

# Defense Metals Announces Positive Preliminary Economic Assessment For The Wicheeda Rare Earth Element Project

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VANCOUVER, Nov. 24, 2021 - [Defense Metals Corp.](#) ("Defense Metals" or the "Company") (TSXV: DEFN) (OTCQB: DSE) (FSE: 35D) is pleased to announce the results of its Preliminary Economic Assessment (PEA) and updated mineral resource estimate for the development of its Wicheeda Rare Earth Element (REE) deposit located in British Columbia, Canada. The PEA was prepared by SRK Consulting (Canada) Inc. (SRK). The effective date of the PEA is November 21, 2021 and a technical report relating to the PEA will be filed on SEDAR within 45 days of this news release.

## PEA Highlights

### Strong Financial Metrics

- The project has a pre-tax net present value (NPV) of \$765 million<sup>1</sup>, and after-tax NPV of \$512 million, at 8% discount rate.
- The pre-tax internal rate of return (IRR) is 20%, and the after-tax IRR is 16%.
- The capital payback is 5 years from start of production, and assumes partial self-funding of construction of hydrometallurgical plant from concentrate sales.
- Revenues average \$397 million per year from sale of REE mineral concentrate (years 1-4) and mixed REE hydroxide carbonate precipitate (years 5-16).
- Operating margin of 65.2%.
- Production of a saleable high-grade flotation-concentrate, with average 43% total rare earth oxide (TREO) for the project mine. It will be sold to market directly for years 1-4 and will then feed a project hydrometallurgical plant starting in year 5.
- Project near to key infrastructure.
- Base case economics were calculated using rare earth oxide (REO) prices of US\$5.76/kg TREO in flotation concentrate and US\$14.04/kg TREO in mixed REE carbonate precipitates.

### Significant Production Potential

- The study contemplates a 1.8 Mtpa (million tonnes per year) mill throughput open pit mining operation with 1.75:1 (waste:mill feed) strip ratio over a 19 year mine (project) life that includes 3 years of construction, and early revenue generation from a phased open pit development. Phase 1 initial pit strip ratio of 0.63:1 (waste:mill feed) yields rapid access to high-grade surface mineralization. Pre-production and first mill feed both in year 1.
- Average annual REO production of 25,423 tonnes.
- Operating costs average \$137 million per year over a 16-year life of mine (LOM).

### Development Capital

- Initial capital expenditures (CAPEX) are \$461 million (includes a contingency allowance of 20% to 25% for major construction items). The expansion capex under a cash-funded scenario is \$474 million. Sustaining capex for the life of the project is \$1.2 billion.
- A scenario that uses concentrate sales to partially self fund the construction of a hydrometallurgical plant reduces project cash requirements compared to constructing the hydrometallurgical plant as part of Phase 1. This development scenario provides significant optionality to accelerate or defer the investment in the hydrometallurgical plant according to market conditions.

### Mineral Resource Estimate

- The updated Wicheeda Mineral Resource Estimate (MRE) comprises a 5.0 million tonne Indicated Mineral Resource, averaging 2.95% TREO and a 29.5 million tonne Inferred Mineral Resource, averaging 1.83% TREO, reported at a grade of 0.5% TREO within a conceptual Lerchs-Grossman (LG) pit shell. The current resource represents a 36% increase on a contained metal basis in comparison to the prior 2020 MRE due to the estimation of additional economically significant medium and heavy REE's and a lower cut-off grade established based on consideration of TREO and concentrate grade, metallurgical recovery, and operating cost assumptions.



## Exploration Upside

- During 2021, in anticipation of a positive PEA outcome, Defense Metals completed a 29-hole 5,349 metre resource and delineation diamond drill program at Wicheeda. The results of drilling are expected during Q1 2022 and as such will be incorporated into the PEA. The drilling is expected to support ongoing advanced economic studies through the development of an updated geological model and mineral resource estimate.

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<sup>1</sup> All figures are in Canadian dollars unless otherwise specified

Craig Taylor, CEO of Defense Metals, stated: "We are pleased to have delivered a positive PEA for the Wicheeda REE Project that has the potential to be one of the top REE projects in the world. We chose SRK due to its world class experience and reputation in the mining industry and in particular its ability to assemble a team with highly specialized knowledge of Rare Earth Elements projects. The results of the PEA reveal the Wicheeda Project demonstrates robust economics and relatively low initial CAPEX via a staged development scenario that provides the flexibility to capitalize on forecast REE demand pressure."

Dr. Luisa Moreno, Director, added: "The Wicheeda project has the three main aspects for a successful rare earth project, favorable minerology dominated by coarse grained bastnasite family minerals, a metallurgical process that yielded high grade flotation concentrate and great infrastructure in a friendly jurisdiction. With the positive PEA, the project is undoubtedly a step closer to production."

## PEA Key Metrics

Table 1: Key financial and project metrics



Project Metric	Units	Value
Pre-tax NPV @ 8%	\$k	\$764,586
After-tax NPV @ 8%	\$k	\$511,577
Pre-tax IRR @ 8%	% (real)	20%
After-tax IRR @ 8%	% (real)	17%
Undiscounted After-tax Cashflow (LOM)	\$k	\$1,785,587
Payback Period from start of production	Years	5
Initial Capital Expenditure	\$k	\$599,845
Maximum Production Rate	Mtpa	1.8
Mine Life	years	16
Ramp-up Years	years	1
Average Production Rate after Ramp-up	Mtpa	1.73
Mill Feed for Concentrate Sales	tonnes	5,416,388
Mill Feed for HM Plant Precipitate Sales	tonnes	20,712,812
Total Mill Feed	tonnes	26,129,200
Life Mine ROM Grade	% REO in mill feed	2.33%
Life of Mine Waste Rock	tonnes	45,658,098
Life of Mine Strip Ratio	Waste:Mill feed	1.75
Net Revenue from Concentrate	\$k	\$862,520
Net Revenue from Precipitate	\$k	\$5,236,095
NSR (concentrate and precipitate)	\$/tonne mill feed	\$228.73
Operating Margin	%	65.21%
Operating Costs		
Mining	\$/t	\$13.14
Beneficiation	\$/t	\$13.63
Beneficiation Tailings	\$/t	\$1.25
Hydrometallurgical Plant (per tonne of mill feed for HM)	\$/t	\$55.75
Hydrometallurgical Tailings (per tonne of mill feed for HM)	\$/t	\$0.86
Water Management	\$/t	\$1.91
Site G&A	\$/t	\$4.78
Total Unit Operating Costs	\$/t mill feed	\$79.58
Optimization Opportunities and Next Steps		



The PEA describes a well-developed base case flotation concentration and hydrometallurgical pre-leach-caustic crack-leach flowsheet capable of achieving high REE recoveries into a mixed REE precipitate product. The base case represents a well-proven and widely adopted REE recovery flowsheet.

There are several alternative process and infrastructure development options that have shown promise in initial testing or based on the characteristics of Wicheeda REE feed are expected to be viable, that have the potential to yield simplifications that may contribute to decreased CAPEX and/or operating costs (OPEX). Future critical path bench and/or pilot-scale testwork and economic trade-off, and resource estimation studies are planned which include (but are not limited to):

- Economic trade off studies designed to investigate the optimal hydrometallurgical plant location. CAPEX/OPEX may be achievable in siting the hydrometallurgical plant more remote from the project site near industrial reagent supply than the base case.
- Front-end investigation of pre-concentration (e.g., x-ray transmission (XRT) particle sorting) and flotation flowsheet metallurgical optimization assessing the effect of grind size and lowered or alternative reagent dosages, as well as conditioning and flotation slurry temperature.
- Hydrometallurgical optimization including investigation of potential process alternatives including direct caustic crack-leach or sulphuric acid bake.
- During 2021, in anticipation of a positive PEA outcome, Defense Metals completed a 29-hole 5,349 metre resource and delineation diamond drill program at Wicheeda. The results of drilling are expected during Q1 2022 and as such have been incorporated into the PEA. The drilling is expected to support ongoing advanced economic studies through the development of an updated geological model and mineral resource estimate.
- Further metallurgical test work to confirm and improve recoveries and better define detailed design parameters such as liquid-solid separation requirements.
- Further definition of the detailed characteristics of the tailings and water management components.
- Engage with rights and stakeholders.
- Design and implementation of a full environmental base line program in support of Federal and Provincial Environmental Assessment for the project.
- Future infill and expansion drilling.

## Updated Mineral Resource

The Wicheeda deposit is modelled as a southeast-trending, north to northeast dipping composite layered syenite-carbonatite sill complex having dimensions of approximately 400 m north-south by 100-250 m east-west. The mineralization is interpreted as a moderately north-northeast dipping, shallowly north plunging, layered sill complex having low REE grade syenite at its base, overlain by transitional intermediate REE grade hybrid xenolithic-carbonatite (fenite), and finally relatively higher REE grade dolomite-carbonatite rocks, which form the main mineralization of the Wicheeda REE deposit outcropping at surface.

The updated MRE comprises a 5.0 million tonnes Indicated Mineral Resource, averaging 2.95% TREO (Total Rare Earth Oxide: CeO<sub>2</sub>, La<sub>2</sub>O<sub>3</sub>, Nd<sub>2</sub>O<sub>3</sub>, Pr<sub>6</sub>O<sub>11</sub>, Sm<sub>2</sub>O<sub>3</sub>, Eu<sub>2</sub>O<sub>3</sub>, Gd<sub>2</sub>O<sub>3</sub>, Tb<sub>4</sub>O<sub>7</sub>, Dy<sub>2</sub>O<sub>3</sub> and Ho<sub>2</sub>O<sub>3</sub>), and a 29.5 million tonnes Inferred Mineral Resource, averaging 1.83% TREO, reported at a cut-off grade of 0.5% TREO within a conceptual Lerchs-Grossman (LG) pit shell and is provided in Table 2.

The lower cut-off grade was established based on consideration of TREO and concentrate payable, metallurgical recovery, and operating cost assumptions.

The MRE is predominately based on an unchanged geological model and methodologies utilized to calculate the 2020 MRE. Differences relate to the incorporation of pulp REE multi-element fusion inductively coupled plasma mass spectrometry (ICP-MS), re-assay of the 2008 and 2009 drillholes, reducing the uncertainty regarding the historical incomplete X-ray fluorescence analytical results, updated estimation parameters, and a 2020 LiDAR survey. The increased resolution of the LiDAR allows for more robust mine planning, particularly when considering the high relief within the Project area.

Table 2: Wicheeda Mineral Resource (effective date November 21, 2021)



Category	Tonnes	TREO	TREO	CeO <sub>2</sub>	La <sub>2</sub> O <sub>3</sub>	Pr <sub>6</sub> O <sub>11</sub>	Nd <sub>2</sub> O <sub>3</sub>	Sm <sub>2</sub> O <sub>3</sub>	Gd <sub>2</sub> O <sub>3</sub>	Eu <sub>2</sub> O <sub>3</sub>	Dy <sub>2</sub> O <sub>3</sub>	Tb <sub>4</sub> O <sub>7</sub>	Ho <sub>2</sub> O <sub>3</sub>
	(Million)	(%)	(kt)	(%)	(%)	(%)	(%)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
Indicated	5.0	2.95	148	1.44	1.04	0.11	0.30	296	126	60	33	11	3
Inferred	29.5	1.83	539	0.89	0.61	0.08	0.21	240	112	50	32	10	4

## Notes for Resource Table:

- The MRE was prepared by Warren Black, M.Sc., P.Geo. of APEX Geoscience Ltd under the supervision of the Q. Deiss, Bsc (Hons), Pri.Sci.Nat. of SRK Consulting (Canada) Inc., in accordance with CIM Definition Standards.
- The MRE is classified according to the CIM "Estimation of Mineral Resources and Mineral Reserves Best Practices" dated November 29th, 2019 and CIM "Definition Standards for Mineral Resources and Mineral Reserves" dated March 2014.
- Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability. There is no guarantee that part of the mineral resources discussed herein will be converted to a mineral reserve in the future.
- All figures are rounded to reflect the relative accuracy of the estimates. Total may not sum due to rounding.
- Mean rock densities supported by 795 measurements applied: 2.94 g/cm<sup>3</sup> (dolomite-carbonatite), 2.87 g/cm<sup>3</sup> (xenolithic-carbonatite), 2.70 g/cm<sup>3</sup> (syenite), and 2.74 g/cm<sup>3</sup> (limestone).
- The reasonable prospect for eventual economic extraction is met by reporting the Mineral Resources at a cut-off grade of 0.50% TREO (total rare earth oxide, sum of 10 oxides: CeO<sub>2</sub>, La<sub>2</sub>O<sub>3</sub>, Nd<sub>2</sub>O<sub>3</sub>, Pr<sub>6</sub>O<sub>11</sub>, Sm<sub>2</sub>O<sub>3</sub>, Eu<sub>2</sub>O<sub>3</sub>, Gd<sub>2</sub>O<sub>3</sub>, Tb<sub>4</sub>O<sub>7</sub>, Dy<sub>2</sub>O<sub>3</sub>, and Ho<sub>2</sub>O<sub>3</sub>), contained within a Lerchs-Grossman (LG) optimized pit shell
- The cut-off grade is calculated, and the LG pit is optimized based on the assumption that the hydrometallurgical process will produce mixed REE carbonate precipitates. The parameters utilized include the following considerations:
  - TREO price: \$18.66/kg
  - Exchange rate of 1.30 C\$:US\$
  - Precipitate production grades of 81.09% of TREO
  - Processing cost includes \$21.47/t of mill feed for flotation plus a variable cost for hydrometallurgical plant that is based on the feed grade. The average cost of hydrometallurgical plant is assumed to be \$1,204/t of concentrate
  - Mining cost of C\$2.00/t for mill feed and waste
  - G&A Costs included in the processing cost is C\$6M/yr
  - The overall process recoveries: For TREO ≥ 2.3%, recovery is 69.6%; between 2.3% and 1.5% TREO, recovery is 65.3%; and less than 1.5% TREO, recovery is 52.2%. These assume variable flotation recoveries and a constant hydrometallurgical recovery.
  - Overall pit slope angles vary by zone between 40 and 48 degrees

The PEA for the Wicheeda REE Deposit is preliminary in nature, includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as mineral reserves, and there is no certainty that the preliminary economic assessment forecasts will be realized or that any of the resources will ever be upgraded to reserves. Mineral resources that are not mineral reserves do not have demonstrated economic viability.

## Mineral Resource Estimate Methodology

1. The drillhole database comprised of 27 exploration diamond drillholes completed in 2008 and 2009 by previous owners (10 holes totalling 2,244 metres) and in 2019 by Defense Metals (13 holes totalling 2,005 metres), containing a total of 137 core samples analyzed for REE by multi-element fusion ICP-MS.
2. The 3D geological modeling integrates assay and geological data collected from diamond core drilling; surface geophysics; mapping; soil geochemical; and airborne magnetic; and radiometric geophysical surveys.
3. Search ellipsoids defined by metal modelled variograms, which range from 130 to 140 m in the major axis, 100 m in the minor axis, and 9 to 18 m in the vertical axis. The MRE was estimated with 3 m composites utilizing Ordinary kriging and accounting for varying anisotropy.
4. Indicated Resources were categorized within a search ellipse of 90 m by 60 m by 9 m with a minimum of 5 drillholes. Blocks do not extend beyond the limits of the variograms.

Table 3: Mineral Resource cut-off sensitivity



Category	Cut-off	Tonnes <sup>1</sup>	TREO <sup>2</sup>	TREO	CeO <sub>2</sub>	La <sub>2</sub> O <sub>3</sub>	Pr <sub>6</sub> O <sub>11</sub>	Nd <sub>2</sub> O <sub>3</sub>	Sm <sub>2</sub> O <sub>3</sub>	Gd <sub>2</sub> O <sub>3</sub>	Eu <sub>2</sub> O <sub>3</sub>	Dy <sub>2</sub> O <sub>3</sub>	Tb <sub>4</sub> O <sub>7</sub>	Ho <sub>2</sub> O <sub>3</sub>
	TREO (%) <sup>2</sup>	(Million)	(%)	(Tonnes)	(%)	(%)	(%)	(%)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)	(ppm)
Indicated	0.25	5.032	2.94	148,186	1.44	1.04	0.11	0.30	296	126	60	33	11	3
	0.50	5.031	2.95	148,184	1.44	1.04	0.11	0.30	296	126	60	33	11	3
	0.75	5.030	2.95	148,173	1.44	1.04	0.11	0.30	296	126	60	33	11	3
	1.00	5.025	2.95	148,134	1.44	1.04	0.11	0.30	296	126	60	33	11	3
	1.50	4.984	2.96	147,577	1.44	1.05	0.11	0.30	298	126	61	33	11	3
	2.00	4.654	3.04	141,608	1.49	1.08	0.12	0.31	305	129	62	34	11	4
	2.50	3.687	3.24	119,523	1.58	1.15	0.13	0.32	322	135	65	35	12	4
Inferred	0.25	34.971	1.59	557,463	0.77	0.53	0.07	0.18	215	103	46	31	10	4
	0.50	29.467	1.83	538,757	0.89	0.61	0.08	0.21	240	112	50	32	10	4
	0.75	25.348	2.03	515,099	0.99	0.68	0.08	0.23	259	117	54	32	10	4
	1.00	20.888	2.28	477,214	1.11	0.78	0.09	0.25	281	126	58	32	11	4
	1.50	14.112	2.83	398,734	1.37	0.98	0.11	0.31	323	142	65	34	12	4
	2.00	12.258	2.99	366,258	1.45	1.04	0.12	0.32	335	146	67	35	12	4
	2.50	8.402	3.33	279,680	1.62	1.17	0.13	0.35	359	155	72	37	13	4

#### Notes

1.<sup>1</sup> Tonnes constrained within a LG open pit.

2.<sup>2</sup> TREO % sum of CeO<sub>2</sub>, La<sub>2</sub>O<sub>3</sub>, Nd<sub>2</sub>O<sub>3</sub>, Pr<sub>6</sub>O<sub>11</sub>, Sm<sub>2</sub>O<sub>3</sub>, Eu<sub>2</sub>O<sub>3</sub>, Gd<sub>2</sub>O<sub>3</sub>, Tb<sub>4</sub>O<sub>7</sub>, Dy<sub>2</sub>O<sub>3</sub> and Ho<sub>2</sub>O<sub>3</sub>.

3. Grades are reported as in-situ grades.

Table 3 above illustrates the sensitivity of the MRE to different cut-off grades for a potential open-pit operation scenario with reasonable outlook for economic extraction. The reader is cautioned that the figures provided in these tables should not be interpreted as a statement of mineral resources. Quantities and estimated grades for different cut-off grades are presented for the sole purpose of demonstrating the sensitivity of the resource model to the choice of a specific cut-off grade.

#### Mine Planning

SRK developed and evaluated a series of operational scenarios involving different production rates and saleable products to arrive at an optimum solution for mine development. An optimization model was used to check the sensitivity of the deposit against various key variables, and multiple high-level schedules were costed and economically assessed under varying pricing assumptions.

From this scenario analysis, a go-forward scenario was selected for further refinement. An updated pit optimization was run to select a pit based on optimizing the balance of NPV and risk. This pit was the basis of a production schedule for the LOM. Over the LOM, the project will generate 26.1 Mt of mill feed at a strip ratio of 1.75:1 (waste:mill feed) and an average grade of 2.3% TREO.



The Wicheeda deposit will be mined as a conventional open pit operation. In-pit haulage for both mill feed and waste will be by 65 tonne haulage trucks. Mill feed will be mined in six-metre benches and hauled to the crusher close to the pit rim. Crushed mill feed will be conveyed to the flotation mill.

Waste rock will be mined and hauled to an on-site rock storage facility as well as to the tailings storage facility (TSF) for embankment construction.

The mining operation has been costed as owner operated.

#### Flotation Concentrator

Material from the Wicheeda deposit is to be processed in a flotation concentrator to produce a flotation concentrate that is further processed at the hydrometallurgical plant. The flotation concentrator is to incorporate unit operations that are standard to the industry and include: crushing and grinding to liberate the REE minerals from the waste rock, followed by conditioning at elevated temperature with the required reagents followed by rougher and scavenger flotation. The resulting rougher-scavenger flotation concentrate is to be further upgraded during multiple stages of reagent conditioning and cleaner flotation. The upgraded flotation concentrate is then thickened, filtered and prepared for transport to the hydrometallurgical plant for further processing. The flotation concentrator tailings is to be pumped to the TSF for disposal.

An important aspect for a successful rare-earth project is the production of a flotation concentrate<sup>2</sup>, and only a select number of companies have been able to report such achievement. A high-grade flotation concentrate leads to smaller hydrometallurgy plant equipment and consequently considerably lower capital expenditures. As lower volumes of mineral concentrate are processed, there are also operating costs benefits as less reagents are consumed.

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<sup>2</sup> Except ion-absorption clays

#### Hydrometallurgical Plant

Flotation concentrate is subjected to a pre-leach process using hydrochloric acid (HCl) to remove gangue minerals that are present. The pre-leach residue is then processed by caustic cracking using a strong sodium hydroxide (NaOH) solution at elevated temperature. This converts the REE phosphate and fluorocarbonate minerals to hydroxides and dissolved phosphate, fluoride and carbonate species. The dissolved species are precipitated using lime and the NaOH thereby regenerated and re-used. The REE hydroxide is leached with HCl, impurities removed and the REE then precipitated with lime to form a REE hydrate which is dried, packaged, and sent to market.

As noted, NaOH used is regenerated using lime and the hydrochloric acid is regenerated using sulphuric acid. Waste products from the hydrometallurgical plant consist mainly of gypsum, excess lime, calcium phosphate and carbonate and minor metal precipitates. The hydrometallurgical residue is combined with the flotation tailings for storage.

The hydrometallurgical plant design summarized above is based on extensive bench-scale hydrometallurgical testing by SGS Lakefield on bulk samples of flotation concentrate produced during pilot plant flotation operations on Wicheeda mineralized material. Hydrometallurgical testwork is continuing and will result in pilot plant demonstration of the selected process.

#### On-site Project Infrastructure

##### Water Management

The Wicheeda Project will consist of infrastructure on the east and west extents of Wichcika Creek, and upstream of Wicheeda Lake. Water management infrastructure are required to capture the surface water



runoff and seepage from the open pit, waste rock storage facilities, mill feed stockpiles, and the tailings storage facility.

A single collection pond down stream of the pit and waste storage area will have sufficient storage capacity to manage a 1 in 100-year rainfall event. Water collected in the open pit will be directed to the pond, along with runoff from the processing plant pad. Inflows to the pond will be pumped to the processing plant or will be treated and discharged to Wichcika Creek.

The TSF will provide sufficient water storage capacity to handle the Inflow Design Flood based on its dam classification and safely manage more extreme events. A minimal TSF decant pond will be maintained, with a dedicated water management pond downstream of the water storage area, as noted above which will maintain a minimum pond volume to meet monthly water demand at the processing plant. All excess water will be pumped to the dedicated water management facility and/or contact water ponds at the processing plant area for recirculation in the plant or to be treated and discharged. A series of seepage collection stations will also be located along the downstream toe of the TSF dam to pump seepage back into the TSF pond.

Waste rock and pit wall water quality are expected to have elevated levels of molybdenum, arsenic, uranium and radium. Water in the TSF is expected to be elevated for the same parameters as waste rock and pit wall areas, along with fluoride. A water treatment plant has been sized based on a monthly water balance with the 1 in 25-year annual runoff contributions to the waste rock areas, open pit, and TSF. The plant is expected to treat for molybdenum, arsenic, uranium, radium and fluoride and will be situated at the processing area. The plant is sized to treat up to 2300 gpm of water and will discharge excess water from the water management facilities to Wichcika Creek.

Long-term water quality predictions for the project area will be developed to determine the duration of water treatment requirements. Closure strategies will be implemented to reduce the long-term water treatment requirements, including flooding the open pit, as well as resloping and covering of waste rock dumps and the tailings area.

## Tailings

The TSF is a key aspect of the operation. The following operating and mine life assumptions were used to determine the required tailings storage capacity:

- Total mill feed to be mined - 26 million tonnes
- An assumed annual mining rate - 1.8 Mtpa (= average of 5,000 tpd)
- LOM is 16 years (minimum)
- 100% of tailings and hydrometallurgical residue go to the TSF
- Required TSF capacity = 20 million cubic meters (m<sup>3</sup>) (at an average assumed dry density of 1.4 t/m<sup>3</sup>)

SRK completed several site selection exercises. Each site selection exercise was based on slightly different criteria provided by the operation and included consideration of both dewatered (thickened, filtered) and conventional slurry tailings. Conventional slurry tailings disposal is the basis of the PEA.

The TSF location, layout depositional approaches and water management will be further developed to meet both provincial regulations as well as Canadian and Global standards of good practice as the project advances through the PEA to future studies.

## General Site Infrastructure

An additional allowance for general site infrastructure such as buildings, site roads and other items of \$26 million was added to the capital costing.

## Offsite Project Infrastructure

## Power



Power is assumed to be supplied via a new high-voltage line connecting to the BC Hydro 138 kV line (1L 365) running to the west of the project to the project site. Costing has been derived from benchmarks and no detail design has been undertaken

#### Access

The existing forestry road from Bear lake to the project site is assumed to be upgraded for logistics access. The road crosses Wichcika Creek. The construction of a bridge is required, and this has been costed at a conceptual level. The bridge is also required for the backhaul of rock from the mine for the construction of the TMF.

#### Water Supply

Water is relatively abundant in the project area with multiple streams, lakes and rivers within proximity. An allowance for a local source was made in the costing.

Costing assumptions for offsite project infrastructure is shown in Table 3. A 25% contingency is included in the estimates.

Table 3: Offsite infrastructure capex estimates

#### Offsite Infrastructure Capex Total (\$million)

Power Line	\$48.3
Substation and connection	\$8.1
Water Supply	\$8.1
Access Road	\$84.5
Access Bridge	\$9.8
Offsite Infrastructure Total	\$158.8

#### Environmental and Social

The project is located within Treaty 8 territory. A robust Engagement Management Plan will be developed and implemented in order to initiate the federal and provincial environmental assessment process the project will be required to complete.

In addition to the engineering work required to advance the design of the water and tailings management Defense Metals will also be developing and initiating the collection of a thorough environmental baseline database. The environmental database which will contain data on physical properties (hydrogeology, hydrology, geochemistry, climatic conditions) as well as all biological properties of the immediate and regional project areas (flora and fauna, terrestrial and aquatic species). Following the collection of the environmental baseline database an environmental assessment satisfying the Canadian Impact Assessment Act and British Columbia's Environmental Assessment Act will be completed in order to advance the project through to production.

#### Capital Costs Summary

The initial project capital cost is estimated at \$461 million, including a contingency allowance of 20% to 25% for major items. Initial operating cashflows from the project are re-invested in the construction of the



hydrometallurgical plant.

Table 4: Total capital cost estimates

Category	Units	Initial	Expansion	Sussex	Closure	Total
Open Pit Capex	\$k	\$30,845		\$24,602		\$72,081
Flotation Plant Initial	\$k	\$102,551				\$133,316
Hydromet. Plant	\$k	\$0	\$474,091			\$616,319
General onsite infrastructure	\$k	\$26,000				\$33,800
Water Management	\$k	\$67,704				\$88,015
Beneficiation Tailings Handling	\$k	\$15,803				\$20,544
Offsite Infrastructure	\$k	\$158,844				\$206,497
Tailings Management Facility	\$k	\$59,672		\$195,307		\$331,472
Site wide Sussex	\$k			\$181,464		\$235,904
Closure Costs	\$k				\$164,996	\$214,494
Total Capex	\$k	\$461,419	\$474,091	\$401,373	\$164,996	\$1,952,443

The duration of the detailed design and construction phase of the project has been estimated to be 36 months.

#### Operating Costs Summary

The operating cost estimates are shown in Table 5. For the hydrometallurgical plant costs, only mill feed associated with the plant operation is considered for calculation of unit costs.

Table 5: Total operating cost estimates

Operating Costs	LOM (\$k)	LOM Average	Units
Mining Total Opex	\$343,246	\$13.14	\$/t total mill feed
Beneficiation plant	\$356,235	\$13.63	\$/t total mill feed
Beneficiation tailings	\$32,607	\$1.25	\$/t total mill feed
Hydrometallurgical plant	\$1,154,837	\$55.75	\$/t of mill feed for HM
Hydrometallurgical tailings	\$17,797	\$0.86	\$/t of mill feed for HM
Water Management	\$49,920	\$1.91	\$/t total mill feed
Site G&A	\$124,800	\$4.78	\$/t total mill feed
Total Operating Costs	\$2,079,443	\$79.58	\$/t total mill feed

#### Financial Analysis and Sensitivity



The expected project cashflows were modelled using a simple discounted cash-flow model. A discount rate of 8% was used. The model uses real 2021 USD for all cashflows and costs and is configured for annual periods, and an exchange rate of 1.3 CAD/USD was used for reporting CAD values as used in this Press Release.

A simple tax model was constructed using a depletion model for depreciation estimates. No opening balance of tax credits or eligible prior expenditure was used. The estimates of tax payable are considered to likely be conservative (high) from the perspective of Defense Metals. Table 7 summarizes the estimated total LOM cashflows. The column at the right is the NPV (cost) of those cashflows.

Table 7: Key financial and project metrics

Cashflow	Units LOM	NPV
Net Revenue from Concentrate \$k	\$862,520	\$585,259
Net Revenue from Precipitate \$k	\$5,236,095	\$2,245,223
Royalty \$k	\$121,972	\$56,610
Net Revenue after Royalty \$k	\$5,976,643	\$2,773,872
Total Operating Costs \$k	\$2,079,443	\$975,049
Operating Cashflow \$k	\$2,384,417	\$764,586
Total Capex \$k	\$1,501,879	\$987,841
Working Capital \$k	\$10,904	\$46,396
Pre-tax Cash Flow \$k	\$2,384,417	\$764,586
Total Tax Payable \$k	\$598,830	\$253,009
After-tax Cashflow \$k	\$1,785,587	\$511,577

Figure 2 show simple single factor sensitivity to changes in the main parameters of commodity price, capital costs and operating costs.

Breakeven (zero) NPV corresponds to a reduction in price assumption of 22% compared to base case.

#### About the Wicheeda REE Property

The 2,008 hectare Wicheeda REE Property, located approximately 80 km northeast of the city of Prince George, British Columbia, is readily accessible by all-weather gravel roads and is near infrastructure, including power transmission lines, the CN railway and major highways.

Geologically, the property is situated in the Foreland Belt and within the Rocky Mountain Trench, a major continental geologic feature. The Foreland Belt contains part of a large alkaline igneous province, stretching from the Canadian Cordillera to the southwestern United States, which includes several carbonatite and alkaline intrusive complexes hosting the Aley (niobium), Rock Canyon (REE), and Wicheeda (REE) deposits.

#### Qualified Persons

SRK Qualified Persons (QPs) are all independent as defined by National Instrument 43-101 - Standards of Disclosure for Mineral Projects and have contributed to their corresponding sections of the PEA, and have reviewed and approved the scientific, technical, and economic information contained in this news release.



The SRK QPs include André Deiss, (geology and mineral resources), Andy Thomas (pit geotechnical), Anoush Ebrahimi (mining), Eric Olin (flotation concentration), Samantha Barnes (water management), Mark Liskowich (environmental-social -permitting), and Neil Winkelmann (infrastructure, marketing and economics). Associate consultant, John Goode, is the QP for hydrometallurgical processing.

The scientific and technical information contained in this news release as it relates to the Wicheeda REE Project has been reviewed and approved by Kristopher J. Raffle, P.Geo. (BC) Principal and Consultant of APEX Geoscience Ltd. of Edmonton, AB, a director of Defense Metals and a "Qualified Person" as defined in NI 43-101. Mr. Raffle verified the data disclosed which includes a review of the analytical and test data underlying the information and opinions contained therein.

#### About SRK

SRK is an independent, global network of consulting practices in over 45 countries on six continents. Its experienced engineers and scientists work with clients in multi-disciplinary teams to deliver integrated, sustainable solutions across a range of sectors - mining, water, environment, infrastructure and energy.

#### About Defense Metals Corp.

[Defense Metals Corp.](#) is a mineral exploration company focused on the acquisition of mineral deposits containing metals and elements commonly used in the electric power market, defense industry, national security sector and in the production of green energy technologies, such as, rare earths magnets used in wind turbines and in permanent magnet motors for electric vehicles. Defense Metals has an option to acquire 100% of the Wicheeda Rare Earth Element Property located near Prince George, British Columbia, Canada. [Defense Metals Corp.](#) trades in Canada under the symbol "DEFN" on the TSX Venture Exchange, in the United States, under "DFMTF" on the OTCQB and in Germany on the Frankfurt Exchange under "35D".

#### National Instrument 43-101 Technical Report

A technical report for the Wicheeda Project will be prepared in accordance with National Instrument 43-101 and will be filed on SEDAR at [www.sedar.com](http://www.sedar.com) and on the Company's website within 45 days of this news release. Readers are encouraged to read the technical report in its entirety, including all qualifications, assumptions and exclusions that relate to the details summarized in this news release. The technical report is intended to be read as a whole, and sections should not be read or relied upon out of context.

Neither the TSX Venture Exchange nor its Regulation Services Provider (as that term is defined in the policies of the TSX Venture Exchange) accepts responsibility for the adequacy or accuracy of this news release.

#### Cautionary Statement Regarding "Forward-Looking" Information

This news release contains "forward-looking information or statements" within the meaning of applicable securities laws, which may include, without limitation, statements relating to the PEA and its potential and expected outcomes including the capital costs, operating costs, internal rate of return, annual production, and net present value of the Wicheeda Project, the ongoing optimization test work and the expected outcomes, plans for its Wicheeda Property, assays, drill results and expected timelines, results and outcomes, expanded resource and scale of expanded resource, potential production, the advancement and development of the Wicheeda Property, further metallurgical work, engagement with stakeholders, the technical, financial and business prospects of the Company, its project and other matters. All statements in this news release, other than statements of historical facts, that address events or developments that the Company expects to occur, are forward-looking statements. Although the Company believes the expectations expressed in such forward-looking statements are based on reasonable assumptions, such statements are not guarantees of future performance and actual results may differ materially from those in the forward-looking statements. Such statements and information are based on numerous assumptions regarding present and future business strategies and the environment in which the Company will operate in the future, including the price of rare earth elements, the anticipated costs and expenditures, the ability to achieve its goals, that general business and economic conditions will not change in a material adverse manner, that financing will be available if and when needed and on reasonable terms. Such forward-looking



information reflects the Company's views with respect to future events and is subject to risks, uncertainties and assumptions, including the risks and uncertainties relating to the interpretation of exploration results, risks related to the inherent uncertainty of exploration and cost estimates, the potential for unexpected costs and expenses and those other risks filed under the Company's profile on SEDAR at [www.sedar.com](http://www.sedar.com). While such estimates and assumptions are considered reasonable by the management of the Company, they are inherently subject to significant business, economic, competitive and regulatory uncertainties and risks. Factors that could cause actual results to differ materially from those in forward looking statements include, but are not limited to, continued availability of capital and financing and general economic, market or business conditions, adverse weather and climate conditions, failure to maintain or obtain all necessary government permits, approvals and authorizations, failure to maintain community acceptance (including First Nations), risks relating to unanticipated operational difficulties (including failure of equipment or processes to operate in accordance with specifications or expectations, cost escalation, unavailability of materials and equipment, government action or delays in the receipt of government approvals, industrial disturbances or other job action, and unanticipated events related to health, safety and environmental matters), risks relating to inaccurate geological and engineering assumptions, decrease in the price of rare earth elements, the impact of Covid-19 or other viruses and diseases on the Company's ability to operate, loss of key employees, consultants, or directors, increase in costs, delayed drilling results, litigation, and failure of counterparties to perform their contractual obligations. The Company does not undertake to update forward-looking statements or forward-looking information, except as required by law.

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