Atlas Geophysics Memorandum M2021138

EL20/2020 Gravity Survey

NORFOLK METALS LIMITED

Memo completed by:

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1.0 Project Brief

Project P2021138 involved the acquisition and processing of **1,317** new gravity stations for Norfolk Metals Limited over an area approximately 18km south of Smithton in Northern Tasmania (Figure 1).

Gravity stations were acquired using a 400m x 50m grid configuration. Atlas Geophysics completed the acquisition of the dataset with one crew utilising foot-borne gravity methods.

Acquisition for the project commenced on the 1st of December 2021 and finished on the 15th of December 2021. Final data were delivered shortly after project completion.

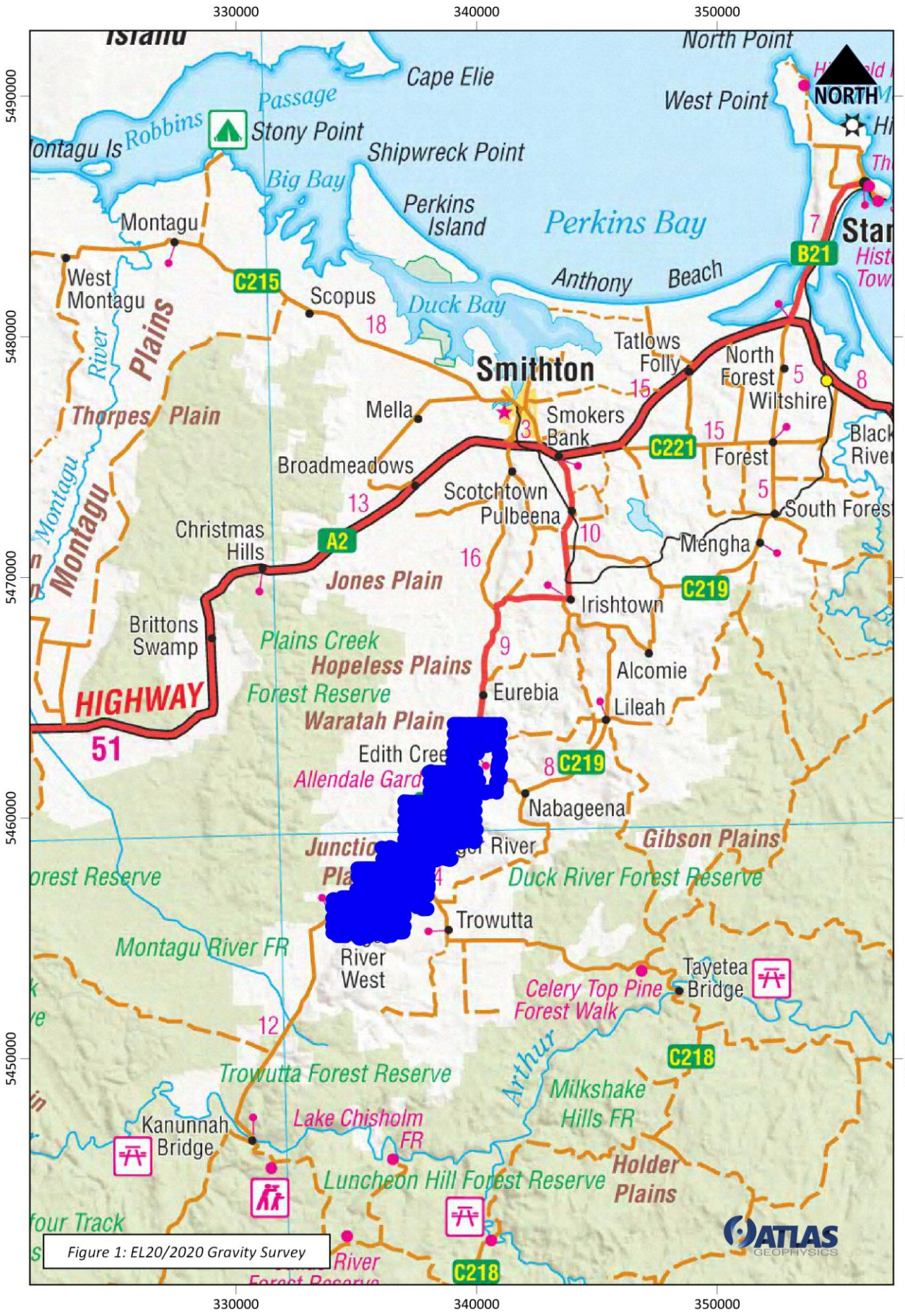


Figure 1: EL20/2020 Gravity Survey

2.0 Equipment and Instrumentation

The following instrumentation was used for acquisition of the gravity data:

- One CG-6 Autograv Gravity Meter
  - (Serial Number: 21020321, SF: 1.0000)
- One CHCi70+ GNSS Rover Receiver
- One CHCi70+ GNSS Base Receiver

Ancillary equipment included:

- Laptop computers for data download and processing
- Garmin autonomous GPS receivers for navigation
- InReach personal satellite tracking units
- Iridium satellite phones for long distance communications
- Personal Protective Equipment for all personnel
- Batteries, battery chargers, solar cells, UPS System
- Survey consumables
- Tools, engineering, and maintenance equipment for vehicle servicing
- First aid and survival kits
- Tyres and recovery equipment

3.0 Calibration and Control

The gravity meter used for the survey had been recently calibrated on the Guildford Cemetery – Helena Valley Primary School calibration range (2010990117 - 2010990217) in Western Australia. The calibration process validated the gravity meter's scale factor to ensure reduction of the survey data produces correct Observed Gravities from measured dial reading values.

One new gravity control station 202113800001 "Dutch Mill Dairy" and one new GNSS control station 202113800101 "Dutch Mill Dairy GNSS only" were used to control all field observations throughout the project.

GNSS control was established at 202113800101 by submitting three 10-hour sessions of static data to Geoscience Australia's AUSPOS processing system, producing first-order geodetic coordinates. These coordinates are accurate to better than 10mm for the x, y, and z observables.

Gravity control was established at station 202113800001 via two ABA ties to existing Atlas Geophysics control station 201300100001 "Grace's Cottage". Standard deviation of the gravity ties is 0.001mGal.

4.0 GNSS-Gravity Acquisition

Gravity data were acquired concurrently with GNSS data using a Scintrex CG-6 gravity meter. Data were acquired in single shifts of up to 12 hours duration, with each shift consisting of a single loop controlled by observations at the gravity control station. Each loop contained a minimum of two repeated readings so that an interlocking network of closed loops was formed. A total of **40** repeat readings representing **3.04%** of the survey were acquired for quality control purposes. Repeat readings were evenly distributed, where possible, on a time-basis throughout each of the gravity loops.

GNSS data were acquired with the rover receiver operating in post-process kinematic (PPK) mode with a GNSS rover sensor attached to a 2.00m walking pole. Static data were logged at the control station with a base receiver operating in post-process static (PPS) mode with the GNSS sensor mounted on a fixed tripod.

5.0 GNSS Processing and QC

The acquired GNSS raw data were processed daily using Novatel Waypoint GrafNav v8.90 post-processing software.

GrafNav was used to transform the GNSS-derived WGS84 coordinates to GDA94 coordinates for each gravity station location. MGA coordinates were then derived by projecting the GDA94 geodetic coordinates with a Universal Transverse Mercator (UTM) transform using the appropriate zone. It should be noted that WGS84 and GDA94 coordinates (x, y, and z) are no longer roughly equivalent, with a difference in horizontal coordinates of greater than 1.0m and a difference in elevation of 90-100mm. GrafNav produced GDA94 ellipsoidal heights for each gravity station location; and elevations above the Australian Height Datum (AHD) were modelled using the AUSGEOID09 geoid model, with separations (N values) added to GDA94 ellipsoidal heights.

The resulting GrafNav data (output in Atlas Geophysics standard format) were then imported into Atlas Geophysics Reduction and Interpretation Software (AGRIS) for QC and used in the reduction of the gravity data. A module built into AGRIS allows the user to examine data quality factors such as station repeatability between multiple control stations, coordinate velocity, dilution of precision, coordinate quality factor and standard error for each gravity station location. The procedure is carried out before merging the positional data with gravity data for final reduction to Bouguer Anomaly. Comprehensive statistics, repeatability analysis and histogram plotting are also performed.

QC procedures were applied to the GNSS data daily and any gravity stations not conforming to the quoted specifications were repeated by the company at no cost to the client.

6.0 Gravity Processing and QC

The acquired gravity data were processed using the company's in-house gravity pre-processing and reduction software, AGRIS. This software allows for full data pre-processing, reduction to Bouguer Anomaly, repeatability, and statistical analysis, as well as full quality control of the output dataset.

Once downloaded from the gravity meters, the data were analysed for consistency and preliminary QC was performed to confirm that observations meet specification for standard deviation, reading rejection, temperature, and tilt values. Once the data were verified the software averaged the multiple gravity readings and performed a merge with the previously QC-passed GNSS data. The software then applies a linear drift correction and earth tide correction. Any gravity stations not conforming to the quoted specifications were repeated by the company at no cost to the client.

The following corrections were further applied to the dataset to produce Spherical Cap Bouguer Anomalies on the GDA94 transform of the GRS80 ellipsoid and AAGD07 gravity datum. For legacy reasons, Geoidal Bouguer Anomalies on the Australian Height Datum (AHD) and ISOGAL84 gravity datum have also been calculated.

The formulae below produce data in μms^{-2} or gravity units (GU). To convert to mGal, divide by a factor of 10.

***Instrument scale factor*:** This correction is used to correct a gravity reading (in dial units) to a relative gravity unit value based on the meter calibration.

$$r_c = 10 \cdot (r \cdot S(r))$$

where,

r_c corrected reading in gravity units
r gravity meter reading in dial units
$S(r)$ scale factor (dial units/milliGal)

Earth Tide Correction: The earth is subject to variations in gravity due to the gravitational attraction of the Sun and the Moon. These background variations can be corrected for using a predictive formula which utilises the gravity observation position and time of observation. The Scintrex CG-5 & CG-6 gravity meters automatically calculate ETC but use only an approximate position for the gravity observation so is not entirely accurate. For this reason, the Scintrex ETC is subtracted from the reading and a new correction calculated within AGRIS software.

$$r_t = r_c + g_{tide}$$

where,

r_t tide corrected reading in gravity units
r_c scale factor corrected reading in gravity units
g_{tide} Earth Tide Correction (ETC) in gravity units

Instrument Drift Correction: Since all gravity meters are mechanical, they are all prone to instrument drift. Drift can be caused by mechanical stresses and strains in the spring mechanism as the meter is moved, knocked, reset, subjected to temperature extremes, subjected to vibration, unclamped etc. The most common cause of instrument drift is due to extension of the sensor spring with changes in temperature (obeying Hooke's law). To calculate and correct for daily instrument drift, the difference between the gravity control station readings (closure error) is used to assume the drift and a linear correction is applied.

$$ID = \frac{r_{cs2} - r_{cs1}}{t_{cs2} - t_{cs1}}$$

where,

ID	Instrument Drift in gu/hour
r_{cs2}	control station 2nd reading in gravity units
r_{cs1}	control station 1st reading in gravity units
t_{cs2}	control station 2 time
t_{cs1}	control station 1 time

Observed Gravity: The preceding corrections are applied to the raw gravity reading to calculate the earth's absolute gravitational attraction at each gravity station. The corrections produced Observed Gravities on the AAGD07 and ISOGAL84 datums.

$$G_o = g_{cs1} + (r_t - r_{cs1}) - (t - t_{cs1}) \cdot ID$$

where,

G_o	Observed Gravity in gravity units (ISOGAL84 or AAGD07)
g_{cs1}	control station 1 known Observed Gravity in gravity units
r_t	tide corrected reading in gravity units
r_{cs1}	control station 1 reading in gravity units
t	reading time
t_{cs1}	control station 1 time
ID	instrument drift in gravity units/hour

Theoretical Gravity 1980: The theoretical (or normal) gravity value at each gravity station is calculated based on the assumption that the Earth is a homogeneous ellipsoid. The closed form of the 1980 International Gravity Formula is used to approximate the theoretical gravity at each station location and essentially produce a latitude correction. Gravity values vary with latitude as the earth is not a perfect sphere and the polar radius is much smaller than the equatorial radius. The effect of centrifugal acceleration is also different at the poles versus the equator.

$$G_{t80} = 9780326.7715((1 + 0.001931851353(sin^2 l)/(SQRT(1 - 0.0066943800229(sin^2 l)))$$

where,

G_{t80}	Theoretical Gravity 1980 in gravity units
l	GDA94 latitude at the gravity station in decimal degrees

Theoretical Gravity 1967: The theoretical (or normal) gravity value at each gravity station is calculated based on the assumption that the Earth is a homogeneous ellipsoid. The 1967 variant of the International Gravity Formula is used to approximate the theoretical gravity at each station location and essentially produce a latitude correction. Gravity values vary with latitude as the earth is not a perfect sphere and the polar radius is much smaller than the equatorial radius. The effect of centrifugal acceleration is also different at the poles versus the equator.

$$G_{t67} = (9780318.456 \cdot (1 + 0.005278895 \cdot sin^2(l) + 0.000023462 \cdot sin^4(l)))$$

where,

G_{t67} Theoretical Gravity 1967 in gravity units
l GDA94 latitude at the gravity station in decimal degrees

Atmospheric Correction: The gravity effect of the atmosphere above the ellipsoid can be calculated with an atmospheric model and is subtracted from the theoretical gravity.

$$AC = 8.74 - 0.00099 \cdot h + 0.0000000356 \cdot h^2$$

where,

AC Atmospheric Correction in gravity units
h elevation above the GDA94 transformed GRS80 ellipsoid in metres

Ellipsoidal Free Air Correction: Since the gravity field varies inversely with the square of distance, it is necessary to correct for elevation changes from the reference ellipsoid (GDA94 transformed GRS80). Gravitational attraction decreases as the elevation above the reference ellipsoid increases.

$$EFAC = -(3.087691 - 0.004398\, sin^2 l) \cdot h + 7.2125 \cdot 10^{-7} \cdot h^2$$

where,

$EFAC$ Ellipsoidal Free Air Correction in gravity units
l GDA94 latitude at the gravity station in decimal degrees
h elevation above the GDA94 transformed GRS80 ellipsoid in metres

Geoidal Free Air Correction: Since the gravity field varies inversely with the square of distance, it is necessary to correct for elevation changes from the reference geoid (AHD). Gravitational attraction decreases as the elevation above the reference geoid increases.

$$GFAC = (3.08768 - 0.00440 sin^2(l)) \cdot h - 0.000001442 \cdot h^2$$

where,

$GFAC$ Free Air Correction in gravity units
l GDA94 latitude at the gravity station in decimal degrees
h elevation above the reference geoid (AHD) in metres

Spherical Cap Bouguer Correction: If a gravity observation is made above the reference ellipsoid, the effect of rock material between the observation and the ellipsoid must be considered. The mass of rock makes a positive contribution to the gravity value. The correction is calculated using the closed form equation for the gravity effect of a spherical cap of radius 166.7km, based on a spherical Earth with a mean radius of 6,371.0087714km, height relative the ellipsoid and rock densities of 2.67, 2.40 and 2.20 tm^{-3} (gm/cc).

$$SCBC = 2\pi G\rho((1+\mu)\cdot h - \lambda R)$$

where,

$SCBC$	Spherical Cap Bouguer Correction in gravity units
G	gravitational constant = $6.67428{\cdot}10^{-11} m^3 kg^{-1} s^{-2}$
ρ	rock density (2.67, 2.40 and 2.20 tm^{-3})
h	elevation above the GDA94 transformed GRS80 ellipsoid in metres
R	$(R_o + h)$ the radius of the earth at the station
R_o	mean radius of the earth = 6,371.0087714 km (on the GDA94 transformed GRS80 ellipsoid)
μ & λ	are dimensionless coefficients defined by:

$$\mu = ((1/3)\cdot \eta^2 - \eta)$$

where,

η	h/R

$$\lambda = (1/3)\{(d + f\delta + \delta^2)[(f-\delta)^2 + k]^{\frac{1}{2}} + p + m\cdot ln(n/(f - \delta + [(f-\delta)^2 + k]^{\frac{1}{2}})\}$$

where,

d	$3\cdot cos^2\alpha - 2$
f	$cos\alpha$
k	$sin^2\alpha$
p	$-6\cdot cos^2\alpha\cdot \sin(\alpha/2) + 4\cdot sin^3(\alpha/2)$
δ	(R_o/R)
m	$-3\cdot k\cdot f$
n	$2\cdot[sin\,(\alpha/2) - sin^2(\alpha/2)]$
α	S/R_o with S = Bullard B Surface radius = 166.735 km

Geoidal Bouguer Correction: If a gravity observation is made above the reference geoid, the effect of rock material between the observation and the ellipsoid must be considered. The mass of rock makes a positive contribution to the gravity value. The slab of rock makes a positive contribution to the gravity value. Rock densities of 2.67, 2.40 and 2.20 t/m^{-3} (gm/cc) were used in the correction.

$$GBC = 0.4191\cdot\rho\cdot h$$

where,

GBC	Geoidal Bouguer Correction in gravity units
ρ	rock density (2.67, 2.40 and 2.20 tm^{-3})
h	elevation above the reference geoid (AHD) in m

Ellipsoidal Free Air Anomaly: The Ellipsoidal Free Air Anomaly is the difference between the observed gravity and theoretical gravity that has been computed for latitude and corrected for the elevation of the gravity station above or below the reference ellipsoid.

$$EFAA = G_{oAAGD07} - (G_{t80} - AC) - EFAC$$

where,

$EFAA$ Ellipsoidal Free Air Anomaly in gravity units
G_o Observed Gravity on the AAGD07 datum in gravity units
G_{t80} Theoretical Gravity 1980 in gravity units
AC Atmospheric Correction in gravity units
$EFAC$ Ellipsoidal Free Air Correction in gravity units

Geoidal Free Air Anomaly: The Geoidal Free Air Anomaly is the difference between the observed gravity and theoretical gravity that has been computed for latitude and corrected for the elevation of the gravity station above or below the reference geoid.

$$GFAA = G_{oISOGAL84} - G_{t67} + GFAC$$

where,

$GFAA$ Free Air Anomaly in gravity units
G_o Observed Gravity on the ISOGAL84 datum in gravity units
G_{t67} Theoretical Gravity 1967 in gravity units
$GFAC$ Geoidal Free Air Correction in gravity units

Spherical Cap Bouguer Anomaly: The Spherical Cap Bouguer Anomaly is computed from the Ellipsoidal Free Air Anomaly above by removing the attraction of the spherical cap calculated by the Spherical Cap Bouguer Correction.

$$SCBA = EFAA - SCBC$$

where,

$SCBA$ Spherical Cap Bouguer Anomaly in gravity units
$EFAA$ Ellipsoidal Free Air Anomaly in gravity units
$SCBC$ Bouguer Correction in gravity units

Geoidal Bouguer Anomaly: The Geoidal Bouguer Anomaly is computed from the Geoidal Free Air Anomaly above by removing the attraction of the slab calculated by the Geoidal Bouguer Correction.

$$GBA = GFAA - GBC$$

where,

GBA Geoidal Bouguer Anomaly in gravity units
$GFAA$ Geoidal Free Air Anomaly in gravity units
GBC Geoidal Bouguer Correction in gravity units

7.0 Gravity Results

The gravity survey was completed in **15** days of acquisition. An average acquisition rate of around **88** stations per day of production was achieved for the survey. The survey progressed well with no major delays.

Final data have met and exceeded quoted project specifications. Repeatability of the data was excellent, with the standard deviation of the elevation repeats at **0.025m** and the standard deviation of the gravity repeats at **0.005mGal**. The production report contains summary statistics and histograms for repeatability.

8.0 Data Formats and Deliverables

Final reduced ASCII data for the project have been delivered in ASEG-GDF2 and standard Atlas format. Table 2 overleaf details the format of the final gravity database supplied. All fields are comma delimited.

Appendix B contains a plot of final station locations, images of GNSS Derived Elevation (GDA94 transformed GRS80), Spherical Cap Bouguer Anomaly and first vertical derivative of Spherical Cap Bouguer Anomaly.

All data, both raw and processed, have been supplied with this memorandum using a cloud-based service. Table 1 below summarises the deliverables. Should the reader require further copies of the deliverables, please contact Atlas Perth Operations.

Final Delivered Data	Format	Data
Gravity Database	Comma Space Delimited .csv	•
Gravity Database	Point located data ASEG-GDF2	•
Raw Positional Data	AGRIS format, comma delimited	•
Raw Gravity Data	Scintrex CG-5 format	•
Final Grids	ER Mapper Grids .ers	•
Final Images	GIS compatible Geotiff .tif	•
Acquisition Memo	PDF .pdf	•

Table 1: Final Deliverables

Field Header	Field Description	Format	Units
PROJECT	Atlas Geophysics Project Number	A9	None
STATION	Unique Station ID	I8	None
STATIONCODE	Unique Station Code	A13	None
LINE	Line ID	I8	None
TYPE	Observation Type : Base, Field or Repeat	A8	None
EASTING	Coordinate Easting UTM projection of the Geographic coordinates	F11.3	M
NORTHING	Coordinate Northing UTM projection of the Geographic coordinates	F12.3	M
ZONE	UTM Zone Number	F8.0	NA
LATITUDE	Coordinate Latitude (Refer DATUM column for Geographic Datum)	F15.10	DD
LONGITUDE	Coordinate Longitude (Refer DATUM column for Geographic Datum)	F15.10	DD
ORTHOHTM	Coordinate Elevation Orthometric (Refer GEOID column for Geoid used)	F9.3	M
ELLIPHTM	Coordinate Elevation Ellipsoidal	F9.3	M
N	Geoid Separation (Refer GEOID column for Geoid used)	F8.3	M
DATE	Observation Date	I8	None
TIME	Observation Time	I8	None
DIALMGAL	Gravity Dial Reading	F9.3	mGal
ETCMGAL	Earth Tide Correction (Longman)	F8.3	mGal
SCALE	Scale Factor Applied to Dial Reading	F9.6	None
OBSG84MGAL	Observed Gravity ISOGAL84	F11.3	mGal
OBSG84GU	Observed Gravity ISOGAL84	F11.2	Gu
OBSGAAGD07GU	Observed Gravity AAGD07	F13.2	Gu
OBSGAAGD07MGAL	Observed Gravity AAGD07	F16.3	mGal
DRIFTMGAL	Drift Applied to Dial Readings	F10.3	mGal
TGRAV67GU	Theoretical Gravity 1967	F11.2	Gu
TGRAV67MGAL	Theoretical Gravity 1967	F12.3	mGal
TGRAV80GU	Theoretical Gravity 1980	F11.2	Gu
GFACGU	Geoidal Free Air Correction	F8.2	Gu
GFACMGAL	Geoidal Free Air Correction	F9.3	mGal
GFAAGU	Geoidal Free Air Anomaly	F8.2	Gu
GFAAMGAL	Geoidal Free Air Anomaly	F9.3	mGal
GBC267GU	Geoidal Bouguer Correction 2.67 tm^-3	F9.2	Gu
GBC240GU	Geoidal Bouguer Correction 2.40 tm^-3	F9.2	Gu
GBC220GU	Geoidal Bouguer Correction 2.20 tm^-3	F9.2	Gu
GBC267MGAL	Geoidal Bouguer Correction 2.67 tm^-3	F11.3	mGal
GBC240MGAL	Geoidal Bouguer Correction 2.40 tm^-3	F11.3	mGal
GBC220MGAL	Geoidal Bouguer Correction 2.20 tm^-3	F11.3	mGal
GBA267GU	Geoidal Bouguer Anomaly 2.67 tm^-3	F9.2	gu
GBA240GU	Geoidal Bouguer Anomaly 2.40 tm^-3	F9.2	gu
GBA220GU	Geoidal Bouguer Anomaly 2.20 tm^-3	F9.2	gu
GBA267MGAL	Geoidal Bouguer Anomaly 2.67 tm^-3	F11.3	mGal
GBA240MGAL	Geoidal Bouguer Anomaly 2.40 tm^-3	F11.3	mGal
GBA160MGAL	Geoidal Bouguer Anomaly 1.60 tm^-3	F11.3	mGal
TGRAV80ACGU	Theoretical Gravity 1980 Atmospheric Corrected	F11.2	gu
EFACGU	Ellipsoidal Free Air Correction	F9.2	gu
EFAAGU	Ellipsoidal Free Air Anomaly	F8.2	gu
SCBC267GU	Spherical Cap Bouguer Correction 2.67 tm^-3	F10.2	gu
SCBC240GU	Spherical Cap Bouguer Correction 2.40 tm^-3	F10.2	gu
SCBC220GU	Spherical Cap Bouguer Correction 2.20 tm^-3	F10.2	gu
SCBA267GU	Spherical Cap Bouguer Anomaly 2.67 tm^-3	F10.2	gu
SCBA240GU	Spherical Cap Bouguer Anomaly 2.40 tm^-3	F10.2	gu
SCBA160GU	Spherical Cap Bouguer Anomaly 1.60 tm^-3	F10.2	gu
SCBA267MGAL	Spherical Cap Bouguer Anomaly 2.67 tm^-3	F12.3	mGal
SCBA240MGAL	Spherical Cap Bouguer Anomaly 2.40 tm^-3	F12.3	mGal
SCBA160MGAL	Spherical Cap Bouguer Anomaly 1.60 tm^-3	F12.3	mGal
TCINNERGU	Inner Terrain Correction	F8.2	gu
TCINNERMGAL	Inner Terrain Correction	F8.3	mGal
QFINNER	Quality Factor Inner TC	I2	None
TCOUTERGU	Outer Terrain Correction	F8.2	gu
TCOUTERMGAL	Outer Terrain Correction	F8.3	mGal
QFOUTER	Quality Factor Outer TC	F2	None
TCTOTALGU	Total Terrain Correction	F8.2	gu
TCTOTALMGAL	Total Terrain Correction	F8.3	mGal
CGBA267GU	Complete Geoidal Bouguer Anomaly 2.67 tm^-3	F11.3	gu
CGBA267MGAL	Complete Geoidal Bouguer Anomaly 2.67 tm^-3	F11.3	mGal
CSCBA267GU	Complete Spherical Cap Bouguer Anomaly 2.67 tm^-3	F12.2	gu
CSCBA267MGAL	Complete Spherical Cap Bouguer Anomaly 2.67 tm^-3	F12.2	mGal
DIFFEASTM	Repeat Error for Easting Observation	F8.3	m
DIFFNORTHM	Repeat Error for Northing Observation	F8.3	m
DIFFHTM	Repeat Error for Elevation Observation	F8.3	m
DIFFOBSGMGAL	Repeat Error for Observed Gravity	F8.3	mGal
DIFFOBSGGU	Repeat Error for Observed Gravity	F8.2	gu
METERSN	Serial Number of Gravity Instrument	I8	None
CLOSUREGU	Loop Closure in gu	F8.2	gu
CLOSUREMGAL	Loop Closure in mGal	F8.3	mGal
HDIFF	Horizontal Difference between Acquired and Proposed Station	F7.3	m
GRVBASE	Gravity Base	A11	None
GNSSBASE	GNSS Base	A11	None
DATUM	Geographic Datum	A10	None
GEOID	Geoid Model	A10	None
GRAVDATUM	Gravity Datum	A10	None

Table 2: Final Gravity Database Format

9.0 Project Safety

Prior to survey commencement, a Hazard Identification and Risk Assessment (HIRA) was carried out for all new tasks not covered under Atlas Geophysics Standard Operating Procedures (SOP's) or the company's Health Safety Environment (HSE) field manual.

APPENDIX A
Control Station Descriptions

202113800001 – Dutch Mill Dairy

GEODETIC COORDS GDA94		GRID COORDINATES MGA Z55	
Latitude (DD MM SS)	40° 57' 51.92640"S	***Easting***	339,768.297
Longitude (DD MM SS)	145° 05' 45.08160"E	***Northing***	5,463,446.320
Ellipsoidal Height	N/A	***Orthometric Height (AUSGEOID09)***	N/A

OBSERVED GRAVITY	Established: 01/12/2021
gu AAGD07	9802604.24

Occupation Method/Location Details

The control point is on the corner of a concrete path on the right side of a building at the front of the Dutch Mill Tasmanian Dairy.

Gravity Control was established via two ABA ties to existing Atlas Geophysics control station 201300100001 “Grace's Cottage”. Standard deviation of the gravity ties is 0.001mGal.

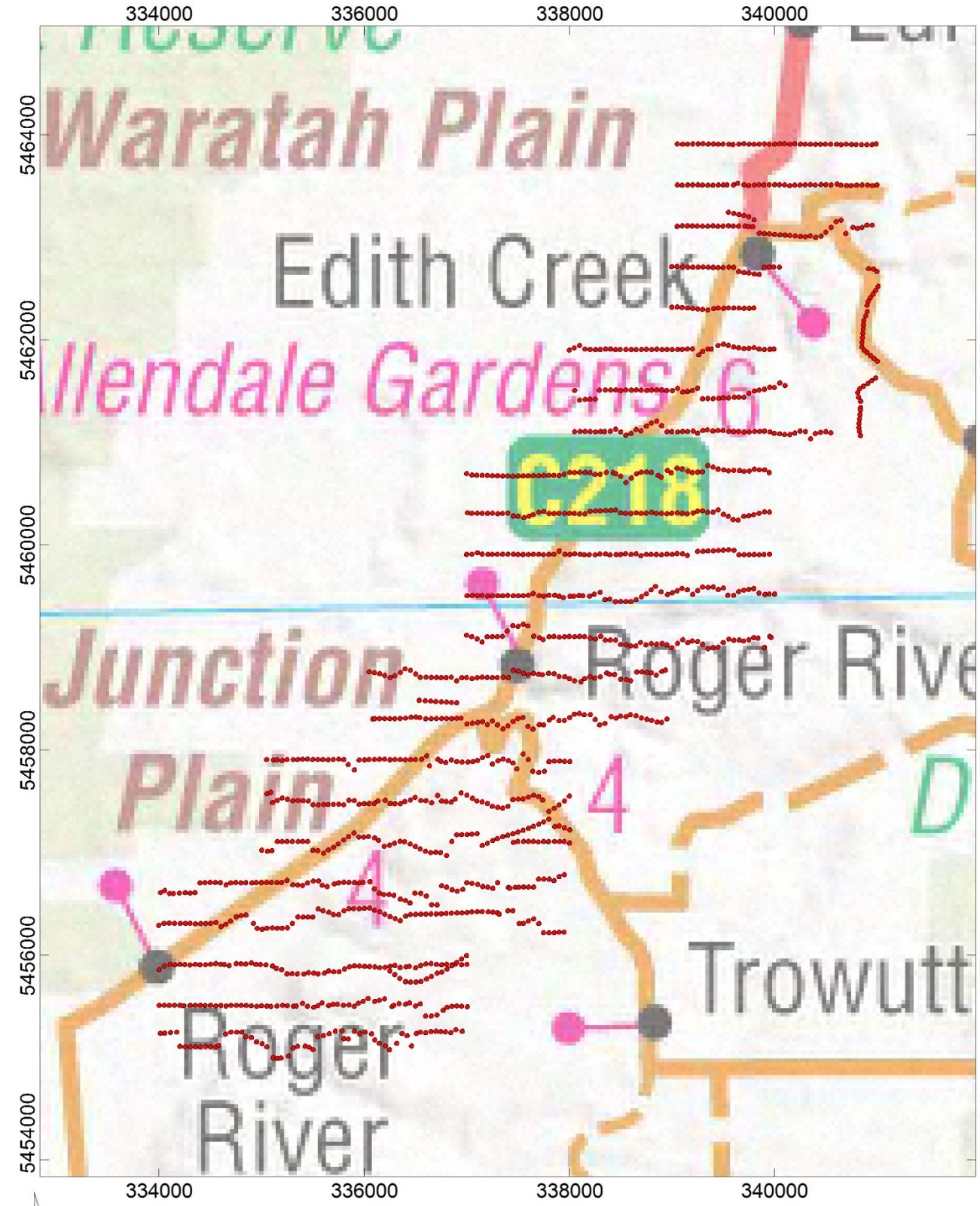
GNSS Control was not established at this location.

This control station is to the right of the building at the front of the Dutch Mill Tasmanian Dairy complex on Trowutta Road, Edith Creek, Tasmania.



Photograph of Control Station 202113800001 and surrounds

APPENDIX B
Plots and Imagery



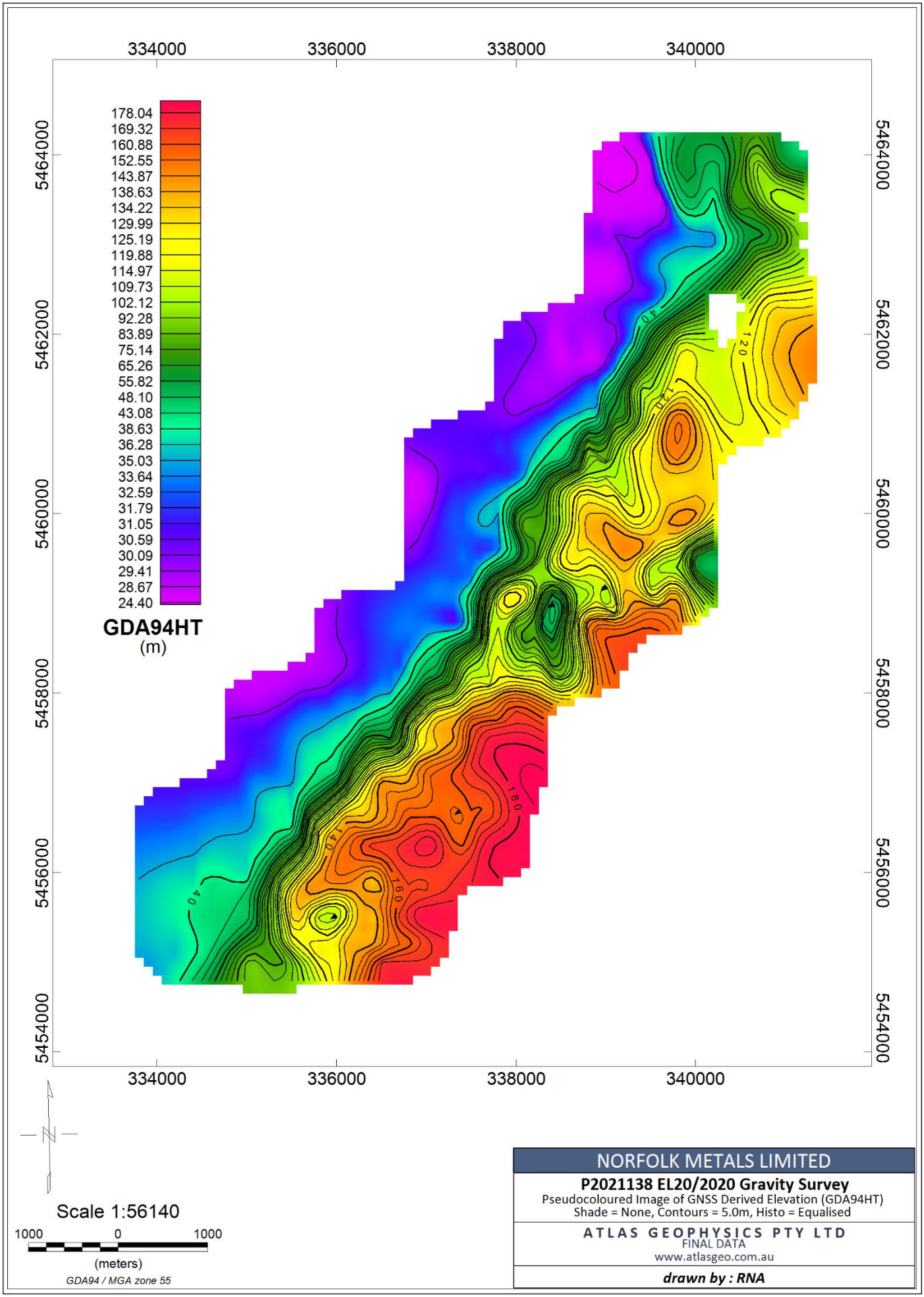
Scale 1:56140

1000 0 1000

(meters)

GDA94 / MGA zone 55

NORFOLK METALS LIMITED
P2021138 EL20/2020 Gravity Survey Plot of Gained Stations 400m x 50m Grid Configuration
ATLAS GEOPHYSICS PTY LTD FINAL DATA www.atlasgeo.com.au
drawn by : RNA



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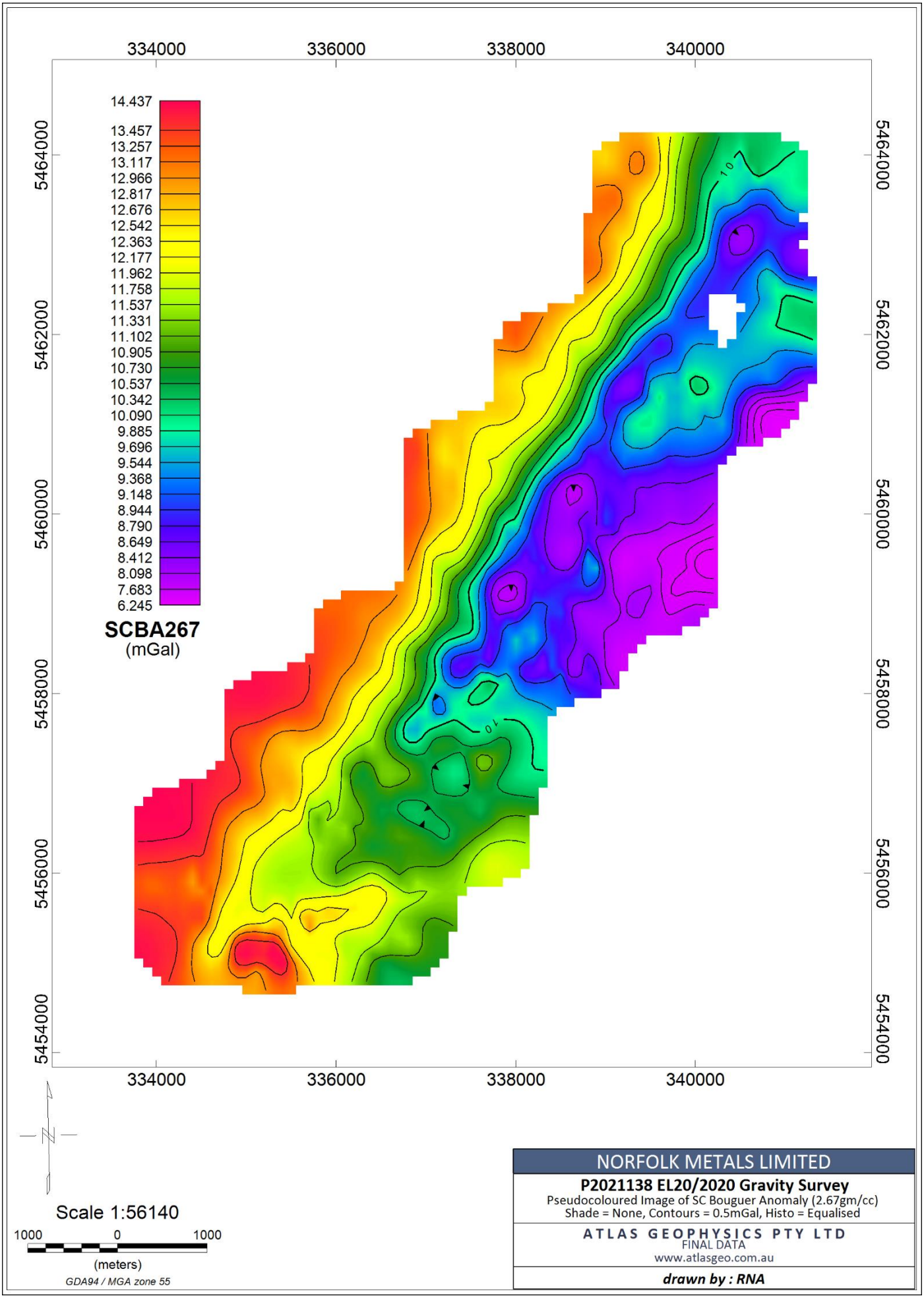
P2021138 EL20/2020 Gravity Survey

Pseudocoloured Image of GNSS Derived Elevation (GDA94HT)
Shade = None, Contours = 5.0m, Histo = Equalised

ATLAS GEOPHYSICS PTY LTD
FINAL DATA
www.atlasgeo.com.au

drawn by : RNA



Scale 1:56140

1000 0 1000

(meters)

GDA94 / MGA zone 55

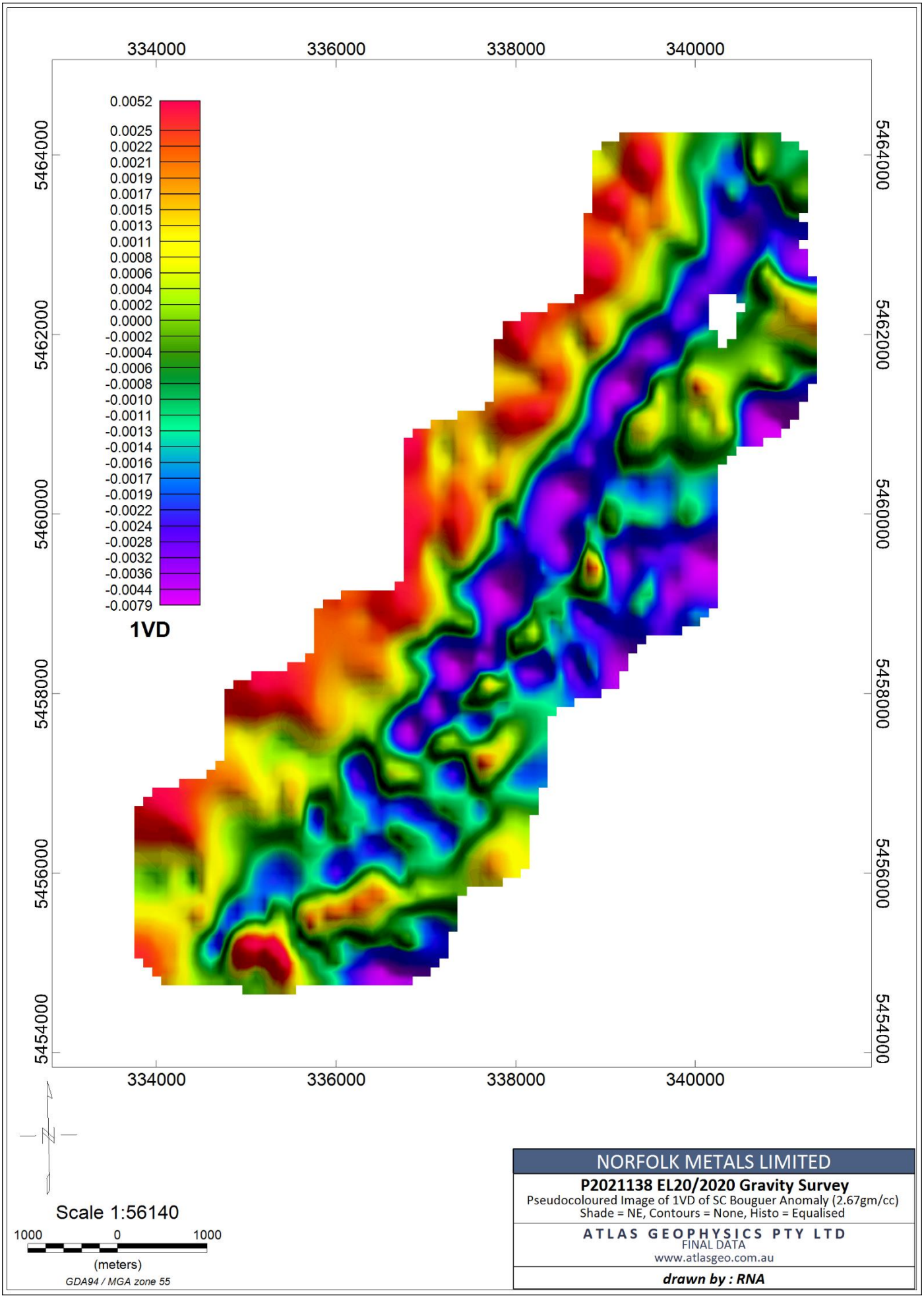
NORFOLK METALS LIMITED

P2021138 EL20/2020 Gravity Survey

Pseudocoloured Image of SC Bouguer Anomaly (2.67gm/cc)
Shade = None, Contours = 0.5mGal, Histo = Equalised

ATLAS GEOPHYSICS PTY LTD
FINAL DATA
www.atlasgeo.com.au

drawn by : RNA



Scale 1:56140

1000 0 1000

(meters)

GDA94 / MGA zone 55

NORFOLK METALS LIMITED
P2021138 EL20/2020 Gravity Survey Pseudocoloured Image of 1VD of SC Bouguer Anomaly (2.67gm/cc) Shade = NE, Contours = None, Histo = Equalised
ATLAS GEOPHYSICS PTY LTD FINAL DATA www.atlasgeo.com.au
drawn by : RNA

APPENDIX C
GNSS Control Information

202113800101 Dutch Mill Dairy GNSS only
0101 -40 57 51.46311 145 05 45.07590 35.143 37.413 GDA94
0101 -40 57 51.46297 145 05 45.07585 35.144 37.414 GDA94
0101 -40 57 51.46321 145 05 45.07572 35.141 37.411 GDA94

GDA94AVE
-40 57 51.46312
145 05 45.07580

-40.96429531
145.09585439

GDA94HT
35.143

AHDHT
37.413

N
-2.270

MGA55
339767.850
5463460.604

AMG55
339654.392
5463277.370