PRESS RELEASE ASX/TSX: CDV
16 July 2019 2019-13

CARDINAL'S STARTER PIT INFILL DRILLING RESULTS

Cardinal Resources Limited (ASX/TSX: CDV) (**"Cardinal"** or **"the Company"**) is pleased to report positive results from a selected area within the proposed starter pit that encompasses the first 2 to 3 years of production at its flagship Namdini Gold Project in Ghana. The infill drill programme results highlight the robustness of the Company's current Mineral Resource and further supports the Company's Project Finance plans.

HIGHLIGHTS

- Infill drilling tested down to the base of the proposed starter pit to a vertical depth of 140m

Selected in fill drill hole intersections:

89m @ 2.3 g/t Au from surface in NMRC794

83m @ 3.5 g/t Au from surface in NMRC745

78m @ 4.1 g/t Au from surface in NMRC738

74m @ 2.6 g/t Au from surface in NMRC743

69m @ 3.9 g/t Au from 99m in NMRC762

60m @ 2.1 g/t Au from surface in NMRC766

42m @ 3.2 g/t Au from 138m in NMRC771

40m @ 3.7 g/t Au from 10m in NMRC767

14m @ 4.1 g/t Au from 146m in NMDD172

Intersections are reported above 0.5 g/t Au using a minimum width of 3m, with no more than 3m of internal dilution of less than 0.5 g/t Au.

Cardinal's Chief Executive Officer / Managing Director, Archie Koimtsidis said:

"This close spaced infill drill programme, along with the previous Grade Control* programme within our proposed starter pit, confirms the robustness of our Mineral Resource, thereby providing higher confidence in predicting operational outcomes.

"The infill results are also key to underpinning the delivery of a high-quality engineering study which will provide more informed economic data during the critical project finance payback period.

"An added benefit of these infill drill results is enhancing confidence in the first 2 to 3 years production from the proposed starter pit. This will assist Cardinal with project financing options for the Namdini Project with a declared open pit Ore Reserve of 5.1Moz (138.6 Mt @ 1.13 g/t Au; 0.5 g/t cut-off) inclusive of 0.4Moz Proved (7.4 Mt @ 1.31 g/t Au; 0.5 g/t cut-off) and 4.7Moz Probable (131.2 Mt @ 1.12 g/t Au; 0.5 g/t cut-off)."

** Refer to ASX/TSX press release "Cardinal Grade Control Drill Results Returned" dated 12 December 2017.*

Infill Drilling

Cardinal completed a 3,640m Reverse Circulation percussion and Diamond core test infill drill programme which comprised 30 drill holes infilling earlier drilling to a grid pattern of approximately 25m (E) by 25m (N), within the proposed starter pit. The drill programme comprised three 25 metre spaced traverses with an area of approximately 300m (E) by 75m (N) to approximately 140m vertical (Figure 1). Drilling was inclined at around -65° to the east in the Namdini local grid, consistent with drilling undertaken for previous mineral resource (Figures 2, 3 and 4). Detailed results of the drill programme are provided in Schedule 1 to this announcement.

The close spaced infill drill pattern has demonstrated continuity of mineralised zones within this infill drilling area. The results provide another layer of confidence that the spatial distribution and tenor of gold within this test area are in line with the Namdini Mineral Resource expectations.

Drilling, Sampling, Sub-sampling, and Sample Analysis methods:

Reverse circulation percussion drilling (nominally 130mm i.e. 5¼ inch diameter) was usually 200m or less in depth. All reverse circulation holes were down-hole surveyed at 30m intervals.

Diamond core drilling was HQ in size in both weathered and fresh rock. All diamond holes were surveyed down-hole at 30m intervals. All HQ core was orientated.

The infill drilling comprised east-west trending traverses of easterly inclined holes. Hole spacing was approximately 25m by 25m.

All reverse circulation samples were collected at the drill site over 1m intervals and split using a multi-stage riffle splitter.

Diamond core was generally longitudinally sawn in half; with half sent for assaying, and half retained in core trays for future reference. One metre samples were taken and submitted to an independent laboratory for assaying. At the laboratory, both core and reverse circulation samples followed a standard procedure of drying, jaw crushing and pulverising by ring mill. The pulverised samples were thoroughly mixed ('mat-rolled') and then 200g of sub-sample was collected. Internal laboratory checks required at least 90% of the pulp passing 75µm. A 50g charge was produced for subsequent fire assay.

Very good recovery of both core and reverse circulation samples (>95%) were recorded and they are considered to be representative of the mineralisation defined by the drilling.

Cardinal used two laboratories for its sample submissions, SGS Ouagadougou Laboratory in Burkina Faso and SGS Tarkwa Laboratory in Ghana. The independent SGS commercial geochemical analytical laboratories are officially recognized by the South African National Accreditation System (SANAS) as meeting the requirements of the ISO/IEC 17025 standard for specific registered tests for the Minerals Industry.

As part of the Cardinal QAQC program, a suite of internationally accredited and certified reference materials ('standards') and locally sourced blanks were included in the sample submission sequence. The standards covered gold grade ranges expected at Namdini. Interlaboratory umpire analyses were also conducted. The sampling, sample preparation and analysis processes were found to be appropriate and acceptable for Mineral Resource estimation

Certified reference material (blanks and standards) were submitted into the sample stream at a rate of 1 in 20 samples. Duplicate samples of reverse circulation chips were taken at a rate of 1 in 22.

No employee, officer, director, or associate of Cardinal carried out any sample preparation on samples from the Namdini Project exploration programme. Drill core was transported from the drill site by a Cardinal vehicle to the secure core yard facility at the Bolgatanga Field Exploration Office.

All samples collected for assaying were retained in a locked, secure storage facility until collected and transported by the SGS laboratory personnel. Retained drill core was securely stored in the core storage facility and pulps and coarse rejects returned from the laboratories were securely stored in the exploration core logging area and at a nearby secure location in Bolgatanga, Ghana.

Drill hole collars were surveyed using differential GPS (DGPS), with most diamond holes and deeper RC holes down hole surveyed at intervals of generally around 30m using electronic multi-shot and gyroscopic equipment. The drilling at Namdini is considered to have been surveyed with sufficient accuracy for current estimates.

Cut-off grade(s) including the basis for the selected cut-off grade:

An estimated marginal cut-off grade was established at 0.5 g/t Au using an assumed long-term gold price of US$1,300/oz. The provided Mineral Resource was validated and used to develop a mining model, as the basis for a LOM plan and economic assessment.

Gold royalties were assumed at 5% of gold price, with payable gold estimated at 99.8% of doré exported. The net gold price was thus US$39.67 /g. The input processing cost provided in the ASX and TSX announcement on 18 April 2019 was US$14.30/t plus an additional US$1.50 /t allowed for stockpile reclaim giving a total of US$15.80 /t of mill feed (as dry tonnes). The tested overall process recovery utilised was 82%. Thus, the marginal cut-off grade ('COG') is estimated as: process cost / (net gold price * process recovery) giving 0.5 g/t Au (to one significant figure).

Using this marginal COG, the proportion of ore and the gold grade above the COG were defined in the mining model. The parcelled proportions of ore above COG within the blocks were then exported for open pit optimisation. The 0.5 g/t Au COG approximates an operational parameter that the Company believes to be applicable. This is in accordance with the guidelines of Reasonable Prospects for Eventual Economic Extraction in CIM and the JORC Code.

Mining and Metallurgical Methods and Parameters and other modifying factors considered to date:

Metallurgical testwork continued to focus on development of on the same flowsheet as presented in Cardinal's PFS study (ASX/TSX 18 September 2019). The flowsheet is described as a conventional primary crush, SABC, flotation, regrind and carbon-in-leach circuit.

The metallurgical testwork on fresh material was carried out by ALS Laboratory in Perth, Australia and at the Maelgwyn Laboratory in Johannesburg, South Africa. Positive leach results were returned from the Maelgwyn Mineral Services Africa (MMSA) metallurgical Laboratories in South Africa from pilot scale testwork utilising the Aachen^{TM} Shear Reactor (ASX/TSX Press Release dated 4 June 2019). Aachen^{TM} is a relatively simple, proven process being used several global gold producers and specifically in Africa. These operations have consistently demonstrated an uplift in gold recovery with Aachen^{TM}.

Mining costs were developed from first principles and a profit factor applied to estimate contract mining cost. The estimated base mining cost has an applied incremental cost with depth, to account for increased haulage costs and the depth of mining increases in line with standard mining cost principles. All costs have been determined on a US dollar ("US$") basis. Mining will be conducted by a mining contractor which would bear the total mining capital cost under an outsourced mining arrangement, with the costs recovered by the mining contractor on a cost per tonne mined basis.

Figure 1: Plan View of Namdini deposit showing drill hole locations and interpreted geology

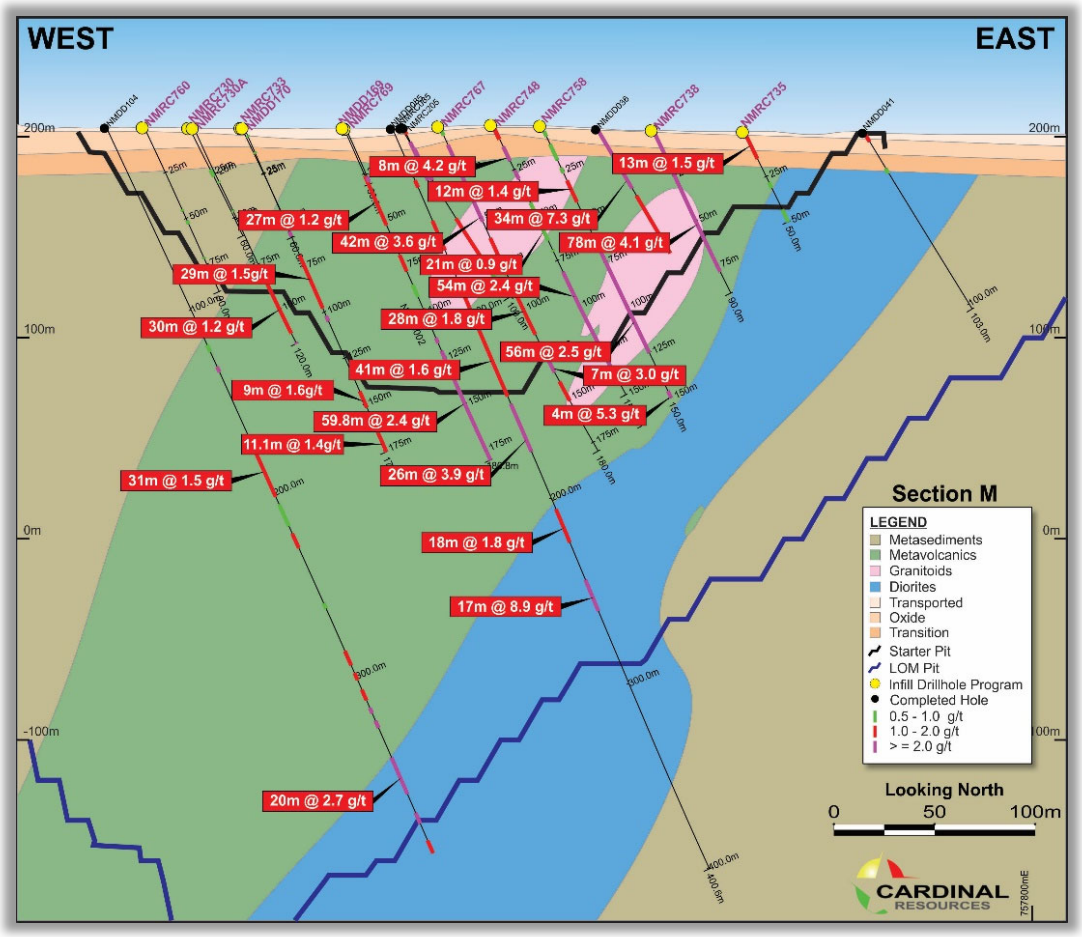

Figure 2: Cross Section showing down hole mineralised intersections of infill holes

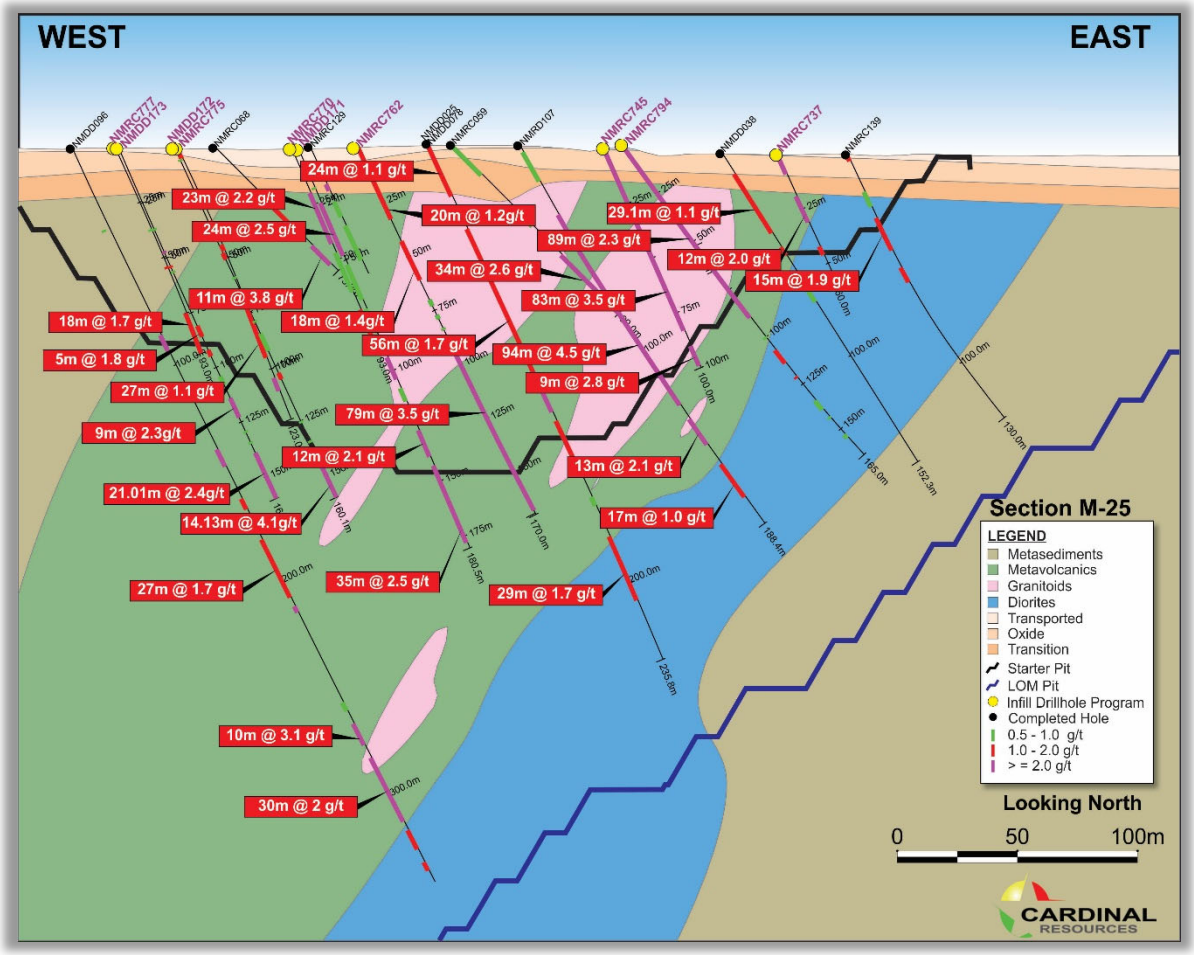

Figure 3: Cross Section showing down hole mineralised intersections of infill holes

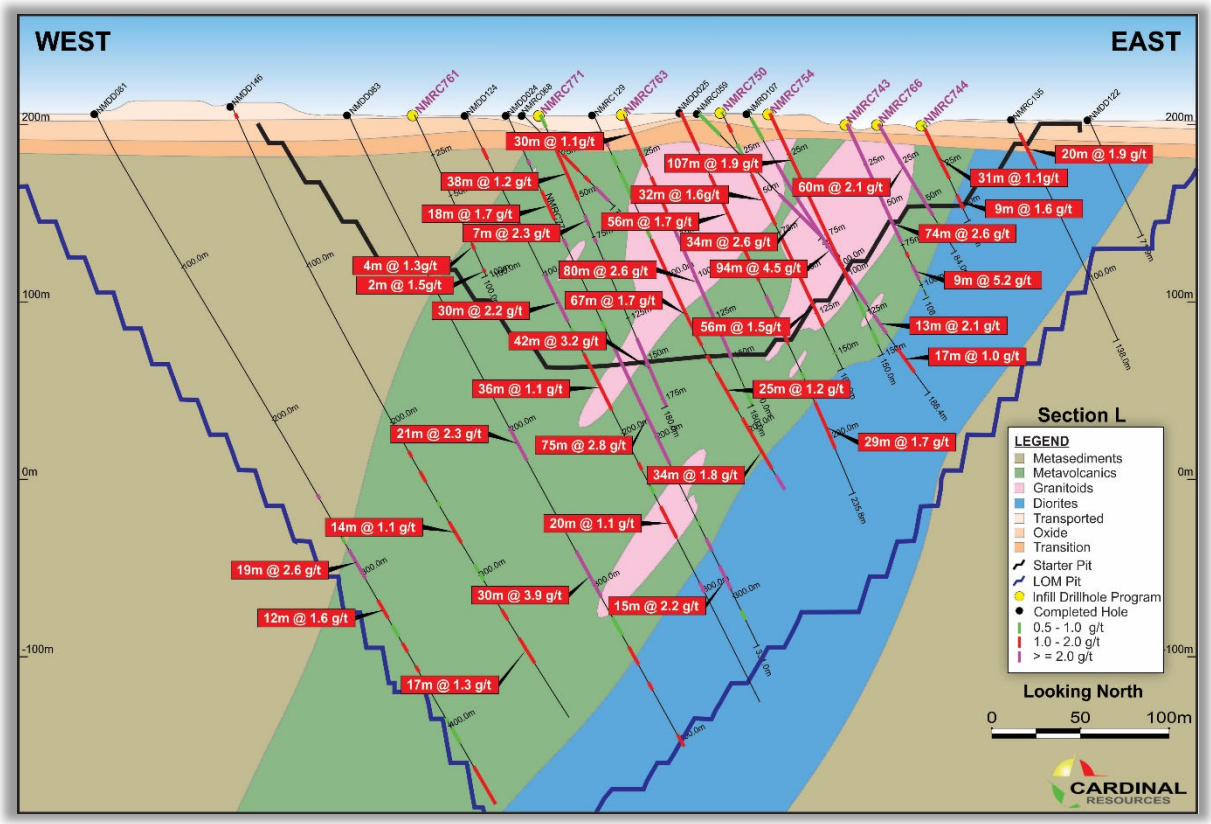

Figure 4: Cross Section showing down hole mineralised intersections of infill holes

ABOUT CARDINAL

Cardinal Resources Limited (ASX/TSX: CDV) is a West African gold-focused exploration and development Company that holds interests in tenements within Ghana, West Africa.

The Company is focused on the development of the Namdini Project, for which the Company has published a gold **Ore Reserve of 5.1Moz** (138.6 Mt @ 1.13 g/t Au; 0.5 g/t cut-off), inclusive of **0.4Moz Proved** (7.4 Mt @ 1.31 g/t Au; 0.5 g/t cut-off) and **4.7Moz Probable** (131.2 Mt @ 1.12 g/t Au; 0.5 g/t cut-off), and a soon to be completed Feasibility Study.

Exploration programmes are also underway at the Company's Bolgatanga (Northern Ghana) and Subranum (Southern Ghana) Projects.

Cardinal confirms that it is not aware of any new information or data that materially affects the information included in its announcement of the Ore Reserve of 3 April 2019. All material assumptions and technical parameters underpinning this estimate continue to apply and have not materially changed.

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Competent Person's / Qualified Person's Statement

The information in this press release that relates to Exploration Targets, Exploration Results, Mineral Resources and Ore Reserves is based on information compiled by Mr. Richard Bray, a Competent Person (Qualified Person) who is a Registered Professional Geologist with the Australian Institute of Geoscientists. Mr. Bray has more than five years' experience relevant to the styles of mineralisation and type of deposits under consideration and to the activity which is 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" and as a Qualified Person as defined by the NI43-101 instrument. Mr. Bray is a full-time employee of Cardinal and holds equity securities in the Company. Mr. Bray has consented to the inclusion of the matters in this report based on the information in the form and context in which it appears.

The information in this press release that relates to Exploration Targets, Exploration Results, Mineral Resources and Ore Reserves is based on information compiled by Mr. Ekow Taylor, a Competent Person (Qualified Person) who is a Chartered Professional Geologist with the Australasian Institute of Mining and Metallurgy. Mr. Ekow Taylor has more than five years' experience relevant to the styles of mineralisation and type of deposits under consideration and to the activity which is 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" and as a Qualified Person as defined by the NI43-101 instrument. Mr. Taylor is a full-time employee of Cardinal and holds equity securities in the Company. Mr. Taylor has consented to the inclusion of the matters in this report based on the information in the form and context in which it appears.

Both Mr Bray and Mr Taylor have worked on the Exploration at the Namdini Gold Project collaboratively and are jointly and severely responsible for the Exploration Results.

ASX Listing Rule 5.23.2

This report contains information extracted from the following reports which are available for viewing on the Company's website www.cardinalresources.com.au :

○ 04 June 2019	Positive Metallurgical Update on Namdini Project
○ 18 April 2019	Addendum to Namdini Ore Reserves Press Release
○ 10 April 2019	Feasibility Study & Project Finance Update
○ 03 April 2019	Cardinal's Namdini Ore Reserve Now 5.1Moz
○ 26 October 2018	Technical Report on Namdini Gold Project Filed on Sedar
○ 18 September 2018	Cardinal Namdini Pre-Feasibility Study 4.76Moz Ore Reserve
○ 12 December 2017	Cardinal Grade Control Drill Results Returned

The Company confirms it is not aware of any new information or data that materially affects the information included in this report relating to exploration activities and all material assumptions and technical parameters underpinning the exploration activities in those market announcements continue to apply and have not been changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcements. Cardinal confirms that it is not aware of any new information or data that materially affects the information included in its announcement of the Ore Reserve of 3 April 2019. All material assumptions and technical parameters underpinning this estimate continue to apply and have not materially changed.

Disclaimer

This ASX / TSX press release has been prepared by Cardinal Resources Limited (ABN: 56 147 325 620) ("Cardinal" or "the Company"). Neither the ASX or the TSX, nor their regulation service providers accept responsibility for the adequacy or accuracy of this press release.

This press release contains summary information about Cardinal, its subsidiaries and their activities, which is current as at the date of this press release. The information in this press release is of a general nature and does not purport to be complete nor does it contain all the information, which a prospective investor may require in evaluating a possible investment in Cardinal.

By its very nature exploration for minerals is a high-risk business and is not suitable for certain investors. Cardinal's securities are speculative. Potential investors should consult their stockbroker or financial advisor. There are a number of risks, both specific to Cardinal and of a general nature which may affect the future operating and financial performance of Cardinal and the value of an investment in Cardinal including but not limited to economic conditions, stock market fluctuations, gold price movements, regional infrastructure constraints, timing of approvals from relevant authorities, regulatory risks, operational risks and reliance on key personnel and foreign currency fluctuations.

Except for statutory liability which cannot be excluded and subject to applicable law, each of Cardinal's officers, employees and advisors expressly disclaim any responsibility for the accuracy or completeness of the material contained in this press release and excludes all liability whatsoever (including in negligence) for any loss or damage which may be suffered by any person as a consequence of any information in this Announcement or any error or omission here from. Except as required by applicable law, the Company is under no obligation to update any person regarding any inaccuracy, omission or change in information in this press release or any other information made available to a person nor any obligation to furnish the person with any further information. Recipients of this press release should make their own independent assessment and determination as to the Company's prospects, its business, assets and liabilities as well as the matters covered in this press release.

Forward-looking statements

Certain statements contained in this press release, including information as to the future financial or operating performance of Cardinal and its projects may also include statements which are 'forward-looking statements' that may include, amongst other things, statements regarding targets, anticipated timing of the feasibility study (FS) on the Namdini project, estimates and assumptions in respect of mineral resources and anticipated grades and recovery rates, production and prices, recovery costs and results, capital expenditures and are or may be based on assumptions and estimates related to future technical, economic, market, political, social and other conditions. These 'forward – looking statements' are necessarily based upon a number of estimates and assumptions that, while considered reasonable by Cardinal, are inherently subject to significant technical, business, economic, competitive, political and social

uncertainties and contingencies and involve known and unknown risks and uncertainties that could cause actual events or results to differ materially from estimated or anticipated events or results reflected in such forward-looking statements.

Cardinal disclaims any intent or obligation to update publicly or release any revisions to any forward-looking statements, whether as a result of new information, future events, circumstances or results or otherwise after today's date or to reflect the occurrence of unanticipated events, other than required by the Corporations Act and ASX and TSX Listing Rules. The words 'believe', 'expect', 'anticipate', 'indicate', 'contemplate', 'target', 'plan', 'intends', 'continue', 'budget', 'estimate', 'may', 'will', 'schedule' and similar expressions identify forward-looking statements.

All forward-looking statements made in this press release are qualified by the foregoing cautionary statements. Investors are cautioned that forward-looking statements are not guarantees of future performance and accordingly investors are cautioned not to put undue reliance on forward-looking statements due to the inherent uncertainty therein.

SCHEDULE 1 – DRILL RESULTS

The listed intercepts within the tables in Schedule 1, have a detailed explanation within the notes, to describe how the intercepts were calculated, using 0.5 g/t cut-off, which approximates the cut-off of Reasonable Prospects of Eventual Economic Extraction ("RPEEE") as per The Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves ("JORC Code") 2012 and Canadian Institute of Mining ("CIM") 2010 guidelines and internal dilution of no more than 3m at <0.5g/t Au.

Hole ID	Typ	Depth	Dip	Azim	Grid_ID	mEast	mNorth	mRL
NMDD169	DDH	180.7	-66.2	89.05	UTM_WGS84Zone_30 North	757,461.1	1,177,218.1	203.73
NMDD170	DDH	176.1	-66.5	92.36	UTM_WGS84Zone_30 North	757,410.5	1,177,229.3	203.99
NMDD171	DDH	180.4	-67.2	93.93	UTM_WGS84Zone_30 North	757,455.2	1,177,197.7	204.43
NMDD172	DDH	160.1	-65.6	91.67	UTM_WGS84Zone_30 North	757,405.3	1,177,205.7	204.40
NMDD173	DDH	160.0	-66.5	92.15	UTM_WGS84Zone_30 North	757,382.7	1,177,209.3	204.54
NMRC730	RC	36	-65.0	99.96	UTM_WGS84Zone_30 North	757,384.3	1,177,230.0	203.98
NMRC730	RC	120	-65.7	89.74	UTM_WGS84Zone_30 North	757,386.8	1,177,233.0	203.90
NMRC733	RC	60	-65.6	92.03	UTM_WGS84Zone_30 North	757,410.1	1,177,227.4	203.99
NMRC735	RC	50	-64.1	91.3	UTM_WGS84Zone_30 North	757,657.3	1,177,192.2	202.18
NMRC737	RC	60	-65.9	90.75	UTM_WGS84Zone_30 North	757,654.1	1,177,163.9	202.00
NMRC738	RC	90	-63.9	88.01	UTM_WGS84Zone_30 North	757,611.8	1,177,194.3	202.94
NMRC743	RC	108	-64.4	89.34	UTM_WGS84Zone_30 North	757,599.5	1,177,146.7	199.79
NMRC744	RC	60	-64.3	87.91	UTM_WGS84Zone_30 North	757,642.0	1,177,140.9	199.32
NMRC745	RC	100	-66.3	86.7	UTM_WGS84Zone_30 North	757,583.0	1,177,177.3	204.59
NMRC748	RC	150	-64.0	87.9	UTM_WGS84Zone_30 North	757,533.2	1,177,208.8	205.57
NMRC750	RC	160	-64.1	90.11	UTM_WGS84Zone_30 North	757,529.7	1,177,156.4	206.51
NMRC754	RC	150	-64.5	96.3	UTM_WGS84Zone_30 North	757,533.1	1,177,208.8	205.56
NMRC758	RC	150	-65.1	95.65	UTM_WGS84Zone_30 North	757,557.3	1,177,204.5	205.15
NMRC760	RC	90	-66.0	97.63	UTM_WGS84Zone_30 North	757,361.7	1,177,232.1	204.38
NMRC761	RC	100	-64.6	88.98	UTM_WGS84Zone_30 North	757,357.9	1,177,181.4	205.16
NMRC762	RC	170	-65.6	93.45	UTM_WGS84Zone_30 North	757,480.3	1,177,192.3	204.77
NMRC763	RC	180	-66.4	88.65	UTM_WGS84Zone_30 North	757,474.9	1,177,166.7	205.48
NMRC766	RC	84	-60.4	89.42	UTM_WGS84Zone_30 North	757,617.6	1,177,147.6	199.77
NMRC767	RC	180	-65.5	90.45	UTM_WGS84Zone_30 North	757,507.4	1,177,214.0	204.78
NMRC769	RC	30	-65.3	86.71	UTM_WGS84Zone_30 North	757,461.1	1,177,218.1	203.62
NMRC770	RC	93	-66.3	86.39	UTM_WGS84Zone_30 North	757,453.6	1,177,192.8	204.29
NMRC771	RC	180	-65.0	89.83	UTM_WGS84Zone_30 North	757,428.4	1,177,172.1	204.95
NMRC775	RC	123	-64.4	89.45	UTM_WGS84Zone_30 North	757,406.9	1,177,200.3	204.47
NMRC777	RC	93	-65.1	85.45	UTM_WGS84Zone_30 North	757,380.6	1,177,201.1	204.70
NMRC794	RC	165	-53.9	99.94	UTM_WGS84Zone_30 North	757,586.9	1,177,174.4	204.61

Table 4: Drill hole Collar data

Hole_ID	mFrom	mTo	mLength	Au_ppm	Section
NMRC730A	84	101	17	1.1	M
NMRC730A	105	114	9	1.7	M
NMRC730A	114	120	6	0.6	M
NMRC735	6	15	9	2.1	M
NMRC735	28	31	3	0.6	M
NMRC735	43	46	3	1.0	M
NMRC737	2	9	7	2.4	M-25
NMRC737	19	27	8	2.9	M-25
NMRC737	42	46	4	1.1	M-25
NMRC738	0	78	78	4.1	M
NMRC743	0	74	74	2.6	L
NMRC743	80	83	3	1.5	L
NMRC743	88	97	9	5.2	L
NMRC744	0	31	31	1.1	L
NMRC744	48	53	5	2.5	L
NMRC745	0	83	83	3.5	M-25
NMRC745	90	99	9	2.8	M-25
NMRC748	0	5	5	2.7	M
NMRC748	12	20	8	4.2	M
NMRC748	25	30	5	2.8	M
NMRC748	43	64	21	0.9	M
NMRC748	81	99	18	3.5	M
NMRC748	103	121	18	2.9	M
NMRC748	126	132	6	1.7	M
NMRC750	0	10	10	1.1	L
NMRC750	10	13	3	0.5	L
NMRC750	22	27	5	0.7	L
NMRC750	39	71	32	1.6	L
NMRC750	78	123	45	1.7	L
NMRC754	0	107	107	1.9	L
NMRC754	135	140	5	1.6	L
NMRC758	3	6	3	0.7	M
NMRC758	14	19	5	1.2	M
NMRC758	23	26	3	0.6	M
NMRC758	30	42	12	1.4	M
NMRC758	69	76	7	3.1	M
NMRC758	83	125	42	2.8	M
NMRC758	146	150	4	5.3	M
NMRC761	64	67	3	0.7	L
NMRC762	3	9	6	1.6	M-25
NMRC762	13	33	20	1.2	M-25
NMRC762	43	57	14	1.8	M-25
NMRC762	70	73	3	0.6	M-25
NMRC762	99	168	69	3.9	M-25
NMRC763	3	33	30	1.1	L
NMRC763	39	58	19	1.1	L
NMRC763	71	78	7	0.6	L
NMRC763	85	135	50	3.4	L
NMRC763	141	151	10	3.4	L
NMRC763	169	172	3	0.6	L

Hole_ID	mFrom	mTo	mLength	Au_ppm	Section
NMRC763	174	177	3	0.6	L
NMRC766	0	60	60	2.1	L
NMRC766	65	74	9	0.9	L
NMRC767	0	10	10	0.5	M
NMRC767	10	50	40	3.7	M
NMRC767	61	75	14	1.3	M
NMRC767	89	114	25	2.0	M
NMRC767	128	135	7	3.0	M
NMRC767	140	151	11	1.1	M
NMRC769	26	29	3	3.7	M
NMRC770	22	43	21	2.4	M-25
NMRC770	51	65	14	0.7	M-25
NMRC770	77	93	16	2.1	M-25
NMRC771	0	8	8	0.8	L
NMRC771	18	28	10	1.3	L
NMRC771	33	53	20	1.4	L
NMRC771	62	66	4	3.7	L
NMRC771	76	79	3	2.2	L
NMRC771	138	180	42	3.2	L
NMRC775	0	5	5	1.5	M-25
NMRC775	44	47	3	1.8	M-25
NMRC775	68	95	27	1.1	M-25
NMRC775	104	110	6	4.0	M-25
NMRC777	80	93	13	2.2	M-25
NMRC794	0	89	89	2.3	M-25
NMRC794	106	113	7	1.8	M-25
NMRC794	133	138	5	0.9	M-25
NMDD169	32	53	21	1.1	M
NMDD169	69	78	9	1.1	M
NMDD169	85	92	7	0.8	M
NMDD169	100	105	5	1.6	M
NMDD169	114	117	3	2.3	M
NMDD169	127	142	15	2.0	M
NMDD169	142	153	11	0.7	M
NMDD169	153	181	28	3.6	M
NMDD170	56	59	3	2.6	M
NMDD170	69	91	22	1.8	M
NMDD170	102	105	3	4.3	M
NMDD170	147	152	5	2.6	M
NMDD170	165	176	11	1.4	M
NMDD171	24	44	20	2.9	M-25
NMDD171	54	58	4	2.7	M-25
NMDD171	58	127	69	0.7	M-25
NMDD171	127	139	12	2.1	M-25
NMDD171	143	164	21	2.7	M-25
NMDD171	169	178	9	3.1	M-25
NMDD172	22	28	6	1.4	M-25
NMDD172	48	51	3	1.4	M-25
NMDD172	85	89	4	1.6	M-25
NMDD172	103	106	3	1.5	M-25

Hole_ID	mFrom	mTo	mLength	Au_ppm	Section
NMDD172	146	160	14	4.1	M-25
NMDD173	81	86	5	1.8	M-25
NMDD173	92	95	3	1.4	M-25
NMDD173	104	108	4	0.9	M-25
NMDD173	114	120	6	3.3	M-25
NMDD173	139	160	21	2.4	M-25

Table 5: Summary of individual intercepts.

Notes:

- Intersections are reported above 0.5 g/t Au using a minimum width of 3m, with no more than 3m of internal dilution of less than 0.5 g/t Au.
- Intervals are Reverse Circulation drill cuttings and Diamond half core which are both sampled every 1m
- Samples are analyzed for Au (SGS Lab FAA505 method) which is a 50g fire assay fusion with AAS instrument finish.
- Grid coordinates are in WWGS84 Zone 30 North.

APPENDIX 1 – JORC CODE 2012 EDITION – TABLE 1

Section 1 – Sampling Technique and Data

Criteria	JORC Code Explanation	Commentary
Sampling techniques	*Nature and quality of sampling (e.g. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc.). These examples should not be taken as limiting the broad meaning of sampling.*	In fill resource drilling comprises 5 diamond core holes and 25 Reverse Circulation (RC) drill holes totalling 3,640 m. Diamond core sampling was half-core sampling of HQ core size. RC drilling utilised face-sampling hammers of nominally 127 to 140 mm diameter, with samples collected by riffle splitting. Additional drilling including exploration and sterilisation drilling outside the Mineral Resource area, and 10m by 15m spaced trial RC grade control drilling was not included in the Mineral Resource estimation dataset.
	Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.	Field sampling followed Cardinal Namdini protocols including industry standard quality control procedures. Sample representativity is ensured by: RC samples: Collecting 1m samples from a cyclone, passing them through a 3-tier riffle splitter, and taking duplicate samplers every 20th sample. Diamond Core: For drilling prior to approximately April 2016 core was halved for sub-sampling with a diamond saw. From approximately April 2016 to June 2017 core was quartered for assaying. For drilling after June 2017 diamond core was halved for sub-sampling. Sample intervals range from 0.2 to 1.8 m in length, with majority of samples assayed over 1 m intervals.
	Aspects of the determination of mineralisation that are Material to the Public Report. *In cases where 'industry standard' work has been done this would be relatively simple (e.g. 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases, more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (e.g. submarine nodules) may warrant disclosure of detailed information.*	After oven drying diamond core samples were crushed using a jaw crusher, with core and RC samples crushed to a -2mm size using an RSD Boyd crusher. Riffle split sub-samples were pulverised to nominally 85% passing 75 microns. Pulverised samples were fire assayed for gold using a 50-gram charge with an atomic absorption finish, with a detection limit of 0.01 g/t Au. Assays of greater than 100 g/t were re-analysed with a gravimetric finish.
Drilling techniques	*Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka, sonic, etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc.).*	Diamond core drilling is completed with core size of HQ with tipple tube drilling through surficial saprolite and standard tubes for deeper drilling. Core was orientated using a digital Reflex ACT II RD orientation tool. Reverse circulation drilling utilised face sampling hammers of nominal 127 to 140mm diameter. The Mineral Resource drilling comprises east-west trending traverses of holes inclined towards the east at generally 45° to 65° approximately perpendicular to mineralisation.

Criteria	JORC Code Explanation	Commentary
		All drill collars are surveyed using an RTK GPS with most diamond holes and deeper RC holes downhole surveyed at intervals of generally around 30 m using electronic multi-shot and gyroscopic equipment.
Drill sample recovery	*Method of recording and assessing core and chip sample recoveries and results assessed.*	Recovered core lengths were measured for 98% of the diamond resource drilling, showing generally very high recoveries, which average 99.8% for mineralised domain samples. RC sample recoveries were assessed by weighing recovered sample weights for 1m intervals. For the combined dataset estimated recoveries average 85% which is considered acceptable.
	Measures taken to maximise sample recovery and ensure representative nature of the samples.	All drilling activities were supervised by company geologists. Measures taken to maximise diamond core recovery included use of HQ core size with triple tube drilling through the saprolite zone, and having a geologist onsite to examine core and core metres marked and orientated to check against the driller's blocks and ensuring that all core loss is considered. RC sample recovery was maximised by utilising drilling rigs with sufficient compressor capacity, including auxiliary compressors to provide dry, high recovery samples. In cases where the RC rig was unable to maintain dry samples the hole was continued by diamond core drilling. RC sample condition was routinely logged by field geologists with less than 0.2% of resource RC samples logged as moist or wet.
	Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	No relationship is seen to exist between sample recovery and grade, and no sample bias is due to preferential loss/gain of any fine/coarse material due to the generally high sample recoveries obtained by both drilling methods employed.
Logging	*Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.*	All drill holes were geologically logged, and selected diamond core was geotechnically logged. The lithology, alteration and geotechnical characteristics of core are logged directly to a digital format on a Field Toughbook laptop logging system following procedures and using Cardinal geologic codes. Data is imported into Cardinal's central database after validation in Maxwell LogChief™ software. The geological and geotechnical logging is of appropriate detail to support the Mineral Resource estimation, and mining and metallurgical studies.
	Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc.) photography.	Logging was both qualitative and quantitative depending on the field being logged. RC chips in trays and HQ core were photographed both in dry and wet form.
	The total length and percentage of the relevant intersections logged.	Geological logs are available for 86,728 (99.5%) of the resource drilling
Sub-sampling techniques	*If core, whether cut or sawn and whether quarter, half or all core taken.*	For sampling, diamond core was either quartered or halved with these sample types providing 36% and 64% of mineralised domain core samples, respectively.

Criteria	JORC Code Explanation	Commentary
and sample preparation	*If non-core, whether riffled, tube sampled, rotary split, etc. and whether sampled wet or dry.*	RC samples were split using a three-tier riffle splitter. Rare wet samples were air dried prior to riffle splitting.
	For all sample types, the nature, quality, and appropriateness of the sample preparation technique.	Sample preparation and gold assaying was undertaken by independent commercial laboratories. Most primary samples were submitted to SGS Ouagadougou or SGS Tarkwa for analysis by fire-assay with assays from these laboratories contributing around one third and two thirds of the estimation dataset, respectively. Samples analysed by Intertek Tarkwa provide around 0.5% of the estimation dataset. After oven drying diamond core samples were crushed using a jaw crusher, with core and RC samples crushed to minus 2mm using an RSD Boyd crusher. Riffle split sub-samples were pulverised to nominally 85% passing 75 microns utilising an LM2 pulveriser. The sample preparation is of appropriately high quality for Mineral Resource estimation.
	Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.	Procedures adopted to maximise representivity of samples include crushing and pulverising of samples prior to further sub-sampling by appropriate splitting techniques. Sample preparation equipment was routinely cleaned with crushers and pulveriser flushed with barren material at the start of every batch.
	Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate/second-half sampling.	Measures taken to ensure sample representivity include use of appropriate sub-sampling methods, including riffle splitting for RC samples and halving, or quartering diamond core with a diamond saw. RC field duplicates were routinely collected, and selected samples were submitted for inter-laboratory check assaying.
	Whether sample sizes are appropriate to the grain size of the material being sampled.	Sample sizes are appropriate for the grain size of the sampled material.
Quality of Assay data and laboratory tests	*The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.*	Samples are analysed for gold by lead collection fire assay of a 30 or 50g charge with AAS finish; the assay charge is fused with the litharge-based flux, cupelled and prill dissolved in aqua regia and gold tenor determined by flame AAS. Fire assay is considered a total assay technique. The quality of the Fire Assaying and laboratory procedures are considered to be entirely appropriate for this deposit type. The analytical method is considered appropriate for this mineralisation style and is of industry standard. Pulverised samples were fire assayed for gold using a 30 or 50-gram charge with an atomic absorption finish, with a detection limit of 0.01 g/t. Assays of greater than 100 g/t were re-analysed with a gravimetric finish. The fire assays represent total analyses and are appropriate for the style of mineralisation. They are of appropriately high quality for Mineral Resource estimation.
	For geophysical tools, spectrometers, handheld XRF instruments, etc., the parameters used in determining the analysis including instrument make and	No hand-held geophysical tools were used.

Criteria	JORC Code Explanation	Commentary
	model, reading times, calibrations factors applied and their derivation, etc.	
	Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e. lack of bias) and precision have been established.	Monitoring of sample preparation and analysis included industry standard methods comprising routine submission of certified reference standards, coarse and fine blanks, and inter-laboratory repeats. These procedures have confirmed the reliability and accuracy of the sample preparation and analysis with sufficient confidence for the Mineral Resource estimation. Acceptable levels of accuracy and precision have been established.
Verification of sampling and assaying	*The verification of significant intersections by either independent or alternative company personnel.*	Significant intersections have been verified by alternative company personnel.
	The use of twinned holes.	None of the drill holes in this report are twinned.
	Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols.	Primary data were captured on field tough book laptops using LogChief™ Software. The software has validation routines and data was then imported onto a secure central database.
	Discuss any adjustment to assay data.	No adjustments were made to assays.
Location of data points	*Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.*	All drill collars are surveyed by RTK GPS (±10mm of accuracy) with most diamond holes and deeper RC holes downhole surveyed at intervals of generally around 30 m using electronic multi-shot and gyroscopic equipment.
	Specification of the grid system used.	Coordinate and azimuth are reported in UTM WGS84 Zone 30 North.
	Quality and adequacy of topographic control.	Topographic control was established from aerial photography using 12 surveyed control points. A 1m ground resolution DTM was produced by Sahara Mining Services from a UAV survey using a DJI Inspire 1 UAV at an altitude of 100m. Topographic control is adequate for estimation of Mineral Resources and Ore Reserve.
Data spacing and distribution	*Data spacing for reporting of Exploration Results.*	Drill spacing is at 50m x 100m line spacing with infill to 50m x 50m and 10m x 15m in selected areas.
	Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	Drill data spacing and distribution are sufficient to establish geological and grade continuity for the Mineral Resource and Ore Reserve classifications were applied utilising this information. Mineralisation tested by generally 50m by 50m and closer spaced drilling is assigned to the Indicated category, with estimates for zones with more closely spaced drilling classified as Measured. Estimates for panels not informed consistently 50 by 50 m drilling are assigned to the Inferred category.
Orientation of data in relation to geological structure	*Whether sample compositing has been applied.*	Drill hole assays were composited to 2m down-hole intervals for Mineral Resource estimation.
	Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.	Most resource drilling was inclined at around 45^0 to 60^o to the east, providing un-biased sampling of the mineralisation.
	If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to	

Criteria	JORC Code Explanation	Commentary
	have introduced a sampling bias, this should be assessed and reported if material.	
Sample security	*The measures taken to ensure sample security.*	Diamond core and RC samples were transported from the drill site by Cardinal vehicle to secure storage at the Bolgatanga field exploration office. Core yard technicians, field technicians and geologists ensured samples were logged, prepared, and securely stored until collected for transportation to the assay laboratories by personnel employed by the assay laboratory. All samples submitted for assaying were retained in a locked secure shed until collected by laboratory personnel for transport to assay laboratory. Retained drill core and RC chips are securely stored in the core storage compound, and pulps are securely stored in the core shed A sign-off process between Cardinal and the laboratory truck driver ensured samples and paperwork correspond. The samples were then transported to the laboratory where they were receipted against the dispatch documents. The assay laboratories were responsible for samples from the time of collection from the exploration office.
Audits or reviews	*The results of any audits or reviews of sampling techniques and data.*	Data is audited by Maxwell Geoservices (Perth), who have not made any other recommendations.

Section 2 – Reporting of Exploration Results

(Criteria listed in section 1 will also apply to this section where relevant)

Criteria	JORC Code Explanation	Commentary
Mineral Tenement and Land Status	*Type, name/reference number, location and ownership including agreements or material issues with third parties including joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.*	The Mining Licence covering Cardinal's Namdini Project over an area of approximately 19.54 sq. km is located in the Northeast region of Ghana. The previous holder of the Mining Licence, Savannah Mining Ghana Limited (Savanah) completed an initial Environmental Impact Statement (EIS) and lodged the EIS with the Environmental Protection Agency of Ghana. The application by Savannah for a Large-Scale Mining Licence over an area of approximately 19.54 sq. km in the Upper East Region of Ghana covering Cardinal's Namdini Project has been granted by the Minister of Lands and Natural Resources of Ghana. Savannah applied for the assignment of this Large-Scale Mining Licence to Cardinal Namdini Mining Limited (Namdini), a wholly owned Subsidiary of Cardinal. The assignment has been granted by the Minister of Lands and Natural Resources of Ghana.
	The security of the tenure held at the time of reporting along with any known impediments to obtaining a license to operate in the area.	All tenements are current and in good standing. The Mining Lease for Namdini was granted for an initial 15 years which is renewable.
Exploration Done by Other Parties	*Acknowledgment and appraisal of exploration by other parties.*	Aside from Cardinal there has been no recent systematic exploration undertaken on the Namdini Project.
Geology	*Deposit type, geological setting, and style of mineralisation*	The deposit type comprises gold mineralisation within sheared and highly altered rocks containing sulphides; mainly pyrite with minor arsenopyrite. The geological setting is a Paleoproterozoic Greenstone Belt comprising Birimian metavolcanics, volcaniclastics and metasediments located in close proximity to a major 30 km ~N-S regional shear zone with splays. The style of mineralisation is hydrothermal alteration containing disseminated gold-bearing sulphides.
Drill hole information	*A summary of all information material to the understanding of the exploration results including tabulation of the following information for all Material drill holes:* • *Easting and northing of the drill hole collar* • *Elevation or RL (Reduced Level – elevation above sea level in meters) of the drill hole collar* • *Dip and azimuth of the hole* • *Down hole length and interception depth* • *Hole length*	A summary of drill hole information is provided in this document..

Criteria	JORC Code Explanation	Commentary
	If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.	There has been no exclusion of information.
Data aggregation methods	*In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually Material and should be stated.* *Where aggregated intercepts incorporate short lengths of high-grade results and longer lengths of low-grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.* *The assumptions used for any reporting of metal equivalent values should be clearly stated.*	No weighting averaging techniques nor cutting of high grades have yet been undertaken. Aggregated intercepts incorporating minimum 3m lengths of high-grade results above 0.5g/t Au are calculated to include no more than intervals of 3m below grades of <0.5 g/t Au when assay results are reported.
Relationship between mineralisation widths and intercept lengths	*These relationships are particularly important in the reporting of exploration results.* *If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.* *If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (e.g. 'down hole length, true width not known').*	The resource drilling comprises east-west trending traverses of holes inclined towards the east at generally 45^0 to 65^o approximately perpendicular to mineralisation.
Diagrams	*Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported. These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.*	Appropriate maps with scale are included within the body of the announcement
Balanced Reporting	*Where comprehensive reporting of all Exploration Results is not practical, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.*	The accompanying document is considered to represent a balanced report.
Other substantive exploration data	*Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observation; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment;*	Density measurements available for Namdini comprise 11,047 immersion measurements performed by either Cardinal (9,652) or SGS Tarkwa or Ouagadougou (1,395) on diamond core. Oxidised and porous samples were wax-coated prior to density measurement.

Criteria	JORC Code Explanation	Commentary
	metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	
Further Work	*The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large – scale step – out drilling).* *Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.*	Exploration drilling will continue to target projected lateral and depth extensions of the mineralisation along with infill drilling designed to increase confidence in Mineral Resource estimates.