



**Breakaway  
Research**

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### Company Information

ASX Code	PWN
Share Price	A\$0.15
Ord Shares	92.0m
<b>Market Cap</b>	<b>A\$13.8m</b>
Cash (June 13)	A\$1.1m
Total Debt	A\$-
<b>Enterprise Value</b>	<b>A\$12.6m</b>

### Directors

Non-Exec Chairman	Adrian Griffin
Managing Director	Patrick McManus
Non-Exec Director	George Sakalidis
Non-Exec Director	Gary Johnson

### Company Details

Address	23 Belgravia Street Belmont WA 6104
Phone	+618 9479 5386
Web	www.potashwest.com.au

### Top Five Shareholders

Barclay Wells	17.9%
Elsinore Energy	14.9%
UOB-Kay Hian	5.8%
Adrian Griffin	4.1%
Patrick McManus	2.1%

### 1 Year Price Chart



# Potash West NL (PWN)

*One of the world's largest glauconite deposits*

**Recommendation: Speculative BUY**

## Company Update

### Key Points

- **Dandaragan Trough project covers a 2,700km<sup>2</sup> area prospective for mineral-rich glauconite deposits**
- **The project area has excellent access to infrastructure**
- **Potash West is currently focused on producing a superphosphate product from the Dinner Hill greensand deposit - creating a low risk, low cost initial development option**
- **Dinner Hill phosphate resource now 90Mt @ 2.65% P<sub>2</sub>O<sub>5</sub>, 3.6% K<sub>2</sub>O and 4.5% CaO - deposit remains open to the north and east**
- **Longer term value to be realised by producing potash products via the K-Max process as market conditions permit**

*Potash West (Potash) continues to optimise the development options for its large potassium-rich glauconite deposits within the Dandaragan Trough project in WA, as it seeks to enter the lucrative global fertiliser market. Initial studies demonstrated that the project could support a long-life potash production facility producing a range of valuable products via the Company's proprietary K-Max process. More recently a Scoping Study has been successfully completed on a lower cost, lower risk opportunity to produce a single superphosphate product – dramatically increasing the potential for near term development.*

### Investment Thesis

Potash West (ASX: PWN) owns 100% of the Dandaragan Trough project covering very large greensand deposits (quartz, apatite, glauconite) that can be processed to produce a range of fertiliser and chemical products.

A series of scoping level studies have been undertaken assessing development options. A 2012 'glauconite' scoping study highlighted the significant value of the Dinner Hill deposit and demonstrated the potential for the K-Max process to recover a range of phosphate (P<sub>2</sub>O<sub>5</sub>) and potash (potassium salts) products. However, the capital barriers to this development option are significant.

More recently, a study assessing a lower cost project producing a single superphosphate (SSP) product via well-established technology has indicated a lower risk, more affordable development option with robust financial returns. The study is based on a phosphate resource of 90Mt @ 2.65% P<sub>2</sub>O<sub>5</sub> which has been outlined at the Dinner Hill deposit.

Breakaway is encouraged by the excellent technical progress that Potash West is achieving, as well as by recent unsolicited approaches by private and public companies seeking to make a strategic investment in the Company.



## Company Update

### Dandaragan Trough Project

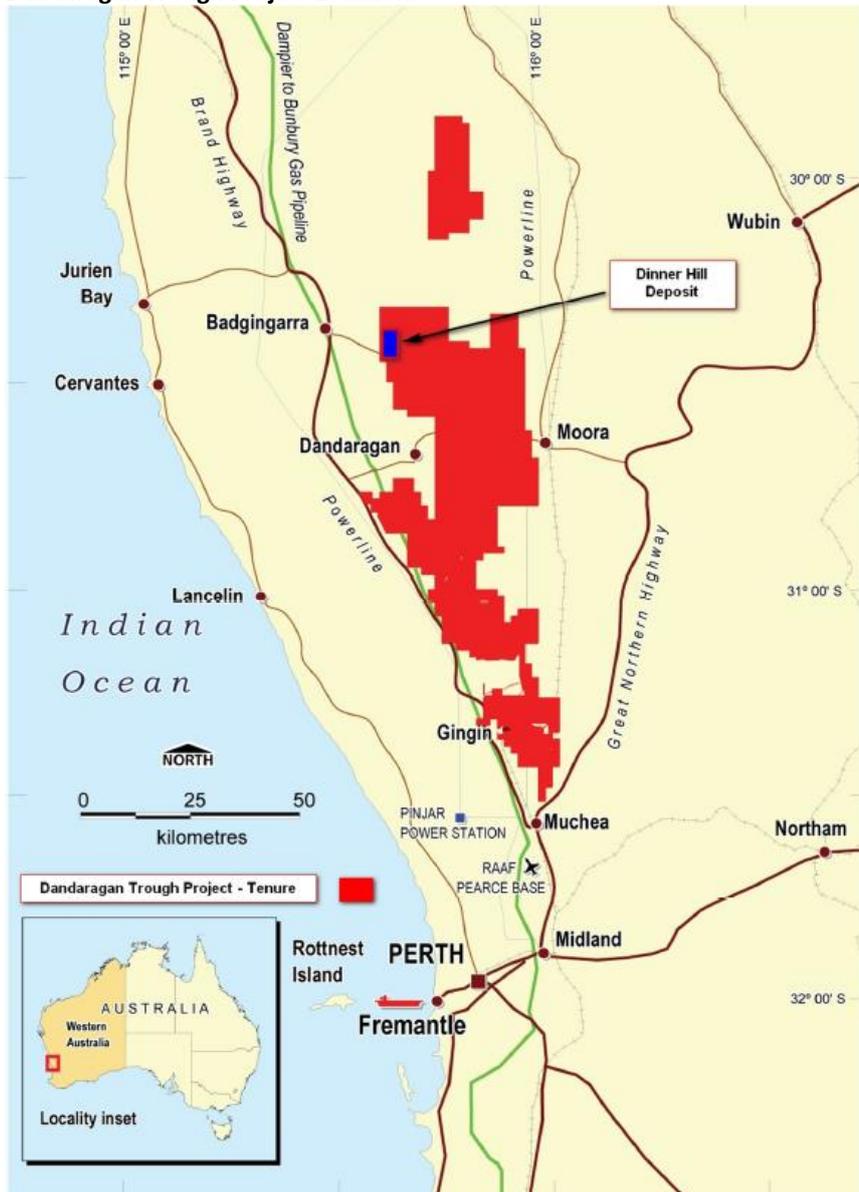
>2,700km<sup>2</sup> of prospective area

The Dandaragan Trough project encompasses a land area of over 2,700km<sup>2</sup>, comprising 15 exploration licences and licence applications. It has excellent access to infrastructure, including transport, power, gas and nearby towns.

#### Dandaragan Trough Project Locations

Extensive infrastructure

Close to local markets and export ports



Source: Potash West

Within the Dandaragan Trough project area, most work has been undertaken on the Dinner Hill deposit which hosts a JORC Indicated Resource of 244Mt @ 3.0% K<sub>2</sub>O and 1.6% P<sub>2</sub>O<sub>5</sub>. Only 20% of the target areas are adequately drill tested and the Company has another 9 high priority prospects at various stages of assessment.

Resource in the 'Indicated' category

Within the 244Mt resource, Potash West has identified a 'phosphate rich' resource component of 90Mt @ 2.65% P<sub>2</sub>O<sub>5</sub>, 3.6% K<sub>2</sub>O and 4.5% CaO at a 1.85% P<sub>2</sub>O<sub>5</sub> cut-off. Encouragingly, the entire resource lies within the Indicated Resource category.



The Dinner Hill resource comprises two greensand bands as outlined below:

**Dinner Hill K-Max Resource**

Unit	Category	Tonnes (Mt)	K <sub>2</sub> O (%)	P <sub>2</sub> O <sub>5</sub> (%)
Molecap Greensand	Indicated	120	4.6	1.8
	Inferred	2	4.4	2.2
	<b>Total</b>	<b>122</b>	<b>4.6</b>	<b>1.8</b>
Poison Hill Greensand	Indicated	121	1.5	1.4
	Inferred	1	1.6	1.1
	<b>Total</b>	<b>122</b>	<b>1.5</b>	<b>1.4</b>
<b>Total Resources</b>	Indicated	241	3.0	1.6
	Inferred	2	3.6	1.9
	<b>Total</b>	<b>244</b>	<b>3.0</b>	<b>1.6</b>

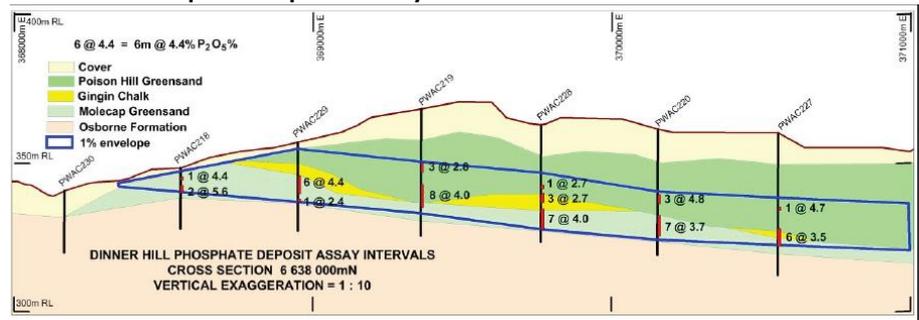
Source: Potash West

The K-Max mining plan is based solely upon the Molecap greensand band. The phosphate mining plan incorporates the bottom of the Poison Hill greensand and the top of the Molecap seam.

The following cross section illustrates drill results within the two sub-horizontal greensand bands separated by a relatively thin layer of the Gingin Chalk. It also outlines the 1% envelope that has been used in the 'phosphate' resource model.

*Sub-horizontal greensand intervals host the mineralisation*

**Dinner Hill Phosphate Deposit – assay interval cross section 6638000mN**

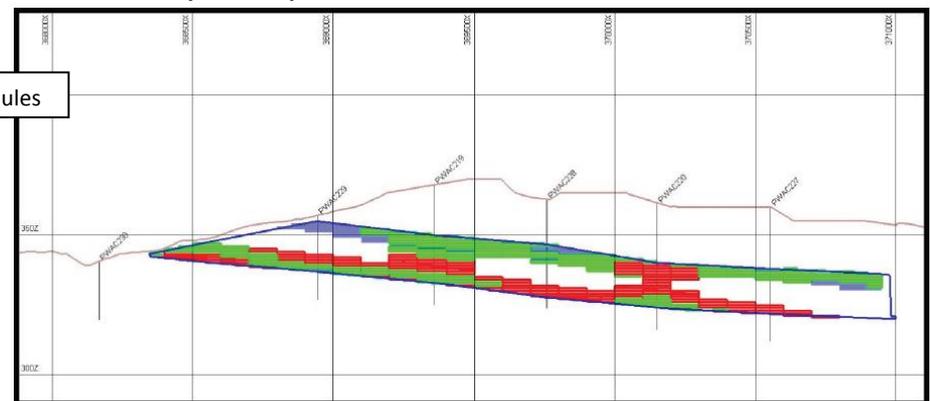


Source: Potash West

The same cross-section is used below to illustrate the resource block model – with P<sub>2</sub>O<sub>5</sub> grade colour coded from blue (lower grade) to red (higher grade) for the two horizons. In the margin to the left is a schematic stratigraphic column, highlighting the occurrence of phosphate nodules within the two sub-horizontal greensand bands.



**Dinner Hill Phosphate Deposit – Block model cross section 6638000mN**



Source: Potash West P<sub>2</sub>O<sub>5</sub>: Blue 1%-1.85%; Green 1.85% to 3%; red >3% only blocks with CaO; P<sub>2</sub>O<sub>5</sub> % < 2.5 shown



## Phosphate Scoping Study

*Phosphate Scoping Study recently completed*

Based on the current phosphate resource (derived from just 20% of the Dinner Hill prospect area), Potash West has recently completed a phosphate Scoping Study designed to test the financial and technical viability of a conventional process to produce a single superphosphate (SSP) product.

*3.8 Mtpa option has lower CAPEX*

A 3.8 Mtpa operational scenario has been assessed, with the results released in September 2013. The study demonstrates the technical and financial viability of the project, with strong operating margins. Importantly, with a capital requirement of around \$144M, it provides a significant capital expenditure reduction compared to the earlier 'glauconite' study using the K-Max process – which had a CAPEX of \$880M for a 4.0 Mtpa scenario and \$650M for a 2.4 Mtpa scenario, beyond the reach of a junior resource company in the current market.

The key outcomes of the Phosphate Scoping Study are summarised below:

### Phosphate Scoping Study Outcomes

Metric	3.8Mtpa
Mine Life	20 years
Average revenue per year	A\$131m
Operating cash costs per year	A\$97.6m
IRR	26.2%
NPV <sub>10</sub>	A\$218m
Capital Costs	A\$144m
Payback Period	4 years

*Source: Potash West*

*Simple mining operation*

The Scoping Study was based on the greensand deposits at Dinner Hill, which largely comprise an unconsolidated mixture of glauconite, silica and apatite. A simple mining operation is proposed, with the topsoil and overburden removed by scrapers and the topsoil stockpiled for later rehabilitation. The target mineralised horizons is then mined by bulldozer, with the ore fed into an in-pit slurry unit.

*Conventional process route*

The slurry is pumped to a concentrator, where it is screened, de-slimed and magnetically separated. The majority of the phosphate is contained within the coarser than 0.5mm fraction, which will be milled prior to being fed to a flotation plant to produce phosphate rock containing >30% P<sub>2</sub>O<sub>5</sub>. The flotation tailings and slimes will be de-watered and returned to the mine void as part of the rehabilitation process.

The phosphate rock will be acidulated using purchased sulphuric acid to produce superphosphate (SSP) containing >18% P<sub>2</sub>O<sub>5</sub>.

The current resource will support a 20 year mine life based on a 3.8Mtpa operation and will generate +\$30m of free cash flow per year. Opportunities exist for capital and operating cost reductions through continued process improvements, as well as through potential delineation of higher grade and broader widths of mineralisation.

*Synergy potential from a future K-Max plant*

An opportunity may eventuate to build side-by-side phosphate and K-Max plants to produce additional potash and alum products from the same feed material. This could be expected to lead to reduced downstream operating costs.



## Capital and Operating Costs

Design criteria and capital costs for the phosphate project, based on a 3.8Mtpa throughput rate, have been provided by independent consultants Strategic Metallurgy Pty Ltd (SMet), at an order of accuracy of ±35%.

Base case 3.8Mtpa option

### Phosphate Scoping Study Capital Costs

	AUD \$ millions
Process Plant	\$72.9
Infrastructure	\$34.7
Indirect costs (including contingency)	\$36.7
<b>TOTAL</b>	<b>\$144.2</b>

Source: Potash West

The project has several strategic advantages that support a low overall operating cost structure, mitigating the relatively low insitu grade of the Dinner Hill deposit. The greensand host sand is friable in nature and stripping ratios are low, creating very low mining costs. Similarly, the well-established regional infrastructure and close proximity to markets allows for modest transportation costs. SMet has provided the estimates for personnel, reagents and consumables, power and maintenance costs. The overall operating costs are summarised below:

Low mining and transport costs

### Phosphate Scoping Study Operating Costs

	A\$/tonne of feed	A\$/tonne of product
Mining and Rehabilitation	\$8.79	\$97.75
Process Plant	\$13.25	\$147.25
Railing and project shipping	\$3.62	\$40.19
<b>TOTAL</b>	<b>\$25.66</b>	<b>\$285.19</b>

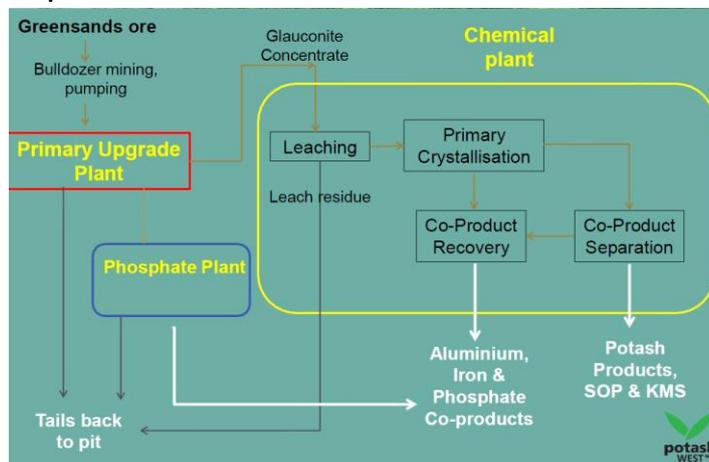
Source: Potash West

## Testwork and Processing

Potash West has demonstrated the viability of extracting a range of potassium products from the glauconite rich greensands via its K-Max process, which subjects concentrated ore to hydrometallurgical and pyrometallurgical processing stages to extract K, P, Mg, Fe and Al – and converts these elements to saleable products. This work is supported by over 1,000 bench scale tests. However, K-Max processing is yet to be tested outside of the laboratory and the capital barriers are high.

Produces a range of fertiliser products

### Proposed Greensands Flow Sheet – ‘K-Max’ Chemical Plant



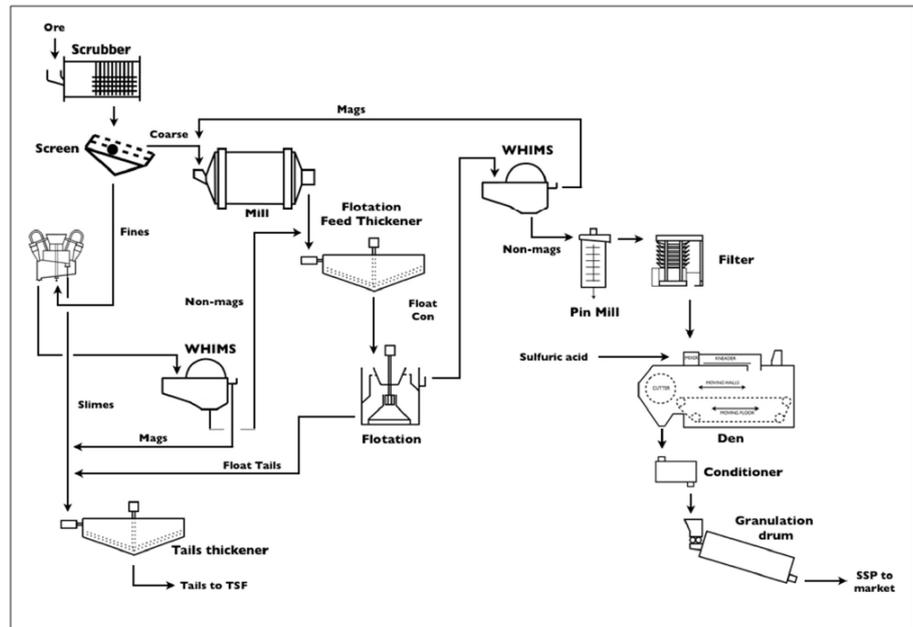
Source: Potash West



*Phosphate plant a low risk, lower cost early development option*

K-Max also fails to recover much of the phosphate, and this has driven assessment of producing phosphate products as an adjunct or independently. The phosphate mineralisation is predominantly fluoroapatite and nodular in nature and is easily upgraded by simple processing to produce phosphate rock containing >30% P<sub>2</sub>O<sub>5</sub>. In turn, this phosphate rock can be acidulated with purchased sulfuric acid to produce SSP containing >18% P<sub>2</sub>O<sub>5</sub> (adding sulphuric acid to rock phosphate makes it water soluble). This is the basis for the recent completed phosphate Scoping Study.

### Proposed SSP Flow Sheet – Phosphate Plant



*Conventional processing to produce > 18% P<sub>2</sub>O<sub>5</sub> superphosphate*

Source: Potash West

The key operating parameters for the phosphate plant include:

- Screening at 0.5mm recovers approximately 63% of the contained phosphate for direct feed to the flotation plant
- De-sliming and magnetic separation recovers a further 7% of the contained P<sub>2</sub>O<sub>5</sub> for direct feed to the flotation plant
- Flotation and magnetic separation recovers 88% of the phosphate from the flotation feed to the phosphate concentrate
- Acidulation recovers 100% of the phosphate from the phosphate concentrate to the SSP product
- An overall recovery of 61.3%

*Relatively simple and cheap process*

The major attributes of the processing plant include the relatively simple and cheap upgrade of the phosphate mineralisation from an average head grade of 2.65% P<sub>2</sub>O<sub>5</sub> to around 5.2% P<sub>2</sub>O<sub>5</sub> for feed to the flotation plant. It involves a phosphate recovery of 70% in only 36% of the mass, and this significant upgrade allows for relatively small downstream processing units.

In addition, the various processing steps are low cost and relatively easy to operate. The main reagents required include sulfuric acid, for the acidulation process, and fatty acid, for flotation. The reagents can be delivered to site by road from Kwinana.



## Additional Prospects

*9 high priority targets to test*

Within Potash West's extensive land holding, the Company has identified a further 9 high priority targets for potassium-rich glauconite deposits which will be tested in due course. Two of the most prospective are Dambadjie and Attunga. Significant zones of up to **58m of phosphate rich 'Molecap Greensands'** with low overburden have been intersected in drilling, demonstrating the potential scale available.

*1.0 – 1.5 billion tonne target*

Previously, an independent study of the Dinner Hill area estimated an exploration target of between 1.0 and 1.5 billion tonnes of greensand grading at between 4.0% and 4.8% K<sub>2</sub>O (as well as 8% to 10% Al<sub>2</sub>O<sub>3</sub>, 12% to 14% iron oxide, and 2% to 2.4% magnesium oxide). The study also estimated an exploration target of 300-600Mt of phosphate mineralisation at a grade of between 1.5% and 3% P<sub>2</sub>O<sub>5</sub>.

## Future Activities

*Scoping studies complete*

Potash West has now completed two scoping studies demonstrating the technical viability of financially attractive projects; one being a facility using the K-Max process to produce a broad range of potash products and chemicals, and the other being a stand-alone single superphosphate facility.

*Immediate focus is phosphate*

While both projects are attractive, it is likely that the Company will focus on the phosphate project in the near term due to its low technical risk, lower capital requirements and the short distance to ports and markets. Further feasibility activity is proposed, with the eventual aim of production in late 2017. In parallel the Company will continue to optimise the 'K-max' option, including investigation of synergy between the two projects.

## Milestones & Medium Term Outlook

Activity	Expected time frame
'Glauconite' Scoping Study Results	Dec-2012
'Phosphate' Scoping Study Results	Sep-2013
Phosphate Feasibility Study	Dec qtr-2015
Phosphate Construction	Dec qtr-2017
K-Max Pilot Plant	1 Year
K-Max Feasibility Studies	2 Years
K-Max Construction	2-3 Years

*Source: Potash West*

## Breakaway's View

Potash West has already delineated a sizable resource at the Dinner Hill deposit, and there is excellent potential for major increases at nearby resource targets. The region has well established infrastructure and the Company has successfully demonstrated two viable development options for its resources – supplying a range of products to booming fertiliser businesses.

The long term outlook for the fertiliser industry is attractive and Breakaway believes Potash West represents an attractive 'value' proposition for investors. The Company should experience a strong re-rating as it progressively achieves its assessment and development milestones.



### **Analyst Verification**

We, Grant Craighead and Geoff Reed, as the Research Analysts, hereby certify that the views expressed in this research accurately reflect our personal views about the subject securities or issuers and no part of analyst compensation is directly or indirectly related to the inclusion of specific recommendations or views in this research.

### **Disclosure**

Breakaway Investment Group (AFSL 290093) may hold direct and indirect shares in Potash West. It has also received a commission on the preparation of this research note.

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