

Chapter 1
Table of contents

ESMERALDA GRAPHITE PROJECT

aarc ENVIRONMENTAL SOLUTIONS
APEM Group

GRAPHINEX

Table of Contents

2 Executive summary 1

2.1 Project proponent 1

2.2 Project summary 1

2.3 Project description 3

2.4 Assessment pathway 4

2.5 Community consultation and stakeholder engagement 5

2.6 Environmental assessment 5

2.7 Proposed general environmental management 21

2.8 TOR Reconciliation table 23

3 Introduction 1

3.1 Project description 3

3.2 Project proponent 6

3.3 Environmental impact assessment process 10

3.4 Public consultation process 12

3.5 TOR reconciliation table 14

4 Project Description 1

4.1 Proposed development 1

4.2 Site description 12

4.3 Project Phases 36

4.4 Environmentally relevant activities 83

4.5 Notifiable activities 84

4.6 TOR reconciliation table 85

5 Project rationale and alternatives 1

5.1 Project rationale 1

5.2 Project design 2

5.3 Project alternatives 4

5.4 TOR reconciliation table 16

6 Legislative requirements and project approvals 1

6.1 Overall framework 1

6.2 Commonwealth legislation 3

6.3 Queensland legislation 5

6.4 Local Legislation 32

6.5 Project consistency with Approvals and outcomes 32

6.6 TOR Reconciliation table 40

7 Stakeholder Consultation and Engagement 1

7.1 Introduction 1

7.2 Consulted parties 1

7.3 Methods of consultation 4

7.4 Potential impacts 4

7.5 Mitigation measures 8

7.6 TOR Reconciliation table 13

8 Tenure including Native Title 1

8.1 Environmental objectives 1

8.2 Existing environment 1

8.3 Potential impacts 11

8.4 Mitigation measures 11

8.5 TOR Reconciliation table 13

9 Land use planning 1

9.1 Environmental objectives 1

9.2 Existing environment 1

9.3 Potential impacts 7

9.4 Mitigation and management measures 9

9.5 TOR Reconciliation table 16

10 Land – geology, geomorphology, topography and soils 1

10.1 Environmental objectives 1

10.2 Existing environment 2

10.3 Potential impacts 38

10.4 Mitigation and management measures 52

10.5 TOR Reconciliation table 61

11 First Nations Cultural Heritage 1

11.1 Environmental objectives 1

11.2 Legislation and guidelines 1

11.3 Assessment methodology 2

11.4 Existing Environment 3

11.5 Impact Assessment 7

11.6 Mitigation and management measures 8

11.7 TOR Reconciliation table 10

12 Non-Indigenous cultural heritage 1

12.1 Environmental objective 1

12.2 Legislation 1

12.3 Assessment methodology 3
12.4 Description of existing values 3
12.5 Potential impacts 7
12.6 Mitigation and management measures 7
12.7 TOR Reconciliation table 11

13 Rehabilitation and closure 1
13.1 Relevant policy and legislation 1
13.2 Rehabilitation planning 2
13.3 Rehabilitation Strategy 13
13.4 Monitoring and maintenance 23
13.5 Closure and relinquishment 24
13.6 TOR Reconciliation table 25

14 Water resources 1
14.1 Legislation and Policy 1
14.2 Surface water 6
14.3 Groundwater 37
14.4 TOR Reconciliation table 97

15 Water quality 1
15.1 Surface water 1
15.2 Groundwater 41
15.3 TOR Reconciliation table 77

16 Flooding and regulated structures 2
16.1 Environmental objectives and performance outcomes 2
16.2 Flooding 3
16.3 Regulated structures 35
16.4 Potential impacts 42
16.5 Mitigation, monitoring and management 43
16.6 TOR Reconciliation table 46

17 Waste 1
17.1 Environmental objectives 1
17.2 Legislation and guidelines 3
17.3 Existing Environment 5
17.4 Potential impacts 24
17.5 Waste avoidance, mitigation and management 28
17.6 Non-mineral waste management 31
17.7 Mineral waste management 47
17.8 Performance monitoring and review 58

17.9 TOR Reconciliation table 59

18 Flora and Fauna 1

18.1 Environmental objectives 2
18.2 Legislation and guidelines 3
18.3 Regional and local Setting 9
18.4 Assessment methodology 12
18.5 Existing environment 28
18.6 Potential impacts 61
18.7 Potential impacts to prescribed environmental matters 85
18.8 Environmental Offset Strategy 98
18.9 TOR Reconciliation table 100

19 Biosecurity 1

19.1 Environmental objectives 1
19.2 Existing environment 1
19.3 Impact assessment 5
19.4 Biosecurity mitigation and management measures 8
19.5 TOR Reconciliation table 14

20 Social 1

20.1 Social objectives 1
20.2 Project Legislative Context 1
20.3 Social Impact Assessment 2
20.4 Mitigation and management measures 22
20.5 SIMP monitoring 38
20.6 TOR Reconciliation table 39

21 Economics 1

21.1 Environmental objectives 1
21.2 Existing economic environment 1
21.3 Potential economic impacts 12
21.4 Mitigation and management measures 21
21.5 TOR Reconciliation table 23

22 Hazards, health and safety 1

22.1 Scope 1
22.2 Objectives and performance outcomes 1
22.3 Risk assessment methodology 2
22.4 Risk Identification 8
22.5 Impact Assessment 19
22.6 Consultation 23

22.7 Mitigation Measures 24
22.8 Effectiveness of risk controls 28
22.9 Meeting environmental objectives and performance outcomes 28
22.10 Monitoring auditing and reporting 29
22.11 TOR Reconciliation table 30

23 Air quality 1
23.1 Environmental objectives 1
23.2 Legislation and guidelines 1
23.3 Existing environment 3
23.4 Impact assessment 9
23.5 Mitigation measures 29
23.6 TOR Reconciliation table 31

24 Noise and vibration 1
24.1 Environmental objectives 1
24.2 Existing environment 4
24.3 Impact assessment 9
24.4 Management and mitigation measures 25
24.5 TOR Reconciliation table 28

25 Traffic and transport 1
25.1 Environmental objectives 1
25.2 Total transport task 1
25.3 Road transport 3
25.4 Rail transport 16
25.5 Air transport 19
25.6 Sea transport and Port Facilities 20
25.7 Other known projects 20
25.8 TOR Reconciliation table 23

26 Climate 1
26.1 Existing environment 1
26.2 Impact assessment 15
26.3 Mitigation measures 21
26.4 Effectiveness of risk controls 23
26.5 TOR Reconciliation table 24

27 Greenhouse gas 1
27.1 Abatement Plan 1
27.2 Environmental objectives and performance outcomes 2
27.3 Legislation and guidelines 2

27.4 Existing environment 4
27.5 Impact assessment 6
27.6 Emissions inventory 11
27.7 Mitigation measures 22
27.8 Risks and likely magnitude of impacts on environmental values 34
27.9 TOR reconciliation table 37

28 Visual amenity 1
28.1 Environmental objectives 1
28.2 Existing environment 1
28.3 Methodology 16
28.4 Potential impacts 18
28.5 Mitigation and management measures 29
28.6 TOR Reconciliation table 30

29 Cumulative impact 1
29.1 Environmental objectives 1
29.2 Existing environment 1
29.3 Potential impacts 3
29.4 Cumulative impact assessment 3
29.5 Conclusion 34
29.6 TOR Reconciliation table 35

30 Environmental management plans 1
30.1 Introduction 1
30.2 Legislative context 1
30.3 Environmental Management System strategic framework 3
30.4 TOR Reconciliation table 30

31 Conclusions and commitments 1
31.1 Project impacts and management measures summary 1
31.2 Commitments 17
31.3 Overall Project impact and opportunities assessment 36
31.4 TOR Reconciliation table 42

32 Proposed Environmental Authority Conditions 1
32.1 Schedule A – General 2
32.2 Schedule B – Air 5
32.3 Schedule C – Waste 5
32.4 Schedule D – Noise 7
32.5 Schedule E – Groundwater 7
32.6 Schedule F –Surface Water 12

32.7 Schedule G –Sewage treatment 18

32.8 Schedule H –Land and Biodiversity 19

32.9 Schedule I –Structures 21

33 References 1

List of Appendices

Appendix A. Air Quality Assessment
Appendix B. Greenhouse Gas and Decarbonisation Technical Report
Appendix C. Public Consultation Report
Appendix D. Aquatic Ecology Assessment
Appendix E. Terrestrial Ecology Assessment
Appendix F. Stygofauna Assessment
Appendix G. Groundwater Dependent Ecosystem Assessment
Appendix H. Soils and Land Suitability Assessment
Appendix I. Noise and Vibration Impact Assessment
Appendix J. Social Impact Management Plans
Appendix K. Surface Water Assessment
Appendix L. Groundwater Impact Assessment
Appendix M. Land-based Effluent Disposal Assessment Report
Appendix N. Transport Impact Assessment
Appendix O. Social Impact Assessment
Appendix P. Economic Impact Assessment[1]
Appendix Q. Non-indigenous Cultural Heritage Environmental Impact Assessment
Appendix R. Groundwater Impact Assessment Peer Review
Appendix S. Erosion Stability Assessment (WEPP)
Appendix T. Progressive Rehabilitation and Closure Plan
Appendix U. Geochemistry Assessment of Mine Materials and Tailings
Appendix V. Pit Void Water Quality Modelling
Appendix W. Technical Report for Tailings Storage Facilities
Appendix X. Watercourse Diversion Functional Design Report
Appendix Y. Noise and Vibration Management Plan

List of Attachments

Attachment 1. Terms of Reference
Attachment 2. Terms of Reference – Reconciliation Table
Attachment 3. Contaminated Land Register
Attachment 4. Offset strategy

List of Figures

Figure 3-1: Coordinated project process flowchart (OCG 2026) 11
Figure 4-1: Project location 3
Figure 4-2: Project infrastructure layout 6
Figure 4-3: Project transport corridor 7
Figure 4-4: Underlying and adjoining land tenure 13
Figure 4-5: Underlying and adjoining resource tenure 15

[1] A commercial-in-confidence version of Appendix P (Technical Report – Economic Impact Assessment) has been provided separately to the Coordinator-General to support the evaluation of the EIS. Appendix P contains commercially sensitive information relating to Graphinex's project economics and is therefore not publicly available.

Figure 4-6: Project connection to Flinders Highway 17
Figure 4-7: Topography and hydrological context 21
Figure 4-8: Watercourses and wetland areas 22
Figure 4-9: Satellite imagery (8th January 2026) 23
Figure 4-10: Satellite imagery (12th January 2026) 24
Figure 4-11: 9am Wind speed and direction, Georgetown, Queensland 26
Figure 4-12: Regional geology and fault line 28
Figure 4-13: Stratigraphy and target resource 29
Figure 4-14: Soil profile classes and observation sites 33
Figure 4-15: Mine site haul road cross-section 40
Figure 4-16: Service road cross-section 40
Figure 4-17: Process flow from ROM to graphite concentrate through MPP 42
Figure 4-18: Mine progression Year -1 50
Figure 4-19: Mine progression Year 1 51
Figure 4-20: Mine progression Year 2 52
Figure 4-21: Mine progression Year 3 53
Figure 4-22: Mine progression Year 4 54
Figure 4-23: Mine progression Year 5 55
Figure 4-24: Mine progression Year 10 56
Figure 4-25: Mine progression Year 15 57
Figure 4-26: Mine Progression Year 20 58
Figure 4-27: Mine progression Year 25 59
Figure 4-28: Mine progression Year 30 60
Figure 4-29: Mine progression Year 35 61
Figure 4-30: Mine progression Year 40 62
Figure 4-31: Mine progression Year 45 63
Figure 4-32: Mine progression Year 50 64
Figure 4-33: Mine progression Year 53 65
Figure 4-34: Simplified MPP Process flow diagram 70
Figure 4-35: Post-mining land use - production area 78
Figure 4-36: Post-mining land use - transport corridor 79
Figure 4-37: Final landform design 82
Figure 5-1: Disturbance extent comparison 6
Figure 7-1: Project presentation material 3
Figure 8-1: Existing and expected tenure layout 3
Figure 8-2: Underlying and adjoining resource tenure 6
Figure 8-3: Native Title Area QUD6109/1998 and QUD6020/2001 10
Figure 9-1: Underlying and adjacent land use 3
Figure 9-2: Proposed PMLUs - Mining and production area 13
Figure 9-3: Proposed PMLUs - Transport corridor 14
Figure 10-1: Regional topography 4
Figure 10-2: Stratigraphy and target resource 9
Figure 10-3: Soil profile classes and observation sites 11
Figure 10-4: Assessed Agricultural Land Classification 34
Figure 10-5: Assessed crop land use suitability 35
Figure 10-6: Assessed pasture and beef cattle grazing land use suitability 36
Figure 10-7: Predicted regional topography in Year 63 41
Figure 10-8: Proposed irrigation area 50
Figure 10-9: Sewage irrigation area with regional ecosystem context 51
Figure 10-10: Indicative locations for soil stockpiles 57
Figure 11-1: Recorded Aboriginal cultural heritage 6
Figure 12-1: Location of Rowe's old camp and yards shown in yellow circle and the Project area in red ... 4
Figure 12-2: Stock route to Esmeralda from Croydon in 1892, approximate Project location (red dot) below 'ESMERALDA' 5
Figure 13-1: Post-mining land use - production area 6
Figure 13-2: Post-mining land use - transport corridor 7
Figure 13-3: Rehabilitation areas - production area 10
Figure 13-4: Rehabilitation areas - transport corridor 11

Figure 13-5: Final landform design 19
Figure 14-1: Project locality - GABORA 5
Figure 14-2: Regional context 10
Figure 14-3: Regional catchments 11
Figure 14-4: Norman River flow duration curve (Streamflow Gauge 916001B) 12
Figure 14-5: Streamflow gauging stations 13
Figure 14-6: Unnamed tributary of Warrigal Creek 16
Figure 14-7: Wetlands 17
Figure 14-8: Native title areas 20
Figure 14-9: Water management infrastructure 23
Figure 14-10: Sediment dam typical section 26
Figure 14-11: Water management system schematic 29
Figure 14-12: Surface geology 41
Figure 14-13: Solid geology 42
Figure 14-14: Regional extent of the Wallumbilla Formation 43
Figure 14-15: Conceptual groundwater model 45
Figure 14-16: Groundwater monitoring bore locations 48
Figure 14-17: Groundwater table elevation 52
Figure 14-18: Depth to groundwater table 53
Figure 14-19: Groundwater flow contours 54
Figure 14-20: ESMB01D hydrograph 56
Figure 14-21: ESMB02D hydrograph 57
Figure 14-22: ESMB04D hydrograph 58
Figure 14-23: ESMB05D hydrograph 59
Figure 14-24: ESMB06D hydrograph 60
Figure 14-25: ESMB07S hydrograph 61
Figure 14-26: ESMB07D hydrograph 62
Figure 14-27: ESMB17 hydrograph 63
Figure 14-28: Registered groundwater bores 67
Figure 14-29: Mapped groundwater dependent ecosystems from the BOM GDE Atlas. 70
Figure 14-30: The location of EPBC Act listed Springs relative to the Project Area 71
Figure 14-31: Model domain 74
Figure 14-32: Model zonation 76
Figure 14-33: Predicted groundwater inflow to the open pit void 83
Figure 14-34: Maximum predicted drawdown in the GRF 85
Figure 14-35: Maximum predicted drawdown and mapped aquatic GDEs 87
Figure 14-36: Maximum predicted drawdown and mapped terrestrial GDEs 88
Figure 14-37: Post closure particle tracking 91
Figure 14-38: Groundwater level recovery within the backfilled pit void 92
Figure 14-39: Proposed additional monitoring bores 95
Figure 15-1: Unnamed tributary of Warrigal Creek 5
Figure 15-2: Wetlands 6
Figure 15-3: Regional context 7
Figure 15-4: Regional catchments 8
Figure 15-5: Topography and surface water 9
Figure 15-6: Water monitoring locations 16
Figure 15-7: Sediment particle size classification (February 2025) 23
Figure 15-8: Sediment particle size classification (December 2025) 24
Figure 15-9: Sediment particle size classification (January 2026) 24
Figure 15-10: Water management infrastructure 28
Figure 15-11: REMP monitoring locations 38
Figure 15-12: Project locality - GABORA 42
Figure 15-13: Registered groundwater bores 47
Figure 15-14: Mapped groundwater dependent ecosystems from the BOM GDE Atlas. 50
Figure 15-15: The location of EPBC Act listed Springs relative to the Project Area 51
Figure 15-16: Groundwater monitoring bore network 54
Figure 15-17: Field electrical conductivity 55
Figure 15-18: Electrical conductivity (µS/cm) histogram 55

Figure 15-19: Field pH 56
Figure 15-20: Piper trilinear diagram 63
Figure 15-21: Extended Durov diagram 64
Figure 15-22: Post-closure backfilled pit 66
Figure 15-23: Modelled pit void pH 67
Figure 15-24: Modelled pit void TDS 67
Figure 15-25: Comparison of modelled water quality with local groundwater quality 68
Figure 15-26: Post closure particle tracking - 1000 years 70
Figure 15-27: Proposed additional monitoring bores 74
Figure 16-1: Floodplain topography adjacent to the Project 4
Figure 16-2: Recorded streamflow data for 2025/2026 flood event 5
Figure 16-3: Streamflow gauging station 6
Figure 16-4: Time distribution of rainfall - December 2025/January 2026 rainfall event 7
Figure 16-5: Satellite imagery (8th January 2026) 9
Figure 16-6: Satellite imagery (12th January 2026) 10
Figure 16-7: Satellite imagery (13th February 2009) 11
Figure 16-8: Hydraulic model extent 13
Figure 16-9: 1% AEP Flood Afflux for the Operational Phase 15
Figure 16-10: Change in 1% AEP Peak Flood Velocity for the Operational Phase 16
Figure 16-11: Final landform design 19
Figure 16-12: 0.1% AEP depth for closure phase (SSP 5-8.5) 20
Figure 16-13: 0.1% AEP velocity for closure phase (SSP5-8.5) 21
Figure 16-14: 1% AEP Flood Afflux for the Closure Phase (SSP2-4.5 2090) 23
Figure 16-15: Change in 1% AEP peak flood velocity for the closure phase (SSP 2-4.5 2090) 24
Figure 16-16: Watercourse and diversion 27
Figure 16-17: Conceptual diversion drain cross-section - operational scenario 28
Figure 16-18: Conceptual diversion drain cross section - post- mining scenario 29
Figure 16-19: 0.1% AEP peak flood depth - operation 30
Figure 16-20: 0.1% AEP peak velocity - operations 31
Figure 16-21: 0.1% AEP peak flood depth - post-mining 32
Figure 16-22: 0.1% AEP peak velocity - post-mining 33
Figure 16-23: Water Management Infrastructure 37
Figure 16-24: Process Water Dam typical cross section 38
Figure 16-25: Typical TSF cross-section 40
Figure 16-26: Levee typical section 41
Figure 16-27: Proposed additional monitoring bores 45
Figure 17-1: Project layout and waste storage areas 18
Figure 17 2: Process flow block diagram 20
Figure 17-3: Typical TSF cross-section 22
Figure 17-4: Proposed irrigation area for treated effluent disposal 35
Figure 17-5: Sewage irrigation area with regional ecosystem context 36
Figure 17-6: Sewage irrigation area with soil type context 37
Figure 17-7: Typical cross-section of a TSF cell design 55
Figure 17-8: Post-closure backfilled pit void 56
Figure 18-1: Protected areas in the vicinity of the Project 10
Figure 18-2: Project climate data (1950 to 2025) 12
Figure 18-3: Terrestrial flora study area including the location of flora survey sites 16
Figure 18-4: Terrestrial fauna study area including the location of flora survey sites 17
Figure 18-5: Aquatic ecology survey site locations 20
Figure 18-6: GDE Assessment areas relative to mapped GDEs 24
Figure 18-7: Groundwater bores monitored for stygofauna 27
Figure 18-8: Field-verified regional ecosystems (mining and production area - NW) 30
Figure 18-9: Field-verified regional ecosystems (mining and production area - NE) 31
Figure 18-10: Field-verified regional ecosystems (mining and production area - SW) 32
Figure 18-11: Field-verified regional ecosystems (mining and production area - SE) 33
Figure 18-12: Field-verified regional ecosystems (transport corridor) 34
Figure 18-13: Major habitat types (mining and production area) 36
Figure 18-14: Major habitat types (transport corridor) 37

Figure 18-15: Fauna species of conservation significance identified in the study area 39
Figure 18-16: Potential White-throated Needletail habitat in the study area and surrounds 42
Figure 18-17: Potential Fork-tailed Swift habitat in the study area and surrounds 43
Figure 18-18: Watercourse determination outcome 47
Figure 18-19: Waterway barrier works risk level for the Project area 48
Figure 18-20: Regional ecosystems analogous to wetlands (mining and processing area) 50
Figure 18-21: Regional ecosystems analogous to wetlands (western transport corridor) 51
Figure 18-22: Regional ecosystems analogous to wetlands (eastern transport corridor) 52
Figure 18-23: Groundwater dependent ecosystem mapping 55
Figure 18-24: Potential terrestrial GDEs and springs 56
Figure 18-25: Ecohydrological conceptualisation of a swamp wetland depression 58
Figure 18-26: Ecohydrological conceptualisation of an ephemeral flood channel system 60
Figure 18-27: Disturbance extent comparison 63
Figure 18-28: Regional ecosystems and extent of disturbance (mining and production area - west) 66
Figure 18-29: Regional ecosystems and extent of disturbance (mining and production area - east) 67
Figure 18-30: Regional ecosystems and extent of disturbance (mining and production area - south) 68
Figure 18-31: Regional ecosystems and extent of disturbance (transport corridor) 69
Figure 18-32: Major habitat types and extent of disturbance (mining and production area) 70
Figure 18-33: Major habitat types and extent of disturbance (transport corridor) 71
Figure 18-34: Matters of State Environmental Significance in relation to the Project layout 91
Figure 18-35: MSES within the study area – Regional Ecosystems 92
Figure 19-1: Records of introduced flora species in the study area 4
Figure 19-2: Introduced flora and fauna species in relation to MSES in the Project disturbance area 7
Figure 20-1: Local study area 4
Figure 20-2: Regional study area 5
Figure 21-1: Forecast global natural graphite demand, 2024 to 2050 3
Figure 21-2: Forecast global battery-grade graphite demand, 2024 to 2050. 3
Figure 21-3: Study catchments 5
Figure 21-4: Croydon LGA Gross Regional Product, 2014-15 to 2024-25 6
Figure 21-5: Employment by Industry (Place of Work), 2024-25 7
Figure 21-6: Value of agricultural production, 2021 8
Figure 21-7: Approximate location of regional projects 11
Figure 21-8: Total Gross Value Add (GVA) Supported by Industry, Construction ($M) 18
Figure 21-9: Average Annual Gross Value Add (GVA) Supported by Industry, (Qld) Full Operations ($M) 19
Figure 22-1: Peak flow reporting locations (Existing 0.1% AEP flood depth) 10
Figure 22-2: Bushfire Risk 11
Figure 23-1: Mean daily maximum and minimum temperatures at BoM's Croydon Township station 4
Figure 23-2: 2021 Seasonal distribution of winds predicted by TAPM/CALMET (Katestone 2026a) 5
Figure 23-3: 2021 Diurnal distribution of winds predicted by TAPM/CALMET (Katestone 2026a) 5
Figure 23-4: 2021 Diurnal profile of mixing depth predicted by TAPM/CALMET (Katestone 2026a) 6
Figure 23-5: Sensitive receptors 7
Figure 23-6: Year 42 mine layout, emission areas and haul routes 12
Figure 23-7: Predicted maximum 24-hour average ground-level concentrations of PM10 18
Figure 23-8: Predicted annual average ground-level concentrations of PM10 19
Figure 23-9: Predicted maximum 24-hour average ground-level concentrations of PM2.5 20
Figure 23-10: Predicted cumulative annual average ground-level concentrations of PM2.5 21
Figure 23-11: Predicted annual average ground-level concentrations of TSP 22
Figure 23-12: Predicted maximum monthly dust deposition rate 23
Figure 23-13: Predicted maximum 1-hour average ground-level concentrations of NO2 24
Figure 23-14: Predicted annual average ground-level concentrations of NO2 25
Figure 23-15: Predicted maximum 1-hour average ground-level concentrations of SO2 26
Figure 23-16: Predicted maximum 24-hour average ground-level concentrations of SO2 27
Figure 23-17: Predicted maximum 8-hour average ground-level concentrations of CO 28
Figure 24-1: Receptors near Project 7
Figure 24-2: Noise contours – Scenario 2, Year 47 (CONCAWE day-calm) 17
Figure 24-3: Noise contours – Scenario 2, Year 47 (CONCAWE day-downwind) 18
Figure 24-4: Noise contours – Scenario 2, Year 47 (CONCAWE night-calm) 19
Figure 24-5: Noise contours – Scenario 2, Year 47 (CONCAWE night-downwind) 20

Figure 24-6: Noise contours – Scenario 2, Year 47 (ISO 9613-2:2024) 21
Figure 25-1: Transport from Project site to Port of Townsville 2
Figure 25-2: Site location 5
Figure 25-3: Road links assessed in traffic assessment 7
Figure 25-4: Surveyed traffic volumes (AM and PM) 9
Figure 25-5: Queensland Rail Network Map - Mount Isa to Townsville Inlander rail line 17
Figure 25-6: Existing Flinders Highway / Railway intersections points (purple) 18
Figure 25-7: Existing flinders Highway Railway level crossing points 18
Figure 26-1: Mean rainfall and evaporation 5
Figure 26-2: Monthly mean temperatures for Croydon (1912-2014) 6
Figure 26-3: Monthly mean temperatures for Georgetown Airport (2005-2025) 7
Figure 26-4: Wind speed and direction at Georgetown, Qld at 9 am and 3 pm 8
Figure 26-5: Winds speed and direction at Croydon, Qld, at 9 am and 3 pm 9
Figure 26-6: Regional bushfire history 12
Figure 26-7: Floodplain topography of the Project 14
Figure 26-8: Climate predictions for Croydon Shire (Queensland Government 2024) 16
Figure 26-9: Croydon Township yearly rainfall (1889-2025) 17
Figure 28-1: Annual tussock grassland 3
Figure 28-2: Eucalypt woodland along creeks 4
Figure 28-3: Paperbark woodland 4
Figure 28-4: Seasonal swamp 5
Figure 28-5: Unnamed tributary of Warrigal Creek 6
Figure 28-6: Regional topography 7
Figure 28-7: Waterways and wetlands in relation to the Project area 8
Figure 28-8: Regional land use and sensitive receptors 10
Figure 28-9: Recorded Aboriginal cultural heritage 11
Figure 28-10: Proposed site layout at maximum disturbance 14
Figure 28-11: Proposed final rehabilitated landform 15
Figure 28-12: Visual impact of maximum disturbance landform during daytime (year 40) 20
Figure 28-13: Visual impact of maximum disturbance landform during nighttime, including light(year 40) 21
Figure 28-14: Visual impact of maximum disturbance landform during daytime (year 52) 22
Figure 28-15: Viewshed of sensitive receptors pre-mining at day 24
Figure 28-16: Viewshed of sensitive receptors pre-mining at night 25
Figure 28-17: Impact of maximum disturbance layout on sensitive receptor visibility at day (year 40) 26
Figure 28-18: Impact of maximum disturbance layout on sensitive receptor visibility at night (year 40) ... 27
Figure 28-19: Impact of final rehabilitated landform on sensitive receptor visibility at day (year 52) 28
Figure 29-1: Other mining leases 2
Figure 30-1: Graphinex EMS document hierarchy 4
Figure 32-1: Project disturbance area 1
Figure 32-2: Project disturbance area – access road 2
Figure 32-3: Surface water monitoring locations 3

List of Tables

Table 2-1: Typical stratigraphic sequence of the region 6
Table 2-2: Mineral resource for the Esmeralda Graphite Project 7
Table 2-3: Soil profile classes 7
Table 3-1: EIS chapters 1
Table 3-2: EIS attachments 1
Table 3-3: EIS appendices 2
Table 3-4: Consultant and sub-consultant EIS preparation team 8
Table 4-1: Project phases 9
Table 4-2: Current underlying and adjoining land tenure details 14
Table 4-3: Underlying and adjoining resource tenure 14
Table 4-4: Key local road network 16
Table 4-5: Fit for use assessment Richmond Croydon Road 16
Table 4-6: Climate statistics for Croydon, Queensland 25

Table 4-7: Exploration history summary 30
Table 4-8: Mineral resource for the Esmeralda Graphite Project 31
Table 4-9: Soil profile classes 32
Table 4-10: Recommended topsoil stripping depth and estimated topsoil volumes 37
Table 4-11: Construction materials transportation 44
Table 4-12: Monitoring objectives, criteria and actions 48
Table 4-13: Indicative Mine Schedule 66
Table 4-14: Mining equipment 69
Table 4-15: Applicable ERAs for the Project 83
Table 4-16: Notifiable activities for the Project 84
Table 5-1: Project alternatives assessment summary 5
Table 5-2: Assessment of beneficial impacts 11
Table 5-3: Assessment of potential adverse impacts 12
Table 6-1: Relevant Commonwealth and State government legislations and policies 1
Table 6-2: Applicable ERAs for the Project 8
Table 6-3: State planning policy compatibility 18
Table 6-4: SDAP code assessment 21
Table 6-5: Human rights considerations 29
Table 6-6: Summary of legislative considerations 33
Table 7-1: Project study areas 2
Table 7-2: Areas of interest raised in consultation 4
Table 7-3: Workforce management impacts 5
Table 7-4: Housing and accommodation impacts 6
Table 7-5: Health and community wellbeing impacts 7
Table 7-6: Key Social Impact Management sub-plans, objectives and measures 8
Table 7-7: Summary of Community stakeholder engagement plan 10
Table 8-1: Underlying and adjoining land tenure details 4
Table 8-2: Underlying and adjoining resource tenure 4
Table 8-3: Active and proposed quarries within 25 km of Project 7
Table 9-1: Summary of proposed PMLUs 11
Table 10-1: Typical stratigraphic sequence at the Project area 6
Table 10-2: Summary of mineralogical results, adapted from RGS (2026) 7
Table 10-3: Graphinex Esmeralda Project reserve (as of 2024) 7
Table 10-4: Composite graphitic granite breccia ore body sample (RGS 2026) 8
Table 10-5: Soil profile classes 10
Table 10-6: Chemical fertility of topsoil (0 – 0.1 m) in SPC 1Cl(Ck), sampled at D1 12
Table 10-7: Physical properties of SPC 1Cl(Ck), sampled at D1 13
Table 10-8: Land summary SPC 1Cl(Ck) – analysed site D1 13
Table 10-9: Chemical fertility of topsoil (0–0.1 m) in SPC 2Cl(Ck), sampled at D2 15
Table 10-10: Physical properties of SPC 2Cl(Ck), sampled at D2 15
Table 10-11: Land summary SPC 2Cl(Ck) – analysed Site D2 16
Table 10-12: Chemical fertility of topsoil (0–0.1 m) in SPC 3Cl(Ck), sampled at D3 18
Table 10-13: Physical properties of SPC 3Cl(Ck), sampled at D3 18
Table 10-14: Land Summary SPC 3Cl(Ck) – Analysed Site D3 18
Table 10-15: Chemical fertility of topsoil (0 – 0.1 m) in SPC 4Cl(Ck), sampled at D7 20
Table 10-16: Physical properties of SPC 4Cl(Ck), sampled at D7 20
Table 10-17: Land Summary SPC 4Cl(Ck) – Analysed Site D7 21
Table 10-18: Chemical fertility of topsoil (0-0.1m) in SPC 5Cl(Nm), sampled at D11 22
Table 10-19: Physical properties of SPC 5Cl(Nm), sampled at D11* 22
Table 10-20: Land Summary SPC 5Cl(Nm) – analysed Site D11 23
Table 10-21: Chemical fertility of topsoil (0 – 0.1 m) in SPC 6Cl(El), sampled at D16 24
Table 10-22: Physical properties of SPC 6Cl(El), sampled at D16* 25
Table 10-23: Land Summary SPC 6Cl(El) – Analysed Site D16 26
Table 10-24: Chemical fertility of topsoil (0 – 0.1 m) in SPC 7Cl(Nm), sampled at D20 28
Table 10-25: Physical properties of SPC 7Cl(Nm), sampled at D20 28
Table 10-26: Land Summary SPC 7Cl(Nm) – Analysed Site D20 29
Table 10-27: Land suitability classes 30
Table 10-28: Summary of crop land use suitability for each SPC 31

Table 10-29: Summary of pasture and grazing land use suitability for each SPC 31
Table 10-30: ALC description 32
Table 10-31: Summary of ALC for each SPC 33
Table 10-32: Acid Sulphate Soil Assessment 37
Table 10-33: Notifiable activities for the Project 42
Table 10-34: Summary of geochemical characteristics for mine materials 43
Table 10-35: Potential impacts from soil disturbance and relevant management measures 44
Table 10-36: Potential growth medium stripping depth and estimated volumes 45
Table 10-37: MEDLI output summary 47
Table 10-38: Effluent quality 48
Table 10-39: Nutrient Loading 48
Table 10-40: Flow weighted nitrate concentration 48
Table 10-41: Summary of application or management measures on mine materials 53
Table 11-1: Desktop assessment results 5
Table 12-1: Results of database heritage searches 5
Table 12-2: Significance ratings for the Project area 6
Table 12-3: Stop Work procedure 8
Table 12-4: Procedure for discovery of palaeontological resources 10
Table 13-1: Project rehabilitation areas (RAs) 8
Table 13-2: Description of rehabilitation zones and revegetation strategy 15
Table 13-3: Provisional species seed mix and sowing rates 22
Table 14-1: Summary of surface water environmental values 7
Table 14-2: Waterways in the vicinity of the MLA areas 8
Table 14-3: Regional Ecosystems analogous with Wetlands in the study area 15
Table 14-4: Details of existing surface water licences 18
Table 14-5: Mine water storages 24
Table 14-6: Site storage catchment area (hectares) 24
Table 14-7: Project net water demand 27
Table 14-8: Average annual water balance (ML/year) 30
Table 14-9: Summary of groundwater environmental values 38
Table 14-10: Site and regional stratigraphy 39
Table 14-11: Summary of monitoring bore construction details 46
Table 14-12: Summary of falling heads test 49
Table 14-13: Hydraulic conductivity results 50
Table 14-14: Registered bore details and water quality details 65
Table 14-15: Major canopy species within the MLA and surrounds. 68
Table 14-16: Assessment of model confidence level classification 78
Table 14-17: Summary of annual groundwater inflow to the open pit void 81
Table 14-18: Proposed additional monitoring bore details 93
Table 15-1: Regional Ecosystems analogous with Wetlands in the study area 4
Table 15-2: Summary of environmental values 10
Table 15-3: Nearby mines 11
Table 15-4: Draft surface water quality objectives 12
Table 15-5: Surface water quality results and comparison to draft WQOs for the Project area 17
Table 15-6: Sediment quality results and comparison to interim objectives for the Project area 25
Table 15-7: Contaminants of Concern 29
Table 15-8: REMP water monitoring locations 37
Table 15-9: Summary of groundwater environmental values 43
Table 15-10: Registered groundwater bore details and water quality analysis 45
Table 15-11: Major canopy species within the MLA and surrounds. 48
Table 15-12: Laboratory water quality data – Dissolved metals 57
Table 15-13: Laboratory water quality data – Total metals 58
Table 15-14: Laboratory water quality data – Major ion composition 60
Table 15-15: Proposed additional monitoring bores 72
Table 16-1: Stream flow gauging data for 2025/2026 flood event 5
Table 16-2: Preliminary Consequence Category Assessment Summary 35
Table 17-1: Sewage ERA 3
Table 17-2: Council operated waste management infrastructure 6

Table 17-3: Anticipated waste generation and management strategies 9
Table 17-4: Indicative mine schedule 15
Table 17-5: Summary of geochemical characteristics for mine materials 23
Table 17-6: Waste streams and potential impacts 24
Table 17-7: Estimated peak emissions to air 26
Table 17-8: Estimated peak emissions to land 26
Table 17-9: Estimated peak NPI threshold determination 27
Table 17-10: Selection criteria for irrigation system areas (AS/NZS 1547:2012) 38
Table 17-11: MEDLI input parameters 40
Table 17-12: MEDLI output summary 41
Table 17-13: Design parameters 49
Table 17-14: Physical characteristics of the TSF cells 50
Table 18-1: Fauna survey effort summary 14
Table 18-2: Aquatic ecology and water quality survey sites 21
Table 18-3: GDE assessment sites and purpose 25
Table 18-4: Details of bores monitored for stygofauna 26
Table 18-5: Field-verified regional ecosystems in the study area 28
Table 18-6: Conservation significant fauna species potentially occurring in the study area 38
Table 18-7: Regional Ecosystems analogous to wetlands in the study area 49
Table 18-8: Regional ecosystems in the study area and impacted by the Project 64
Table 18-9: Extent of major habitat types in the Project disturbance area and the study area 65
Table 18-10: Detailed channel cross section and longitudinal gradient summary 72
Table 18-11: Regional ecosystems that intersect a VM Act wetland assessment summary 86
Table 18-12: Regional ecosystems that intersect a VM Act watercourse assessment summary 87
Table 18-13: White-throated Needletail significant impact assessment 93
Table 18-14: Waterways providing for fish passage significant impact assessment 95
Table 18-15: Summary of MSES to have a significant residual impact from the Project 97
Table 18-16: MSES to be offset via the Environmental Offset Strategy 98
Table 19-1: Monitoring objectives, criteria and actions 10
Table 20-1: SIA study areas 3
Table 20-2: Social impact significance assessment matrix 11
Table 20-3: Summary of Project social impacts 12
Table 20-4: Regional projects likely to contribute to potential cumulative social impacts 20
Table 20-5: Cumulative impacts of the Project on social values 21
Table 20-6: Management and monitoring – Workforce management plan (Appendix J) 24
Table 20-7: Management and monitoring – Housing and accommodation plan (Appendix J) 27
Table 20-8: Management and monitoring – Local business and industry procurement plan (Appendix J) 29
Table 20-9: Management and monitoring – Health and community wellbeing plan (Appendix J) 32
Table 20-10: Community and stakeholder engagement plan (Appendix J) 36
Table 21-1: Study catchments 4
Table 21-2: Major projects in the regional catchment 9
Table 21-3: Assessment of beneficial impacts 13
Table 21-4: Potential adverse impacts 14
Table 21-5: Assessment of cumulative impacts 20
Table 22-1: Consequence of impact 4
Table 22-2: Likelihood of impact 4
Table 22-3: Risk level actions 4
Table 22-4: Consequence classification 6
Table 22-5: Hazard identification for site workers' health and safety 14
Table 22-6: Anticipated hazardous materials and dangerous goods 16
Table 22-7: Identification of Class III and IV risks 21
Table 22-8: Class III assessed risks 23
Table 22-9: Key elements of the Emergency Response Plan 27
Table 23-1: Air quality objectives used in the assessment 2
Table 23-2: Mean daily maximum and minimum temperatures at BoM's Croydon Township station 3
Table 23-3: Sensitive receptors 6
Table 23-4: Background air quality measured at the DETSI North Ward monitoring station 8

Table 23-5: Ambient background concentrations selected for use in the air quality assessment 9
Table 23-6: Emissions inventory – mine year 42 12
Table 23-7: Emission rates for combustion gases 14
Table 23-8: Stack characteristics for diesel gensets 14
Table 23-9: Routine mitigation measures 14
Table 23-10: Predicted ground-level concentrations due to the Project in isolation 17
Table 23-11: Predicted ground-level concentrations due to the Project plus ambient background concentrations 17
Table 24-1: Acoustic quality objectives for residences and protected areas 2
Table 24-2: Calculated outdoor acoustic quality objectives for residences 2
Table 24-3: Proposed Project noise limits 3
Table 24-4: Proposed Project blasting airblast and vibration limits 4
Table 24-5: List of nearest receptors and distance from MLA 5
Table 24-6: Noise logging results – average LAeq,15min levels 8
Table 24-7: Noise logging results – rating background noise levels 8
Table 24-8: Mining equipment and locations 9
Table 24-9: Sound power level data for modelled equipment 10
Table 24-10: Noise model scenarios 11
Table 24-11: Noise modelling meteorological conditions 13
Table 24-12: Predicted A-weighted noise levels at sensitive receptors 15
Table 24-13: Predicted Z-weighted noise levels at sensitive receptors for low frequency review 16
Table 24-14: Road traffic noise levels 23
Table 24-15: Aircraft noise level calculations 24
Table 24-16: Proposed Project noise limits 25
Table 24-17: Proposed Project blasting limits 26
Table 25-1: Existing road conditions 6
Table 25-2: Daily workforce peak numbers 11
Table 25-3: Workforce Transportation Distributions per shift 11
Table 25-4: Workforce Project trips 12
Table 25-5: Project Inbound and outbound trips – vehicles per hour (vph) 12
Table 25-6: Heavy vehicle movements for the Project 12
Table 25-7: Fit for use assessment Richmond Road 14
Table 25-8: Rail level crossings on intersections with Flinders Highway (Richmond to Townsville) 18
Table 25-9: Project Pipeline – Northwest Minerals Province 20
Table 26-1: Meteorological data sources 1
Table 26-2: Climate statistics for Croydon township and Georgetown airport 3
Table 26-3: Esmeralda Station rainfall statistics (1914-2025) 4
Table 26-4: Bushfire history 10
Table 26-5: Noise modelling meteorological conditions 19
Table 27-1: GHG guidelines assessment and decarbonisation requirements 1
Table 27-2: Key Commonwealth and state legislations relevant to the Project 3
Table 27-3: Summary of the GHG and renewable energy targets across the nation and Queensland 4
Table 27-4: Existing and expected projects in the region of the Project 5
Table 27-5: Project activities resulting in Scope 1 emissions 7
Table 27-6: Energy content and emission factors for Scope 1 and Scope 3 assessment 8
Table 27-7: Project activities resulting in Scope 3 emissions 10
Table 27-8: Summary of energy consumed for LOP (NGER category) 11
Table 27-9: Scope 1 emissions for the Project 12
Table 27-10: Annual Scope 1 emissions for the Project 13
Table 27-11: Annual Scope 3 emissions for the Project 18
Table 27-12: Summary of unabated LOP and average annual GHG emissions (tCO2-e) 22
Table 27-13: Project GHG abatement hierarchy including Key Result Areas and KPIs 25
Table 27-14: Summary of unabated and abated LOP and average annual GHG emissions 33
Table 27-15: Project contribution to Queensland's emissions reduction targets 35
Table 27-16: Terms of reference (ToR) reconciliation table 37
Table 28-1: Field-verified regional ecosystems in the study area 2
Table 28-2: List of nearest receptors and distance from MLA 9
Table 28-3: Visual angle from R2 to the WRDs and TSFs at maximum disturbance (year 40) 23

Table 29-1: Summary of potential cumulatively affected environmental values 3
Table 29-2: Summary of MSES to have a significant residual impact from the Project 10
Table 29-3: MSES to be offset via the Environmental Offset Strategy 11
Table 29-4: Project GHG abatement hierarchy including Key Result Areas and KPIs 18
Table 29-5: Cumulative impacts on social values 29
Table 30-1: Queensland and Commonwealth legislative requirement 1
Table 30-2: Environmental Management System document hierarchy 4
Table 30-3: Aspects and impacts register 9
Table 30-4: EMP Summary 19
Table 31-1: Land and rehabilitation impacts and management measures 2
Table 31-2: Water impacts and management measures 3
Table 31-3: Flora and fauna impacts and management measures 6
Table 31-4: Economic impacts and management measures 7
Table 31-5: Air quality impacts and management measures 9
Table 31-6: Noise and vibration impacts and management measures 9
Table 31-7: Noise and vibration impacts and management measures 10
Table 31-8: Traffic and transport impacts and management measures 11
Table 31-9: Visual amenity impacts and management measures 12
Table 31-10: Social impacts and management measures 12
Table 31-11: Summary of Project commitments 17
Table 31-12: Summary of MSES to have a significant residual impact from the Project 37