



**AVALON**

MINERALS LTD

# COPPER IN SWEDEN

BUILDING A EUROPEAN COPPER PRODUCER



January 2016

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# AVALON MINERALS – KEY POINTS

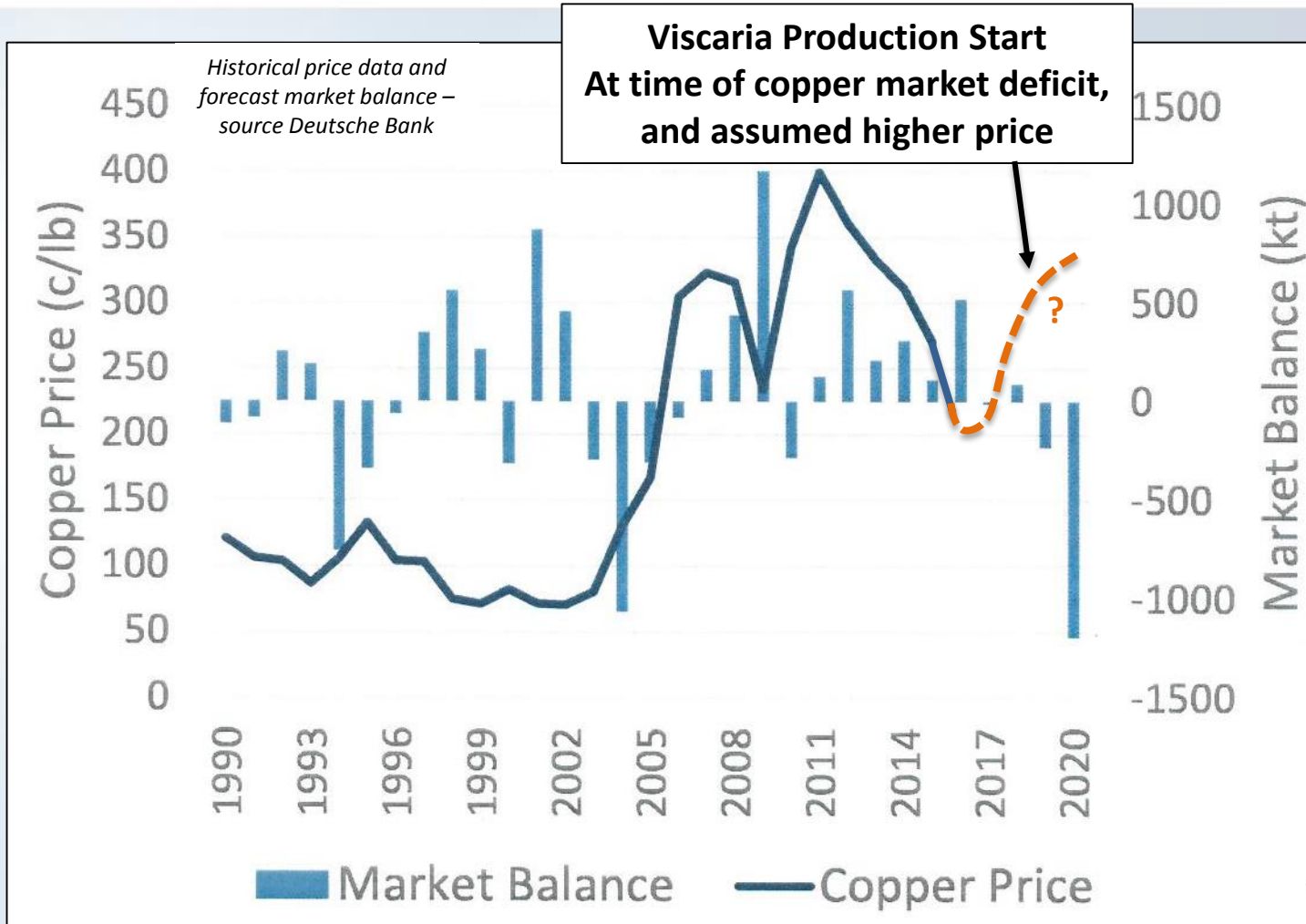
1. Copper development company
2. Single high quality asset focus
3. Supported by outstanding infrastructure
4. Low sovereign risk
5. Highly competent team in place to deliver project

If you believe in copper then Avalon represents a compelling investment opportunity

*As energy becomes greener approx. 3 - 5 times more copper per megawatt will be required  
(source - Atalaya Mining Nov 2015)*

*While a conventional car contains 15kg of copper on average, hybrid cars contain 30-40kg,  
and a full electric vehicle, 60kg (source - m2m.riotinto.com)*

# COPPER FUNDAMENTALS – GOOD TIMING



# AVALON MINERALS – CONSIDER AN INVESTMENT DECISION BASED ON RISK AND A 3-5 YEAR TIME FRAME

## General Risk – Low

- Sweden, low sovereign risk
- Kiruna – a mining district
- Viscaria Project
  - 3 approved exploitation concessions
  - ESIA in progress leading to environmental permitting
- High quality team
- Supportive major shareholders limiting investment risk

## Development Risk – Low

- 2015 Scoping Study (SS) demonstrated viable project
- 2015 SS clearly shows that a 2Mtpa operation is required and that the Mining Inventory must be increased
- Road, Rail, Town, Airport, Sea Ports - all existing

## Technical Risk – Low

- 2015 drilling program very successful
- Strong upside case for delivery of additional resources and mining inventory
  - D Zone growth potential very obvious
  - A & B Zone combined open pit
  - A Zone underground not yet pursued but known resources
  - Development area exploration success
- 64% of current resources in M&I category

## Production Risk – Low

- Forecast higher copper prices at expected time of production
- Best infrastructure support of any copper development opportunity globally
- Low cost hydro power
- High quality concentrate
- Local equipment manufacturers and contractor/consultant groups

# VISCARIA COPPER – 2015, DELIVERED TO GOALS

## **Ownership**

- 100% ownership retained
- 

## **Drilling**

- Completed 8,000m of diamond drilling at D Zone in 2015
  - Strongly outperformed historical results and delivered confidence
  - Outstanding results such as VDD 193, 26.7m at 2.6% Cu including 6.6m at 3.5% Cu
  - Recent drilling results 'as good as A Zone' – the former mine
- 

## **Scoping Study and ESIA**

- Copper only Scoping Study completed in December 2015
- Underpinned by new D Zone Mineral resource estimate delivered in November
- Small open pits on A, B and D Zones + Underground at D Zone
- Outstanding infrastructure
- Low technical risk geology and mineralogy
- Upside and scale increase needs to be delivered in 2016 Updated Scoping Study
- ESIA underway – critical path to permitting

# VISCARIA COPPER – 2015 SCOPING STUDY

The 2015 Scoping Study confirmed the project description to begin ESIA process (Refer ASX Announcement 14 December 2015)

|                                 |   |
|---------------------------------|---|
| <b>Strip ratio (LOM)</b>        | 5.8   |
| <b>Process plant</b>            | Crush, grind and copper flotation plant,<br>1.2Mtpa throughput capacity |
| <b>Recovery rates</b>           | 90.2%   |
| <b>Copper Production</b>        |   |
| LOM                             | 107kt   |
| Average per annum               | 12kt  |
| <b>Mine life</b>                | Minimum eight years, mineralisation is open at depth and along strike   |
| <b>Development capital</b>      |   |
| Site Infrastructure             | US\$87m (A\$119m)   |
| Underground                     | US\$15m (A\$20m)  |
| <b>Sustaining capital (LOM)</b> |   |
| Site Infrastructure             | US\$10.6m (A\$14m)  |
| Underground                     | US\$20.0m (A\$27m)  |
| <b>Cash operating cost</b>      |   |
| LOM C1                          | US\$1.86/lb (A\$2.54/lb)  |
| LOM AISC                        | US\$2.10/lb (A\$2.87/lb)  |
| <b>Copper price</b>             | US\$3.25/lb (A\$4.45/lb)  |
| <b>Exchange rate</b>            |   |
| AUD : USD                       | 0.73  |
| <b>NPV pre-tax (7%)</b>         | US\$74m (A\$102m)   |
| <b>IRR pre-tax (%)</b>          | 22%   |
| <b>Payback period</b>           | 3.7 years   |
| <b>Capital intensity</b>        | US\$7,335/t cu p.a. (A\$10,048/t cu p.a.)                               |

# VISCARIA COPPER – WHAT HAS THE 2015 SCOPING STUDY TOLD US?

- **‘Main takeaway’ – increase the mining inventory from 10 mill tonnes to 18 mill tonnes to allow for a 2mtpa operation. This is in progress.**
- Scoping Study metrics clearly demonstrate that the project needs to deliver:
  - Annual production rate of **2mtpa**,
  - at a capital cost of between **US\$120 – 150 mill**,
  - with an initial **9 year mine life**
  - to deliver **>20,000t copper** in concentrate per annum
  - and have a Capital Intensity of between 5,500\$/t to 7,500\$/t
- **On these metrics, target NPV is >US\$120 mill, target IRR is >25%, target payback of < 4years, target AISC <US\$2/lb**
- *Increasing the mining inventory through low technical risk drilling will extend the currently defined shoots at D Zone laterally and to depth – holes 195 and 196 have already delivered some of this*
- *Combination of the A and B Zone open pits add to inventory*
- *High grade A Zone underground represents significant further upside beyond the targets stated above*



# VISCARIA COPPER PROJECT



PROJECT SITE



KIRUNA TOWN



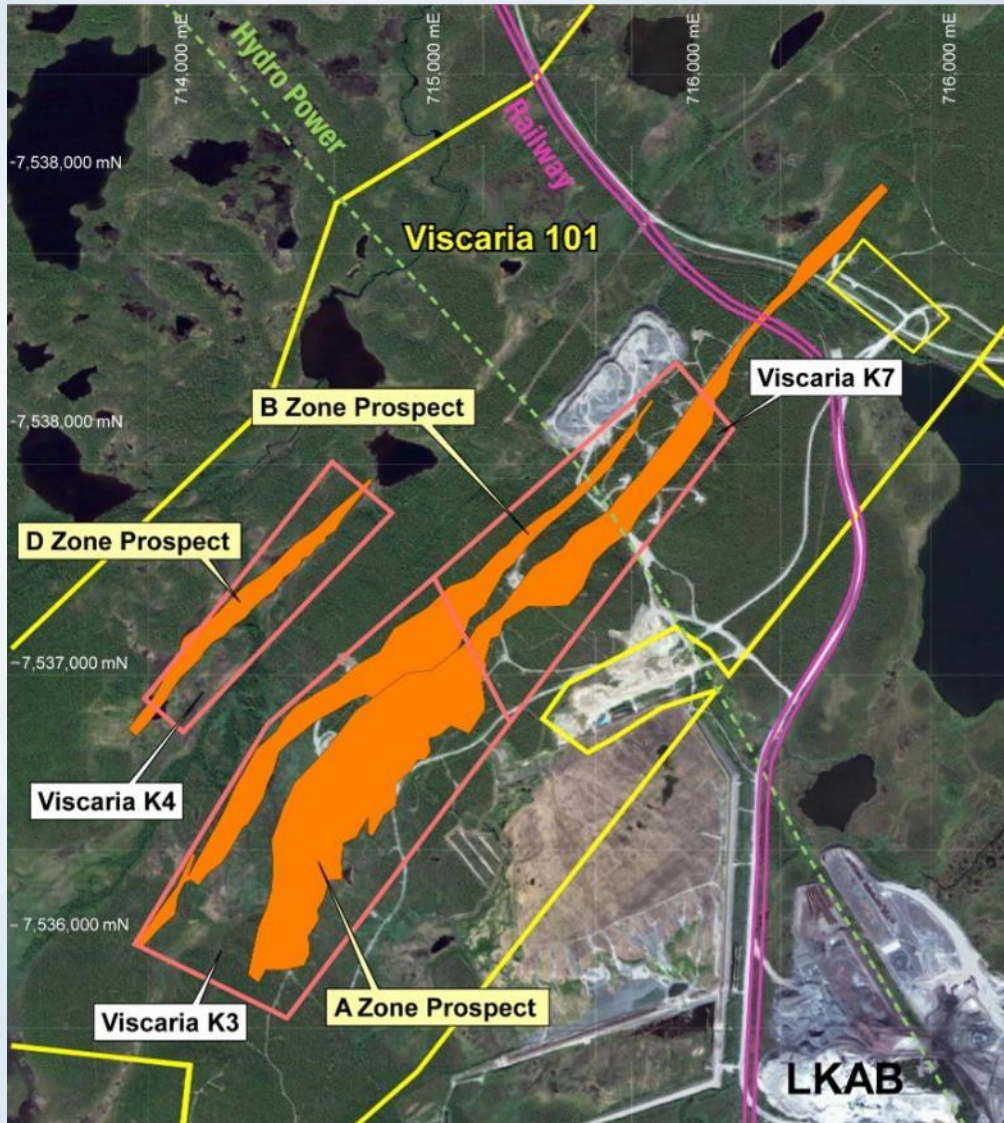
PUBLIC ACCESS ELECTRIC RAIL



LOW COST HYDRO POWER

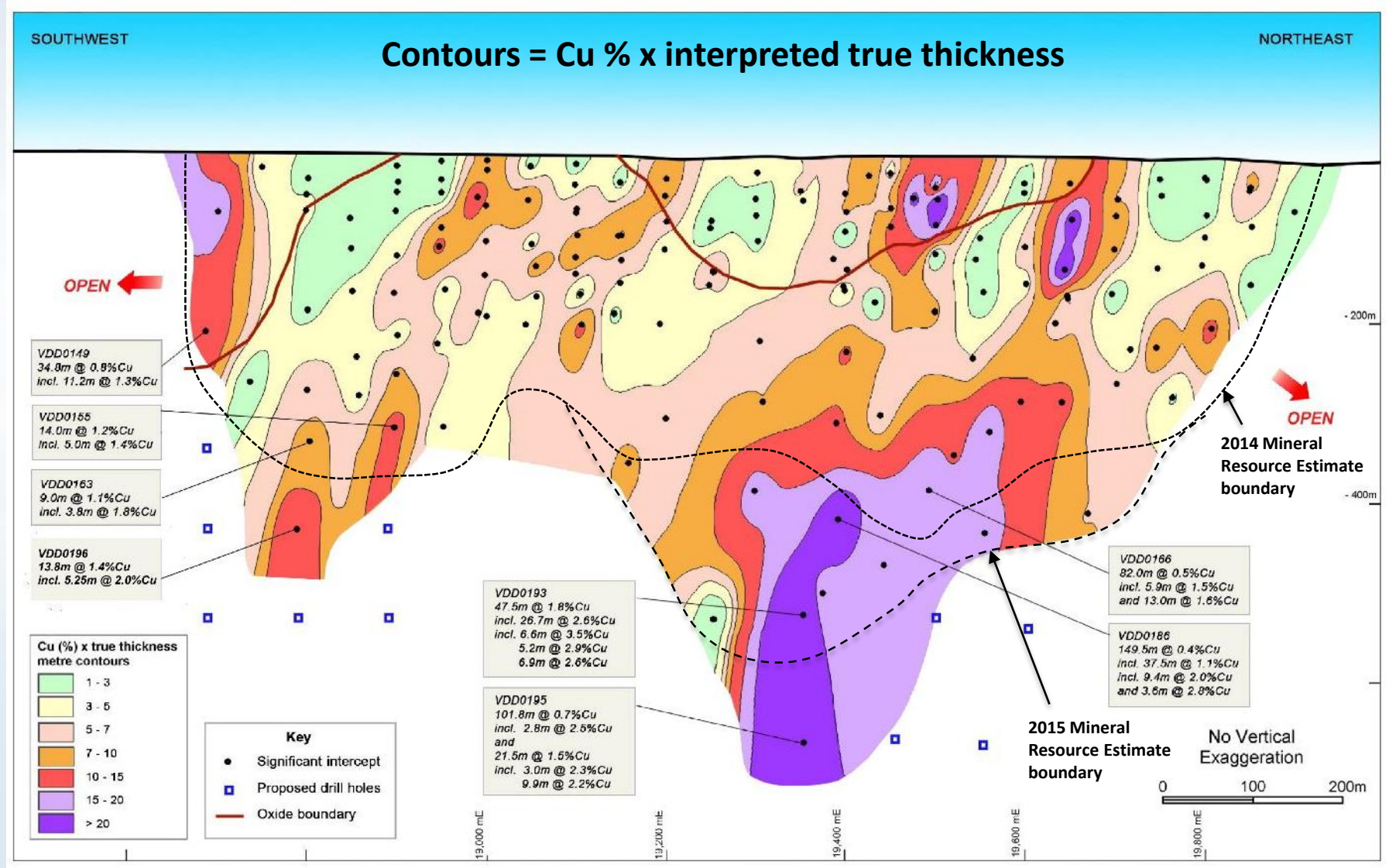


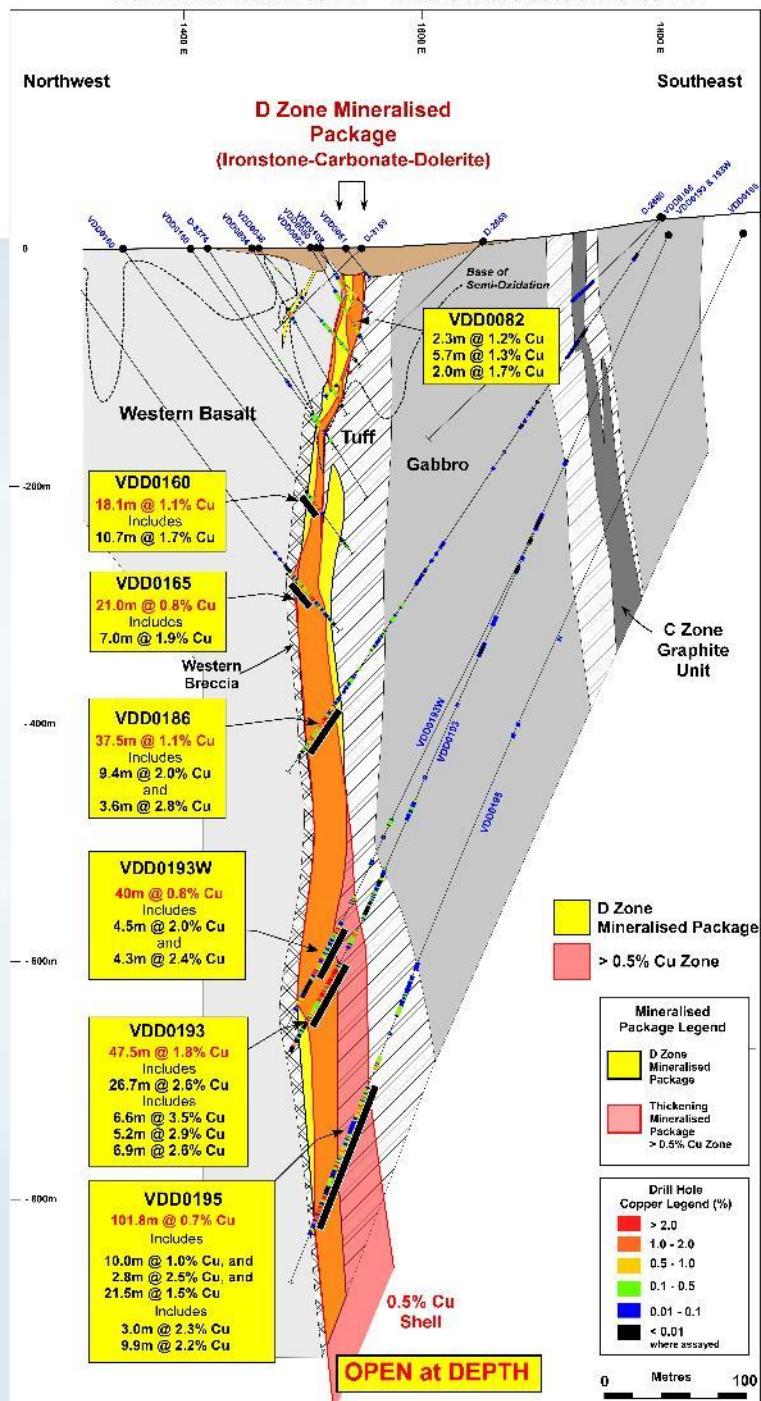
# VISCARIA LOCATION



- 3 Exploitation Concessions (valid to 2037 and 2039) approved covering the main areas of mineralisation at Viscaria
- Viscaria is in an area of 'National Interest for Minerals'
- Outstanding access to, and quality of, infrastructure, and low cost hydro power
- Multiple Scandinavian smelting opportunities, including Ronnskar located 470km by rail

# VISCARIA D ZONE LONG SECTION





# VISCARIA CROSS SECTION

Section through main shoot - VDD 193, 193W, 195, 186 and shallower holes above 186

The widest reported intersections in each hole (red text) progressively thicken downward within the shoot.

<10m > 18.1m > 21m > 37.5m  
> 40m > 47.5m > 101.8m.

Broadly we see consistent trend of downward-widening intersections.

There are also more intervals of >2% Cu at depth (lowermost 4 holes) compared to the holes above 300m depth.

# VISCARIA – MINERAL RESOURCE ESTIMATES AND MINING INVENTORY

| Mineral Resource     | Tonnes (Mt) | Grade (% Cu) |
|----------------------|-------------|--------------|
| A Zone <sup>#</sup>  | 21.6        | 1.5          |
| B Zone <sup>#</sup>  | 19.7        | 0.8          |
| D Zone Open Pit*     | 3.1         | 0.8          |
| D Zone Underground*  | 8.0         | 1.4          |
| <b>Total</b>         | <b>52.4</b> | <b>1.2</b>   |
| Mining inventory     | Tonnes (Mt) | Grade (% Cu) |
| A Zone Open Pit @    | 2.6         | 1.3          |
| B Zone Open Pit @    | 2.0         | 0.7          |
| D Zone Open Pit@     | 1.6         | 0.9          |
| D Zone Underground @ | 3.8         | 1.5          |
| <b>Total</b>         | <b>10.0</b> | <b>1.2</b>   |

\* 2015 Mineral Resource estimate

# 2014 Mineral Resource estimate, based on initial work completed in Nov 2011; 0.4% COG  
all considered to be open-pittable

@ 2015 Scoping Study Mining Inventory

# VISCARIA – DON'T UNDERESTIMATE THE VALUE OF LOCATION AND EXISTING INFRASTRUCTURE

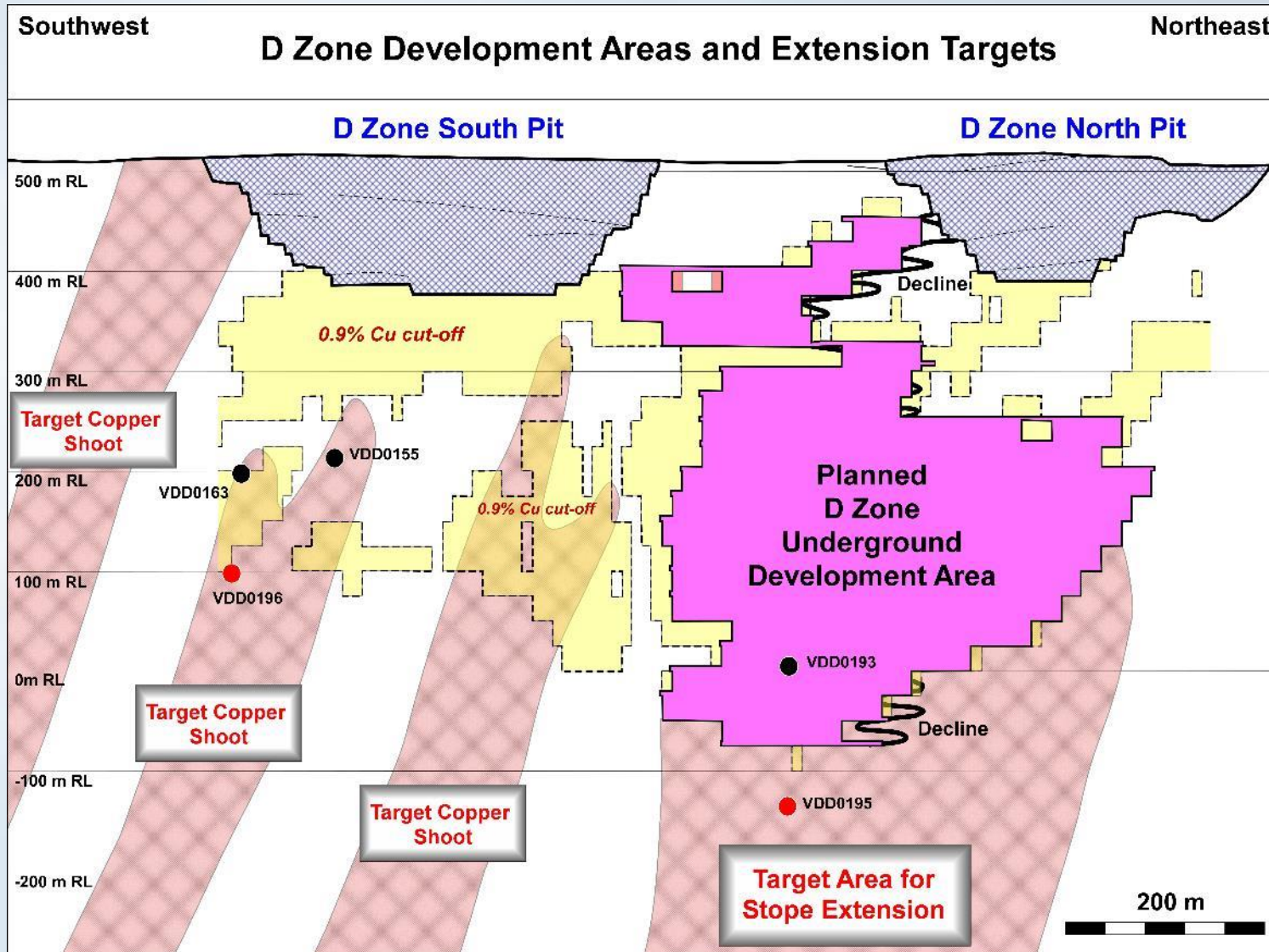
Mining infrastructure in place adjacent to the world's largest underground magnetite mine and iron pellet manufacturing facility

- ✓ Airport
- ✓ Mining town with mining contractors
- ✓ Low cost hydro power
- ✓ Highway access
- ✓ Electric rail access

All of these facilities deliver

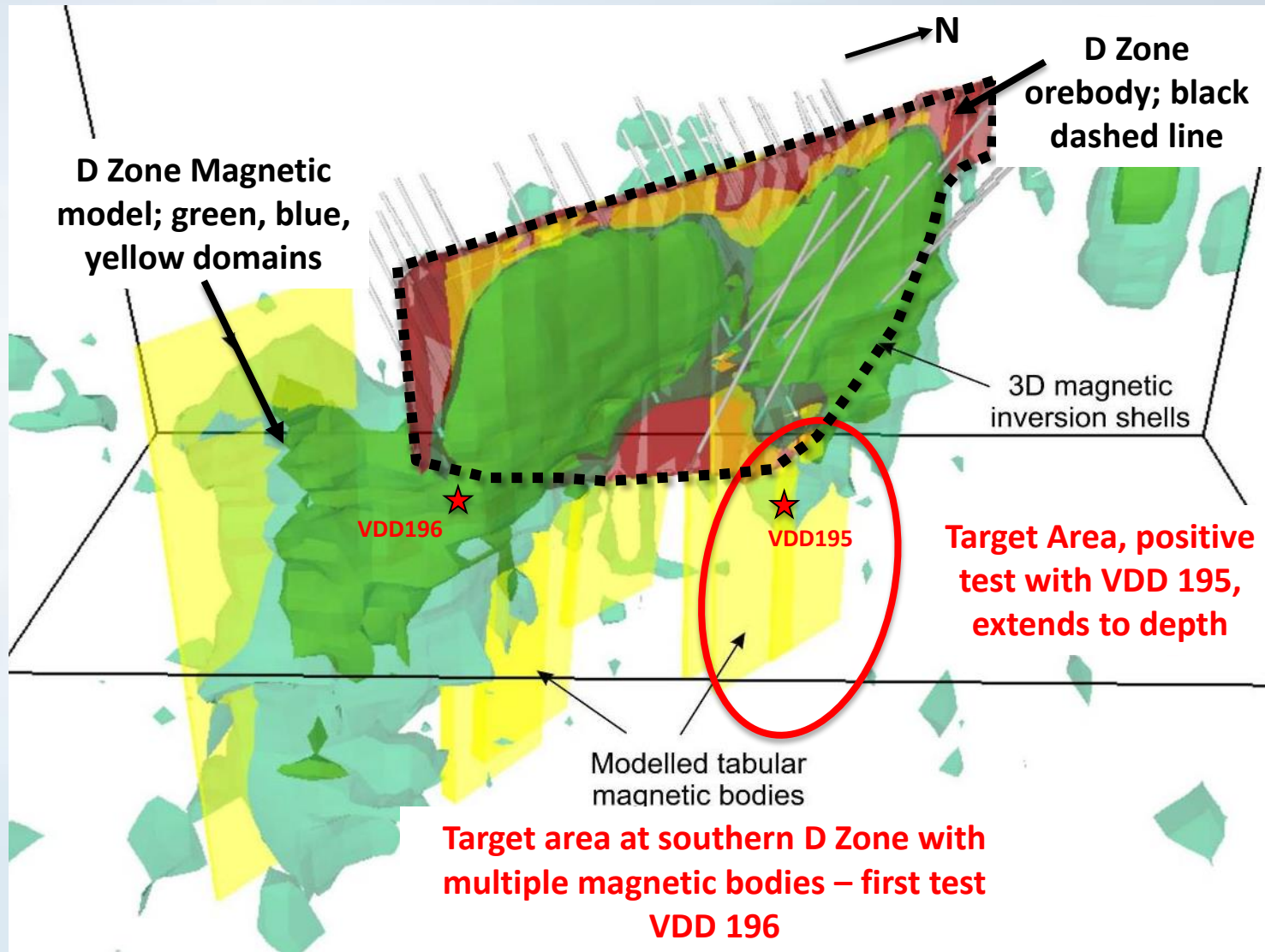
- ✓ Lower Capital Costs
- ✓ Lower Operating Costs
- ✓ Reduced implementation risk

# D ZONE – MINE PLANNING



D Zone showing planned open pits and schematic underground mine planning scenario based on 2015 Scoping Study

# D ZONE - VERY CONFIDENT IT WILL BE LARGER

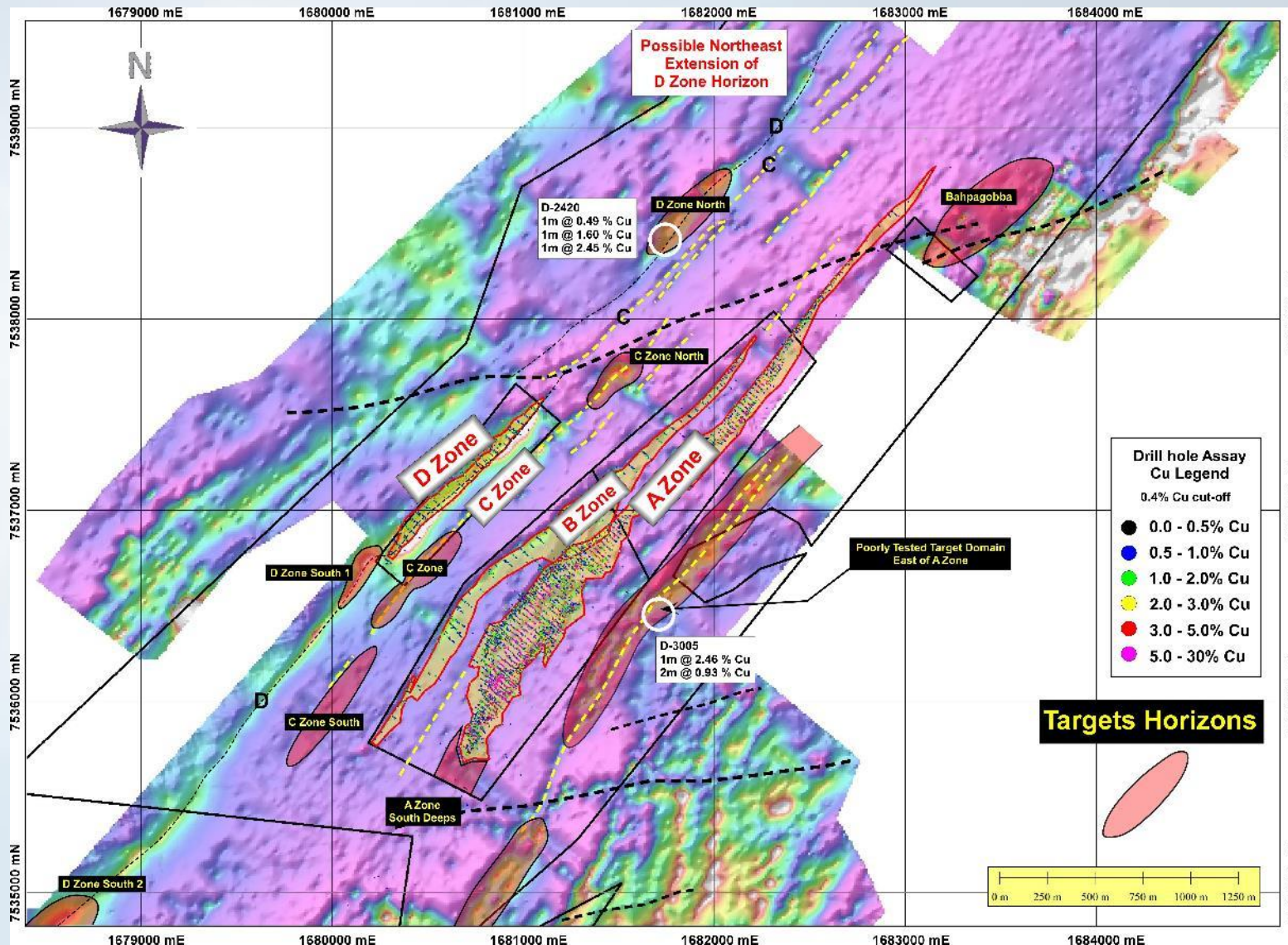


D Zone is delivering very robust intersections

Geophysical modelling and structural geology is enabling the delivery of a predictive model for resource growth



# DEVELOPMENT AREA - OUTSTANDING UPSIDE

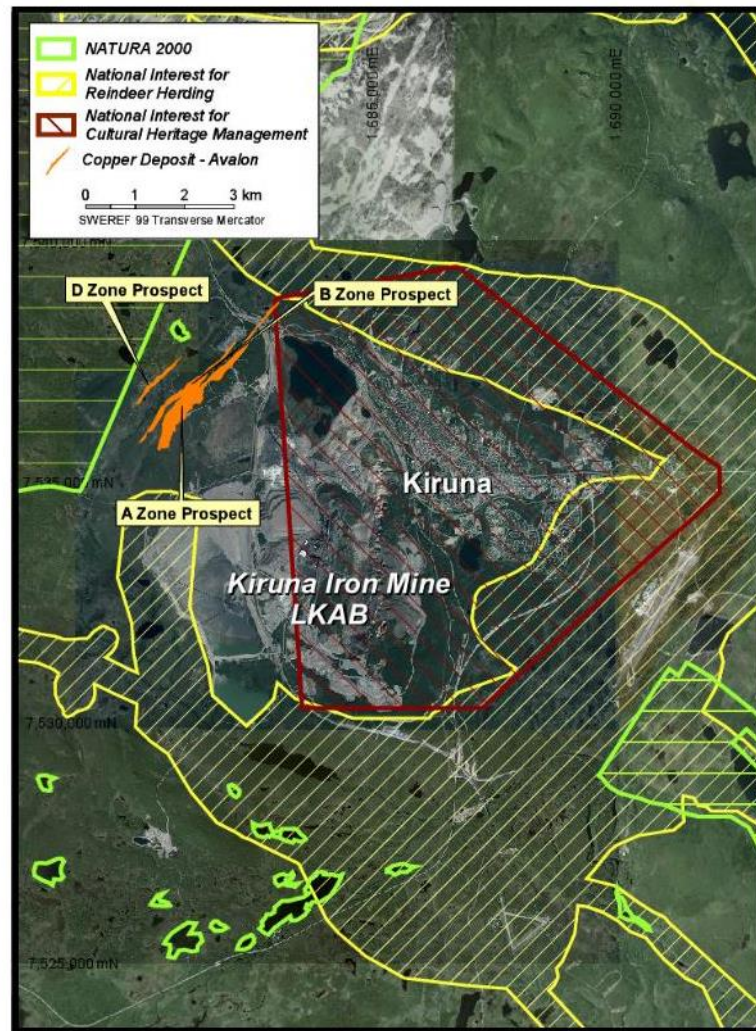
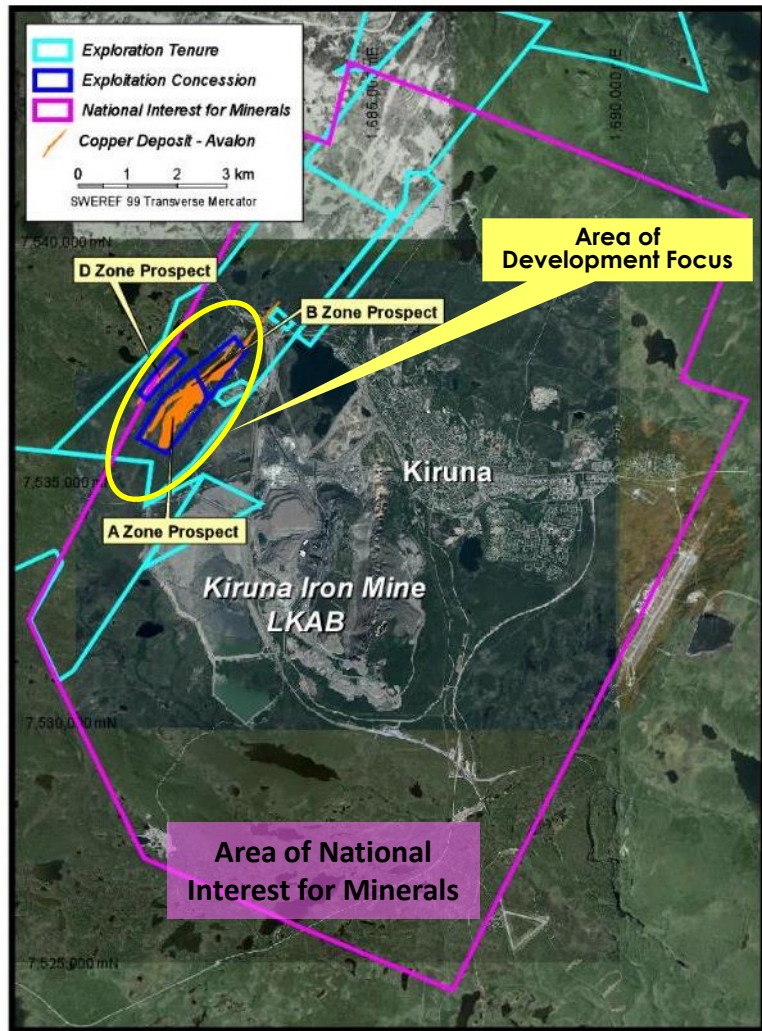


Mine scale orebody extensions, low technical risk

Exploration success within 5km

A rich portfolio of near mine targets to add to the scale of the project

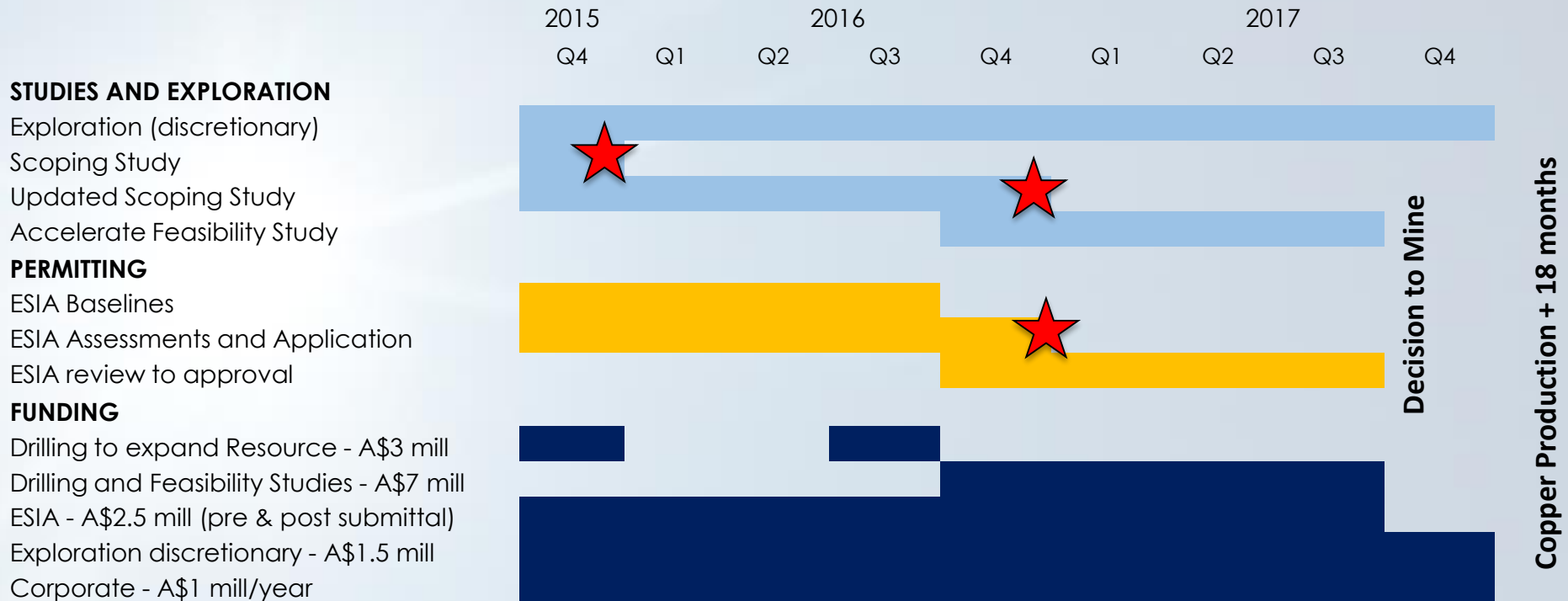
# STAKEHOLDER ENGAGEMENT



Proposed development area is in a window surrounded by multiple land use areas

The key issues are (1) a strong mining heritage, (2) reindeer herding (3) Natura 2000 (4) recreation

# PLANNING TO DELIVER



## TARGET TIME FRAMES

- ✓ Scoping Study Copper Project - December 2015
- Updated Scoping Study - Q4, 2016
- Decision to Build and construction start in late 2017
- Copper production, plus 18 months

# CORPORATE

|                    |  |
|--------------------|--|
| TICKER             | ASX:AVI<br>Frankfurt:AL9                   |
| SHARE PRICE*       | \$0.022                                    |
| SHARES ON ISSUE    | 332,690,122                                |
| MARKET CAP         | \$7.3M                                     |
| CASH#              | \$1.7M                                     |
| 52 WEEK TRADING    | \$0.016 - \$0.035                          |
| COVERAGE           | Morgans Stockbroking<br>Breakaway Research |
| CORPORATE ADVISORY | Viaticus Capital                           |

As at 06.01.16 - 30 day VWAP \*

As at 06.01.16 - unaudited #

Top 10 shareholders hold 72% of shares on issue

Top 10 comprise institutions and high net worth individuals

Board and management hold 3.5% and have participated in recent placements

European and UK shareholders total 50%

## SUBSTANTIAL SHAREHOLDERS

| NAME                          | %     |
|-------------------------------|-------|
| Valbonne II                   | 15.3% |
| Tan Sri Abu Sahid Bin Mohamed | 10.1% |
| Marilei International         | 9.5%  |
| Wyntorc SA                    | 6.3%  |
| Potezna Gromadka              | 5.9%  |

# APPENDICES

# VISCARIA D ZONE – HIGH GRADE INTERSECTIONS

| Shoot   | Drill hole number | From (m)         | To (m) | Interval (m) | % Cu |       |
|---------|-------------------|------------------|--------|--------------|------|-------|
| 1       | VDD 171           | 89.0             | 103.2  | 14.2         | 2.0  | oxide |
|         | VDD 149           | 225.0            | 230.7  | 5.7          | 1.7  | oxide |
| 2       | VDD 163           | 399.2            | 403.0  | 3.8          | 1.8  |       |
|         | VDD 155           | 389.0            | 394.0  | 5.0          | 1.4  |       |
|         | VDD 196           | 559.5            | 564.8  | 5.3          | 2.0  |       |
| 3       | VDD 185           | 425.9            | 428.0  | 2.1          | 2.3  |       |
|         | VDD 177           | 350.0            | 351.0  | 1.0          | 3.7  |       |
| 4       | VDD 195           | 713.7            | 716.4  | 2.8          | 2.5  |       |
|         |                   | 737.6            | 740.6  | 3.1          | 2.3  |       |
|         |                   | 745.6            | 755.5  | 9.9          | 2.2  |       |
|         | VDD 193           | 564.6            | 591.3  | 26.7         | 2.6  |       |
|         |                   | <i>including</i> |        |              |      |       |
|         |                   | 565.4            | 572.0  | 6.6          | 3.5  |       |
|         |                   | 573.0            | 578.2  | 5.2          | 2.9  |       |
|         |                   | 584.4            | 591.3  | 6.9          | 2.6  |       |
|         | VDD 193W          | 320.0            | 324.5  | 4.5          | 2.0  |       |
|         |                   | 353.3            | 357.6  | 4.3          | 2.4  |       |
|         | VDD 186           | 506.7            | 516.1  | 9.4          | 2.0  |       |
|         |                   | 527.6            | 531.1  | 3.6          | 2.8  |       |
|         | VDD 192           | 471.7            | 479.1  | 7.4          | 1.9  |       |
|         |                   | 481.1            | 481.7  | 0.7          | 2.1  |       |
|         |                   | 483.1            | 484.1  | 1.0          | 1.9  |       |
|         | VDD183            | 577.2            | 580.7  | 3.5          | 2.2  |       |
| VDD 165 | 362.0             | 369.0            | 7.0    | 1.9          |      |       |
| VDD 160 | 272.0             | 277.1            | 5.1    | 2.0          |      |       |
| 5       | VDD 190           | 536.8            | 545.2  | 8.4          | 1.7  |       |
|         | VDD189            | 501.0            | 505.6  | 4.6          | 2.0  |       |
|         | VDD 129           | 301.0            | 306.0  | 5.0          | 2.0  |       |
|         | VDD 169           | 428.0            | 432.0  | 4.0          | 1.8  |       |
|         | VDD 157           | 382.0            | 386.0  | 4.0          | 1.8  |       |
|         | VDD 187           | 257.4            | 263.6  | 6.2          | 1.7  |       |

Summary of high grade intersections taken from various ASX announcements

# VISCARIA COPPER – MINERAL RESOURCES

## Viscaria Copper Project Mineral Resource Estimates Summary – Nov 2015

| Resource Area | Location    | Classification | Tonnes (Mt) | Cu Grade (%) | Contained Cu (kt) |
|---------------|-------------|----------------|-------------|--------------|-------------------|
| A Zone        | Open Pit    | Measured       | 14.44       | 1.7          | 240.0             |
|               |             | Indicated      | 4.69        | 1.2          | 57.2              |
|               |             | Inferred       | 2.48        | 1.0          | 25.5              |
|               |             | Subtotal       | 21.61       | 1.5          | 322.7             |
| B Zone        | Open Pit    | Measured       | 0.12        | 1.3          | 1.6               |
|               |             | Indicated      | 4.12        | 0.7          | 29.7              |
|               |             | Inferred       | 15.41       | 0.8          | 118.7             |
|               |             | Subtotal       | 19.65       | 0.8          | 149.0             |
| D Zone        | Open Pit    | Indicated      | 3.11        | 0.81         | 25.2              |
|               |             | Inferred       | 0.01        | 0.32         | 0.02              |
|               |             | Subtotal       | 3.11        | 0.81         | 25.2              |
|               | Underground | Indicated      | 7.26        | 1.37         | 99.8              |
|               |             | Inferred       | 0.78        | 1.57         | 12.2              |
|               |             | Subtotal       | 8.03        | 1.39         | 111.9             |
| Overall Cu    |             | Total          | 52.4        | 1.2          | 608.9             |

# A VERY HIGH QUALITY LEADERSHIP TEAM



Chairman  
**Graham Ascough**

Resources executive. Broad global experience with large companies and building juniors



CEO and Managing Director  
**Malcolm Norris**

Geologist and Business Development. Track record of discovery and growth

General Manager  
Studies and Technical Services  
**Ray Robinson**

Mining Engineer.  
Has delivered many feasibility studies



CFO & Company Secretary  
**Gavin Leicht**

Finance professional with significant experience in copper



General Manager - Geology  
**Dr. Bruce Rohrlach**

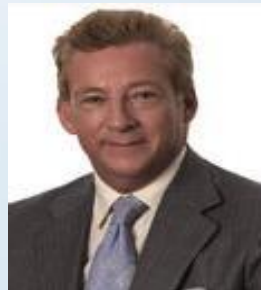
Geologist who has played a key role in several significant discoveries and feasibility studies

Non-Executive Director  
**Crispin Henderson**

Senior banking executive

Non-Executive Director  
**Don Hyma**

Senior project management executive across multiple commodities



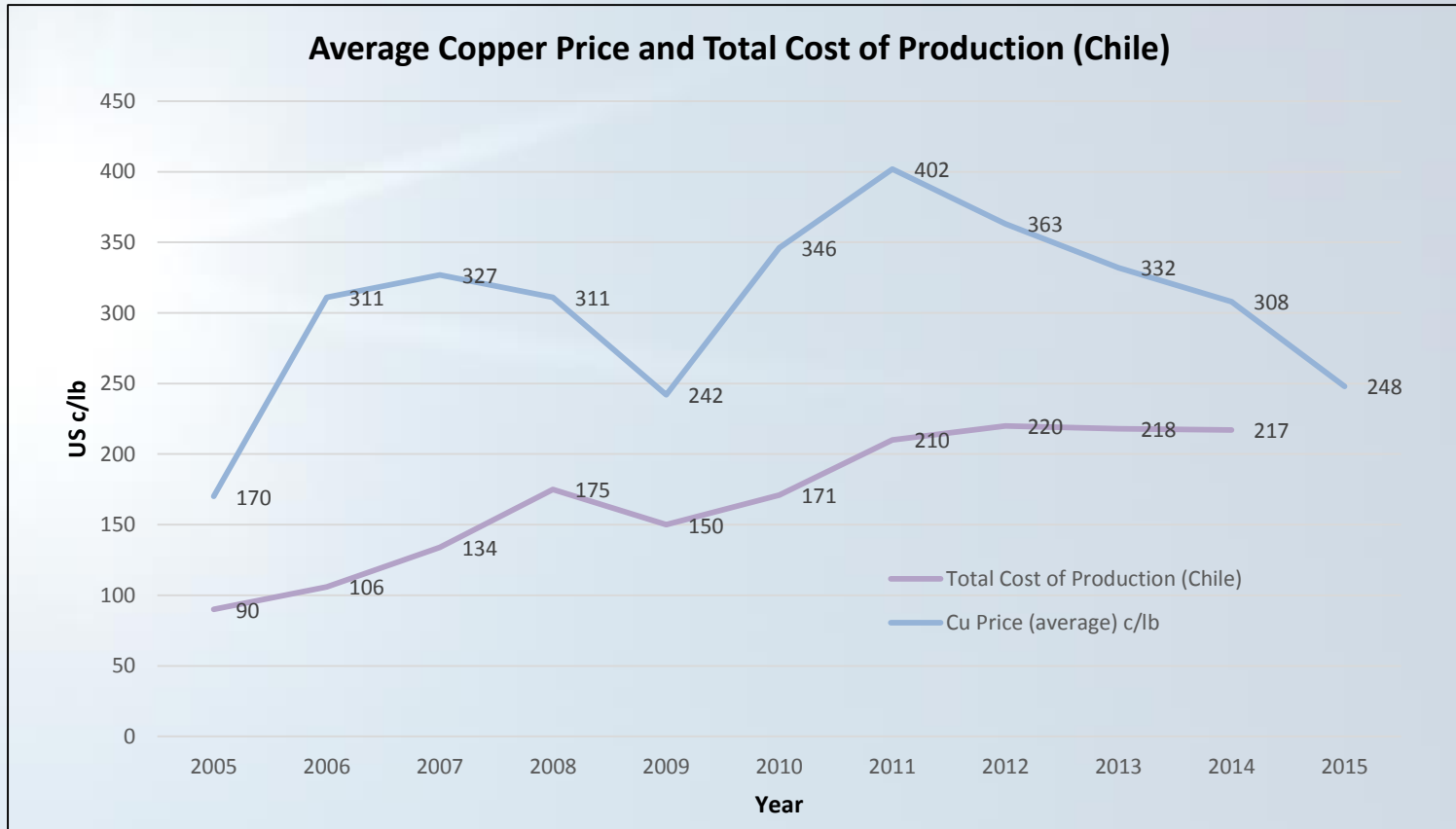


# KIRUNA LOCATION MAP



- Railway Line
- 2030 Deformation Zone
- Proposed E10 Bypass
- New connection to E10
- Viscaria Project
- Kirunavarra Mine
- Luossavaara Ski Hill
- Existing Town Centre
- Power Station - Waste to Energy
- Golf Course
- Proposed New Town Centre
- Airport
- Public Rail Terminal

# CHILE - TOTAL COST OF PRODUCTION, Cu USc/lb

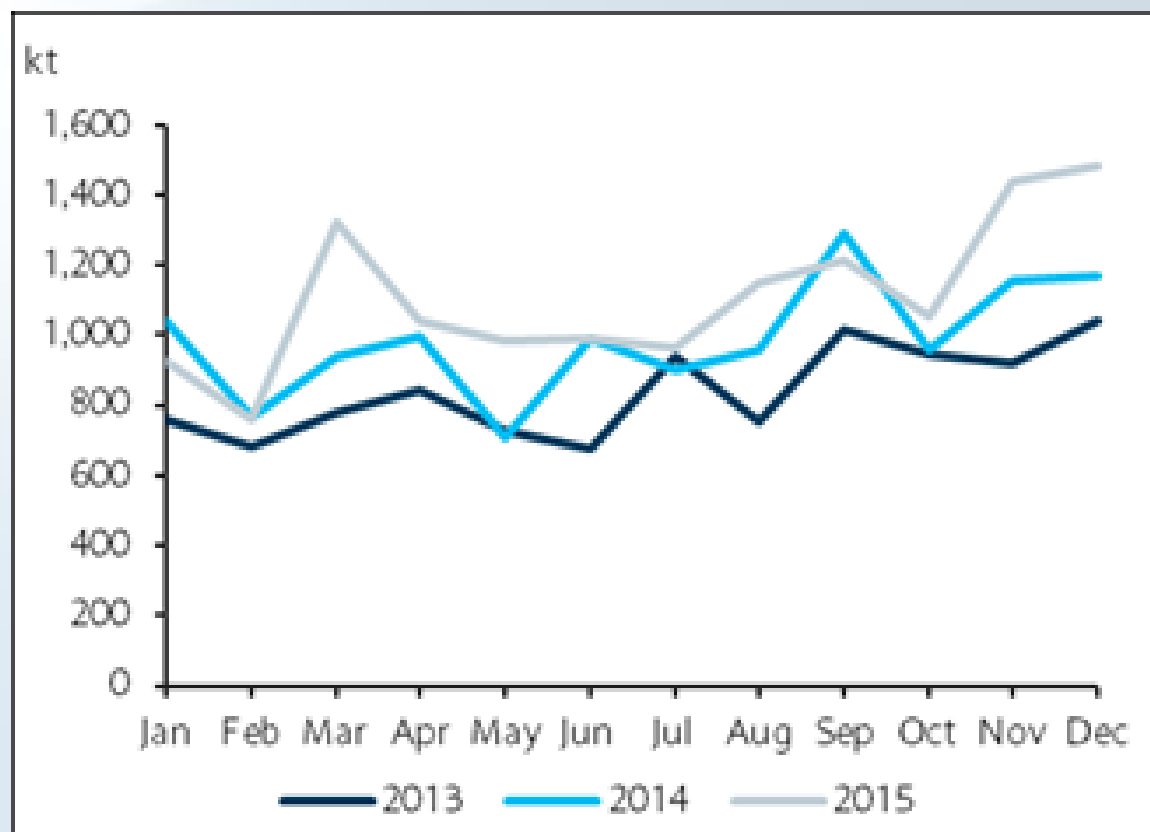


Rule of thumb; target total cost of production should be no more than 2/3 of the long term copper price. Current metrics dictate some changes to production must prevail.

# CHINA – COPPER ORE AND CONCENTRATE IMPORTS

Chinese copper ore and concentrate imports were strong during December 2015

Copper ores and concentrates imports rose to 1480Kt, up 3% m/m and 26.8% y/y. For 2015, imports rose 12.3% y/y, compared with 17.7% for 2014. For 2015, imports of ores and concentrates were up 12.3% y/y, which contrasts with the weakness in unwrought copper and semi imports (-0.3% y/y). The pattern reflects China's growing smelter and refining capacity.



Source: Barclays

# COMPETENT PERSONS STATEMENT

## Competent Persons Statement

The information in this report that relates to exploration results is based upon information reviewed by Mr Malcolm Norris who is a Fellow of the Australasian Institute of Mining and Metallurgy. Mr Norris is a full-time employee of Avalon Minerals Ltd and has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is undertaking to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Mr Norris consents to the inclusion in the report of the matters based on his information in the form and context in which it appears.

The information in this report that relates to the A Zone and B Zone Mineral Resources are based on the information compiled by Dr Bielin Shi who is a Member of the Institute of Mining and Metallurgy and is a full time employee of CSA Global Pty Ltd (CSA). CSA are an independent mining consultancy who have been engaged by Avalon Minerals Limited to perform geological consulting on a fee for service basis. Dr Bielin Shi has sufficient experience that is relevant to the style of mineralisation being considered and to the activity being undertaken to qualify as a competent person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Dr Shi consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.

The information in this report that relates to the D Zone Mineral Resource estimate is based on the information compiled by Chris Grove who is a Member of the Australasian Institute of Mining and Metallurgy and is a full time employee of Measured Group Pty Ltd. Measured Group is an independent mining consultancy who have been engaged by Avalon Minerals Limited to perform geological consulting on a fee for service basis. Mr Grove has sufficient experience that is relevant to the style of mineralisation being considered and to the activity being undertaken to qualify as a competent person as defined in the 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves. Mr Grove consents to the inclusion in this report of the matters based on his information in the form and context in which it appears.