Results of the National GNSS CORS Campaign, June 2013

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Contents

[Introduction 7](#_Toc370911765)

[Measurand 7](#_Toc370911766)

[Measurand Traceability 7](#_Toc370911767)

[Measurand Uncertainty 7](#_Toc370911768)

[GPS Data 8](#_Toc370911769)

[GPS Data Irregularities 8](#_Toc370911770)

[Method 25](#_Toc370911771)

[Results 26](#_Toc370911772)

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## Expiry of this Report

5 years after authorisation date.

## Abbreviations

AFN Australian Fiducial Network

ARGN Australian Regional GNSS Network

CORS Continuously Operating Reference Station(s)

GDA94 Geocentric Datum Australia 1994

GNSS Global Navigation Satellite System(s)

GPS Global Positioning System

GRS80 Geodetic Reference System 1980

IGS International GNSS Service

ITRF International Terrestrial Reference Frame

ITRF92 International Terrestrial Reference Frame 1992

ITRF2008 International Terrestrial Reference Frame 2008

# Introduction

An Australian-wide certification campaign of positions in accordance with Regulation 13 of the National Measurement Regulations 1999 and the National Measurement Act 1960 has been run from 00:00:00 (UTC time) on Sunday 23 June 2013 to 00:00:00 (UTC time) Sunday 30 June 2013 (GPS week 1746). The primary objective of this campaign was to improve the consistency of legally traceable CORS positions across Australia, and the stated uncertainties on previously certified stations. As of 20 October 2013, ten applications for verification of a reference standard of measurement under Regulation 12 of the National Measurement Regulations 1999 have been received for verification of GDA94 position on their owned or managed station monuments. This report documents the processing and analysis of the national Regulation 13 campaign GPS data for the stations to satisfy the position verification requirements.

# Measurand

Station position, at the time of measurement and stated instrumentation, of a GPS monument with respect to the Geocentric Datum of Australia (GDA94) referred to the GRS80 ellipsoid being in the ITRF92 reference frame at the epoch 1994.0.

# Measurand Traceability

Measurement traceability was ensured by comparing the computed solution against the recognised value standard for position of the Australian Fiducial Network stations. Additionally, the computed solution was checked against the ITRF based solutions computed by the IGS and the individual global analysis centres of the IGS. The validity and traceability of the entire GPS system was ensured via its link to the global Satellite Laser Ranging (SLR) and Very Long Baseline Interferometry (VLBI) observing networks through the ITRF. The validity and traceability of our internal computation processes were ensured by undertaking standard benchmark analysis prior to this analysis.

# Measurand Uncertainty

Position uncertainties were calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

Type A uncertainty sources were evaluated by adopting an a priori sigma of 0.001 metre for the precision (1 sigma) of the L1-frequency, one-way, phase observation, at zenith. The corresponding uncertainties of all parameters were determined, by standard error propagation theory, in the least-squares estimation process used in the GPS analysis. Since the formal (internal) precision estimates of GPS solutions are well known to be optimistic, a factor of 10 (i.e. variance scale factor of 100) was subsequently applied to the variance-covariance matrix of the computed GDA94 coordinates.

Type B uncertainty sources, which in practice contribute to position uncertainty, cannot be estimated from the statistical analysis of short-period (i.e. 7-day) observations; these include environmental effects, such as long-period station loading (deformation) processes. Table 1 shows the major type B uncertainty sources for GPS analysis.

Table 1. Type B uncertainty sources (95% C.L.) for position, determined from GPS, and the total uncertainty, assuming the normal distribution of the uncertainty sources, high degrees of freedom and a coverage factor, k, of 2.

| Uncertainty Source | Position Uncertainty Horizontal (mm) | Position Uncertainty Vertical (mm) |
| --- | --- | --- |
| Antenna phase centre | 3 | 10 |
| Monument stability | 1 | 1 |
| Other sources including un-modelled crustal loading, satellite orbit variations, atmosphere, tectonics, signal multi-path | 6 | 10 |

# GPS Data

GPS RINEX data was supplied for the campaign week from the above ten clients. Figure 1 shows the locations of the stations. Tables 2 – 11 list the GPS receiver and antenna type at these stations. The AFN/ARGN/IGS network sites used in the GPS data processing are plotted in Figure 1. Table 12 lists the GPS receiver and antenna type used in the GPS data processing for each of the AFN/ARGN/IGS network sites. Table 13 lists the GPS antenna heights to the Antenna Reference Point (ARP) used in the GPS data processing for the AFN/ARGN/IGS stations. The ARP is the reference point as defined by IGS and the RINEX specifications. Table 14 - 23 list the GPS antenna heights to the Antenna Reference Point (ARP) used in the GPS data processing for the campaign stations.

# GPS Data Irregularities

Note that the station KARR submitted by CR Kennedy has the same four-char ID as the ARGN site KARR, they are not the same site. There is no solution for the site MIDG submitted by CR Kennedy because of poor quality of data.

A figure shows the locations of the campaign stations in green circles and ARGN/IGS stations in black triangles across Australia, including stations in Perth, Darwin, Sydney and Hobart.

Figure 1: Stations of the campaign week (circles) and AFN/ARGN/IGS (black triangles) stations used in GPS data processing.

Table 2: GPS receiver and antenna types for the station submitted by RPS Australia East Pty Ltd.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| CAVL | TRIMBLE NETR9 | 4611118879 | TRM57971.00 NONE |

Table 3: GPS receiver and antenna types for the station submitted by PMB Peak Downs Mine, BHP Billiton Mitsubishi Alliance.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| PDM1 | LEICA GRX1200GGPRO | 06450065 | LEIAX1202GG NONE |

Table 4: GPS receiver and antenna types for the stations submitted by Blackwater Mine, BHP Billiton Mitsubishi Alliance.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| BWMA | LEICA GRX1200+GNSS | 09341018 | LEIAS10 NONE |
| R10B | LEICA GRX1200GGPRO | 09341089 | LEIAS10 NONE |

Table 5: GPS receiver and antenna types for the stations submitted by Department of Natural Resources and Mines, Queensland.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| BDST | LEICA GRX1200GGPRO | 103226 | LEIAT504GG NONE |
| BDVL | TRIMBLE NETR9 | 5116354145 | TRM59800.00 NONE |
| BEE2 | TRIMBLE NETR5 | 1440932015 | TRM57971.00 NONE |
| BULA | TRIMBLE NETR9 | 5220354471 | TRM59800.00 NONE |
| CBLT | TRIMBLE NETR5 | 1440947134 | TRM57971.00 NONE |
| CLEV | TRIMBLE NETR5 | 1440904813 | TRM57971.00 NONE |
| COEN | TRIMBLE NETR9 | 5116354158 | TRM59800.00 NONE |
| COOL | TRIMBLE NETR9 | 5209354439 | TRM59800.00 NONE |
| DALB | TRIMBLE NETR5 | 4822A53935 | TRM59800.00 NONE |
| GATT | TRIMBLE NETR5 | 30255746 | TRM55971.00 NONE |
| GGTN | TRIMBLE NETR9 | 5116354139 | TRM59800.00 NONE |
| HNIS | LEICA GRX1200+GNSS | 09330024 | LEIAR25.R3 LEIT |
| HUGH | TRIMBLE NETR9 | 5220354468 | TRM59800.00 NONE |
| IPS2 | LEICA GRX1200GGPRO | 103242 | LEIAT504GG NONE |
| JLCK | TRIMBLE NETR9 | 5115354138 | TRM59800.00 NONE |
| KILK | TRIMBLE NETR9 | 5209354423 | TRM59800.00 NONE |
| LURA | TRIMBLE NETR9 | 5115354100 | TRM59800.00 NONE |
| MRBA | TRIMBLE NETR9 | 5115354104 | TRM59800.00 NONE |
| ROBI | LEICA GRX1200GGPRO | 200712 | LEIAT504GG NONE |
| RSBY | LEICA GRX1200+GNSS | 09310026 | LEIAR25.R3 LEIT |
| STHG | TRIMBLE NETR9 | 5220354469 | TRM59800.00 NONE |
| TOOG | TRIMBLE NETR5 | 30473612 | TRM55971.00 NONE |
| TOOW | LEICA GRX1200GGPRO | 103231 | LEIAT504GG NONE |
| WARW | LEICA GRX1200GGPRO | 200725 | LEIAT504GG NONE |
| WOOL | TRIMBLE NETRS | 0220164017 | TRM29659.00 NONE |

Table 6: GPS receiver and antenna types for the stations submitted by Land and Property Information, NSW.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| ANNA | TRIMBLE NETR9 | 5109354036 | TRM59800.00 SCIS |
| ARDL | LEICA GRX1200+GNSS | 15169075 | LEIAR10 NONE |
| ARMD | LEICA GRX1200+GNSS | 09240064 | LEIAX1203+GNSS NONE |
| BALN | LEICA GRX1200GGPRO | 07490014 | LEIAX1202GG NONE |
| BATH | TRIMBLE NETR9 | 5112354079 | TRM59800.00 SCIS |
| BEGA | LEICA GRX1200+GNSS | 13110-021 | LEIAR10 NONE |
| BING | TRIMBLE NETR9 | 5109354040 | TRM59800.00 SCIS |
| BJCT | LEICA GR25 | 15169089 | LEIAR10 NONE |
| BKNL | TRIMBLE NETR9 | 5115354136 | TRM59800.00 SCIS |
| BLRN | TRIMBLE NETR9 | 1441112234 | TRM57971.00 NONE |
| BOMB | TRIMBLE NETR9 | 0712118519 | TRM57971.00 NONE |
| BRBA | LEICA GRX1200+GNSS | 13110-009 | LEIAR10 NONE |
| BRDW | LEICA GRX1200+GNSS | 13110-036 | LEIAR10 NONE |
| BURK | LEICA GR25 | 15169073 | LEIAR10 NONE |
| CBAR | TRIMBLE NETR9 | 5109354030 | TRM59800.00 SCIS |
| CBLE | TRIMBLE NETR9 | 0712118514 | TRM57971.00 NONE |
| CHIP | LEICA GRX1200GGPRO | CR6200323020 | ASH701945E\_M SCIS |
| CKWL | TRIMBLE NETR9 | 1441112327 | TRM57971.00 NONE |
| CLBI | TRIMBLE NETR9 | 5000113743 | TRM57971.00 NONE |
| CNBN | TRIMBLE NETR9 | 5026353820 | TRM59800.00 SCIS |
| CNDO | LEICA GRX1200+GNSS | 13110-012 | LEIAR10 NONE |
| COFF | LEICA GRX1200GGPRO | 08340033 | LEIAX1202GG NONE |
| COMA | LEICA GRX1200+GNSS | 13110-024 | LEIAR10 NONE |
| CRDX | LEICA GRX1200+GNSS | 13194-086 | LEIAR10 NONE |
| CSNO | LEICA GRX1200+GNSS | 09250174 | LEIAX1203+GNSS NONE |
| CTMD | LEICA GRX1200+GNSS | 13194-010 | LEIAR10 NONE |
| CWN2 | TRIMBLE NETR5 | CR6200323012 | ASH701945E\_M SCIS |
| CWRA | LEICA GRX1200+GNSS | 13110-028 | LEIAR10 NONE |
| DBBO | TRIMBLE NETR9 | 5115354140 | TRM59800.00 SCIS |
| DKSN | LEICA GRX1200+GNSS | 09120016 | LEIAR25 LEIT |
| DLQN | TRIMBLE NETR9 | 1441112113 | TRM57971.00 NONE |
| DUNE | LEICA GRX1200+GNSS | 13194-012 | LEIAR10 NONE |
| FORB | LEICA GRX1200+GNSS | 13110-045 | LEIAR10 NONE |
| FTDN | TRIMBLE NETR9 | 1441109201 | TRM57971.00 NONE |
| GFEL | TRIMBLE NETR9 | 1441107128 | TRM57971.00 NONE |
| GFTH | LEICA GRX1200+GNSS | 13110-025 | LEIAR10 NONE |
| GFTN | LEICA GRX1200+GNSS | 12356-019 | LEIAR10 NONE |
| GILG | TRIMBLE NETR9 | 0712118768 | TRM57971.00 NONE |
| GLBN | LEICA GRX1200GGPRO | CR6200232023 | ASH701945E\_M SCIS |
| GLIN | LEICA GRX1200+GNSS | 13110049 | LEIAR10 NONE |
| GONG | TRIMBLE NETR9 | 5109354035 | TRM59800.00 SCIS |
| GUNN | TRIMBLE NETR9 | 0712118808 | TRM57971.00 NONE |
| HAY1 | LEICA GRX1200+GNSS | 13194-016 | LEIAR10 NONE |
| HLBK | TRIMBLE NETR9 | 0712118140 | TRM57971.00 NONE |
| IHOE | LEICA GRX1200+GNSS | 09480019 | LEIAR25.R3 LEIT |
| INVL | TRIMBLE NETR9 | 5109354041 | TRM59800.00 SCIS |
| JERI | TRIMBLE NETR9 | 1441109023 | TRM57971.00 NONE |
| LGOW | LEICA GRX1200+GNSS | 09250080 | LEIAX1203+GNSS NONE |
| LIRI | LEICA GR25 | 15039038 | LEIAR10 NONE |
| LKHT | TRIMBLE NETR9 | 1441112398 | TRM57971.00 NONE |
| MACK | LEICA GRX1200+GNSS | 09250086 | LEIAX1203+GNSS NONE |
| MENA | LEICA GRX1200GGPRO | CR6200323021 | ASH701945E\_M SCIS |
| MGRV | LEICA GRX1200GGPRO | CR6200323001 | ASH701945E\_M SCIS |
| MOUL | TRIMBLE NETR9 | 1441112486 | TRM57971.00 NONE |
| MREE | LEICA GRX1200+GNSS | 13110-023 | LEIAR10 NONE |
| MSVL | LEICA GRX1200+GNSS | 09250088 | LEIAX1203+GNSS NONE |
| MTHR | TRIMBLE SPS851 | 30080002 | TRM57971.00 NONE |
| MUDG | LEICA GRX1200+GNSS | 09250090 | LEIAX1203+GNSS NONE |
| MWAL | TRIMBLE NETR9 | 1441112282 | TRM57971.00 NONE |
| NBRI | LEICA GRX1200GGPRO | 12356-016 | LEIAR10 NONE |
| NBRK | TRIMBLE NETR9 | 5112354076 | TRM59800.00 SCIS |
| NDRA | LEICA GRX1200+GNSS | 13194-014 | LEIAR10 NONE |
| NEWE | LEICA GRX1200+GNSS | 725070 | LEIAR25.R4 LEIT |
| NGAN | LEICA GRX1200+GNSS | 09250089 | LEIAX1203+GNSS NONE |
| NOWE | LEICA GRX1200+GNSS | 13194-015 | LEIAR10 NONE |
| NSTA | TRIMBLE NETR9 | 5116354135 | TRM59800.00 SCIS |
| NWCS | TRIMBLE NETR5 | CR6200323013 | ASH701945E\_M SCIS |
| NWRA | LEICA GRX1200GGPRO | CR6200323011 | ASH701945E\_M SCIS |
| OBRN | TRIMBLE NETR9 | 1441107021 | TRM57971.00 NONE |
| ORNG | LEICA GRX1200+GNSS | 09250076 | LEIAX1203+GNSS NONE |
| OVAL | TRIMBLE NETR9 | 0712118813 | TRM57971.00 NONE |
| PBOT | LEICA GRX1200GGPRO | 200930 | LEIAT504GG LEIS |
| PERI | LEICA GRX1200+GNSS | 12356-013 | LEIAR10 NONE |
| PMAC | LEICA GRX1200+GNSS | 07520004 | LEIAX1202GG NONE |
| PRKS | LEICA GRX1200+GNSS | 13194-088 | LEIAR10 NONE |
| PTKL | LEICA GRX1200GGPRO | 200537 | LEIAT504GG SCIS |
| PUTY | LEICA GRX1200+GNSS | 09250084 | LEIAX1203+GNSS NONE |
| RAND | TRIMBLE NETR9 | 0712118260 | TRM57971.00 NONE |
| RGLN | TRIMBLE NETR5 | 30738847 | TRM57971.00 NONE |
| RUUS | TRIMBLE NETR9 | 5112354075 | TRM59800.00 SCIS |
| RYLS | LEICA GRX1200+GNSS | 13110-035 | LEIAR10 NONE |
| SCON | TRIMBLE NETR9 | 5115354137 | TRM59800.00 SCIS |
| SNGO | LEICA GRX1200+GNSS | 09250082 | LEIAX1203+GNSS NONE |
| SPWD | LEICA GRX1200+GNSS | CR6200323024 | ASH701945E\_M SCIS |
| TAMW | LEICA GRX1200+GNSS | 09250096 | LEIAX1203+GNSS NONE |
| TARE | LEICA GRX1200GGPRO | 08340035 | LEIAX1202GG NONE |
| TBOB | LEICA GRX1200GGPRO | 200524 | LEIAT504GG SCIS |
| TMBA | TRIMBLE NETR9 | 5116354154 | TRM59800.00 SCIS |
| TMRA | TRIMBLE NETR9 | 0712118827 | TRM57971.00 NONE |
| TMUT | TRIMBLE NETR9 | 1441112528 | TRM57971.00 NONE |
| TNTR | LEICA GRX1200+GNSS | 13110027 | LEIAR10 NONE |
| TULL | LEICA GR25 | 15169077 | LEIAR10 NONE |
| TURO | LEICA GRX1200+GNSS | 09480009 | LEIAR25.R3 LEIT |
| ULLA | LEICA GRX1200+GNSS | 08470020 | LEIAX1203+GNSS NONE |
| UNSW | LEICA GRX1200+GNSS | 448 | LEIAT504 LEIS |
| VLWD | TRIMBLE NETR5 | CR6200323007 | ASH701945E\_M SCIS |
| WAKL | TRIMBLE NETR9 | 0412118090 | TRM57971.00 NONE |
| WARI | TRIMBLE NETR9 | 0412118503 | TRM57971.00 NONE |
| WGGA | TRIMBLE NETR5 | 30765520 | TRM57971.00 NONE |
| WLGT | LEICA GRX1200+GNSS | 12356-021 | LEIAR10 NONE |
| WRRN | TRIMBLE NETR9 | 0712118773 | TRM57971.00 NONE |
| WWLG | LEICA GRX1200GGPRO | 200525 | LEIAT504GG SCIS |
| WYNG | LEICA GRX1200GGPRO | 08340043 | LEIAX1202GG NONE |
| YARO | LEICA GRX1200+GNSS | 09250173 | LEIAX1203+GNSS NONE |
| YASS | TRIMBLE NETR9 | 1312118069 | TRM57971.00 NONE |
| YMBA | TRIMBLE NETR9 | 0712118428 | TRM57971.00 NONE |
| YUNG | TRIMBLE NETR9 | 5106354020 | TRM59800.00 SCIS |

Table 7: GPS receiver and antenna types for the stations submitted by C.R. Kennedy Survey Solutions.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| ACL2 | LEICA GRX1200GGPRO | 07160051 | LEIAX1202GG NONE |
| ARCD | LEICA GR10 | 12261077 | LEIAS10 NONE |
| ARUN | LEICA GRX1200GGPRO | 08150070 | LEIAX1202GG NONE |
| BARA | LEICA GR10 | 12261114 | LEIAS10 NONE |
| BCMT | LEICA GRX1200GGPRO | 08150053 | LEIAX1202GG NONE |
| BDMR | LEICA GR10 | 12261095 | LEIAS10 NONE |
| BDRM | LEICA GRX1200+GNSS | 06200165 | LEIAX1202GG NONE |
| BIND | LEICA GR10 | 12261135 | LEIAS10 NONE |
| BLMT | LEICA GR10 | 12131113 | LEIAS10 NONE |
| BMDW | LEICA GX1230GG | 07150019 | LEIAX1202GG NONE |
| BNBY | LEICA GRX1200+GNSS | 12261123 | LEIAS10 NONE |
| BRTN | LEICA GRX1200GGPRO | 8240034 | LEIAX1202GG NONE |
| CALN | LEICA GRX1200+GNSS | 11301055 | LEIAS10 NONE |
| CANN | LEICA GRX1200GGPRO | 08120009 | LEIAX1202GG NONE |
| CANV | LEICA GR10 | 11501027 | LEIAS10 NONE |
| CAPL | LEICA GR10 | 12291039 | LEIAS10 NONE |
| CARB | LEICA GRX1200+GNSS | 12131123 | LEIAS10 NONE |
| CBTN | LEICA GRX1200+GNSS | 11181034 | LEIAS10 NONE |
| CCMB | LEICA GRX1200+GNSS | 7520021 | LEIAX1202GG NONE |
| CHCC | LEICA GRX1200+GNSS | 11331018 | LEIAS10 NONE |
| CORY | LEICA GRX1200+GNSS | 11181029 | LEIAS10 NONE |
| CRCW | LEICA GR10 | 12291046 | LEIAS10 NONE |
| CRKA | LEICA GRX1200GGPRO | 09360004 | LEIAX1203+GNSS NONE |
| CRKB | LEICA GRX1200GGPRO | 07030026 | LEIAX1202GG NONE |
| CRKM | LEICA GRX1200+GNSS | 09380011 | LEIAX1203+GNSS NONE |
| CRKP | LEICA GRX1200+GNSS | 11401032 | LEIAS10 NONE |
| CRKS | LEICA GRX1200+GNSS | 09410012 | LEIAX1203+GNSS NONE |
| CRL\_ | LEICA GRX1200GGPRO | 08160083 | LEIAX1202GG NONE |
| CRNS | LEICA GRX1200+GNSS | 010191058 | LEIAS10 NONE |
| CUDG | LEICA GR10 | 12291040 | LEIAS10 NONE |
| DIXL | LEICA GR10 | 12261099 | LEIAS10 NONE |
| DOCK | LEICA GRX1200+GNSS | 11331043 | LEIAS10 NONE |
| DUAR | LEICA GR10 | 12261136 | LEIAS10 NONE |
| DUBO | LEICA GRX1200GGPRO | 08470011 | LEIAX1202GG NONE |
| DWSN | LEICA GR10 | 12261082 | LEIAS10 NONE |
| DYST | LEICA GR10 | 12261113 | LEIAS10 NONE |
| ENSH | LEICA GRX1200+GNSS | 09380073 | LEIAX1203+GNSS NONE |
| EUNG | LEICA GRX1200+GNSS | 11081011 | LEIAS10 NONE |
| GLAD | LEICA GRX1200+GNSS | 09250131 | LEIAX1203+GNSS NONE |
| GRAS | LEICA GRX1200+GNSS | 11071047 | LEIAS10 NONE |
| GSFD | LEICA GRX1200+GNSS | 11381093 | LEIAS10 NONE |
| GYM2 | LEICA GRX1200GGPRO | 08160098 | LEIAX1202GG NONE |
| HBAY | LEICA GX1230GG | 06200150 | LEIAX1202GG NONE |
| HBG1 | LEICA GRX1200+GNSS | 11501026 | LEIAS10 NONE |
| HBG2 | LEICA GRX1200+GNSS | 11381030 | LEIAS10 NONE |
| HNSB | LEICA GRX1200+GNSS | 11181040 | LEIAS10 NONE |
| HOGN | LEICA GRX1200+GNSS | 11301060 | LEIAS10 NONE |
| JEEB | LEICA GRX1200+GNSS | 09250099 | LEIAX1203+GNSS NONE |
| JOON | LEICA GR10 | 12661070 | LEIAS10 NONE |
| KARR | LEICA GR10 | 12261056 | LEIAS10 NONE |
| KING | TRIMBLE NETR5 | 30607393 | TRM55971.00 NONE |
| KJNG | LEICA GR10 | 11381032 | LEIAS10 NONE |
| KMRA | LEICA GR10 | 12291049 | LEIAS10 NONE |
| KOUM | LEICA GRX1200+GNSS | 11031067 | LEIAS10 NONE |
| KURR | LEICA GRX1200+GNSS | 09380124 | LEIAX1203+GNSS NONE |
| LAUN | LEICA GRX1200+GNSS | 9380084 | LEIAX1203+GNSS NONE |
| LITH | LEICA GRX1200+GNSS | 09390004 | LEIAX1203+GNSS NONE |
| LTSP | LEICA GR10 | 12261076 | LEIAS10 NONE |
| MCLV | LEICA GRX1200+GNSS | 09360005 | LEIAX1203+GNSS NONE |
| MICH | LEICA GRX1200+GNSS | 12261094 | LEIAS10 NONE |
| MIDG | LEICA GRX1200+GNSS | 11141004 | LEIAS10 NONE |
| MIRA | LEICA GRX1200+GNSS | 11081009 | LEIAS10 NONE |
| MISA | LEICA GRX1200GGPRO | 08150065 | LEIAX1202GG NONE |
| MNDH | LEICA GR10 | 12261085 | LEIAS10 NONE |
| MNVA | TRIMBLE NETR5 | 1440918119 | TRM55971.00 NONE |
| MRYB | LEICA GRX1200+GNSS | 09250047 | LEIAX1203+GNSS NONE |
| MTB2 | LEICA GRX1200+GNSS | 09360006 | LEIAX1203+GNSS NONE |
| MTBL | LEICA GR10 | 12261084 | LEIAS10 NONE |
| MTGA | LEICA GRX1200+GNSS | 09250085 | LEIAX1203+GNSS NONE |
| MUSW | LEICA GRX1200+GNSS | 09350036 | LEIAX1203+GNSS NONE |
| NHAV | LEICA GRX1200+GNSS | 11331009 | LEIAS10 NONE |
| OLYM | LEICA GX1230GG | 06200156 | LEIAX1202GG NONE |
| PAIN | LEICA GRX1200+GNSS | 11331019 | LEIAS10 NONE |
| PROS | LEICA GRX1200+GNSS | 09391055 | LEIAS10 NONE |
| PTHD | LEICA GRX1200+GNSS | 9341086 | LEIAS10 NONE |
| RIDG | LEICA GR10 | 12261083 | LEIAS10 NONE |
| RLST | LEICA GR10 | 7030040 | LEIAX1203+GNSS NONE |
| RXBY | LEICA GRX1200+GNSS | 10451012 | LEIAS10 NONE |
| SALT | LEICA GRX1200GGPRO | 08250003 | LEIAX1202GG NONE |
| SAWG | LEICA GRX1200+GNSS | 09390084 | LEIAX1203+GNSS NONE |
| SLAD | LEICA GRX1200+GNSS | 11301043 | LEIAS10 NONE |
| TALO | LEICA GR10 | 12261140 | LEIAS10 NONE |
| TARO | LEICA GR10 | 11501014 | LEIAS10 NONE |
| TCBY | LEICA GRX1200+GNSS | 11181041 | LEIAS10 NONE |
| TERA | LEICA GR10 | 12291035 | LEIAS10 NONE |
| THEO | LEICA GR10 | 11471098 | LEIAS10 NONE |
| TNGL | LEICA GR10 | 11511053 | LEIAS10 NONE |
| TORQ | LEICA GRX1200+GNSS | 10461035 | LEIAS10 NONE |
| TRNG | LEICA GRX1200GGPRO | 06360003 | LEIAX1202GG NONE |
| TWED | LEICA GRX1200+GNSS | 07160038 | LEIAX1202GG NONE |
| WLTN | LEICA GR10 | 12261111 | LEIAS10 NONE |
| WNDN | LEICA GR10 | 12261062 | LEIAS10 NONE |
| WWCC | LEICA GX1230GG | 07330048 | LEIAX1202GG NONE |

Table 8: GPS receiver and antenna types for the stations submitted by Position Partners Pty Ltd.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| 2FYS | TRIMBLE NETRS | 762-10080 | TPSCR.G3 TPSH |
| 3CAM | TOPCON NETG3A | 403-0291 | TPSG3\_A1 TPSD |
| 3DAN | TOPCON NETG3A | 383-0240 | TPSCR.G3 TPSH |
| 7LAU | TOPCON NETG3A | 383-2216 | TPSCR.G3 TPSH |

Table 9: GPS receiver and antenna types for the stations submitted by National Geospatial Reference Systems Section, Geoscience Australia.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| ALBY | LEICA GRX1200GGPRO | 200527 | LEIAT504GG NONE |
| ANDA | LEICA GRX1200GGPRO | 200531 | LEIAT504GG SCIS |
| ARUB | LEICA GRX1200+GNSS | 09500005 | LEIAR25.R3 NONE |
| BALA | LEICA GRX1200+GNSS | 09310004 | LEIAR25.R3 NONE |
| BBOO | LEICA GRX1200GGPRO | 200547 | LEIAT504GG SCIS |
| BDLE | LEICA GR25 | 2002048 | LEIAT504GG SCIS |
| BEEC | LEICA GR25 | 200238 | LEIAT504GG NONE |
| BNDY | TRIMBLE NETR5 | CR6200538006 | ASH701945E\_M NONE |
| BRO1 | LEICA GRX1200+GNSS | 0937002 | LEIAR25.R3 LEIT |
| BROC | LEICA GRX1200+GNSS | 09330036 | LEIAR25.R3 NONE |
| BUR2 | LEICA GRX1200GGPRO | 103322 | LEIAT504 SCIS |
| BURA | LEICA GRX1200GGPRO | 200552 | LEIAT504GG SCIS |
| COOB | LEICA GRX1200+GNSS | 09480010 | LEIAR25.R3 LEIT |
| DARM | LEICA GRX1200PRO | 42022 | ASH701945C\_M NONE |
| DODA | LEICA GRX1200GGPRO | 200536 | LEIAT504GG NONE |
| ESPA | LEICA GRX1200GGPRO | 200533 | LEIAT504GG SCIS |
| EXMT | LEICA GRX1200+GNSS | 09370012 | LEIAR25.R3 LEIT |
| FLND | TRIMBLE NETR9 | 5220354464 | TRM59800.00 SCIS |
| FROY | LEICA GRX1200+GNSS | 09310030 | LEIAR25.R3 LEIT |
| GABO | LEICA GRX1200GGPRO | 200229 | LEIAT504GG SCIS |
| HIL1 | LEICA GRX1200PRO | CR5200404028 | ASH701945C\_M NONE |
| HYDN | LEICA GRX1200GGPRO | 200534 | LEIAT504GG SCIS |
| JAB2 | LEICA GRX1200GGPRO | 103313 | LEIAT504 NONE |
| JERV | TRIMBLE NETR9 | 5209354434 | TRM59800.00 NONE |
| KALG | LEICA GRX1200GGPRO | 200526 | LEIAT504GG SCIS |
| KAT1 | LEICA GRX1200+GNSS | 09310015 | LEIAR25.R3 LEIT |
| KAT2 | TRIMBLE NETR8 | 4938353446 | TRM59800.00 NONE |
| KELN | LEICA GRX1200GGPRO | 200548 | LEIAT504GG SCIS |
| KUNU | LEICA GRX1200+GNSS | 200539 | LEIAT504GG SCIS |
| LAMB | TRIMBLE NETR9 | 5209354411 | TRM59800.00 NONE |
| LARR | LEICA GRX1200GGPRO | 200535 | LEIAT504GG NONE |
| LIAW | LEICA GRX1200GGPRO | 200538 | LEIAT504GG SCIS |
| LKYA | LEICA GRX1200GGPRO | 200541 | LEIAT504GG SCIS |
| LONA | LEICA GRX1200+GNSS | 09330034 | LEIAR25.R3 LEIT |
| LORD | LEICA GRX1200GGPRO | 200702 | LEIAT504GG NONE |
| MAIN | LEICA GRX1200GGPRO | 200540 | LEIAT504GG NONE |
| MEDO | LEICA GRX1200+GNSS | 10150007 | LEIAR25.R3 LEIT |
| MNGO | TRIMBLE NETR9 | 5116354148 | TRM59800.00 NONE |
| MTCV | LEICA GRX1200+GNSS | 09370010 | LEIAR25.R3 LEIT |
| MTDN | TRIMBLE NETR9 | 5209354461 | TRM59800.00 SCIS |
| MTEM | LEICA GRX1200+GNSS | 5220354497 | TRM59800.00 NONE |
| MTMA | LEICA GRX1200+GNSS | 09440004 | LEIAR25.R3 LEIT |
| NCLF | LEICA GRX1200GGPRO | 200542 | LEIAT504GG SCIS |
| NHIL | LEICA GRX1200+GNSS | 09330004 | LEIAR25.R3 NONE |
| NORF | LEICA GRX1200GGPRO | 200696 | LEIAT504GG SCIS |
| NORS | LEICA GRX1200GGPRO | 200546 | LEIAT504GG SCIS |
| PTLD | LEICA GR25 | 200233 | LEIAT504GG SCIS |
| PTSV | LEICA GRX1200GGPRO | 200550 | LEIAT504GG SCIS |
| RAVN | LEICA GRX1200GGPRO | 200716 | LEIAT504GG SCIS |
| RHPT | LEICA GRX1200GGPRO | 103316 | LEIAT504 NONE |
| RKLD | LEICA GRX1200+GNSS | 09310006 | LEIAR25.R3 NONE |
| RNSP | LEICA GRX1200+GNSS | 09310019 | LEIAR25.R3 NONE |
| SA45 | LEICA GRX1200GGPRO | 200551 | LEIAT504GG SCIS |
| SPBY | LEICA GRX1200GGPRO | 200549 | LEIAT504GG SCIS |
| STR2 | TRIMBLE NETR9 | 4844A59851 | TRM59800.00 NONE |
| STR3 | LEICA GRX1200+GNSS | 09330013 | LEIAR25.R3 NONE |
| TID1 | TRIMBLE NETR8 | 205 | AOAD/M\_T JPLA |
| TOMP | LEICA GRX1200+GNSS | 10120010 | LEIAR25.R3 LEIT |
| UCLA | LEICA GRX1200GGPRO | 09370004 | LEIAR25.R3 NONE |
| WAGN | LEICA GRX1200+GNSS | 09330050 | LEIAR25.R3 LEIT |
| WARA | LEICA GRX1200GGPRO | 200677 | LEIAT504GG SCIS |
| WILU | LEICA GRX1200+GNSS | 09330021 | LEIAR25.R3 LEIT |
| WLAL | LEICA GRX1200+GNSS | 09310008 | LEIAR25.R3 LEIT |
| WMGA | LEICA GRX1200+GNSS | 09500008 | LEIAR25.R3 LEIT |
| YAR2 | ASHTECH UZ-12 | 371 | AOAD/M\_T NONE |
| YAR3 | LEICA GRX1200GGPRO | 08360001 | LEIAR25 NONE |
| YEEL | LEICA GRX1200GGPRO | 200532 | LEIAT504GG SCIS |
| YELO | LEICA GRX1200GGPRO | 200523 | LEIAT504GG SCIS |
| YNKI | TRIMBLE NETR9 | 5116354144 | TRM59800.00 NONE |
| YULA | TRIMBLE NETR9 | 5220354465 | TRM59800.00 NONE |

Table 10: GPS receiver and antenna types for the station submitted by Saraji Mine, BHP Billiton Mitsubishi Alliance.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| SRB1 | TRIMBLE SPS852 | 30167877 | TRM55971.00 NONE |

Table 11: GPS receiver and antenna types for the stations submitted by Western Australian Land Information Authority.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| ABNY | TRIMBLE NETR5 | 30278501 | TRM55971.00 NONE |
| BALI | TRIMBLE NETR5 | 30973154 | TRM57971.00 NONE |
| BINN | TRIMBLE NETR5 | 30318060 | TRM55971.00 NONE |
| BODD | TRIMBLE NETR5 | 31050746 | TRM57971.00 NONE |
| BUSS | TRIMBLE NETR5 | 30966303 | TRM57971.00 NONE |
| COLL | TRIMBLE NETR5 | 30975474 | TRM57971.00 NONE |
| CUND | TRIMBLE NETR5 | 23534390 | TRM55971.00 NONE |
| DMGB | LEICA GX1230+GNSS | 13757 | LEIAT502 NONE |
| DOWE | TRIMBLE NETR9 | 1441043077 | TRM57971.00 NONE |
| DWEL | TRIMBLE NETR5 | 30337696 | TRM55971.00 NONE |
| HTDG | TRIMBLE NETR5 | 30767634 | TRM57971.00 NONE |
| HYDE | TRIMBLE NETR5 | 1440929055 | TRM57971.00 NONE |
| KDAL | TRIMBLE NETR5 | 30966384 | TRM57971.00 NONE |
| LANN | TRIMBLE NETR5 | 1440921040 | TRM57971.00 NONE |
| MDAH | TRIMBLE NETR5 | 23534323 | TRM55971.00 NONE |
| MIDL | TRIMBLE NETR5 | 23534341 | TRM55971.00 NONE |
| MURK | TRIMBLE NETR9 | 1441043075 | TRM57971.00 NONE |
| NYAB | TRIMBLE NETR9 | 1441009249 | TRM57971.00 NONE |
| PINY | TRIMBLE NETR9 | 1441040387 | TRM57971.00 NONE |
| QUAN | TRIMBLE NETR5 | 30377293 | TRM55971.00 NONE |
| ROTT | TRIMBLE NETR5 | 23534347 | TRM55971.00 NONE |
| STRG | TRIMBLE NETR5 | 1440921100 | TRM57971.00 NONE |
| TORK | TRIMBLE NETR5 | 23534334 | TRM55971.00 NONE |
| WHIY | TRIMBLE NETR5 | 30765368 | TRM57971.00 NONE |

Table 12: GPS receiver and antenna types for the AFN/ARGN/IGS sites.

| Station | GPS receiver type | GPS antenna serial number | IGS antenna type and dome type |
| --- | --- | --- | --- |
| ALIC | LEICA GRX1200GGPRO | 09370001 | LEIAR25.R3 NONE |
| CEDU | TRIMBLE NETR8 | 194 | AOAD/M\_T AUST |
| DARW | GRX1200GGPRO | CR13354 | ASH700936D\_M NONE |
| HOB2 | LEICA GRX1200GGPRO | 203 | AOAD/M\_T NONE |
| KARR | TRIMBLE NETR8 | 4938353444 | TRM59800.00 NONE |
| MOBS | LEICA GRX1200GGPRO | CR20020709 | ASH701945C\_M NONE |
| PERT | TRIMBLE NETR9 | 5220354498 | TRM59800.00 NONE |
| STR1 | LEICA GRX1200GGPRO | CR620023911 | ASH701945C\_M NONE |
| SYDN | JPS E\_GGD | CR519994908 | ASH701945C\_M NONE |
| TIDB | ASHTECH UZ-12 | 205 | AOAD/M\_T JPLA |
| TOW2 | LEICA GRX1200GGPRO | 09310016 | LEIAR25.R3 NONE |
| YARR | LEICA GRX1200PRO | 103314 | LEIAT504 NONE |

Table 13: GPS antenna heights to ARP used in GPS processing for the minimally constrained AFN/ARGN/IGS stations.

| Station | Domes number | Antenna height to ARP (m) | Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- | --- | --- | --- |
| ALIC | 50137M001 | 0.0015 | PERT | 50133M001 | 0.0595 |
| CEDU | 50138M001 | 0.0060 | STR1 | 50119M002 | 0.0040 |
| DARW | 50134M001 | 0.0025 | SYDN | 50124M003 | 0.0300 |
| HOB2 | 50116M004 | 0.0000 | TIDB | 50103M108 | 0.0614 |
| KARR | 50139M001 | 0.0010 | TOW2 | 50140M001 | 0.0033 |
| MOBS | 50182M001 | 0.0000 | YARR | 50107M006 | 0.0045 |

Table 14: GPS antenna heights to ARP used in GPS processing for the station submitted by RPS Australia East Pty Ltd.

| Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- |
| CAVL | - | 0.0001 |

Table 15: GPS antenna heights to ARP used in GPS processing for the station submitted by PMB Peak Downs Mine, BHP Billiton Mitsubishi Alliance.

| Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- |
| PDM1 | - | 0.0140 |

Table 16: GPS antenna heights to ARP used in GPS processing for the stations submitted by Blackwater Mine, BHP Billiton Mitsubishi Alliance.

| Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- |
| BWMA | - | 0.000 |
| R10B | - | 0.000 |

Table 17: GPS antenna heights to ARP used in GPS processing for the stations submitted by Department of Natural Resources and Mines, Queensland.

| Station | Domes number | Antenna height to ARP (m) | Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- | --- | --- | --- |
| BDST | 59981M001 | 0.0000 | IPS2 | AUM000007 | 0.0000 |
| BDVL | 59931M001 | 0.0000 | JLCK | 59928M001 | 0.0000 |
| BEE2 | 59980M001 | 0.0000 | KILK | 59918M001 | 0.0000 |
| BULA | 59930M001 | 0.0000 | LURA | 59917M001 | 0.0000 |
| CBLT | 59979M001 | 0.0000 | MRBA | 59924M001 | 0.0000 |
| CLEV | 59978M001 | 0.0150 | ROBI | 59976M001 | 0.0000 |
| COEN | 59921M001 | 0.0000 | RSBY | 59953M001 | 0.0000 |
| COOL | 59933M001 | 0.0010 | STHG | 59932M001 | 0.0000 |
| DALB | AUM000095 | 0.0060 | TOOG | - | 0.0000 |
| GATT | 59977M001 | 0.0000 | TOOW | 59982M001 | 0.0000 |
| GGTN | 59920M001 | 0.0000 | WARW | AUM000094 | 0.0030 |
| HNIS | 59959M001 | 0.0000 | WOOL | 50143M003 | 0.0000 |
| HUGH | 59929M001 | 0.0000 |  |  |  |

Table 18: GPS antenna heights to ARP used in GPS processing for the stations submitted by Land and Property Information, NSW.

| Station | Domes number | Antenna height to ARP (m) | Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- | --- | --- | --- |
| ANNA | AUM000265 | 0.0000 | MREE | AUM000185 | 0.0000 |
| ARDL | AUM000289 | 0.0000 | MSVL | AUM000160 | 0.0000 |
| ARMD | AUM000143 | 0.0760 | MTHR | AUM000261 | 0.0000 |
| BALN | AUM000180 | 0.0000 | MUDG | AUM000161 | 0.0000 |
| BATH | AUM000102 | 0.0000 | MWAL | AUM000253 | 0.0000 |
| BEGA | AUM000199 | 0.0000 | NBRI | AUM000195 | 0.0000 |
| BING | 59942M001 | 0.0000 | NBRK | 59915M001 | 0.0000 |
| BJCT | AUM000298 | 0.0000 | NDRA | AUM000260 | 0.0000 |
| BKNL | 59951M001 | 0.0000 | NEWE | AUM000268 | 0.0000 |
| BLRN | AUM000262 | 0.0000 | NGAN | AUM000162 | 0.0000 |
| BOMB | AUM000284 | 0.0000 | NOWE | AUM000272 | 0.0000 |
| BRBA | AUM000186 | 0.0030 | NSTA | 59934M001 | 0.0000 |
| BRDW | AUM000200 | 0.0000 | NWCS | AUM000182 | 0.0000 |
| BURK | AUM000299 | 0.0000 | NWRA | AUM000163 | 0.0000 |
| CBAR | AUM000294 | 0.0000 | OBRN | AUM000211 | 0.0000 |
| CBLE | AUM000280 | 0.0000 | ORNG | AUM000164 | 0.0000 |
| CHIP | AUM000144 | 0.0000 | OVAL | AUM000274 | 0.0000 |
| CKWL | AUM000213 | 0.0000 | PBOT | AUM000165 | 0.0000 |
| CLBI | AUM000297 | 0.0000 | PERI | AUM000198 | 0.0000 |
| CNBN | 59949M001 | 0.0000 | PMAC | AUM000166 | 0.0000 |
| CNDO | AUM000145 | 0.0020 | PRKS | AUM000252 | 0.0000 |
| COFF | AUM000146 | 0.0000 | PTKL | 50145M004 | 0.0000 |
| COMA | AUM000193 | 0.0000 | PUTY | AUM000178 | 0.0000 |
| CRDX | AUM000197 | 0.0000 | RAND | AUM000288 | 0.0000 |
| CSNO | AUM000147 | 0.0000 | RGLN | AUM000194 | 0.0000 |
| CTMD | AUM000277 | 0.0000 | RUUS | AUM000296 | 0.0000 |
| CWN2 | AUM000148 | 0.0000 | RYLS | AUM000290 | 0.0000 |
| CWRA | AUM000181 | 0.0000 | SCON | AUM000212 | 0.0000 |
| DBBO | AUM000149 | 0.0020 | SNGO | AUM000168 | 0.0000 |
| DKSN | AUM000150 | 0.0000 | SPWD | AUM000169 | 0.0000 |
| DLQN | AUM000216 | 0.0000 | TAMW | AUM000170 | 0.3000 |
| DUNE | AUM000287 | 0.0000 | TARE | AUM000171 | 0.0000 |
| FORB | AUM000259 | 0.0000 | TBOB | 59963M001 | 0.0000 |
| FTDN | AUM000263 | 0.0000 | TMBA | AUM000210 | 0.0000 |
| GFEL | AUM000214 | 0.0000 | TMRA | AUM000282 | 0.0000 |
| GFTH | AUM000151 | 0.0000 | TMUT | AUM000209 | 0.0000 |
| GFTN | AUM000152 | 0.0000 | TNTR | AUM000172 | 0.0000 |
| GILG | AUM000279 | 0.0000 | TULL | AUM000293 | 0.0000 |
| GLBN | AUM000153 | 0.0000 | TURO | 59956M001 | 0.0000 |
| GLIN | AUM000154 | 0.0000 | ULLA | AUM000173 | 0.0000 |
| GONG | AUM000155 | 0.1950 | UNSW | 50190M001 | 0.0000 |
| GUNN | AUM000271 | 0.0000 | VLWD | AUM000174 | 0.0000 |
| HAY1 | AUM000267 | 0.0000 | WAKL | AUM000283 | 0.0000 |
| HLBK | AUM000278 | 0.0000 | WARI | AUM000270 | 0.0000 |
| IHOE | 59962M001 | 0.0000 | WGGA | AUM000176 | 0.0000 |
| INVL | AUM000269 | 0.0000 | WLGT | AUM000177 | 0.0000 |
| JERI | AUM000215 | 0.0000 | WRRN | AUM000276 | 0.0000 |
| LGOW | AUM000156 | 0.0000 | WWLG | 59988M001 | 0.0000 |
| LIRI | AUM000292 | 0.0000 | WYNG | AUM000179 | 0.0000 |
| LKHT | AUM000256 | 0.0000 | YARO | AUM000196 | 0.0000 |
| MACK | AUM000157 | 0.0000 | YASS | AUM000275 | 0.0000 |
| MENA | AUM000158 | 0.0000 | YMBA | AUM000273 | 0.0000 |
| MGRV | AUM000159 | 0.0000 | YUNG | AUM000258 | 0.0000 |
| MOUL | AUM000255 | 0.0000 |  |  |  |

Table 19: GPS antenna heights to ARP used in GPS processing for the stations submitted by C.R. Kennedy Survey Solutions.

| Station | Domes number | Antenna height to ARP (m) | Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- | --- | --- | --- |
| ACL2 | - | 0.0000 | JEEB | - | 0.0000 |
| ARCD | - | 0.0350 | JOON | - | 0.0260 |
| ARUN | - | 0.0000 | KARR | - | 0.0050 |
| BARA | - | 0.0510 | KING | - | 0.0030 |
| BCMT | - | 0.0000 | KJNG | - | 0.0000 |
| BDMR | - | 0.0350 | KMRA | - | 0.0350 |
| BDRM | - | 0.0000 | KOUM | - | 0.0000 |
| BIND | - | 0.0350 | KURR | - | 0.0000 |
| BLMT | - | 0.0000 | LAUN | - | 0.0000 |
| BMDW | - | 0.0000 | LITH | - | 0.0000 |
| BNBY | - | 0.0000 | LTSP | - | 0.0350 |
| BRTN | - | 0.0000 | MCLV | - | 0.0000 |
| CALN | - | 0.0000 | MICH | - | 0.0000 |
| CANN | - | 0.0000 | MIDG | - | 0.0000 |
| CANV | - | 0.0000 | MIRA | - | 0.0000 |
| CAPL | - | 0.0350 | MISA | - | 0.0000 |
| CARB | - | 0.0000 | MNDH | - | 0.0000 |
| CBTN | - | 0.0000 | MNVA | - | 0.0000 |
| CCMB | - | 0.0000 | MRYB | - | 0.0000 |
| CHCC | - | 0.0000 | MTB2 | - | 0.0000 |
| CORY | - | 0.0000 | MTBL | - | 0.0350 |
| CRCW | - | 0.0000 | MTGA | - | 0.0000 |
| CRKA | - | 0.0000 | MUSW | - | 0.0000 |
| CRKB | - | 0.0000 | NHAV | - | 0.0000 |
| CRKM | - | 0.0090 | OLYM | - | 0.0000 |
| CRKP | - | 0.0000 | PAIN | - | 0.0000 |
| CRKS | - | 0.0000 | PROS | - | 0.0000 |
| CRL\_ | - | 0.0000 | PTHD | - | 0.0000 |
| CRNS | - | 0.0000 | RIDG | - | 0.0000 |
| CUDG | - | 0.0000 | RLST | - | 0.0000 |
| DIXL | - | 0.0350 | RXBY | - | 0.0000 |
| DOCK | - | 0.0000 | SALT | - | 0.0000 |
| DUAR | - | 0.0000 | SAWG | - | 0.0000 |
| DUBO | - | 0.0000 | SLAD | - | 0.0000 |
| DWSN | - | 0.0000 | TALO | - | 0.0350 |
| DYST | - | 0.0350 | TARO | - | 0.0790 |
| ENSH | - | 0.0000 | TCBY | - | 0.0000 |
| EUNG | - | 0.0000 | TERA | - | 0.0350 |
| GLAD | - | 0.0000 | THEO | - | 0.0780 |
| GRAS | - | 0.0000 | TNGL | - | 0.0760 |
| GSFD | - | 0.0000 | TORQ | - | 0.0000 |
| GYM2 | - | 0.0000 | TRNG | - | 0.0000 |
| HBAY | - | 0.0000 | TWED | - | 0.0000 |
| HBG1 | - | 0.0000 | WLTN | - | 0.0000 |
| HBG2 | - | 0.0000 | WNDN | - | 0.0350 |
| HNSB | - | 0.0000 | WWCC | - | 0.0000 |
| HOGN | - | 0.0000 |  | - |  |

Table 20: GPS antenna heights to ARP used in GPS processing for the stations submitted by Position Partners Pty Ltd.

| Station | Domes number | Antenna height to ARP (m) | Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- | --- | --- | --- |
| 2FYS | - | 0.0000 | 3DAN | - | 0.0000 |
| 3CAM | - | 0. 0000 | 7LAU | - | 0. 0000 |

Table 21: GPS antenna heights to ARP used in GPS processing for the stations submitted by National Geospatial Reference Systems Section, Geoscience Australia.

| Station | Domes number | Antenna height to ARP (m) | Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- | --- | --- | --- |
| ALBY | 50191M001 | 0.0000 | MAIN | 59944M001 | 0.0000 |
| ANDA | 59971M001 | 0.0000 | MEDO | 59919M001 | 0.0000 |
| ARUB | 59946M001 | 0.0000 | MNGO | 59948M001 | 0.0000 |
| BALA | 59947M001 | 0.0000 | MTCV | 59965M001 | 0.0000 |
| BBOO | 59997M001 | 0.0000 | MTDN | 59922M001 | 0.0000 |
| BDLE | 50196M001 | 0.0000 | MTEM | 59954M001 | 0.0000 |
| BEEC | 59986M001 | 0.0000 | MTMA | 59958M001 | 0.0000 |
| BNDY | 50185M001 | 0.0000 | NCLF | 59916M001 | 0.0000 |
| BRO1 | 50176M003 | 0.0000 | NHIL | 59960M001 | 0.0000 |
| BROC | 59955M001 | 0.0000 | NORF | 50189M001 | 0.0000 |
| BUR2 | 50144M003 | 0.0005 | NORS | 50194M001 | 0.0000 |
| BURA | 50193M001 | 0.0000 | PTLD | 50158M003 | 0.0000 |
| COOB | 59970M001 | 0.0000 | PTSV | 50178M003 | 0.0019 |
| DARM | 50184M001 | 0.0035 | RAVN | 59967M001 | 0.0000 |
| DODA | 59985M001 | 0.0000 | RHPT | 50187M001 | 0.0000 |
| ESPA | 50177M002 | 0.0000 | RKLD | 59941M001 | 0.0000 |
| EXMT | 59939M001 | 0.0000 | RNSP | 59943M001 | 0.0000 |
| FLND | 59936M001 | 0.0000 | SA45 | 59987M001 | 0.0305 |
| FROY | 59937M001 | 0.0000 | SPBY | 50162M004 | 0.0005 |
| GABO | 59983M001 | 0.0000 | STR2 | 50119M001 | 0.0015 |
| HIL1 | 50141S001 | 0.0000 | STR3 | 50119M005 | 0.2687 |
| HYDN | 50195M001 | 0.0000 | TID1 | 50103M108 | 0.0614 |
| JAB2 | 50136M002 | 0.0000 | TOMP | 59935M001 | 0.0000 |
| JERV | 59923M001 | 0.0000 | UCLA | 50153M002 | 0.0000 |
| KALG | 50188M001 | 0.0000 | WAGN | 59966M001 | 0.0040 |
| KAT1 | 59968M001 | 0.0000 | WARA | 50198M001 | 0.0000 |
| KAT2 | 59968M002 | 0.0000 | WILU | 59964M001 | 0.0000 |
| KELN | 50197M001 | 0.0000 | WLAL | 59950M001 | 0.0000 |
| KUNU | 59995M001 | 0.0000 | WMGA | 59961M001 | 0.0000 |
| LAMB | 59925M001 | 0.0000 | YAR2 | 50107M004 | 0.0814 |
| LARR | 59984M001 | 0.0000 | YAR3 | 50107M008 | 0.0040 |
| LIAW | 50192M001 | 0.0000 | YEEL | 59996M001 | 0.0000 |
| LKYA | 59952M001 | 0.0000 | YELO | 50199M001 | 0.0000 |
| LONA | 59957M001 | 0.0000 | YNKI | 59914M001 | 0.0000 |
| LORD | 59998M001 | 0.0000 | YULA | 59926M001 | 0.0000 |

Table 22: GPS antenna heights to ARP used in GPS processing for the stations submitted by Saraji Mine, BHP Billiton Mitsubishi Alliance.

| Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- |
| SRB1 | - | 0.0380 |

Table 23: GPS antenna heights to ARP used in GPS processing for the stations submitted by Western Australian Land Information Authority.

| Station | Domes number | Antenna height to ARP (m) | Station | Domes number | Antenna height to ARP (m) |
| --- | --- | --- | --- | --- | --- |
| ABNY | - | 0.0000 | KDAL | 59989M001 | 0.0000 |
| BALI | 59994M001 | 0.0000 | LANN | - | 0.0000 |
| BINN | AUM000091 | 0.0000 | MDAH | AUM000093 | 0.0000 |
| BODD | - | 0.0000 | MIDL | 59990M001 | 0.0000 |
| BUSS | 59993M001 | 0.0000 | MURK | - | 0.0000 |
| COLL | 59992M001 | 0.0000 | NYAB | - | 0.0000 |
| CUND | 59991M001 | 0.0000 | PINY | - | 0.0000 |
| DMGB | - | 0.0000 | QUAN | - | 0.0280 |
| DOWE | - | 0.0000 | ROTT | AUM000088 | 0.0000 |
| DWEL | AUM000092 | 0.0000 | STRG | AUM000100 | 0.0000 |
| HTDG | - | 0.0000 | TORK | AUM000089 | 0.0000 |
| HYDE | - | 0.0000 | WHIY | AUM000090 | 0.0000 |

# Method

Analysis was undertaken following the procedures detailed in Geoscience Australia’s GPS Analysis Manual for the Verification of Position Issue 1.15.

In summary, daily solutions of the campaign stations and AFN/ARGN/IGS/other site data were processed using Bernese GPS Processing Software version 5.0. The Bernese GPS Software conforms to the IERS2003 conventions. IGS final GPS satellite ephemerides and earth orientation parameters were used in the computations. The double difference carrier phase observables at 30-second epoch intervals were used for GPS data processing. Other measurement modelling and parameter estimation included:

* Receiver clock corrections.
* Absolute antenna elevation-dependent phase centre variation corrections.
* Solid earth tide displacements.
* Ocean tide loading displacements.
* Elevation cutoff of 10° for all observations.
* QIF integer ambiguity resolution strategy.
* Elevation dependent observation weighting.
* Troposphere zenith delays estimated at 1-hour intervals for all stations.
* Minimum constraint condition for daily network solution in terms of the ITRF2008 using subset of the IGS08 reference stations.

This solution was transformed to GDA94 using the transformation approach detailed in: ITRF to GDA94 coordinate transformation, John Dawson and Alex Woods, Journal of Applied Geodesy 4 (2010), no. 4, pp. 189-199, available online at <http://www.reference-global.com/loi/jag>.

# Results

Tables 24 - 33 list the Root Mean Square (RMS) of the daily station coordinate values. Table 34 - 43 list the station coordinates resulting from the combination of the daily ITRF solutions and their subsequent transformation to GDA94.

Table 24: Root Mean Square (RMS) of daily station coordinates for the station submitted by RPS Australia East Pty Ltd.

| Station | North  (mm) | East  (mm) | Up  (mm) |
| --- | --- | --- | --- |
| CAVL | 0.7 | 1.5 | 3.4 |

Table 25: Root Mean Square (RMS) of daily station coordinates for the station submitted by PMB Peak Downs Mine, BHP Billiton Mitsubishi Alliance.

| Station | North  (mm) | East  (mm) | Up  (mm) |
| --- | --- | --- | --- |
| PDM1 | 1.6 | 0.8 | 5.2 |

Table 26: Root Mean Square (RMS) of daily station coordinates for the station submitted by Blackwater Mine, BHP Billiton Mitsubishi Alliance.

| Station | North  (mm) | East  (mm) | Up  (mm) | Station | North  (mm) | East  (mm) | Up  (mm) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BWMA | 1.4 | 0.6 | 3.5 | R10B | 1.0 | 0.4 | 3.9 |

Table 27: Root Mean Square (RMS) of daily station coordinates for the stations submitted by Department of Natural Resources and Mines, Queensland.

| Station | North  (mm) | East  (mm) | Up  (mm) | Station | North  (mm) | East  (mm) | Up  (mm) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BDST | 0.7 | 1.2 | 4.9 | IPS2 | 0.9 | 0.6 | 2.9 |
| BDVL | 0.5 | 0.7 | 2.6 | JLCK | 0.5 | 0.5 | 2.5 |
| BEE2 | 2.2 | 0.9 | 4.5 | KILK | 1.1 | 1.1 | 2.1 |
| BULA | 0.5 | 0.4 | 2.9 | LURA | 1.0 | 0.5 | 3.2 |
| CBLT | 0.9 | 0.7 | 2.9 | MRBA | 0.7 | 0.4 | 3.3 |
| CLEV | 1.2 | 1.2 | 5.3 | ROBI | 1.4 | 0.9 | 4.3 |
| COEN | 1.0 | 1.3 | 5.1 | RSBY | 0.9 | 0.9 | 4.9 |
| COOL | 0.6 | 0.5 | 1.5 | STHG | 0.6 | 0.4 | 1.9 |
| DALB | 1.6 | 0.8 | 4.9 | TOOG | 1.2 | 0.9 | 3.0 |
| GATT | 1.1 | 0.7 | 3.7 | TOOW | 0.8 | 0.9 | 3.8 |
| GGTN | 0.7 | 0.5 | 2.7 | WARW | 0.9 | 2.4 | 2.7 |
| HNIS | 1.4 | 1.2 | 4.8 | WOOL | 0.9 | 0.7 | 4.8 |
| HUGH | 0.7 | 0.4 | 2.2 |  |  |  |  |

Table 28: Root Mean Square (RMS) of daily station coordinates for the stations submitted by Land and Property Information, NSW.

| Station | North  (mm) | East  (mm) | Up  (mm) | Station | North  (mm) | East  (mm) | Up  (mm) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ANNA | 1.3 | 1.5 | 5.6 | MREE | 0.7 | 1.1 | 3.4 |
| ARDL | 0.3 | 0.4 | 3.6 | MSVL | 1.2 | 1.2 | 2.7 |
| ARMD | 1.1 | 0.9 | 3.1 | MTHR | 0.9 | 0.9 | 3.7 |
| BALN | 1.0 | 1.1 | 5.9 | MUDG | 0.6 | 1.3 | 3.5 |
| BATH | 0.5 | 0.5 | 2.7 | MWAL | 0.5 | 0.3 | 3.4 |
| BEGA | 0.8 | 0.7 | 5.1 | NBRI | 1.0 | 0.6 | 3.9 |
| BING | 0.7 | 0.7 | 2.1 | NBRK | 0.4 | 0.4 | 2.3 |
| BJCT | 0.6 | 0.4 | 3.8 | NDRA | 0.7 | 0.5 | 1.7 |
| BKNL | 0.4 | 0.6 | 2.5 | NEWE | 0.9 | 1.0 | 4.1 |
| BLRN | 0.6 | 1.0 | 3.4 | NGAN | 2.5 | 0.7 | 6.3 |
| BOMB | 0.9 | 0.5 | 3.8 | NOWE | 0.4 | 0.7 | 4.5 |
| BRBA | 0.8 | 0.8 | 2.2 | NSTA | 0.8 | 0.6 | 3.3 |
| BRDW | 0.5 | 1.0 | 2.8 | NWCS | 0.7 | 0.4 | 4.9 |
| BURK | 0.8 | 0.5 | 3.5 | NWRA | 0.9 | 0.6 | 3.5 |
| CBAR | 0.4 | 0.7 | 1.8 | OBRN | 0.9 | 0.6 | 2.5 |
| CBLE | 0.7 | 0.7 | 3.0 | ORNG | 1.1 | 0.9 | 5.6 |
| CHIP | 0.7 | 0.7 | 3.1 | OVAL | 0.8 | 0.9 | 1.8 |
| CKWL | 0.4 | 0.6 | 2.6 | PBOT | 0.8 | 0.6 | 2.4 |
| CLBI | 1.0 | 0.5 | 6.9 | PERI | 1.3 | 0.9 | 3.0 |
| CNBN | 0.8 | 0.8 | 3.5 | PMAC | 0.6 | 0.7 | 5.5 |
| CNDO | 0.4 | 0.4 | 2.7 | PRKS | 0.9 | 0.8 | 2.8 |
| COFF | 0.8 | 0.5 | 2.6 | PTKL | 0.6 | 0.6 | 4.0 |
| COMA | 0.6 | 1.0 | 3.4 | PUTY | 1.8 | 1.5 | 6.2 |
| CRDX | 0.5 | 1.5 | 4.7 | RAND | 0.5 | 0.6 | 6.0 |
| CSNO | 0.8 | 0.8 | 6.5 | RGLN | 0.6 | 0.7 | 2.8 |
| CTMD | 0.4 | 0.9 | 1.4 | RUUS | 0.6 | 0.6 | 2.9 |
| CWN2 | 0.9 | 0.6 | 4.2 | RYLS | 0.6 | 0.9 | 4.6 |
| CWRA | 1.2 | 0.9 | 5.7 | SCON | 0.6 | 1.0 | 3.9 |
| DBBO | 0.5 | 0.7 | 3.9 | SNGO | 1.5 | 1.7 | 5.0 |
| DKSN | 0.7 | 0.5 | 1.7 | SPWD | 0.9 | 1.1 | 5.8 |
| DLQN | 0.4 | 0.5 | 3.7 | TAMW | 1.5 | 1.4 | 4.0 |
| DUNE | 0.8 | 0.6 | 3.4 | TARE | 1.0 | 1.0 | 3.3 |
| FORB | 0.6 | 0.6 | 2.0 | TBOB | 0.6 | 0.5 | 3.2 |
| FTDN | 0.8 | 0.9 | 3.0 | TMBA | 0.9 | 1.4 | 2.4 |
| GFEL | 0.9 | 0.8 | 3.6 | TMRA | 0.7 | 0.6 | 2.2 |
| GFTH | 1.0 | 0.6 | 3.5 | TMUT | 1.1 | 0.6 | 4.1 |
| GFTN | 0.7 | 0.6 | 3.0 | TNTR | 0.7 | 1.1 | 3.4 |
| GILG | 0.7 | 0.7 | 3.8 | TULL | 0.4 | 0.7 | 2.4 |
| GLBN | 0.5 | 0.6 | 3.0 | TURO | 0.5 | 0.4 | 1.9 |
| GLIN | 0.6 | 0.7 | 4.6 | ULLA | 1.2 | 2.6 | 9.5 |
| GONG | 0.5 | 0.6 | 5.0 | UNSW | 0.9 | 0.6 | 2.9 |
| GUNN | 1.0 | 1.0 | 3.6 | VLWD | 0.9 | 0.5 | 4.5 |
| HAY1 | 0.6 | 0.6 | 4.0 | WAKL | 0.8 | 0.6 | 3.1 |
| HLBK | 0.9 | 0.5 | 2.6 | WARI | 0.6 | 0.9 | 4.1 |
| IHOE | 0.3 | 0.4 | 3.5 | WGGA | 0.9 | 0.4 | 3.2 |
| INVL | 0.9 | 0.8 | 3.1 | WLGT | 0.6 | 0.5 | 3.7 |
| JERI | 0.7 | 0.5 | 3.7 | WRRN | 0.7 | 0.6 | 1.5 |
| LGOW | 1.8 | 0.7 | 5.6 | WWLG | 0.8 | 0.2 | 2.7 |
| LIRI | 0.8 | 0.8 | 4.0 | WYNG | 0.7 | 1.1 | 4.3 |
| LKHT | 0.7 | 0.6 | 2.1 | YARO | 0.9 | 1.2 | 2.4 |
| MACK | 0.6 | 1.6 | 7.3 | YASS | 0.8 | 0.3 | 3.6 |
| MENA | 0.6 | 0.8 | 5.8 | YMBA | 1.1 | 0.8 | 4.5 |
| MGRV | 0.9 | 0.8 | 2.7 | YUNG | 0.7 | 0.3 | 3.3 |
| MOUL | 0.6 | 0.6 | 3.9 |  |  |  |  |

Table 29: Root Mean Square (RMS) of daily station coordinates for the stations submitted by C.R. Kennedy Survey Solutions.

| Station | North  (mm) | East  (mm) | Up  (mm) | Station | North  (mm) | East  (mm) | Up  (mm) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ACL2 | 0.5 | 0.7 | 3.0 | HOGN | 1.5 | 1.1 | 4.9 |
| ARCD | 1.7 | 1.2 | 3.7 | JEEB | 1.3 | 1.3 | 5.2 |
| ARUN | 1.8 | 0.7 | 6.5 | JOON | 0.9 | 1.2 | 3.4 |
| BARA | 1.2 | 0.8 | 4.4 | KARR | 0.8 | 1.0 | 2.4 |
| BCMT | 1.2 | 1.0 | 7.1 | KING | 0.6 | 1.1 | 3.1 |
| BDMR | 1.2 | 1.1 | 4.4 | KJNG | 1.8 | 1.0 | 6.6 |
| BDRM | 1.7 | 1.2 | 6.0 | KMRA | 1.4 | 1.1 | 6.2 |
| BIND | 0.4 | 1.5 | 2.2 | KOUM | 1.7 | 0.7 | 4.9 |
| BLMT | 1.2 | 1.2 | 2.0 | KURR | 2.5 | 2.1 | 8.7 |
| BMDW | 1.1 | 0.7 | 3.2 | LAUN | 1.0 | 0.6 | 3.3 |
| BNBY | 0.9 | 1.4 | 2.1 | LITH | 1.4 | 1.2 | 5.8 |
| BRTN | 1.9 | 0.7 | 6.0 | LTSP | 1.9 | 0.5 | 8.8 |
| CALN | 1.4 | 0.5 | 2.3 | MCLV | 0.8 | 0.5 | 4.8 |
| CANN | 1.0 | 0.9 | 3.8 | MICH | 1.6 | 1.3 | 4.8 |
| CANV | 2.0 | 0.8 | 5.3 | MIRA | 1.3 | 1.1 | 3.9 |
| CAPL | 1.1 | 0.6 | 2.8 | MISA | 0.8 | 0.9 | 2.1 |
| CARB | 1.3 | 0.5 | 3.0 | MNDH | 1.5 | 1.3 | 5.1 |
| CBTN | 0.6 | 1.4 | 6.2 | MNVA | 1.1 | 1.9 | 9.1 |
| CCMB | 0.8 | 1.1 | 4.4 | MRYB | 1.6 | 0.9 | 4.0 |
| CHCC | 1.9 | 1.2 | 7.9 | MTB2 | 0.9 | 0.8 | 3.3 |
| CORY | 1.3 | 1.0 | 4.4 | MTBL | 1.3 | 0.4 | 3.2 |
| CRCW | 1.0 | 1.7 | 4.9 | MTGA | 1.2 | 1.5 | 5.7 |
| CRKA | 0.7 | 0.8 | 1.6 | MUSW | 1.2 | 0.7 | 3.2 |
| CRKB | 1.2 | 1.0 | 5.6 | NHAV | 0.5 | 0.9 | 2.2 |
| CRKM | 1.7 | 0.9 | 4.7 | OLYM | 0.4 | 0.5 | 1.9 |
| CRKP | 0.8 | 1.3 | 3.1 | PAIN | 1.6 | 0.7 | 4.0 |
| CRKS | 1.4 | 3.0 | 4.3 | PROS | 0.7 | 1.3 | 3.0 |
| CRL\_ | 1.9 | 1.1 | 6.4 | PTHD | 2.2 | 1.1 | 8.2 |
| CRNS | 1.2 | 0.7 | 4.0 | RIDG | 1.2 | 0.9 | 4.2 |
| CUDG | 1.4 | 0.7 | 3.4 | RLST | 1.3 | 0.4 | 4.6 |
| DIXL | 1.0 | 0.5 | 5.0 | RXBY | 1.0 | 0.8 | 2.1 |
| DOCK | 1.2 | 0.4 | 2.3 | SALT | 1.7 | 0.9 | 3.1 |
| DUAR | 1.2 | 0.5 | 4.6 | SAWG | 2.4 | 0.8 | 11.2 |
| DUBO | 1.1 | 1.3 | 7.7 | SLAD | 1.2 | 0.7 | 3.2 |
| DWSN | 1.4 | 0.5 | 6.0 | TALO | 1.5 | 1.0 | 5.9 |
| DYST | 1.6 | 0.3 | 3.2 | TARO | 1.1 | 1.1 | 5.6 |
| ENSH | 1.2 | 0.4 | 3.8 | TCBY | 2.1 | 2.1 | 6.5 |
| EUNG | 1.6 | 0.9 | 4.5 | TERA | 1.2 | 0.7 | 3.1 |
| GLAD | 1.3 | 1.1 | 5.6 | THEO | 1.0 | 1.6 | 3.8 |
| GRAS | 1.1 | 0.6 | 3.5 | TNGL | 1.2 | 1.0 | 5.3 |
| GSFD | 1.5 | 2.1 | 6.1 | TORQ | 1.7 | 0.5 | 3.7 |
| GYM2 | 0.5 | 1.3 | 3.1 | TRNG | 1.2 | 0.8 | 4.3 |
| HBAY | 1.0 | 1.4 | 3.1 | TWED | 0.9 | 1.4 | 1.9 |
| HBG1 | 1.7 | 2.8 | 6.3 | WLTN | 0.9 | 1.2 | 1.4 |
| HBG2 | 1.3 | 2.8 | 8.6 | WNDN | 1.3 | 1.2 | 6.3 |
| HNSB | 1.9 | 0.9 | 2.4 | WWCC | 0.8 | 0.6 | 5.0 |

Table 30: Root Mean Square (RMS) of daily station coordinates for the stations submitted by Position Partners Pty Ltd.

| Station | North  (mm) | East  (mm) | Up  (mm) | Station | North  (mm) | East  (mm) | Up  (mm) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2FYS | 0.6 | 1.2 | 3.9 | 3DAN | 0.9 | 0.6 | 2.9 |
| 3CAM | 0.9 | 0.6 | 2.4 | 7LAU | 0.7 | 0.7 | 3.9 |

Table 31: Root Mean Square (RMS) of daily station coordinates for the stations submitted by National Geospatial Reference Systems Section, Geoscience Australia.

| Station | North  (mm) | East  (mm) | Up  (mm) | Station | North  (mm) | East  (mm) | Up  (mm) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ALBY | 3.0 | 2.4 | 4.1 | MEDO | 0.7 | 0.9 | 4.2 |
| ALIC | 0.6 | 0.5 | 3.0 | MNGO | 1.2 | 0.5 | 4.3 |
| ANDA | 0.3 | 0.5 | 4.1 | MOBS | 0.9 | 0.5 | 2.5 |
| ARUB | 0.9 | 0.5 | 1.8 | MTCV | 0.5 | 0.3 | 3.1 |
| BALA | 0.7 | 0.8 | 2.5 | MTDN | 0.7 | 0.6 | 3.6 |
| BBOO | 0.7 | 0.7 | 3.8 | MTEM | 0.9 | 0.5 | 2.2 |
| BDLE | 0.7 | 0.5 | 2.2 | MTMA | 0.3 | 0.1 | 1.5 |
| BEEC | 0.5 | 0.7 | 1.4 | NCLF | 0.9 | 0.6 | 3.7 |
| BNDY | 1.1 | 0.5 | 3.7 | NHIL | 0.6 | 0.3 | 2.4 |
| BRO1 | 0.9 | 0.5 | 3.7 | NORF | 1.7 | 1.0 | 3.5 |
| BROC | 0.6 | 0.4 | 1.7 | NORS | 0.5 | 0.6 | 2.2 |
| BUR2 | 0.7 | 0.6 | 3.4 | PERT | 0.7 | 0.7 | 4.7 |
| BURA | 0.7 | 0.5 | 3.3 | PTLD | 0.7 | 0.4 | 4.0 |
| CEDU | 0.5 | 0.8 | 3.6 | PTSV | 0.5 | 0.5 | 4.5 |
| COOB | 0.6 | 0.6 | 3.2 | RAVN | 0.8 | 1.1 | 3.0 |
| DARM | 0.8 | 0.6 | 4.1 | RHPT | 0.8 | 0.5 | 1.6 |
| DARW | 1.1 | 0.6 | 2.6 | RKLD | 0.8 | 0.7 | 2.0 |
| DODA | 0.6 | 0.8 | 2.9 | RNSP | 0.5 | 0.5 | 3.0 |
| ESPA | 0.7 | 0.3 | 3.7 | SA45 | 0.8 | 0.5 | 5.1 |
| EXMT | 0.9 | 0.9 | 2.5 | SPBY | 0.7 | 0.7 | 4.0 |
| FLND | 0.7 | 0.3 | 2.1 | STR1 | 0.5 | 0.5 | 1.6 |
| FROY | 0.8 | 0.7 | 3.6 | STR2 | 0.8 | 0.5 | 1.4 |
| GABO | 0.8 | 0.7 | 3.7 | STR3 | 0.5 | 0.5 | 1.7 |
| HIL1 | 1.1 | 1.1 | 4.6 | SYDN | 1.0 | 0.7 | 3.4 |
| HOB2 | 0.7 | 1.0 | 3.5 | TID1 | 0.7 | 1.0 | 2.4 |
| HYDN | 0.6 | 0.5 | 3.2 | TIDB | 0.9 | 0.8 | 1.7 |
| JAB2 | 1.0 | 0.8 | 3.9 | TOMP | 1.0 | 0.3 | 4.6 |
| JERV | 0.6 | 0.7 | 2.3 | TOW2 | 0.4 | 0.5 | 2.2 |
| KALG | 0.5 | 0.8 | 2.3 | UCLA | 0.8 | 0.9 | 3.9 |
| KARR | 2.0 | 1.0 | 2.5 | WAGN | 0.8 | 0.9 | 4.0 |
| KAT1 | 0.7 | 0.6 | 4.1 | WARA | 0.6 | 0.5 | 4.6 |
| KAT2 | 0.6 | 0.7 | 3.7 | WILU | 0.5 | 0.6 | 2.0 |
| KELN | 0.7 | 0.6 | 2.7 | WLAL | 1.0 | 0.8 | 5.4 |
| KUNU | 0.9 | 0.8 | 2.4 | WMGA | 0.6 | 0.4 | 2.5 |
| LAMB | 0.4 | 0.6 | 3.0 | YAR2 | 0.6 | 1.0 | 3.7 |
| LARR | 0.5 | 0.4 | 3.5 | YAR3 | 0.4 | 0.4 | 2.1 |
| LIAW | 1.4 | 0.7 | 2.3 | YARR | 0.3 | 0.2 | 2.6 |
| LKYA | 0.6 | 0.6 | 2.6 | YEEL | 0.5 | 0.3 | 2.2 |
| LONA | 0.7 | 0.7 | 3.0 | YELO | 0.4 | 0.5 | 2.5 |
| LORD | 1.8 | 2.4 | 4.8 | YNKI | 0.8 | 0.5 | 4.4 |
| MAIN | 0.7 | 1.1 | 3.1 | YULA | 0.5 | 0.8 | 5.0 |

Table 32: Root Mean Square (RMS) of daily station coordinates for the station submitted by Saraji Mine, BHP Billiton Mitsubishi Alliance.

| Station | North  (mm) | East  (mm) | Up  (mm) |
| --- | --- | --- | --- |
| SRB1 | 0.6 | 0.7 | 2.3 |

Table 33: Root Mean Square (RMS) of daily station coordinates for the stations submitted by Western Australian Land Information Authority.

| Station | North  (mm) | East  (mm) | Up  (mm) | Station | North  (mm) | East  (mm) | Up  (mm) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ABNY | 1.6 | 0.7 | 5.1 | KDAL | 1.4 | 1.2 | 5.0 |
| BALI | 0.9 | 1.0 | 3.6 | LANN | 0.6 | 0.2 | 4.7 |
| BINN | 1.3 | 0.9 | 2.8 | MDAH | 1.3 | 1.7 | 5.7 |
| BODD | 1.5 | 1.0 | 4.1 | MIDL | 1.1 | 1.0 | 3.0 |
| BUSS | 1.0 | 0.9 | 3.3 | MURK | 0.8 | 0.8 | 3.1 |
| COLL | 0.9 | 1.9 | 4.4 | NYAB | 1.1 | 1.0 | 4.1 |
| CUND | 0.8 | 1.2 | 1.8 | PINY | 0.8 | 0.9 | 2.5 |
| DMGB | 4.5 | 1.2 | 8.9 | QUAN | 0.9 | 1.2 | 4.5 |
| DOWE | 0.5 | 0.5 | 1.4 | ROTT | 2.6 | 1.2 | 7.3 |
| DWEL | 1.0 | 1.6 | 2.7 | STRG | 0.6 | 1.4 | 4.3 |
| HTDG | 0.7 | 0.7 | 3.8 | TORK | 1.3 | 1.5 | 3.6 |
| HYDE | 1.0 | 0.9 | 3.8 | WHIY | 0.9 | 1.2 | 2.9 |

Table 34: Computed Geocentric Datum of Australia (GDA94) geodetic coordinates and their uncertainty for the station submitted by RPS Australia East Pty Ltd. The uncertainties are calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

| Station | Longitude (DMS east)  Uncertainty (m) | | | Latitude (DMS south)  Uncertainty (m) | | | Ellipsoidal height (m)  Uncertainty (m) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| CAVL | 148 | 3 | 4.47441 | 22 | 8 | 53.80434 | 331.1605 |
|  |  |  | ±0.008 |  |  | ±0.007 | ±0.019 |

Table 35: Computed Geocentric Datum of Australia (GDA94) geodetic coordinates and their uncertainty for the station submitted by PMB Peak Downs Mine, BHP Billiton Mitsubishi Alliance. The uncertainties are calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

| Station | Longitude (DMS east)  Uncertainty (m) | | | Latitude (DMS south)  Uncertainty (m) | | | Ellipsoidal height (m)  Uncertainty (m) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| PDM1 | 148 | 10 | 27.52674 | 22 | 15 | 13.05950 | 320.2465 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |

Table 36: Computed Geocentric Datum of Australia (GDA94) geodetic coordinates and their uncertainty for the stations submitted by Blackwater Mine, BHP Billiton Mitsubishi Alliance. The uncertainties are calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

| Station | Longitude (DMS east)  Uncertainty (m) | | | Latitude (DMS south)  Uncertainty (m) | | | Ellipsoidal height (m)  Uncertainty (m) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BWMA | 148 | 52 | 42.89396 | 23 | 46 | 9.22286 | 289.5868 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| R10B | 148 | 49 | 14.05336 | 23 | 35 | 52.93674 | 261.9299 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |

Table 37: Computed Geocentric Datum of Australia (GDA94) geodetic coordinates and their uncertainty for the stations submitted by Department of Natural Resources and Mines, Queensland. The uncertainties are calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

| Station | Longitude (DMS east)  Uncertainty (m) | | | Latitude (DMS south)  Uncertainty (m) | | | Ellipsoidal height (m)  Uncertainty (m) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| BDST | 152 | 59 | 42.27818 | 27 | 59 | 13.56952 | 101.0957 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| BDVL | 139 | 20 | 52.45815 | 25 | 54 | 1.53286 | 69.2535 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| BEE2 | 153 | 12 | 9.07874 | 27 | 43 | 13.21540 | 54.8086 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BULA | 139 | 54 | 11.00047 | 22 | 54 | 48.77562 | 200.6836 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| CBLT | 152 | 57 | 5.45878 | 27 | 5 | 3.97242 | 83.9394 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| CLEV | 153 | 15 | 59.52268 | 27 | 31 | 34.17662 | 67.0056 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| COEN | 143 | 10 | 36.12960 | 13 | 57 | 31.58774 | 254.8036 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| COOL | 145 | 40 | 49.20249 | 26 | 44 | 31.60503 | 333.8023 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| DALB | 151 | 15 | 49.65027 | 27 | 10 | 13.97534 | 394.6846 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| GATT | 152 | 19 | 51.99962 | 27 | 32 | 38.17784 | 140.5830 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| GGTN | 143 | 32 | 26.26022 | 18 | 18 | 21.49825 | 367.2252 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| HNIS | 142 | 17 | 46.34459 | 10 | 35 | 25.36780 | 87.8323 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.019 |
| HUGH | 144 | 12 | 16.06842 | 20 | 56 | 50.79625 | 524.1138 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.019 |
| IPS2 | 152 | 45 | 33.62940 | 27 | 36 | 53.76279 | 88.6425 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| JLCK | 141 | 44 | 20.36258 | 20 | 40 | 9.41011 | 169.5250 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| KILK | 152 | 15 | 7.42235 | 26 | 5 | 3.22005 | 250.9043 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| LURA | 144 | 27 | 25.10260 | 15 | 34 | 39.05660 | 150.7512 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| MRBA | 145 | 19 | 25.78315 | 17 | 1 | 4.64102 | 645.5204 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| ROBI | 153 | 22 | 52.50836 | 28 | 4 | 37.08915 | 65.2921 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| RSBY | 150 | 47 | 24.28230 | 23 | 9 | 39.58844 | 58.2527 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| STHG | 143 | 17 | 7.01035 | 24 | 21 | 0.92247 | 195.8079 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| TOOG | 152 | 21 | 59.08272 | 27 | 5 | 0.00691 | 193.6034 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| TOOW | 151 | 55 | 42.43292 | 27 | 32 | 4.00318 | 685.7717 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| WARW | 152 | 1 | 49.40184 | 28 | 12 | 48.54182 | 507.4286 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| WOOL | 153 | 2 | 6.96433 | 27 | 29 | 5.88837 | 91.0536 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |

Table 38: Computed Geocentric Datum of Australia (GDA94) geodetic coordinates and their uncertainty for the stations submitted by Land and Property Information, NSW. The uncertainties are calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

| Station | Longitude (DMS east)  Uncertainty (m) | | | Latitude (DMS south)  Uncertainty (m) | | | Ellipsoidal height (m)  Uncertainty (m) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ANNA | 152 | 5 | 10.77370 | 32 | 47 | 5.28731 | 41.6966 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| ARDL | 146 | 54 | 12.43554 | 34 | 21 | 3.09323 | 237.5319 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| ARMD | 151 | 39 | 56.97368 | 30 | 30 | 52.62727 | 1034.7843 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BALN | 153 | 33 | 50.71983 | 28 | 52 | 21.62989 | 44.5350 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BATH | 149 | 34 | 1.95859 | 33 | 25 | 46.90217 | 756.6209 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BEGA | 149 | 50 | 31.21206 | 36 | 40 | 33.30663 | 52.7123 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BING | 151 | 39 | 8.37323 | 32 | 24 | 42.41120 | 486.8683 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BJCT | 148 | 57 | 51.06077 | 30 | 6 | 5.98048 | 198.1456 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.017 |
| BKNL | 141 | 28 | 12.34539 | 31 | 59 | 46.68579 | 307.5148 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BLRN | 143 | 34 | 2.66312 | 34 | 38 | 45.11536 | 77.6241 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BOMB | 149 | 14 | 13.51680 | 36 | 54 | 43.38425 | 723.1510 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BRBA | 150 | 36 | 26.24420 | 30 | 22 | 49.26518 | 537.2214 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BRDW | 149 | 47 | 6.64939 | 35 | 26 | 47.38551 | 679.5570 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BURK | 145 | 56 | 3.44033 | 30 | 5 | 42.99128 | 136.4084 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| CBAR | 145 | 50 | 10.14437 | 31 | 30 | 49.18126 | 260.6348 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| CBLE | 148 | 22 | 41.60972 | 30 | 57 | 12.77009 | 209.3299 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| CHIP | 151 | 12 | 4.37222 | 33 | 53 | 12.80921 | 55.9012 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CKWL | 149 | 28 | 21.04131 | 34 | 27 | 21.86006 | 916.1770 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| CLBI | 148 | 35 | 7.80136 | 29 | 32 | 33.22813 | 179.8644 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CNBN | 149 | 16 | 10.45059 | 31 | 19 | 59.96386 | 674.8177 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| CNDO | 147 | 9 | 3.61472 | 33 | 5 | 6.58757 | 229.7387 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| COFF | 153 | 8 | 17.98122 | 30 | 18 | 0.43829 | 46.5929 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| COMA | 149 | 7 | 37.99580 | 36 | 14 | 7.35726 | 823.4612 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| CRDX | 150 | 46 | 3.23112 | 34 | 19 | 29.31445 | 402.1838 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CSNO | 153 | 2 | 51.25233 | 28 | 51 | 56.07349 | 69.0820 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| CTMD | 148 | 1 | 32.32736 | 34 | 38 | 21.49767 | 356.1929 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| CWN2 | 151 | 10 | 17.59692 | 33 | 35 | 37.33386 | 218.0782 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CWRA | 148 | 42 | 8.31794 | 33 | 49 | 52.48762 | 333.3734 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| DBBO | 148 | 36 | 7.64028 | 32 | 14 | 57.75194 | 297.6600 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| DKSN | 149 | 8 | 8.62187 | 35 | 15 | 2.71111 | 613.8429 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| DLQN | 144 | 57 | 52.63357 | 35 | 31 | 53.84303 | 110.0425 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| DUNE | 149 | 23 | 17.42274 | 32 | 0 | 42.71083 | 412.7569 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| FORB | 148 | 0 | 25.08213 | 33 | 23 | 6.97479 | 269.7995 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| FTDN | 151 | 13 | 30.88384 | 33 | 51 | 18.23313 | 27.9279 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| GFEL | 148 | 9 | 38.60640 | 33 | 53 | 34.90199 | 412.5747 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| GFTH | 146 | 2 | 12.43751 | 34 | 17 | 10.73015 | 161.6623 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| GFTN | 152 | 55 | 58.43929 | 29 | 41 | 34.93208 | 59.1992 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| GILG | 148 | 39 | 44.85857 | 31 | 42 | 39.55949 | 319.4663 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| GLBN | 149 | 43 | 3.76318 | 34 | 45 | 20.50522 | 678.7260 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| GLIN | 151 | 45 | 5.98253 | 29 | 44 | 36.80308 | 1205.6866 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| GONG | 150 | 53 | 55.82782 | 34 | 25 | 38.01219 | 75.6159 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| GUNN | 150 | 15 | 22.60258 | 30 | 58 | 41.42983 | 303.8309 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| HAY1 | 144 | 51 | 8.82104 | 34 | 30 | 19.95330 | 107.8181 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| HLBK | 147 | 19 | 2.62937 | 35 | 43 | 27.77881 | 284.6246 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| IHOE | 143 | 29 | 31.40969 | 32 | 51 | 50.92268 | 151.0238 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.016 |
| INVL | 151 | 6 | 51.81551 | 29 | 46 | 35.14380 | 627.2129 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| JERI | 145 | 43 | 31.67957 | 35 | 21 | 19.18904 | 129.7161 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| LGOW | 150 | 9 | 35.39253 | 33 | 28 | 51.42941 | 969.4123 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| LIRI | 147 | 58 | 58.41213 | 29 | 25 | 47.06796 | 186.0271 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| LKHT | 146 | 42 | 20.93771 | 35 | 13 | 38.15764 | 169.5221 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MACK | 152 | 55 | 6.16501 | 30 | 42 | 37.59534 | 43.4360 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| MENA | 150 | 44 | 37.50900 | 34 | 7 | 33.95992 | 111.4384 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| MGRV | 150 | 49 | 51.54245 | 33 | 37 | 35.49101 | 45.2397 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| MOUL | 144 | 2 | 9.68772 | 35 | 5 | 27.78231 | 84.0504 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| MREE | 149 | 49 | 31.97405 | 29 | 27 | 27.82465 | 245.9703 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| MSVL | 150 | 22 | 24.21243 | 34 | 33 | 1.95870 | 703.1915 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MTHR | 151 | 5 | 56.78164 | 32 | 36 | 55.58896 | 96.1321 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MUDG | 149 | 35 | 4.84577 | 32 | 35 | 24.02344 | 482.4117 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MWAL | 145 | 59 | 18.44461 | 35 | 59 | 35.33100 | 144.2593 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| NBRI | 149 | 47 | 10.87633 | 30 | 19 | 48.47119 | 253.7299 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| NBRK | 145 | 48 | 50.52518 | 29 | 40 | 37.77703 | 181.4733 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| NDRA | 146 | 32 | 15.11272 | 34 | 45 | 6.86740 | 169.1505 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| NEWE | 151 | 47 | 19.47743 | 32 | 55 | 26.31537 | 30.1798 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| NGAN | 147 | 11 | 40.39978 | 31 | 33 | 50.07345 | 204.0410 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| NOWE | 151 | 42 | 58.59014 | 31 | 30 | 48.81423 | 886.7008 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| NSTA | 150 | 26 | 38.76370 | 29 | 2 | 43.99516 | 458.2989 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| NWCS | 151 | 45 | 54.82063 | 32 | 55 | 46.51105 | 52.9531 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| NWRA | 150 | 36 | 17.31203 | 34 | 52 | 25.58378 | 46.5746 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| OBRN | 149 | 51 | 27.37610 | 33 | 42 | 14.23450 | 1137.4011 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| ORNG | 149 | 5 | 52.87985 | 33 | 17 | 6.72320 | 906.9414 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| OVAL | 148 | 38 | 45.77720 | 32 | 45 | 13.86716 | 409.4756 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| PBOT | 151 | 12 | 43.38718 | 33 | 58 | 26.51849 | 34.5379 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| PERI | 148 | 24 | 35.88117 | 36 | 24 | 40.66109 | 1753.8096 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| PMAC | 152 | 53 | 51.63168 | 31 | 27 | 42.88792 | 43.8992 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| PRKS | 148 | 10 | 35.26530 | 33 | 8 | 5.05591 | 367.5505 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| PTKL | 150 | 54 | 49.30152 | 34 | 28 | 31.99637 | 34.5549 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| PUTY | 150 | 39 | 34.25315 | 32 | 57 | 10.96999 | 296.4904 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| RAND | 146 | 34 | 42.60973 | 35 | 35 | 37.62696 | 179.3137 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| RGLN | 149 | 39 | 17.93075 | 33 | 24 | 56.40307 | 780.9462 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| RUUS | 141 | 16 | 8.29164 | 34 | 2 | 32.99201 | 39.1390 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| RYLS | 149 | 58 | 36.02164 | 32 | 47 | 32.83404 | 611.0340 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| SCON | 150 | 52 | 10.70910 | 32 | 3 | 4.89363 | 247.5848 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| SNGO | 151 | 10 | 32.68926 | 32 | 33 | 29.66461 | 75.2694 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| SPWD | 150 | 33 | 50.17116 | 33 | 41 | 54.76973 | 399.5044 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| TAMW | 150 | 55 | 51.28567 | 31 | 5 | 34.29314 | 439.6462 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| TARE | 152 | 27 | 49.65668 | 31 | 54 | 43.95007 | 44.8835 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| TBOB | 142 | 3 | 26.70671 | 29 | 27 | 0.60688 | 191.1505 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| TMBA | 148 | 0 | 41.47934 | 35 | 46 | 39.69380 | 667.0038 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| TMRA | 147 | 32 | 3.85875 | 34 | 26 | 47.24118 | 319.5743 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| TMUT | 148 | 13 | 12.63285 | 35 | 18 | 3.93949 | 306.1132 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| TNTR | 152 | 1 | 11.70394 | 29 | 3 | 17.19619 | 901.1791 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| TULL | 147 | 34 | 10.92052 | 32 | 37 | 55.97163 | 271.3865 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| TURO | 150 | 7 | 19.89596 | 36 | 2 | 6.54448 | 53.3331 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| ULLA | 150 | 27 | 55.22171 | 35 | 21 | 43.10391 | 63.1260 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| UNSW | 151 | 13 | 54.63300 | 33 | 55 | 3.63448 | 86.9794 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| VLWD | 150 | 58 | 37.79226 | 33 | 52 | 50.30948 | 42.6771 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| WAKL | 144 | 22 | 51.56391 | 35 | 27 | 19.24644 | 91.7359 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| WARI | 150 | 34 | 27.12036 | 29 | 32 | 26.11447 | 372.1093 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| WGGA | 147 | 22 | 9.46446 | 35 | 6 | 25.87662 | 215.9898 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.017 |
| WLGT | 148 | 7 | 0.97565 | 30 | 1 | 24.21843 | 170.3264 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| WRRN | 147 | 50 | 11.18983 | 31 | 42 | 2.93989 | 229.1351 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| WWLG | 147 | 19 | 18.03028 | 33 | 42 | 12.36732 | 359.7525 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| WYNG | 151 | 25 | 26.31915 | 33 | 16 | 57.18783 | 57.9493 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| YARO | 151 | 55 | 19.99605 | 31 | 14 | 10.84111 | 996.6430 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| YASS | 148 | 54 | 47.68454 | 34 | 50 | 41.68024 | 522.7266 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| YMBA | 153 | 21 | 28.41352 | 29 | 26 | 50.80004 | 43.6305 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| YUNG | 148 | 16 | 57.88364 | 34 | 18 | 13.55422 | 444.9621 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |

Table 39: Computed Geocentric Datum of Australia (GDA94) geodetic coordinates and their uncertainty for the stations submitted by C.R. Kennedy Survey Solutions. The uncertainties are calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

| Station | Longitude (DMS east)  Uncertainty (m) | | | Latitude (DMS south)  Uncertainty (m) | | | Ellipsoidal height (m)  Uncertainty (m) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ACL2 | 151 | 41 | 58.62005 | 27 | 16 | 13.08162 | 509.4526 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| ARCD | 148 | 51 | 28.32236 | 25 | 16 | 18.40264 | 381.1957 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| ARUN | 153 | 22 | 26.49989 | 27 | 56 | 26.13530 | 60.6571 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BARA | 149 | 47 | 44.95257 | 24 | 9 | 32.46967 | 144.7353 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BCMT | 153 | 11 | 37.05905 | 28 | 7 | 31.26377 | 586.7804 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BDMR | 149 | 31 | 19.21503 | 25 | 30 | 37.69260 | 295.5943 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BDRM | 153 | 4 | 9.00864 | 26 | 41 | 4.77841 | 182.2931 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BIND | 149 | 2 | 50.90769 | 26 | 39 | 54.36176 | 366.7524 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| BLMT | 115 | 55 | 31.04907 | 31 | 56 | 49.35724 | -15.1601 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BMDW | 147 | 59 | 17.07577 | 21 | 47 | 50.38073 | 312.9977 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BNBY | 115 | 38 | 17.27906 | 33 | 19 | 9.08148 | -22.3831 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| BRTN | 147 | 14 | 38.18290 | 42 | 44 | 20.84196 | 28.1831 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| CALN | 148 | 46 | 35.14110 | 20 | 53 | 54.49549 | 82.7269 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CANN | 140 | 55 | 1.84806 | 21 | 51 | 45.53942 | 301.8179 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.022 |
| CANV | 148 | 40 | 19.18430 | 20 | 17 | 20.63970 | 74.3669 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| CAPL | 148 | 2 | 24.02193 | 23 | 7 | 18.49256 | 315.3126 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CARB | 148 | 14 | 54.93900 | 21 | 59 | 37.44635 | 335.8602 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CBTN | 150 | 49 | 12.50162 | 34 | 3 | 47.86104 | 101.2933 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| CCMB | 147 | 37 | 21.74641 | 22 | 43 | 35.09935 | 339.0582 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CHCC | 153 | 7 | 3.14447 | 30 | 17 | 43.28375 | 49.9298 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CORY | 152 | 54 | 39.59460 | 26 | 24 | 58.14967 | 164.4906 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CRCW | 150 | 16 | 28.59999 | 25 | 17 | 29.57730 | 351.8989 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CRKA | 138 | 35 | 20.90259 | 34 | 56 | 1.89809 | 49.2677 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CRKB | 153 | 2 | 49.72176 | 27 | 26 | 27.81271 | 56.0416 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CRKM | 144 | 54 | 24.68318 | 37 | 49 | 30.67280 | 19.4920 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| CRKP | 115 | 50 | 28.30707 | 31 | 56 | 33.01675 | 0.9584 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CRKS | 151 | 11 | 6.07567 | 33 | 55 | 25.29733 | 43.4138 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| CRL\_ | 153 | 25 | 17.44646 | 27 | 32 | 15.79359 | 157.9189 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| CRNS | 145 | 45 | 29.92849 | 16 | 56 | 8.61633 | 72.0261 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| CUDG | 147 | 16 | 32.91266 | 22 | 11 | 37.74628 | 298.6960 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| DIXL | 150 | 16 | 15.13514 | 23 | 56 | 37.55407 | 179.8568 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| DOCK | 144 | 56 | 38.92470 | 37 | 48 | 42.12237 | 30.9507 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| DUAR | 149 | 48 | 48.44382 | 23 | 41 | 13.78390 | 125.3019 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| DUBO | 148 | 36 | 10.98803 | 32 | 14 | 48.10770 | 297.2967 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| DWSN | 150 | 1 | 38.79744 | 24 | 33 | 34.49265 | 181.0292 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| DYST | 148 | 30 | 0.32734 | 22 | 35 | 54.67271 | 232.5686 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| ENSH | 148 | 31 | 12.89329 | 23 | 28 | 41.94317 | 243.6687 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| EUNG | 148 | 29 | 37.95794 | 21 | 7 | 51.74452 | 741.6323 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| GLAD | 151 | 15 | 15.91660 | 23 | 50 | 28.61213 | 84.9925 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| GRAS | 149 | 18 | 16.98225 | 21 | 21 | 26.66574 | 108.8048 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| GSFD | 151 | 19 | 42.89901 | 33 | 25 | 13.68426 | 44.9386 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| GYM2 | 152 | 39 | 36.15960 | 26 | 11 | 18.65461 | 120.4635 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| HBAY | 152 | 49 | 35.60633 | 25 | 16 | 58.93631 | 66.8934 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| HBG1 | 150 | 59 | 8.05506 | 34 | 11 | 16.51803 | 258.8722 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| HBG2 | 150 | 56 | 21.47877 | 34 | 8 | 25.37856 | 290.0209 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| HNSB | 151 | 5 | 51.53628 | 33 | 42 | 1.17104 | 228.2260 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| HOGN | 148 | 58 | 1.95561 | 21 | 21 | 21.69315 | 322.0699 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.022 |
| JEEB | 152 | 39 | 29.49822 | 27 | 39 | 4.92931 | 108.7633 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| JOON | 115 | 44 | 59.73749 | 31 | 43 | 56.72253 | 25.4939 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| KARR | 116 | 50 | 38.88837 | 20 | 44 | 4.44599 | 10.2245 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| KING | 151 | 50 | 22.98977 | 26 | 32 | 24.60829 | 484.8056 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| KJNG | 150 | 47 | 30.17613 | 33 | 30 | 42.86178 | 102.4456 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| KMRA | 149 | 27 | 54.90116 | 23 | 7 | 19.14545 | 141.4311 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| KOUM | 149 | 14 | 35.71652 | 21 | 36 | 23.33017 | 91.3645 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| KURR | 151 | 29 | 28.88560 | 32 | 47 | 56.23691 | 74.4740 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.022 |
| LAUN | 147 | 8 | 45.53433 | 41 | 26 | 4.87741 | 66.5269 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| LITH | 150 | 2 | 28.59833 | 33 | 19 | 29.87180 | 946.8157 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| LTSP | 149 | 0 | 43.64023 | 22 | 17 | 53.05953 | 201.1231 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MCLV | 138 | 32 | 36.14754 | 35 | 13 | 4.88073 | 66.1421 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MICH | 149 | 8 | 50.78801 | 35 | 43 | 7.65909 | 870.9576 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| MIRA | 148 | 51 | 48.17113 | 21 | 9 | 35.63561 | 112.2989 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MISA | 139 | 29 | 13.65521 | 20 | 44 | 11.60456 | 404.4774 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MNDH | 115 | 42 | 39.72604 | 32 | 31 | 47.09512 | -26.8400 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MNVA | 148 | 3 | 39.85826 | 23 | 54 | 34.41401 | 323.1541 |
|  |  |  | ±0.010 |  |  | ±0.010 | ±0.043 |
| MRYB | 139 | 15 | 42.13056 | 35 | 8 | 58.43896 | 36.2833 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MTB2 | 138 | 51 | 37.50024 | 35 | 3 | 48.35874 | 332.3175 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MTBL | 147 | 38 | 45.86258 | 23 | 19 | 27.42012 | 328.8110 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MTGA | 140 | 46 | 51.72386 | 37 | 49 | 59.09893 | 48.6463 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| MUSW | 150 | 56 | 20.36718 | 32 | 15 | 5.57151 | 278.1023 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| NHAV | 138 | 29 | 22.18523 | 34 | 47 | 37.78658 | 11.0257 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| OLYM | 136 | 53 | 26.20686 | 30 | 26 | 21.90245 | 106.4662 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| PAIN | 144 | 4 | 4.03589 | 38 | 26 | 31.59612 | 40.0955 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| PROS | 151 | 35 | 47.40510 | 26 | 9 | 27.43574 | 402.4350 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| PTHD | 118 | 36 | 19.92407 | 20 | 24 | 43.43725 | 16.3524 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| RIDG | 150 | 12 | 32.75184 | 23 | 17 | 15.57060 | 127.5686 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| RLST | 148 | 23 | 48.74014 | 24 | 24 | 23.96626 | 309.1668 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| RXBY | 136 | 54 | 7.48829 | 30 | 33 | 29.19292 | 115.6643 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| SALT | 153 | 34 | 29.53918 | 28 | 16 | 18.24380 | 48.9640 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| SAWG | 151 | 25 | 47.48069 | 32 | 45 | 31.04612 | 103.8561 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| SLAD | 149 | 13 | 32.28729 | 21 | 4 | 0.85087 | 105.8063 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| TALO | 149 | 6 | 47.83138 | 26 | 2 | 26.32660 | 370.1458 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| TARO | 149 | 53 | 40.23884 | 25 | 48 | 5.01627 | 275.0222 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| TCBY | 153 | 0 | 12.17343 | 25 | 55 | 7.83000 | 59.7641 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| TERA | 148 | 47 | 4.12981 | 23 | 57 | 38.29288 | 329.0337 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| THEO | 150 | 4 | 31.64516 | 24 | 56 | 55.03476 | 218.5516 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.021 |
| TNGL | 150 | 34 | 24.69153 | 24 | 29 | 30.31660 | 247.1266 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| TORQ | 144 | 18 | 35.62299 | 38 | 19 | 19.00628 | 58.0049 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| TRNG | 151 | 53 | 57.39735 | 26 | 47 | 43.55440 | 495.2968 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| TWED | 153 | 24 | 0.91164 | 28 | 20 | 56.14439 | 80.6623 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| WLTN | 115 | 52 | 46.66792 | 32 | 2 | 32.64961 | -11.1626 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| WNDN | 150 | 1 | 1.95973 | 26 | 7 | 25.58962 | 343.6710 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| WWCC | 147 | 22 | 16.33597 | 35 | 6 | 34.67434 | 207.5326 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |

Table 40: Computed Geocentric Datum of Australia (GDA94) geodetic coordinates and their uncertainty for the stations submitted by Position Partners Pty Ltd. The uncertainties are calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

| Station | Longitude (DMS east)  Uncertainty (m) | | | Latitude (DMS south)  Uncertainty (m) | | | Ellipsoidal height (m)  Uncertainty (m) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| 2FYS | 149 | 10 | 29.05534 | 35 | 19 | 30.33362 | 603.3351 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| 3CAM | 144 | 58 | 12.69155 | 37 | 39 | 0.03399 | 156.5130 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.017 |
| 3DAN | 145 | 13 | 2.47418 | 38 | 1 | 57.82870 | 24.5556 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| 7LAU | 147 | 11 | 3.15270 | 41 | 26 | 45.64903 | 37.3780 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |

Table 41: Computed Geocentric Datum of Australia (GDA94) geodetic coordinates and their uncertainty for the stations submitted by National Geospatial Reference Systems Section, Geoscience Australia. The uncertainties are calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

| Station | Longitude (DMS east)  Uncertainty (m) | | | Latitude (DMS south)  Uncertainty (m) | | | Ellipsoidal height (m)  Uncertainty (m) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ALBY | 117 | 48 | 36.64961 | 34 | 57 | 0.84508 | 36.7294 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| ALIC | 133 | 53 | 7.84803 | 23 | 40 | 12.44598 | 603.3548 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| ANDA | 137 | 9 | 36.34836 | 30 | 27 | 11.86849 | 101.4782 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| ARUB | 125 | 55 | 27.65241 | 31 | 48 | 32.83550 | 104.2853 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| BALA | 123 | 52 | 4.97182 | 32 | 27 | 38.82245 | 130.8713 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| BBOO | 136 | 3 | 31.20740 | 32 | 48 | 37.28621 | 288.7351 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| BDLE | 147 | 39 | 21.68355 | 37 | 45 | 31.01257 | 126.0429 |
|  |  |  | ±0.008 |  |  | ±0.007 | ±0.018 |
| BEEC | 146 | 39 | 27.85395 | 36 | 20 | 47.20960 | 443.0426 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| BNDY | 152 | 19 | 15.60713 | 24 | 54 | 29.62410 | 80.1202 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| BRO1 | 122 | 12 | 32.69101 | 18 | 0 | 14.33354 | 42.3448 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| BROC | 144 | 12 | 14.43037 | 36 | 1 | 53.07866 | 131.5423 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| BUR2 | 145 | 54 | 53.45458 | 41 | 3 | 0.26107 | 3.9024 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.017 |
| BURA | 117 | 10 | 28.69102 | 30 | 31 | 31.90369 | 327.9871 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| CEDU | 133 | 48 | 35.37567 | 31 | 52 | 0.01671 | 144.8202 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.019 |
| COOB | 134 | 43 | 21.25274 | 29 | 2 | 4.99204 | 230.3935 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| DARM | 130 | 53 | 29.35763 | 12 | 25 | 26.46101 | 83.1730 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| DARW | 131 | 7 | 57.84792 | 12 | 50 | 37.35867 | 125.2238 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| DODA | 131 | 11 | 12.56034 | 13 | 50 | 4.50780 | 90.6358 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| ESPA | 121 | 53 | 39.54897 | 33 | 52 | 27.57626 | 32.5277 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| EXMT | 114 | 6 | 48.13126 | 21 | 57 | 38.45021 | 16.5287 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| FLND | 148 | 14 | 29.67729 | 40 | 12 | 51.80933 | 7.6033 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.017 |
| FROY | 125 | 48 | 1.60233 | 18 | 7 | 33.47652 | 156.0151 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| GABO | 149 | 54 | 54.70655 | 37 | 34 | 5.28415 | 24.0079 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| HIL1 | 115 | 44 | 18.87926 | 31 | 49 | 31.90488 | -27.1908 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| HOB2 | 147 | 26 | 19.43582 | 42 | 48 | 16.98552 | 41.1322 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| HYDN | 118 | 53 | 30.73635 | 32 | 26 | 57.80223 | 300.1497 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| JAB2 | 132 | 53 | 40.30946 | 12 | 39 | 36.56616 | 82.6407 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.019 |
| JERV | 136 | 6 | 2.38638 | 22 | 51 | 37.92638 | 382.0569 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| KALG | 121 | 27 | 33.30205 | 30 | 47 | 3.83830 | 338.0964 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| KARR | 117 | 5 | 49.87276 | 20 | 58 | 53.16974 | 109.2353 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| KAT1 | 132 | 9 | 11.76527 | 14 | 22 | 33.63353 | 184.4104 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| KAT2 | 132 | 9 | 9.00218 | 14 | 22 | 30.29311 | 184.3500 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| KELN | 117 | 42 | 9.46548 | 31 | 37 | 20.37925 | 253.1372 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| KUNU | 128 | 45 | 45.42580 | 15 | 40 | 37.09210 | 92.0033 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| LAMB | 134 | 3 | 46.53892 | 26 | 56 | 19.03785 | 311.3448 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| LARR | 133 | 12 | 45.90842 | 15 | 34 | 23.39693 | 229.4491 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| LIAW | 146 | 40 | 23.08315 | 41 | 54 | 8.17811 | 1054.3449 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| LKYA | 130 | 49 | 29.00221 | 12 | 27 | 19.71276 | 69.3987 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| LONA | 121 | 19 | 8.58048 | 28 | 52 | 42.38984 | 354.3158 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| LORD | 159 | 3 | 40.31102 | 31 | 31 | 11.61100 | 71.5017 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| MAIN | 134 | 5 | 34.33223 | 14 | 2 | 46.35701 | 162.4689 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| MEDO | 114 | 36 | 34.36182 | 26 | 45 | 26.63317 | 109.8985 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| MNGO | 143 | 39 | 6.18770 | 38 | 46 | 47.26718 | 62.6944 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.019 |
| MOBS | 144 | 58 | 31.20673 | 37 | 49 | 45.89894 | 40.6757 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| MTCV | 133 | 12 | 24.11502 | 25 | 56 | 44.51358 | 545.0042 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| MTDN | 131 | 29 | 33.78671 | 22 | 7 | 58.12555 | 672.6036 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| MTEM | 143 | 26 | 56.04546 | 37 | 35 | 15.46515 | 518.0803 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| MTMA | 117 | 50 | 35.12086 | 28 | 6 | 55.17055 | 389.5515 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| NCLF | 116 | 7 | 23.75073 | 34 | 42 | 30.18646 | 71.2516 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| NHIL | 141 | 38 | 45.61955 | 36 | 18 | 30.34618 | 139.0333 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| NORF | 167 | 56 | 19.78726 | 29 | 2 | 36.06691 | 159.1045 |
|  |  |  | ±0.008 |  |  | ±0.007 | ±0.019 |
| NORS | 121 | 47 | 14.04390 | 32 | 15 | 36.10209 | 461.2646 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| PERT | 115 | 53 | 6.88632 | 31 | 48 | 7.09668 | 12.7682 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| PTLD | 141 | 36 | 48.48524 | 38 | 20 | 39.85550 | 0.9605 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| PTSV | 138 | 29 | 8.56195 | 35 | 5 | 40.95686 | 57.8123 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| RAVN | 120 | 4 | 15.17425 | 33 | 35 | 48.31701 | 205.8096 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| RHPT | 145 | 57 | 42.61940 | 41 | 3 | 54.48451 | 25.9555 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| RKLD | 137 | 50 | 5.25732 | 19 | 58 | 3.45646 | 276.3582 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |
| RNSP | 133 | 48 | 59.52451 | 18 | 23 | 16.41555 | 348.5616 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| SA45 | 137 | 56 | 3.56716 | 32 | 28 | 13.07681 | 201.9754 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| SPBY | 147 | 55 | 51.04975 | 42 | 32 | 47.20562 | 1.1573 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| STR1 | 149 | 0 | 36.17982 | 35 | 18 | 55.93953 | 800.0323 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| STR2 | 149 | 0 | 36.54752 | 35 | 18 | 58.19916 | 802.5802 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| STR3 | 149 | 0 | 35.53434 | 35 | 18 | 56.51969 | 799.0167 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| SYDN | 151 | 9 | 1.35698 | 33 | 46 | 51.18419 | 85.6857 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.018 |
| TID1 | 148 | 58 | 47.98445 | 35 | 23 | 57.15619 | 665.4189 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| TIDB | 148 | 58 | 47.98444 | 35 | 23 | 57.15618 | 665.4200 |
|  |  |  | ±0.007 |  |  | ±0.008 | ±0.017 |
| TOMP | 117 | 24 | 1.09575 | 22 | 50 | 47.26822 | 434.7057 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| TOW2 | 147 | 3 | 20.46535 | 19 | 16 | 9.42804 | 88.2192 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| UCLA | 128 | 52 | 59.32730 | 31 | 40 | 46.54030 | 68.7443 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| WAGN | 117 | 24 | 36.32661 | 33 | 19 | 59.06139 | 289.0310 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| WARA | 128 | 17 | 46.20597 | 25 | 2 | 13.95629 | 587.2657 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| WILU | 120 | 13 | 6.10034 | 26 | 37 | 32.47801 | 491.5164 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| WLAL | 120 | 38 | 36.56685 | 19 | 46 | 43.02109 | 21.1941 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| WMGA | 134 | 21 | 16.27704 | 19 | 56 | 0.14824 | 416.4619 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| YAR2 | 115 | 20 | 49.10009 | 29 | 2 | 47.61678 | 241.3711 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| YAR3 | 115 | 20 | 49.72804 | 29 | 2 | 47.40382 | 242.5342 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| YARR | 115 | 20 | 49.08940 | 29 | 2 | 47.74254 | 241.4315 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.016 |
| YEEL | 135 | 47 | 3.74897 | 34 | 8 | 38.97288 | 169.8105 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| YELO | 119 | 38 | 44.85705 | 31 | 17 | 26.52179 | 347.2349 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| YNKI | 146 | 13 | 5.54333 | 38 | 48 | 44.07050 | 34.6758 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| YULA | 130 | 56 | 29.63348 | 25 | 13 | 51.82206 | 512.3395 |
|  |  |  | ±0.008 |  |  | ±0.007 | ±0.018 |

Table 42: Computed Geocentric Datum of Australia (GDA94) geodetic coordinates and their uncertainty for the station submitted by Saraji Mine, BHP Billiton Mitsubishi Alliance. The uncertainties are calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

| Station | Longitude (DMS east)  Uncertainty (m) | | | Latitude (DMS south)  Uncertainty (m) | | | Ellipsoidal height (m)  Uncertainty (m) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| SRB1 | 148 | 16 | 52.45992 | 22 | 25 | 17.15288 | 301.7914 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.020 |

Table 43: Computed Geocentric Datum of Australia (GDA94) geodetic coordinates and their uncertainty for the station submitted by Western Australian Land Information Authority. The uncertainties are calculated in accordance with the principles of the ISO Guide to the Expression of Uncertainty in Measurement (1995), with an interval estimated to have a confidence level of 95% at the time of verification. The combined standard uncertainty was converted to an expanded uncertainty using a coverage factor, k, of 2.

| Station | Longitude (DMS east)  Uncertainty (m) | | | Latitude (DMS south)  Uncertainty (m) | | | Ellipsoidal height (m)  Uncertainty (m) |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ABNY | 117 | 53 | 11.59826 | 35 | 1 | 37.77401 | -12.7758 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BALI | 115 | 50 | 33.19292 | 33 | 46 | 0.09741 | 177.4810 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BINN | 115 | 41 | 51.06124 | 33 | 9 | 11.51285 | -23.7166 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BODD | 116 | 26 | 57.74416 | 32 | 57 | 56.81996 | 565.6008 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| BUSS | 115 | 18 | 31.75504 | 33 | 40 | 27.71885 | -26.2386 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| COLL | 116 | 18 | 1.74095 | 33 | 17 | 23.01302 | 207.9706 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| CUND | 117 | 20 | 40.19585 | 31 | 43 | 42.72742 | 282.7114 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| DMGB | 118 | 35 | 12.67482 | 20 | 18 | 43.58411 | 9.4278 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| DOWE | 116 | 58 | 10.22951 | 31 | 16 | 1.88081 | 272.0347 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| DWEL | 116 | 3 | 45.13514 | 32 | 42 | 48.81557 | 233.8879 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.018 |
| HTDG | 114 | 36 | 38.49775 | 28 | 46 | 22.81254 | -14.3993 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| HYDE | 118 | 55 | 15.81700 | 32 | 28 | 39.65301 | 339.9456 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| KDAL | 115 | 5 | 54.79195 | 34 | 9 | 48.44252 | 44.3290 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| LANN | 115 | 20 | 47.64442 | 31 | 2 | 47.27038 | -9.7708 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| MDAH | 115 | 43 | 45.18922 | 32 | 32 | 7.14203 | -18.2121 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| MIDL | 116 | 0 | 19.61783 | 31 | 53 | 11.47334 | -6.7581 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| MURK | 116 | 40 | 57.28344 | 31 | 44 | 21.79352 | 213.2084 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| NYAB | 118 | 10 | 29.84141 | 33 | 39 | 56.27001 | 321.9987 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| PINY | 116 | 58 | 46.77950 | 32 | 29 | 28.37338 | 347.3601 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| QUAN | 114 | 36 | 49.47580 | 28 | 46 | 12.99127 | -13.4479 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |
| ROTT | 115 | 31 | 44.40538 | 31 | 59 | 40.08256 | -13.9446 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| STRG | 115 | 49 | 9.51525 | 31 | 51 | 58.34169 | 0.0564 |
|  |  |  | ±0.007 |  |  | ±0.007 | ±0.017 |
| TORK | 115 | 35 | 3.57383 | 31 | 29 | 44.54346 | -11.6917 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.018 |
| WHIY | 116 | 1 | 41.03494 | 32 | 17 | 51.12815 | 200.4450 |
|  |  |  | ±0.008 |  |  | ±0.008 | ±0.019 |

END OF REPORT