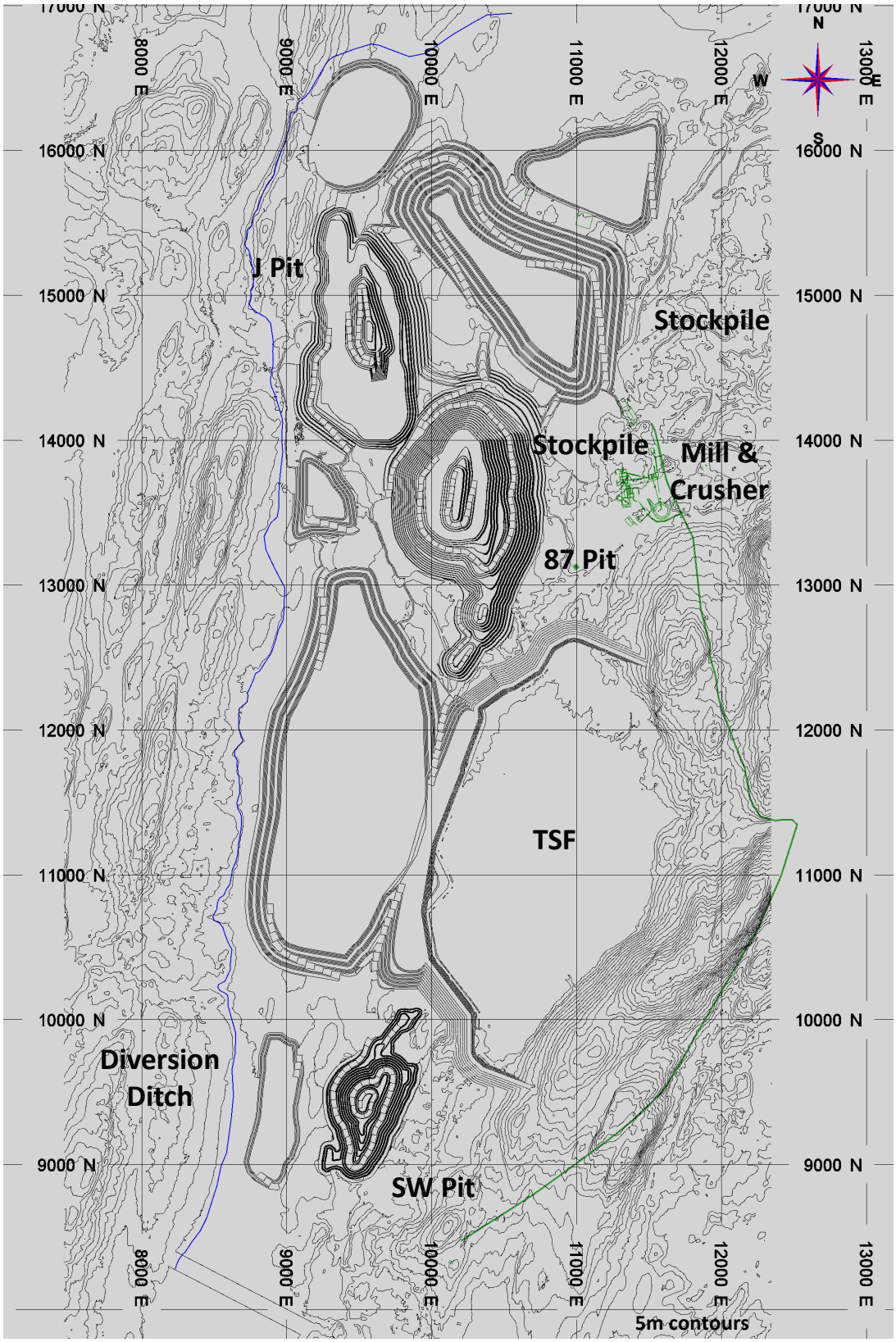
Year 5


17000 N
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E
N
W
E
S
16000 N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
J Pit
Stockpile
Stockpile
Mill &
Crusher
87 Pit
TSF
Diversion
Ditch
SW Pit
5m contours

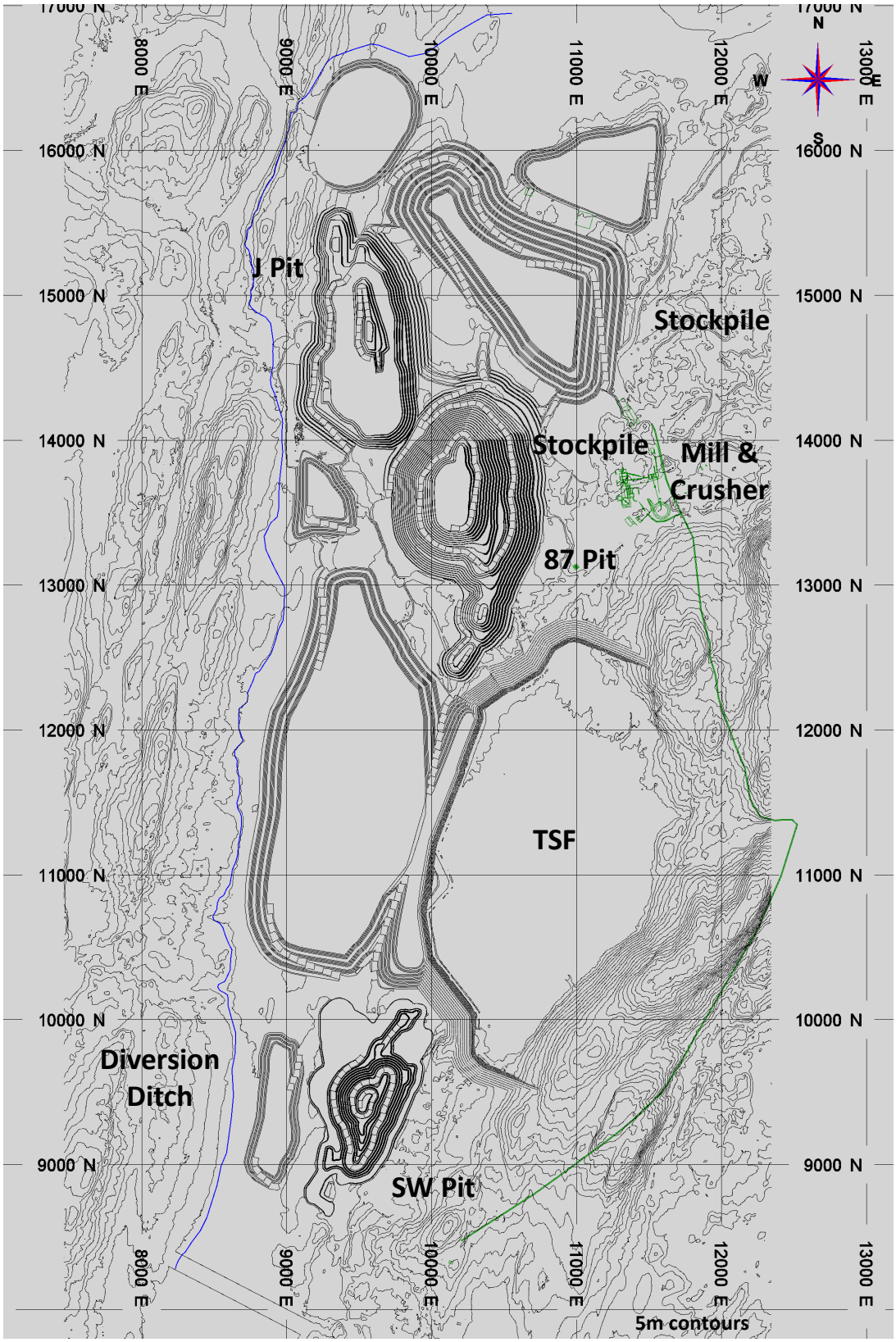
Year 6


J Pit
Stockpile
Stockpile
Mill &
Crusher
87 Pit
TSF
Diversion
Ditch
SW Pit
5m contours
N
S
W
E
17000 N
16000 N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E

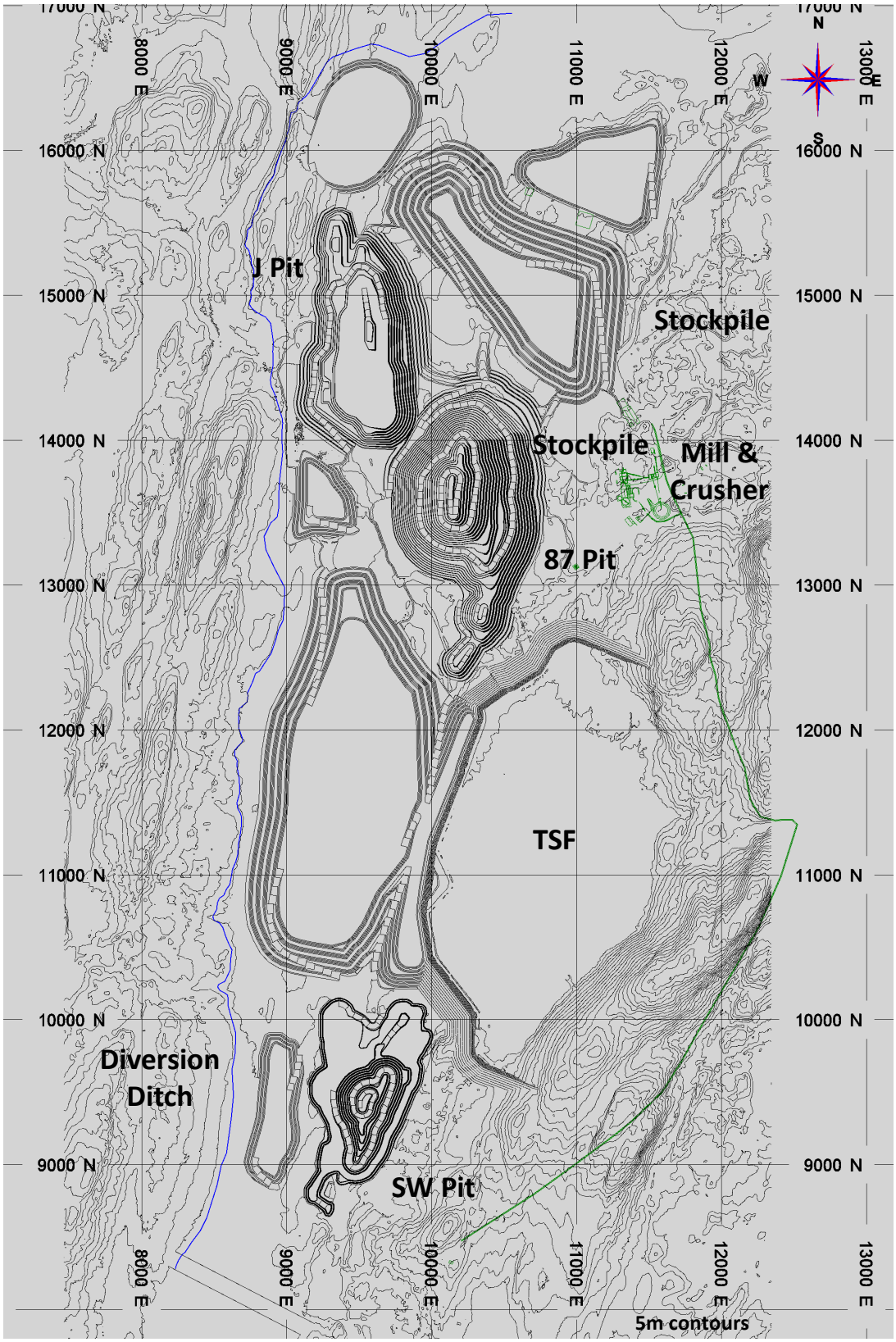
Year 7


J Pit
Stockpile
Stockpile
Mill &
Crusher
87 Pit
TSF
Diversion
Ditch
SW Pit
5m contours
17000 N
16000 N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E
N
S
W
E

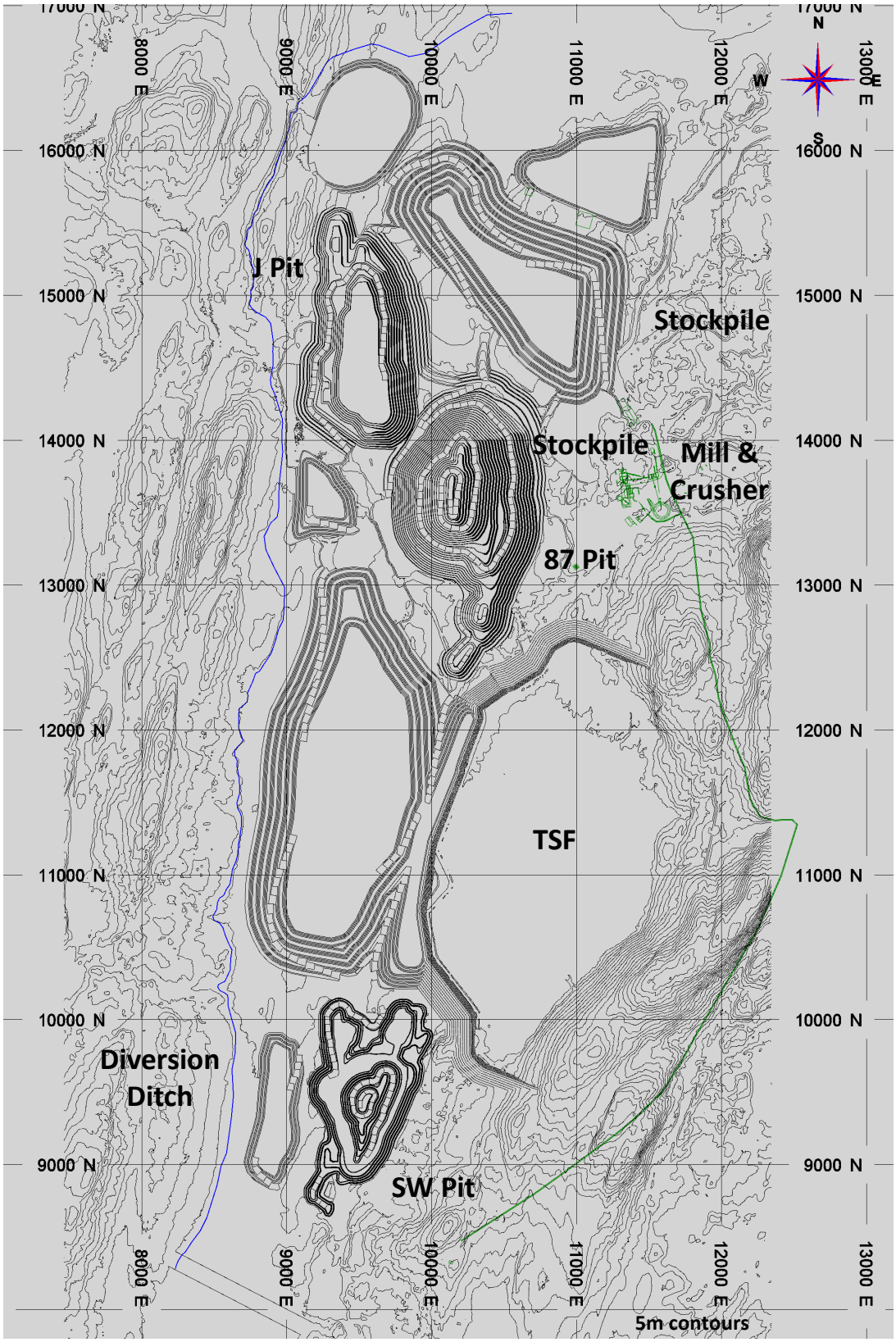
Year 8
all ultimate pits active



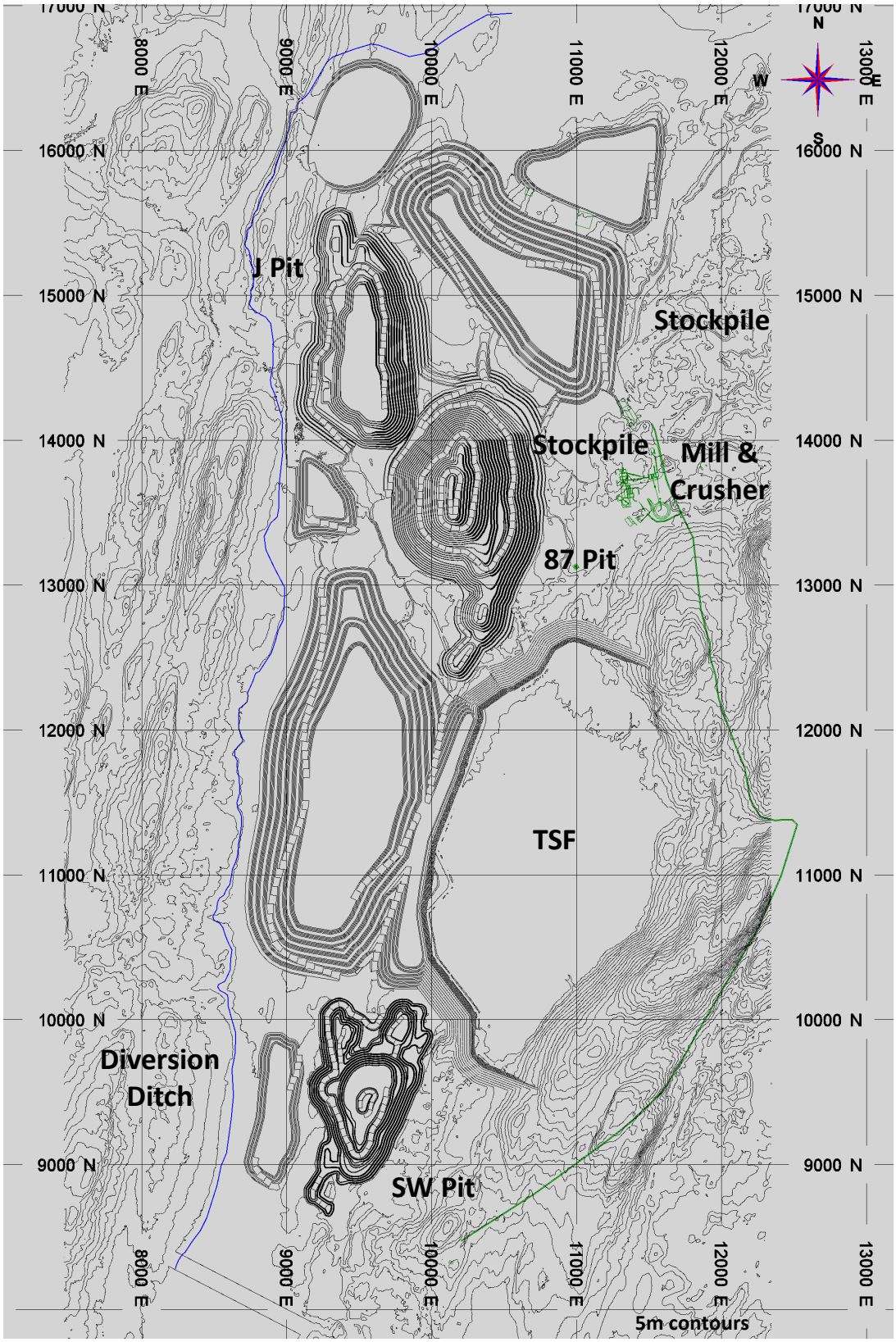
Year 9
87 pit complete



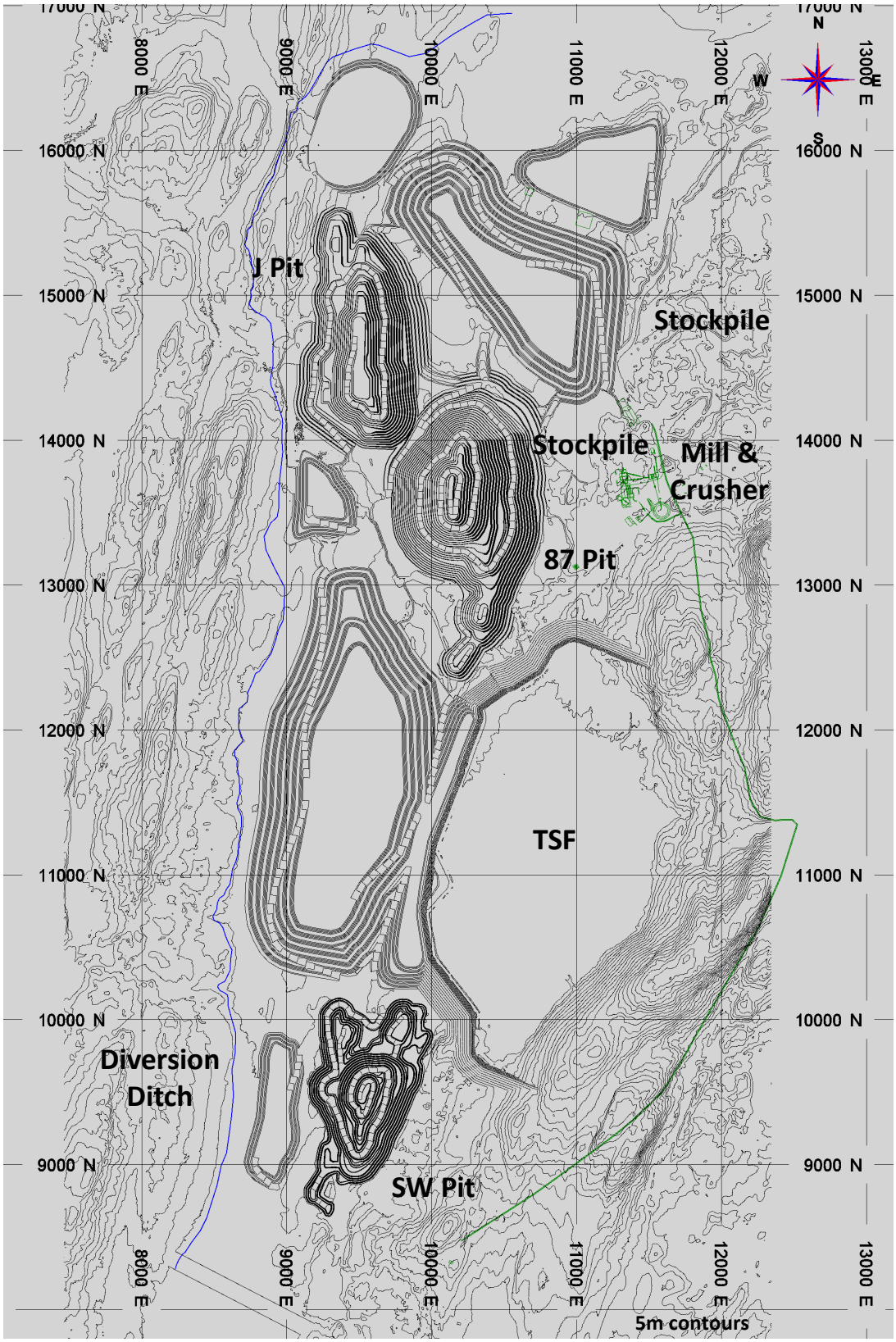
Year 10


J Pit
Stockpile
Stockpile
Mill &
Crusher
87 Pit
TSF
Diversion
Ditch
SW Pit
5m contours
N
S
W
E
17000 N
16000 N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E

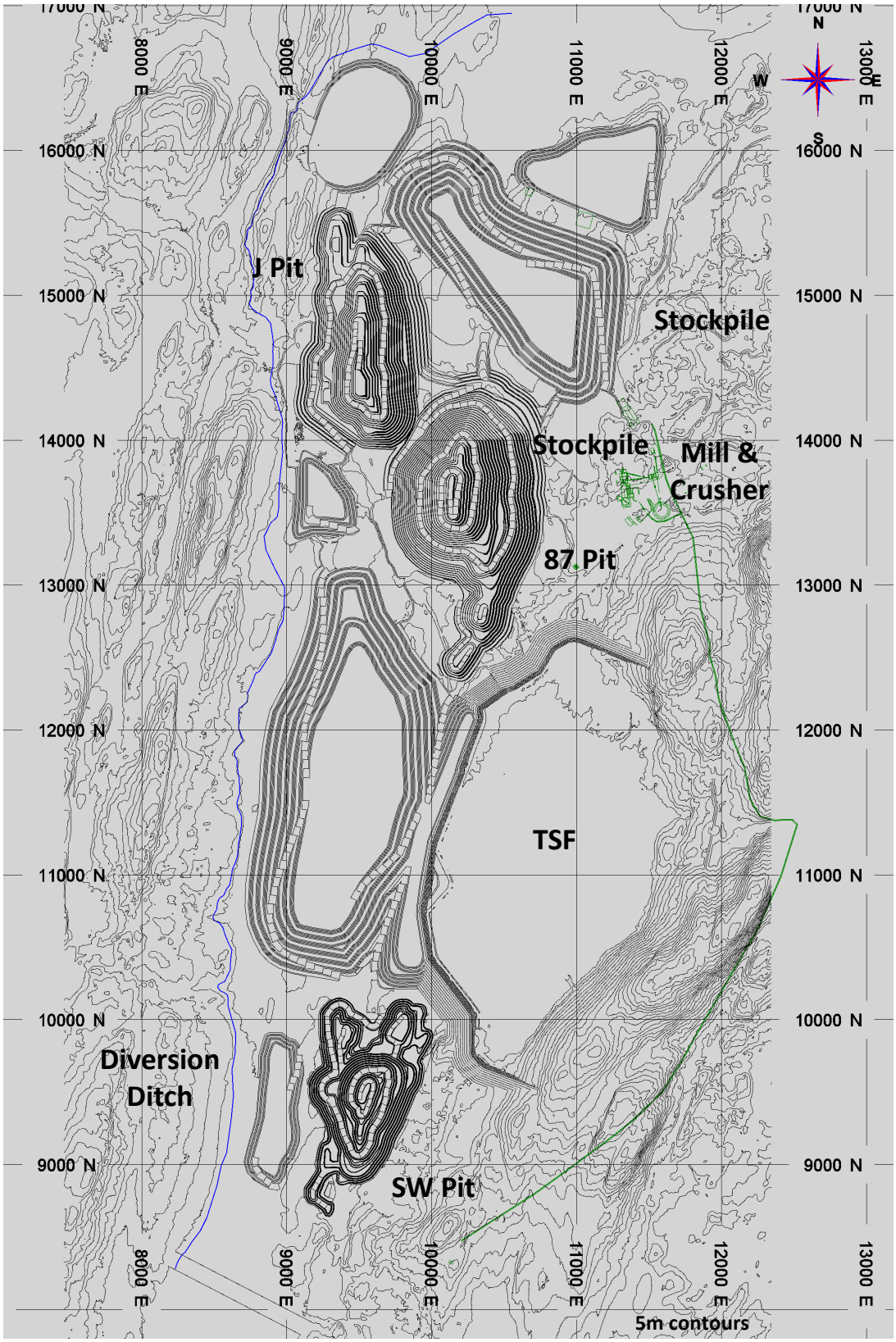
Year 11


17000 N
8000 E
9000 E
10000 E
11000 E
12000 E
13000 E
N
W
E
S
16000 N
15000 N
14000 N
13000 N
12000 N
11000 N
10000 N
9000 N
J Pit
Stockpile
Stockpile
Mill &
Crusher
87 Pit
TSF
Diversion
Ditch
SW Pit
5m contours

Year 12
SW pit complete

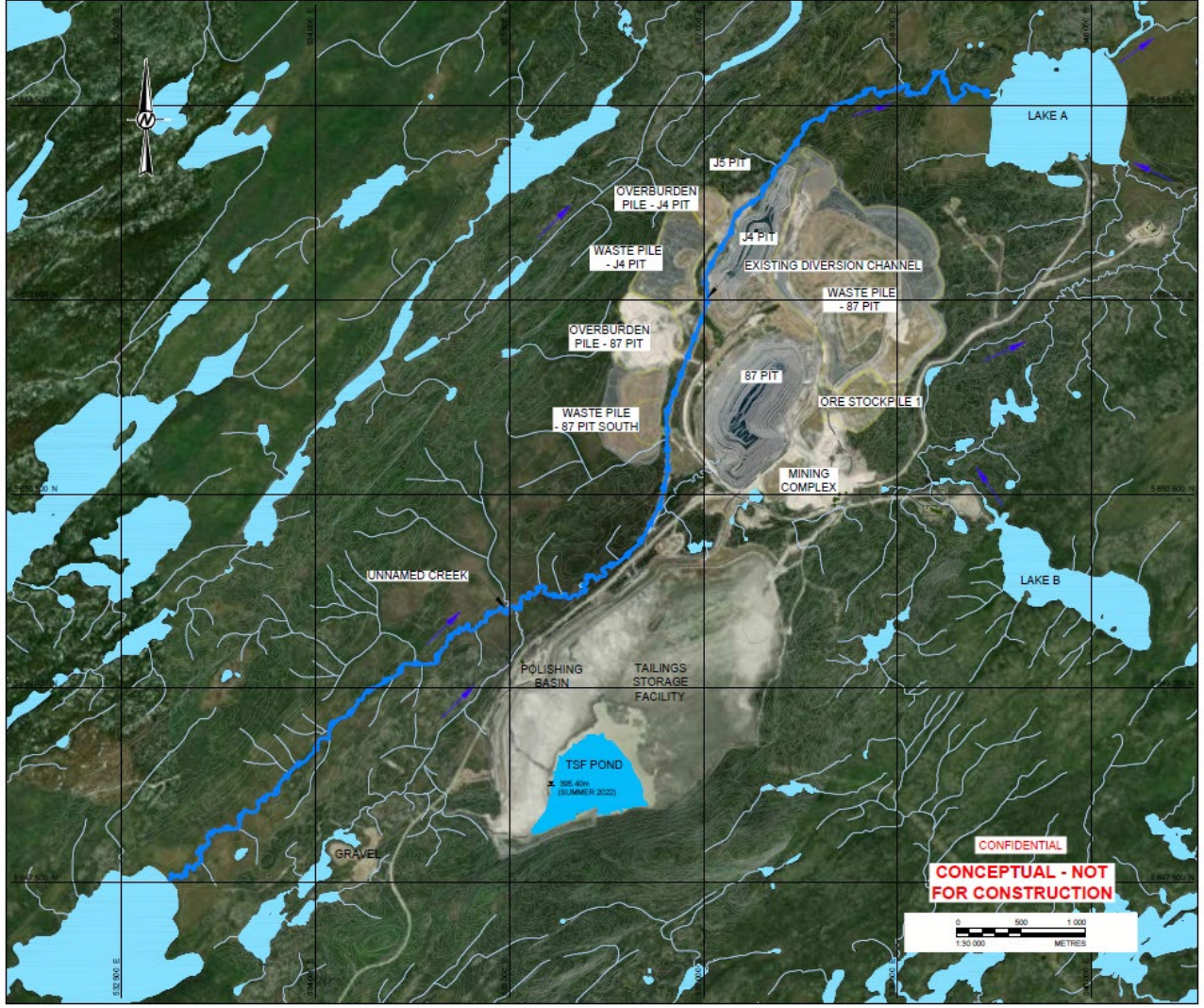


Year 13
J pit complete



GOLDER

Troilus Project – Water Management Plan Option Analysis



Discussion Support

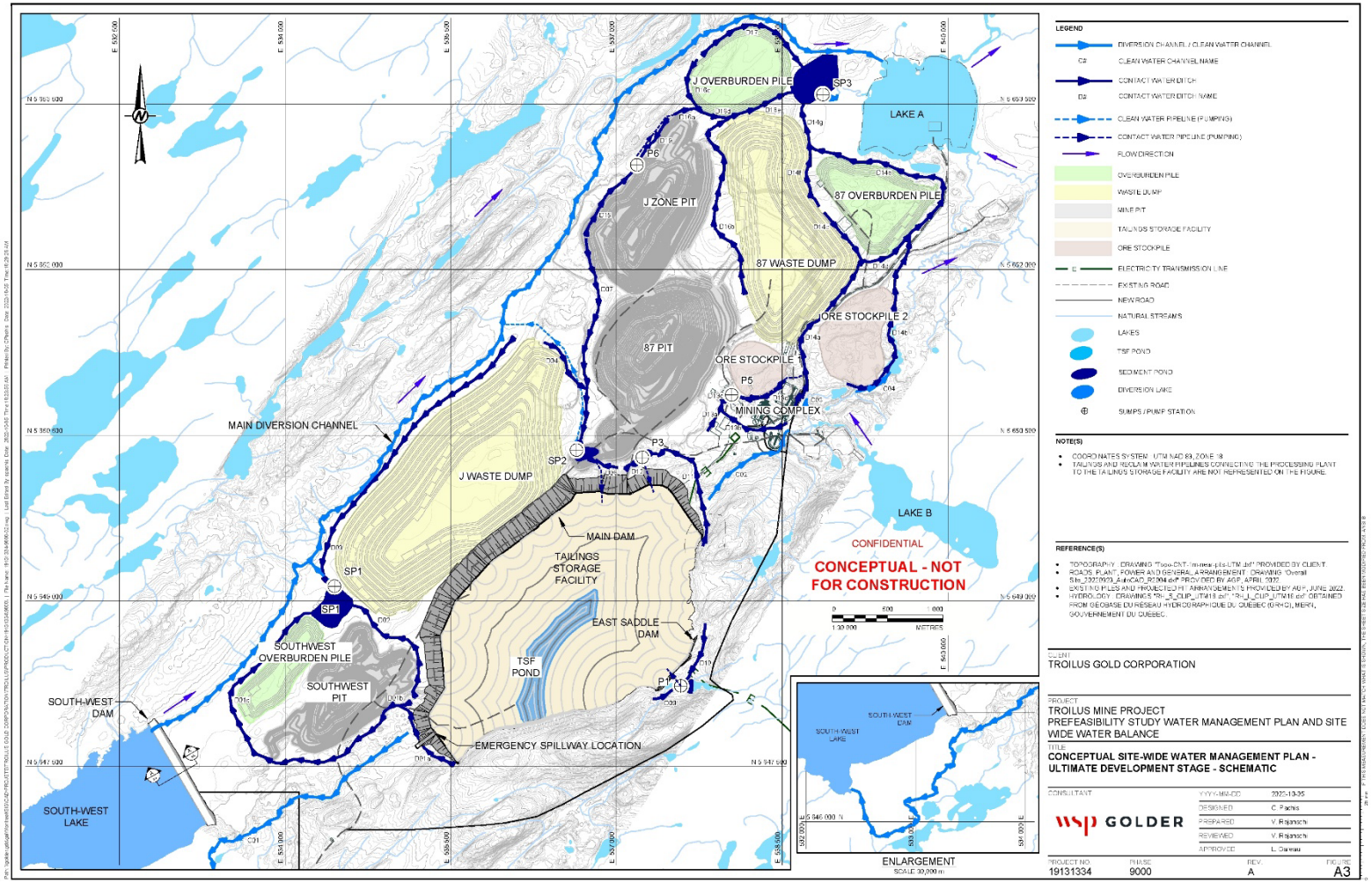
033-191213134-9000-Rev0

November 2022

Current Water Management Plan

Overview

Maximum Development Stage

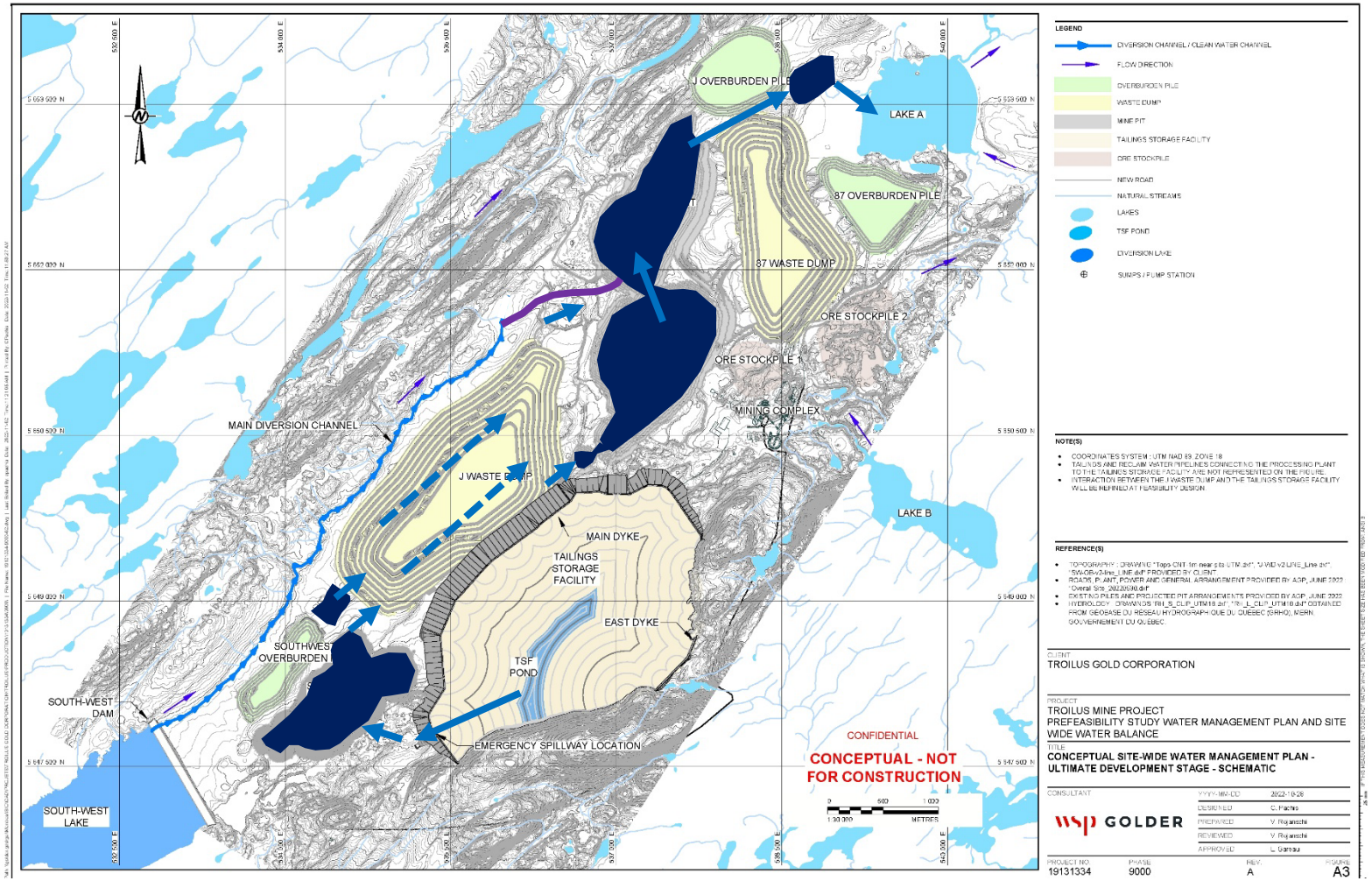


Current Water Management Plan

Overview

Closure Drainage Plan

- The need for the Main Diversion Channel and the SW Dam at closure could be eliminated if a corridor is maintained between the TSF and the J Waste Dump!



Current Water Management Plan

Critique

Strengths
- plan respects follows regulatory guidance (D019, ECCC) in that it maximises diversion of natural runoff around the site, while avoiding watershed transfer - maintains from Year -1 to the end of active closure a large area available for the site development with minimal water management constraints - mine plan changes do not require large changes to water management plan - for most of the site, there are no natural water courses immediately downstream of waste facilities ⇒ decreased risk to the environment and easier operation - with the exception of the Main Diversion channel, closure drainage plan is simple and not costly

Current Water Management Plan

Critique

Weaknesses	Category / Period	Control / Mitigation	Residual	Comment
Important CAPEX for the SW Dam and the Main Diversion Channel	Financial / Construction	-	Important CAPEX	-
SW Dam upstream of the site poses a safety risk	Safety, Financial, Environmental / Construction to Closure	Very robust design (70 m wide crest)	No credible catastrophic failure mode (no breaching). A leaky dam failure (high seepage through the dam) is credible at closure.	The dam would not qualify as a closure landform because of the remaining failure mode. Perpetual inspection and maintenance likely required
SW Dam impounds upstream lakes	Environmental / Construction to Closure	-	Environmental impact	Impoundment could be combined with fish habitat enhancement measures

Current Water Management Plan

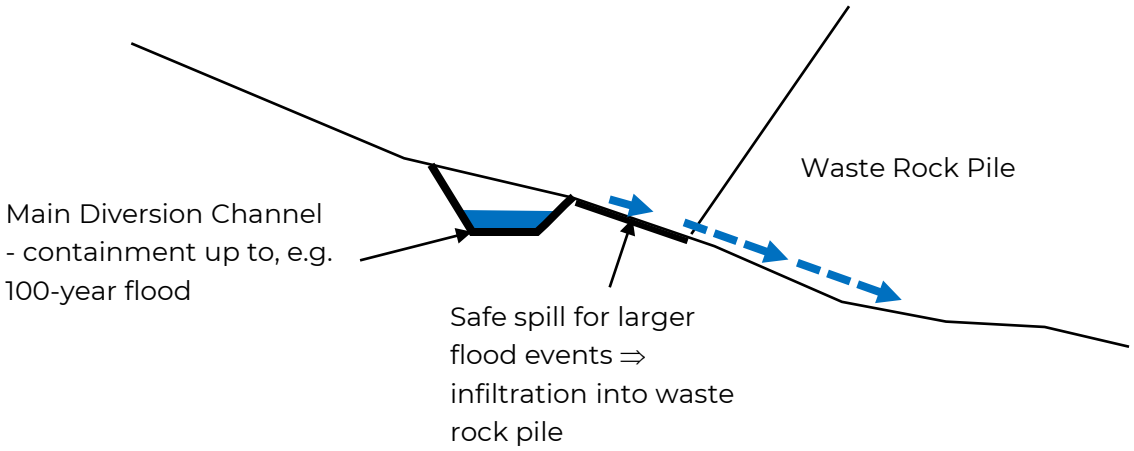
Critique

Weaknesses	Category / Period	Control / Mitigation	Residual	Comment
Unnamed Creek distruction	Environment / Construction to Closure	-	Fish habitat destruction requiring compensation	-
Government might require Main Diversion Channel to be built as fish habitat from the beginning	Financial	-	Financial	-

Current Water Management Plan

Critique

Weaknesses	Category / Period	Control / Mitigation	Residual	Comment
Main Diversion Channel at closure is complex – expensive to construct (habitat creation), potential need for perpetual maintenance	Financial, Environmental / Closure	Lower channel to increase freeboard. Create “spillways” to allow damage-free channel overtopping into the valley	Need for regular inspections and, potentially, maintenance cannot be excluded. E.g. beaver dam blockages.	Perpetual inspection and maintenance likely required



Current Water Management Plan

Critique

Weaknesses	Category / Period	Control / Mitigation	Residual	Comment
Closure plan involves allowing SW Pit Lake overflow to seep through waste rock pile	Environmental / Closure	-	Lack of fish habitat continuity for the SW Pit Lake	Habitat upstream of SW Dam is connected to downstream lakes via the Main Diversion Channel

Alternative Water Management Plans

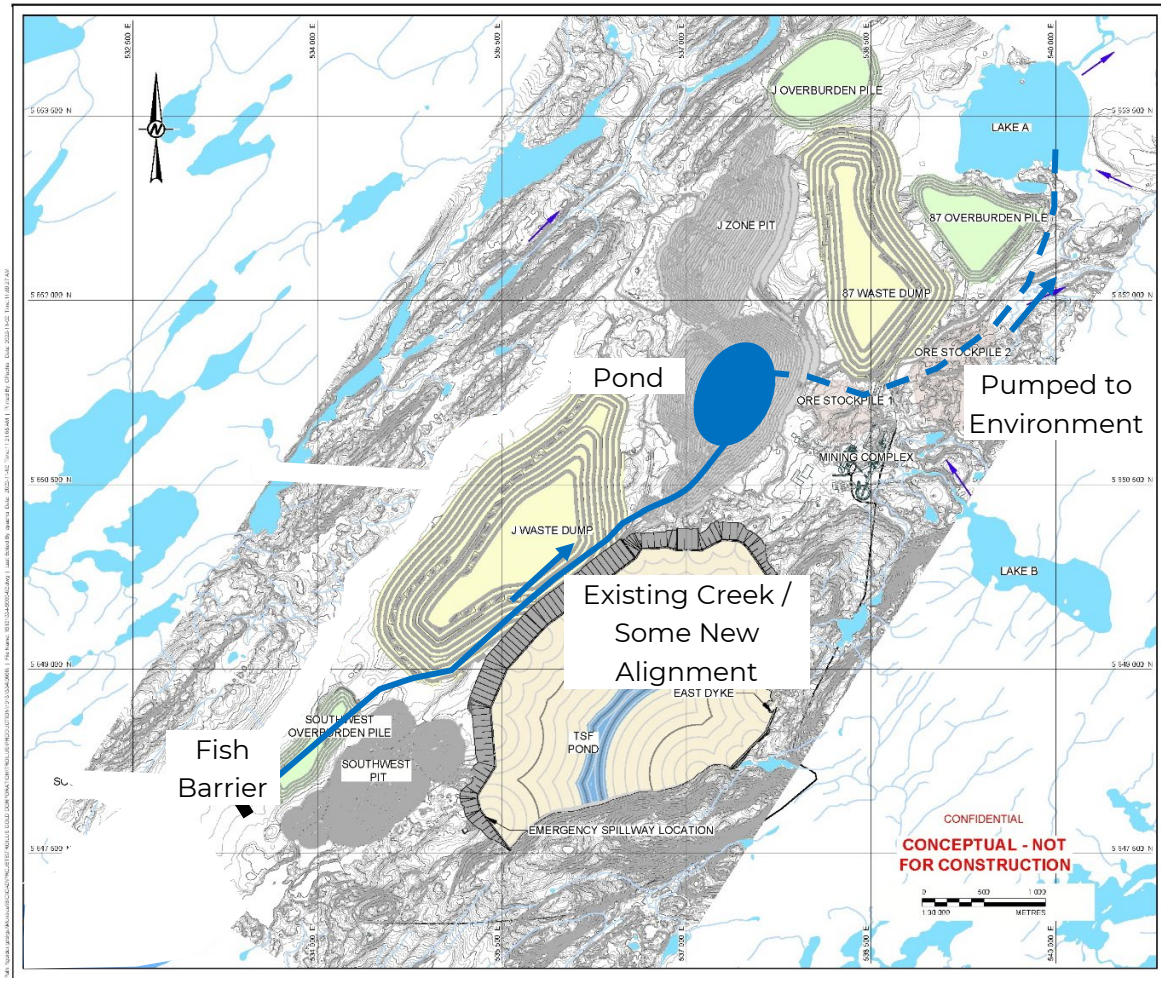
Alternative Identification

1. Maintain Unnamed Creek through-out the operational period and divert it around the pits
    - Not feasible due to high topography both south and north of 87 and J pits

Alternative Water Management Plans

Alternative Identification

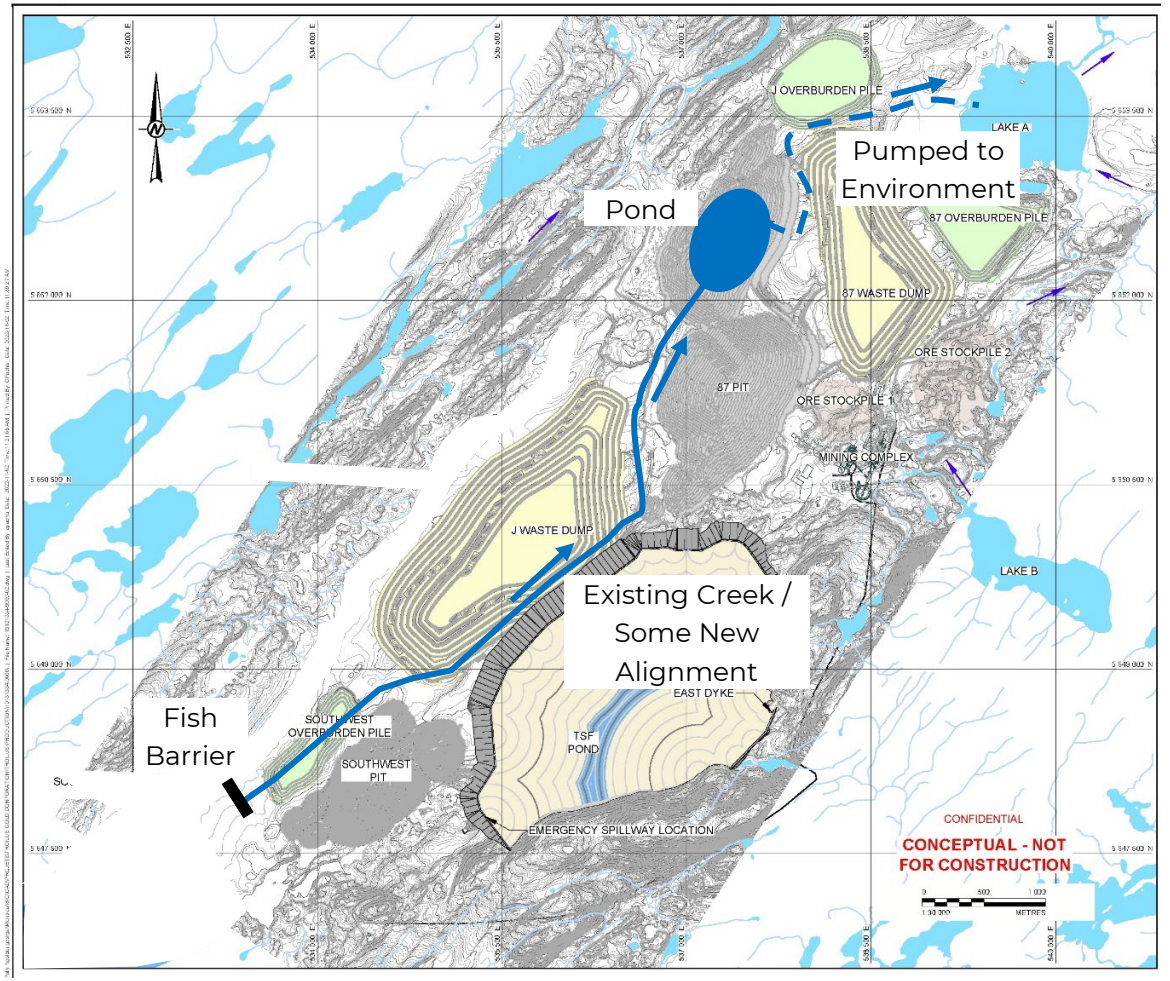
2. Maintain Unnamed Creek through-out the operational period and use one of the 87 and J pits as a sump. Alternate the mining of the two pits.



Alternative Water Management Plans

Alternative Identification

2. Maintain Unnamed Creek through-out the operational period and use one of the 87 and J pits as a sump. Alternate the mining of the two pits.



Alternative Water Management Plans

Alternative Identification

2. Maintain Unnamed Creek through-out the operational period and use one of the 87 and J pits as a sump. Alternate the mining of the two pits.

- Involves eliminating the Unnamed Creek fish habitat within the mine development area.

Alternative Water Management Plans

Alternative Identification

2. Maintain Unnamed Creek through-out the operational period and use one of the 87 and J pits as a sump. Alternate the mining of the two pits.

- Technically (water management alone) feasible based on initial assessments.

- 31 km^2 reporting the pits
- Approx. 21 M m^3/year runoff under average climate conditions.
- Approx. 1 m^3/s, 5 MW pumping station operating 66% of the time under average climate conditions,
- Approx. 10 M m^3 as 1:100 year volume in pit. Current J and 87 pits storage capacity is larger.

Alternative Water Management Plans

Alternative 2 - Critique

2. Maintain Unnamed Creek through-out the operational period and use one of the 87 and J pits as a sump. Alternate the mining of the two pits. Maintain the natural water course as a fish habitat all the way until the two pits.

Strengths
- It eliminates the SW Dam and the Main Diversion Channel. Lower CAPEX. - No dam and diversion channel to maintain at closure

Alternative Water Management Plans

Alternative 2 - Critique

2. Maintain Unnamed Creek through-out the operational period and use one of the 87 and J pits as a sump. Alternate the mining of the two pits. Maintain the natural water course as a fish habitat all the way until the two pits.

Weakness

- Mixing runoff from ~20 km^2 natural watershed with contact water is not consistent with typical regulatory guidelines and philosophy
- Unnamed Creek fish habitat is still destroyed.
- Vulnerable to unfavorable contact water quality.
- Water management constrains the mine plan.

2.1.5 Dilution, mélange et ségrégation des eaux

Aucune dilution des eaux usées minières n'est permise. Sans limiter le sens de ce qui précède, une stratégie de gestion des résidus miniers acidogènes par ennoiement, autorisée par le ministère du Développement durable, de l'Environnement et des Parcs, peut constituer une exception à cette exigence.

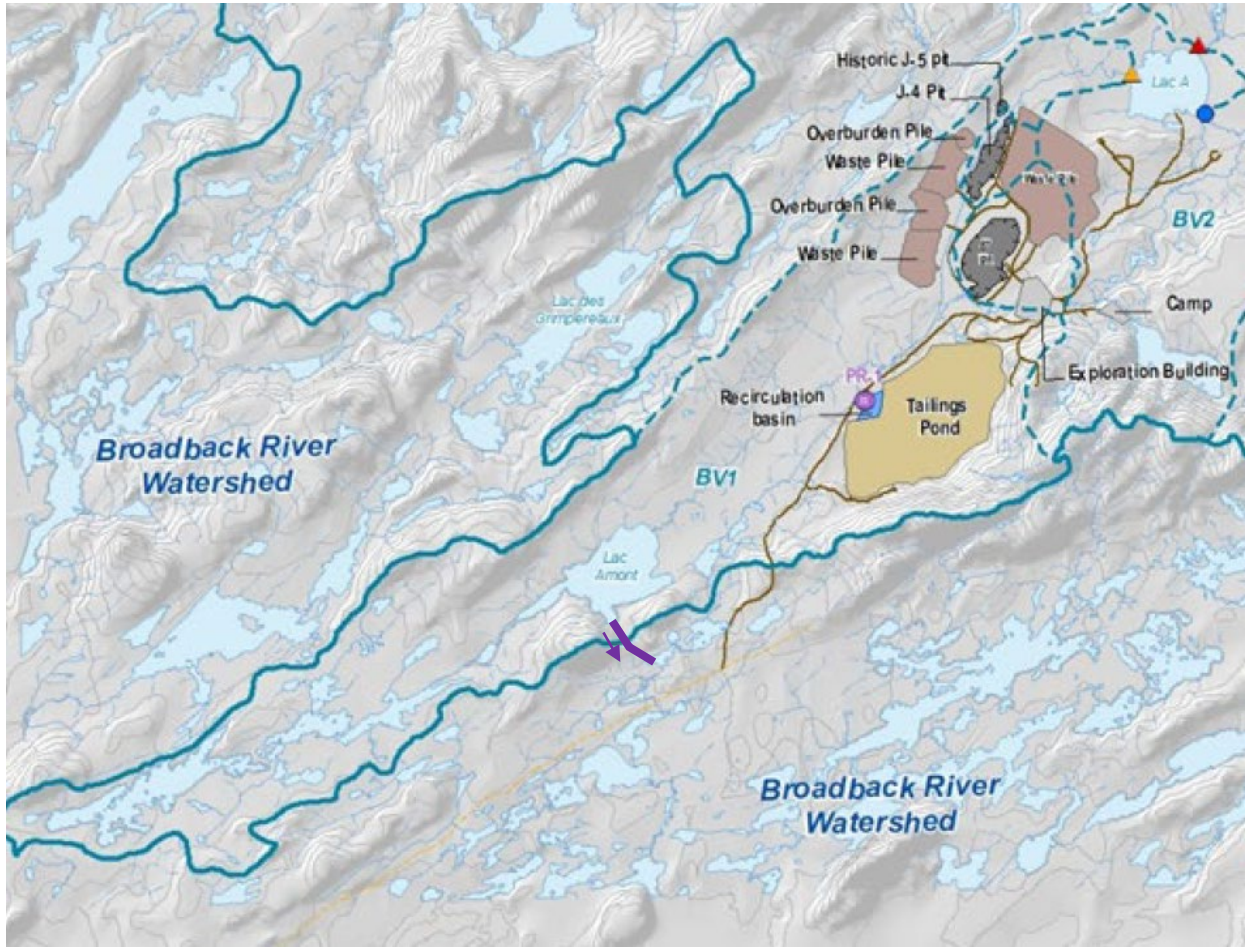
Les eaux de ruissellement à l'extérieur des zones d'activité doivent être captées par des fossés de drainage construits autour des composantes du site minier afin d'éviter que ces eaux n'entrent en contact avec des sources de contamination. Ce réseau de drainage, permettant l'évacuation des eaux non contaminées dans l'environnement, doit être installé, à moins que l'exploitant ne démontre l'impossibilité technicoéconomique de tels travaux.

16 **Directive 019 sur l'industrie minière – mars 2012**

Alternative Water Management Plans

Alternative Identification

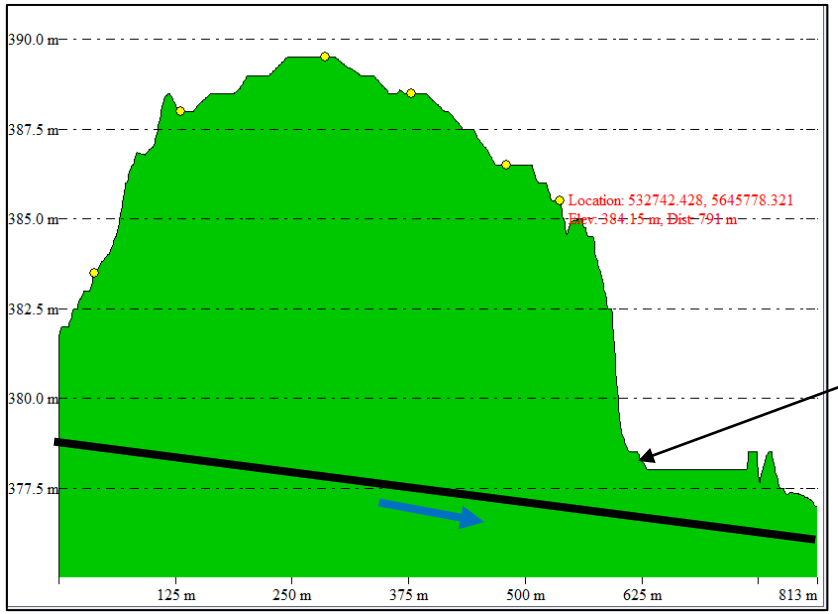
3. Divert Unnamed Creek upstream of the site to a different water body and different watershed. The diversion could be operational only or permanent.

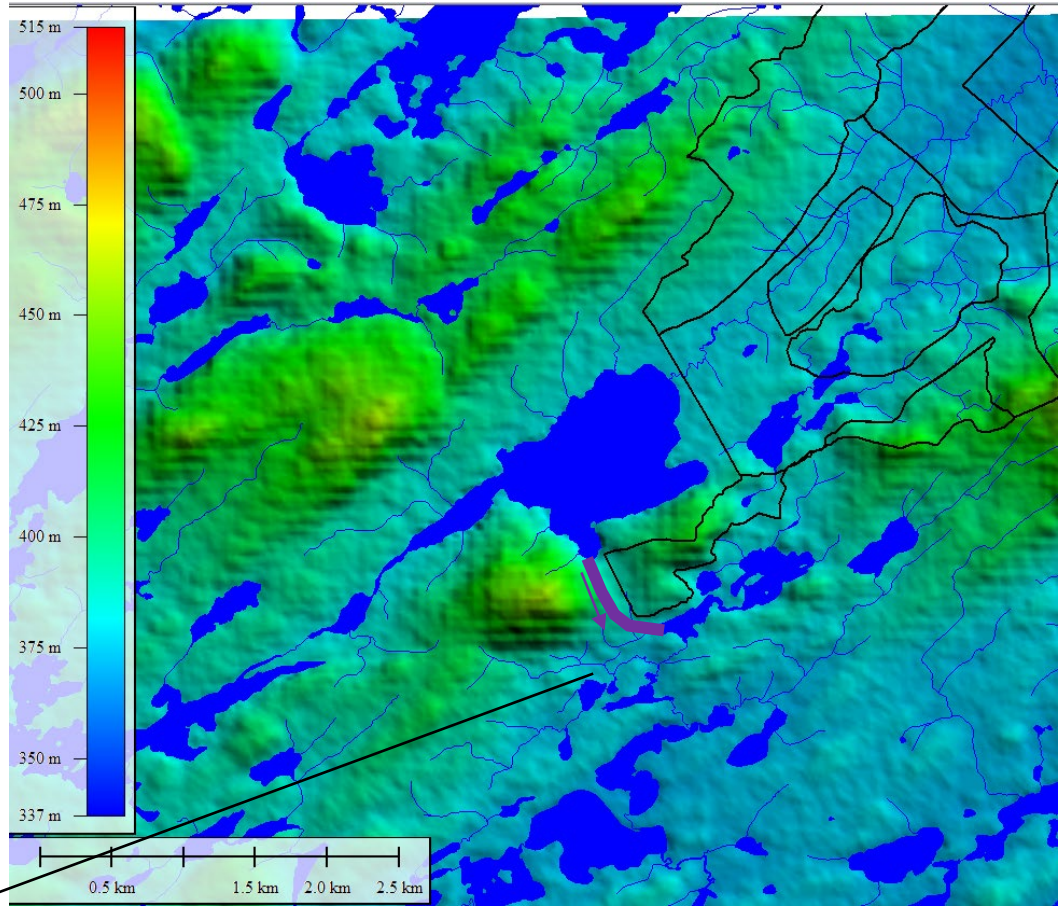


Alternative Water Management Plans

Alternative Identification

3. Divert Unnamed Creek upstream of the site to a different water body and different watershed. The diversion could be operational only or permanent.





Alternative Water Management Plans

Alternative 3 - Critique

3. Divert Unnamed Creek upstream of the site to a different water body and different watershed. The diversion could be operational only or permanent.

Strengths
- Eliminates both diversion scheme (current plan – large capex, challenging closure plan) and need to manage excessive water volumes in pit (alternative 2)

Alternative Water Management Plans

Alternative 3 - Critique

3. Divert Unnamed Creek upstream of the site to a different water body and different watershed. The diversion could be operational only or permanent.

Weaknesses

- 16 km^2 watershed transfer from Rupert River to Broadback River watershed – regulatory challenges
- Environmental impact in downstream water courses:
  - Increase in watershed: potential erosion because of increase in flow
  - Decrease in watershed: partial loss of fish habitat (Lake A and downstream)

wsp GOLDER

Thank you

GOLDER

Troilus – Tailings and Water Management

Water Management Workshop

2022-11-14

033-19121334-13000-Rev0

Governance

Dam safety inspection or dam safety review results, Engineer of Record

- Troilus has had discussions with and intends to retain WSP Golder as Engineer of Record for the Troilus TSF.
- Start of EoR duties likely to coincide with a dam safety review (DSR). No DSR has been undertaken for the facility in the past, due to its status as a closed facility.
- SNC designed the starter facility, and Golder designed the subsequent dam raises and modifications.
- Golder has performed annual dam safety inspections for many years.
- The geotechnical performance of the facility has been good, and Troilus has diligently addressed minor issues that have been observed during inspections (i.e., erosion).
- The design basis for the re-commissioning of the facility has considered design guidelines consistent with the current state of practice, including GISTM and CDA.
- Legislated minimum design guidelines in Quebec (Directive 019) are met or exceeded in the proposed design basis for the facility.

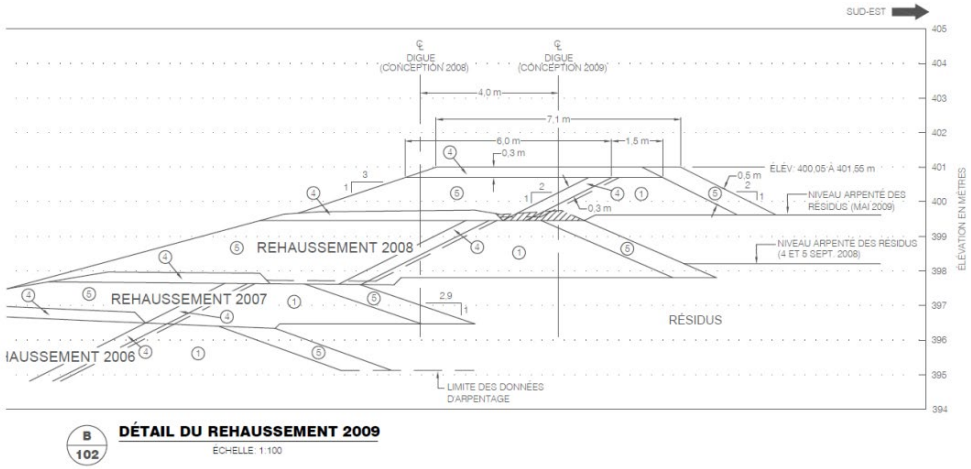
Design Criteria

Dam breach assessment, TSF consequence classification, adherence to GISTM

- No consequence classification exists for the existing facility. Given the location of the TSF relative to proposed mining pits, it is inevitable that the facility will have an “extreme” consequence classification during operations.
- Extreme loading conditions per the Global Industry Standard for Tailings Management
  - requirements of the Canadian Dam Association dam safety guidelines are met due to the application of extreme design loads
  - a dam breach assessment will be required for detailed design to inform the emergency response plan for the mine
  - Criteria of Directive 019, which outlines applicable controls for the design and the construction and operation of TSFs in Quebec, are met or exceeded by the application of design guidance for extreme consequence facilities.
  - Exceptions to the above, where Directive 019 has a higher performance standard (i.e., FS for post-liquefaction) have been analyzed and the PFS design aligns with these.

Existing Conditions

Summary of existing TSF

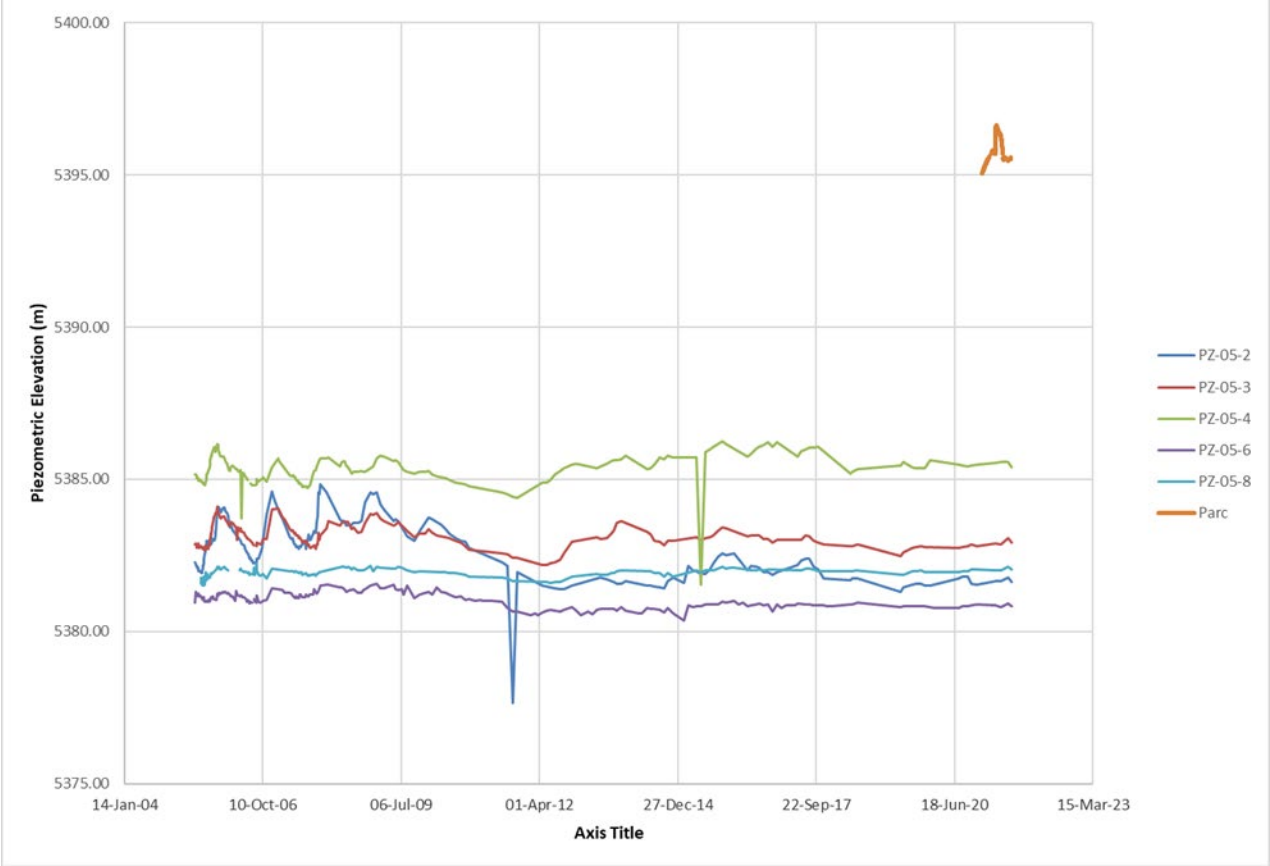


- Existing TSF is an upstream raise facility, approximately 20 m high.
- Starter dam was constructed from till with till cut-offs through esker materials and a cement-bentonite cutoff through thick alluvial sand or silt.
- Designed as a “leaky dam” to encourage lowering of water pressures against the embankment.
- A 30 m toe berm was constructed in 2005 to increase stability and economically dispose of waste rock.
- Slurry deposition (approx. 45%wt solid) with a water reclaim barge protected by a berm.

Current Performance

Existing instrumentation, dam performance issues

- Five piezometers are installed in the embankments.
- Water levels in these instruments showed modest variations during operation, and relatively stable levels since closure.
- Water levels between 381 and 386 m asl. In comparison, the TSF crest is at about 400 m asl and the pond is at about 396 m asl.
- CPT data showed water table ~12 m below the tailings beach in areas closest to the perimeter embankment.

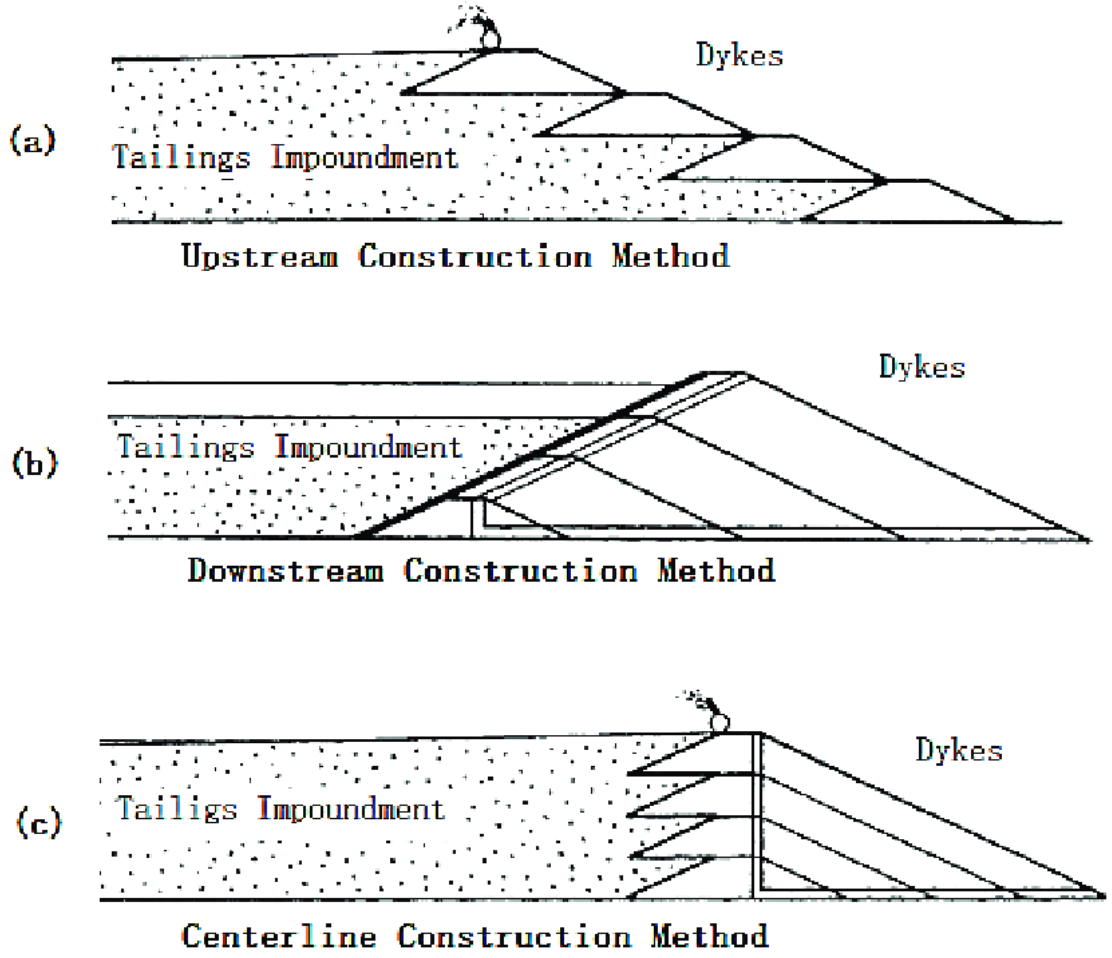


Options Study – Completed October 2020

Alternatives Study

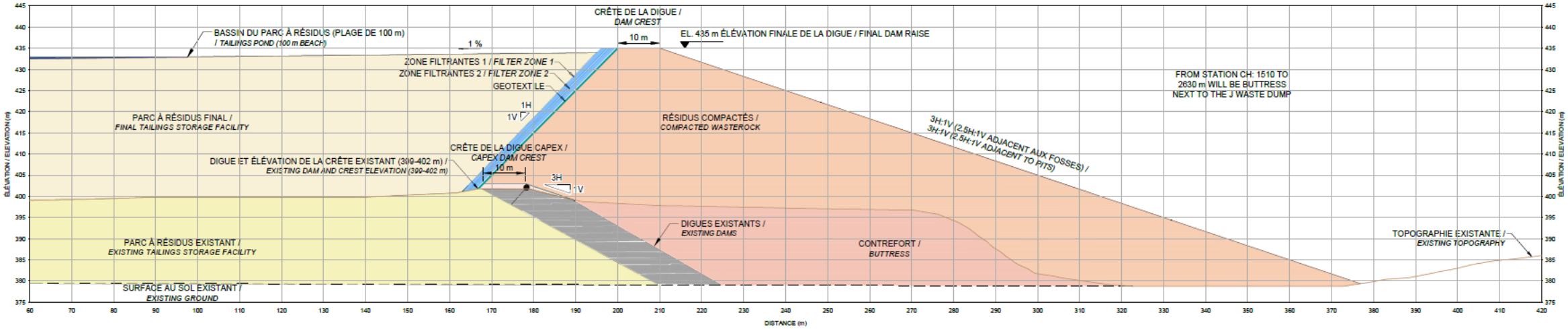
Criteria \ Alternative	Thickened Slurry Tailings	Deep Cone Thickened Slurry Tailings	Filtered Tailings
Capacity	218 Mt	132-204 Mt	216 Mt
Storage Capacity years	~ 17	~ 10-16	~ 17
Capacity Rank	1	3	1
Capex Costs Rank	2	1	3
Opex Costs Rank	1	2	5
Operability	1	1	5
Closure Complexity	2	2	1
Dam Safety and Environmental Risks	3	1	2
Overall	**10**	**10**	**17**

Types of tailings dams



Prefeasibility Design

Overall design description



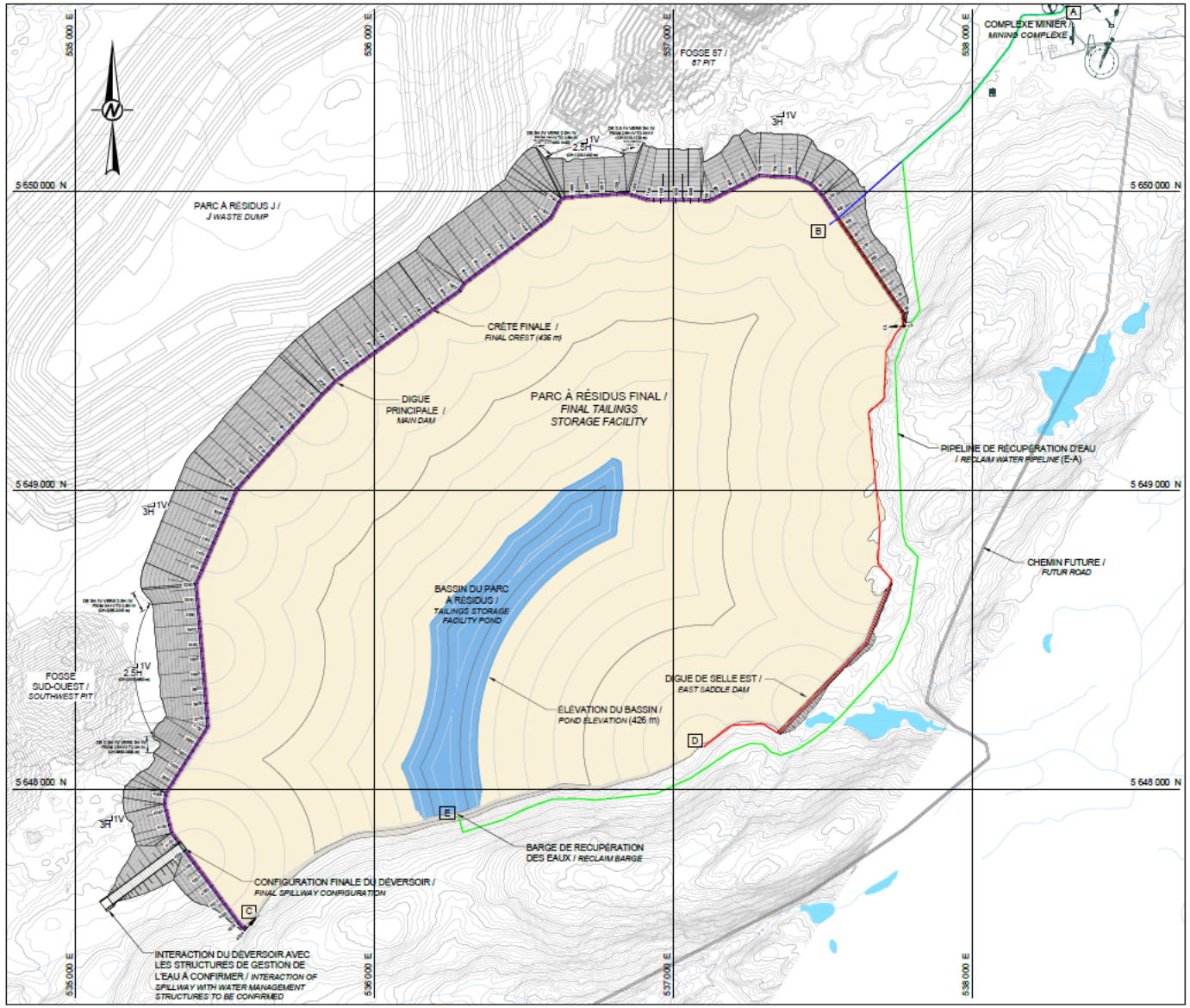
Note: Historic dyke raises simplified for clarity of presentation.

- Downstream raise construction, resulting in improved geotechnical stability and providing additional storage capacity.
- Continue the design concept of a ‘leaky dam’, with upstream filters.
- PFS design to 435 m retains 167.3 Mt of tailings (8% contingency on LOM tailings of 155 Mt).

Prefeasibility Design

Overall design description

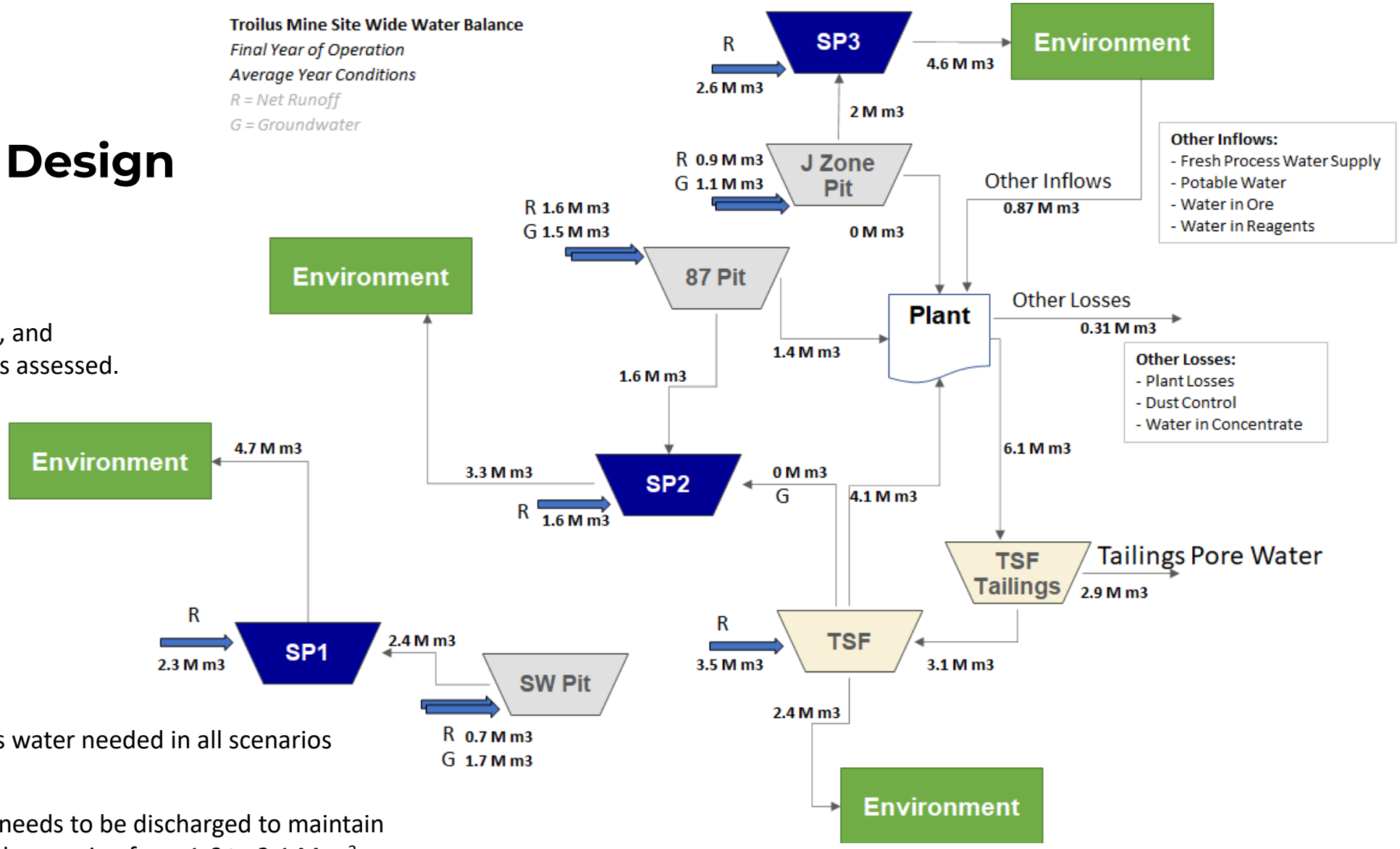
- The TSF will be raised annually in 2 – 2.5 m downstream raises.
- Once the tailings reach an elevation of 428 m the East Saddle Dam will be constructed, as tailings can no longer be naturally contained against the mountain.
- Downstream slopes are 3H:1V, except adjacent to pits where they are 2.5H:1V.



Prefeasibility Design

Water Balance

- Average, 10-year dry, 10-year wet, and potential climate change scenarios assessed.



- **Key Findings:**

Water collected can supply the process water needed in all scenarios assessed.

Additional surplus water from the TSF needs to be discharged to maintain targeted operational water levels, surplus ranging from 1.6 to 3.1 M m^3 depending on the scenario. The capacity of the existing suspended solids treatment plant is sufficient to treat the surplus water.

Prefeasibility Design

TSF seepage, seepage quality and hydrogeology

- Directive 019 classifies tailings as low and high risk with regards to geochemistry and provides guidance for classification.
- The historic Troilus tailings were classified as low risk with respect to the Directive 019 guidance (Golder 2003). Initial test data suggests that the new tailings would be similar to historic tailings.
- There are no specific requirements for impermeabilization of a TSF for low-risk tailings. Groundwater quality monitoring is implemented for confirmation.
- Geochemistry testing is still ongoing and design changes could be required if the tailings are reclassified as high-risk tailings.

Prefeasibility Design

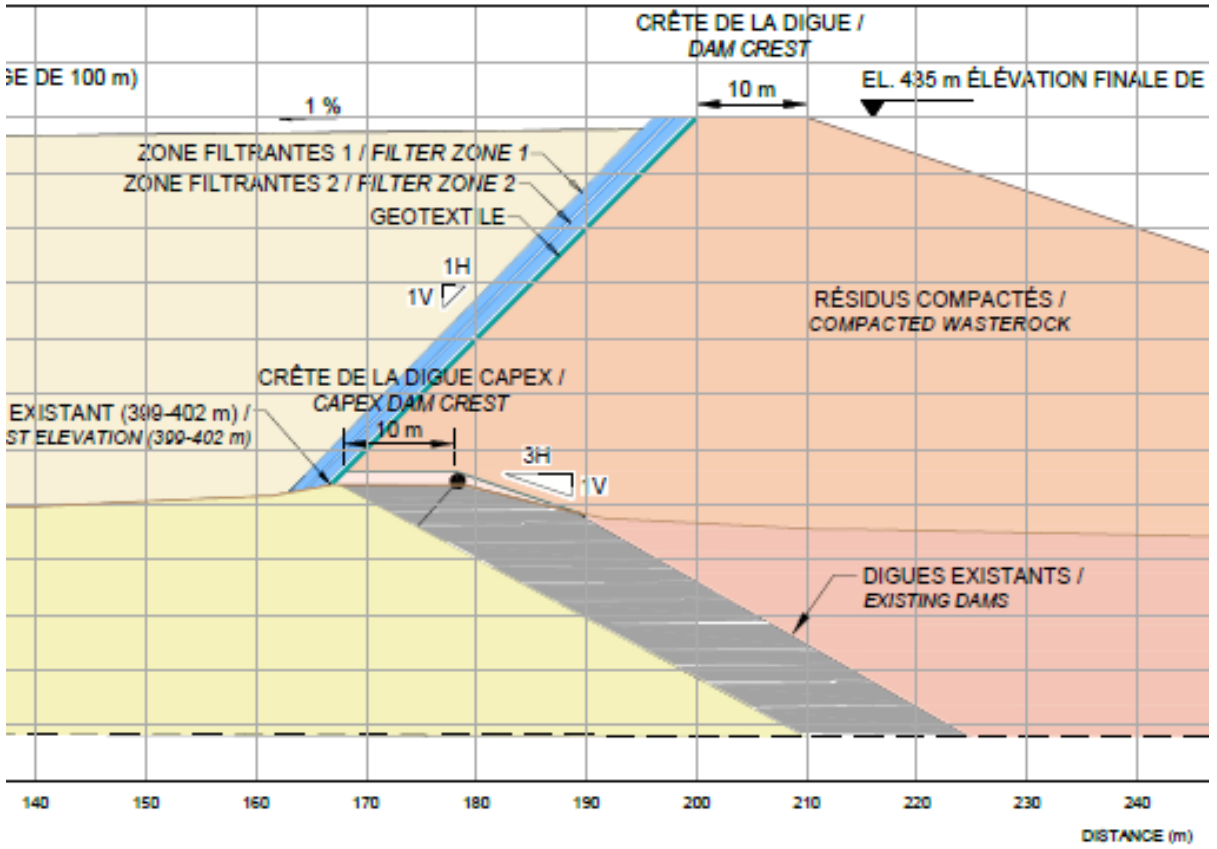
Tailings Pipeline and Pumping

- Tailings out of the ore processing plant will be thickened in a high-rate thickener to approximately 66 weights% solids before being transported to the TSF.
- Tailings will be deposited through spigots on the crest of the dam and along the mountain on the east of the TSF.
- Deposition will start from the mountain on the east of the TSF with only a portion of the pipeline for deposition off the dam crest needing to be installed at the onset.
- To transport the tailings to the TSF a pump train of 3 centrifugal pumps in series will be needed. Only one pump train will be installed at the onset along with a spare pump to provide redundancy. Over the life of the project as the TSF is raised each train will require a fourth pump.
- The existing reclaim barge will be shifted upslope as the TSF raises. Active water management will be required until the closure spillway is constructed.

Prefeasibility Design

TSF construction materials

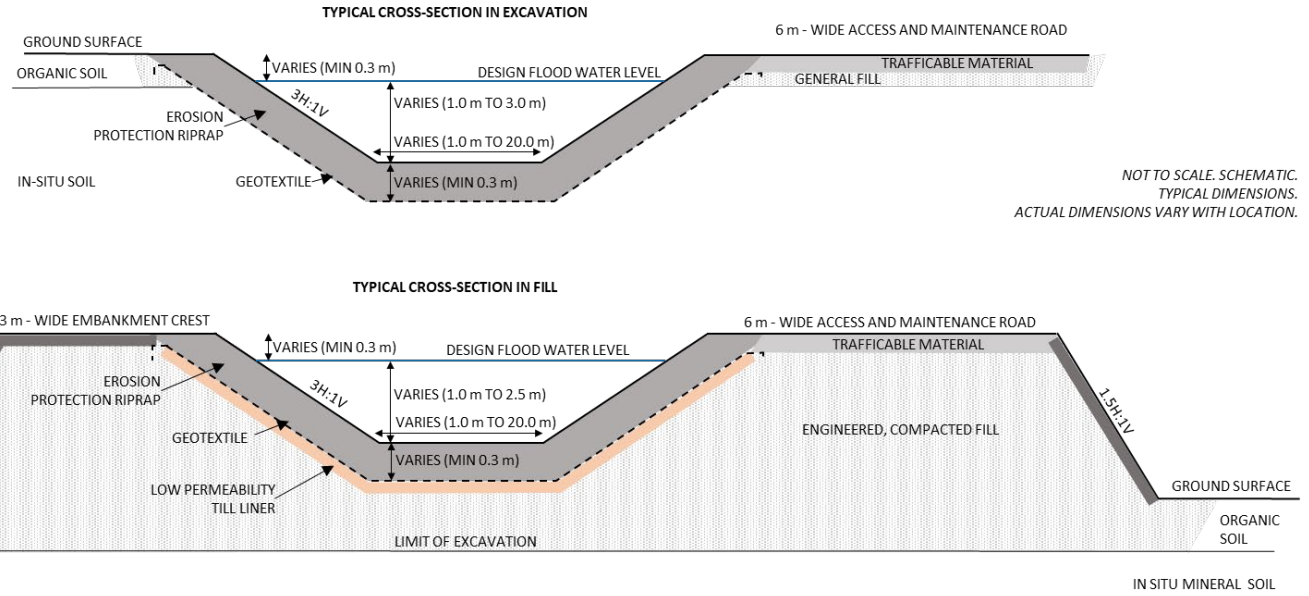
TSF Construction Materials
Embankment fill, placed in compacted 1.5 m lifts using roller (Spread and compact only)
Filter zone 1 (1 m thick placed in 1.5 m lifts and compacted with bucket at 1:1 slope) – from natural borrow sources Filter zone 2 (1 m thick placed in 1.5 m lifts and compacted with bucket at 1:1 slope) - crushed and processed on site
Geotextile (Texel 924)
TSF Spillway
Embankment fill, placed in compacted 1.5 m lifts using roller (Spread and compact only)
Riprap (D50 (mm) – 200 and 550) – processed on site
Bedding gravel – from natural borrow sources or processed on site
Geotextile

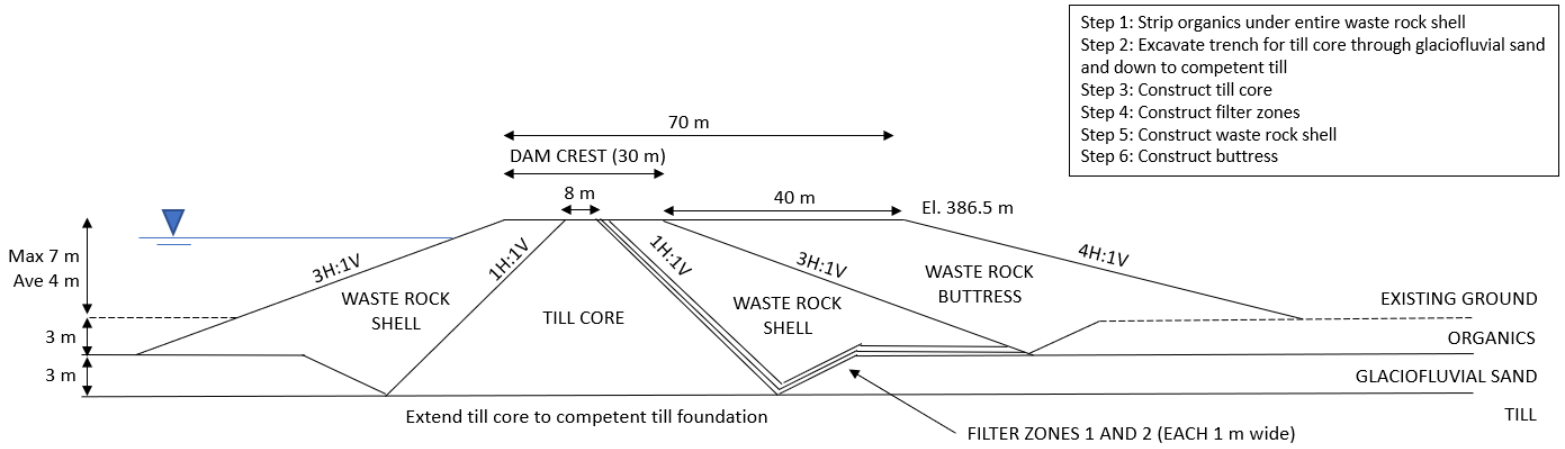


Prefeasibility Design

SWWM construction materials

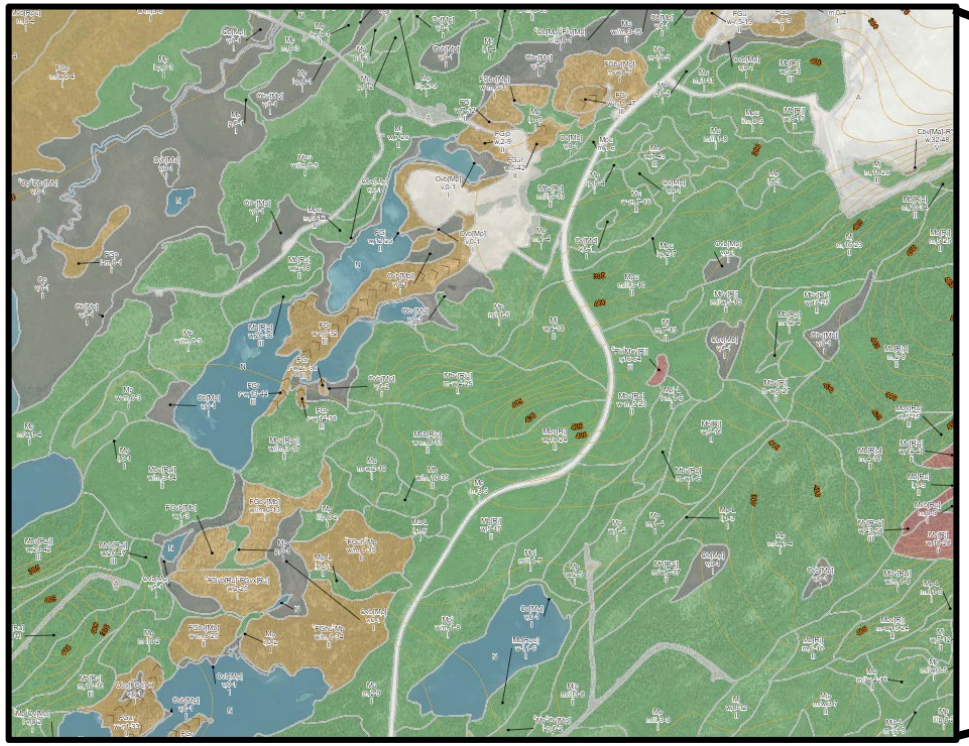
- Till is required for the core of the SW diversion dam and lining of the diversion (in required locations where foundation permeability is high).
- Filters and waste rock will be sourced and constructed in a similar way to the TSF.
- Filters for the dam will be crushed and screened on site.





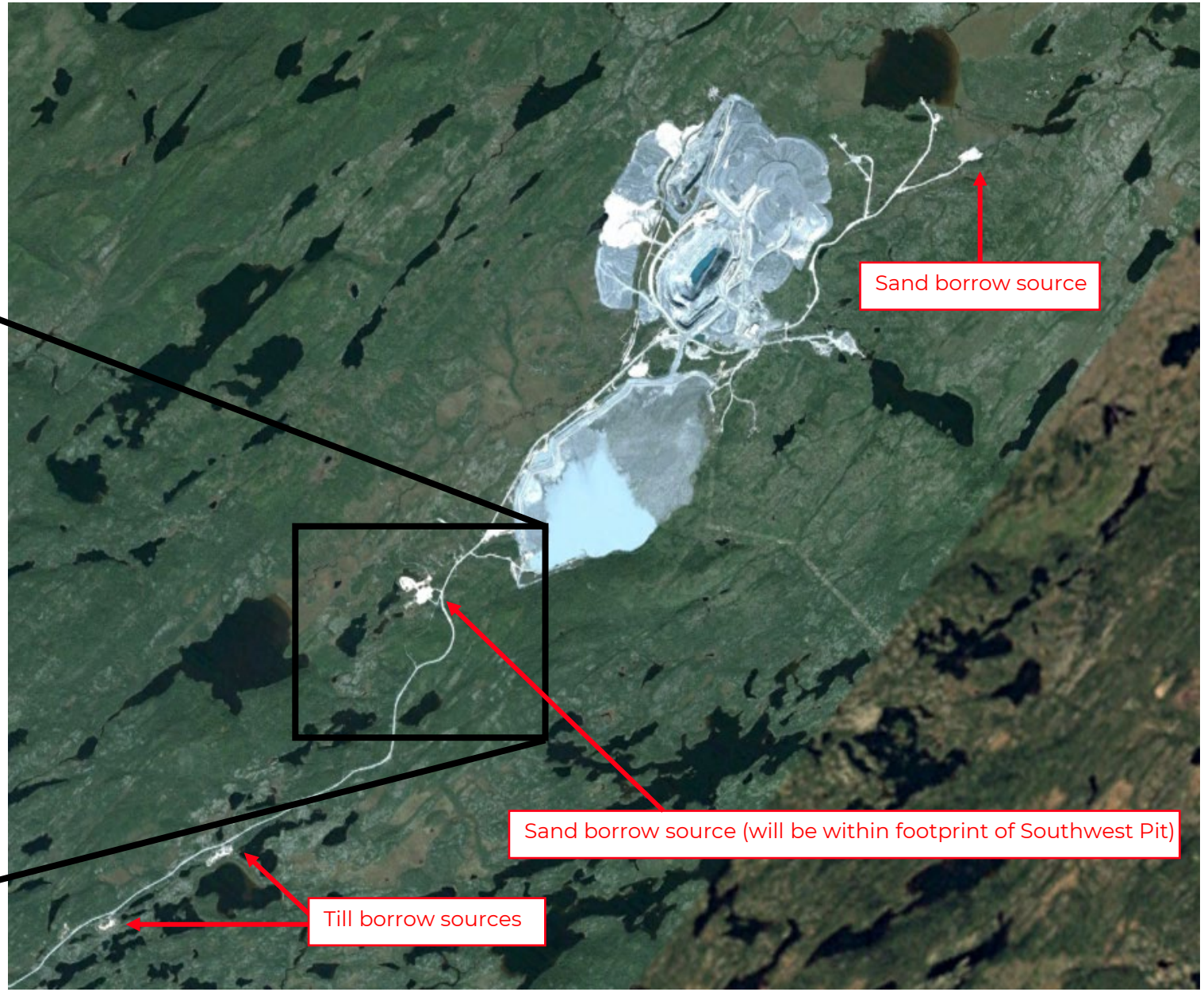
Prefeasibility Design

Borrow areas (including for closure, if available)



Yellow is glaciofluvial (predominantly sand)

Green is till



In-Pit Disposal

- In-pit disposal could be considered following complete mining of a pit
- Opportunity to reduce ultimate size of existing TSF
- Advantages for closure, scalability and flexibility
- PFS design required to assess pumping, groundwater/tailings interaction, cold weather impacts, slope management
- In-Pit Co-disposal could be considered to reduce waste rock stored above ground and have potentially positive geochemistry impacts, but may have operational challenges
- Key inputs to assess in-pit viability are:
    - Life of mine tonnage/mine plan
    - Geochemistry of tailings
    - Potential for underground mining

Hydrogeology - Investigation

- Monitor water quality of seepage from the toe ditches of the facility.
    - The only geochemical issue has been excess iron.

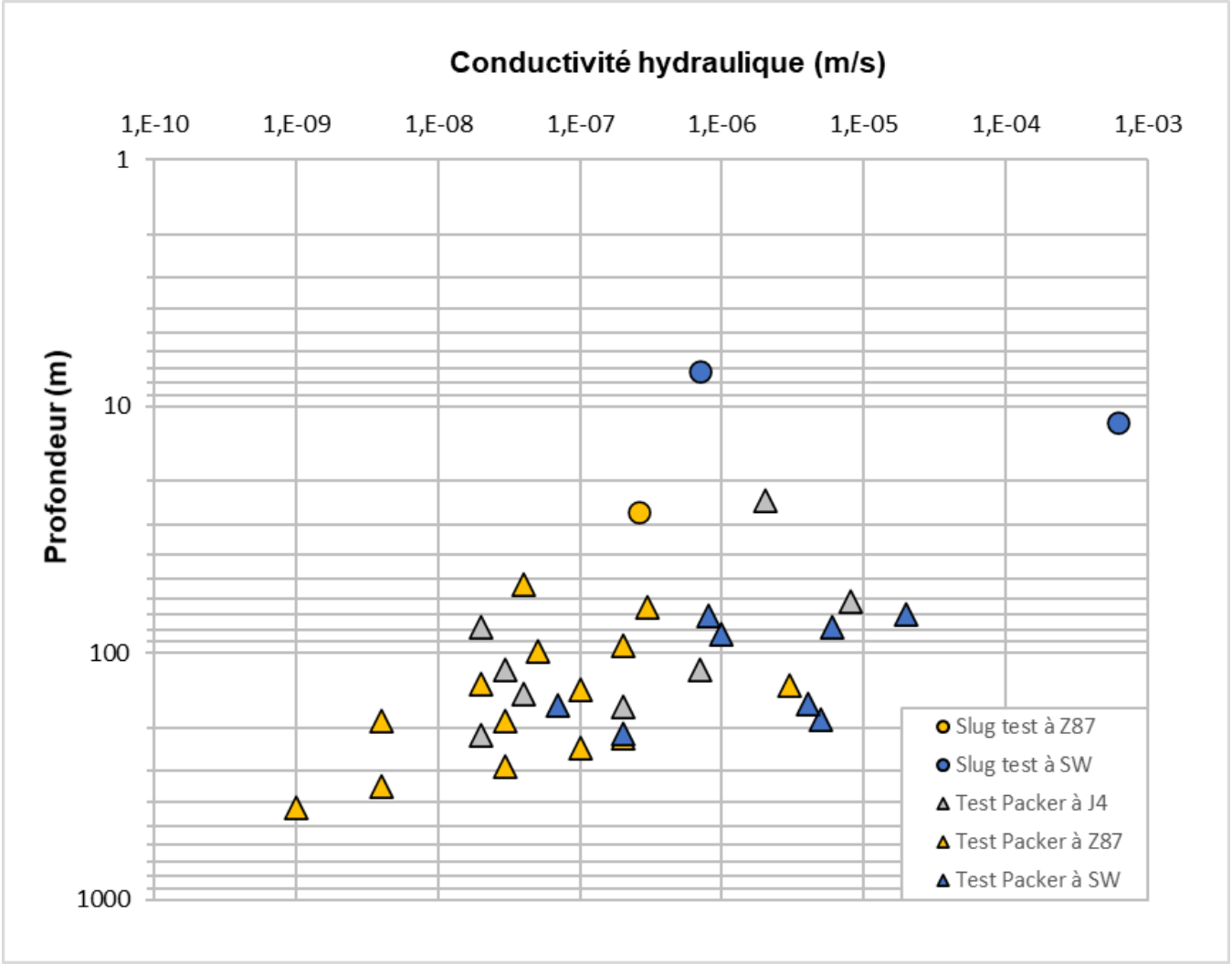
As part of the hydrogeological study and in support of the mining development of the Troilus site, the following hydrogeological investigation was carried out in 2020-2021:

- A total of 32 packer tests were completed in 11 boreholes. These packer tests were carried out to characterize the bedrock hydraulic properties over various intervals covering depths between 14 m to 466 m below the surface.

- Permeability tests (slug test) were carried out in the 18 available observation wells installed in unconsolidated deposits or shallow bedrock. The results included 3 tests in the bedrock, 14 tests in unconsolidated deposits and 1 test in the tailings deposit.

- Between July and October 2021, piezometric level monitoring was carried out during the J4 pit dewatering (average pumping rate of 1,600 cubic m^3/h. Five-second intervals data logger recorded water level from May to November 2021, in the open water of J4 pit as well as in six boreholes spatially distributed around the pit.

Hydrogeology – Hydraulic Conductivity in Bedrock



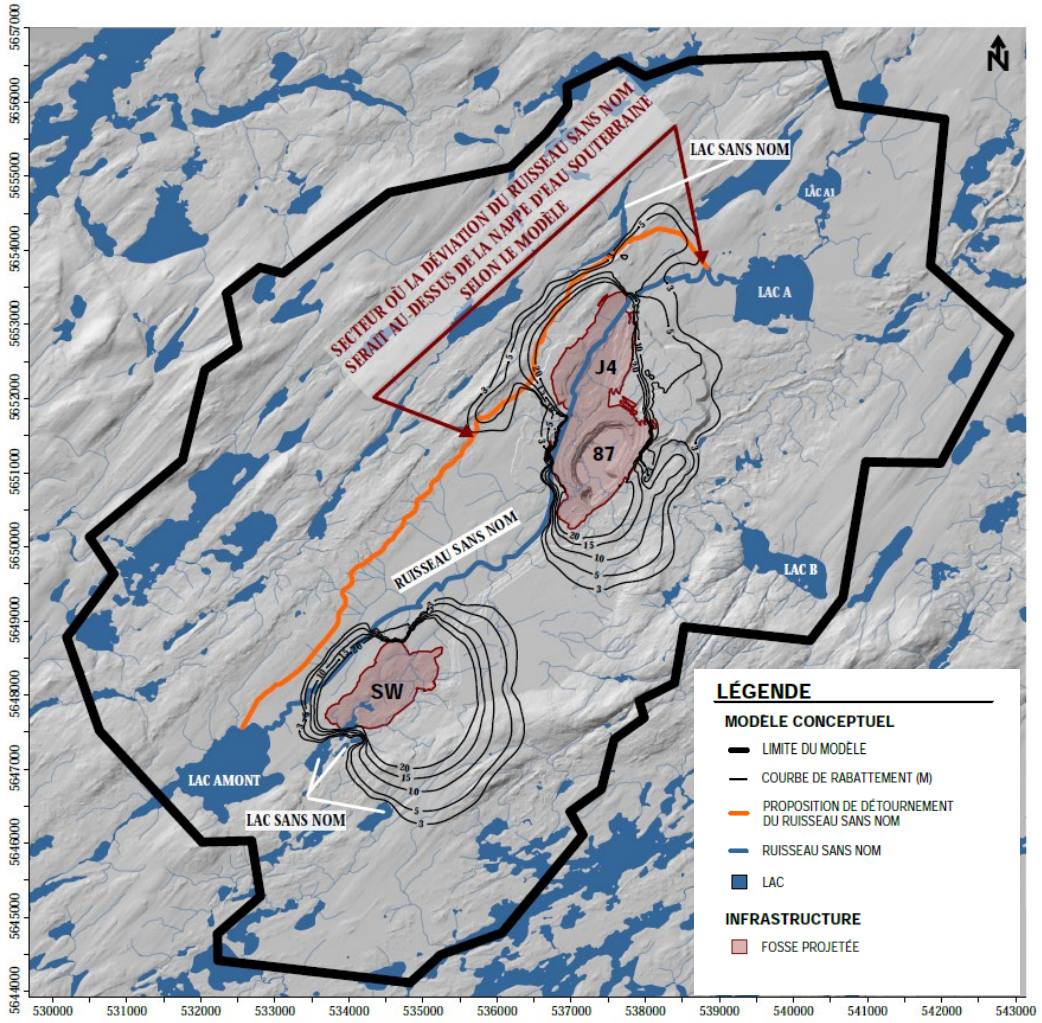
Hydrogeology – Groundwater inflows

A hydrogeological study of the site was carried out to define the hydrogeological conditions for the future mining, including the extension of the 87 and J4 open pits and the development of the SW open pit over a projected operating period of 14 years.

Pit	Groundwater Inflows (m^3/h)
J4	140
87	180
SW	215

This seepage rate is suitable for water management including diversion ditches and in-pit sumps. Consequently, the modeling does not consider the installation of pumping wells on the periphery of the pits to carry out the dewatering. The simulated flows relative to the scale of the project do not justify, at this stage of the study, assessments of active dewatering.

Hydrogeology - Potential extent of groundwater drawdown



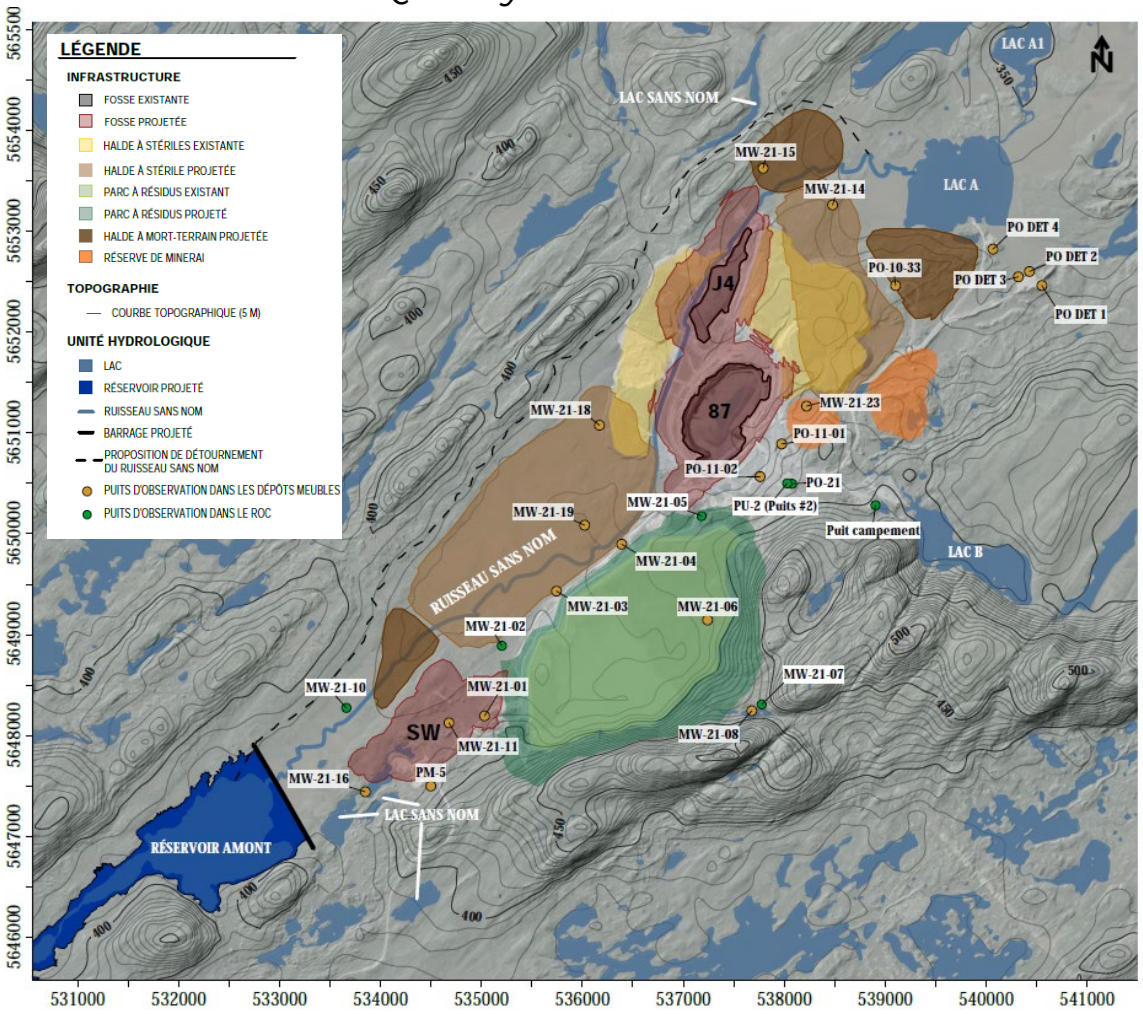
The potential extent of the drawdown zone greater than 3 m would reach four lakes and the proposed alignment of the Ruisseau Sans-Nom diversion.

If the alignment of the diversion is above the level of the groundwater table, the drawdown caused by the dewatering of the pits will not impact the flow regime in the stream.

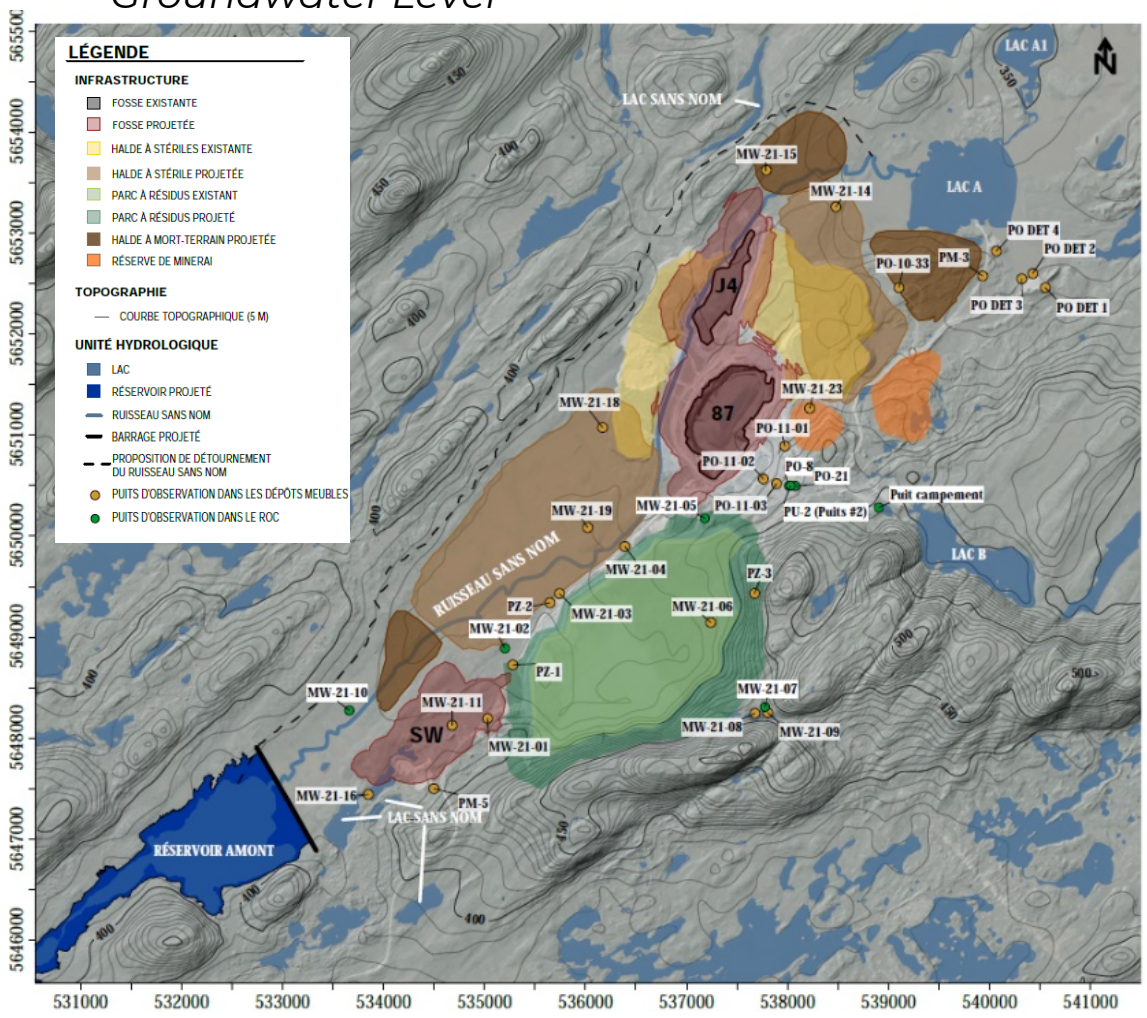
While the diversion is expected to be above the water table given its location on a hillside where groundwater could, locally, not contribute (seepage) to the stream, at this stage of the project, there is no groundwater level data along the proposed alignment of the Ruisseau Sans-Nom diversion to establish whether it will be above or below of the groundwater table.

Hydrogeology - Groundwater Monitoring Program

Groundwater Quality



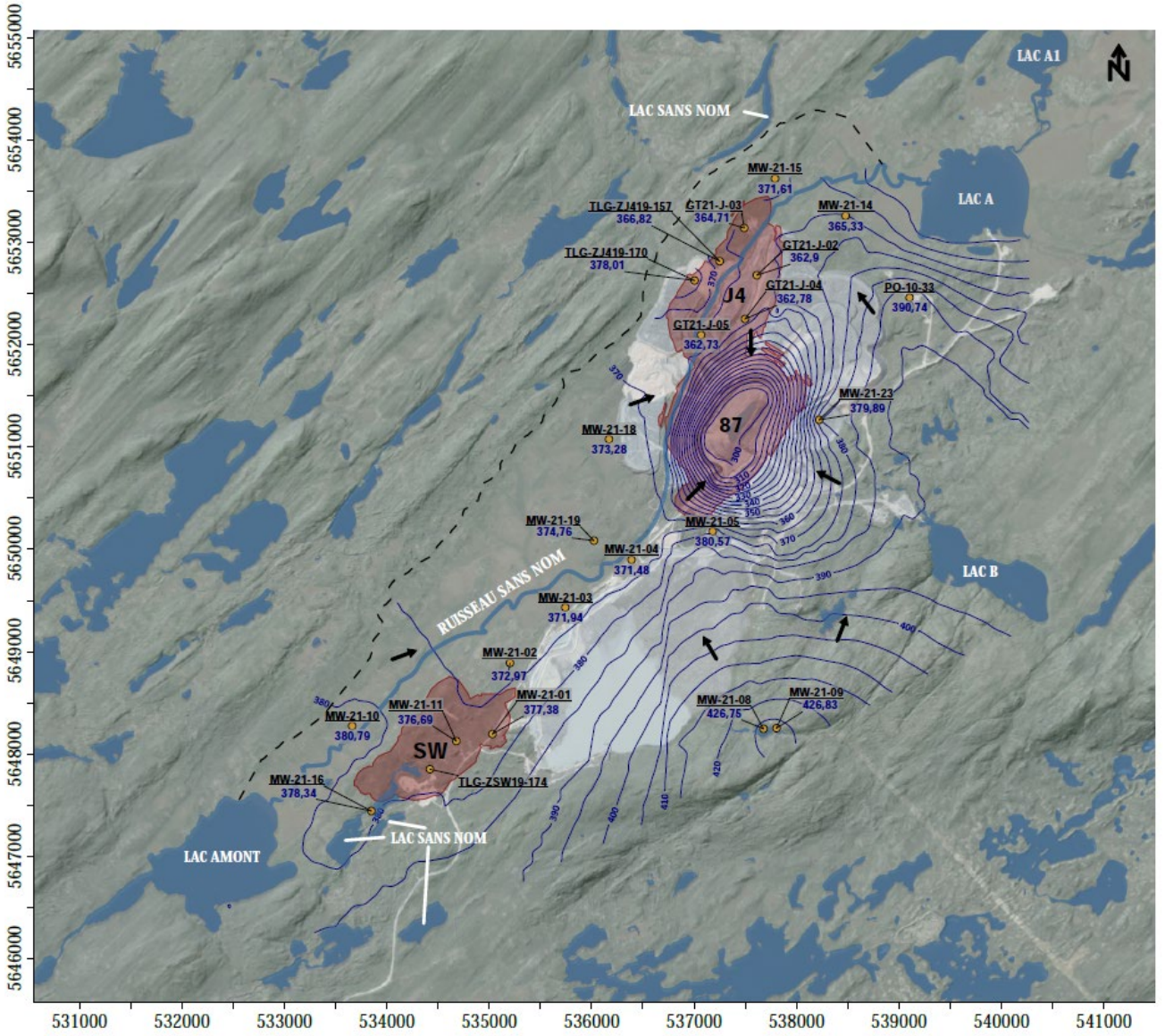
Groundwater Level



WSP GOLDER

Hydrogeology - Groundwater Monitoring Program

Groundwater Level



wsp GOLDER

Thank you

TROILUS

Project Engineering Development 2022

Overview & Looking Forward

TSX: **TLG** OTCQX: **CHXMF** FRA: **CM5R**

November 2022

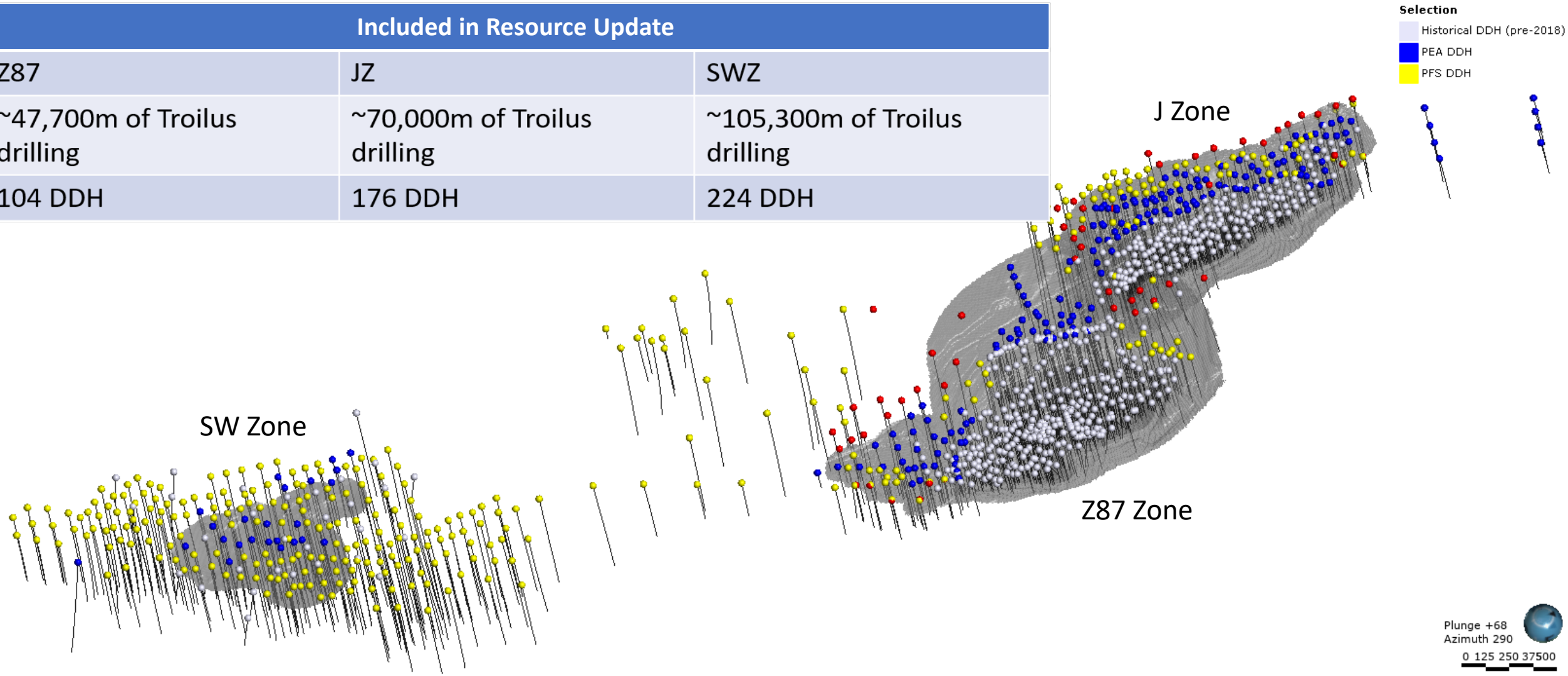
PROJECT OVERVIEW

- Geology Update
- Metallurgical Testwork completed
- Site Layout
- Financials

2022 Resource Update

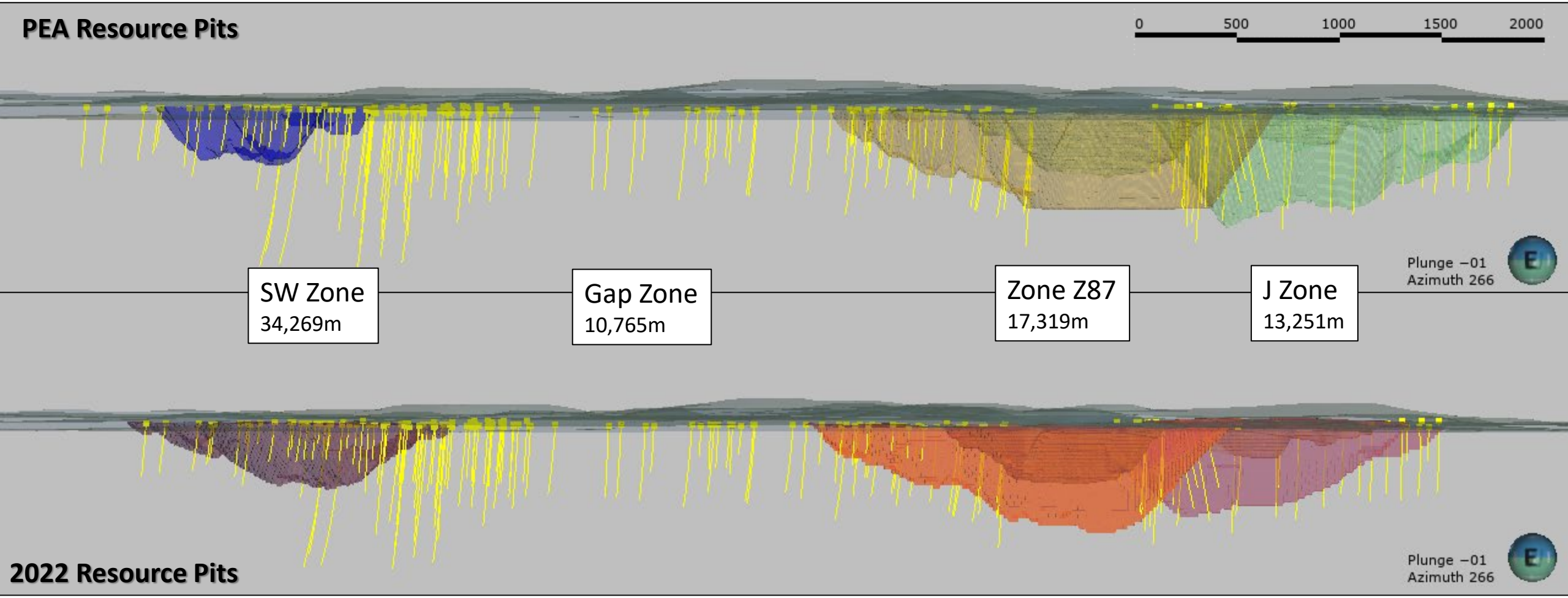
Included in Resource Update		
Z87	JZ	SWZ
~47,700m of Troilus drilling	~70,000m of Troilus drilling	~105,300m of Troilus drilling
104 DDH	176 DDH	224 DDH

Z87-J-SW
PEA RES pit shells



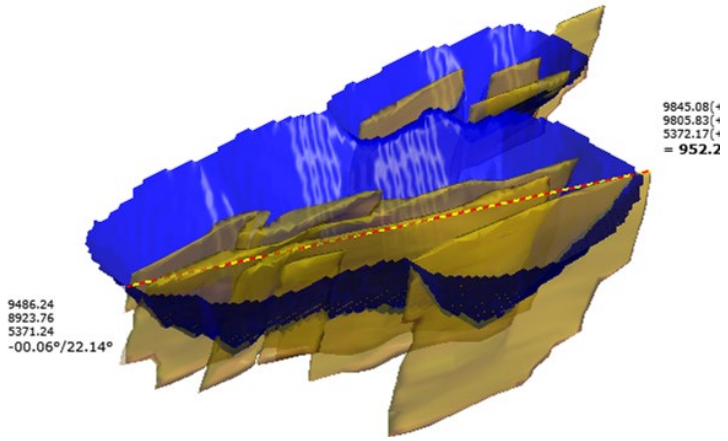
2022 Drilling Summary (as of October 31st)

Long section looking west

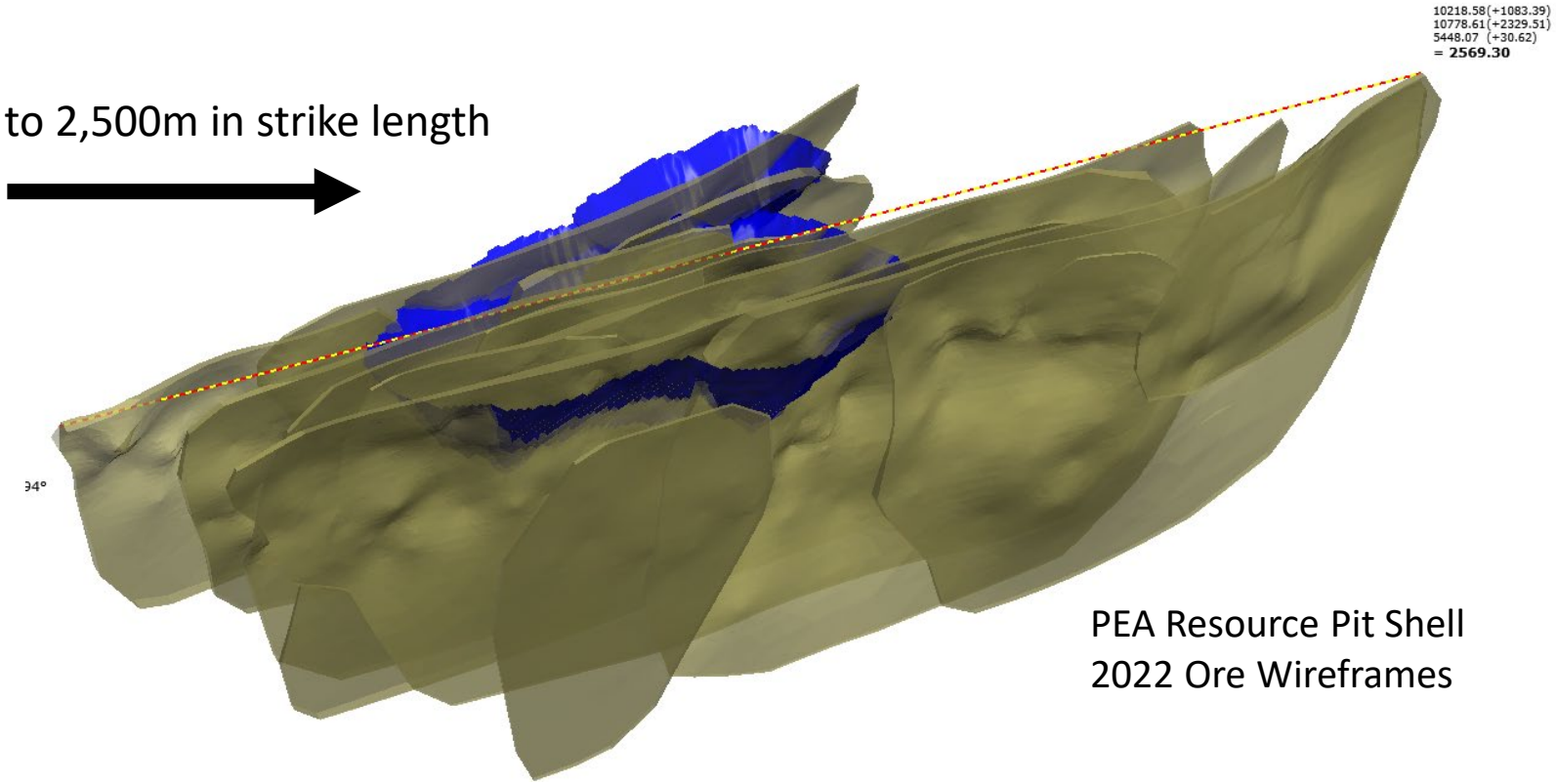


Mineral Resource Growth: Southwest Zone 2019 - 2022

950m to 2,500m in strike length



PEA Resource Pit Shell
PEA Ore Wireframes



PEA Resource Pit Shell
2022 Ore Wireframes

Included in Resource Update		
Z87	JZ	SWZ
~47,700m of Troilus drilling	~70,000m of Troilus drilling	~105,300m of Troilus drilling
104 DDH	176 DDH	224 DDH

METALLURGICAL TESTWORK

Completed Test Work

ERIEZ

- Pilot Plant campaigns J, 87 and SW life of mine composite samples representing the PEA pit shells. Pilot plant included milling, gravity gold recovery, rougher/scavenger flotation, concentrate re-grinding and cleaner flotation. Pilot plant results generated the following data:
    - Optimum grind size determination for both rougher/scavenger and cleaner circuits,
    - Au and Ag recovery to gravity concentrate and Au, Ag and Cu recovery to flotation concentrate
    - Concentrate mass pull weights for each deposit.

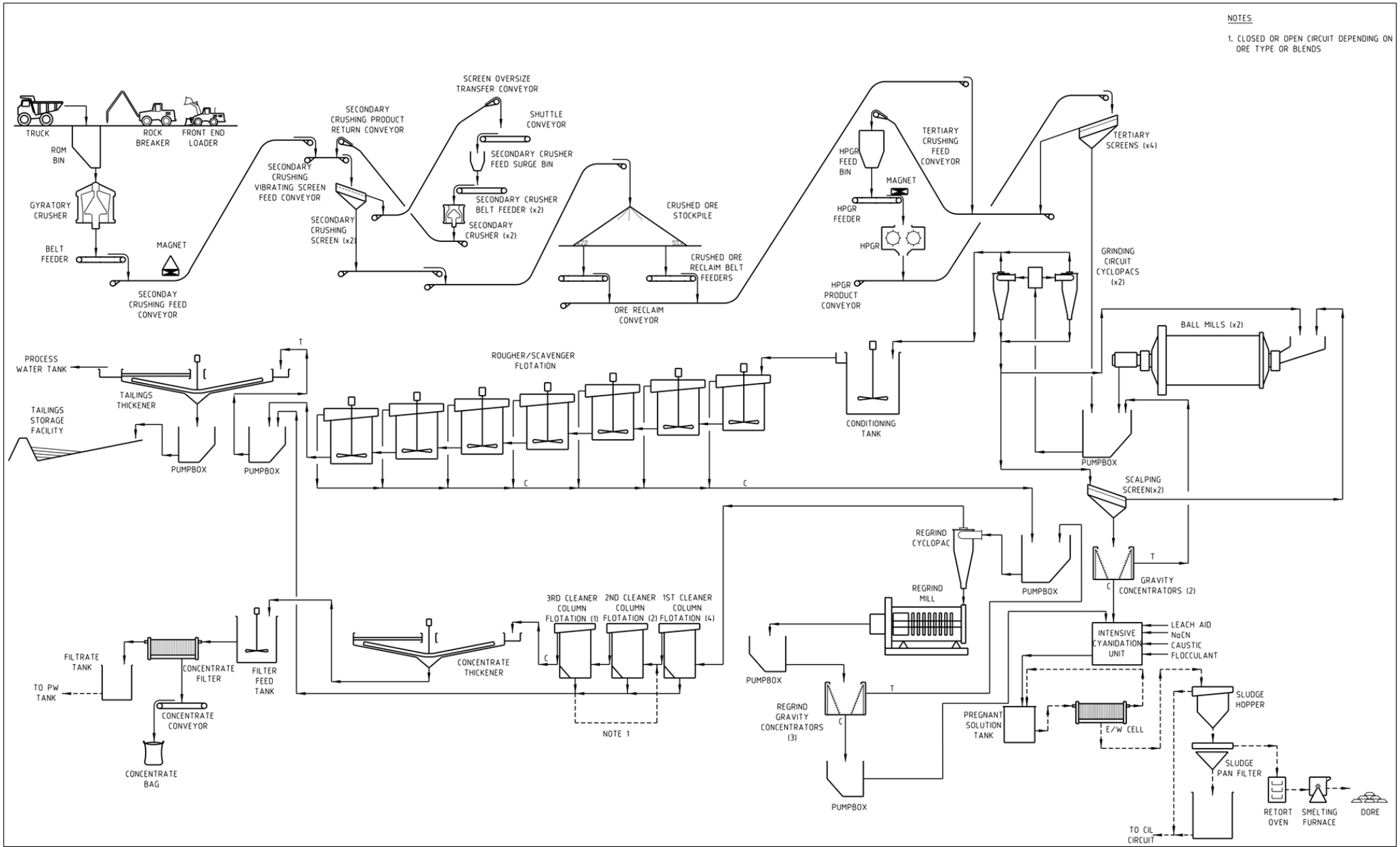
FLSmidth/Knelson

Samples from each of the deposits were subjected to enhanced Gravity Gold Recovery (e GRG) testing. These results of these test provided information on the gravity recovery of gold both in the primary and secondary/regrind circuits.

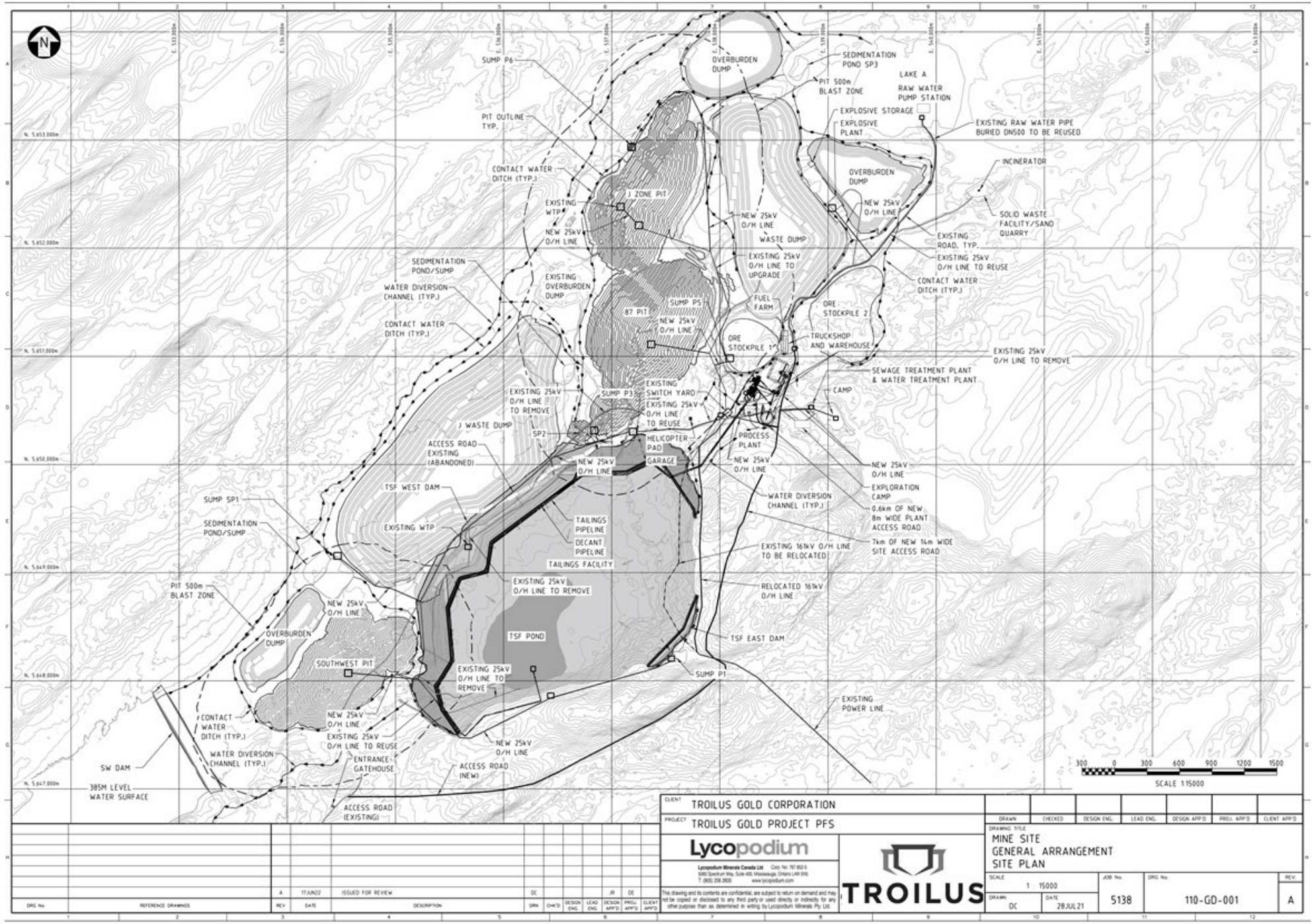
Base Metallurgical Laboratories

Base Met conducted mineralogy and liberation characterization for representative sample of the J, 87 and SW Zones. Additionally, hardness characterization analysis including Bond Abrasion Index, Bond Rod Mill and Bond Ball Mill indexes, and SMG analysis. Samples from the Eriez pilot plant testing were also analyzed and subjected to additional testing including cyanidation of the gravity concentrates, sedimentation and flocculation testing of tailings samples, chemical analysis of final concentrate as well as filtration and cyanidation testing of select samples.

PROCESS FLOWSHEET



SITE LAYOUT


SUMP P6
OVERBURDEN DUMP
SEDIMENTATION POND SP3
LAKE A
RAW WATER PUMP STATION
PIT 500m BLAST ZONE
EXPLOSIVE STORAGE
EXPLOSIVE PLANT
EXISTING RAW WATER PIPE BURIED DN500 TO BE REUSED
PIT OUTLINE TYP.
CONTACT WATER DITCH (TYP.)
INCINERATOR
OVERBURDEN DUMP
J ZONE PIT
EXISTING WTP
NEW 25kV O/H LINE
SOLID WASTE FACILITY/SAND QUARRY
WASTE DUMP
EXISTING ROAD, TYP.
EXISTING 25kV O/H LINE TO UPGRADE
EXISTING 25kV O/H LINE TO REUSE
SEDIMENTATION POND/SUMP
WATER DIVERSION CHANNEL (TYP.)
EXISTING OVERBURDEN DUMP
SUMP P5
87 PIT
FUEL FARM
ORE STOCKPILE 2
ORE STOCKPILE 1
TRUCKSHOP AND WAREHOUSE
EXISTING 25kV O/H LINE TO REMOVE
SEWAGE TREATMENT PLANT & WATER TREATMENT PLANT
CAMP
EXISTING SWITCH YARD
SUMP P3
J WASTE DUMP
SP2
HELICOPTER PAD
GARAGE
PROCESS PLANT
ACCESS ROAD EXISTING (ABANDONED)
TSF WEST DAM
SUMP SP1
EXPLORATION CAMP
0.6km OF NEW 8m WIDE PLANT ACCESS ROAD
WATER DIVERSION CHANNEL (TYP.)
TAILINGS PIPELINE
DECANT PIPELINE
TAILINGS FACILITY
7km OF NEW 14m WIDE SITE ACCESS ROAD
EXISTING 161kV O/H LINE TO BE RELOCATED
RELOCATED 161kV O/H LINE
TSF POND
TSF EAST DAM
SOUTHWEST PIT
SUMP P1
EXISTING POWER LINE
CONTACT WATER DITCH (TYP.)
SW DAM
ENTRANCE GATEHOUSE
ACCESS ROAD (NEW)
385M LEVEL WATER SURFACE
ACCESS ROAD (EXISTING)
SCALE 1:15000
CLIENT TROILUS GOLD CORPORATION
PROJECT TROILUS GOLD PROJECT PFS
Lycopodium
TROILUS
DRAWING TITLE
MINE SITE
GENERAL ARRANGEMENT
SITE PLAN
SCALE 1 : 15000
DRAWN DC
DATE 28JUL21
JOB No. 5138
DRG No. 110-GD-001
REV. A
A ITAUN22 ISSUED FOR REVIEW

TOTAL OPEX

	US$/tonne	*US$/t Ore*
Process Plant	**$5 to $6/t**	**$5 to $6/t**
Mining OPEX	**$2 to $3/t**	**$9 to $13.5/t**
G&A	**$1.4 to $1.6/t**	**$1.4 to $1.6/t**
Total OPEX	**$8.5 to $10.6/t**	**$15.5 to $21/t**

PROJECT FINANCIALS – INPUTS

- Au $1,650
- Cu $4.00
- Ag $22.00
- Exchange Rate US$ 1.0 = CDN $1.3
- Royalty 1%
- Discount Rate 5%

PROJECT FINANCIALS AFTER TAX – OUTPUTS ALL IN US$

- Project has the ability to be a long-life operation with reasonably low costs.
- Internal Rate of Return Between 14% and 18%
- Net Present Value after Tax Approximately $500 million
- Payback Approximately 5 years
- All in Sustaining Cost (AISC) $934
- Life of mine 18 years

FEASIBILITY OBJECTIVES

PROJECT FINANCIALS – OUTPUTS ALL IN US$

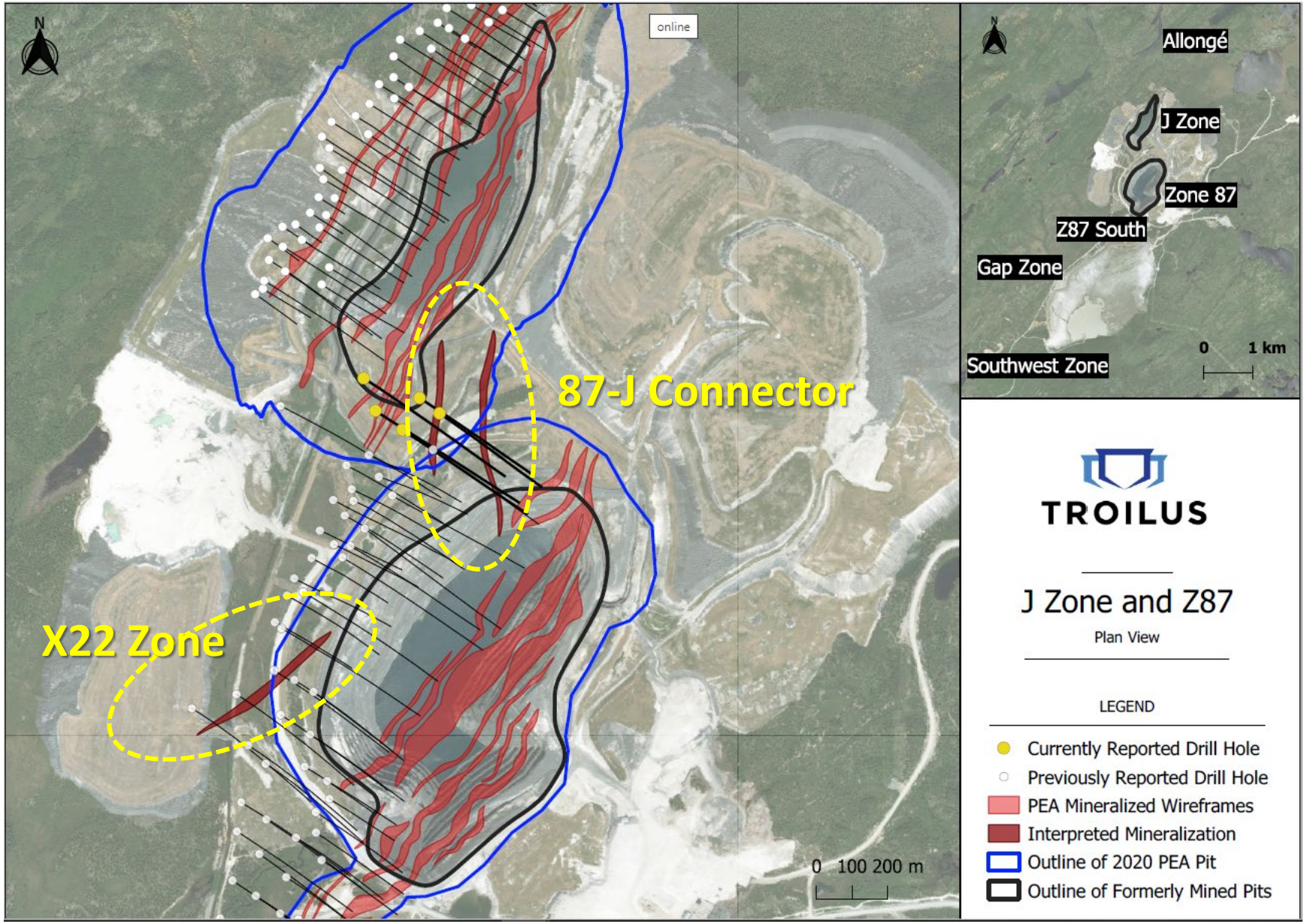
- Project has the ability to be a long-life operation with reasonably low costs.
- After Tax Internal Rate of Return Between 18% and 25%
- Net Present Value after Tax Approximately $500 and $750 million
- Payback Approximately 3 to 4 years
- All in Sustaining Cost (AISC) < $1,000
- Life of mine Greater than 18 years

FEASIBILITY WORK PLANNED

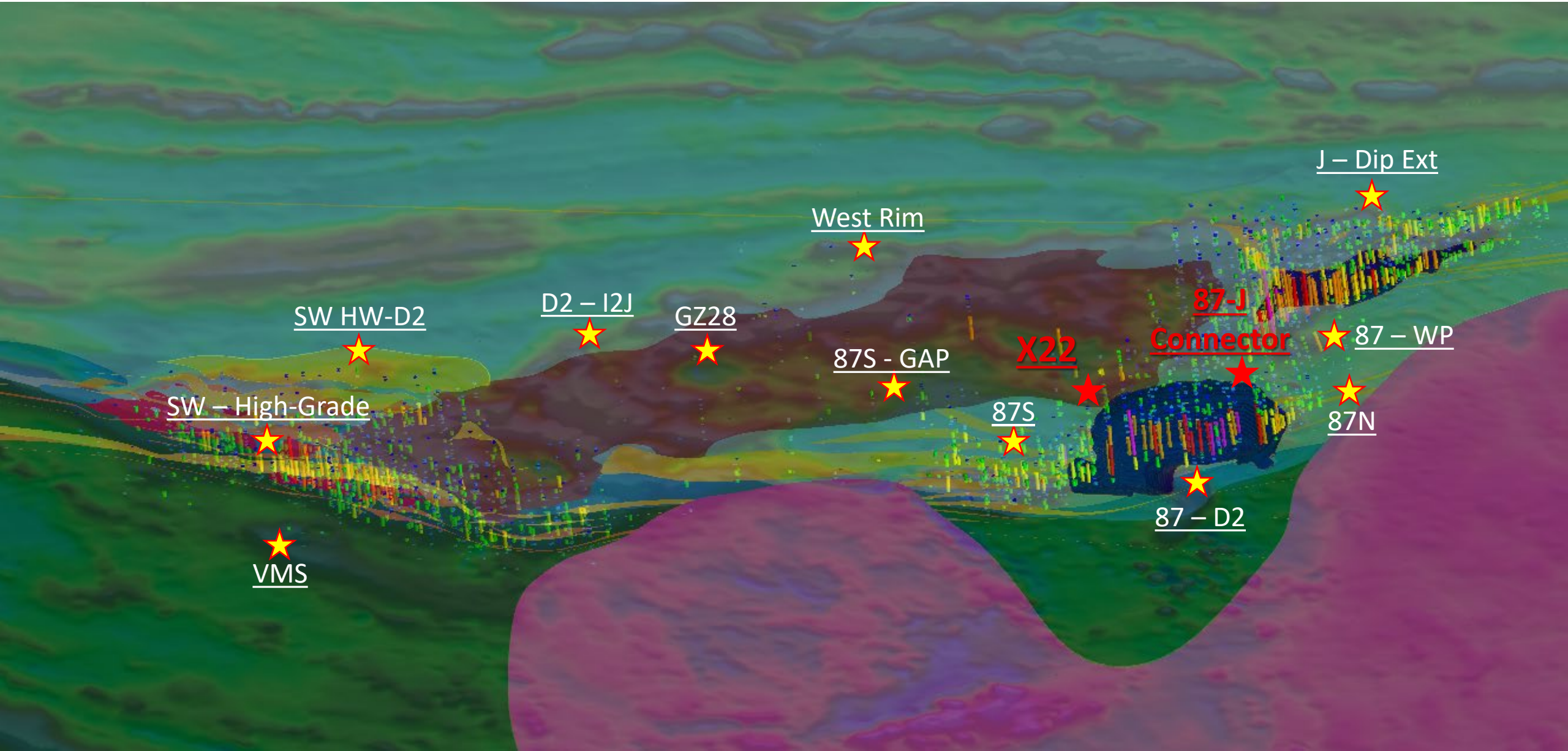
- Geology
- Metallurgical Testwork
- Mining
- Process Plant and Infrastructure

2023 Highest Priorities

- Focus on drilling, expanding and defining near pit high grade opportunities for the FS
- Evidence X22 Zone could extend several hundred metres into the Gap Zone
- Great potential for further definition of high grades between 87 and J pits

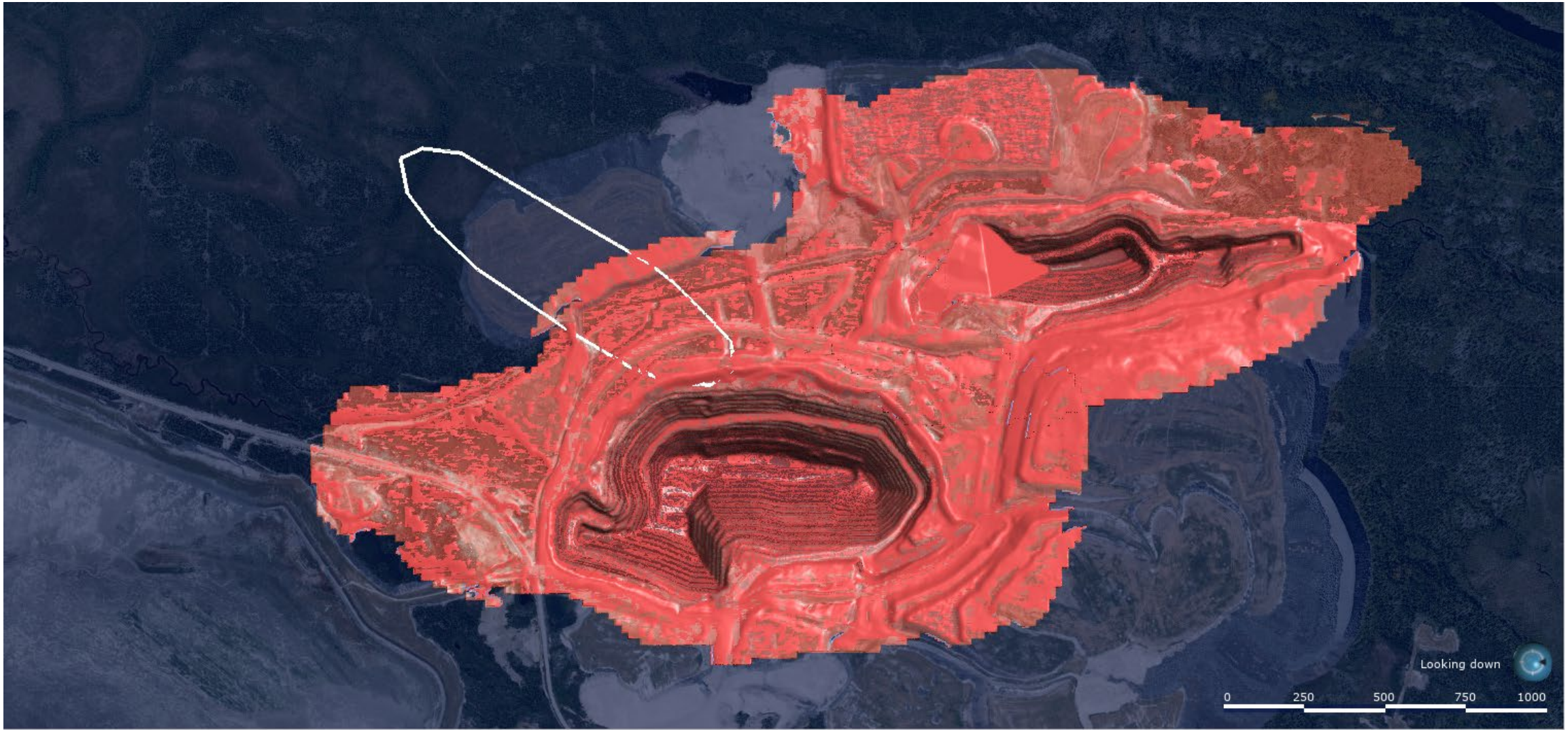


NEAR MINE TARGETS - 2023 BLUE SKY POTENTIAL



2023 BLUE SKY OPEN PIT POTENTIAL

2023 BLUE SKY OPEN PIT POTENTIAL



METALLURGICAL TESTWORK

Additional Planned Test Work

ERIEZ/FLSmidth Knelson

- Samples of material from the J, 87 and SW representing the new material that was not in the PEA pilot plant samples will be tested at Eriez. Work will included milling, gravity gold recovery, rougher/scavenger flotation, concentrate re-grinding and cleaner flotation. The new work will generated the following data:
    - Optimum grind size determination,
    - Au and Ag recovery to gravity concentrate and Au, Ag and Cu recovery to flotation concentrate
    - Concentrate mass pull weights for each deposit.

Base Metallurgical Laboratories

Base Met will conduct mineralogy and liberation characterization for representative samples of the J, 87 and SW Zones not previously characterized. Additionally, variability hardness characterization analysis including Bond Abrasion Index, Bond Rod Mill and Bond Ball Mill indexes, and SMG analysis will be conducted using ¼ core splits (7 – 10 samples per deposit)

Tomra Sorting Testing

Sample of mineralized material are being subjected to preliminary transmission x-ray analysis to determine if it would be possible to pre-concentrate the feed to flotation circuit.

MINING

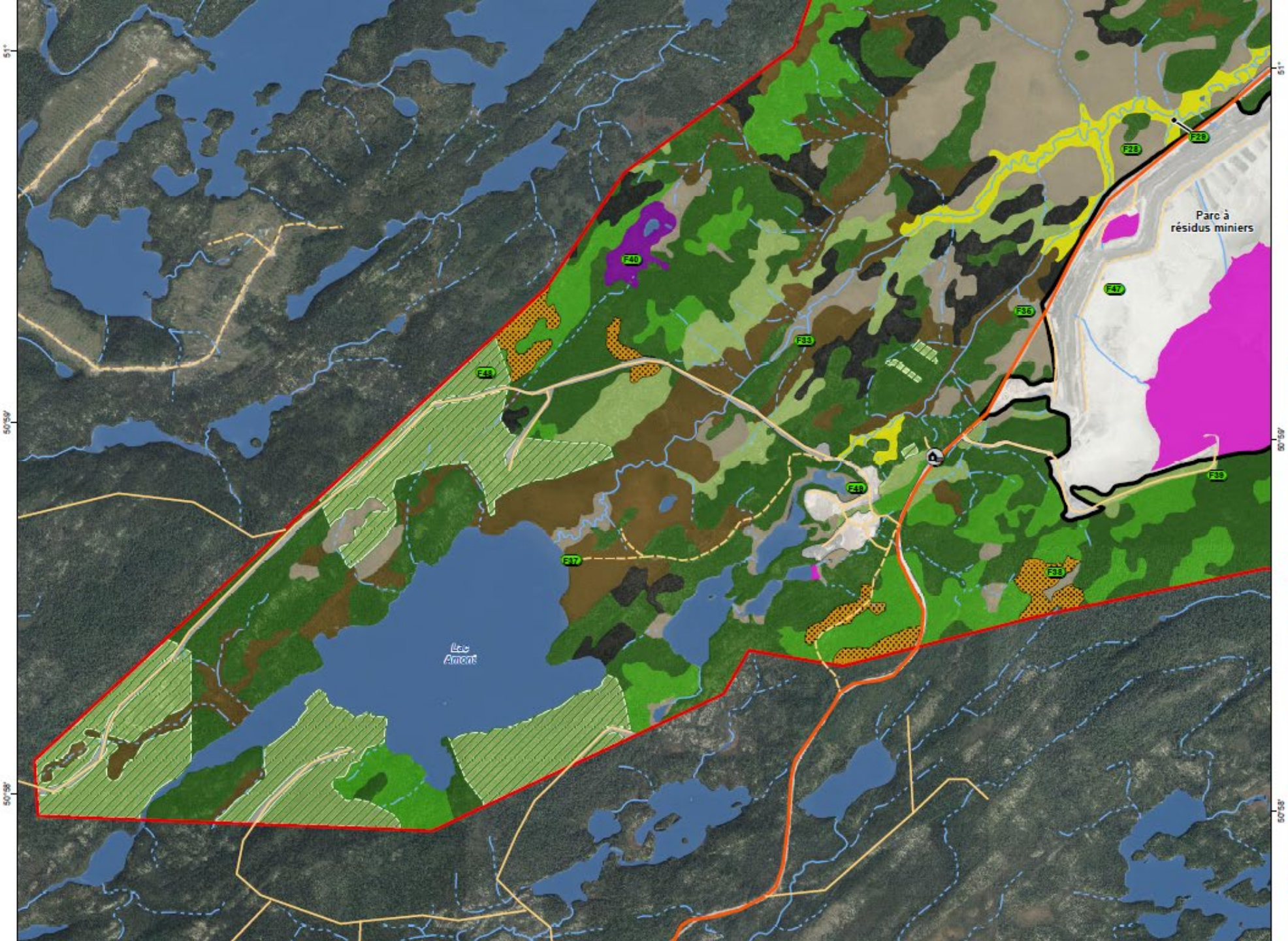
- Trade-off Studies
  - At Pit Crushing and Conveying to Waste Piles and Process Plant
  - Throughput Analysis 35 ktpd versus 50 ktpd
  - All Electric Haul Trucks

PROCESS PLANT AND INFRASTRUCTURE

- Trade-off Studies
  - Throughput Analysis 35 ktpd versus 50 ktpd
  - Power Upgrade to facilitate higher throughput and all Electric Mining
- Tailings Deposition
- Water Management Opportunities

Novembre 2022 – Water Management Workshop – Environmental aspects

Troilus Mine



Secteur sud

Sources
BDTQ 1:20 000, MRNF Québec, 2012
Réseau routier, Adresse Québec, 2019-07
Orthophoto, MRNF Québec, 2013
Inventaire, Wachiih, 2019

Fichier : 19-0071_VEc2-1a2-3_vegetation_191122.mxd

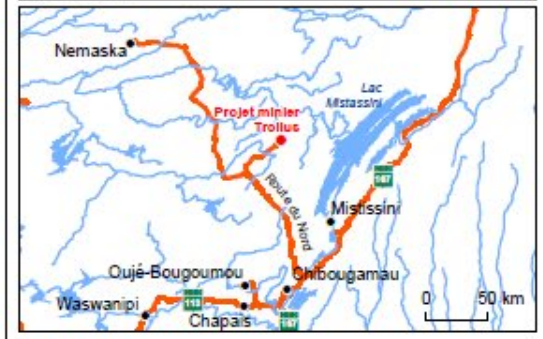
0 200 400 m

Projection : MTM fuseau 8, NAD83

N
O E
S

Carte 2-3

Wachiih TROILUS **Novembre 2019**



Hydrographie
- Cours d'eau intermittent
- Cours d'eau permanent

Végétation
- F1 Station d'inventaire de la végétation

Milieux terrestres
- Anthropique
- Dénudé sec
- Peuplement en régénération
- Coupe récente
- Peuplement feuillu
- Peuplement mélangé
- Peuplement résineux
- Peuplement d'intérêt phytosociologique

Milieux humides
- Étang
- Marais
- Marécage arbustif
- Tourbière boisée
- Tourbière ouverte
- Tourbière ouverte (réticulée)

Espèce végétale exotique envahissante
- Alpiste roseau

Infrastructures
- Bâtiments d'exploration
- Camp d'exploration
- Guérite
- Ligne de transport d'énergie
- Ancien site minier

Réseau routier
- Route d'accès
- Chemin carossable
- Chemin non carossable

Limites
- Zone d'étude

Projet minier Troilus
État de référence du milieu récepteur

Végétation et milieux humides
Secteur centre

Sources
BDTQ 1:20 000, MRNF Québec, 2012
Réseau routier, Adresse Québec, 2019-07
Orthophoto, MRNF Québec, 2013
Inventaire, Wachiih, 2019

Fichier : 19-0071_VEc2-1a2-3_vegetation_191122.mxd

0 240 480 m

Projection : MTM fuseau 8, NAD83

N
O E
S

Carte 2-2

Wachiih TROILUS Novembre 2019

Hydrographie
- Cours d'eau intermittent
- Cours d'eau permanent

Végétation
- F1 Station d'inventaire de la végétation

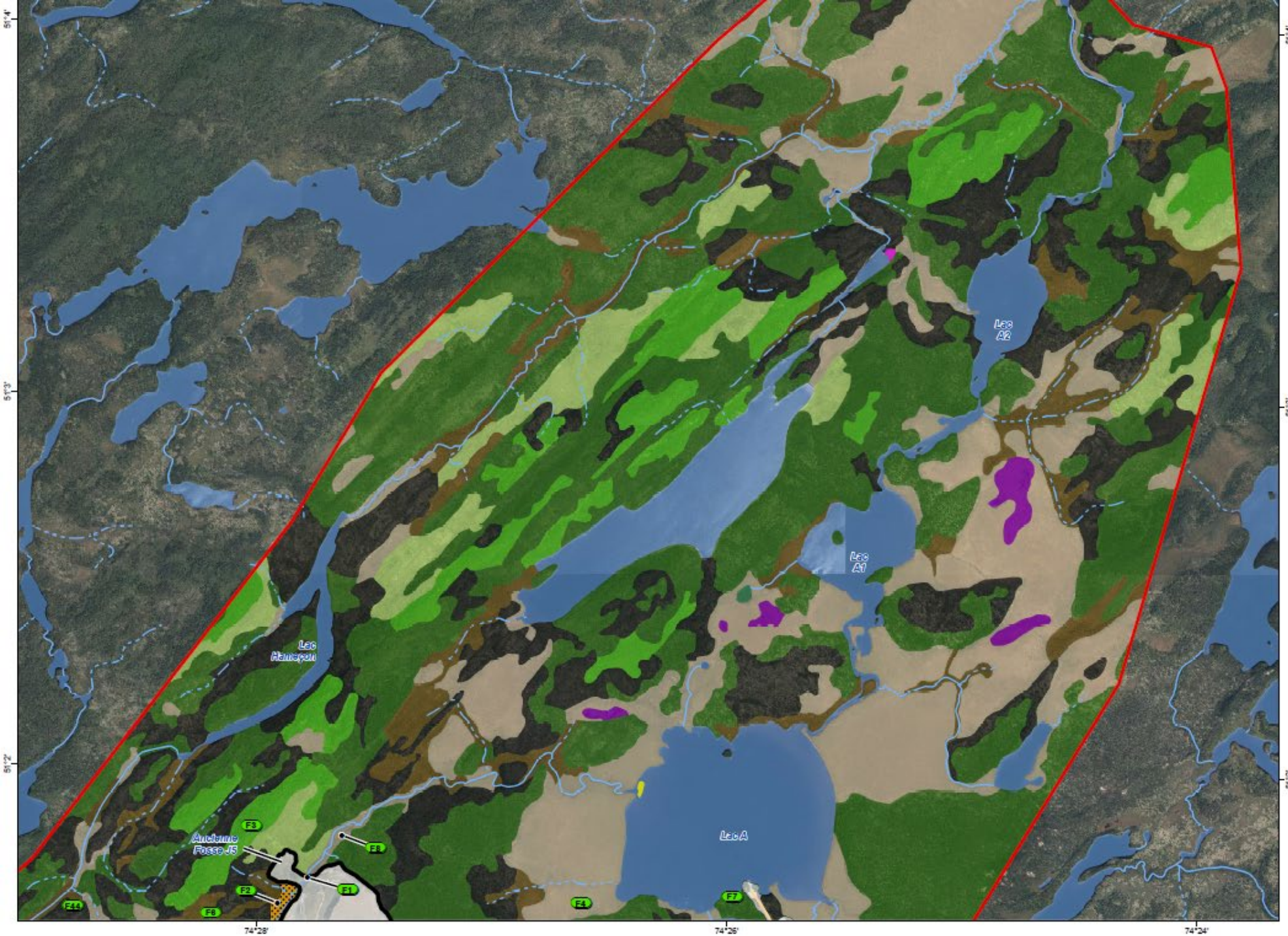
Milieux terrestres
- Anthropique
- Dénudé sec
- Peuplement en régénération
- Coupe récente
- Peuplement feuillu
- Peuplement mélangé
- Peuplement résineux
- Peuplement d'intérêt phytosociologique

Milieux humides
- Étang
- Marais
- Marécage arbustif
- Tourbière boisée
- Tourbière ouverte
- Tourbière ouverte (réticulée)

Espèce végétale exotique envahissante
- Alpiste roseau

Infrastructures
- Bâtiments d'exploration
- Camp d'exploration
- Guérite
- Ligne de transport d'énergie
- Ancien site minier

Réseau routier
- Route d'accès
- Chemin carossable
- Chemin non carossable



Réseau routier, Adresse Québec, 2019-07
Orthophoto, MRNF Québec, 2013
Inventaire, Wachiih, 2019

Fichier : 19-0071_VEc2-1a2-3_vegetation_191122.mxd

0 200 400 m

Projection : MTM fuseau 8, NAD83

N
O E
S

Carte 2-1

Wachiih TROILUS **Novembre 2019**

Hydrographie
- Cours d'eau intermittent
- Cours d'eau permanent

Végétation
- F1 Station d'inventaire de la végétation

Milieux terrestres
- Anthropique
- Dénudé sec
- Peuplement en régénération
- Coupe récente
- Peuplement feuillu
- Peuplement mélangé
- Peuplement résineux
- Peuplement d'intérêt phytosociologique

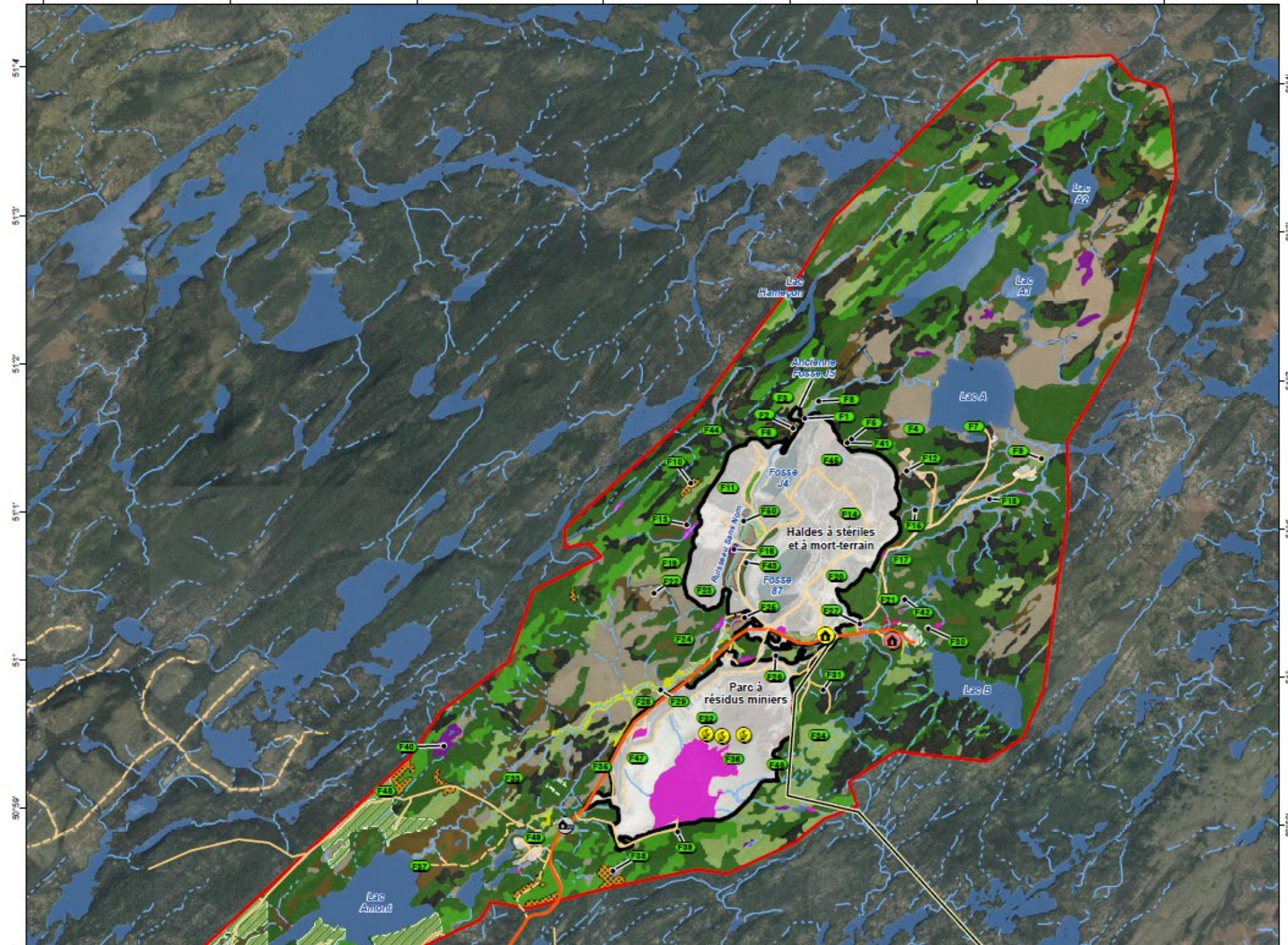
Milieux humides
- Étang
- Marais
- Marécage arbustif
- Tourbière boisée
- Tourbière ouverte
- Tourbière ouverte (réticulée)

Espèce végétale exotique envahissante
- Alpiste roseau

Infrastructures
- Bâtiments d'exploration
- Camp d'exploration
- Guérite
- Ligne de transport d'énergie
- Ancien site minier

Réseau routier
- Route d'accès
- Chemin carossable
- Chemin non carossable

Limites
- Zone d'étude



Projet minier Troilus
État de référence du milieu récepteur
Végétation et milieux humides

Sources
BDTQ 1:20 000, MRNF Québec, 2012
Réseau routier, Adresse Québec, 2019-07
Orthophoto, MRNF Québec, 2013
Inventaire, Wachiih, 2019

Fichier : 19-0071_VEc2_vegetation_19l122.mxd

N
O E
S

0 500 1 000 m

Projection : MTM fuseau 8, NAD83

Carte 2

Wachiih TROILUS **Novembre 2019**

Hydrographie
- Cours d'eau intermittent
- Cours d'eau permanent

Végétation
- F1 Station d'inventaire de la végétation

Milieux terrestres
- Anthropique
- Dénudé sec
- Peuplement en régénération
- Coupe récente
- Peuplement feuillu
- Peuplement mélangé
- Peuplement résineux
- Peuplement d'intérêt phytosociologique

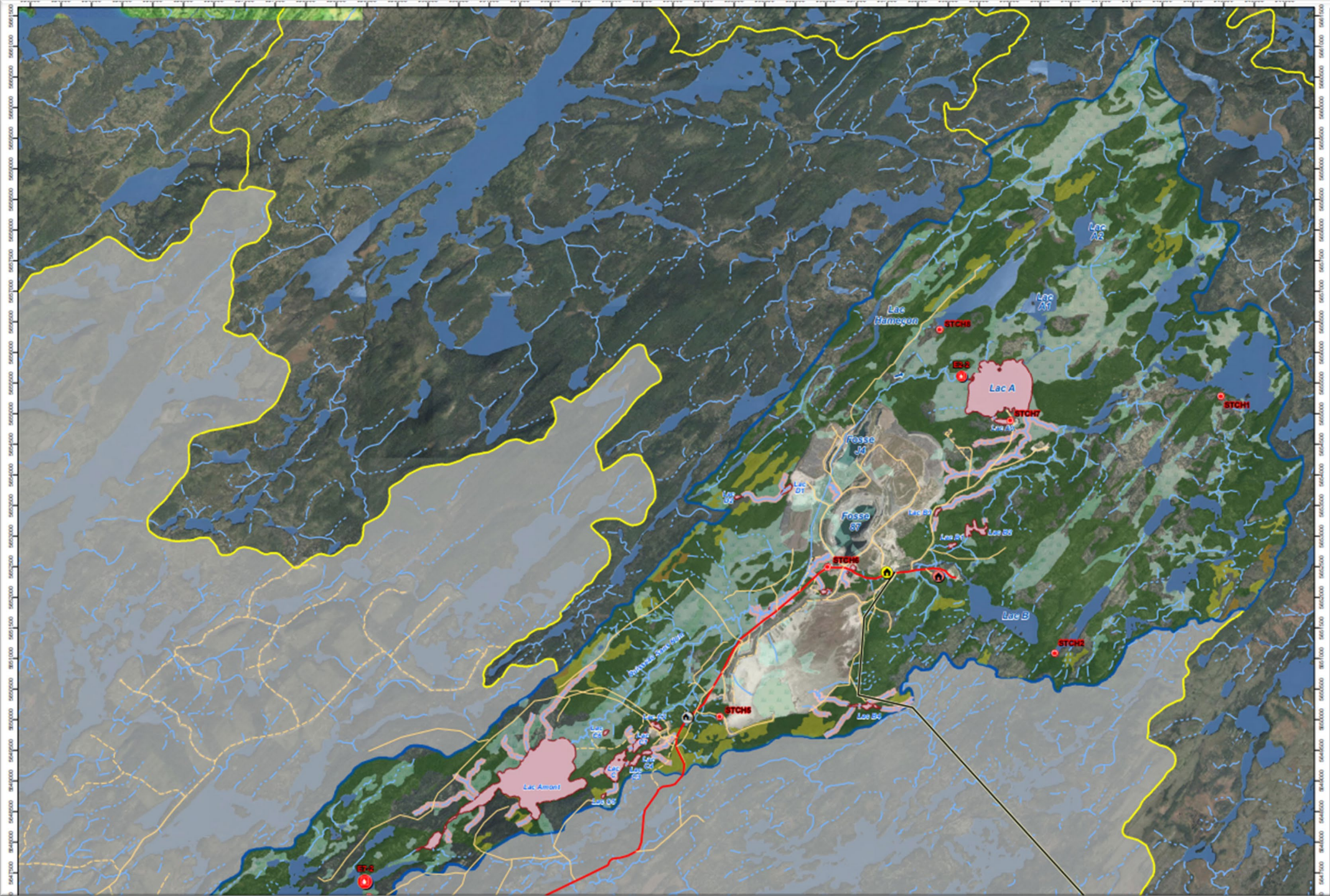
Milieux humides
- Étang
- Marais
- Marécage arbustif
- Tourbière boisée
- Tourbière ouverte
- Tourbière ouverte (réticulée)

Espèce végétale exotique envahissante
- Alpiste roseau

Infrastructures
- Bâtiments d'exploration
- Camp d'exploration
- Guérite
- Ligne de transport d'énergie
- Ancien site minier

Réseau routier
- Route d'accès
- Chemin carossable
- Chemin non carossable

Limites



Projet minier Troilus

Carte de travail 2022

Sources
BDTQ 1:20 000, MRNF Québec, 2012
Réseau routier, Adresse Québec, 2019-07
Milieux humides potentiels, MELCC, 2019
Peuplements écoforestiers 5e décennal, MFFP, 2022
Orthophotos, , MRNF Québec, 2013
Inventaire, Wachiih, DDM, , 2018-2021

Fichier : 22-0343_Ct_Travail_20220613.mxd

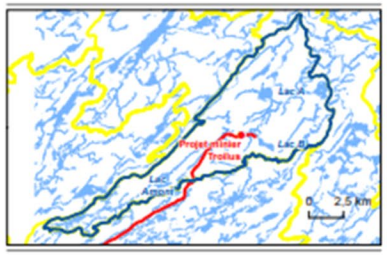
0 450 900 m

Projection : MTM fuseau 8, NAD83

Carte

Wachiih TROILUS

Juin 2022



Travaux projetés
- Station d'inventaire des chiroptères
- Station à échantillonner
- Cours d'eau ciblé
- Plan d'eau ciblé

Hydrographie
- Cours d'eau permanent
- Cours d'eau intermittent
- Bassin versant Troilus
- Bassin versant Broadback

Végétation
- Feuillu
- Mélangé
- Résineux
- Milieux humides potentiels

Infrastructures
- Bâtiments d'exploration
- Camp d'exploration
- Guérite
- Hélipad
- Ligne de transport d'énergie

Réseau routier
- Route d'accès
- Chemin carossable
- Chemin non carossable

Limite
- Zone d'étude

Main considerations

- Land use
- Environmental considerations
  - Water quality/quantity
  - Fish habitat and migration
- Technical considerations
  - Effluents
  - Water management construction vs operation vs closure.

Land use

- Water management plan should:
  - Respect and consider future land use
  - Limit impact on territory
  - Avoid sensitive or high usage areas
  - Allow land users to practice traditional activities
  - Avoid impacts on land user’s; water quantity, transportation; hunting/fishing practices

Land use- addressing past problems

- Water quality in Lake A during construction and operation.
  - Improved quickly after closure.
- Groundwater quality during operation.
- Suspended solids in tailings pond effluent; remains an issue 20 years after operation.
- Iron concentration in TSF exfiltration points.



Actual Environment

Environmental considerations

- Water quantity and quality
  - Geochemistry
- Wetlands and fish habitat
- Closure aspects

Water Quality – key concerns

- Separate contact water from non-contact
- Decrease risk associated with construction,spills, proximity with at risk infrastructue/activities.
- Try to reduce monitoring and follow-up complexity
- Protection measures associated with waste rock and tailings; gathering information to accurately predict water quality (geochemistry)

Geochemistry -Important Issues and Assumptions

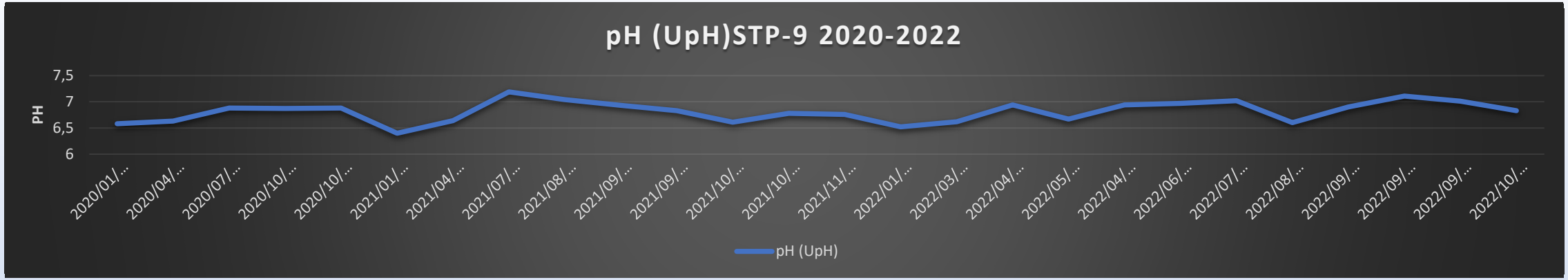
- Why do nearly all ABA for J4 done from 1992 to 2019 say existing J4 waste rock is almost entirely net acid generating (“PAG”), but acidic pH has not been measured at Monitoring Station STP-9?

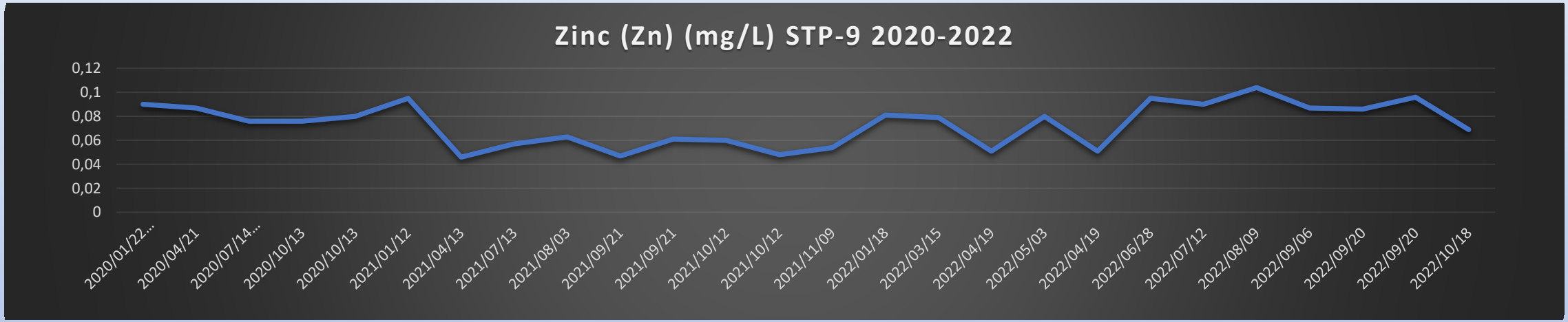
- Why have a few acidic rinse pH values down to pH 3.7 been measured in existing J4 waste rock, but acidic pH has not been measured at STP-9?

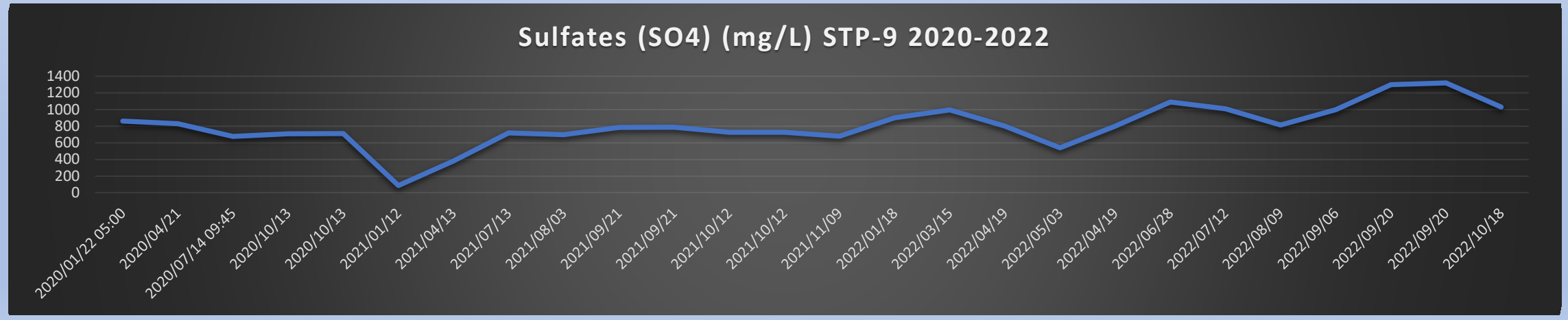
- Are predictions that ARD will appear in 100 years or 1000 years reasonable, or will ARD never appear? Goal of ongoing tests is to answer that

Assumptions For Design

- Waste rock is potentially acidic in the long term. Acidic water is not likely to occur during operation. Design for closure has to consider the waste rock can be acidic.


pH (UpH)STP-9 2020-2022
PH
7,5
7
6,5
6
2020/01/...
2020/04/...
2020/07/...
2020/10/...
2020/10/...
2021/01/...
2021/04/...
2021/07/...
2021/08/...
2021/09/...
2021/09/...
2021/10/...
2021/10/...
2021/11/...
2022/01/...
2022/03/...
2022/04/...
2022/05/...
2022/04/...
2022/06/...
2022/07/...
2022/08/...
2022/09/...
2022/09/...
2022/09/...
2022/10/...
pH (UpH)


Zinc (Zn) (mg/L) STP-9 2020-2022
0,12
0,1
0,08
0,06
0,04
0,02
0
2020/01/22...
2020/04/21
2020/07/14...
2020/10/13
2020/10/13
2021/01/12
2021/04/13
2021/07/13
2021/08/03
2021/09/21
2021/09/21
2021/10/12
2021/10/12
2021/11/09
2022/01/18
2022/03/15
2022/04/19
2022/05/03
2022/04/19
2022/06/28
2022/07/12
2022/08/09
2022/09/06
2022/09/20
2022/09/20
2022/10/18


Sulfates (SO4) (mg/L) STP-9 2020-2022
1400
1200
1000
800
600
400
200
0
2020/01/22 05:00
2020/04/21
2020/07/14 09:45
2020/10/13
2020/10/13
2021/01/12
2021/04/13
2021/07/13
2021/08/03
2021/09/21
2021/09/21
2021/10/12
2021/10/12
2021/11/09
2022/01/18
2022/03/15
2022/04/19
2022/05/03
2022/04/19
2022/06/28
2022/07/12
2022/08/09
2022/09/06
2022/09/20
2022/09/20
2022/10/18

Water quantity

- Different Creek diversion options and the construction of a big dam on Lake Amont could displace water into other watersheds. We want to avoid that as much as we can.
- In the past operation ‘’high infiltration rate from stream into J4 pit’’
- Ensure comparable input to Lake A

Wetland and fish habitat

- Avoid fish habitat loss. Try to create new potential fish habitat; sediment type, flow type, depth, temperature.
- Avoid wetlands… easier said than done. Wetland serve ecological purposes; filtering and carbon storage
  - Complexity, cost and compensation.
- Creek diversion aims to replace the old – no net loss
- Compensations projects are super hard to find for both wetlands and fish habitat.

  Compensation projects can be found with land users.
- Most recent projects had to go outside Eeyou Istchee to find compensation projects.
  - Compensation projects are very costly: seek to account for loss/degradation associated with project.

Closure aspects

- Leave a safe environment for humans and animals (open pits, slopes of waste piles, chemicals).
- Avoid complex water management especially during closure; passive treatment options, few effluents, water level management.
- Need to consider climate change for closure
- Site needs to ressemble the natural environment at closure.

Closure Conditions

- Site must be returned to natural state;
  - Safe for wildlife/humans
  - Traditional land use
  - No free dumping
  - Less steep slopes for waste piles
  - Accessibles roads
  - Energy available

Technical considerations

- Monitoring/control points
  - Location
  - Number of effluents
- Water treatment options for;
  - Heavy metals
  - Suspended solids
  - Nutriments
- Emmergency measures in case of;spills, dyke rupture, etc..
- Water management throughout all phases: Construction, operation,closure

Wrap up

- **Water management plan needs to consider:**

- Risk associated with: operations, geochemistry, human activity, management, climate change.
- Futur land and water use.
- Use of passive treatment options.
- Water anagement throughout mining life cycle.
- Limiting footprint and impat on fish habitat/wetlands.
- Higher initial costs could reduce overall operation/closure costs. CAPEX vs OPEX
- Beavers?..

Discussion aid

- Meandering; - erosion, + retention time, precipitation of metals naturally eg; iron.
- Using wetlands as filtering agents
- Cascades to oxygenate water.
- Retention bassins as fish habitat ponds/refuge after closure.
- Pits as sedimentation bassins/ pumping stations/waste storage.
- Using sedimentation bassins to reduce excavation depth requirements

Appendix 2 (Workshop option discussions and notes)

Summary of workshop held with land users and the Troilus project development team and engineering consultants on the water management plan held on November 14th and 15th 2022.

Person presents during the Troilus water management workshop -

Troilus Gold

Ian Pritchard
Mathieu Michaud
Jacqueline Leroux
Daniel Bergeron

WSP-Golder Associés Ltée
Jennifer Lallier
Laurent Gareau (online)
Mathieu Gosselin
Vlad Rojanschi
Sophie Bainbridge

Blue Metric
Rich Schmidt
Ali Nowamooz
Vincent Maklar (online Monday 14)

Cree land user
Charlie Awashish
Kenny Awashish
George Awashish
Eugene Neeposh
Samantha Awashish

AGP
Willie Hamilton
Lamont
Ann Lamontagne (didn't attend to the meeting)

Group 1 Room Mont Royal

Group 2 Room Taiga

Group 3 Room Boréale

On November 14th, the day was spent presenting relevant information and giving context for the water management option discussions to be held on November 15th. On the 15th, everyone was seperated into small groups to evaluate the pro's and con's of each option presented and proposing different options (Presented in the main report) .

Monday 14 November: Discussion notes and highlights

Room Mont Royal:

All participants start off in same room for the different presentations; Water management plan, mining plan, Tailings storage design and hydrology and hydrogeology discussion.

1h00-1h30 pm (eastern time) - Opening welcome and adoption of meeting Agenda- **Troilus Gold- (Ian Pritchard) and WSP-Golder (Jennifer Lallier)**

1h30-2h35 pm - Presentation of the ore extraction mining sequences and the most up to date waste rock design (Actual state, different years, end of exploitation, closure and rehabilitation). **AGP (Willie Hamilton)**

2h35-2h48pm - **Break**

2h48-4h05 pm - Actual Water management plan presentation around the Tailings storage facility (TSF) and for the whole site and the proposed alternatives. **WSP-Golder (Vlad Rojanschi)**
The following topics were discussed:

- For the actual option presented, the southwest dam will raise the current water level in Lake Amont by 4 m in order to allow new stream to be constructed that would border mountain range to the west.
- The Cree land users are concerned about having no fish left due to the actual option proposed with the dam within Lake Amont.
- Discussion with the Cree land users about the change that occurred during the diversion of the old channel to the current one. No major changes were noted by them.
- The Cree land users are asking if any studies were carried on regarding the fish migration from Lake Amont to Lake A. According to the Cree land users, it is the same fish population in both lakes but Lake Amont has better water quality than Lake A and numbers before mining haven't change a lot.

4h05-4h10pm - **Break**

4h10-5h35 pm - Proposed TSF design presentation including the hydrogeological model results following the dewatering of the pits. **WSP-Golder (Sophie Bainbridge, Mathieu Gosselin)**
The following topics were discussed:

- The cyanide concentrations in the water.
- Lot of iron in the surface water.
- Unnamed creek should be called Bibou Creek according to Cree land users.

5h35-5h40pm - **Closure**

End of the day

Tuesday 15 November:

Room Mont Royal:

8h35-9h40 am - Technical study update-**Troilus Gold (Ian Pritchard)**
The following topics were discussed:

- Cyanide is used in the final purification process but it is used in a closed circuit, and none is going in the tailings.
- Two types of chemicals are used in the process.
- 5 years permitting, 2 years construction and 13 years mining operation + closure (min 5 years) (so a total of 25 years).

9h40-10h40 am - Environmental constraints presentation (geochemistry and other issues to take into consideration within the impact assessment)**- Troilus Gold (Mathieu Michaud/ Jacqueline Leroux)**

10h40-11h00 am - Break

11h00-12h30 am - Group discussion (x3) (group 1, 2 and 3) (discussion of the feasibility of the water management plan with the existing constraints and the different proposed alternatives)-**Everyone present at the WSP-Golder office and Laurent online in Group 1**. See the outcome of these discussions below from page 4.

12h30-1h15 pm - Lunch break

1h15-2h25 pm - Sharing the outcome of these 3 groups' discussion, see below from page 4.

2h25-3h00 pm – Closure of the two days meetings.

Group discussion (x3)

Group 1 Room Mont royal

Troilus Gold
Mathieu Michaud
WSP-Golder Associés Ltée
Jennifer Lallier
Laurent Gareau (online)
Cree land user
George Awashish
Charlie Awashish
Bluemetric
Ali Nowamooz

Option 1 Diversion channel

Pros:

- Allow to divert clean water from Lake Amont to Lake A and minimize mix of contact & non-contact water.

Cons:

- Permanent dam or dyke will reduce the fish habitat ,can create long term risks.
- Proposed 87 overburden pile and J overburden pile to be displaced futher from land user camps if possible and divert the water a bit higher than planned in option 1.

Variation: Is it possible to have a deeper trench instead of a dam as the Cree land user does not want any dam or dykes and add several sediment ponds but this will be an obstacle for the wildlife and land users.

Option 2 and 3 Bibou Creek across mine site (filling out J4 or 87 pit with water)

Pros:

- Use of the existing Bibou Creek along TSF toe

Cons:

- The fish habitat within the pit might be risky.
- Change of the creek location over time.
- Mix contact and non-contact water.
- Relocate the land user as the outlet of one of this option is going through their camp.
- Fish barrier.
- Only look at water management option and not the other engineering aspects.
- Stability issue while dewatering one pit and leave the other one full of water.

Variation: Divert water around J and 87 pits

Option 4: Diversion channel to Broadback Watershed

Pros:

- None

Cons:

- No go for the land users as important impact on the watershed and less water expected in Lake A.

In summary, it is highly preferable to make a permanent creek for the fish habitat to be developed with no dam and move Overburden 87 (OB87) waste pile if possible, otherwise move land users locations.

Group discussion (x3)

Group 2 Room Taiga

Troilus Gold
Ian Pritchard
WSP-Golder Associés Ltée
Mathieu Gosselin
Cree land user
Kenny Awashish
Eugene Neeposh
AGP
Willie Hamilton
Bluemetric
Vincent Mlakar

Option 1 Diversion channel

Pros:

- Allow to divert clean water from Lake Amont to Lake A and minimize mix of contact & non-contact water.
- Create a new water course.
- Water management around SW pit is simplified.

Cons:

- Permanent dam long can create term risks, need annual inspections.
- Risk that beavers dam the diversion channel and redirect water into the bottom of the valley.
- Risk to have increased water infiltration into ground and will not reach Lake A.

Option 2 Bibou Creek runs across mine site

Pros:

- Use of the existing Bibou Creek along Tailings storage facility (TSF) toe
- Most of the fish habitat preserved during operation.
- No dam.
- No diversion for long term closure.
- Divert channel around SW pit

Variation:

Divert water around J and 87 pits. Need to assess if diversion is better south or north of 87 pit which would allow to keep fish migration between Lake Amont and Lake A.

Cons:

- Loose buttress by the Waste rock storage facility (WRSF) at the toe of the TSF.
- Limits fish migration, without the addition of the fish barrier because fish would reach the lake without it.
- Mix contact and non-contact water.

Option 3 Diversion channel to Broadback Watershed

Pros:

- Less water to manage on site.
- Avoid mixing clean water upstream of Lake Amont

Cons:

- Affecting 2 watersheds.
- Likely affect Lake A level.
- Lose fish habitat between Lake Amont and Lake A.
- Contact and non-contact water downstream of Lake Amont still has to be managed.
- Very difficult permitting wise.
- Additional ecological baseline works to do which further delay project authorization.
- Closure works and water management between Lake Amont and Lake A still need to be done.

Group 3 Room Boréale

The discussion focused on Option 1 alone and on ways to improve it. Options 2 and 3 were not discussed.

Option 1 Diversion channel

- Most promising if it can be done without impacting water level and quality in Lake Amont. The potential negative effect on fish in Lake Amont is the main problem.
- It may be possible to design a diversion channel that does not impact Lake Amont's normal water level. This will require redesigning the waste rock pile in the valley.
- Such a channel would need guiding berms to prevent flood water levels to enter the mine site.
- The diversion channel could be permanent, that is, maintained for closure:
    - Once fish habitat is established in the channel, it doesn't need to be destroyed at closure.
    - It allows using the waste rock pile as a buttress against the TSF dam.
    - It might require building the channel from the beginning as a fish habitat.
- The diversion channel could be temporary, that is, removed for closure:
    - Fish habitat established in the channel would be destroyed at closure.
    - It doesn't allow using the waste rock pile as a buttress against the TSF dam. Troilus would need to leave a corridor between the waste rock pile and the TSF for the closure channel.
- The closure drainage plan would be more natural looking with the channel in the original valley.

Other discussed topics

- Consider optimization of waste rock locations and potential increase in height of waste rock.
- Consider measures to allow pit lakes to become fish habitat (for example, creating shallow depth areas by backfilling).