



# **AGNICO EAGLE**

**Meadowbank Complex**

## **Operational ARD-ML Sampling and Testing Plan – Whale Tail Mine**

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**DECEMBER 2025  
VERSION 8.0**

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## EXECUTIVE SUMMARY

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Agnico Eagle Mines Limited – Meadowbank Complex (Agnico Eagle) continues to operate the Whale Tail and IVR Pits, an underground operations and Haul Road, a satellite deposit located on the Whale Tail property, to continue mine operations and milling at Meadowbank Mine.

The Whale Tail property is a 408 square kilometre (km<sup>2</sup>) site located on Inuit Owned Land approximately 150 kilometres (km) north of the hamlet of Baker Lake and approximately 50 km northwest of Meadowbank Mine in the Kivalliq Region of Nunavut. The deposits are mined as an open Pit (i.e., Whale Tail and IVR Pits), and underground mining. Ore is hauled to the approved infrastructure at Meadowbank Mine for milling.

Two waste rock storage facilities are currently in operation: the Whale Tail WRSF, located north-west of the Whale Tail Pit, and the IVR WRSF, located east of the IVR Pit. Waste rock and overburden will be trucked to both facilities until the end of operations. The Underground WRSF, located east of the Whale Tail Pit, is a temporary facility as all mine waste rock from underground operations will be temporarily stored there before being returned underground as backfill material.

Waste rock, overburden and lake sediment were sampled and tested as part of a geochemical program presented in Volume 5, Appendix 5-E (Golder 2018). Among the six lithologies tested, two have low acid generating and metal leaching potential, while the remaining lithologies are either potentially acid generating and/or metal leaching rock. The overburden is non-potentially acid generating and non-metal leaching while the lake sediment is potentially acid generating and metal leaching. Testing will be completed on waste rock to identify material that is non-potentially acid generating and low leaching that can be used as construction and closure rock.

An approach is proposed to define if the waste rock lithologies can be used as construction/closure material or must be piled in the Whale Tail and IVR Waste Rock Storage Facility.

**DOCUMENT CONTROL**

Version	Date	Section	Page	Revision	Author
1	June 2016			The Operational ARD-ML Sampling and Testing Plan as Supporting Document for Type A Water Licence Application, submitted to Nunavut Water Board for review and approval	Golder Associates Ltd.
2	June 2018	All	All	Updated to address Term and Condition 8 (NIRB project certificate 008; March 15, 2018). Includes update to project nomenclature to reflect current usage.	Golder Associates Ltd.
3	November 2018	All	All	Update to address recommendation of CIRNAC and ECCC	Agnico Eagle
4_NIRB	November 2018	All	All	Update in support amendment to NIRB PC No. 008	Golder Associates Ltd.
4	March 2019	All	All	2018 Annual report updated version	Agnico Eagle
5	April 2019	All	All	Updated for the Expansion Project in support of the Nunavut Water Board (NWB) Type A Water License Amendment Process	Agnico Eagle
6	November 2020	All	All	Updated to reflect current operation at Whale Tail	Agnico Eagle
		3.1	6	Updated to reflect sampling frequency reduce in Whale Tail Pit	
		Appendix C		Added Whale Tail waster rock sampling rate reduction study	
7	December 2022	All	All	Updated to reflect current operation at Whale Tail	Agnico Eagle
		3.1	5	Updated to reflect sampling frequency reduce in IVR Phase 1 Pit	
		Appendix D	21	Added IVR Phase 1 Pit assay results for both NPR values and Arsenic values for the past three benches.	

7.1	February 2023	Appendix B	19	As per CIRNAC comments on Version 7 of the plan, flow chart has been revised to include the correct sampling frequency for uncertain samples classified as NPAG as outlined in Table 3.2 of this plan	Agnico Eagle
		Appendix C	20	As per CIRNAC comments on Version 7 of the plan, Appendix C has been added to the submission.	
8.0	December 2025	2.1	3	Closure information updated	Agnico Eagle
		3.1	5-7	Rationale included for sampling frequency modification at Whale Tail and IVR Pits	
		Table 3.0	8	Table updated to include approved and proposed sampling frequencies at Whale Tail and IVR Pits	
		Appendix B	19	Table updated with approved and proposed sampling frequencies at Whale Tail and IVR Pits	
		Appendix C	20	Appendix updated to include revised Whale Tail Pit Waste Rock Sampling Rate Reduction Study	
		Appendix D	38	Appendix updated to include revised IVR Phase 2 Pit Waste Rock Sampling Rate Reduction Study	

Prepared by: Environment and Geology Department



Approved by:

Alain Mouton  
Geology Superintendent



**DISTRIBUTION LIST**

Agnico Eagle – Superintendent of Environmental and Critical Infrastructures

Agnico Eagle – Environmental General Supervisor

Agnico Eagle – Environmental Supervisor

Agnico Eagle – Environmental Technician

Agnico Eagle – Engineering Superintendent

Agnico Eagle – Geology Superintendent

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## ACRONYMS

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ABA	Acid-Base Accounting
Agnico Eagle	Agnico Eagle Mines Limited – Meadowbank Complex
ARD	Acid Rock Drainage
HCT	Humidity Cell Test
LOM	Life of Mine
MEND	Mine Environment Neutral Drainage
MPA	Maximum Potential Acidity
ML	Metal (and arsenic) Leaching
NML	Not Metal Leaching
NIRB	Nunavut Impact Review Board
NWB	Nunavut Water Board
NP	Neutralization Potential
NPR	Net Potential Ratio
NPAG	Non-Potentially Acid Generating
Mine	Whale Tail Mine (including Pits and Underground)
PAG	Potentially Acid Generating
QA/QC	Quality Assurance / Quality Control
SFE	Shake Flask Extraction
TDS	Total Dissolved Solids
TIC	Total Inorganic Carbon
WRSF	Waste Rock Storage Facility

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**UNITS**

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%	percent
kg	kilogram(s)
km	kilometer(s)
km <sup>2</sup>	square kilometer(s)
mg/kg	milligram per kilogram
Mt	million tonne(s)
ppm	parts per million
t	tonne(s)
µg/g	micrograms per gram
wt%	weight percent

**SECTION 1 • INTRODUCTION**

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Agnico Eagle Mines Limited – Meadowbank Complex (Agnico Eagle) will continue to operate the Whale Tail and IVR Pits, underground operations, and Haul Road, located on the Whale Tail property, to continue mine operations and milling at Meadowbank Mine.

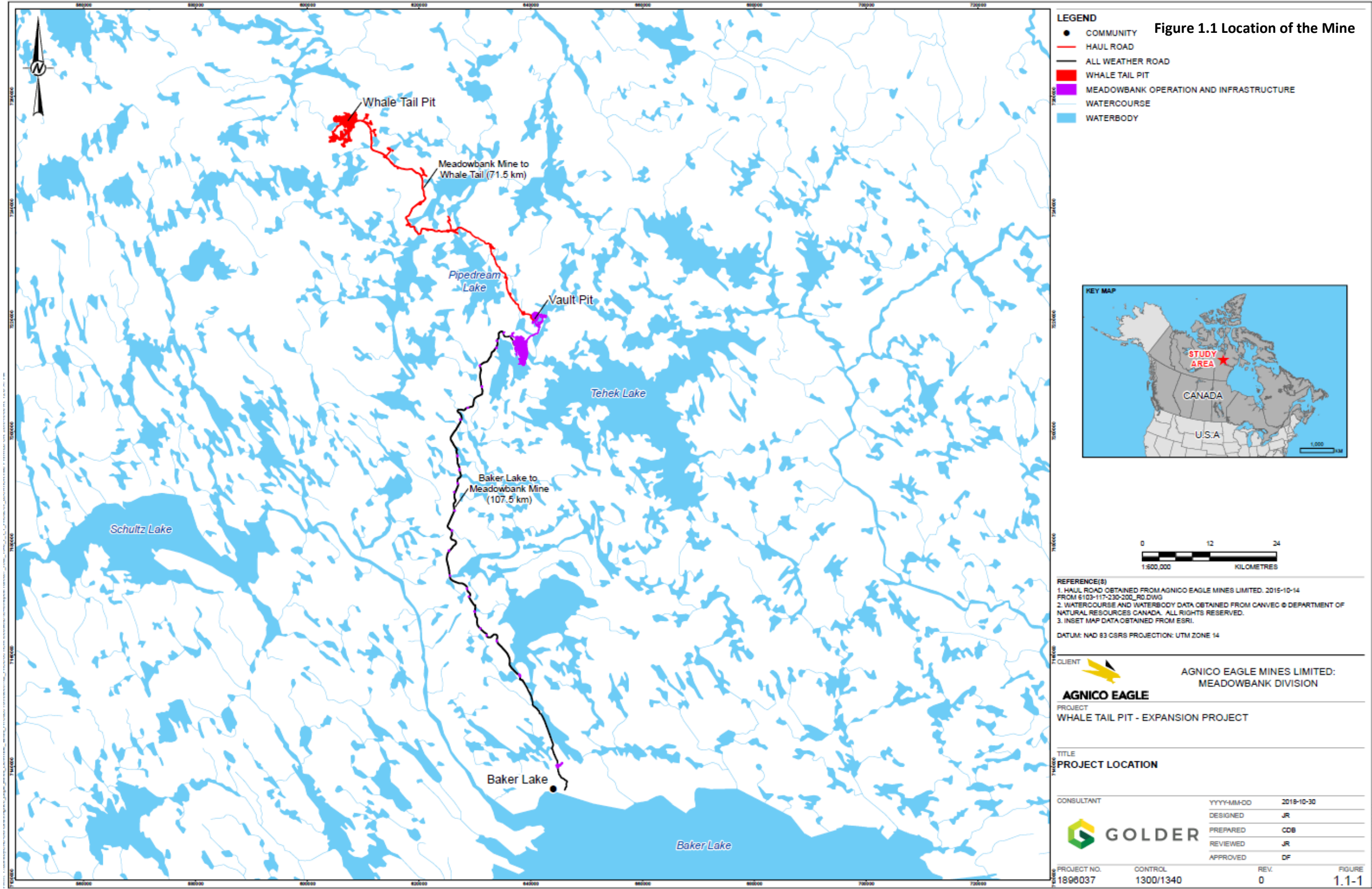
The Whale Tail property is a 408 square kilometre (km<sup>2</sup>) site located on Inuit Owned Land approximately 150 kilometres (km) north of the hamlet of Baker Lake and approximately 50 km northwest of Meadowbank Mine in the Kivalliq Region of Nunavut. The deposit is mined as an open Pit (i.e., Whale Tail and IVR Pits), and underground mining below Whale Tail and IVR Pits. Ore is hauled to the approved infrastructure at Meadowbank Mine for milling.

The general mine site location for the Mine is presented in Figure 1.1.

This document presents an update to the Operational Acid Rock Drainage (ARD) and Metal Leaching (ML) Sampling and Testing Plan (Plan), with the exception of thermal monitoring of waste rock, which is addressed in the Whale Tail - Thermal Monitoring Plan. The Plan is closely associated with the Whale Tail – Waste Rock Management Plan and the Whale Tail - Water Management Plan.

The objectives of the Plan are to define the sampling, analysis, and testing procedures that are to be implemented to define the acid generating and metal leaching potential of waste rock for the Mine. This characterization is to be used by mine staff to ensure that waste rock, overburden (till), and lake sediments are identified, managed, segregated and disposed of in an environmentally appropriate manner, as designated in this Plan. The Plan will also define if the waste rock, the overburden, and the lake sediment can be used as construction/closure material.

This Plan will be updated as required to reflect any changes in operation or economic feasibility occurs, and to incorporate new information and latest technology, where appropriate.





## SECTION 2 • WASTE ROCK MANAGEMENT

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### 2.1 Lithologies

There are six major bedrock types (or lithologies) found at Whale Tail and IVR deposits: komatiite, greywacke, chert, iron formation, basalt, and diorite.

The ARD and ML potential of each waste rock lithology, overburden and lake sediments was evaluated through a static and kinetic testing program (Golder 2018). Geochemical data collection is on-going and will continue throughout mining, per this plan. Details on the test methods used and results obtained are provided in Golder (2018; summarized in Appendix A). While the bulk of some of the lithologies is potentially acid generating (PAG) and/or ML, these lithologies do contain some material that is less reactive and non-potentially acid generating (NPAG) and/or non-metal leaching (NML).

The NPAG waste rock tonnage required for the construction of a 4.7m thermal cover can be consulted in the latest version of the Whale Tail Waste Rock Management Plan.

### 2.2 Waste Rock Segregation

Waste material segregation is described below. Further details on waste rock management can be found in the Whale Tail – Waste Rock Management Plan. Overburden generated from the Whale Tail Pit will be placed in the Whale Tail Waste Rock Storage Facility (WRSF) and overburden generated from the IVR Pits will be placed in the IVR Waste Rock Storage Facility (WRSF).

#### Waste Rock from Open Pits

Characterization of ARD/ML potential in the excavated waste rock is required in order to properly segregate it for use or disposal, is as follows:

- **General Construction and/or Closure** – Only rock that is NPAG and NML can be used for site construction, including dewatering dikes, WRSF cover construction and other closure requirements. It is the responsibility of the Geology Superintendent to ensure that all waste rock being used for construction or reserved for future use during closure has been characterized and verified as being NPAG and NML.
- **Disposal** – All other waste rock (PAG and/or ML), as well as overburden, will be placed within the Whale Tail WRSF or IVR WRSF for permanent storage.

#### Waste Rock from Underground

Waste rock from Underground will be stockpiled temporarily on surface in the Underground WRSF and will not be used for construction purposes. This rock will be entirely used as backfill in the mine such that no waste rock from underground will remain on surface after mine closure.

### **2.2.1 Waste Rock Storage Facility Design**

Most of the waste rock generated at the Whale Tail Mine will be placed in the WRSFs. Waste rock and overburden from the Mine not used for site development purposes will be trucked to the Whale Tail WRSF and IVR WRSF until the end of mine operations. More details about the configuration of the WRSFs can be found in the approved design report submitted to NWB 'Whale Tail WRSF Expansion and IVR WRSF Design Report and Drawings (December 2019)'.

## SECTION 3 • ASSESSMENT OF ARD/ML POTENTIAL AT WHALE TAIL AND IVR PITS

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Sampling and testing of waste materials for ARD and ML will be conducted during mine operations to segregate suitable waste for use in construction and for closure (Section 2.2) from that which will report directly to the Whale Tail WRSF or IVR WRSF. This section discusses field sampling methods, analytical testing, ARD/ML evaluation criteria, and the delineation of waste rock from the open Pits.

Appendix B includes a flow diagram of the process to be followed for waste rock sampling, testing, and segregation.

### 3.1 Field Sampling

Blast holes will be sampled for testing as part of the ARD/ML evaluation (Section 3.2). Sampling will proceed according to the following guidelines that are currently authorized:

- The default sampling frequency is every fourth blast hole in each blast hole pattern. The shallow benches in Whale Tail and IVR Pits will be sampled at a frequency of one sample every two blast holes.
- Drill holes will be spaced to ensure an even distribution of samples throughout the planned blast area.
- Drill cuttings are collected and fully mixed in a stainless-steel sampling tray placed beside the drill.
- The stainless-steel sampling tray contents will be transferred into a clean polyethylene plastic bag.
- Each sample will be collected from drill cuttings and will weigh at least 1 kilogram (kg).
- The samples will be labeled using a convention that is readily traceable back to the production blast hole numbers.

The Geology Superintendent will evaluate the default frequency based on the experience gained during the mining of the Whale Tail and IVR Pits from previous drilling, sampling analysis results and visual inspections. The sampling frequency will be reviewed periodically and the rationale for any changes will be clearly documented and implemented only with the prior approval of the Nunavut Water Board.

The sampling frequency at the Whale Tail site was previously reviewed and approved by the Nunavut Water Board in 2021 and 2023. Refer to previous versions of this management plan for additional information. The below presents the current proposed modifications to the default sampling frequency in Whale Tail and IVR Pits.

After six years of mining activity in the **Whale Tail Pit** and after accumulating substantial information and knowledge of the Whale Tail deposit, the Mine Geology team deemed necessary to review the waste sampling default ratios. The Geology Superintendent evaluated the default sampling frequency

of the waste rock based on the experience gained during the mining of Whale Tail Pit from previous drilling, sampling analysis, and visual inspections (including a study conducted on five subsequent benches) and concluded:

- The central and northern parts (north domain) of the Whale Tail Pit systematically return values either with an NPR below 1 or an Arsenic content above 75 ppm. The rock is classified as PAG/ML.
- The southern part (south domain) of the Whale Tail Pit is returning NPAG with a few standalone occurrences of PAG/ML material.
- Assay results show NPAG/PAG boundary is consistently controlled by the presence of a lithological contact separating these two domains.

Based on the above observations, the Geology Superintendent recommends:

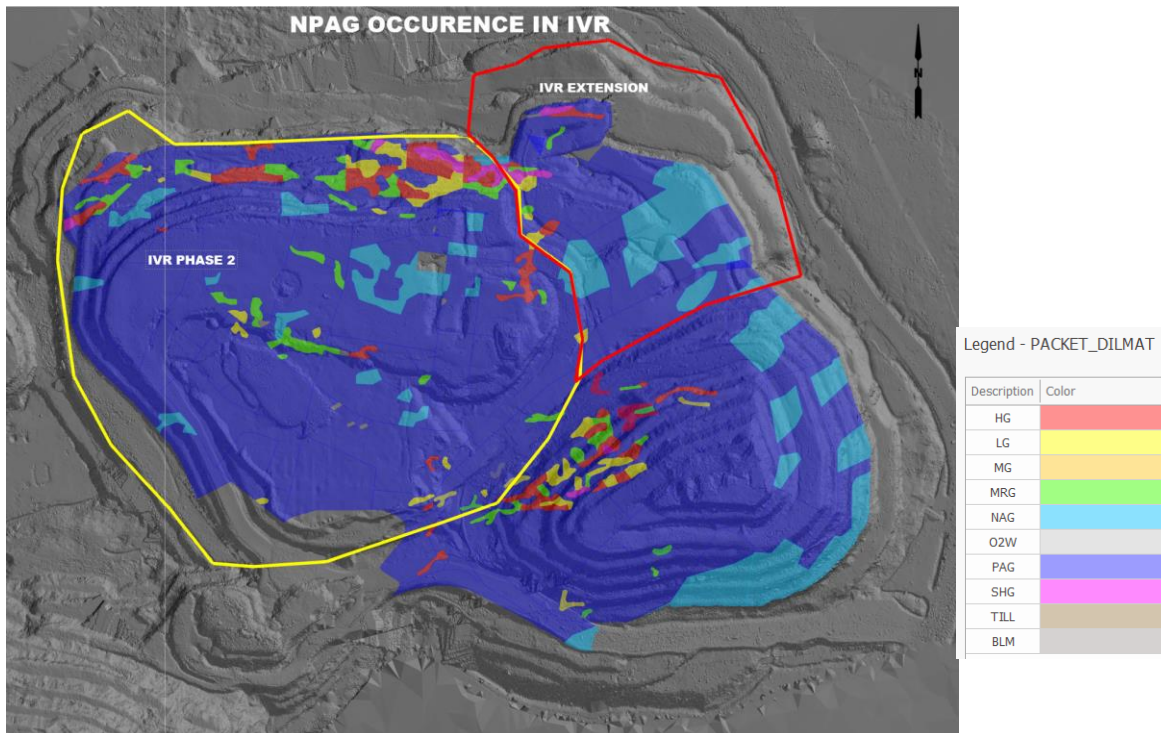
- Decreasing the 1/4 sampling ratio south of the lithological contact (the only area of the Pit with potential for NPAG/NML material) to a ratio of 1/8 and;
- Maintaining the sampling frequency for Carbon/Sulfur and Arsenic north of that same lithological contact to 1/16.

Appendix C presents the complete Whale Tail Pit waste rock sampling rate reduction study supporting the above changes to the plan.

After five years of mining the **IVR Pit** (initially Phase 1 and more recently Phase 2), and after accumulating substantial information and knowledge of the IVR deposit, the Mine Geology team deemed necessary to review the waste sampling default ratios. The Geology Superintendent evaluated the default sampling frequency of the waste rock based on the experience gained during the mining of IVR Pit from previous drilling, sampling analysis, and visual inspections (including a study conducted on four subsequent benches) and concluded:

- IVR Phase 2 Pit has been returning carbon and sulfur assay values translating in CaNPR values (as defined in Section 3.2 of this document), above the threshold value of 2 for the past four benches and typically ranging between 5 and 30 for the north-west part (North Basalt) and ranging from 20 to 300 for the south part (Central Sediment and Komatiite South) of the study area.
- Conversely, the arsenic content returned systematic values well above 75 ppm for the same set of samples and even systematically in the high hundreds of ppm's (usually ranging between 100-1000 ppm).
- The IVR Extension demonstrates few occurrences of minable NPAG/NML packets. For IVR Phase 2 the NPAG/NML packets are insignificant in terms of volume to deem suitable for mining separately (see Figure 1.2).

Figure 1.2 IVR Pit area of study showing the different material type found in the Pit



Based on the above observations, although non-acid generating per the CaNPR calculation, the material from IVR Phase 2 Pit must be systematically classified as PAG/ML due to its high content of arsenic and associated leachability potential. For this reason, the Geology Superintendent recommends to:

- Decrease the sampling frequency of 1/4 ratio for Carbon/Sulfur and Arsenic in IVR Phase 2 to 1/16 ratio. This would be applied to all remaining mining benches in the IVR Phase 2 Pit.
- Maintain the 1/4 sampling ratio for the remainder of the IVR Pit, including the IVR Extension.

Appendix D presents the complete IVR Phase 2 Pit waste rock sampling rate reduction study for both NPR and Arsenic values for the past four benches.

**Table 3.0 Recommended Sampling Frequency by Rock Type**

Rock Type WT Pit	Rock Unit Code WT Pit	Approved Sampling Frequency in WT Pit	Proposed Sampling Frequency in WT Pit
Komatiite North	V4a – 0a	Every 16 <sup>th</sup> hole	No change
Komatiite South	V4a – 0b	Every 4 <sup>th</sup> hole	Every 8 <sup>th</sup> hole
Greywacke Central	S3C – 3b	Every 16 <sup>th</sup> hole	No change
Greywacke South	S3S – 3b	Every 4 <sup>th</sup> hole	No change
Greywacke North	S3N – 3b	Every 16 <sup>th</sup> hole	No change
Chert	S10 – 3b	Every 16 <sup>th</sup> hole	No change
Iron Formation	S9E – 3b	Every 16 <sup>th</sup> hole	No change
Basalt South	V3 – 1b	Every 4 <sup>th</sup> hole	Every 8 <sup>th</sup> hole
Basalt North Gabbro	V3 – 1a / I3A	Every 16 <sup>th</sup> hole	No change
Diorite	I2 – 8b	Every 4 <sup>th</sup> hole	Every 8 <sup>th</sup> hole

Rock Type IVR (PH1 and PH2)	Rock Unit Code IVR (PH1 and PH2)	Approved Sampling Frequency in IVR Pits	Proposed Sampling Frequency in IVR Pits
IVR-PH-1 Komatiite North	V4A_0a	Every 16 <sup>th</sup> hole	No change
IVR-1 Komatiite South	V4A_0b	Every 16 <sup>th</sup> hole	No change
IVR-1 Mafic (North Basalt)	I3A	Every 16 <sup>th</sup> hole	No change
IVR-1 Central Greywacke	S3C-3b	Every 16 <sup>th</sup> hole	No change
IVR Extension Komatiite North	V4A_0a	Every 2 <sup>nd</sup> hole above 5144 elevation and every 4 <sup>th</sup> hole below 5144.	No change
IVR-2 Komatiite South	V4a – 0b	Every 2 <sup>nd</sup> hole above 5144 elevation and every 4 <sup>th</sup> hole below 5144.	Every 16 <sup>th</sup> hole
IVR-2 Mafic (North Basalt)	I3A	Every 2 <sup>nd</sup> hole above 5144 elevation and every 4 <sup>th</sup> hole below 5144.	Every 16 <sup>th</sup> hole
IVR-2 Central Greywacke	S3C-3b	Every 2 <sup>nd</sup> hole above 5144 elevation and every 4 <sup>th</sup> hole below 5144.	Every 16 <sup>th</sup> hole

*Agnico Eagle propose to reduce further the sampling frequency in IVR PH 2 to every 16<sup>th</sup> hole.*

### 3.2 Evaluation of ARD/ML Potential at Whale Tail and IVR Pits

The ARD and ML potential of all samples collected (Section 3.1) will be evaluated through laboratory testing, as described below.

#### 3.2.1 ARD Testing and Classification of ARD Potential (PAG / NPAG)

The most conventional method of characterizing the ARD potential of waste rock is to classify it as PAG, NPAG or of uncertain acid generating potential (uncertain ARD potential) based on the net potential ratio (NPR) value. The NPR is the ratio of the acid-buffering potential (neutralization potential or NP) and the acid generation (maximum potential acidity or MPA; assumed to be due to sulphide sulphur content, or total sulphur minus sulphate sulphur).

The geochemical characterization study (Golder 2018) examined the use of carbonate NP as a surrogate for bulk NP using data obtained from exploration drilling (Golder 2018). The carbonate NP and bulk NP correlate well ( $R^2 = 0.97$ ), implying that NPR calculated using carbonate NP is a safe assessment of available buffering capacity. Further, MPA is calculated based on the total sulphur content of the samples (rather than sulphide content), on the basis that there is no sulphate minerals present in any lithologies, which is conservative. This approach to ARD classification is based on observed trends in rock chemistry, mineralogy, and reactivity of neutralizing minerals (Golder 2018).

The ARD potential of waste rock is traditionally characterized through acid-base accounting (ABA) analyses, which involves a suite of analytical tests that include paste pH, total sulphur, sulphate sulphur, neutralization potential, and carbonate neutralization potential based on total inorganic carbon. Since ABA analyses are relatively slow to complete at a commercial laboratory and require several different types of equipment, the Meadowbank onsite assay laboratory is equipped to analyze total sulphur and total inorganic carbon overnight for the samples of drill cuttings. Mine staff will use these results to calculate the NPR value for each sample as follows:

- Total sulphur is converted into **MPA** by multiplying the total sulphur wt% by 31.25, which yields an MPA value in kg  $\text{CaCO}_3$  equivalent.
- Total inorganic carbon is similarly converted into a carbonate NP (**CaNP**) by multiplying the total wt% inorganic carbon (reported as %C) by 83.34 which yields an NP value in kg  $\text{CaCO}_3$  equivalent.
- The carbonate NPR for the blast hole drill cutting sample is then calculated as  
 **$\text{CaNPR} = \text{CaNP}/\text{MPA}$ .**

This approach is consistent with the use of total sulphur and total inorganic carbon to calculate the MPA and CaNP of waste rock material for the geochemical characterization study (Golder 2018).

The ARD potential of waste materials will be classified first based on total sulphur content and then using the NPR-based guidelines published by MEND (2009). Total sulphur will be used as an initial screening criteria to identify NPAG material, whereby a sample will be considered NPAG when it contains less than 0.1 wt% sulphur, regardless of the CaNP (Golder 2018). Where total sulphur is above 0.1%, the calculated carbonate CaNPR value will be used for sample classification, as summarized in Table 3.1.

**Table 3.1 ARD Classification of Waste Rock and Overburden**

Total Sulphur Screening Criteria	NPR Screening Criteria (based on Carbonate NP)	ARD Potential
Total S < 0.1%	-	Non-potentially acid generating (NPAG)
Total S > 0.1%	CaNPR > 2	
	$1 \leq \text{CaNPR} < 2$	Uncertain or low acid generating potential
	CaNPR < 1	Potentially acid generating (PAG)

### 3.2.2 Metal Leaching Potential Testing and Evaluation

Waste rock materials can also potentially leach metals (and other elements) when they come into contact with water and air, which is referred to as ML potential and can occur even if the materials are non-acid generating. Arsenic is identified as a parameter of environmental interest based on laboratory leaching tests completed to date (Golder 2018).

Standard laboratory techniques for analysis of ML potential include Shake Flask Extraction (SFE) and humidity cell tests (HCT). Both tests involve exposing the samples to water and measuring the metal content of the water after a prescribed period of contact time. The turn-around time for analytical results is too long for either of these tests to be used as a decision-making tool on a day-to-day basis as required during mine operations. Consequently, it is not feasible to segregate waste materials based on measured ML potentials derived from leaching tests.

However, the amount of arsenic released by leaching has been shown to be proportional to the total arsenic content of the sample (Golder 2018), whereby samples with total arsenic content below approximately 75 ppm (as µg/g or mg/kg) indicate a low potential to leach arsenic. This has been selected as a suitable identifier of arsenic leaching. Total arsenic will be analyzed at the Meadowbank on-site laboratory, and arsenic leaching potential be inferred based on the total arsenic content.

A surface runoff water monitoring program will be implemented for the Mine like it is at the other deposits of Meadowbank to detect ML in site contact waters. Further details on the water quality monitoring program are provided in Section 4.2.1.

### 3.2.3 Quality Assurance / Quality Control (QA/QC)

Mined rock samples will be subjected to the same quality assurance / quality control (QA/QC) program currently in use at Meadowbank, which includes the use of certified reference materials and duplicate analyses by an accredited external laboratory. Duplicate analyses include more complex testing described above for ARD classification (Acid Base Accounting or ABA), and metal leaching evaluation (bulk metal content and Shake Flask Extraction or SFE).

For the duplicate samples, the testing frequency of 75 samples per quarter that is currently in place at Meadowbank will be followed, however this frequency will be evaluated and altered as necessary



as the database increases. An approach was implemented in 2022 to establish the number of QA/QC samples required by rock type by quarter to achieve a good distribution regarding the proportion of each lithology to be mined during the quarter in progress. This ratio is based on the vertical advance of the Pits defined in the three months rolling plan produced by the engineering department.

Further, the duplicate test results will be used to confirm the total sulphur (0.1 %) and total arsenic (75 ppm) threshold values in place for waste classification. SFE results from the duplicate analyses will be evaluated against the proposed Effluent Quality Criteria for arsenic (0.1 mg/L) and the 75-ppm value will be modified as necessary based on the results.

### 3.3 Waste Rock Delineation and Tracking

Following laboratory analysis, geology staff will classify waste rock into the following types of material as defined in Table 3.2.

**Table 3.2 ARD Guidelines used to Classify Waste Rock and Overburden**

Waste Type	Criteria for Classification	Frequency of Outlying Data
NPAG/NML	Total S < 0.1% and/or CaNPR > 2 <i>and</i> Average Total Arsenic < 75 ppm	<ul style="list-style-type: none"> <li>• No more than one PAG (S&gt;0.1% and CaNPR&lt;1) for every 8 NPAG samples.</li> <li>• No more than one uncertain sample (S&gt;0.1% and 1≤CaNPR&lt;2) for every 4 NPAG samples.</li> <li>• Average total arsenic value is below 75 ppm</li> </ul>
PAG/ML	Total S > 0.1% and CaNPR < 2 <i>and/or</i> Average Total Arsenic > 75 ppm	<ul style="list-style-type: none"> <li>• Two or more PAG (S&gt;0.1% and CaNPR&lt;1) for every 8 NPAG samples.</li> <li>• Two or more uncertain samples (S&gt;0.1% and 1≤CaNPR&lt;2) for every 4 NPAG samples.</li> <li>• Average total arsenic value is above 75 ppm</li> </ul>

NPAG/NML waste can be used for construction (i.e. pads, roads, and dikes) and closure (i.e., WRSF cover material and other closure requirements) while waste rock classified as PAG/ML must be stored in the Whale Tail WRSF or the IVR WRSF. The criteria outlined in Table 3.2 can be re-evaluated when judged relevant by the Geology Superintendent in consultation with the mine engineer, as additional test data become available. The ARD/ML classification of all samples will be logged in a database for the Mine and will be available as required for annual reports or upon request. The rationale for any changes will be clearly documented and implemented only with the prior approval of the Nunavut Water Board.

CaNPR and total arsenic values will be transferred to the mine plans for each specific blast. Once blasting is complete the mine surveyor will identify the two waste categories: 1) suitable for use in construction or capping (NPAG/NML) and 2) non-suitable material (PAG/NML-ML and NPAG/ML). Outlines from the drill pattern will be used to outline the respective dig limits in the open Pit for each type of material. The different material types or packets will be identified in the field using stakes,

wire flags and flagging tape so that each type of material can be excavated and sent to the appropriate destination (see Section 2.2).

Both waste types 1) NPAG/NML and 2) PAG/NML-ML and NPAG/ML will be assigned a unique identification number and tracked in the Mine's fleet management system to their final location.

### **3.4 WRSF Thermal Cover Material Sampling/Testing Program**

The sampling frequency proposed will result in tens of thousands of samples tested to ensure NPAG and NML material is used for the thermal cover. This is far more than industry standards, but Agnico Eagle is committing to this sampling frequency to ensure clean cover material is used. In addition, the planned segregation program (Table 3.2) does not tolerate ARD-generating material, further decreasing the chance for material with ARD-ML potential in the cover.

Despite the level of effort to segregate rock during mining, Agnico Eagle will also confirm the cover properties after placement. Sampling of cover material would include approximate 80 samples based on MEND (2009) guidance collected from well spaced locations from the sides on top layer of the cover.

Monitoring of thermal properties of the pile and water quality generated from run-off are also included in the monitoring plan (described in Section 4), with results from both used to validate prediction models and determine if any changes will be needed to ensure the cover functions as designed.

**SECTION 4 • PLAN REVIEW, PERFORMANCE MONITORING & REPORTING**

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**4.1 Plan Review**

The Mine Geology Superintendent will be responsible for implementing the Operational ARD-ML Sampling and Testing Plan. The plan is to be reviewed as required by the Geology Superintendent and updated if necessary to reflect any adaptive changes made in the Operational ARD-ML Sampling and Testing Plan. The changes should be made in consultation with the mine engineer and chief assayer. Revised versions should be sent according to the Distribution List.

**4.2 Performance Monitoring**

The Operational ARD-ML Sampling and Testing Plan is the primary tool to ensure that all overburden and waste rock generated during the Mine is appropriately characterized and managed to prevent the future release of contaminants from the Whale Tail WRSF and IVR WRSF into the receiving environment.

In addition to the analytical QA/QC procedures outlined in Section 3.0, performance monitoring activities will include those activities outlined below.

**4.2.1 Water Quality Monitoring**

Water quality will be sampled and monitored by Agnico Eagle in accordance with the Type A Water Licence. The details of this monitoring program are described in the Whale Tail - Water Quality and Flow Management Plan. The data from this monitoring is to be provided to the NWB through annual reporting, as per the Type A Water Licence.

**4.2.2 Permafrost Development**

Thermistors will be installed within the Whale Tail WRSF and IVR WRSF to determine if permafrost formation is observed. More information is provided in the Whale Tail - Thermal Monitoring Plan. Thermal monitoring results are provided in Agnico Eagle's annual report submitted to the NWB.

**SECTION 5 • ADAPTIVE MANAGEMENT**

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**5.1 Management Actions**

Adaptive management will be achieved through performance monitoring (Section 4) and management actions that will be triggered by scenarios outlined in Table 5.1. Action level responses taken during the year will be documented in Agnico Eagle's annual report submitted to the NWB.

**Table 5.1 Adaptive Management Actions Associated with the ARD/ML Plan**

Thresholds	Mitigation Strategies	Potential Issues	Steps	Management Responses
Significant variations from model predictions are observed suggesting potential for ARD/ML Drainage	Use only NPAG/NML waste rock for site construction and closure	Observations of visible sulphide minerals or staining, inferring PAG rock was used in construction material across the site	<ul style="list-style-type: none"> <li>• Notify management</li> <li>• Note location and estimate dimensions of potential PAG/ML material</li> <li>• Collect samples of material from the observed area for analysis (Section 3.2)</li> <li>• Review results; if samples are PAG/ML, establish a monitoring station down gradient of the location</li> <li>• Review water quality sampling; if elevated metal concentrations are detected, proceed to management response.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider relocation of material to WRSF or cover with additional NPAG/NML rock, if possible, otherwise investigate other mitigation strategies.</li> <li>• Review the application of the ARD/ML sampling plan (i.e. sampling frequency, total sulphur and total arsenic threshold value, and material classification)</li> </ul>
	Confirm that waste rock being encountered exhibits the anticipated range of behaviour from baseline study	Higher proportion of waste rock is PAG/ML than anticipated	<ul style="list-style-type: none"> <li>• Geology to document the location and classification of samples to identify trends outside the anticipated geochemical behaviour of the rock types</li> <li>• Notify management if unanticipated trends are observed</li> <li>• Investigate options to source NPAG externally.</li> </ul>	<ul style="list-style-type: none"> <li>• Confirm the availability of sufficient NPAG/NML waste rock for closure</li> <li>• Confirm the availability of sufficient space in the WRSF for PAG/ML waste rock</li> <li>• Initiate a follow-up investigation to evaluate the implications</li> </ul>
	Prevent contamination of the thermal cover with PAG/ML waste rock	Waste rock used to construct the cover material is contaminated with PAG/ML waste rock	<ul style="list-style-type: none"> <li>• Continue to use Agnico Eagle Wenco System (dispatch system), to track and georeference each load of waste rock used to construct the thermal cover.</li> <li>• Once timing, location and quantity of the material placed is identified, assess alternatives to manage the potential contamination. Some alternatives include: <ul style="list-style-type: none"> <li>- Revisiting and updating the block model to identify lithology and geochemistry of waste material,</li> <li>- Re-running water quality model to evaluate impact of contamination on water quality, in the short term.</li> <li>- Excavating the material out of the waste rock cover.</li> <li>- Reinforcing training and to operational personnel.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Evaluate the causes of potential contamination and facilitate the resources to prevent and control the occurrence of future</li> </ul>
Significant variations from model predictions are observed in the water quality of the WRSF pond	Manage contact water quality to avoid exceedance to predicted levels	One contact water quality monitoring sample is different than predicted	<ul style="list-style-type: none"> <li>• Collect and analyze follow up confirmation samples to confirm results</li> <li>• If confirmed, notify management</li> </ul>	<ul style="list-style-type: none"> <li>• Initiate an investigation to reduce the effects of contact water quality, if possible</li> </ul>
		Water quality monitoring program identifies trends outside of those predicted, for a significant period of time (i.e. greater than two months)	<ul style="list-style-type: none"> <li>• Increase monitoring frequency</li> <li>• Notify management</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate alternative strategies to control effects to water quality</li> <li>• Investigate strategies to reduce seepage and runoff from identified sources</li> </ul>

Thresholds	Mitigation Strategies	Potential Issues	Steps	Management Responses
	Progressive covering of WRSF with thermal cover to minimize water in contact with PAG/ML rock during operation and closure	Cover placement is incomplete or not of sufficient thickness	<ul style="list-style-type: none"><li>• Monitor the placement of cover material on the WRSF to ensure appropriate thickness of cover</li><li>• Monitor temperature of cover and waste rock</li><li>• Monitor contact water quality</li><li>• Modify cover thickness with placement of additional material when thickness is not sufficient</li></ul>	<ul style="list-style-type: none"><li>• Waste Rock Facility Monitoring program to confirm completeness of cover on WRSF</li></ul>
		Thermal monitoring confirms that the waste rock cover freeze back is not occurring as anticipated	<ul style="list-style-type: none"><li>• As per Whale Tail Adaptive Management Plan</li></ul>	<ul style="list-style-type: none"><li>• As per Whale Tail Adaptive Management Plan</li></ul>

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**SECTION 6 • REFERENCES**

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Agnico Eagle (Agnico Eagle Mines Limited). 2016. Whale Tail Pit Project - Meadowbank Mine Final Environmental Impact Statement and Type A Water Licence Amendments. Amendment/Reconsideration of the Project Certificate (No. 004/ File No. 03MN107) and Amendment to the Type A Water Licence (No. 2AM-MEA1525). Submitted to the Nunavut Impact Review Board. June 2016.

Agnico Eagle. 2019. Whale Tail Pit Water Quality and Flow Monitoring Plan. Version 6.

Agnico Eagle. 2025. Whale Tail Waste Rock Management Plan. Version 14.

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Agnico Eagle. 2025. Whale Tail Thermal Monitoring Plan. Version 5.

Golder (Golder Associates Ltd.). 2018. Evaluation of the Geochemical Properties of Waste Rock, Ore, Tailing, Overburden and Sediment from the Whale Tail Pit, Agnico Eagle Mines, Meadowbank Division. Document No. 182. October 2018.

MEND (Mine Environment Neutral Drainage), 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. MEND Report 1.20.1. Mining Environment Neutral Drainage Program, Natural Resources Canada. December 2009.

NIRB (Nunavut Impact Review Board). 2020. NIRB Project Certificate [No. 008]. February 19, 2020.

NWB (Nunavut Water Board). 2020. Amended Water Licence #2AM-WTP1830, Whale Tail Project. May 2020.

## APPENDIX A • SUMMARY OF THE ARD/ML POTENTIAL OF WHALE TAIL AND IVR MINE WASTES

The acid rock drainage (ARD) and metal leaching (ML) potential of waste material to be produced at Whale Tail Pit, IVR Pit, and Underground has been evaluated through both static and kinetic testing (Golder 2018). The static tests conducted for this purpose included the following (Test methods and results are provided in (Golder 2018):

- Mineralogy;
- Whole rock analysis;
- Elemental solid phase analysis (multi-acid digestion);
- Acid base accounting (ABA);
- Net acid generation tests; and
- Shake Flask Extraction.

Kinetic testing was conducted on representative samples of waste rock from each lithology using standard 1 kg humidity cell tests, and on a subset of lithologies using 12 to 60 kg composite column tests, a 40 kg composite submerged column, and two 8 kg field cells. Test methods are provided in (Golder 2018).

Table A.0-1 summarizes the ARD/ML potential for the overburden (till), lake sediments, and Pit rock, based on the results of static and kinetic testing (Golder 2018). ARD potential was evaluated by comparing ABA results to the Canadian guidelines presented in MEND (2009). ML potential was evaluated by comparing kinetic test leachate results from each rock type to identify rock types with lower-end and higher-end leaching potential.

**Table A.0.1 Summary of ARD/ML Potentials of Waste Types**

Waste Type	Unit	ARD Potential <sup>1</sup>			Effluent Quality Criteria Exceedances in Test Leachate <sup>2</sup>	ML Potential <sup>2</sup>
		% PAG	% Uncertain	% NPAG		
Komatiite North	V4a – 0a	5	-	95	As	High
Komatiite South	V4a – 0b	29	-	71	As	Moderate
Greywacke Central	S3C – 3b	58	29	13	As	Variable
Greywacke South	S3S – 3b	-	-	100	-	Low
Greywacke North	S3N – 3b	16.6	16.6	66.6	Ni	Variable
Chert	S10 – 3b	87	4	9	As	Variable
Iron Formation	S9E – 3b	27	4	69	As	High
Basalt	V3 – 1b	-	3	97	As	Moderate
Basalt North / Gabbro	V3 – 1a / I3A	4.3	8.7	87	As	Moderate
Diorite	I2 – 8b	15	15	70	-	Low
Overburden	n.a.	-	-	100	Al, Cu, Fe	Low
Lake sediment	n.a.	-	-	100-	Al, As, Fe, Ni	High

<sup>1</sup>Percentage of total samples analyzed (Golder 2018), where PAG = potentially acid-generating; NPAG = not potentially acid-generating

<sup>2</sup>Based on the results corresponding to the bulk column composite samples (Golder 2018) with the exception of diorite which is based on humidity cell test results and overburden and lake sediment which are based on SFE results

n.a. = not applicable

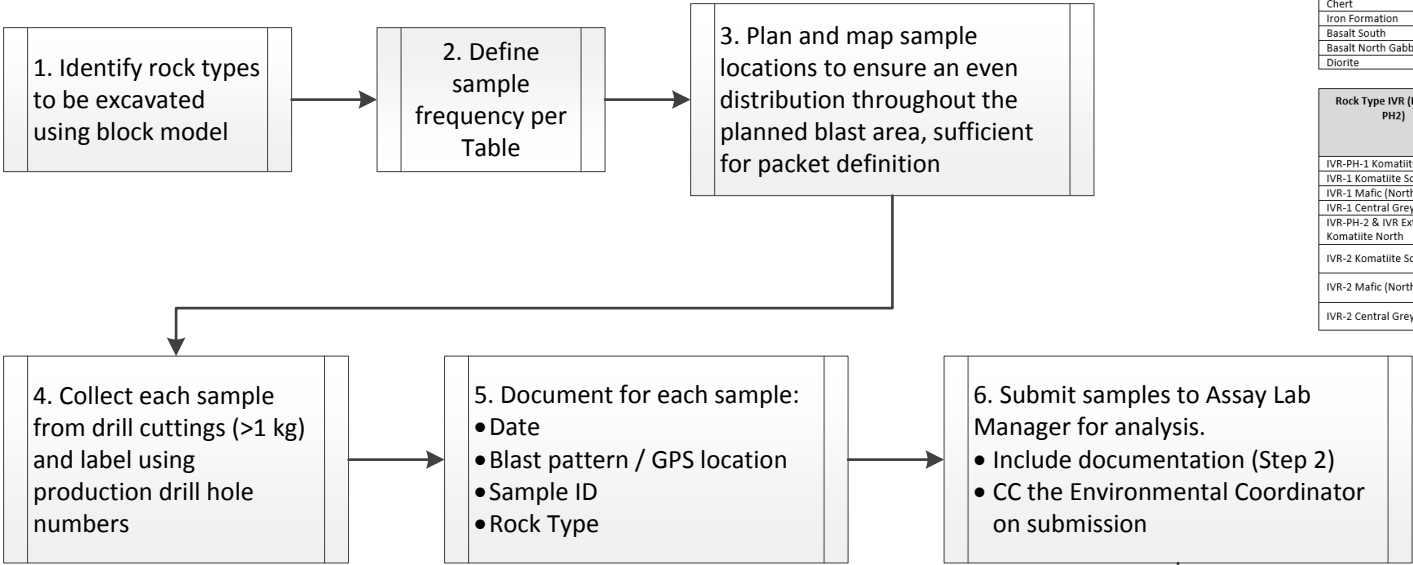


**APPENDIX B • FLOW CHART FOR WASTE ROCK DELINEATION AND SEGREGATION**

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STEP 1: SAMPLE COLLECTION<sup>1,2</sup>

Responsibility: Geology Superintendent

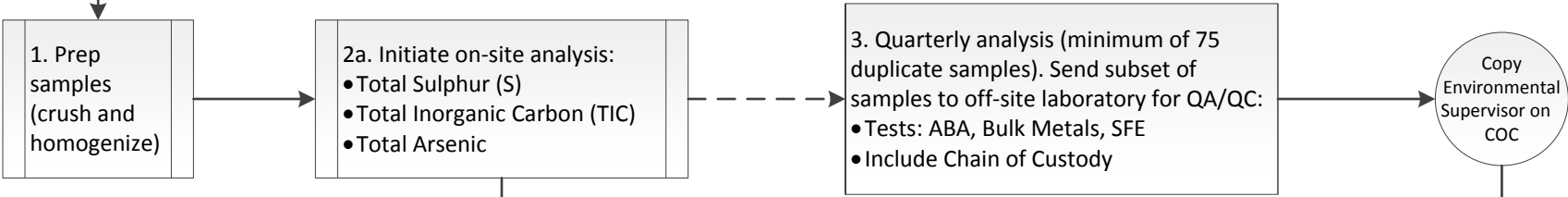


Rock Type WT Pit	Rock Unit Code WT Pit	Approved Sampling Frequency in WT Pit	Proposed Sampling Frequency in WT Pit
Komatite North	V4a – 0a	Every 16 <sup>th</sup> hole	No change
Komatite South	V4a – 0b	Every 4 <sup>th</sup> hole	Every 8 <sup>th</sup> hole
Greywacke Central	S3C – 3b	Every 16 <sup>th</sup> hole	No change
Greywacke South	S3S – 3b	Every 4 <sup>th</sup> hole	No change
Greywacke North	S3N – 3b	Every 16 <sup>th</sup> hole	No change
Chert	S10 – 3b	Every 16 <sup>th</sup> hole	No change
Iron Formation	S9E – 3b	Every 16 <sup>th</sup> hole	No change
Basalt South	V3 – 1b	Every 4 <sup>th</sup> hole	Every 8 <sup>th</sup> hole
Basalt North Gabbro	V3 – 1a / I3A	Every 16 <sup>th</sup> hole	No change
Diorite	I2 – 8b	Every 4 <sup>th</sup> hole	Every 8 <sup>th</sup> hole

Rock Type IVR (PH1 and PH2)	Rock Unit Code IVR (PH1 and PH2)	Approved Sampling Frequency in IVR Pits	Proposed Sampling Frequency in IVR Pits
IVR-PH-1 Komatite North	V4A_0a	Every 16 <sup>th</sup> hole	No change
IVR-1 Komatite South	V4A_0b	Every 16 <sup>th</sup> hole	No change
IVR-1 Mafic (North Basalt)	I3A	Every 16 <sup>th</sup> hole	No change
IVR-1 Central Greywacke	S3C-3b	Every 16 <sup>th</sup> hole	No change
IVR-PH-2 & IVR Extension Komatite North	V4A_0a	Every 2 <sup>nd</sup> hole above 5144 elevation and every 4 <sup>th</sup> hole below 5144.	No change
IVR-2 Komatite South	V4a – 0b	Every 2 <sup>nd</sup> hole above 5144 elevation and every 4 <sup>th</sup> hole below 5144.	Every 16 <sup>th</sup> hole
IVR-2 Mafic (North Basalt)	I3A	Every 2 <sup>nd</sup> hole above 5144 elevation and every 4 <sup>th</sup> hole below 5144.	Every 16 <sup>th</sup> hole
IVR-2 Central Greywacke	S3C-3b	Every 2 <sup>nd</sup> hole above 5144 elevation and every 4 <sup>th</sup> hole below 5144.	Every 16 <sup>th</sup> hole

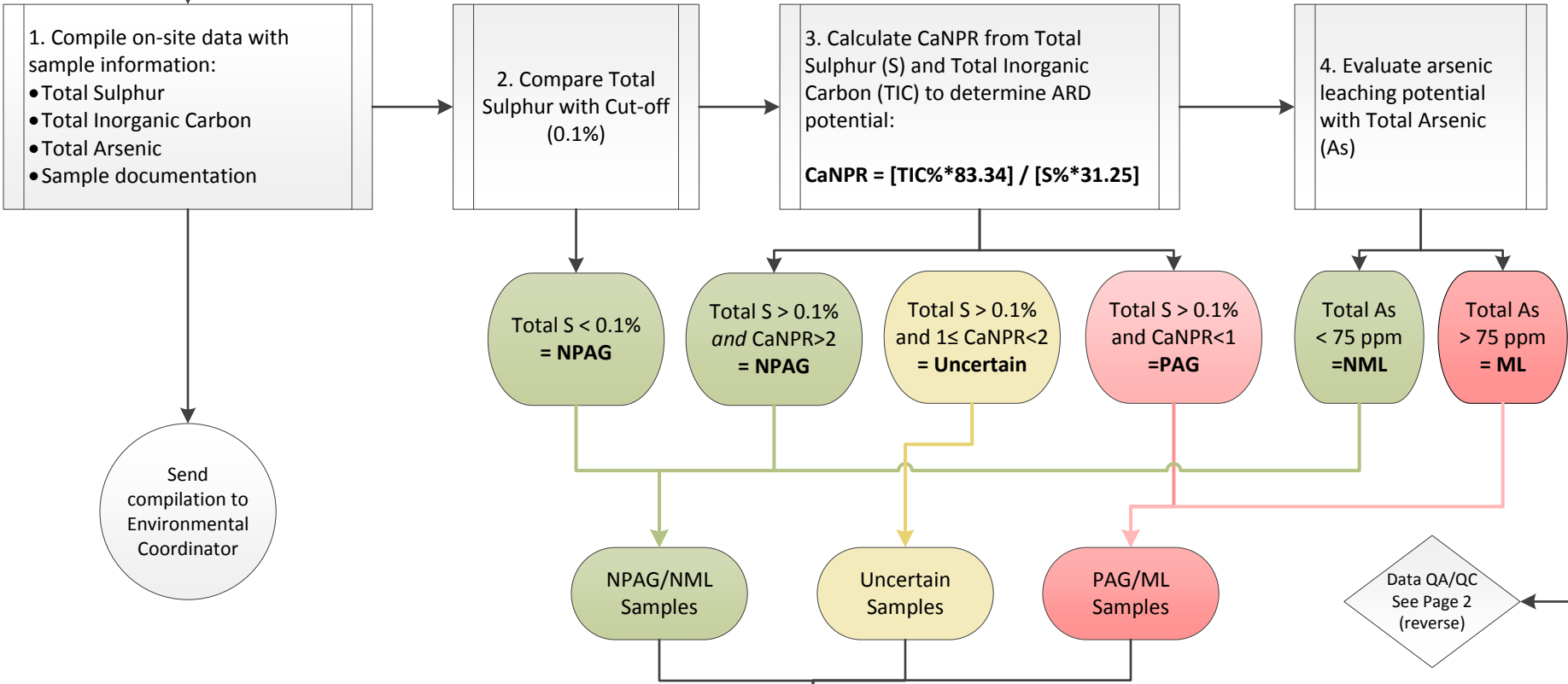
STEP 2: LABORATORY ANALYSIS<sup>1,2</sup>

Responsibility: Assay Laboratory



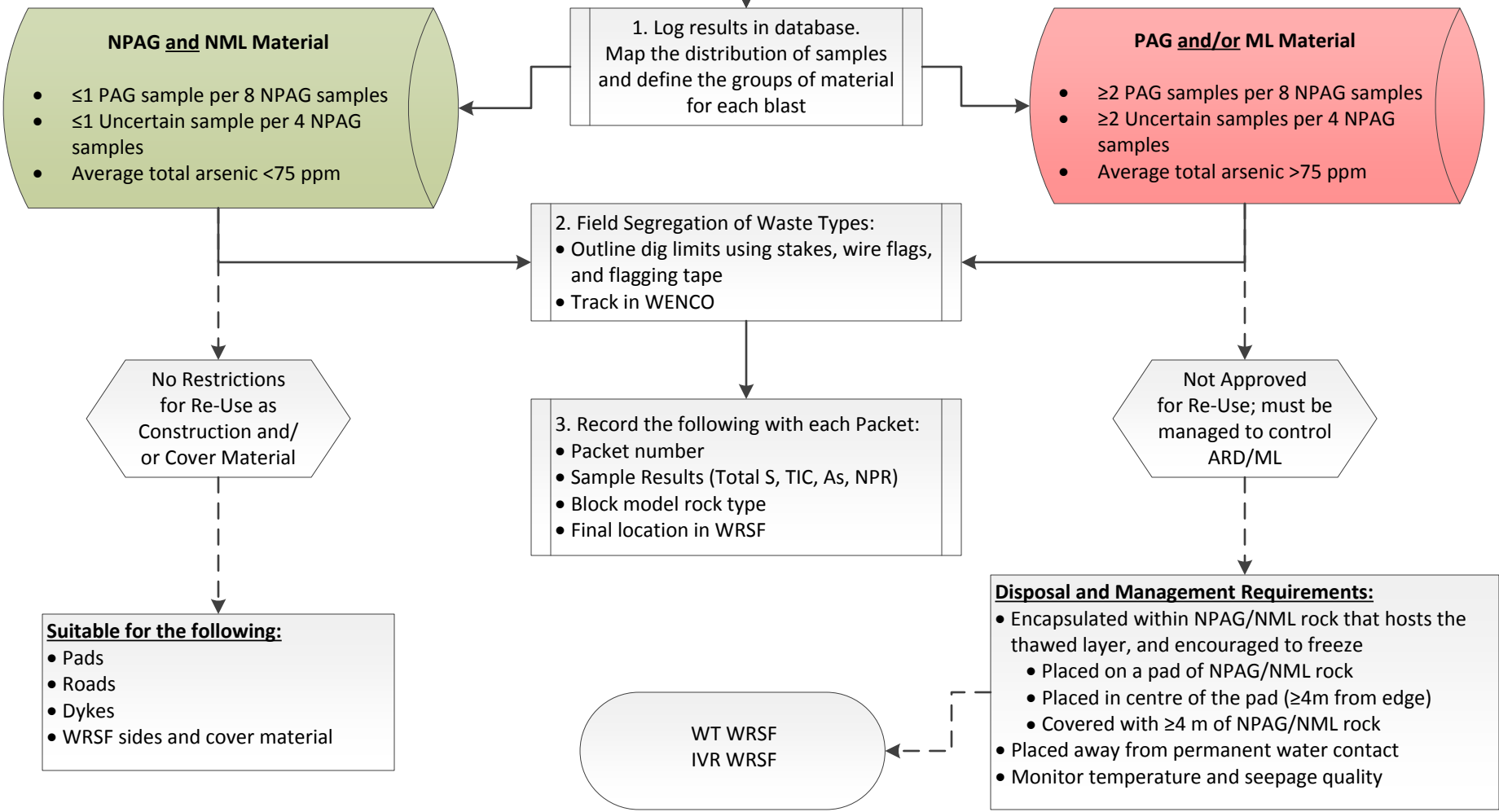
STEP 3: DATA EVALUATION AND ROCK CLASSIFICATION<sup>1</sup>

Responsibility: Geology Superintendent

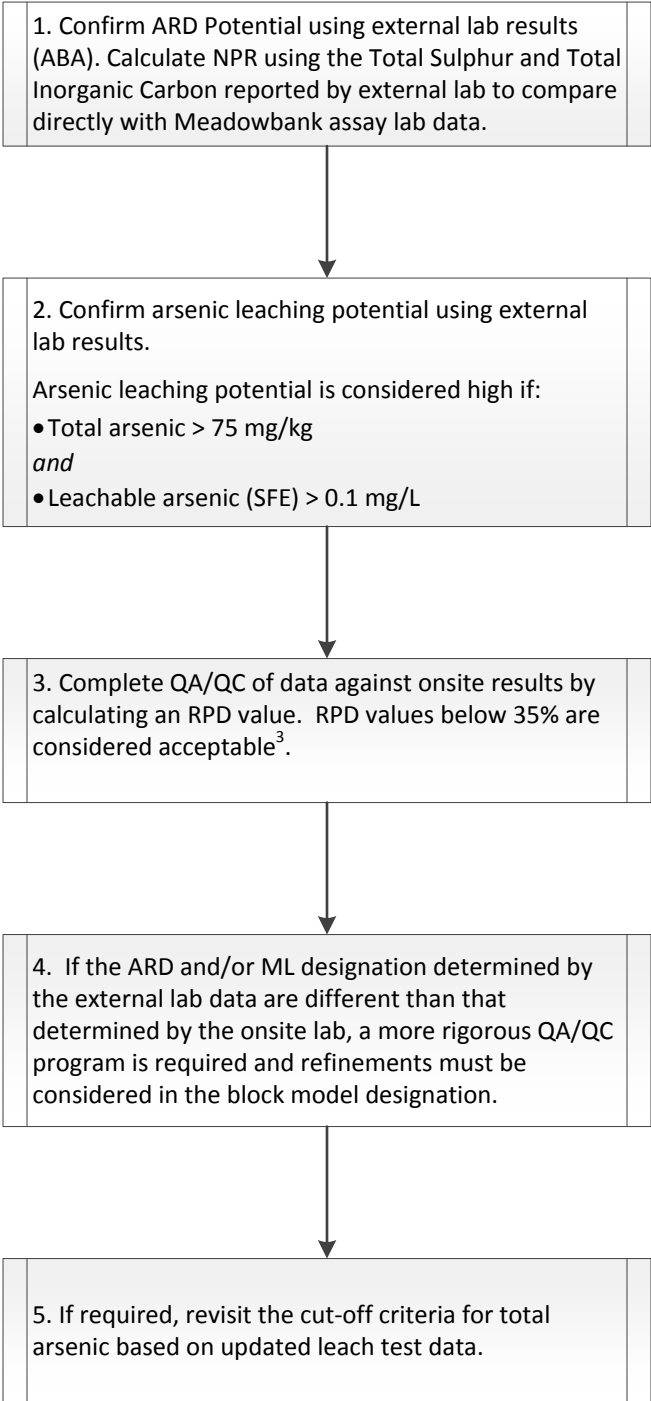


STEP 4: ROCK SEGREGATION AND MANAGEMENT<sup>1</sup>

Responsibility: Geology Superintendent, Engineering, Environmental Coordinator, Construction Supervisor



STEP 3a. DATA QA/QC – EXTERNAL LABORATORY  
Responsibility: Geology Superintendent / Environmental Coordinator



LIST OF ACRONYMS

ARD: acid rock drainage  
PAG: potentially acid generating  
NPAG: not potentially acid generating  
NPR: net potential ratio  
ML: metal leaching  
NML: not metal leaching  
ABA: acid base accounting  
Bulk metals: total metals by ICP  
WRA: whole rock analysis  
SFE: metal leaching by shake flask extraction  
XRF: x-ray fluorescence  
ppm = parts per million  
S = sulphur  
C = carbon  
As = arsenic

LIST OF ANALYTES AT EXTERNAL LAB

**ABA:** acid base accounting by Modified Sobek method. Includes paste pH, Bulk NP, analysis of total S and Total C by C/S analyzer (LECO Furnace), Acid Leachable Sulphate and Sulphide by difference.

**Bulk metals:** trace metals scan by aqua regia digest and analysis by ICP-MS and ICP-OES. Includes Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl, U, V, Zn

**WRA:** whole rock analysisor major oxides by Borate Fusion XRF. Includes SiO2, Al2O3, Fe2O3, MgO, CaO, Na2O, K2O, TiO2, P2O5, MnO, Cr2O3, V2O5, LOI

**SFE:** metal leaching by shake flask extraction, 24 hr leach extraction using DI water at 4:1 L/S ratio, and filtered leachate through 0.2 micron filter. Analysis of leachate includes pH, alkalinity, conductivity, anions (Cl, SO4, NO2, NO3, Br), ortho-phosphate, fluoride, mercury (by CVAAS), and trace metals by ICP-MS and ICP-OES (Ag, Al, As, B, Ba, Be, Bi, Ca, Cd, Co, Cr, Cu, Fe, K, Li, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Se, Si, Sn, Sr, Ti, Tl, U, V, Zn).

References:  
1-Operational ARD-ML Sampling and Testing Plan – Whale Tail Pit Addendum (Golder 2016)  
2- Procedure AMQ-ENV-PRO- Quarry and borrow pit ARD-ML Sampling for Construction  
3-EPA Guidelines for Inorganic Data Review, 1994

**APPENDIX C • WHALE TAIL PIT WASTE ROCK SAMPLING RATE REDUCTION STUDY**

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## Introduction

As indicated in Section 3.1 of the Plan above, a reduction in sampling rate frequency has been recommended by the Geology Superintendent for Whale Tail Pit.

After six years of mining activity in the Whale Tail Pit and after accumulating substantial information and knowledge of the Whale Tail deposit, the Mine Geology team deemed necessary to review the waste sampling default ratios.

A study was conducted on five subsequent benches worth of packet design. Ranging from 5018 to 4990 Pit elevations, the vertical advance in the Pit allowed us to confirm a strong correlation between the different lithologies in the Pit and their respective geochemistry in terms of Carbon/Sulfur and Arsenic contents. The goal of this study was to review the sampling frequency based on sampling analyses results and geological knowledge gained for the past six years and document the rationale for the recommended change.

Mine Geology staff have gathered enough confidence after multiple years of mining in the same deposit to demonstrate that the actual sampling ratio used in the waste rock can be decreased without affecting the results obtained during the waste rock classification process (NPAG/PAG).

The Geology Superintendent evaluated the default sampling frequency of the waste rock based on the experience gained during the mining of Whale Tail Pit from previous drilling, sampling analysis and visual inspections and concluded:

- The central and northern part of the Whale Tail Pit (north domain) systematically return values either with an NPR below 1 or an Arsenic content above 75 ppm. The rock is classified as PAG/ML.
- The southern part of the Whale Tail Pit (south domain) is returning NPAG/NML with a few occurrences of PAG/ML material.
- Assay results show that the NPAG/PAG boundary is consistently controlled by the presence of a lithological contact between the South Sediments unit and the Ultramafic volcanics unit (Komatiite).

Based on the above observations, the Geology Superintendent recommends:

- Decreasing the 1/4 sampling ratio south of the Sediment/Komatiite contact (the only area with potential for NPAG/NML material in the Pit) to a ratio of 1/8 and;
- Maintain the sampling frequency for Carbon/Sulfur and Arsenic north of that same lithological contact to 1/16.

## Data Collection

The dataset for this study consists of more than 11,000 drillhole samples collected from five benches within the Whale Tail Pit, spanning approximately 35 meters vertically across most of the Pit footprint. The benches included are 5018, 5011, 5004, 4997, and 4990. Each bench is mined in two flitches—top and bottom—Agnico Eagle’s standard practice is to split a full 7-meter bench into two 3.5-meter flitches. This approach improves ore control and selectivity during mining.

For these five benches, the following data have been gathered:

1. All available packet designs
2. Outline of the main controlling lithology 3D model
3. Georeferenced assays for every blast hole including:
  - a. Inorganic Carbon content
  - b. Total Sulfur
  - c. Arsenic content
  - d. Calculated NP, MPA, and NPR values

## Results

### Lithological Control – Plan Views

Figures 1 to 10 represent the plan views of the five benches of the study (divided by top and bottom flitch) of the Whale Tail Pit, illustrating the vertical continuity between the north and south domains. The north domain is classified as PAG/ML primarily due to elevated arsenic concentrations. The south domain is mainly classified as NPAG/NML. A lithological/geochemical boundary clearly separates these two domains (as explained above).



Figure 1: Plan View of all packets on 5018 top flitch

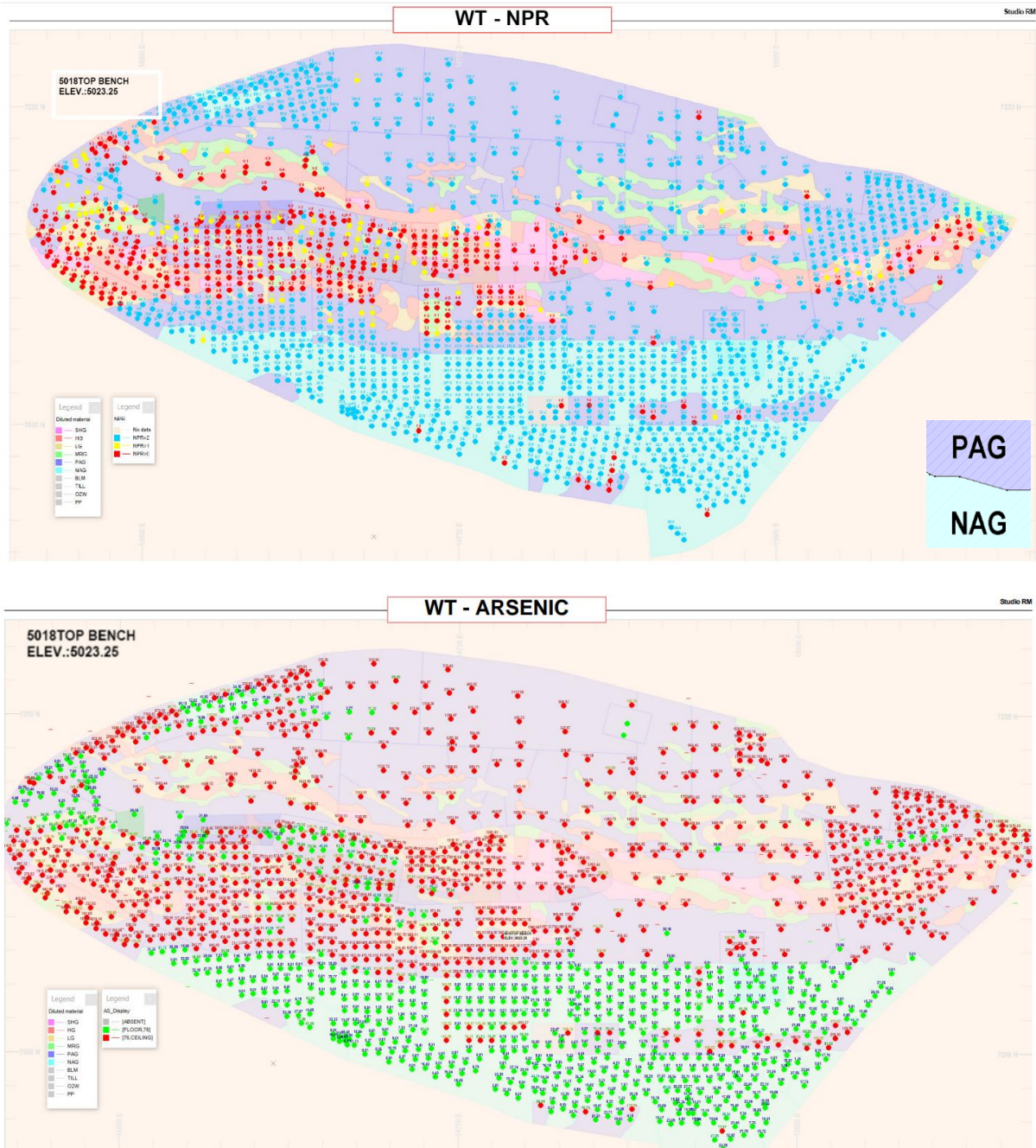


Figure 2: Plan View of all packets on 5018 bottom flitch

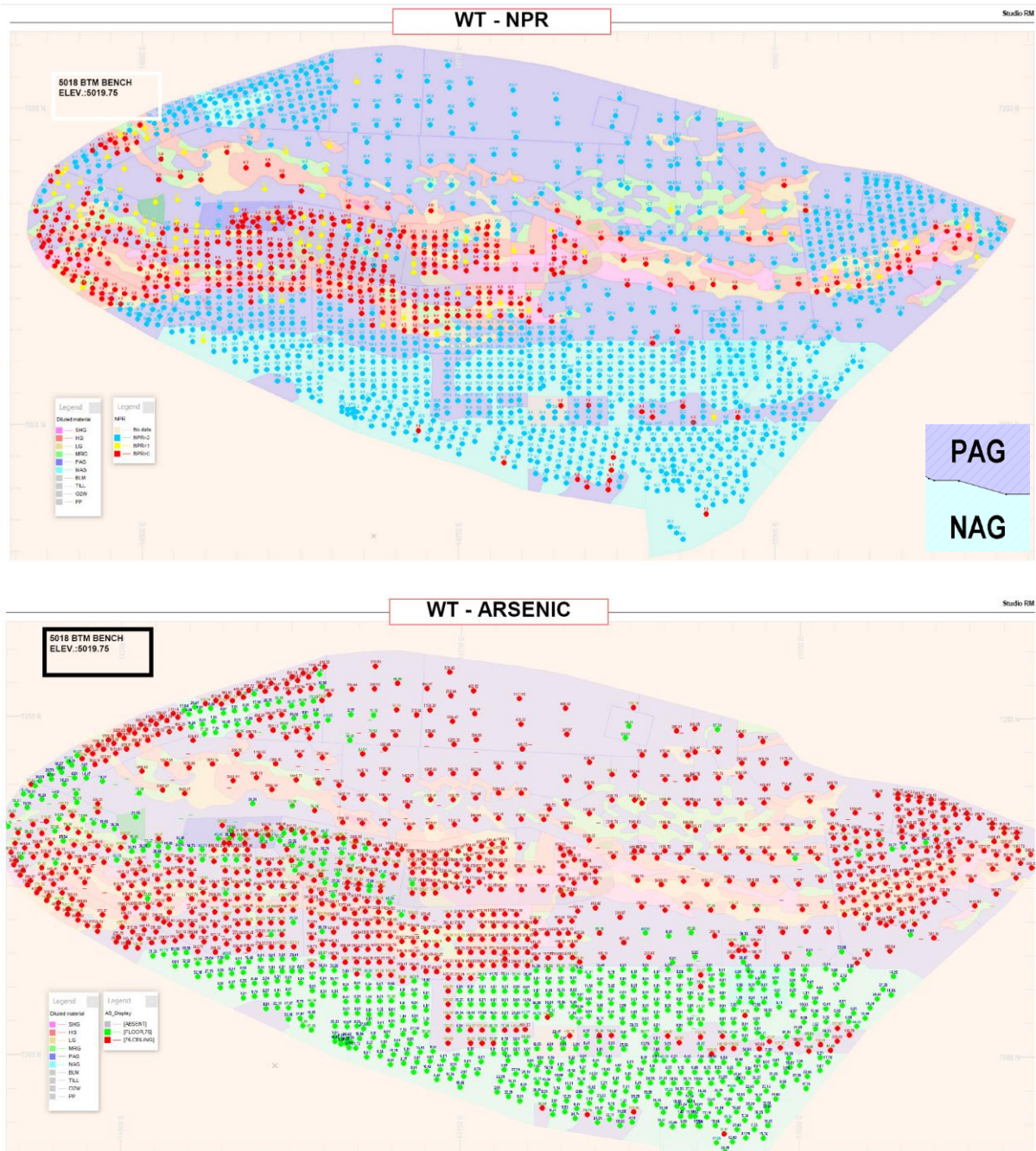




Figure 3: Plan View of all packets on 5011 top flitch

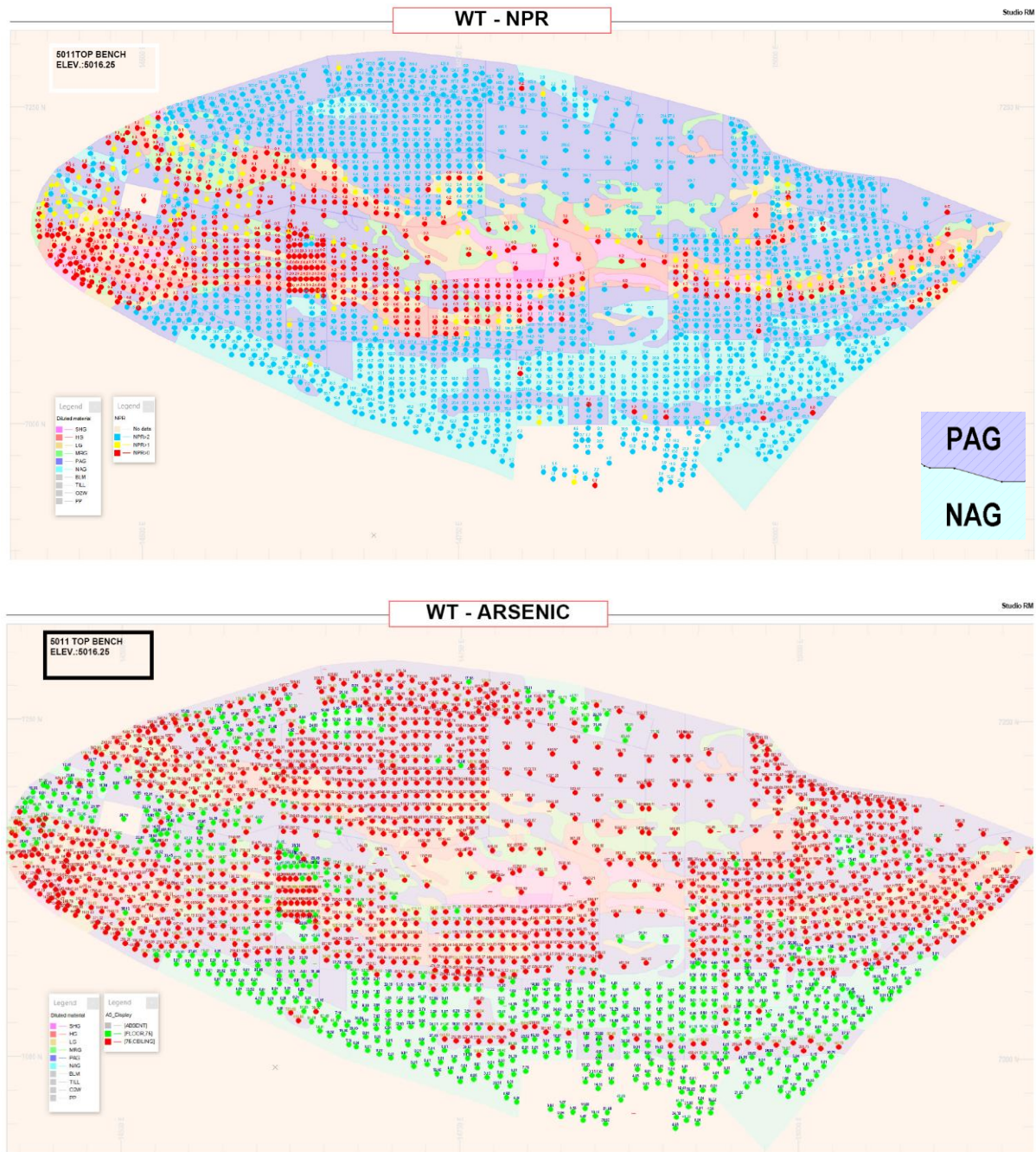


Figure 4: Plan View of all packets on 5011 bottom flitch

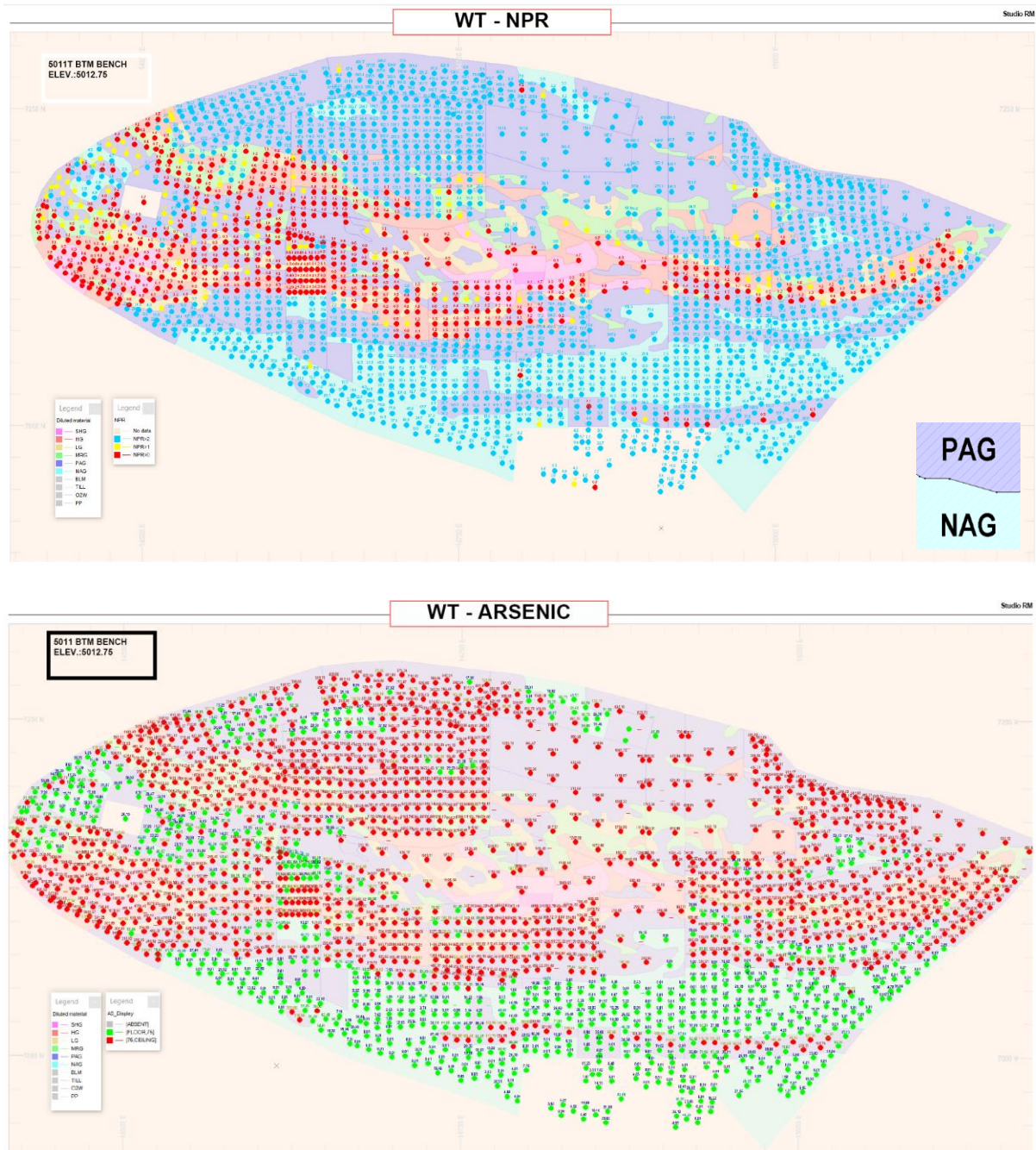
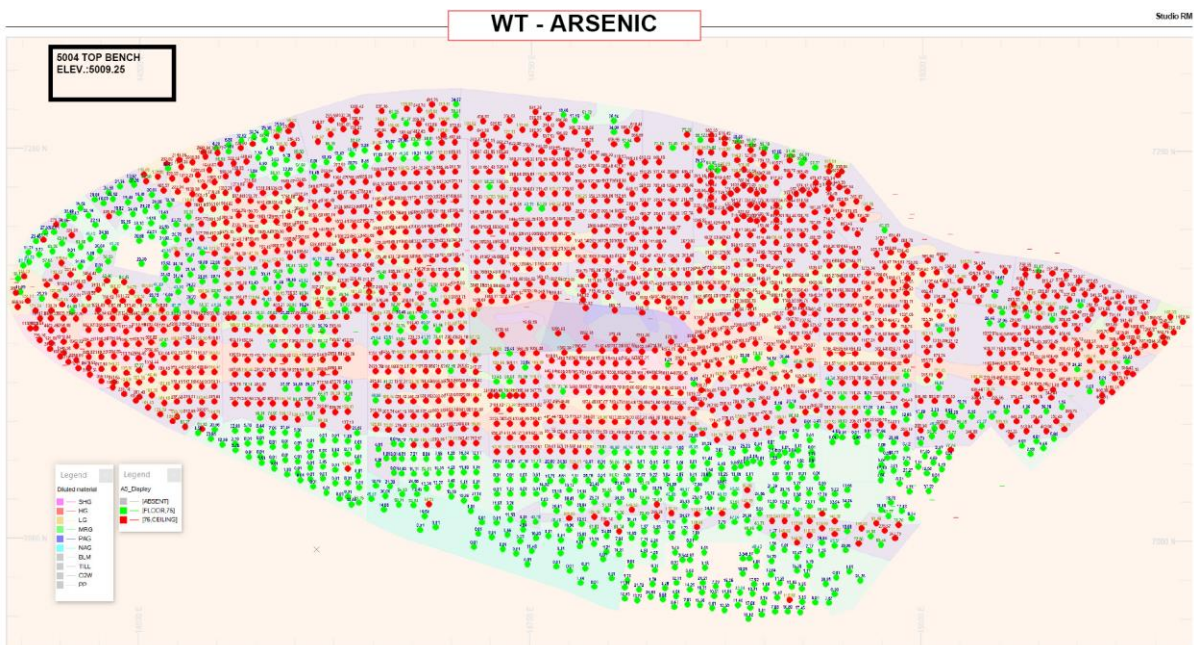
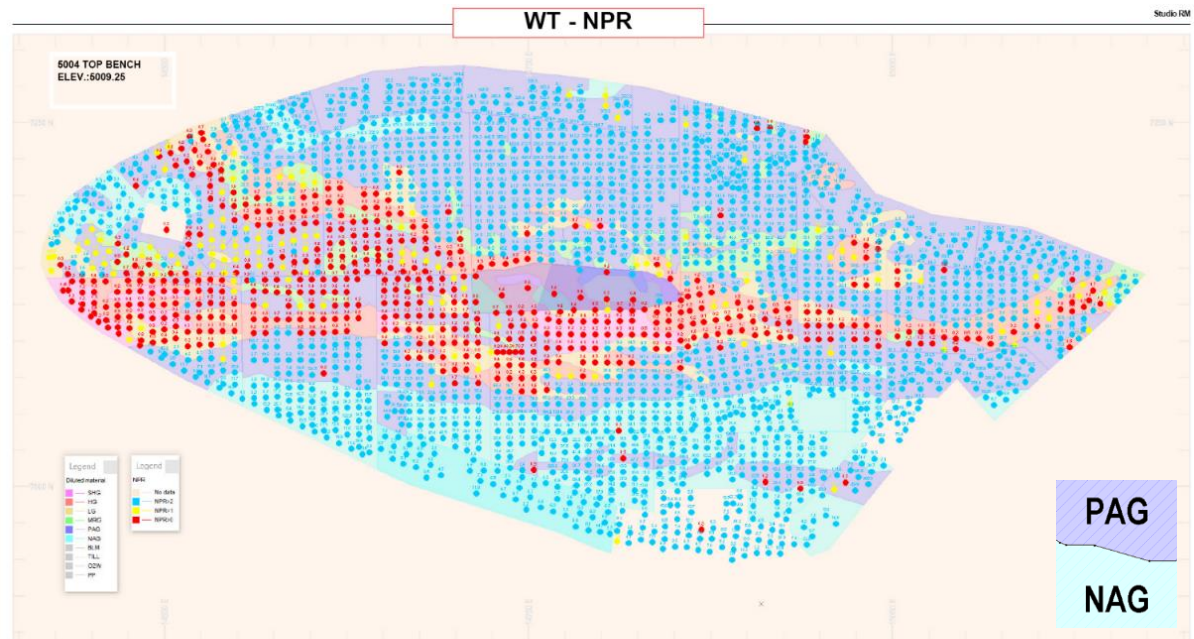




Figure 5: Plan View of all packets on 5004 top flitch



The figure consists of two maps of the same geographic area, showing different data distributions. The top map is titled "WT - NPR" and the bottom map is titled "WT - ARSENIC". Both maps show a large, irregularly shaped area with a grid of points. The top map has a legend with "Legend" and "Legend" sections. The bottom map has a legend with "Legend" and "Legend" sections. The top map also has a "Legend" section on the right side. The bottom map has a "Legend" section on the right side.



Figure 7: Plan View of all packets on 4997 top flitch

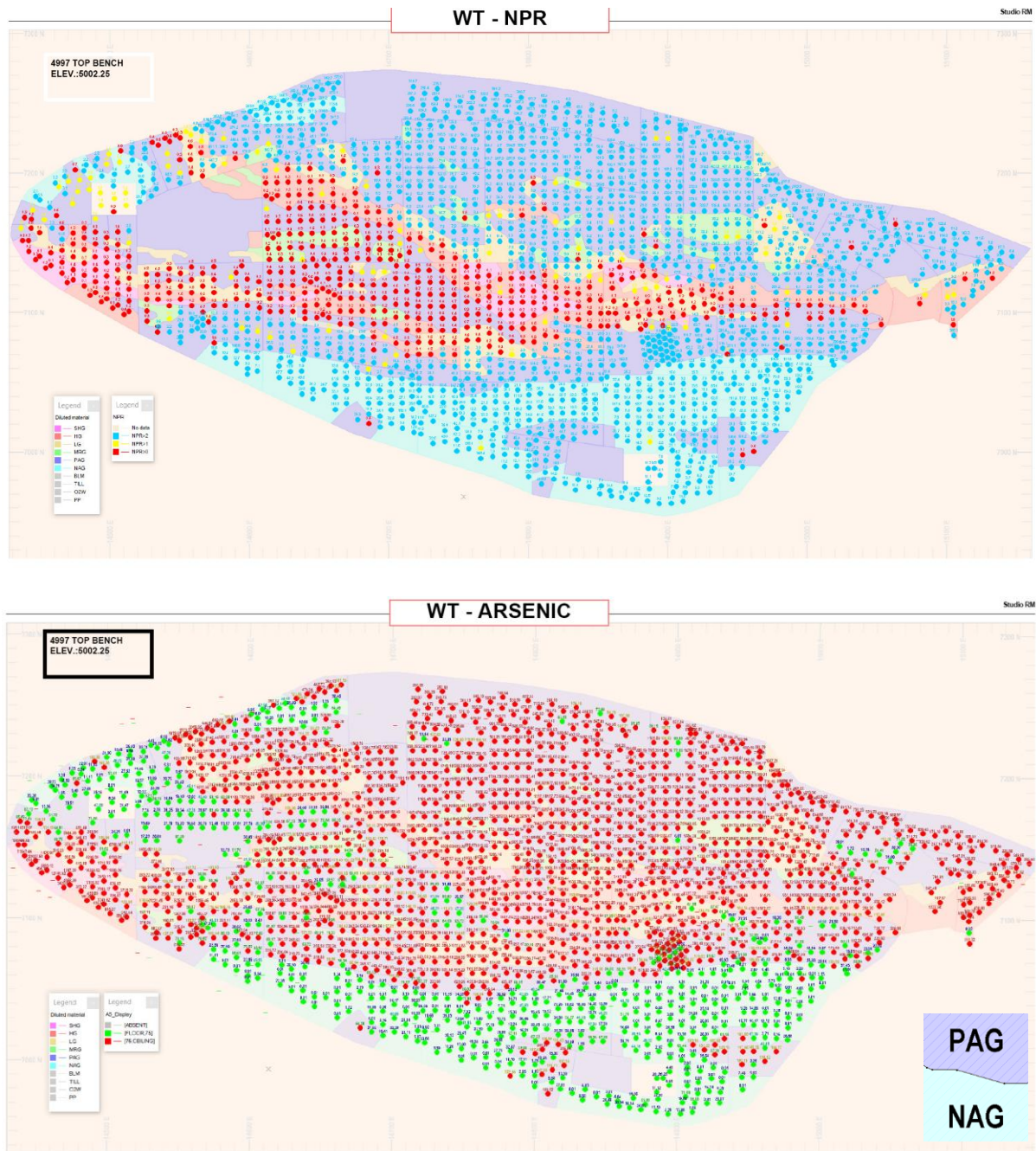


Figure 8: Plan View of all packets on 4997 bottom flitch

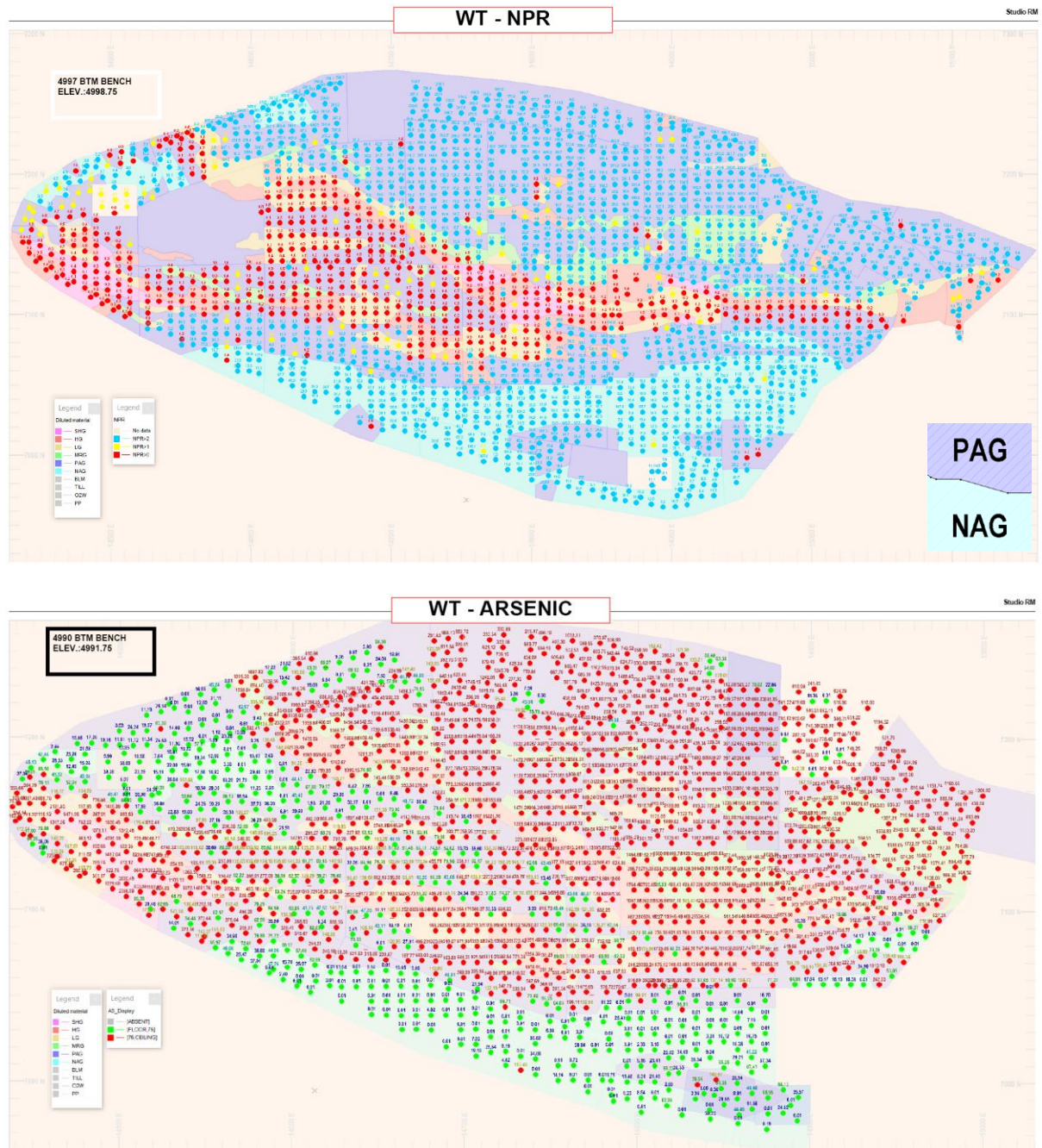




Figure 9: Plan View of all packets on 4990 top flitch

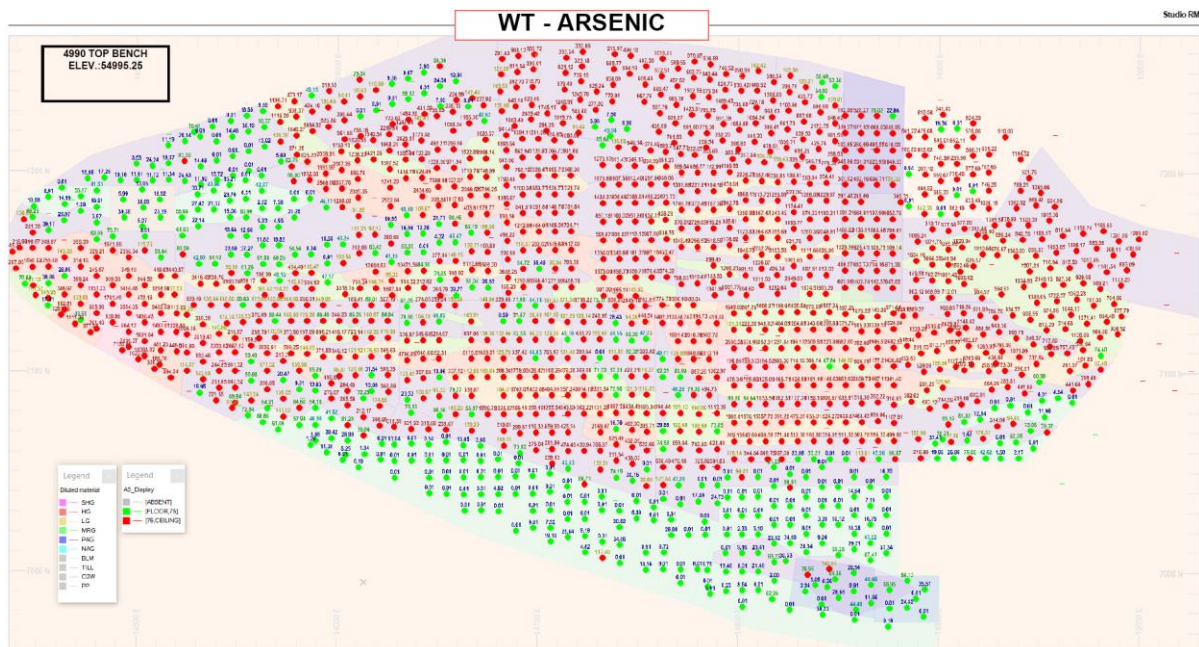
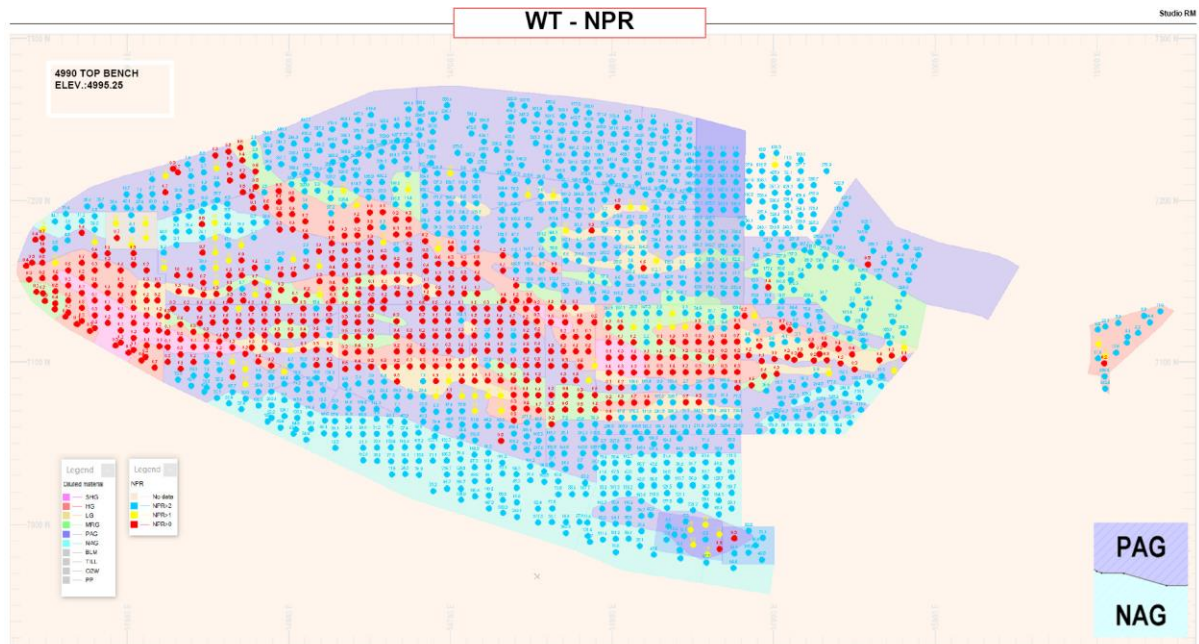
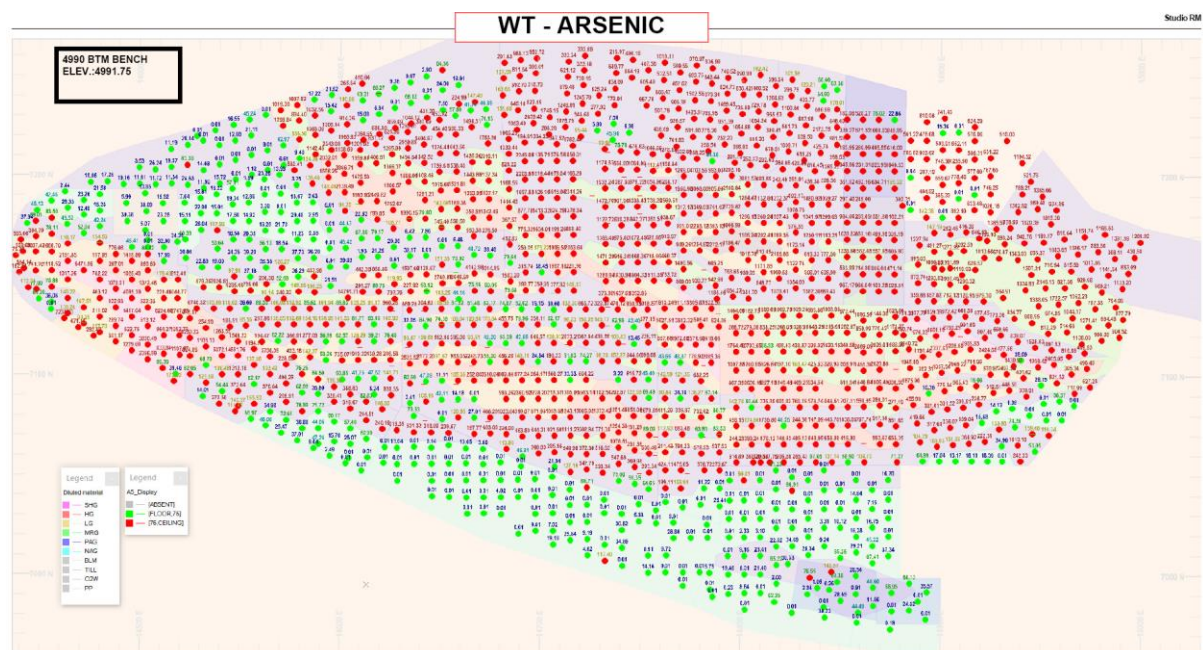
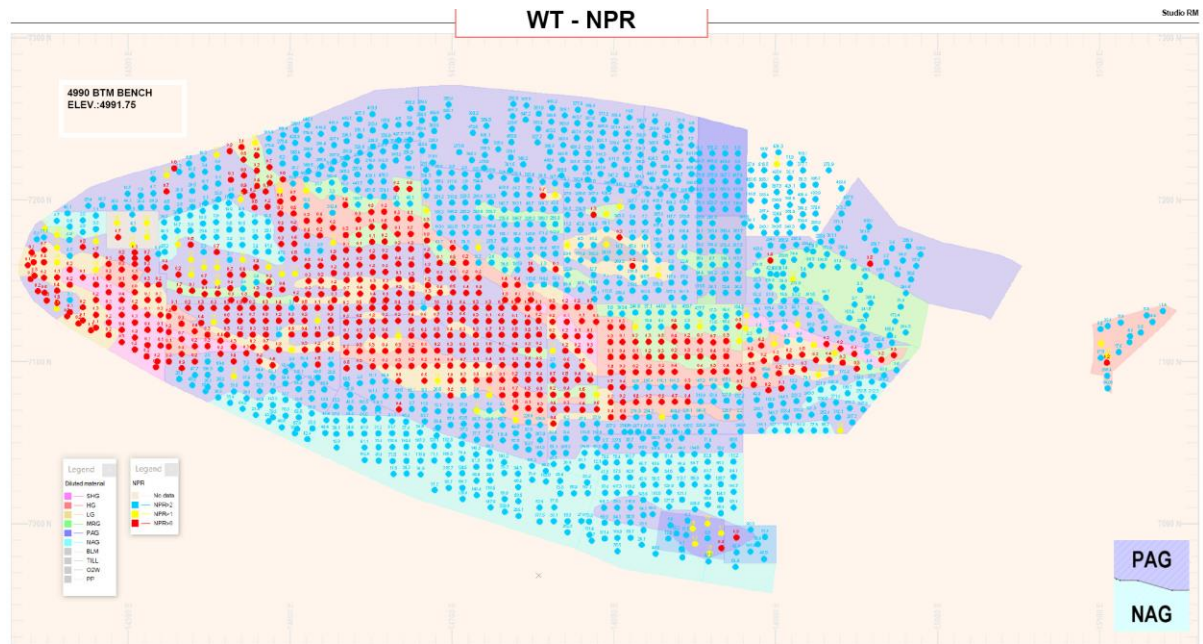


Figure 10: Plan View of all packets on 4990 bottom flitch



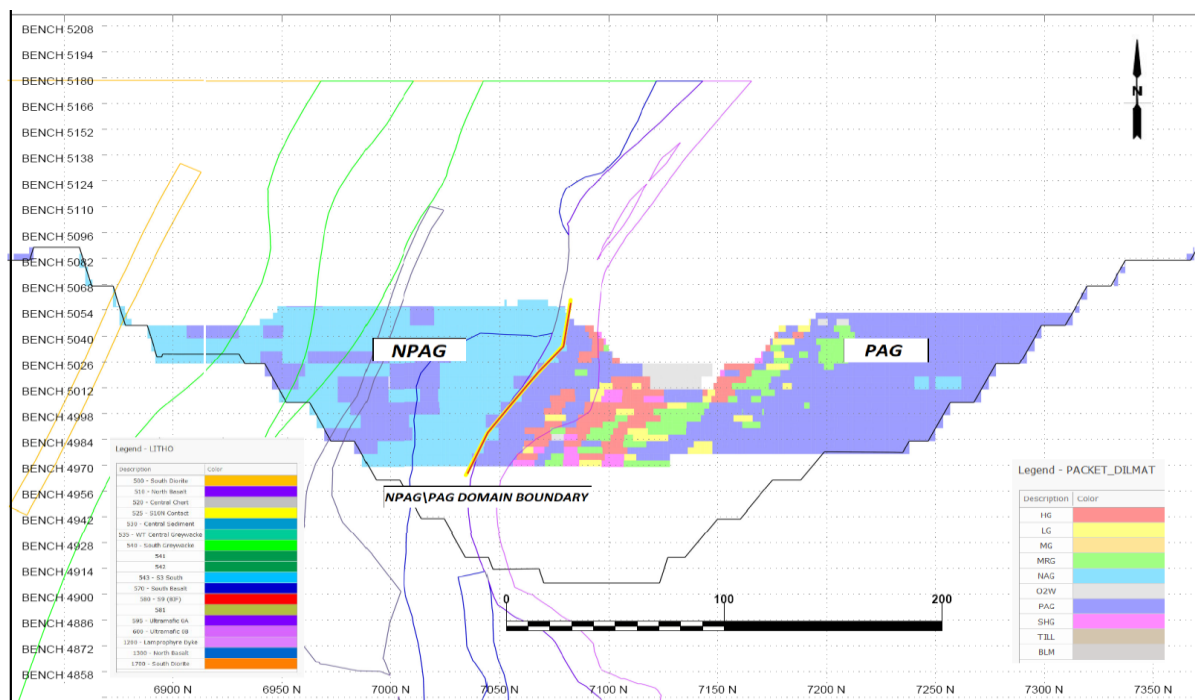


### Lithological Control – Cross Section

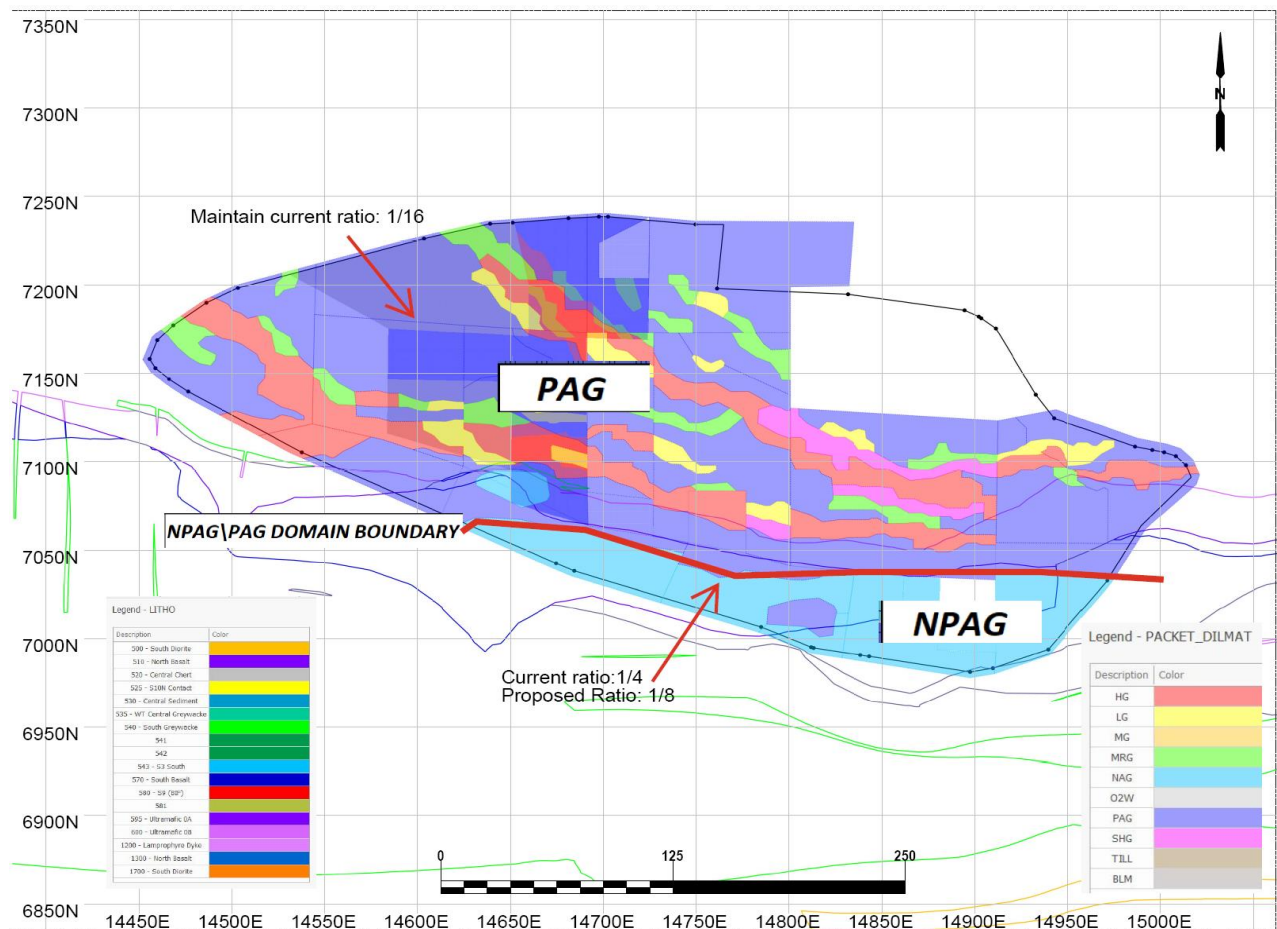
Figure 11 is a schematic cross section of the Whale Tail Pit with a view looking west. It shows that the North domain (to the right of the figure) consistently displays PAG/ML waste rock, and the South domain (to the left of the figure) shows NPAG waste rock with a few sporadic pockets of PAG waste rock.

The yellow/red line on Figure 11 represents the hard boundary between the two domains that is consistent with the geological interpretation of lithological domains. This boundary is the contact between the Komatiite unit (north domain) and the South Sediments unit (south domain). Figure 12 shows a plan view of the two different domains within the Whale Tail Pit with the sampling study area indicated by a contour line.

**Figure 11: Cross section looking west – NPAG/PAG domain correlation to geology domains**



**Figure 12: Plan View – NPAG/PAG domain correlation to geology domains with packets and sampling ratio (current and proposed)**



## Discussion

The improved geological knowledge of the deposit after six years of mining and the outcome of the study from assay results of +11,000 drill samples has guided the decision to maintaining the sampling ratio of the North domain of Whale Tail Pit at a 1/16 ratio and decreasing the sampling ratio of the South domain of the Whale Tail Pit from a 1/4 ratio to a 1/8 ratio.

### South domain with a 1/4 sampling ratio

Figures 13 to 15 show an example of the sample coverage at a 1/4 ratio of an area from the South of the Pit and falling inside the South Sediments geology domain. The geology in this area has been showing consistent geochemistry over the five benches of the study.

Figure 13 is a plan view of Whale Tail Pit with the area of interest (two drill blast patterns inside the red box).

Figure 14 displays the results of the sampling of the blast holes at 1/4 ratio. The high arsenic values are clustered in two locations, and this has been observed consistently over several benches.

**Figure 13: Plan View of the Whale Tail showing area of interest**

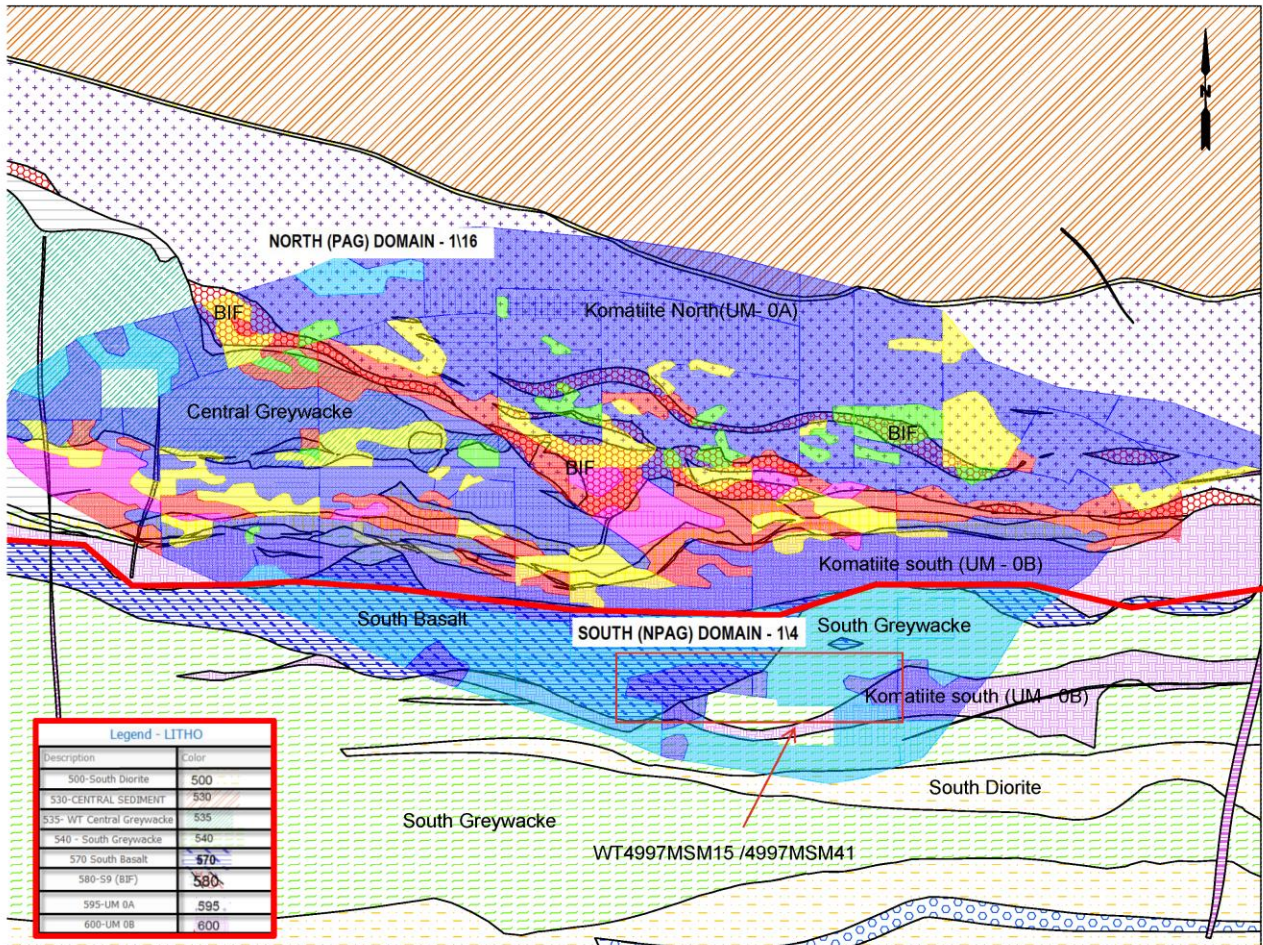
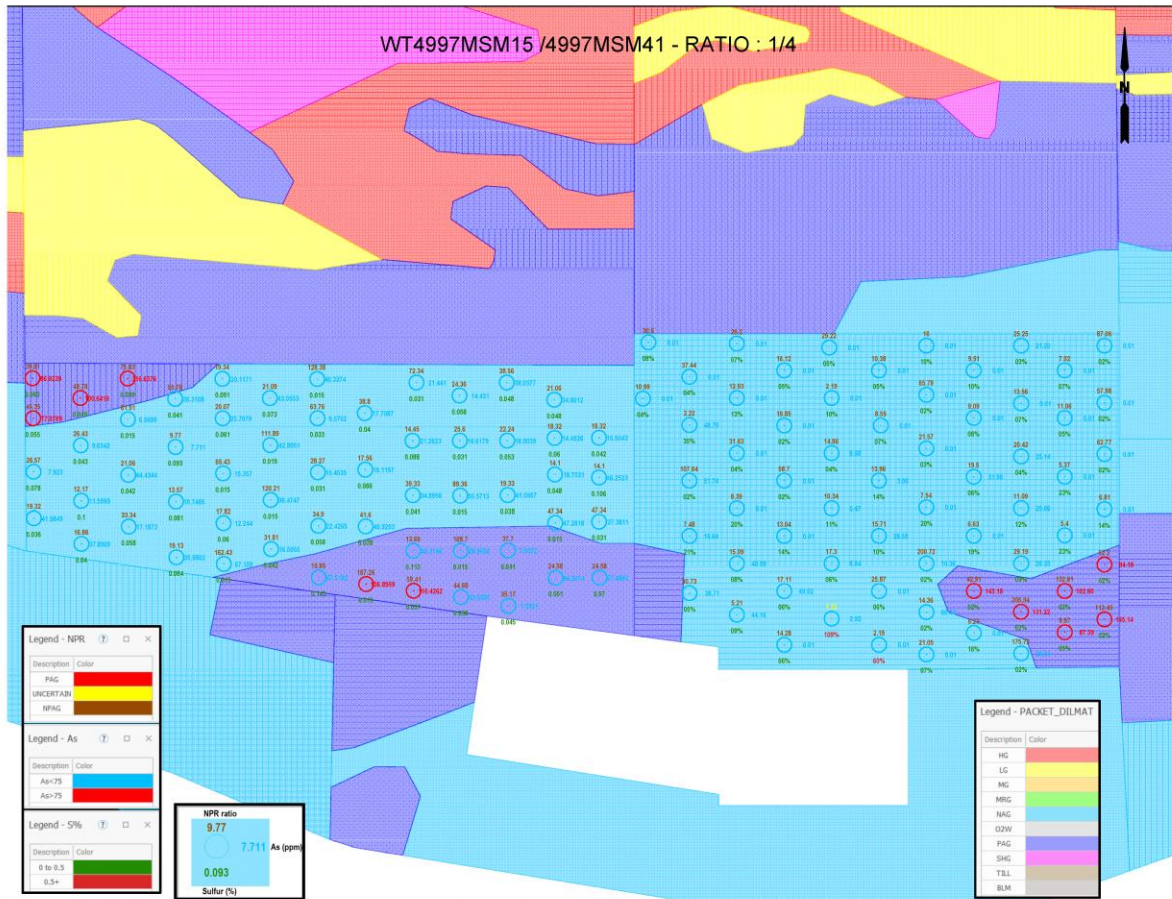




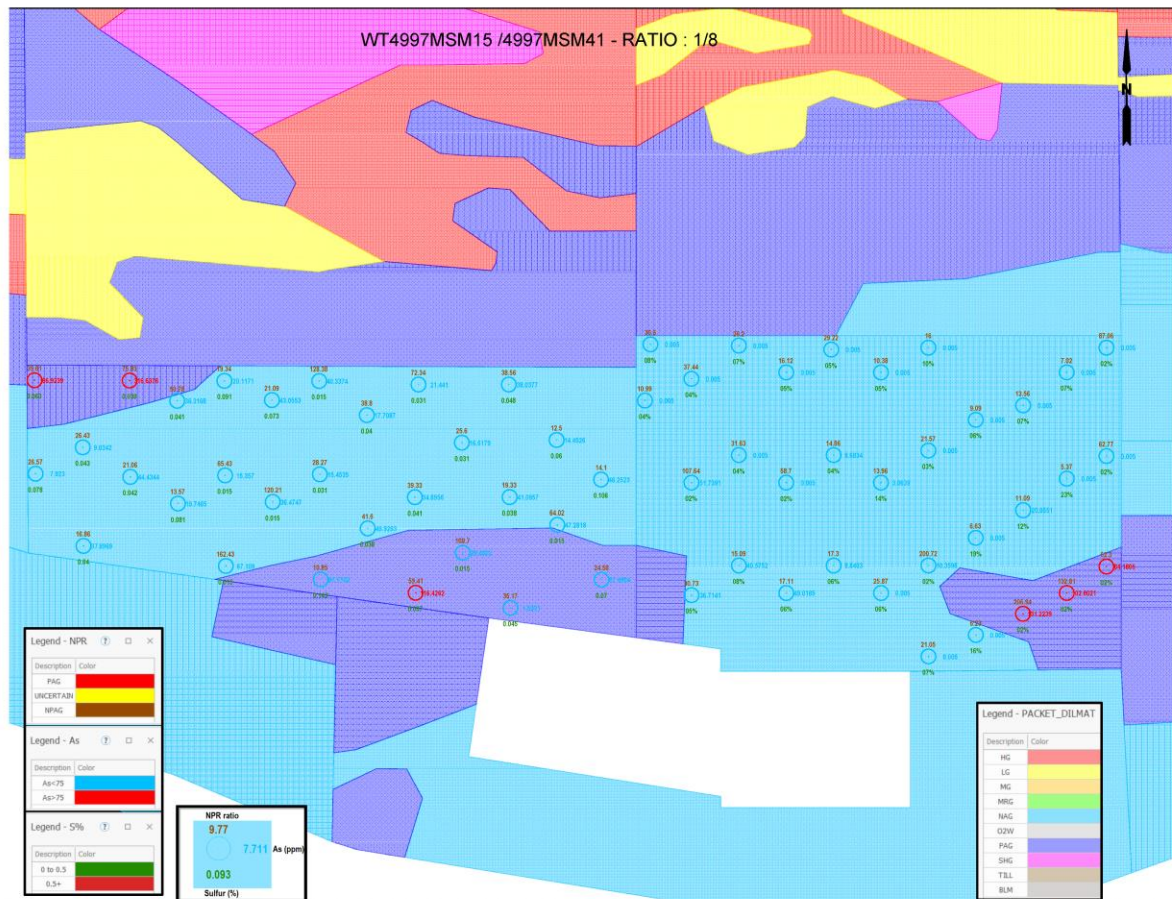
Figure 14: Sample coverage at a 1/4 ratio - South of the Pit, for the two selected blast patterns



### South domain with a 1/8 proposed sampling ratio

In Figure 15, a simulation was done over the same area of interest to achieve a 1/8 sampling ratio. Using the ARD guideline to classify waste rock, the production Geologist would have generated NPAG/PAG packets very similar to what is observed in Figure 14. Considering that there is no lithological change expected for the remaining benches of mining at Whale Tail and therefore the geochemical signature will remain the same, it is expected that a change in sampling ratio will not impact the accuracy of interpreting and creating NPAG/NML and PAG/ML packets.

Figure 15: Simulation - Sample coverage at a 1/8 ratio - South of the Pit



## Conclusion

Following this study, it is recommended to change the sampling ratio in the south domain from a 1/4 ratio to a 1/8 ratio. It has been shown that this ratio will provide enough coverage to confirm the quality of the material and differentiate between NPAG/NML and PAG/ML waste rocks.

**APPENDIX D • IVR PHASE 2 PIT WASTE ROCK SAMPLING RATE REDUCTION STUDY**

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## Introduction

As indicated in Section 3.1 of the Plan above, a reduction in sampling rate frequency has been recommended by the Geology Superintendent for IVR Pit Phase 2.

After five years of mining in the IVR Pit (Phase 1 and Phase 2), and after accumulating substantial information and knowledge of the IVR deposit, the Mine Geology team deems necessary to review the waste sampling default ratios.

A study was conducted on four subsequent benches worth of packet design in IVR Pit (from 5116 to 5095 Pit elevations). The vertical advance in the Pit allowed to gather sufficient data to get a good understanding of the geochemical signature of the rocks and understand the distribution of the key elements used to determine the NPAG/PAG nature of the rock.

The Geology Superintendent evaluated the default sampling frequency of the waste rock based on the experience gained during the mining of IVR Phase 2 Pit from previous drilling, sampling analysis and visual inspections and concluded:

- IVR Phase 2 Pit has been returning carbon and sulfur assay values translating in CaNPR values (as defined in Section 3.2 of this document) above the threshold value of 2 for the past four benches and typically ranging between 5 and 30 for the north-west portion and ranging from 20 to 300 for the south portion of the study area.
- Conversely, the arsenic content returned systematic values well above 75 ppm for the same set of samples and even systematically in the high hundreds of ppm's (usually ranging between 100-1000 ppm).

The south portion of the area of study demonstrates few occurrences of minable NPAG/NML packets. In the north portion, the NPAG/NML packets are insignificant in terms of volume to deem suitable for mining separately from PAG/ML material.

Based on the above observations, although non-acid generating per the NPR calculation, the material from IVR Pit Phase 2 must be systematically classified as PAG/ML due to its high content of Arsenic and associated leachability potential. For this reason, the Geology Superintendent recommends to:

- Decrease the IVR Pit Phase 2 blast hole sampling frequency from a 1/4 ratio for Carbon/Sulfur and Arsenic in IVR Pit Phase 2 to 1/16. This would be applied to all remaining mining benches in the IVR Phase 2 Pit.

## Data Collection

The data used in this study consisted of 5,900 drill hole samples gathered from multiple benches in IVR Pit covering 28 meters vertically in most of the IVR footprint area. These benches are ordered as follows: 5116, 5109, 5102, and 5095.

For these benches, the following data have been gathered:

1. All available Packet designs for the benches shown above.
2. Outline of the main controlling lithology 3D model.
3. Georeferenced assays for every blast hole including:
  - a. Inorganic Carbon content
  - b. Total Sulfur
  - c. Arsenic content
  - d. Calculated NP, MPA, and NPR values

## Results

### Geochemical Data Results – Plan Views

Figures 17 to 24 present plan views of the IVR Phase 2 Pit, illustrating the vertical continuity between the north and south domains. The northern area is classified as PAG/ML primarily due to elevated arsenic concentrations, rather than NPR values.



## IVR Pit Phase 2 NPR & Arsenic values

Figure 17: Plan View of 5116 top flitch

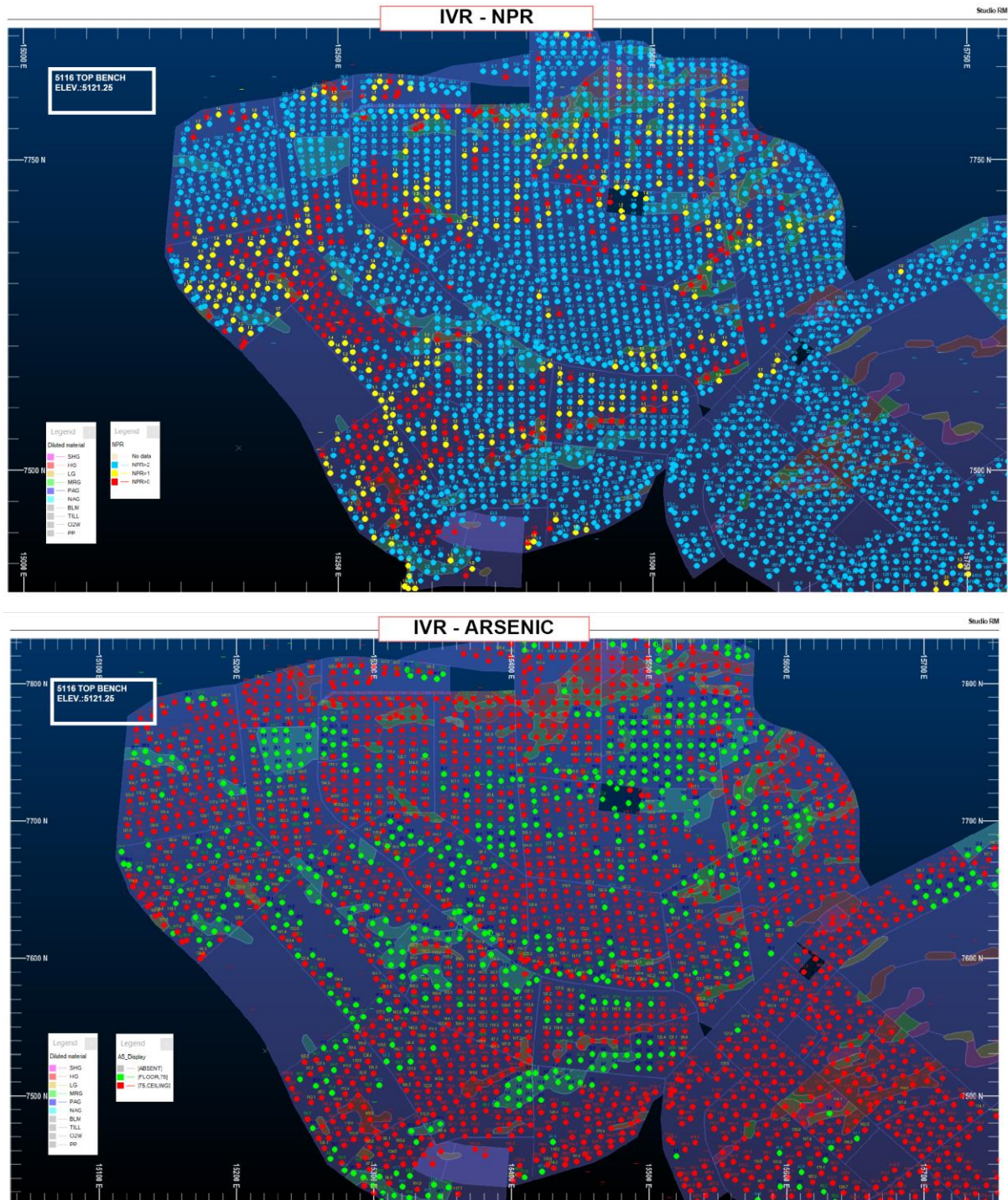




Figure 18: Plan View of 5116 bottom flitch

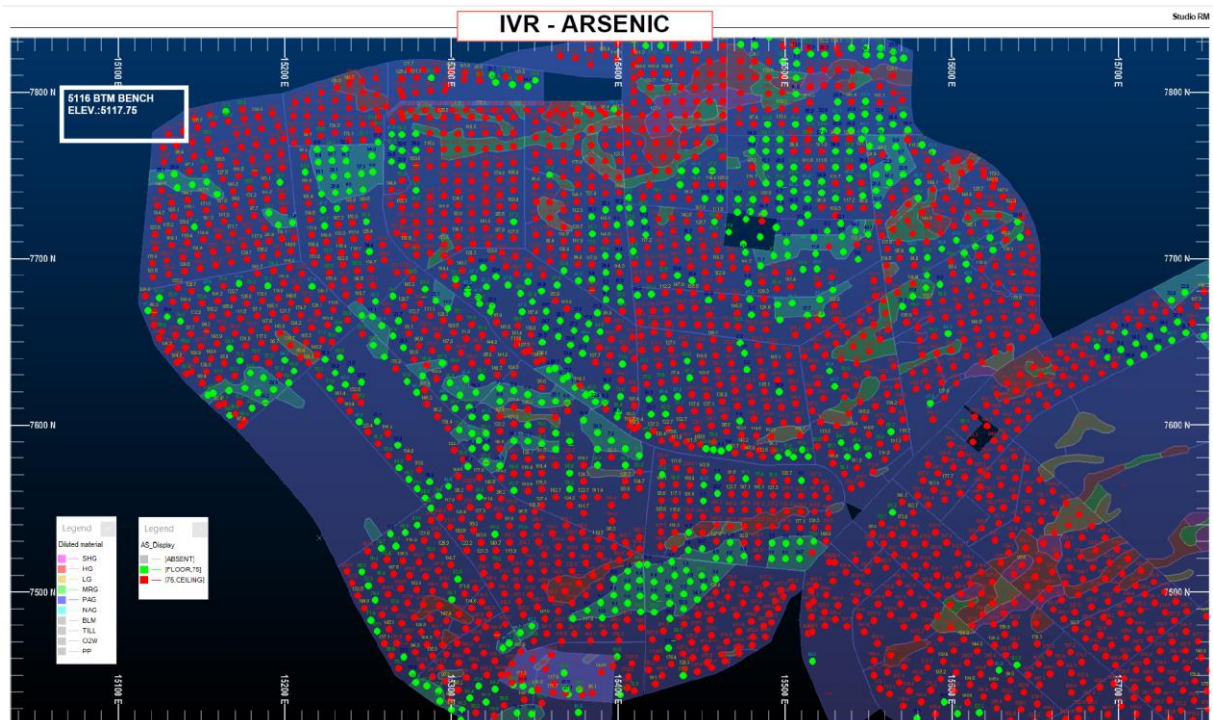
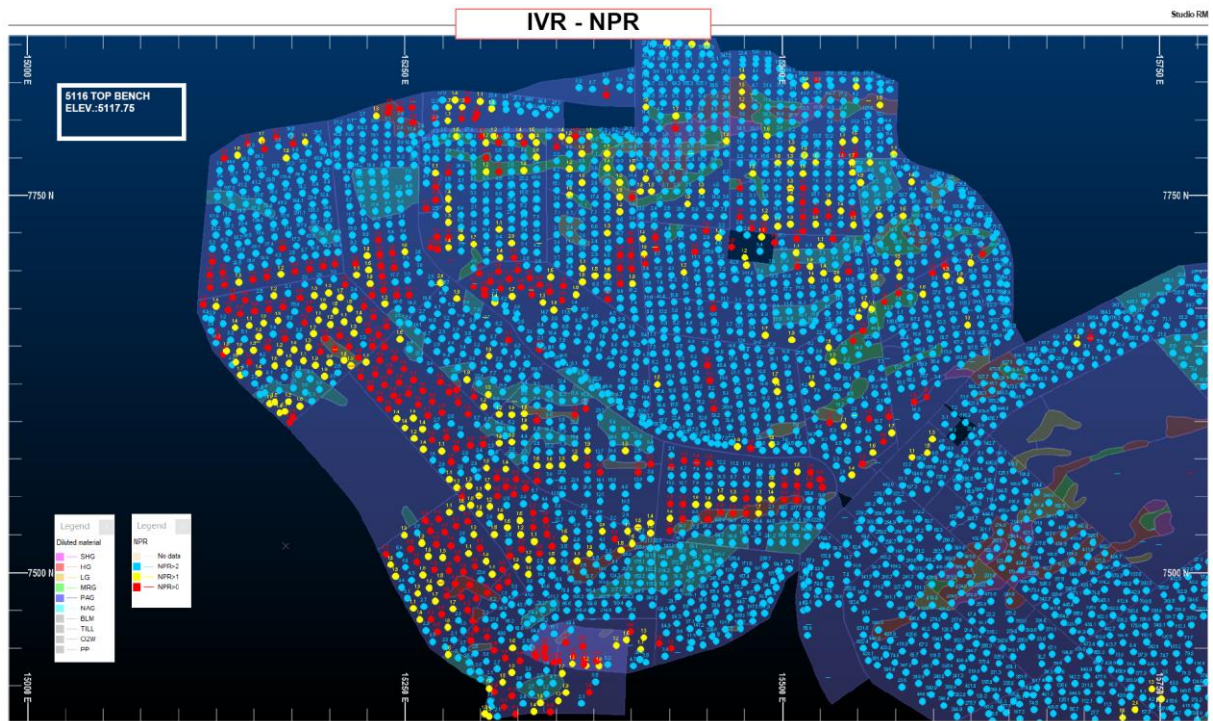




Figure 19: Plan View of 5109 top flitch

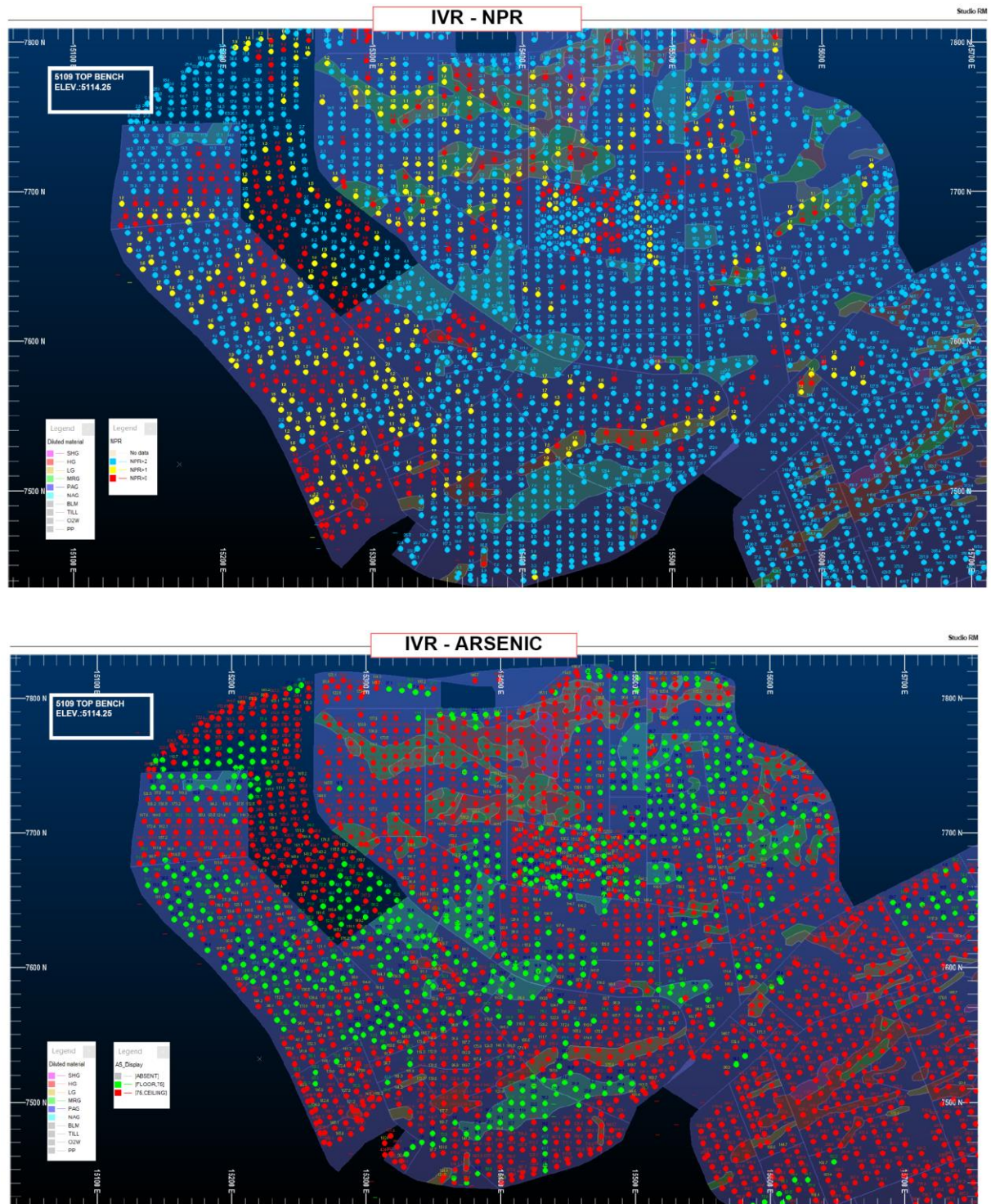




Figure 20: Plan View of 5109 bottom flitch

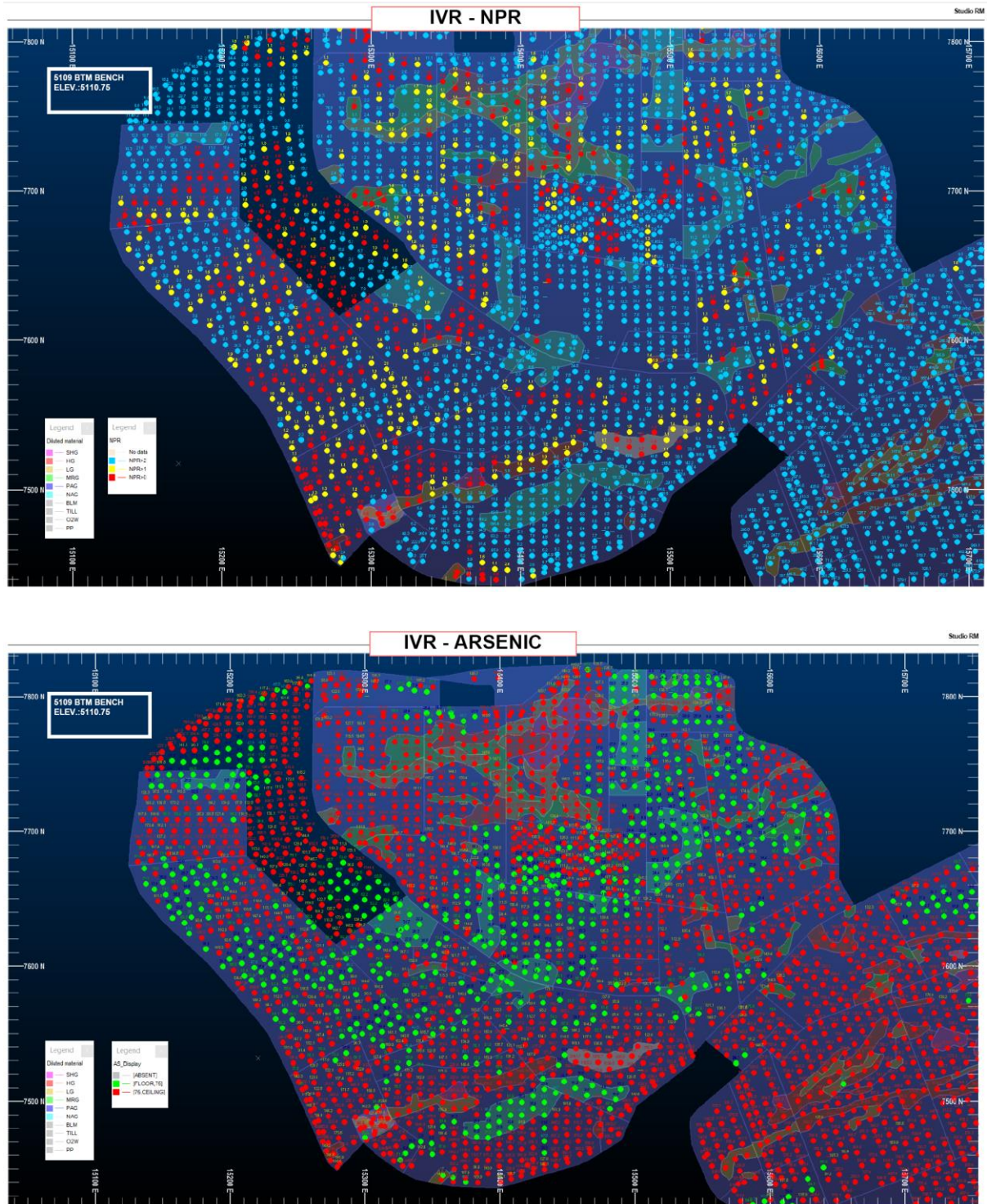




Figure 21: Plan View of 5102 top flitch

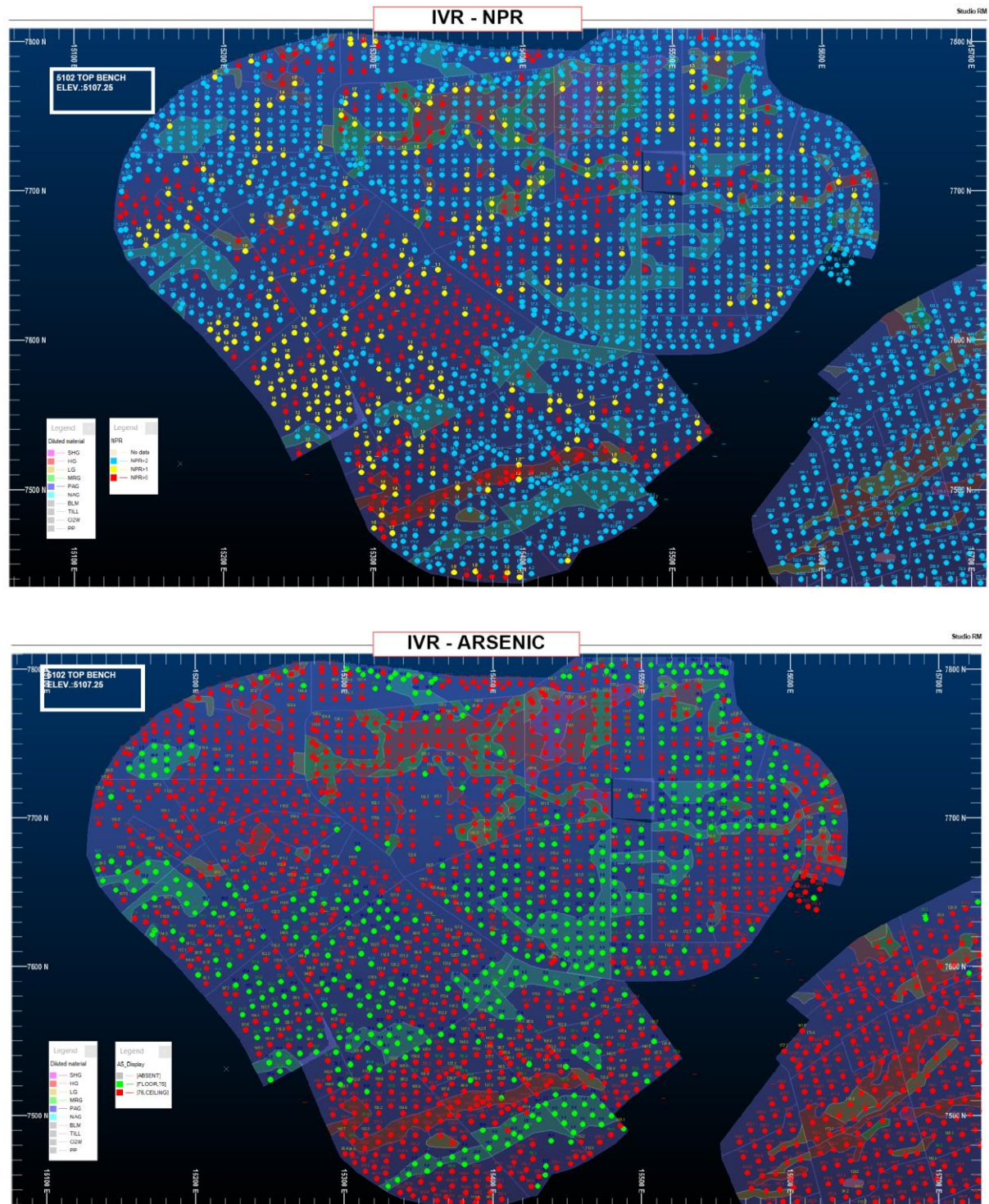




Figure 22: Plan View of 5102 bottom flitch

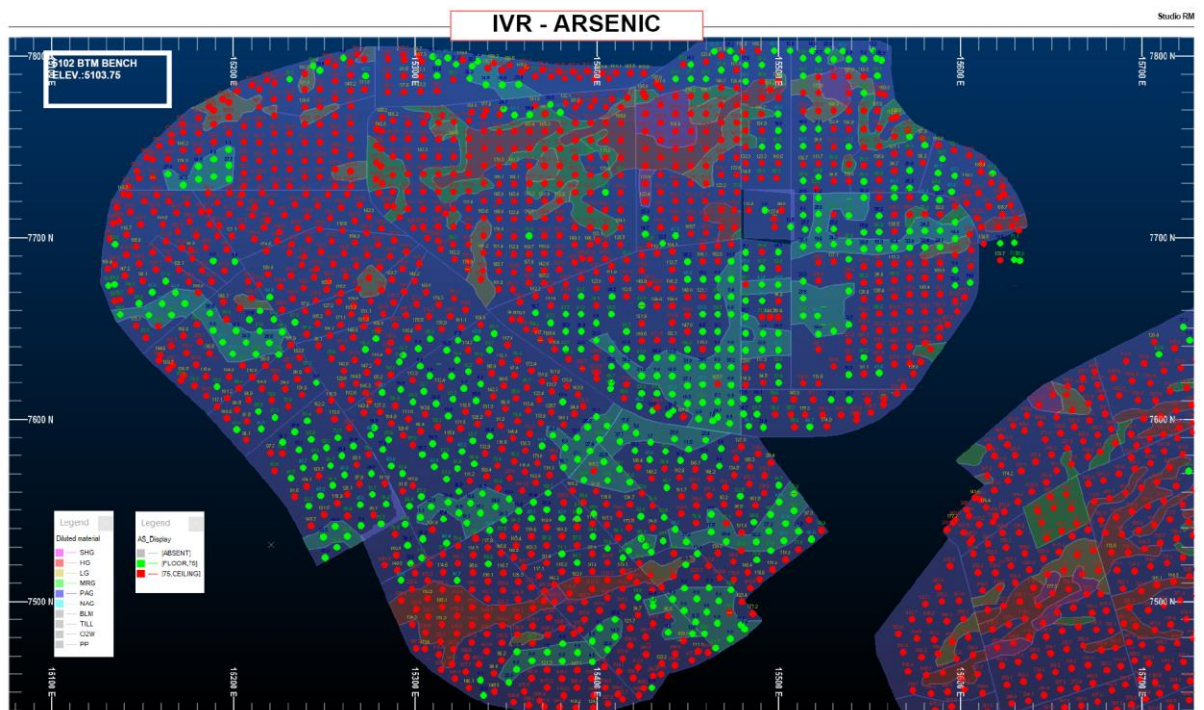
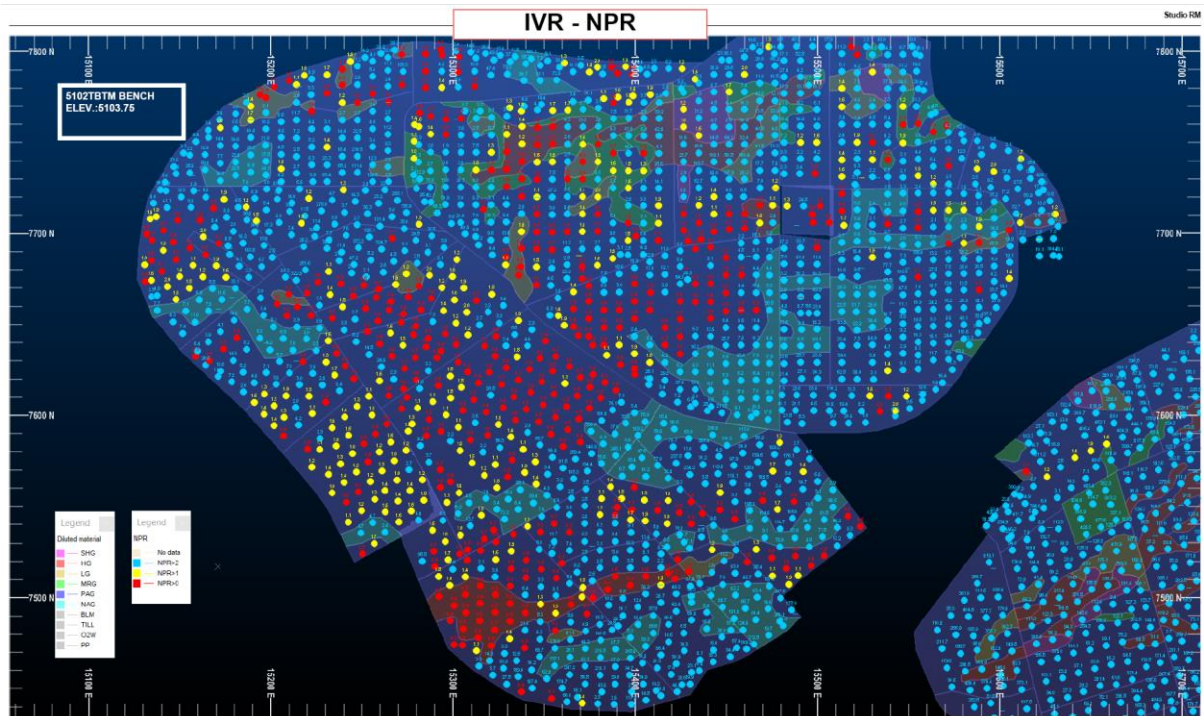


Figure 23: Plan View of 5095 top flitch

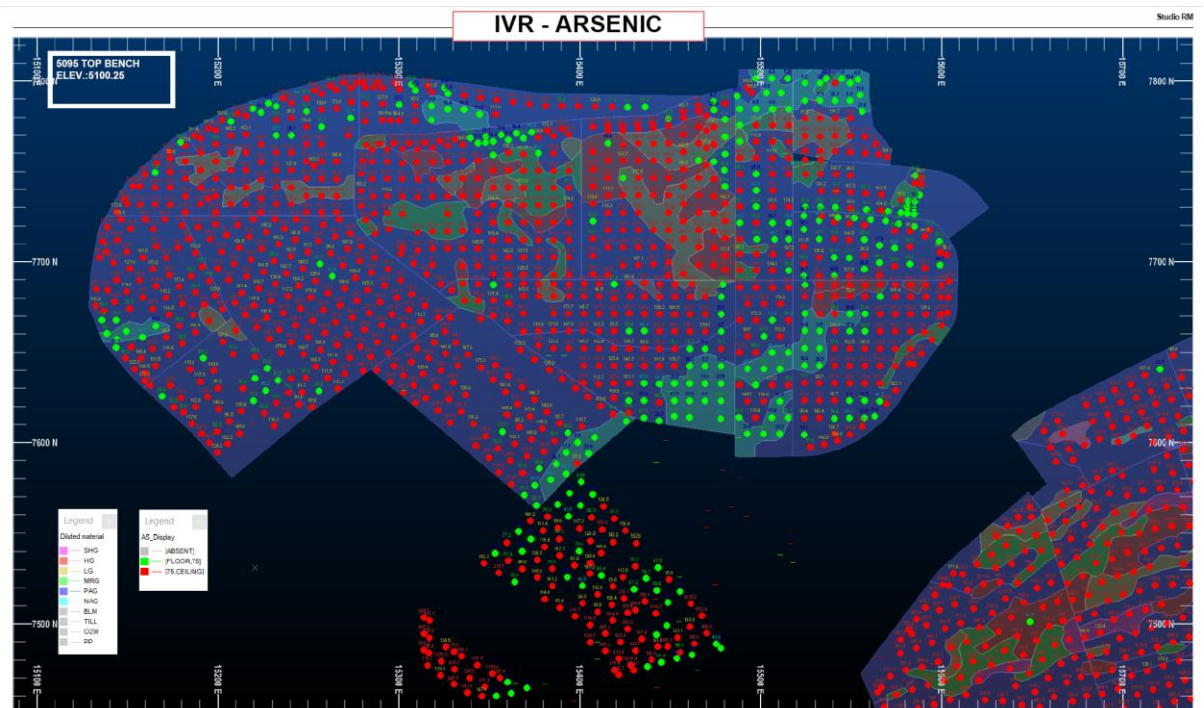
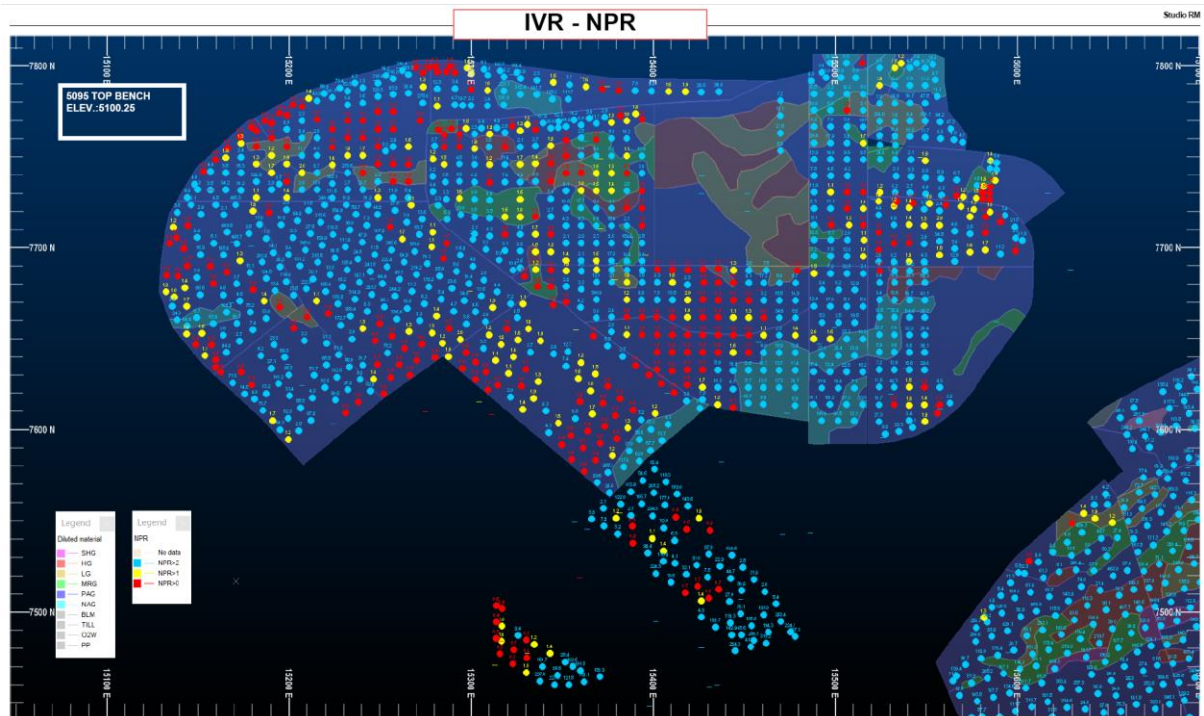
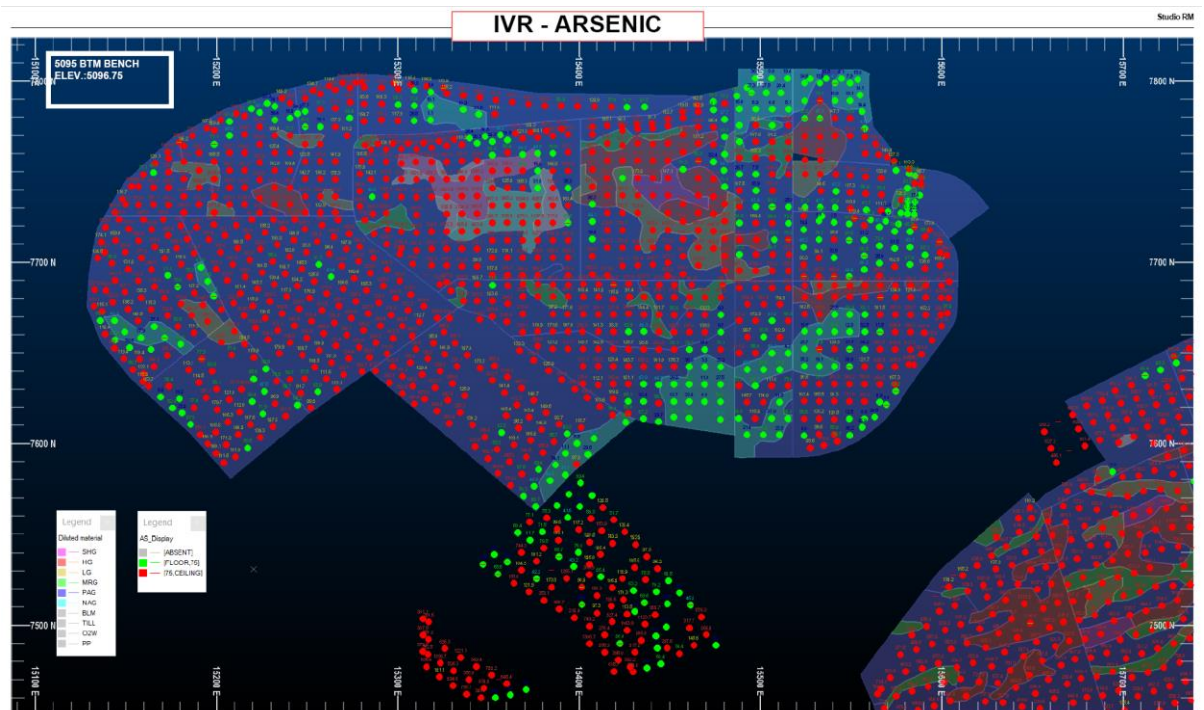
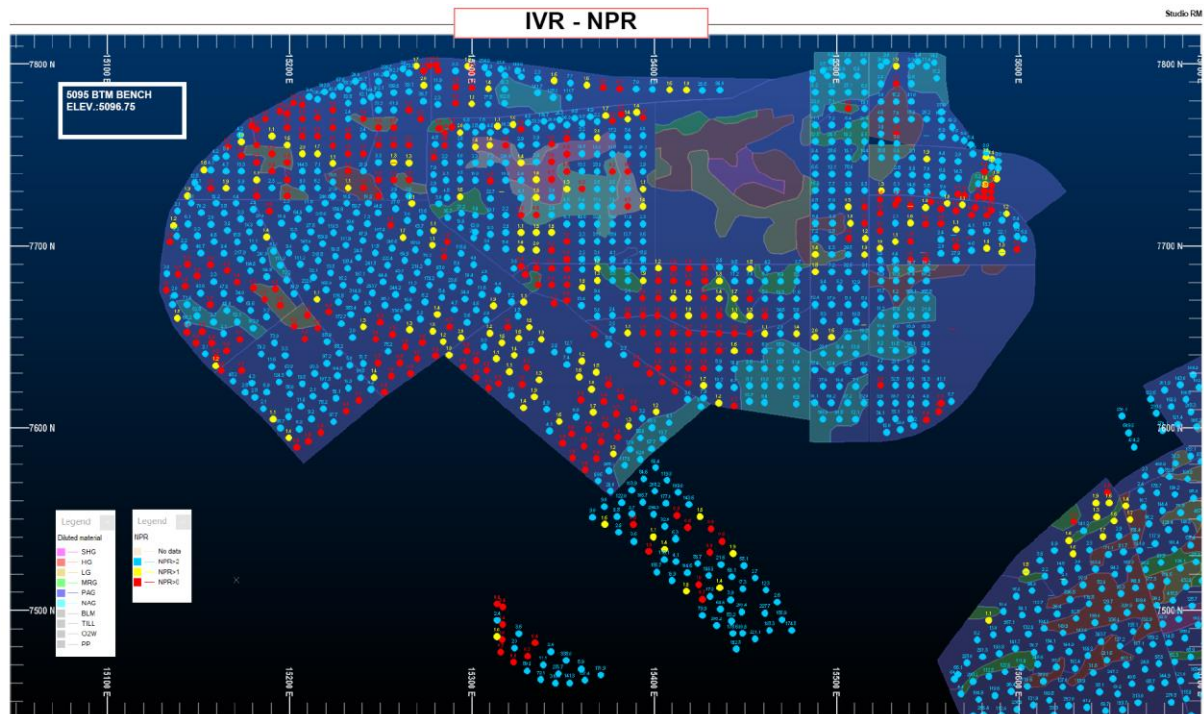




Figure 24: Plan View of 5095 bottom flitch

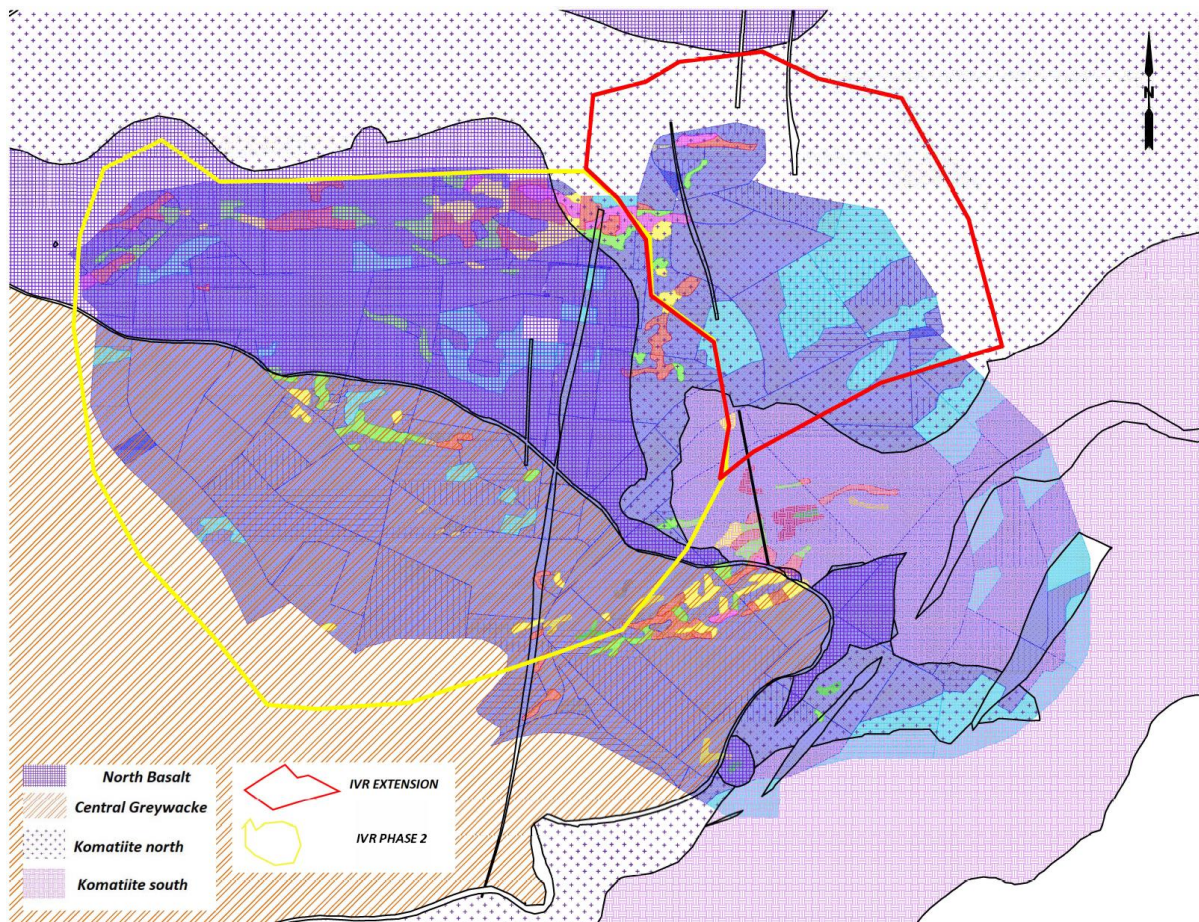




### Lithological Controls

Contrary to Whale Tail Pit, IVR Pit Phase 2 does not seem to show a clear lithological control for the NPAG/PAG domains. The minable zones of NPAG/NML appear to be more concentrated in the Komatiite of the IVR-Extension (see Figure 25), which is the same lithology where the NPAG/NML occurred in IVR 1 Pit. For IVR Phase 2, the North Basalt and the Central Greywacke contain some occurrences of NPAG/NML material; however, these occurrences are not substantial enough in terms of volume to be worth mining.

**Figure 25: Plan View of IVR Pit Area showing IVR Phase 2 and IVR Extension**



### Conclusion

Following the observations detailed above, the knowledge of the deposit after five years of mining and the Geochem results, it is recommended to decrease the sampling ratio at the **IVR Pit Phase 2** from a 1/4 ratio to a 1/16 ratio while maintaining a ratio of 1/4 for the remainder of IVR, including the IVR Extension.