

## Estelle Strategic Review Outcomes

**The strategic review has identified a number of material opportunities, including heap leach processing, optimized ore sorting, and Critical Minerals (CM) extraction, with the aim to significantly improve the project economics**

### Highlights

- The review has identified a number of material opportunities to improve the proposed flowsheet (Figure 1) which could potentially increase gold production whilst reducing the capital and operating costs of the project. These improvements, which are now being tested by METS Engineering (METS) and Rough Stock Mining (Rough Stock) as part of the PFS level studies currently underway, and which have been identified as being important to potential partners and funders in early discussions, include:
  - Investigating an optimized plant size to process high-grade ore from RPM, which remains open in multiple directions, in the early mine schedule, with more selective ore sorting to commence in years 2 or 3 on medium grade Korbelt material to produce a very high-grade concentrate (up to 6 g/t Au per previous ore sorting test work - ASX Announcement: 15 March 2021), potentially requiring a smaller milling circuit
  - Evaluating heap leaching (Figure 2), a well-proven low cost gold recovery method which could potentially recover gold from the 100's of millions of tons of lower grade material and the reject material from the ore sorters, which in the current flowsheet is waste, to provide a lift to the annual gold production profile. METS Engineering (METS) has commenced test work on bulk samples sent to Perth late last year using a finer crush size, with early stage indications looking positive
  - Investigating various heap leaching options, including agglomeration, and alternative leach reagents, with results expected in the 2<sup>nd</sup> half of 2024
  - Assessing extraction options of the highly elevated concentrations of Silver, Copper, Antimony and other CM identified across the project which could potentially provide valuable bi-product credits and which the US government is currently trying to secure a domestic supply
  - Reviewing various selective ore sorting options on material from both RPM and Korbelt with Steinart ore sorting to test a combination of different sensors including, XRT density, colour, laser, and induction, to potentially improve the ore sorting results further
  - Increasing the pit slope angles > 50° from 45° which was used in the scoping study
  - Investigating alternative technology options, such as SAG (Semi Autogenous Grinding) mills, coarse flotation using Hydrofloat technology, and gravity recovery using a Reflux Classifier to further improve and optimize the process flowsheet



- The review also identified that additional drilling was required at RPM this year, with a focus on increasing the resource to the higher measured and indicated categories to prove up a larger ore reserve for the PFS
- Maiden drill testing at the Stibium, Train, Trumpet, Muddy Creek and Stoney prospects, to follow up on the high-grade surface samples of gold, antimony and other CM discovered in those areas last year, was also identified as being a necessity to increase gold resources and to support the proposed CM bi-product extraction
- The review also looked at how the project could potentially generate earlier cashflows, with the Stibium prospect being identified as having the potential for a small-scale starter mine for antimony and other CM to create a concentrate for US domestic supply
- Early-stage discussions with potential partners and funders has shown the need to demonstrate the capabilities of ore sorting on a larger scale. A bulk, up to 200 kt, pilot scale ore sort test program is currently being planned in consultation with Rough Stock, METS and Steinert
- While the review recognised the importance of the West Susitna Access Road (WSAR), which is due to break ground in 2025, it also identified that Nova could potentially utilize the road at an early stage and commence mine construction using the initial frontier trail along the proposed WSAR alignment prior to the road being fully completed, along with the winter snow road to transport equipment to site
- The review also identified numerous power options that would meet the startup requirements (10-20MW) for the Estelle Project with the ability to scale up in the future

**Nova CEO, Mr Christopher Gerteisen commented:** “The Strategic review has been a major success and put us on a clear path to production. We will now look to grow on the success achieved by completing these critical path studies, exploration upside, and advancing the project through 2024 and beyond.

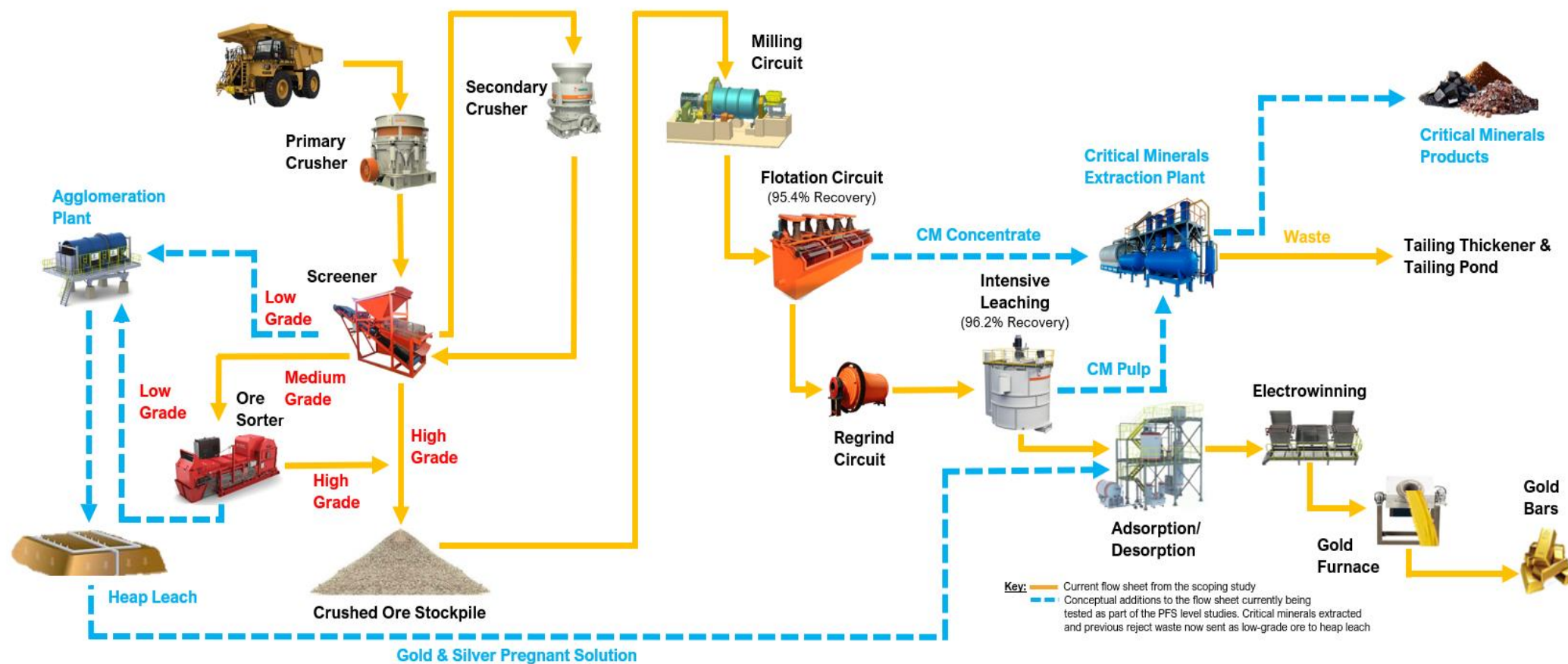
Estelle is a major mineralized trend with abundant gold and critical minerals and we are on track towards development with the support and assistance from our partners in government and academia. We see decades of potential once production commences. Our mission is to grow and secure US domestic supply of gold and critical minerals.

We will keep our shareholders updated on progress including the results of material studies as we move forward.”

**Nova Minerals Limited** (Nova or the **Company**) (**ASX: NVA, OTC: NVAAF, FSE: QM3**) is pleased to announce the key outcomes from the strategic review on its 513km<sup>2</sup> flagship Estelle Gold Project, located in the prolific Tintina Gold Belt in Alaska.

### **Flow Sheet Improvements**

Over the last 4 months METS Engineering has conducted a detailed audit of the existing flowsheet to specifically identify areas where improvements can be made to lower the initial capital costs, increase the gold recovery, and maximize the value of each ton through the plant. As a result of this audit METS recommended that the following potential improvements to the current flowsheet be investigated (See Figure 1) as part of the PFS level studies currently underway, with results expected in the 2<sup>nd</sup> half of 2024.



**Figure 1.** Current and proposed conceptual flowsheet, which is being tested as part of the PFS level studies underway

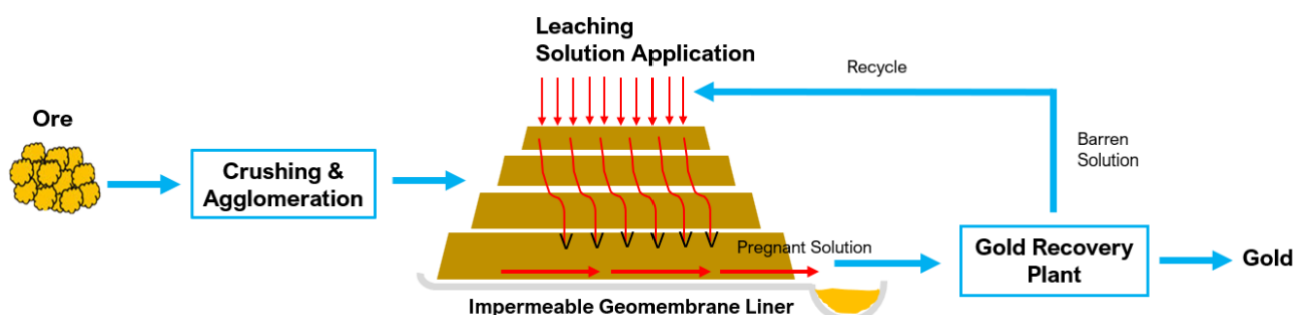


## 1. Heap Leaching Low-Grade Material

Heap leaching, which could be a potential game changer for the project, is a low capital and operating cost alternative to conventional mill processing techniques for gold recovery from low-grade bulk tonnage projects such as Korbelt. It is a well-proven and cost-effective approach used by the majors including Barrick Gold, Newmont, Kinross Gold and Victoria Gold to name a few.

Heap leaching can potentially recover the gold from 100's of millions of tons of lower grade material, and the reject material from the ore sorters, which in the current flowsheet is waste. This has the potential to significantly increase the gold production from the project.

Figure 2 below shows how a typical heap leach process works with ore put through an optional pre-application phase before being stacked on an impermeable heap pad. The pad is then irrigated with a leaching agent for an extended period of time which chemically reacts with the ore to dissolve the gold into a solution as it percolates through the heap. The impregnated solution is then collected at the bottom of the heap and the gold is recovered through a gold processing plant, with the barren solution recycled to start the process again.



**Figure 2.** A typical heap leach process

Heap leaching has a number of benefits including:

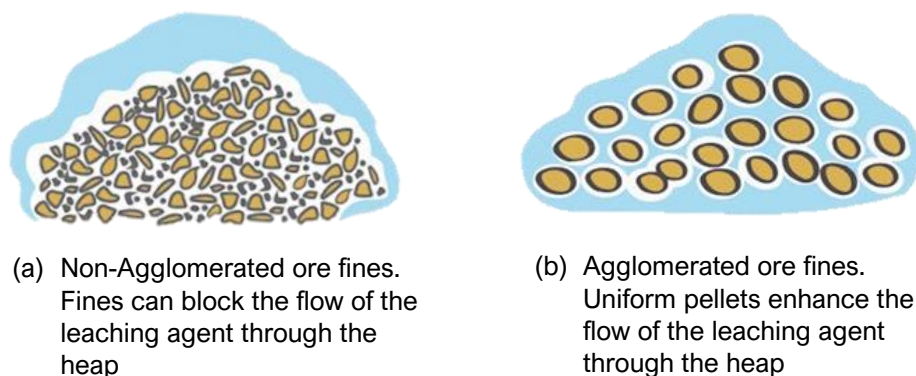
- Recovers low grade gold from ore that was previously sent to waste, resulting in higher potential gold production
- Lower capital cost relative to other methods of gold recovery, as with only higher-grade ore now going through the plant, a smaller plant is required
- Simple process with lower operating costs than conventional processing techniques (lower energy consumption, less equipment configuration)
- Can move a project to cashflow at a quicker pace and generate the capital required to finance the more expensive processing facilities
- Suitable for all climates eg: The Fort Knox gold mine in Alaska and the Eagle gold mine in the Yukon both use heap leaches to extract gold

METS audit work found that the crush sizes used in previous test work on heap leaching were too coarse. Consequently, the Estelle ore's amenability to heap leaching is currently undergoing renewed test work using a finer crushing on the bulk samples from Korbelt and RPM ore that were sent to Perth late last year. This test work, which has also been identified as very important in discussions with potential partners, is also looking at various heap leaching options, including agglomeration, and alternative leach reagents. Early-stage indications look good and heap leaching will potentially be adopted into the flowsheet in the PFS if the final results expected in the 2<sup>nd</sup> half of 2024 continue to be positive.



## 2. Adding an Agglomeration Plant to the Heap Leach Process

The migration of fines through a heap during irrigation can lead to poor permeability and plugging at the bottom of the heap (Figure 3a). Agglomeration, which involves cementing the fines into rigid pellets, greatly enhances the uniform flow of the leach agent through the heap, which in turn improves the efficiency of the heap leach process (Figure 3b). In the pre-stacking phase, crushed ore is put into a tumbling agglomeration drum where a binder is added to cause coalescence, creating uniform ore pellets. The agglomerated ore pellets are then spread over the leaching pad and the gold is recovered as shown in Figure 2 above.



**Figure 3.** How agglomeration works in a heap leach

The benefits of adding agglomeration to the heap leach process prior to stacking include:

- Improved heap percolation rates by up to 100 times
- Reduces the leach time by up to 2/3rds as the leaching agent is incorporated into the agglomeration stage
- Reduced leaching agent consumption due to shorter leach time
- Improved gold recovery and lower operating costs

The METS audit recommended that agglomeration and the use of different reagents, be tested as part of the PFS level studies, and these studies have now commenced as part of the wider heap leaching PFS test work.

## 3. Multi-Element Extraction Including CM for Bi-Product Potential

The extensive surface sampling program undertaken across the entire Estelle claim block in 2023 identified numerous elevated concentrations of Silver, Copper, Antimony (Figure 5) and other Critical Minerals (CM) at a number of prospects (Figure 4). Following visits to both Washington DC, and Alaska's state capital Juneau, by Nova CEO, Christopher Gerteisen, and accompanied by Nova's corporate advisors, strong interest has been shown in Estelle's antimony and CM potential to help shore up the US domestic supply. Consequently the review has identified the extraction of antimony and other CM should be tested as part of the proposed flowsheet as they have the potential to provide significant bi-product credits for the project.

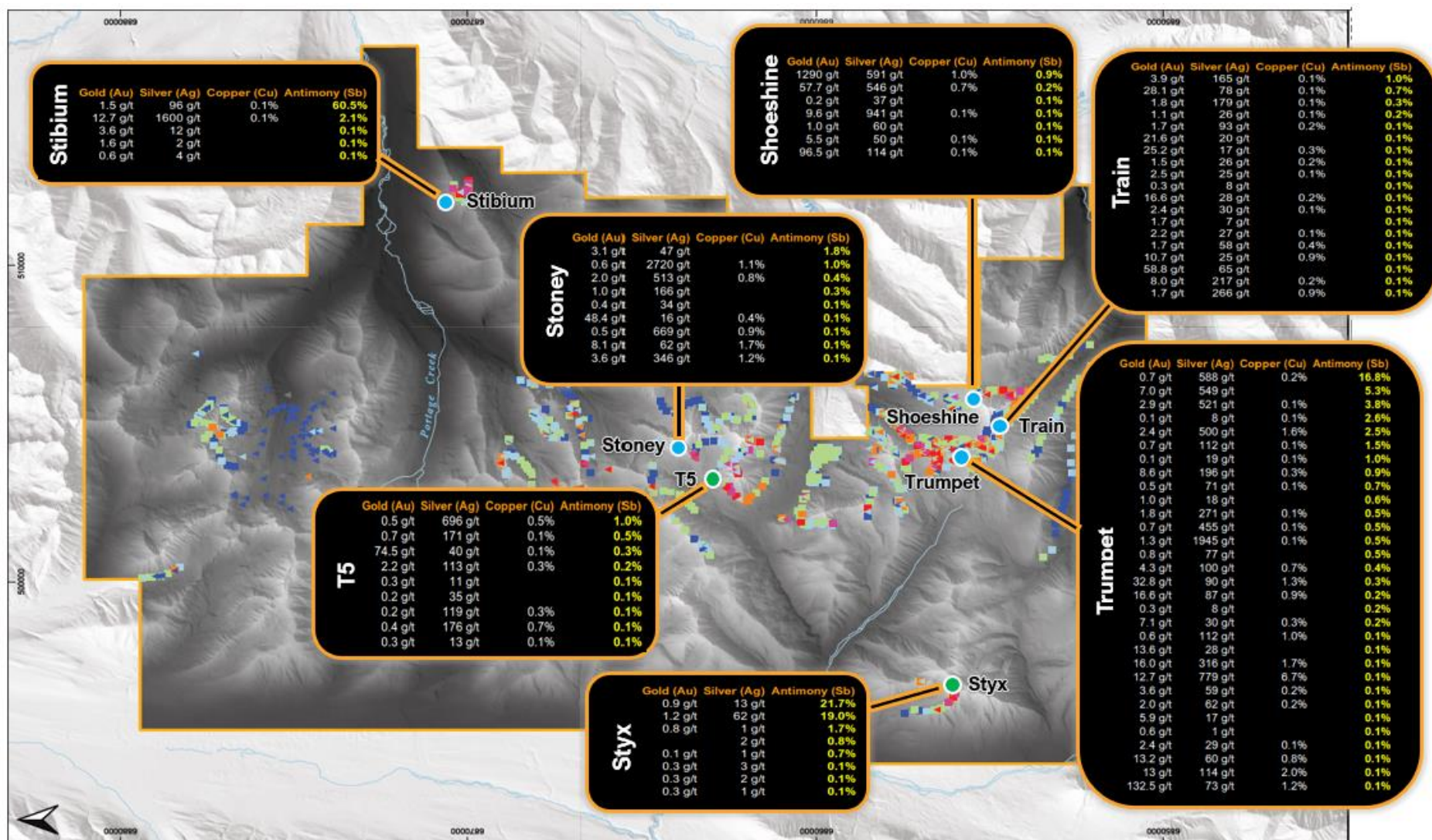
Going forward multi-element analysis will be incorporated in all exploration and resource sampling, and a review is currently being conducted of all existing sample and drill data where multi-element analysis has already been undertaken. Test samples from several Korbel drill holes, which were not previously analyzed for multi-elements, are also being sent to ALS for comprehensive analysis of all elements, and scoping level metallurgical studies on antimony and critical minerals processing in the flow sheet has also commenced.



| Mineral Element | Symbol    | Earth Average (ppm) | Estelle Maximum (ppm)* | Top Prospects at Estelle where Highly Elevated Concentrations have been Discovered to Date | World Production (%)** |                | World Reserves (Kt)** |                | Uses                                                                                                               |
|-----------------|-----------|---------------------|------------------------|--------------------------------------------------------------------------------------------|------------------------|----------------|-----------------------|----------------|--------------------------------------------------------------------------------------------------------------------|
|                 |           |                     |                        |                                                                                            | USA                    | China / Russia | USA                   | China / Russia |                                                                                                                    |
| <b>Gold</b>     | <b>Au</b> | <b>0.004</b>        | <b>1290</b>            | <b>All</b>                                                                                 | <b>5</b>               | <b>20</b>      | <b>3</b>              | <b>9</b>       | <b>Investment, jewelry, electronics</b>                                                                            |
| <b>Antimony</b> | <b>Sb</b> | <b>0.2</b>          | <b>605000</b>          | <b>Stibium, Styx, Shoeshine, Train, Trumpet</b>                                            | <b>0</b>               | <b>85</b>      | <b>60</b>             | <b>700</b>     | <b>Defense tech, munitions, flame retardants, batteries, clean tech, communications, chemicals, ceramics/glass</b> |
| Silver          | Ag        | 0.075               | 2720                   | Stoney, Shoeshine, Train, Trumpet                                                          | 4                      | 20             | 23                    | 116            | Investment, electricals, photovoltaics, solar, jewelry/silverware, brazing/solder, photography                     |
| Copper          | Cu        | 60                  | 100500                 | Stoney, Shoeshine, Train, Trumpet, Trundle                                                 | 4                      | 50             | 44                    | 89             | Construction, electricals, transportation, industrial machinery                                                    |
| Bismuth         | Bi        | 0.009               | >10000                 | RPM, Shoeshine, Train, Trumpet                                                             | 0                      | 80             | NA                    | NA             | Chemicals, pharmaceuticals, glass/ceramics, pigments                                                               |
| Cobalt          | Co        | 25                  | 9110                   | Wombat, Stoney, Train, Trumpet                                                             | <1                     | 6              | 69                    | 390            | Super alloys, chemicals, metallics, tools                                                                          |
| Gallium         | Ga        | 19                  | 61                     | Wombat                                                                                     | 0                      | 99             | 0                     | 760            | Semi conductors, optoelectronics, integrated circuits                                                              |
| Indium          | In        | 0.25                | 60                     | Wombat, Train, Trumpet                                                                     | 0                      | 60             | NA                    | NA             | LCDs, alloys/solders, compounds, electrical components, semiconductors, research                                   |
| Lanthanum       | La        | 39                  | 1480                   | Wombat                                                                                     | 15                     | 70             | 2300                  | 65000          | Catalysts, magnets, ceramics, glass, metallurgical, alloys, polishing                                              |
| Manganese       | Mn        | 950                 | 21900                  | Shoeshine, T5                                                                              | 0                      | 5              | 0                     | 280            | Steel, animal feed, bricks, batteries, fertilizers                                                                 |
| Scandium        | Sc        | 22                  | 156                    | Trumpet                                                                                    | W                      | 55             | 0                     | NA             | Specialty alloys, fuel cells, ceramics, electronics, lasers, lighting                                              |
| Strontium       | Sr        | 370                 | 1550                   | Revelation, Train, Trumpet                                                                 | 0                      | 25             | NA                    | 16000          | Drilling fluids, magnets, pyrotechnics, signals, alloys, pigments/fillers, glass                                   |
| Tellurium       | Te        | 0.001               | 444                    | RPM, Shoeshine, Train, Trumpet, Muddy Creek                                                | W                      | 65             | 4                     | 8              | Solar cells, energy, thermoelectrics, specialty alloys, chemicals, pigments                                        |
| Tungsten        | W         | 1.3                 | >10000                 | Shoeshine, Trumpet, Stoney, RPM, Revelation                                                | 0                      | 90             | NA                    | 2100           | Tools, specialty alloys, electrical, chemicals                                                                     |
| Yttrium         | Y         | 33                  | >500                   | Trumpet, Stoney                                                                            | 0                      | 90             | NA                    | NA             | Catalysts, ceramics, electronics, lasers, metallurgy, phosphors                                                    |

\* Source ALS laboratory analysis ICP\_MS61 , Dataset includes 1844 rock and soil exploration samples across Estelle project area.  
\*\* Source USGS Mineral Commodity Summaries 2023,  
NA - Data not available  
W - Information withheld to avoid disclosing company proprietary data

**Figure 4.** Multi-Element potential at Estelle – Gold, antimony, and other high-grade minerals also discovered



**Figure 5.** Antimony at Estelle - Many surface samples discovered > 0.1% Sb (>0.1% Sb considered high-grade)



The company is also actively pursuing grant opportunities to progress development of its antimony and CM resources at Estelle, and the University of Alaska Fairbanks (UAF), a grantee under the Department of Energy (DoE) CORE CM program, which is tasked with commercializing CM in Alaska, has now included the Estelle project as a partner in the program.

The recent State of Alaska House Bill No.122 provides the Alaska Industrial Development and Export Authority (AIDEA) authority to issue up to US\$300M in bonds to finance critical minerals related projects in Alaska, including projects along the proposed West Susitna Access Road. Refer CS for House Bill No 122 (TRA) <https://www.akleg.gov/PDF/33/Bills/HB0122B.PDF>

#### **4. Perform Additional Ore Sorting Test work**

The review highlighted the need to optimize the ore sorting process from a whole of ore maximum recovery focused approach versus a more selective maximum grade approach that is now being investigated as part of the PFS to unlock significant additional value in terms of overall gold production and cost savings. The previous scoping study flow sheet was designed to consider only two ore material types, low-grade and high-grade. High grade was directed straight to the plant, and all low-grade material was all directed to the ore sorters. The accepted upgraded portion was then directed to the milling circuit, and the reject portion was classified as waste. In this previous scenario, the ore sorters were dialed in to achieve maximum gold recovery, thereby, through dilution, limiting the grade increase that could be achieved.

In current PFS studies, the implementation of heap leach as the primary processing option for low grade ore allows the ore sorting process to be more selectively focused on higher average grade ores with the objective to maximize grade of the accepted portion. Maximizing gold recovery of the accepted portion becomes less of a concern as heap leach now provides a gold recovery process option for the reject portion. Three ore material types are now defined, ie low-grade, medium-grade, and high-grade. Low-grade will go to heap-leach, high-grade will go to the mill, and medium-grade will be selected for ore sorting. The ore sorters will be dialed in to maximize grade of the accepted portion. The outcome is a very high grade accepted portion which is routed to the milling circuit, and a less gold depleted low-grade reject portion which is routed to the heap leach circuit. All material passing through the ore sorters will go its respective gold recovery process circuit, eliminating the waste stream altogether. Significant cost savings can be realized through more selective ore sorting practices which will require less throughput capacity, fewer ore sorters, and minimized supporting infrastructure, and at the same time increase overall gold production.

To date Nova's extensive testing at Tomra has shown that ore sorting is proven to work exceptionally well, and can potentially provide an up to 10 X uplift in grade (ASX Announcement: 15 March 2021). Testing so far has only looked at XRT density sorting, but Steinert's ore sorters (Figure 6) can also sort based on a combination of XRT, colour, laser, and induction sensors, and testing using Steinert's multi-sensor ore sorters is currently underway on ore from both Korbel and RPM.

Early-stage discussions with potential partners and funders has also shown the need to demonstrate the capabilities of ore sorting on a larger scale. A bulk, up to 200 kt, pilot scale ore sort test program is currently being planned in consultation with Rough Stock, METS and Steinert.



**Figure 6.** Steinert multi-sensor ore sorter

## 5. Investigate Alternative technology Options

The review identified that alternative technology options, such as SAG (Semi Autogenous Grinding) mills, coarse flotation with the application of Hydrofloat technology, and gravity recovery using a Reflux Classifier should be investigated to further improve and optimize the process flowsheet

SAG mills perform the crushing, grinding and washing together, and provide the highest reduction rate, while requiring less maintenance than normal crushers.

Hydrofloat allows the flotation of particles of coarser sizes than conventional flotation cells, resulting in reduced operating and capital costs by maximising recovery at a coarser size and rejecting a larger portion of the ore from the plant at the coarsest size possible.

Reflux classifier is a beneficiating device that utilizes both the principle of gravity separation and particle size classification.

METS Engineering to perform test work to establish if the ore is amenable to these alternative technology options.

### Potential Early Production from Stibium

The review identified the importance of antimony and other CM, coincident with the gold, recently discovered in surface sampling at numerous prospects across the project site, including Stibium where high-grade antimony enriched gold mineralization assaying up to 60.5% Sb and 12.7 g/t Au was discovered (ASX Announcement: 10 October 2023). In 2024 Nova intends to conduct a maiden small scale diamond drill program at Stibium early in the field season to test the 2m wide by 30m long massive sulfide vein containing stibnite, pyrite, and galena which was discovered outcropping in hornfels in close proximity to the intrusive outcrop.

With its close proximity to the Whiskey Bravo camp and airstrip, and the significant interest shown by the US government to secure US domestic CM supply chains, Gold-Antimony-CM prospects such as Stibium present a potential near term cashflow opportunity through small scale production to provide a concentrate for US domestic supply, which the Company is currently investigating.

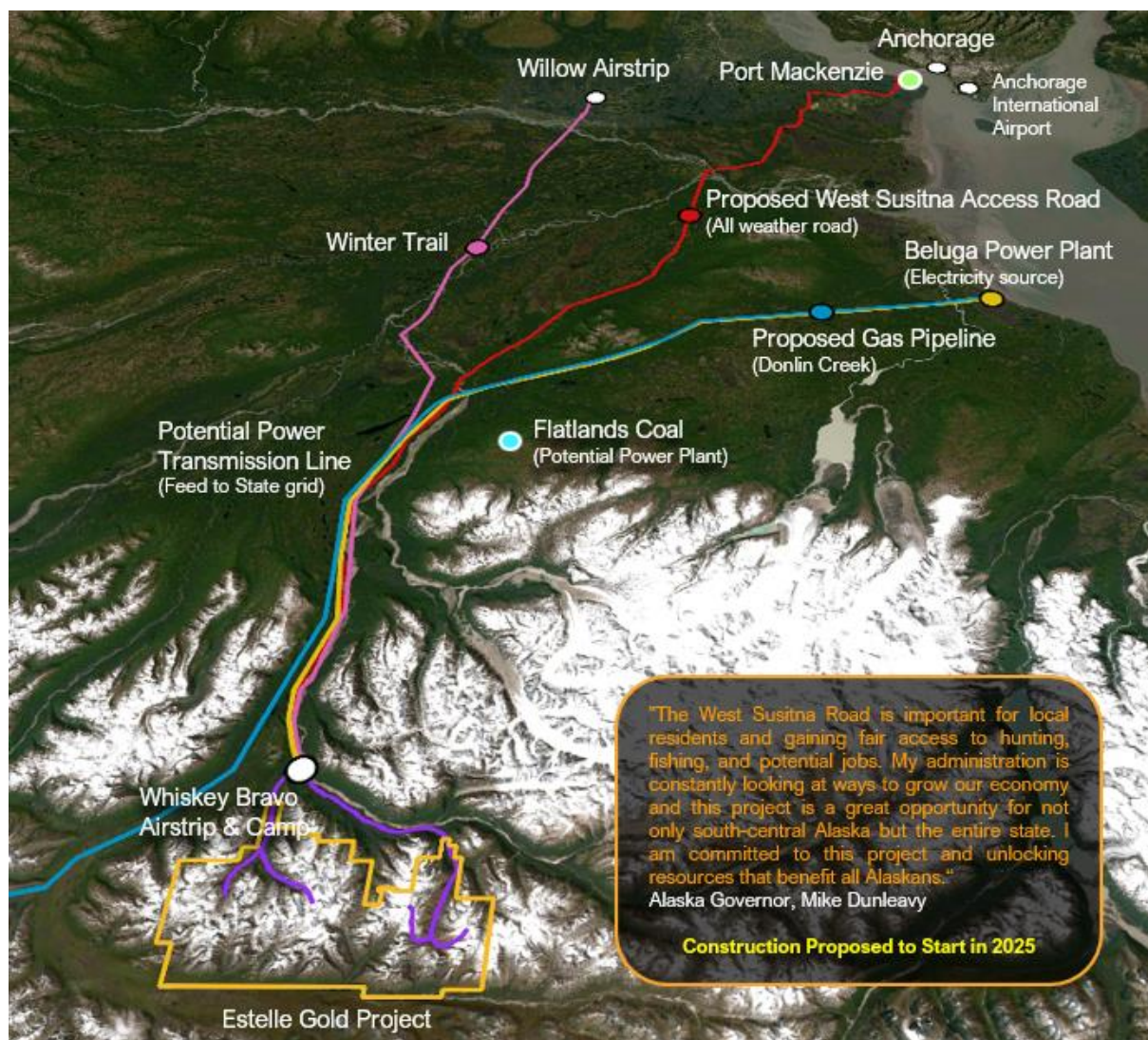


With a minimal impact and footprint required for a small-scale starter mine, a streamlined rapid permit process is possible.

### West Susitna Access Road (WSAR)

The WSAR is a proposed ~150km all-weather road that links the project to port, rail and road (Figure 7), and has considerable support from both government and the community. The road is progressing as part of the DoT State Transportation and Infrastructure Plan with construction of the first 25kms, which includes the largest bridge crossing, scheduled to commence in 2025. The remainder of the road to the Estelle Project is being advanced by the Alaska Industrial Development and Export Authority (AIDEA). AIDEA recently announced that it is completing the last phase field studies in 2024 and will then advance to permitting. In addition, House Bill No.122 provides AIDEA the authority to issue up to US\$300M in bonds for CM related projects and infrastructure in Alaska, including the West Susitna Access Road. (<https://www.akleg.gov/PDF/33/Bills/HB0122B.PDF>)

While the review recognised the importance of the WSAR, it also identified that Nova could potentially utilize the road at an early stage and commence mine construction using the initial frontier trail along the proposed WSAR alignment prior to the road being fully completed, together with the winter snow road to transport equipment to site.



**Figure 7.** Proposed WSAR route and infrastructure solutions



## Power Options

The review identified numerous power options that would meet the startup requirements (10-20MW) for the Estelle Project with the ability to scale up in the future. It is noted that many of these projects are not yet constructed and/or commissioned and still in the planning stages. The company continues to study the options and discuss with the relevant parties to determine the best fit for the Estelle Project in terms of needs and timeline. Options requiring minimal CAPEX are a priority, with infrastructure costs covered by the power provider with the company entering into a long term power purchase agreement. As such, all the following options are being studied and considered as part of the PFS.

- Gas - Chugach Electric Rail Belt tie-in transmission line ~70 mi.
- Nuclear - Westinghouse/NanoNuclear micro/nano reactors on site
- Coal - Flatlands Power Plant transmission line ~25mi.
- Gas - Donlin project pipeline ~15 mi.
- Gas - AKLNG pipeline ~100mi.
- Diesel - generators on site

This announcement has been authorized for release by the Executive Directors.

Christopher Gerteisen  
CEO and Executive Director  
E: [info@novaminerals.com.au](mailto:info@novaminerals.com.au)

Craig Bentley  
Director of Finance & Compliance  
& Investor Relations  
E: [craig@novaminerals.com.au](mailto:craig@novaminerals.com.au)  
M: +61 414 714 196

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This news release contains “forward-looking information” within the meaning of applicable securities laws. Generally, any statements that are not historical facts may contain forward-looking information, and forward looking information can be identified by the use of forward-looking terminology such as “plans”, “expects” or “does not expect”, “is expected”, “budget” “scheduled”, “estimates”, “forecasts”, “intends”, “anticipates” or “does not anticipate”, or “believes”, or variations of such words and phrases or indicates that certain actions, events or results “may”, “could”, “would”, “might” or “will be” taken, “occur” or “be achieved.” Forward-looking information is based on certain factors and assumptions management believes to be reasonable at the time such statements are made, including but not limited to, continued exploration activities, Gold and other metal prices, the estimation of initial and sustaining capital requirements, the estimation of labor costs, the estimation of mineral reserves and resources, assumptions with respect to currency fluctuations, the timing and amount of future exploration and development expenditures, receipt of required regulatory approvals, the availability of necessary financing for the Project, permitting and such other assumptions and factors as set out herein. apparent inconsistencies in the figures shown in the MRE are due to rounding Forward-looking information is subject to known and unknown risks, uncertainties and other factors that may cause the actual results, level of activity, performance or achievements of the Company to be materially different from those expressed or implied by such



forward-looking information, including but not limited to: risks related to changes in Gold prices; sources and cost of power and water for the Project; the estimation of initial capital requirements; the lack of historical operations; the estimation of labor costs; general global markets and economic conditions; risks associated with exploration of mineral deposits; the estimation of initial targeted mineral resource tonnage and grade for the Project; risks associated with uninsurable risks arising during the course of exploration; risks associated with currency fluctuations; environmental risks; competition faced in securing experienced personnel; access to adequate infrastructure to support exploration activities; risks associated with changes in the mining regulatory regime governing the Company and the Project; completion of the environmental assessment process; risks related to regulatory and permitting delays; risks related to potential conflicts of interest; the reliance on key personnel; financing, capitalization and liquidity risks including the risk that the financing necessary to fund continued exploration and development activities at the Project may not be available on satisfactory terms, or at all; the risk of potential dilution through the issuance of additional common shares of the Company; the risk of litigation.

Although the Company has attempted to identify important factors that cause results not to be as anticipated, estimated or intended, there can be no assurance that such forward-looking information will prove to be accurate, as actual results and future events could differ materially from those anticipated in such information. Accordingly, readers should not place undue reliance on forward-looking information. Forward looking information is made as of the date of this announcement and the Company does not undertake to update or revise any forward-looking information which is included herein, except in accordance with applicable securities laws.