

Development Projects (timeline is calendar year)	Partners	2015		2016				2017				2018				2019				2020				2021									
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2								
<b>PROGRAM 1: DEFINE</b>																																	
<a href="#">P1-001</a> & <a href="#">P1-009</a> & <a href="#">P1-012</a> : Gamma Activation Analysis for geo-sensing	CSIRO					Concept TRL2-TRL3 <a href="#">P1-001</a>				Design TRL4-TRL5 <a href="#">P1-009</a>				Prototype TRL 5 <a href="#">P1-012</a>																			
<a href="#">P1-002</a> : PGNAA elemental logging for Instrumenting the Bench	CSIRO					Prototype TRL5 <a href="#">P1-002</a>																											
<a href="#">P1-003</a> : Magnetic resonance of covellite for geo-sensing	CSIRO					Prototype TRL4 <a href="#">P1-003</a>																											
<a href="#">P1-004</a> : GE View an online tool for assessing Grade Engineering® (GE) opportunities	MRIWA			Enhance database TRL4 <a href="#">P1-004</a>				Next phase may be incorporated into the WA Mining Hub																									
<a href="#">P1-005</a> : Upconversion fluorescence of minerals for geo-sensing	Uni of Adelaide			Phase 1: Design TRL2-TRL4 Phase 2: Testing TRL5 <a href="#">P1-005</a>																													
<a href="#">P1-006</a> : Geological controls on grade by size department	UTAS			Phase 1 Models TRL2-TRL4 Phase 2: Testing TRL5 <a href="#">P1-006</a>																													
<a href="#">P1-007</a> : Surface techniques for geo-sensing	UTAS					Review TRL4 <a href="#">P1-007</a>																											
<a href="#">P1-011</a> : Resource scale heterogeneity evaluation	Uni of Adelaide														TRL TBA <a href="#">P1-011</a>																		
<a href="#">P5-013</a> : Magnetic Resonance Bench Analysis – Stage 1 Laboratory Feasibility	CSIRO														TRL 4 <a href="#">P1-013</a>																		
<b>PROGRAM 2: SEPARATE</b>																																	
<a href="#">P2-001</a> : Sensors for rock mass characterisation	Mining <sup>3</sup>											TRL4-TRL5 <a href="#">P2-001</a>		Next phase dependent on outcomes of review																			
<a href="#">P2-002</a> : Blast design optimisation for GE	Mining <sup>3</sup>											TRL3-TRL5 <a href="#">P2-002</a>		Next phase dependent on outcomes of design																			
<a href="#">P2-003</a> : Orebody DNA (M3-003)	Mining <sup>3</sup>										Prototype TRL2-TRL5 <a href="#">P2-003</a>				Next phase would apply to site data and incorporate GE																		
<a href="#">P2-004</a> : LIBS analysis for Geo-sensing	NRC											Tools: TRL2-TRL5 <a href="#">P2-004</a>																					
<a href="#">P2-005</a> : Simulation of GE mining processes	UQ, Mining <sup>3</sup>											Simulation TRL2-TRL5 <a href="#">P2-005</a>																					
M3-001: MWD for Top-of-Coal Stand-off Ph3	Mining <sup>3</sup>					TRL4 <a href="#">M3-001</a>																											
M3-002: Real-time Strata Interface Delineation	Mining <sup>3</sup>											TRL3 <a href="#">M3-002</a>																					
M3-004: Improving Resilience of Mine Haul Roads	Mining <sup>3</sup>					TRL6 <a href="#">M3-004</a>																											
M3-005: Alternative Explosives Formulations Ph 2	Mining <sup>3</sup>			TRL6 <a href="#">M3-005</a>																													
M3-007: Surface Mining – Dynacut Ph.2	Mining <sup>3</sup>					TRL5 <a href="#">M3-007</a>																											
M3-010: Pit stability assessment & deep orebody characterisation using microseismics	Mining <sup>3</sup>					TRL5 <a href="#">M3-010</a>																											
<b>PROGRAM 3: EXTRACT</b>																																	
P3-001: IES Baseline Project	CRC ORE											IES Development: TRL4-TRL6 <a href="#">P3-001</a>																					
<a href="#">P3-006</a> : AMIRA P9Q	UQ, Amira and others											Models TRL5-TRL8 <a href="#">P3-006</a>																					
P3-005: AMIRA P420F	Curtin	Models <a href="#">P3-005</a>																															
<a href="#">P3-008</a> : Comminution optimisation for GE	JKMRC, Gekko					TRL4-TRL6 <a href="#">P3-008</a>																											
P3-009: Additional Research P9Q – IES Development Project	AMIRA, JKMRC, UFRJ, UCT, Hacettepe, Chalmers, Anglo American, AngloGold Ashanti, Barrick, BGRIMM, JKTech, Magotteaux, Metso, Newmont, South32, Vale Technology, Weir Minerals														TRL7 <a href="#">P3-009</a>																		
<a href="#">P3-010</a> : Beneficiation of Hard Rock Lithium Ores	Curtin											TRL3 <a href="#">P3-010</a>																					
P3-012: IES Foundation Project	AMIRA, Hatch, Sedgman, BHP, Anglo American, Teck														TRL 7-9 <a href="#">P3-012</a>																		
<b>PROGRAM 4: CONTROL</b>																																	
<a href="#">P4-001</a> & <a href="#">P4-003</a> : Data driven models	QUT					Plan TRL2 <a href="#">P4-001</a>						Models TRL2-TRL5 <a href="#">P4-003</a>																					
<a href="#">P4-004</a> : Implementation Accelerator	Clareo											TRL4-TRL7 <a href="#">P4-004</a>																					
<a href="#">P4-007</a> : Optimised Production Scheduling for Grade Engineering	Curtin														TRL3-TRL5 <a href="#">P4-007</a>																		
<a href="#">P4-008</a> : Business and eco-system management tools to overcome barriers to change	QUT																	TRL N/A <a href="#">P4-008</a>															

IMPLEMENTATION PROJECTS OVER PAGE

Development Projects (timeline is calendar year)	Partners	2015		2016				2017				2018				2019				2020				2021		
		Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	
<b>IMPLEMENTATION</b>																										
<a href="#">S2-060.A</a> : Los Bronces Advanced Concept Study	Anglo American, COMET			TRL5-TRL7 <a href="#">S2-060.A</a>																						
<a href="#">S2-060.E</a> : Mantoverde Grade Engineering® Study	Anglo American	TRL5-7 <a href="#">S2-060.E</a>																								
<a href="#">S2-079</a> : Los Bronces Grade Engineering® Blast Trial	Anglo American, Davey Bickford, Jerricho, SGS			TRL5-TRL7 <a href="#">S2-079</a>																						
<a href="#">S2-082</a> : THM Livengood GE Opportunity Assessment	Tower Hill Mines			TRL5-TRL7 <a href="#">S2-082</a>																						
<a href="#">S2-085</a> : Gruyere GE Opportunity Assessment	Gold Road Resources			TRL5-TRL7 <a href="#">S2-085</a>																						
<a href="#">P5-001.A</a> : Escondida Differential Blasting Study	BHP, SGS			TRL5-TRL7 <a href="#">P5-001.A</a>																						
<a href="#">P5-001.B</a> : Escondida Integrated Extraction Simulation (IES) Implementation	BHP, JKTech				TRL5-TRL7 <a href="#">P5-001.B</a>				PHASE 2																	
<a href="#">P5-001.C</a> : Escondida As-Is Mapping	BHP				TRL5-TRL7 <a href="#">P5-001.C</a>																					
<a href="#">P5-005.A</a> : Advanced Fragmentation Technologies	Anglo American, JKTech			TRL5-TRL7 <a href="#">P5-005.A</a>																						
<a href="#">P5-005.B</a> : Advance Production Modelling and Control	Anglo American, JKTech			TRL5-TRL7 <a href="#">P5-005.B</a>																						
<a href="#">P5-007.C</a> : Lihir Opportunity Assessment	Newcrest, Bear Rock			TRL5-TRL7 <a href="#">P5-007.C</a>																						
<a href="#">P5-009</a> : Linking Grade Engineering® and Whittle EC	Whittle Consulting			TRL5-TRL7 <a href="#">P5-009</a>																						
<a href="#">P5-010</a> & <a href="#">P5-037</a> : Minera San Cristóbal GE Study and Production Trial	Sumitomo, JKTech, METSO				TRL5-TRL7 <a href="#">P5-010</a>				TRL5-TRL7 <a href="#">P5-037</a>																	
<a href="#">P5-011</a> : Detour Gold GE Opportunity Assessment	Detour Gold				TRL5-TRL7 <a href="#">P5-011</a>																					
<a href="#">P5-012</a> : Los Bronces IES Implementation Project	Anglo American, JKTech						TRL5-TRL7 <a href="#">P5-012</a>																			
<a href="#">P5-015</a> : Kalgoorlie-Boulder Mining Innovation Hub	WASM				TRL5-TRL7 <a href="#">P5-015</a>				TRL4-TRL7 <a href="#">P5-041</a>				Potential next phase													
<a href="#">P5-016</a> & <a href="#">P5-040</a> : Carmen de Andacollo Screening Assessment	Teck				TRL5-TRL7 <a href="#">P5-016</a>				TRL5-7 <a href="#">P5-040</a>																	
<a href="#">P5-018</a> : Sierra Gorda Grade Engineering Study	Sumitomo, KGHM							TRL5-TRL7 <a href="#">P5-018</a>																		
<a href="#">P5-019</a> : CRC ORE - ORICA Differential Blasting Partnership	ORICA						TRL5-TRL7 <a href="#">P5-019</a>																			
<a href="#">P5-021</a> : Surge Slave Separator-Sensing Opportunity Assessment at Minera Escondida Limitada	BHP, Hatch, Mining³						TRL5-TRL7 <a href="#">P5-021</a>																			
<a href="#">P5-022</a> : Los Bronces Opportunity Assessment and Surge Slave Separator	Anglo American, Hatch							TRL5-TRL7 <a href="#">P5-022</a>																		
<a href="#">P5-023</a> : Gramalote Grade Engineering PFS Review	Anglo American, CSIRO, Advisian						TRL5-TRL7 <a href="#">P5-023</a>																			
<a href="#">P5-025</a> : Instrumenting the Bench	Imdex, Orica, Sodern, Atlas Copco									TRL 5 <a href="#">P5-025</a>	TRL 5 <a href="#">P5-025 d</a>															
<a href="#">P5-026</a> : Bonikro Stockpile Preferential Deposition Sampling Study	Newcrest									TRL 6 <a href="#">P5-026</a>																
<a href="#">P5-027</a> : Los Bronces Blasting Study	Anglo American										TRL5-TRL7 <a href="#">P5-027</a>															
<a href="#">P5-028</a> : MEL Grade Heterogeneity Study	BHP									TRL 5 <a href="#">P5-028</a>																
<a href="#">P5-042</a> : BHP Heterogeneity Partnership	BHP										TRL5-7 <a href="#">P5-042</a>															
<a href="#">P5-044</a> : Data analytics for integrated sensor trials at Escondida	BHP										TRL5 <a href="#">P5-044</a>															
<a href="#">P5-045</a> : Analysis of Extended BIMM at MEL	BHP										TRL <a href="#">P5-045</a>															
<a href="#">P5-048</a> : BlastOre Applicability	BHP										TRL5-TRL6 <a href="#">P5-048</a>															
<a href="#">P5-049</a> : Escondida Mine to Mill value quantification	BHP										TRL6 <a href="#">P5-049</a>															
<a href="#">P5-050</a> : Simulation of movement and mixing during blast and excavation	BHP										TRL5-TRL6 <a href="#">P5-050</a>															
<a href="#">P5-052</a> : Mogalakwena Sensor Fusion Trial	Anglo American										TRL 6 – TRL 8 <a href="#">P5-052</a>															
<a href="#">P5-054</a> : Barro Alto Sensor Fusion Trial	Anglo American										TRL 6 – TRL 8 <a href="#">P5-054</a>															
<a href="#">P5-057</a> : Brown Book											TRL 7 – TRL 8 <a href="#">P5-057</a>															
<a href="#">P5-058</a> : CADIA	Newcrest										TRL 5 - TRL 7 <a href="#">P5-058</a>															
<b>KAL HUB</b>																										
<a href="#">KH-005</a> : GE investigation into the relationship between ore grade & size in the Kal Hub region																										