

20 Nov 2017

## PLYMOUTH MINERALS LTD (PLH)

### Expected to produce high margin battery grade LC

Plymouth Minerals Ltd (PLH) recently released its Scoping Study for the San Jose Lithium project. The average C1 cost over the LOM is estimated at US\$5.0k/t of battery grade LC, lower than our assumed US\$5.5k/t. The capex for the project is US\$273m, higher than our assumed US\$250m. The average LOM LC production is estimated at 12.1ktpa with capacity to produce up to 15ktpa (which we previously assumed). We note that the Company has not included any by-product credits (tin and boron) in the Study with further studies still being undertaken.

The Company used LOM lithium price of US\$10,000/t of battery grade LC which is substantially below current spot prices (which currently range between US\$15-25k/t).

To put the PLH capex in context we note that spodumene producers/developers who are considering building lithium refineries have estimated capex in the order of (Tianqi Lithium, Kwinana) US\$312m for 24ktpa of LC, which excludes previously spent mine development and concentrator capex (Greenbushes).

### Battery Grade Lithium Carbonate

Test work results have shown that San Jose's un-beneficiated ore can produce battery grade LC (+99.9% Li<sub>2</sub>CO<sub>3</sub>) using sulphate roast, water-leach process flowsheet. This is substantial as it will allow PLH to capture downstream revenue, as battery grade LC sells for a premium over lower grade LC.

### Expect ~14ktpa LC production for first 10 years

We have adjusted our model assumptions which included increasing the capex to US\$300m from US\$250m (Company assumes US\$273m). We assume 14Ktpa of LC production over the first 10 years and 11.9Ktpa average production over a LOM 30-year. This is compared to the Company's assumed production of 14.1Ktpa over the first 10 years and 12.1Ktpa LOM average production over a 24-year mine life. Our production forecast is down from our previous assumption of 15ktpa of LC with recoveries largely to blame (down to 56% from our previously assumed 85%). Our assumptions of total operating costs over the first 10 years is US\$5.5k/LC and US\$6.3k/LC over the LOM, with the Company assuming US\$4.7k/LC over the first 10 years then and US\$5.0k/LC over the LOM.

### We maintain our Speculative Buy

We have reduced our base (LC US\$10.5k/t) valuation from 55cps to 34cps based on NPV12 due to higher capital and lower production. We have a price target (68cps) well above our valuation given that at spot lithium prices (US\$20k) our valuation is \$2.09/s. We also note that if an industry acquirer wanted to integrate San Jose into its downstream operations it may use a lower discount rate (perhaps NPV5), which would increase our base valuation to 55cps (and spot to ~\$2.50/s). We maintain our Speculative Buy recommendation. We note that PLH currently holds 50% of San Jose and will need to spend a further €2.5 million on a feasibility study to earn a 75% interest, after which its JV partner Valoriza Mininera would be a pro-rata contributing partner to construction and operational funding.

Share Price	\$0.170
Prelim. Valuation	\$0.34
Price Target (12 month)	\$0.68

#### Brief Business Description:

San Jose (Spain) is a Lithium-tin project currently being developed, plus a promising Potash project in Gabon.

#### Hartleys Brief Investment Conclusion

We focus on the lithium project, although the potash project also has significant potential.

#### Board of Directors

Adrian Byass (Managing Director)  
Dr Eric Lilford (Non-exec)  
Christian Cordier (Non-exec)  
Humphrey Hale (Non-exec)  
Kevin Tomlinson (Non-exec Chairman)

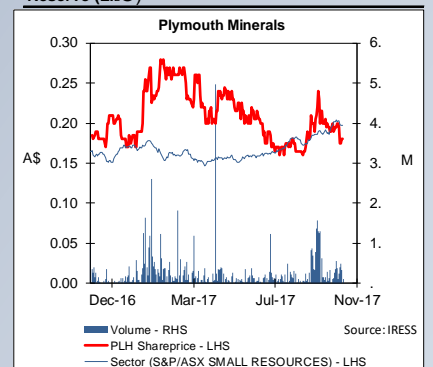
#### Company Address

Level 1, 329 Hay Street  
Subiaco, WA 6008

Issued Capital	151.3m
- fully diluted	195.9m
Market Cap	A\$25.7m
- fully diluted	A\$33.3m
Cash (30 Sep 17a)	A\$2.0m
Debt (30 Sep 17a)	A\$0.0m
EV	A\$23.8m

	Prelim. (A\$m)	FY19e
Prod (LCE t)		nm
Op Cash Flw		nm
Norm NPAT		loss
CF/Share (cps)		nm
EPS (cps)		nm
P/E		nm

	Mt	Li <sub>2</sub> O	LCE Mt
Resources (Li <sub>2</sub> O)	92.3	0.60%	1.30
Reserve (Li <sub>2</sub> O)	none		



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Hartleys has assisted in the completion of capital raisings in the past 12 months for Plymouth Minerals Limited ("Plymouth"), for which it has earned fees. Hartleys has provided corporate advice within the past 12 months, and continues to provide corporate advice to Plymouth for which it has earned and continues to earn fees. An analyst has a beneficial interest in PLH.asx.

## SUMMARY MODEL

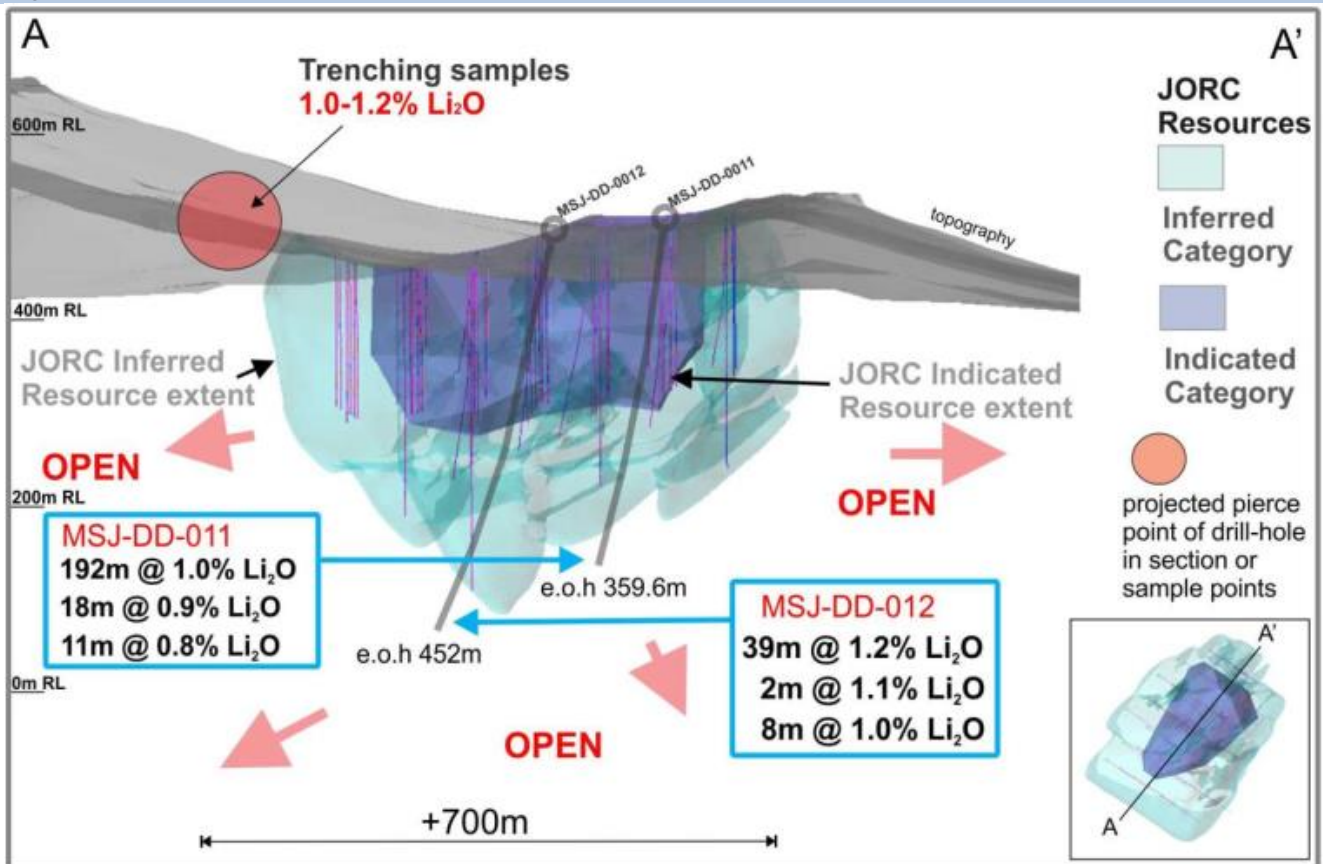
Plymouth Minerals PLH		Share Price \$0.170				20 November 2017 Speculative Buy					
<b>Key Market Information</b>						<b>Directors</b>					
Share Price		\$0.170				Company Information					
Market Capitalisation - ordinary		A\$33m				Level 1, 329 Hay Street					
Net cash		\$2.0m				Subiaco, WA, 6008					
Market Capitalisation - fully diluted		A\$33m				Ph +61 8 6461 6350					
EV		A\$31m				<a href="http://www.plymouthminerals.com">www.plymouthminerals.com</a>					
Issued Capital		151.3m									
Options		44.5									
Issued Capital (diluted for options)		195.9m									
Issued Capital (diluted inc. options and new capital)		541.9m									
<b>12month price target</b>						<b>Top Shareholders</b>					
\$0.68						Ordinary m shs.					
<b>P&amp;L</b>						<b>San Jose JORC Resource</b>					
Unit		30 Jun 18	30 Jun 19	30 Jun 20	30 Jun 21	Mt	Li <sub>2</sub> O%	LCE t			
Net Revenue	A\$m	0.0	0.0	77.9	141.3	Resource (0.1% Li cut-off)	92.3	0.60%	1.3		
Total Costs	A\$m	-3.0	-6.0	-43.6	-80.4	Resource (0.35% Li cut-off)	16.5	0.90%	0.36		
EBITDA	A\$m	-3.0	-6.0	34.3	60.9						
- margin		0%	0%	44%	43%						
Depreciation/Amort	A\$m	-0.5	-7.7	-22.3	-30.8						
EBIT	A\$m	-3.5	-13.8	12.0	30.1						
Net Interest	A\$m	0.0	0.1	0.2	0.1						
Pre-Tax Profit	A\$m	-3.5	-13.7	12.1	30.2						
Tax Expense	A\$m	0.0	0.0	-3.0	-7.6						
Normalised NPAT	A\$m	-3.5	-13.7	9.1	22.7						
Abnormal Items	A\$m	0.0	0.0	0.0	0.0						
Reported Profit	A\$m	-3.5	-13.7	9.1	22.7						
Minority	A\$m	0.0	0.0	0.0	0.0						
Profit Attrib	A\$m	-3.5	-13.7	9.1	22.7						
<b>Balance Sheet</b>						<b>Production Summary</b>					
Unit		30 Jun 18	30 Jun 19	30 Jun 20	30 Jun 21	Unit	Jun 19	Jun 20	Jun 21	Jun 22	
Cash	A\$m	5.6	199.9	79.1	126.9	ROM feed	Mt	0.63	1.25	1.25	
Other Current Assets	A\$m	0.1	0.3	6.1	11.1	Mined grade Li <sub>2</sub> O	%	0.82%	0.82%	0.82%	
Total Current Assets	A\$m	5.7	200.2	85.2	137.9	Process Plant Throughput	Mt	0.26	0.52	0.52	
Property, Plant & Equip.	A\$m	2.9	144.2	271.0	243.5	Beneficiated grade Li <sub>2</sub> O	%	0.92%	0.92%	0.92%	
Exploration	A\$m	3.2	3.6	4.0	4.4	Produced Battery Grade LC	ktpa	7.0	14.0	14.0	
Investments/other	A\$m	0.0	0.0	0.0	0.0	Attrib. (75%)		5.2	10.5	10.5	
Tot Non-Curr. Assets	A\$m	6.1	147.8	275.0	247.9	Mine Life	yr	29.8	28.8	27.8	
Total Assets	A\$m	11.8	348.0	360.1	385.8	Assumed Mining Inventory	Mt	37.2	35.9	34.7	
Short Term Borrowings	A\$m	-	-	-	-	Assumed Mining Inventory - Li <sub>2</sub> O grade	%	0.33%	0.33%	0.33%	
Other	A\$m	0.3	0.5	3.6	6.6						
Total Curr. Liabilities	A\$m	0.3	0.5	3.6	6.6						
Long Term Borrowings	A\$m	-	255.3	255.3	255.3						
Other	A\$m	-	-	-	-						
Total Non-Curr. Liabil.	A\$m	-	255.3	255.3	255.3						
Total Liabilities	A\$m	0.3	255.8	258.9	261.9						
Net Assets	A\$m	11.5	92.1	101.2	123.9						
Net Debt	A\$m	-5.6	55.4	176.2	128.4						
<b>Cashflow</b>						<b>Costs (100% basis)</b>					
Unit		30 Jun 18	30 Jun 19	30 Jun 20	30 Jun 21	Unit	Jun 19	Jun 20	Jun 21	Jun 22	
Operating Cashflow	A\$m	-3.5	-5.9	31.5	58.9	Cost per beneficiated tonne	\$A/t	-	224	-	206
Income Tax Paid	A\$m	0.0	0.0	-3.0	-7.6	EBITDA / beneficiated tonne	\$A/t	175.8	156.2	153.8	
Interest & Other	A\$m	0.0	0.1	0.2	0.1	Cost per ROM feed tonne	\$A/t	-	70	-	64
Operating Activities	A\$m	-3.5	-5.8	28.7	51.5	Total Cash Costs	\$A k/t LC Battery grade	-	8.3	-	7.7
Property, Plant & Equip.	A\$m	-3.3	-149.1	-149.1	-3.3	\$US k/t	-	6.3	-	5.9	6.0
Exploration and Devel.	A\$m	-0.4	-0.4	-0.4	-0.4	C1: Operating Cash Cost = (a)	\$A k/t LC Battery grade	-	6.4	-	6.4
Other	A\$m	0.0	0.0	0.0	0.0	(a) + Royalty = (b)	\$A k/t LC Battery grade	-	7.1	-	7.0
Investment Activities	A\$m	-3.7	-149.5	-149.5	-3.7	C2: (a) + depreciation & amortisation = (c)	\$A k/t LC Battery grade	-	7.8	-	8.5
Borrowings	A\$m	0.0	255.3	0.0	0.0	(a) + actual cash for development = (d)	\$A k/t LC Battery grade	-	28.5	-	6.7
Equity or "bc capital"	A\$m	10.0	94.3	0.0	0.0	AISC: (c) + Royalty	\$A k/t LC Battery grade	-	11.4	-	10.0
Dividends Paid	A\$m	0.0	0.0	0.0	0.0	(d) + Royalty	\$A k/t LC Battery grade	-	35.6	-	7.4
Financing Activities	A\$m	10.0	349.6	0.0	0.0	\$US k/t	-	27.2	-	5.7	5.7
Net Cashflow	A\$m	2.8	194.3	-120.8	47.8						
<b>Shares</b>						<b>Price Assumptions</b>					
Unit		30 Jun 18	30 Jun 19	30 Jun 20	30 Jun 21	Unit	Jun 19	Jun 20	Jun 21	Jun 22	
Ordinary Shares - End	m	187.2	512.0	518.9	528.9	AUDUSD	US\$/A\$	0.76	0.76	0.77	0.78
Ordinary Shares - W'ted	m	162.6	349.6	515.5	523.9	Lithium Carbonate Battery grade	US\$/t	12,888	12,304	10,941	10,941
Diluted Shares - W'ted	m	202.5	375.7	528.9	528.9	Lithium Carbonate Battery grade	AUD\$/t	16,903	16,126	14,168	14,073
<b>Ratio Analysis</b>						<b>Hedging</b>					
Unit		30 Jun 18	30 Jun 19	30 Jun 20	30 Jun 21	Unit	Jun 19	Jun 20	Jun 21	Jun 22	
Cashflow Per Share	A\$ cps	-2.2	-1.7	5.6	9.8	none					
Cashflow Multiple	x	-7.8	-10.2	3.1	1.7	<b>Sensitivity Analysis</b>					
Earnings Per Share	A\$ cps	-2.1	-3.9	1.8	4.3	Valuation					
Price to Earnings Ratio	x	-7.9	-4.3	9.6	3.9	Base Case					
Dividends Per Share	AUD	-	-	-	-	0.34					
Dividend Yield	%	0.0%	0.0%	0.0%	0.0%	Spot USD/AUD 0.76, Battery LC \$20,420/t					
Net Debt / Net Debt + Equity %		-94%	38%	64%	51%	2.09 (508.1%)					
Interest Cover	X	762.8	123.3	na	na	112.4 (395.5%)					
						AUDUSD +/-10%					
						0.24 / 0.28 (-28.8% / -19.2%)					
						18.4 / 23.8 (-18.7% / 5.1%)					
						Production +/-10%					
						0.36 / -0.43 (6.2% / -226.6%)					
						30.9 / 10.8 (36.4% / -52.4%)					
						Operating Costs +/-10%					
						0.17 / 0.32 (-51.9% / -6.8%)					
						15.7 / 26.1 (-30.9% / 14.9%)					
						<b>Unpaid Capital</b>					
						Year Expires					
						No. (m)					
						\$m					
						Avg price					
						% ord					
						30-Jun-18					
						9.3					
						1.4					
						0.15					
						6%					
						30-Jun-19					
						18.4					
						1.2					
						0.06					
						12%					
						30-Jun-20					
						6.9					
						2.4					
						0.35					
						5%					
						30-Jun-21					
						10.0					
						0.0					
						0.00					
						7%					
						30-Jun-22					
						0.0					
						0.0					
						0.00					
						0%					
						TOTAL					
						44.5					
						5.0					
						0.11					
						29%					
						<b>Valuation</b>					
						\$m					
						\$/shr					
						75% San Jose (pre-tax NAV at disc. rate of 12%)					
						228					
						0.42					
						Other Assets/Exploration					
						5					
						0.01					
						Forwards					
						0					
						0.00					
						Corporate Overheads					
						-55					
						-0.10					
						Net Cash (Debt)					
						2					
						0.00					
						Tax (NPV future liability)					
						-9					
						-0.02					
						Options & Other Equity					
						4					
						0.01					
						Total					
						186					
						0.34					
Analyst: Trent Barnett						20 Nov 17					
+61 8 9268 3052											
"bc capital" could be equity or debt. Our valuation is risk-adjusted for how this may be obtained.											
Sources: IRESS, Company Information, Hartleys Research											

Fig. 1: San Jose 2012 JORC Resource.

Classification	Tonnes (Mt)	Li (%)	Li <sub>2</sub> O (%)	Sn (%)
Indicated	23.9	0.31	0.67	0.02
Inferred	68.3	0.26	0.56	0.02
<b>TOTAL</b>	<b>92.3</b>	<b>0.27</b>	<b>0.60</b>	<b>0.02</b>

Source: PLH

Fig. 2: San Jose cross section with JORC resource and recent extensional drilling pierce points.



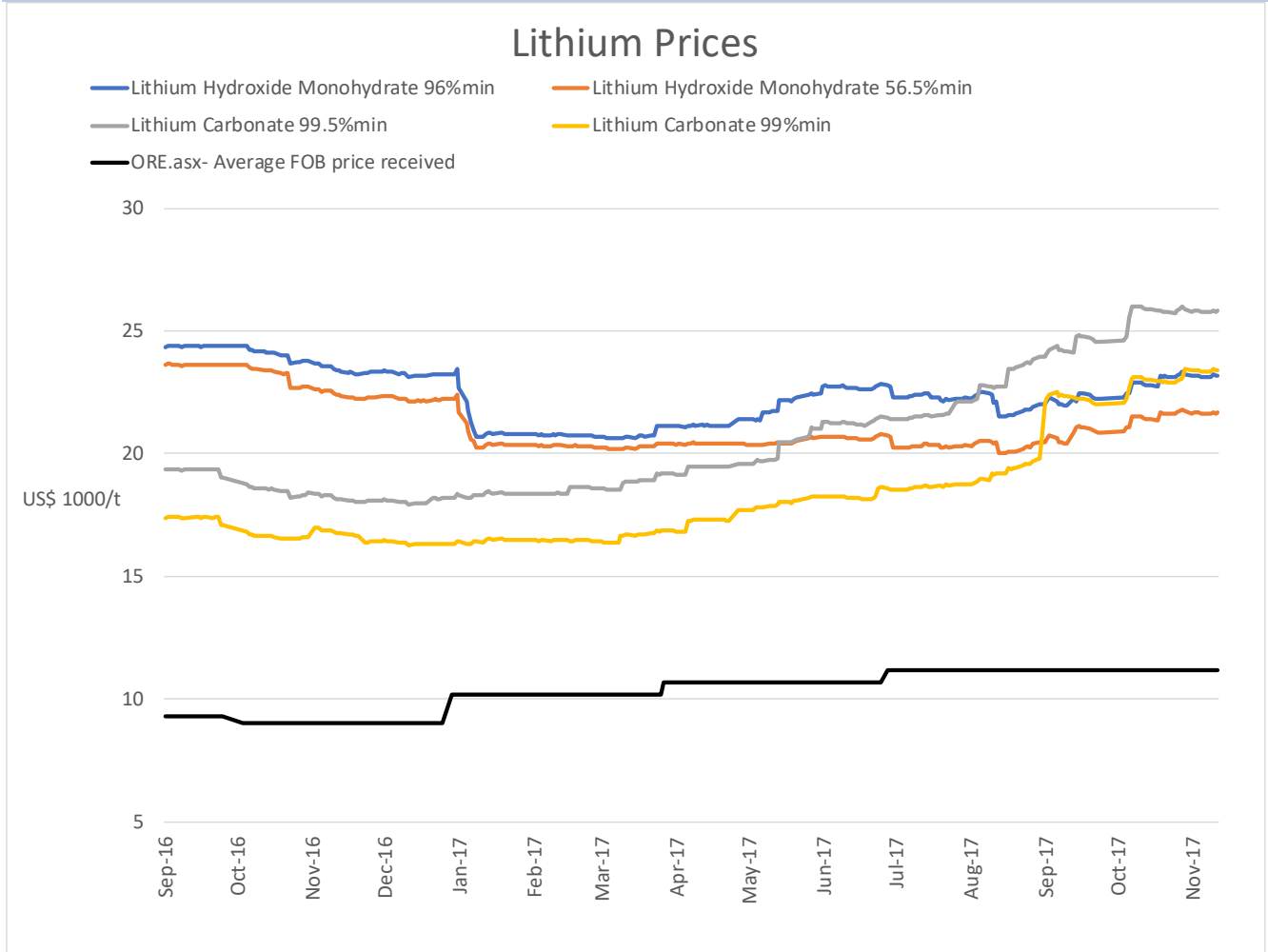
Source: PLH

Fig. 3: Banio Potash Exploration Target.

Prospect	Potash Mineralogy	Depth to Potash (m)	Tonnage Range (Mt)	Grade Range (K <sub>2</sub> O%)	Grade Range (KCl%)
Alpha	Sylvinite	290	262-415	18 - 22	28.5 - 34.8
Ndindi Northern	Carnallite	360	2,600-5,200	12 - 14	19.0 - 22.2
Ndindi Southern	Carnallite	500	3,100-4,800	12 - 14	19.0 - 22.2
<b>Combined</b>			<b>6,000-10,400</b>	<b>12.3-14.4</b>	<b>19.4-22.7</b>

Source: PLH

Fig. 4: Lithium prices in China.



Source: Various

<b>Fig. 5: Hartleys Assumptions vs Scoping Study</b>				
Units		Scoping Oct-17	Hartleys assumptions	Difference
First product sales	Date	Sep 20	Mar 20	
Potential Mining inventory	Mt	30.1	37.5	24.5%
- grade Li	%	0.40%	0.33%	-17.1%
- grade LC	%	2.13%	1.77%	-17.2%
- grade Li2O	%	0.86%	0.71%	-17.2%
Life of mine	Years	24.1	30	24.5%
Implied Mine Inventory	Mt	30.1	37.5	24.5%
- Beneficiated head grade Li2O	%	1.40%	1.13%	-19.3%
- Beneficiated Contained Li2O	Mt	0.18	0.17	-0.7%
- Beneficiated Contained LC	Mt	0.43	0.43	-0.7%
Throughput Rate	Mtpa	1.25	1.25	0.0%
Mass Recovery	(Implied)	42%	41%	-1.2%
Beneficiated Throughput	Mtpa	0.52	0.51	-1.2%
Avg Total Recoveries				
- LC	%	56%	54%	-2.8%
LC Produced	Mt	0.29	0.36	23.4%
- pa	ktpa	12.1	12.0	-0.9%
Total Revenue	US\$m	\$2,790	\$3,759	34.7%
- pa	US\$m	\$116	\$125	8.2%
Total Operating Costs	US\$m	-\$1,403	-\$2,258	60.9%
- pa	US\$m	-\$58	-\$75	29.3%
-per tonne ore	US\$/t	-\$47	-\$60	29.3%
-per tonne beneficiated ore	US\$/t	-\$112	-\$147	30.9%
Total Operating Costs LOM	US\$/t LC	-\$4,798	-\$6,259	30.5%
Average C1 cost LOM	US\$/t LC	-\$5,004	-\$5,824	16.4%
Startup & expansion capex (inc WC)	US\$m	\$273	\$308	12.7%
	AUD\$	\$350	\$395	12.7%
EBITDA	US\$m pa	\$57.55	\$50.02	-13.1%
	- A\$/m pa	\$74	\$64	-13.1%
LOM EBITDA	US\$m	\$1,387	\$1,501	8.2%
Payback (Capex to EBITDA)	x	4.7x	6.2x	29.7%
LC	US \$/t	\$10,000	\$10,419	4.2%

Source: PLH and Hartleys Research

## VALUATION

PLH is still at a speculative stage of development. Our speculative valuation assumes a throughput rate of 1.25Mpta to produce ~12kpta of Lithium Carbonate (LC) LOM average at cash costs of ~\$US6,300/t of LC, and we assume capex ~\$US\$300m, which could generate LOM EBITDA of ~\$US50m/pa, at current LC prices (>US\$20,000/t) it would generate EBITDA of ~\$US150m/pa. Our risked valuation is \$0.34/s, based on development scenario of PLH and diluted for ~350m new shares.

## PRICE TARGET

We have a price target of \$0.68 (\$0.79 previously).

**Fig. 6: Price Target Methodology - PLH**

Price Target Methodology	Weighting	Spot	12 mth out
NPV12 base case lithium, assuming significant equity dilution	45%	\$0.34	\$0.32
NPV12 at spot commodity and fx prices (LC @US\$20,420/t)	15%	\$2.09	\$2.11
NPV12 bear case using LC @US\$8,000/t	5%	\$0.00	\$0.00
Net cash	15%	\$0.01	\$0.01
Takeout at 20% disc to unfunded NPV, no more dilution	5%	\$0.49	\$0.55
NPV5 base case lithium	10%	\$0.55	\$0.61
NPV5 at spot commodity and fx prices (LC @US\$20,420/t)	5%	\$2.51	\$2.52
<b>Risk weighted composite</b>		<b>\$0.67</b>	
<b>12 Months Price Target</b>		<b>\$0.68</b>	
Shareprice - Last		\$0.170	
<b>12 mth total return (% to 12mth target + dividend)</b>		<b>298%</b>	

Source: Hartleys Estimate

**Fig. 7: Key assumptions and risks for valuation**

Assumption	Risk of not realising assumption	Downside risk to valuation if assumption is incorrect	Comment
Declining commodity prices	High	Upside / downside	Our valuation is sensitive to commodity price assumptions.
Exploration success	Medium	Extreme	We assume the projects will have some level of exploration success.
Metallurgy	High	Extreme	We assume PLH will be able to extract battery grade LC and MOP economically.
Offtake	High	Extreme	We assume that PLH will be able to find offtake partners.
Approvals	Medium	Extreme	We assume that the necessary approvals will be given.
Obtaining capital	High	Extreme	We assume that they will be able to obtain the capital required to develop the projects
<i>Conclusion</i>	<i>Our assumptions are very speculative, and hence PLH is high risk.</i>		

Source: Hartleys Estimate

## RISKS

The key risks for Plymouth (like most mine companies in development) is obtaining the necessary funding to complete the project. Other risks are earnings disappointments given the industry is volatile and earnings can disappoint due to cost overruns, project delays, cost inflation, environmental regulations, plant and mine design mistakes or lower production. Although some earnings disappointments can be short term and are only a timing issue, other disappointments can be materially value destructive and can sometimes overhang stocks for a long period of time (for example metallurgy problems). Such disappointments can be very difficult to predict and share price reactions can be severe and immediate upon disclosure by the Company. High financial leverage (if it exists at that time) would add to the problem.

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## Hartleys Recommendation Categories

Buy	Share price appreciation anticipated.
Accumulate	Share price appreciation anticipated but the risk/reward is not as attractive as a "Buy". Alternatively, for the share price to rise it may be contingent on the outcome of an uncertain or distant event. Analyst will often indicate a price level at which it may become a "Buy".
Neutral	Take no action. Upside & downside risk/reward is evenly balanced.
Reduce / Take profits	It is anticipated to be unlikely that there will be gains over the investment time horizon but there is a possibility of some price weakness over that period.
Sell	Significant price depreciation anticipated.
No Rating	No recommendation.
Speculative Buy	Share price could be volatile. While it is anticipated that, on a risk/reward basis, an investment is attractive, there is at least one identifiable risk that has a meaningful possibility of occurring, which, if it did occur, could lead to significant share price reduction. Consequently, the investment is considered high risk.

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