

Appendix A

A-1 Measurements results of Wet Precipitation

| Sample No. | Sampling Date | | Concentration (mg/L) | | | | | | | | pH | EC (mS/m) | Amount | | Note |
|------------|---------------|-------|-------------------------------|------------------------------|-----------------|------------------------------|-----------------|----------------|------------------|------------------|------|-----------|--------|-----------|------|
| | Date | Time | SO ₄ ²⁻ | NO ₃ ⁻ | Cl ⁻ | NH ₄ ⁺ | Na ⁺ | K ⁺ | Mg ²⁺ | Ca ²⁺ | | | mm. | weight(g) | |
| 001 | 12/04/2003 | 08:30 | 5.62 | 7.46 | 9.93 | 4.13 | 1.91 | 7.85 | 0.58 | 3.43 | 0.00 | 0.00 | 0.1 | 3.18 | * |
| 002 | 17/04/2003 | 08:30 | 2.30 | 2.89 | 0.56 | 1.59 | 0.07 | 0.32 | 0.19 | 1.58 | 5.66 | 2.97 | 8.6 | 563.06 | |
| 003 | 19/04/2003 | 08:30 | 3.96 | 3.61 | 0.95 | 2.62 | 0.05 | 0.44 | 0.26 | 1.22 | 4.83 | 4.25 | 7.5 | 547.72 | |
| 004 | 24/04/2003 | 08:30 | 5.35 | 8.37 | 3.71 | 3.75 | 0.15 | 4.86 | 0.38 | 2.39 | 0.00 | 0.00 | 0.2 | 13.93 | * |
| 005 | 26/04/2003 | 08:30 | 4.49 | 8.50 | 1.14 | 1.13 | 0.00 | 0.16 | 0.14 | 0.61 | 5.81 | 6.12 | 0.5 | 32.27 | |
| 006 | 01/05/2003 | 08:30 | 0.51 | 0.31 | 0.09 | 0.32 | 0.00 | 0.12 | 0.06 | 0.15 | 5.26 | 0.83 | 64 | 4234.48 | |
| 007 | 02/05/2003 | 08:30 | 0.08 | 0.06 | 0.00 | 0.04 | 0.00 | 0.05 | 0.05 | 0.00 | 6.11 | 0.22 | 37 | 2557.77 | |
| 008 | 03/05/2003 | 08:30 | 0.82 | 1.41 | 0.21 | 1.11 | 0.00 | 0.50 | 0.07 | 0.10 | 6.09 | 1.12 | 2.5 | 156.26 | |
| 009 | 13/05/2003 | 08:30 | 0.83 | 1.37 | 0.11 | 0.72 | 0.00 | 0.16 | 0.06 | 0.12 | 5.15 | 1.00 | 8.4 | 573.29 | |
| 010 | 18/05/2003 | 08:30 | 0.46 | 1.17 | 0.19 | 1.20 | 0.00 | 0.29 | 0.06 | 0.03 | 6.71 | 0.87 | 3.4 | 186.48 | |
| 011 | 19/05/2003 | 08:30 | 0.91 | 1.81 | 0.81 | 0.32 | 0.00 | 0.08 | 0.05 | 0.00 | 0.00 | 0.00 | 0.2 | 9.57 | * |
| 012 | 20/05/2003 | 08:30 | 2.25 | 2.39 | 1.26 | 1.78 | 0.19 | 0.67 | 0.13 | 0.43 | 6.43 | 2.23 | 1.8 | 104.34 | |
| 013 | 21/05/2003 | 08:30 | 0.65 | 0.57 | 0.29 | 0.76 | 0.00 | 0.16 | 0.08 | 0.20 | 6.35 | 0.80 | 4.2 | 261.75 | |
| 014 | 23/05/2003 | 08:30 | 3.91 | 3.91 | 1.51 | 2.26 | 0.29 | 0.39 | 0.24 | 1.58 | 0.00 | 0.00 | 0.3 | 24.8 | * |
| 015 | 28/05/2003 | 08:30 | 2.34 | 2.43 | 1.04 | 0.29 | 0.26 | 0.55 | 2.13 | 2.93 | 6.82 | 3.08 | 1.6 | 104 | |
| 016 | 01/06/2003 | 08:30 | 0.54 | 0.88 | 0.00 | 0.60 | 0.00 | 0.11 | 0.06 | 0.07 | 5.88 | 0.70 | 25.4 | 1710.91 | |
| 017 | 02/06/2003 | 08:30 | 0.34 | 0.77 | 0.00 | 0.54 | 0.00 | 0.16 | 0.75 | 0.61 | 5.77 | 0.53 | 6.4 | 469.18 | |

All rights reserved

A-1 Measurements results of Wet Precipitation (Continued)

| Sample No. | Sampling Date | | Concentration (mg/L) | | | | | | | | pH | EC (mS/m) | Amount | | Note |
|------------|---------------|-------|-------------------------------|------------------------------|-----------------|------------------------------|-----------------|----------------|------------------|------------------|------|-----------|--------|-----------|------|
| | Date | Time | SO ₄ ²⁻ | NO ₃ ⁻ | Cl ⁻ | NH ₄ ⁺ | Na ⁺ | K ⁺ | Mg ²⁺ | Ca ²⁺ | | | mm. | weight(g) | |
| 018 | 03/06/2003 | 08:30 | 0.95 | 1.23 | 0.00 | 0.65 | 0.00 | 0.14 | 0.00 | 0.07 | 4.84 | 1.07 | 13.6 | 862.4 | |
| 019 | 04/06/2003 | 08:30 | 0.18 | 0.26 | 0.19 | 0.35 | 0.00 | 0.21 | 0.00 | 0.00 | 5.60 | 0.30 | 13.2 | 873.45 | |
| 020 | 05/06/2003 | 08:30 | 0.35 | 0.47 | 0.20 | 0.59 | 0.00 | 0.19 | 0.00 | 0.00 | 5.74 | 0.62 | 1.0 | 57.7 | |
| 021 | 06/06/2003 | 08:30 | 1.34 | 1.28 | 0.76 | 1.10 | 0.00 | 0.35 | 0.00 | 0.29 | 0.00 | 0.00 | 0.4 | 21.79 | * |
| 022 | 07/06/2003 | 08:30 | 0.15 | 0.25 | 0.08 | 0.31 | 0.00 | 0.12 | 0.00 | 0.00 | 5.78 | 0.39 | 2.6 | 174.43 | |
| 023 | 11/06/2003 | 08:30 | 0.56 | 0.73 | 0.18 | 0.47 | 0.00 | 0.10 | 0.02 | 0.22 | 5.96 | 0.74 | 13.6 | 826.03 | |
| 024 | 13/06/2003 | 08:30 | 1.29 | 2.01 | 1.43 | 1.03 | 0.21 | 0.25 | 0.12 | 1.75 | 0.00 | 0.00 | 0.6 | 23.37 | * |
| 025 | 14/06/2003 | 08:30 | 1.80 | 3.02 | 1.56 | 0.47 | 0.20 | 0.29 | 0.34 | 5.52 | 0.00 | 0.00 | 0.2 | 13.83 | * |
| 026 | 16/06/2003 | 08:30 | 1.30 | 2.16 | 0.77 | 0.76 | 0.00 | 0.19 | 0.15 | 3.66 | 6.89 | 2.50 | 0.8 | 40.98 | |
| 027 | 17/06/2003 | 08:30 | 0.16 | 0.48 | 0.00 | 0.42 | 0.00 | 0.11 | 0.00 | 0.08 | 5.88 | 0.50 | 7.6 | 506.33 | |
| 028 | 18/06/2003 | 08:30 | 0.81 | 1.28 | 0.32 | 0.61 | 0.00 | 0.19 | 0.01 | 0.18 | 5.60 | 0.76 | 2.2 | 130.84 | |
| 029 | 20/06/2003 | 08:30 | 0.74 | 1.44 | 0.48 | 1.31 | 0.00 | 0.26 | 0.01 | 0.27 | 0.00 | 0.00 | 0.2 | 9.55 | * |
| 030 | 21/06/2003 | 08:30 | 0.83 | 1.88 | 0.59 | 1.56 | 0.00 | 0.34 | 0.01 | 0.23 | 0.00 | 0.00 | 0.2 | 6.02 | * |
| 031 | 22/06/2003 | 08:30 | 0.15 | 0.35 | 0.14 | 0.27 | 0.00 | 0.13 | 0.00 | 0.00 | 5.63 | 0.30 | 10.0 | 672.2 | |
| 032 | 23/06/2003 | 08:30 | 0.71 | 0.95 | 0.74 | 1.41 | 0.00 | 0.22 | 0.01 | 0.11 | 6.42 | 0.00 | 0.6 | 33.68 | |
| 033 | 24/06/2003 | 08:30 | 0.07 | 0.26 | 0.09 | 0.17 | 0.00 | 0.14 | 0.00 | 0.00 | 5.37 | 0.21 | 12.6 | 829.99 | |
| 034 | 25/06/2003 | 08:30 | 0.32 | 0.34 | 0.26 | 0.71 | 0.00 | 0.29 | 0.00 | 0.00 | 0.00 | 0.00 | 0.2 | 10.98 | * |
| 035 | 26/06/2003 | 08:30 | 0.75 | 0.99 | 0.41 | 1.47 | 0.00 | 0.20 | 0.00 | 0.00 | 6.34 | 1.19 | 0.8 | 52.21 | |

A-1 Measurements results of Wet Precipitation (Continued)

| Sample No. | Sampling Date | | Concentration (mg/L) | | | | | | | | pH | EC (mS/m) | Amount | | Note |
|------------|---------------|-------|-------------------------------|------------------------------|-----------------|------------------------------|-----------------|----------------|------------------|------------------|------|-----------|--------|-----------|------|
| | Date | Time | SO ₄ ²⁻ | NO ₃ ⁻ | Cl ⁻ | NH ₄ ⁺ | Na ⁺ | K ⁺ | Mg ²⁺ | Ca ²⁺ | | | mm. | weight(g) | |
| 036 | 27/06/2003 | 08:30 | 0.27 | 0.40 | 0.14 | 0.68 | 0.00 | 0.14 | 0.00 | 0.00 | 6.09 | 0.54 | 1.6 | 102.14 | |
| 037 | 28/06/2003 | 08:30 | 0.02 | 0.19 | 0.03 | 0.13 | 0.00 | 0.10 | 0.00 | 0.00 | 5.45 | 0.18 | 10.2 | 992.88 | |
| 038 | 29/06/2003 | 08:30 | 0.33 | 0.72 | 0.20 | 0.59 | 0.00 | 0.16 | 0.00 | 0.00 | 6.06 | 0.51 | 2.4 | 136.57 | |
| 039 | 30/06/2003 | 08:30 | 0.26 | 0.42 | 0.17 | 0.66 | 0.00 | 0.19 | 0.00 | 0.00 | 7.04 | 0.53 | 3.4 | 193.31 | |
| 040 | 01/07/2003 | 08:30 | 0.06 | 0.12 | 0.17 | 0.22 | 0.53 | 0.19 | 0.16 | 0.22 | 6.61 | 0.23 | 10.9 | 681.09 | |
| 041 | 02/07/2003 | 08:30 | 0.04 | 0.13 | 0.15 | 0.15 | 0.85 | 0.25 | 0.16 | 0.17 | 6.54 | 0.19 | 8.2 | 499.14 | |
| 042 | 03/07/2003 | 08:30 | 0.01 | 0.10 | 0.12 | 0.11 | 0.22 | 0.14 | 0.15 | 0.17 | 6.20 | 0.19 | 10.6 | 724.98 | |
| 043 | 06/07/2003 | 08:30 | 0.56 | 0.94 | 0.28 | 0.90 | 0.36 | 0.27 | 0.18 | 0.33 | 5.93 | 0.79 | 1.2 | 69.17 | |
| 044 | 08/07/2003 | 08:30 | 0.45 | 0.85 | 0.19 | 0.50 | 0.18 | 0.20 | 0.16 | 0.22 | 5.38 | 0.58 | 3.0 | 170.26 | |
| 045 | 10/07/2003 | 08:30 | 0.04 | 0.17 | 0.15 | 0.26 | 0.35 | 0.21 | 0.17 | 0.23 | 5.75 | 0.26 | 7.0 | 483.64 | |
| 046 | 15/07/2003 | 08:30 | 0.16 | 0.31 | 0.16 | 0.28 | 0.29 | 0.17 | 0.17 | 0.22 | 5.71 | 0.34 | 7.4 | 487.61 | |
| 047 | 21/07/2003 | 08:30 | 0.51 | 0.68 | 0.48 | 1.11 | 0.26 | 0.39 | 0.03 | 0.56 | 5.53 | 0.90 | 2.2 | 107.3 | |
| 048 | 22/07/2003 | 08:30 | 0.89 | 3.02 | 1.03 | 0.74 | 0.59 | 1.25 | 0.42 | 2.58 | 0.00 | 0.00 | 1.7 | 5.32 | * |
| 049 | 24/07/2003 | 08:30 | 0.42 | 0.39 | 0.20 | 0.56 | 0.14 | 0.18 | 0.04 | 0.40 | 6.39 | 0.75 | 2.4 | 146.4 | |
| 050 | 26/07/2003 | 08:30 | 0.52 | 0.58 | 0.41 | 0.51 | 0.37 | 0.18 | 0.06 | 0.49 | 6.30 | 0.82 | 1.2 | 57.45 | |
| 051 | 29/07/2003 | 08:30 | 0.42 | 0.63 | 0.24 | 0.33 | 0.40 | 0.19 | 0.04 | 0.37 | 5.85 | 0.64 | 1.3 | 79.62 | |
| 052 | 31/07/2003 | 08:30 | 0.18 | 0.30 | 0.08 | 0.22 | 0.26 | 0.10 | 0.02 | 0.14 | 6.14 | 0.34 | 5.4 | 342.23 | |
| 053 | 03/08/2003 | 08:30 | 0.69 | 0.48 | 0.23 | 0.37 | 0.51 | 0.41 | 0.03 | 0.25 | 5.82 | 0.69 | 2.4 | 155.82 | |

A-1 Measurements results of Wet Precipitation (Continued)

| Sample No. | Sampling Date | | Concentration (mg/L) | | | | | | | | pH | EC (mS/m) | Amount | | Note |
|------------|---------------|-------|-------------------------------|------------------------------|-----------------|------------------------------|-----------------|----------------|------------------|------------------|------|-----------|--------|-----------|------|
| | Date | Time | SO ₄ ²⁻ | NO ₃ ⁻ | Cl ⁻ | NH ₄ ⁺ | Na ⁺ | K ⁺ | Mg ²⁺ | Ca ²⁺ | | | mm. | weight(g) | |
| 054 | 04/08/2003 | 08:30 | 0.16 | 0.18 | 0.05 | 0.02 | 0.02 | 0.16 | 0.02 | 0.17 | 6.55 | 0.21 | 7.2 | 454.9 | |
| 055 | 08/08/2003 | 08:30 | 0.37 | 0.68 | 0.22 | 0.79 | 0.31 | 0.27 | 0.04 | 0.45 | 6.47 | 0.78 | 1.0 | 61.01 | |
| 058 | 13/08/2003 | 08:30 | 0.23 | 0.22 | 0.07 | 0.16 | 0.47 | 0.28 | 0.04 | 0.23 | 5.82 | 0.29 | 13.4 | 845.57 | |
| 059 | 17/08/2003 | 08:30 | 0.22 | 0.26 | 0.28 | 0.03 | 0.17 | 0.16 | 0.03 | 0.16 | 5.61 | 0.38 | 11.0 | 712.09 | |
| 060 | 18/08/2003 | 08:30 | 0.23 | 0.28 | 0.28 | 0.15 | 0.11 | 0.26 | 0.02 | 0.26 | 5.72 | 0.28 | 7.2 | 421.28 | |
| 061 | 19/08/2003 | 08:30 | 0.47 | 0.68 | 0.42 | 0.24 | 0.05 | 0.31 | 0.01 | 0.12 | 0.00 | 0.00 | 0.3 | 7.7 | * |
| 062 | 20/08/2003 | 08:30 | 0.09 | 0.03 | 0.17 | 0.04 | 0.03 | 0.11 | 0.03 | 0.27 | 5.72 | 0.18 | 56.0 | 3654.22 | |
| 063 | 21/08/2003 | 08:30 | 0.11 | 0.17 | 0.27 | 0.09 | 0.23 | 0.44 | 0.01 | 0.18 | 5.73 | 0.26 | 1.8 | 86.47 | |
| 064 | 22/08/2003 | 08:30 | 0.08 | 0.08 | 0.23 | 0.15 | 0.00 | 0.12 | 0.03 | 0.09 | 5.67 | 0.21 | 31.4 | 2057.82 | |
| 065 | 24/08/2003 | 08:30 | 0.59 | 0.22 | 0.45 | 0.27 | 0.01 | 1.38 | 0.10 | 2.16 | 6.04 | 0.84 | 12.8 | 811.91 | |
| 066 | 25/08/2003 | 08:30 | 0.25 | 0.25 | 0.17 | 0.31 | 0.00 | 0.02 | 0.03 | 0.25 | 5.99 | 0.48 | 1.5 | 769.28 | |
| 067 | 30/08/2003 | 08:30 | 0.44 | 0.56 | 0.17 | 0.73 | 0.00 | 0.12 | 0.06 | 0.83 | 6.61 | 0.92 | 6.0 | 359.7 | |
| 068 | 02/09/2003 | 08:30 | 0.13 | 0.13 | 0.15 | 0.04 | 0.00 | 0.00 | 0.03 | 0.15 | 5.45 | 0.20 | 18.0 | 1197.86 | |
| 069 | 03/09/2003 | 08:30 | 0.42 | 0.37 | 0.20 | 0.23 | 0.00 | 0.06 | 0.01 | 0.10 | 5.81 | 0.36 | 4.0 | 209.95 | |
| 070 | 05/09/2003 | 08:30 | 0.08 | 0.04 | 0.14 | 0.08 | 0.00 | 0.01 | 0.03 | 0.12 | 5.72 | 0.20 | 57.4 | 3912.74 | |
| 071 | 06/09/2003 | 08:30 | 0.32 | 0.12 | 0.24 | 0.38 | 0.00 | 0.46 | 0.05 | 0.12 | 6.75 | 0.48 | 13.4 | 843.95 | |
| 072 | 07/09/2003 | 08:30 | 0.33 | 0.41 | 0.30 | 0.36 | 0.01 | 0.33 | 0.04 | 0.38 | 6.22 | 0.60 | 10.6 | 694.7 | |
| 073 | 08/09/2003 | 08:30 | 0.48 | 0.23 | 0.30 | 0.41 | 0.00 | 0.15 | 0.01 | 0.22 | 6.30 | 0.55 | 1.6 | 89.24 | |

A-1 Measurements results of Wet Precipitation (Continued)

| Sample No. | Sampling Date | | Concentration (mg/L) | | | | | | | | pH | EC (mS/m) | Amount | | Note |
|------------|---------------|-------|-------------------------------|------------------------------|-----------------|------------------------------|-----------------|----------------|------------------|------------------|------|-----------|--------|-----------|------|
| | Date | Time | SO ₄ ²⁻ | NO ₃ ⁻ | Cl ⁻ | NH ₄ ⁺ | Na ⁺ | K ⁺ | Mg ²⁺ | Ca ²⁺ | | | mm. | weight(g) | |
| 074 | 09/09/2003 | 08:30 | 1.07 | 1.74 | 0.36 | 1.18 | 0.00 | 0.26 | 0.04 | 1.08 | 6.71 | 1.65 | 1.0 | 59.27 | |
| 075 | 10/09/2003 | 08:30 | 0.10 | 0.00 | 0.06 | 0.01 | 0.04 | 0.00 | 0.00 | 0.00 | 6.06 | 0.16 | 68.0 | 4555.32 | |
| 076 | 11/09/2003 | 08:30 | 0.37 | 0.18 | 0.11 | 0.03 | 0.22 | 0.32 | 0.01 | 0.05 | 5.57 | 0.21 | 18.6 | 1154.8 | |
| 077 | 12/09/2003 | 08:30 | 0.30 | 0.31 | 0.10 | 0.09 | 0.00 | 0.00 | 0.01 | 0.00 | 5.23 | 0.22 | 9.4 | 597.75 | |
| 078 | 13/09/2003 | 08:30 | 0.32 | 0.14 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.98 | 0.22 | 31.2 | 2033.15 | |
| 079 | 14/09/2003 | 08:30 | 0.51 | 0.64 | 0.13 | 0.26 | 0.00 | 0.16 | 0.01 | 0.17 | 6.15 | 0.47 | 5.0 | 281.19 | |
| 080 | 15/09/2003 | 08:30 | 0.27 | 0.20 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 6.12 | 0.20 | 17.8 | 1130.91 | |
| 081 | 21/09/2003 | 08:30 | 0.67 | 0.94 | 0.09 | 0.12 | 0.00 | 0.00 | 0.00 | 0.16 | 4.98 | 0.65 | 6.9 | 454.99 | |
| 082 | 22/09/2003 | 08:30 | 0.34 | 0.46 | 0.06 | 0.24 | 0.03 | 0.00 | 0.00 | 0.00 | 5.72 | 0.34 | 4.0 | 270.77 | |
| 083 | 23/09/2003 | 08:30 | 0.25 | 0.23 | 0.06 | 0.15 | 0.08 | 0.00 | 0.00 | 0.00 | 5.70 | 0.28 | 6.6 | 431.11 | |
| 092 | 14/10/2003 | 08:30 | 3.25 | 3.25 | 2.47 | 1.68 | 1.69 | 2.03 | 0.16 | 3.47 | 0.00 | 0.00 | 4.8 | 3.8 | * |
| 093 | 20/10/2003 | 08:30 | 1.91 | 2.90 | 0.48 | 0.10 | 0.08 | 0.12 | 0.04 | 1.15 | 0.00 | 0.00 | 0.4 | 28.13 | * |
| 094 | 21/10/2003 | 08:30 | 3.80 | 4.30 | 0.64 | 0.59 | 0.18 | 0.13 | 0.09 | 1.96 | 0.00 | 0.00 | 0.0 | 6.27 | * |
| 095 | 05/11/2003 | 08:30 | 2.15 | 0.79 | 0.15 | 0.98 | 0.04 | 0.05 | 0.00 | 0.16 | 5.02 | 0.50 | 8.6 | 537.12 | |
| 096 | 21/12/2003 | 08:30 | 3.53 | 1.39 | 0.48 | 1.57 | 0.22 | 2.72 | 0.13 | 0.97 | 0.00 | 0.00 | 0.0 | 4.96 | * |
| 097 | 13/01/2004 | 08:30 | 0.86 | 1.55 | 0.33 | 0.74 | 0.02 | 0.15 | 0.00 | 0.21 | 6.29 | 1.06 | 4.4 | 267.37 | |
| 098 | 09/02/2004 | 08:30 | 3.86 | 4.89 | 0.75 | 2.70 | 0.15 | 0.60 | 0.08 | 1.03 | 5.94 | 3.64 | 0.4 | 26.2 | |

* Small sample EC and pH were not measured

A-2 Summary of Ion concentration, Ion balance (R1) and EC check (R2)

| Sample No. | Concentration ($\mu\text{eq/L}$) | | | | | | | | | | | | | Req. R1* | R1 | EC Cal** | Req. R2* | R2 |
|------------|------------------------------------|-----------------|---------------|------------------|-------------|-----------------|---------------|--------------|------------------|------------------|--------------|--------------|---------|----------|--------|----------|----------|--------|
| | SO_4^{2-} | NO_3^- | Cl^- | HCO_3^- | Total Anion | NH_4^+ | Na^+ | K^+ | Ca^{2+} | Mg^{2+} | H^+ | Total Cation | C+A | | | | | |
| 001 | 117.08 | 120.32 | 280.14 | | 517.5 | 229.16 | 83.12 | 200.76 | 171.06 | 47.40 | | 731.50 | 1249.00 | | | 0.00 | | |
| 002 | 47.87 | 46.56 | 15.90 | | 110.33 | 88.23 | 3.05 | 8.29 | 78.76 | 15.28 | 2.19 | 195.80 | 306.14 | 8.00 | 27.92 | 2.19 | 13.00 | -15.10 |
| 003 | 82.50 | 58.21 | 26.76 | | 167.47 | 145.34 | 2.29 | 11.27 | 61.07 | 21.29 | 14.79 | 256.05 | 423.52 | 8.00 | 20.91 | 3.44 | 9.00 | -10.55 |
| 004 | 111.33 | 135.00 | 104.53 | | 350.86 | 208.04 | 6.56 | 124.31 | 119.25 | 31.40 | | 489.57 | 840.43 | | | | | |
| 005 | 93.51 | 137.10 | 32.11 | | 262.72 | 62.65 | 0.00 | 4.21 | 30.56 | 11.15 | 1.55 | 110.11 | 372.83 | 8.00 | -40.93 | 2.76 | 9.00 | -37.82 |
| 006 | 10.55 | 5.05 | 2.60 | | 18.20 | 17.75 | 0.00 | 2.97 | 7.69 | 4.87 | 5.50 | 38.78 | 56.98 | 15.00 | 36.12 | 0.56 | 13.00 | -19.70 |
| 007 | 1.73 | 1.03 | 0.00 | 7.14 | 9.89 | 2.07 | 0.00 | 1.21 | 0.00 | 4.12 | 0.78 | 8.18 | 18.07 | 30.00 | -9.49 | 0.13 | 20.00 | -27.11 |
| 008 | 17.04 | 22.72 | 6.05 | 6.81 | 52.62 | 61.42 | 0.00 | 12.86 | 5.11 | 5.65 | 0.81 | 85.86 | 138.48 | 8.00 | 24.00 | 1.01 | 13.00 | -5.15 |
| 009 | 17.21 | 22.07 | 3.23 | | 42.51 | 40.17 | 0.00 | 4.17 | 5.90 | 5.13 | 7.08 | 62.45 | 104.96 | 8.00 | 18.99 | 0.96 | 13.00 | -2.24 |
| 010 | 9.54 | 18.81 | 5.36 | 28.41 | 62.12 | 66.65 | 0.00 | 7.29 | 1.40 | 5.02 | 0.19 | 80.56 | 142.68 | 8.00 | 12.93 | 0.96 | 13.00 | 5.10 |
| 011 | 18.96 | 29.25 | 22.95 | | 71.16 | 17.64 | 0.00 | 1.93 | 0.00 | 3.96 | | 23.53 | 94.69 | | | | | |
| 012 | 46.83 | 38.53 | 35.42 | 14.91 | 135.69 | 98.41 | 8.08 | 17.17 | 21.64 | 10.71 | 0.37 | 156.37 | 292.07 | 8.00 | 7.08 | 2.08 | 13.00 | -3.57 |
| 013 | 13.53 | 9.13 | 8.22 | 12.40 | 43.29 | 42.40 | 0.00 | 3.99 | 10.23 | 6.57 | 0.45 | 63.64 | 106.93 | 8.00 | 19.03 | 0.74 | 13.00 | -3.61 |
| 014 | 81.35 | 63.11 | 42.61 | | 187.07 | 125.14 | 12.48 | 9.95 | 78.89 | 19.96 | | 246.42 | 433.49 | | | | | |
| 015 | 48.62 | 39.23 | 29.41 | 36.59 | 153.86 | 15.93 | 11.27 | 14.00 | 146.31 | 175.57 | 0.15 | 363.23 | 517.09 | 8.00 | 40.49 | 3.15 | 9.00 | 1.11 |
| 016 | 11.31 | 14.26 | 0.00 | | 25.57 | 33.15 | 0.00 | 2.84 | 3.30 | 4.65 | 1.32 | 45.26 | 70.83 | 15.00 | 27.81 | 0.55 | 13.00 | -12.22 |
| 017 | 7.10 | 12.36 | 0.00 | | 19.47 | 30.16 | 0.00 | 3.98 | 30.26 | 61.36 | 1.70 | 127.46 | 146.92 | 8.00 | 73.50 | 0.96 | 13.00 | 29.03 |

A-2 Summary of Ion concentration, Ion balance (R1) and EC check (R2) (Continued)

| Sample. No | Concentration ($\mu\text{eq/L}$) | | | | | | | | | | | | | Req. | R1 | EC Cal** | Req. | R2 |
|---------------|------------------------------------|-----------------|-------|------------------|----------------|-----------------|---------------|--------------|------------------|------------------|--------------|-----------------|--------|-------|-------|-------------|-------|--------|
| | SO_4^{2-} | NO_3^- | Cl | HCO_3^- | Total Anion | NH_4^+ | Na^+ | K^+ | Ca^{2+} | Mg^{2+} | H^+ | Total Cation | C+A | R1* | R2* | | | |
| 018 | 19.70 | 19.82 | 0.00 | | 39.52 | 35.85 | 0.00 | 3.48 | 3.52 | 0.00 | 14.45 | 57.31 | 96.83 | 15.00 | 18.36 | 1.11 | 13.00 | 2.06 |
| 019 | 3.77 | 4.14 | 5.23 | | 13.14 | 19.57 | 0.00 | 5.37 | 0.00 | 0.00 | 2.51 | 27.45 | 40.59 | 30.00 | 35.26 | 0.37 | 20.00 | 10.55 |
| 020 | 7.29 | 7.59 | 5.72 | | 20.59 | 32.89 | 0.00 | 4.93 | 0.00 | 0.00 | 1.82 | 39.64 | 60.23 | 15.00 | 31.63 | 0.50 | 13.00 | -10.93 |
| 021 | 27.91 | 20.66 | 21.50 | | 70.07 | 60.92 | 0.00 | 8.97 | 14.50 | 0.00 | | 84.39 | 93.98 | | | | | |
| 022 | 3.20 | 4.03 | 2.36 | | 9.59 | 17.20 | 0.00 | 3.00 | 0.00 | 0.03 | 1.66 | 21.88 | 31.47 | 30.00 | 39.08 | 0.28 | 20.00 | -16.59 |
| 023 | 11.56 | 11.80 | 5.17 | | 28.52 | 25.86 | 0.00 | 2.65 | 10.95 | 1.29 | 1.10 | 41.85 | 70.37 | 15.00 | 18.94 | 0.54 | 13.00 | -15.94 |
| 024 | 26.87 | 32.37 | 40.24 | | 99.48 | 56.86 | 9.22 | 6.33 | 87.53 | 9.67 | | 169.61 | 269.09 | | | | | |
| 025 | 37.57 | 48.75 | 44.12 | | 130.44 | 26.07 | 8.77 | 7.39 | 275.24 | 28.03 | | 345.50 | 475.94 | | | | | |
| 026 | 26.99 | 34.83 | 21.80 | 43.00 | 126.62 | 41.88 | 0.00 | 4.75 | 182.65 | 12.50 | 0.13 | 241.91 | 368.54 | 8.00 | 31.28 | 2.33 | 13.00 | -3.55 |
| 027 | 3.31 | 7.75 | 0.00 | | 11.06 | 23.22 | 0.00 | 2.77 | 3.78 | 0.00 | 1.32 | 31.09 | 42.15 | 30.00 | 47.51 | 0.34 | 13.00 | -18.82 |
| 028 | 16.93 | 20.72 | 8.95 | | 46.60 | 33.75 | 0.00 | 4.79 | 9.19 | 0.70 | 2.51 | 50.93 | 97.53 | 15.00 | 4.45 | 0.78 | 13.00 | 1.40 |
| 029 | 15.44 | 23.26 | 13.48 | | 52.18 | 72.88 | 0.00 | 6.64 | 13.67 | 1.11 | | 94.30 | 146.48 | | | | | |
| 030 | 17.19 | 30.34 | 16.68 | | 64.21 | 86.68 | 0.00 | 8.72 | 11.49 | 1.17 | | 108.06 | 172.27 | | | | | |
| 031 | 3.21 | 5.58 | 4.05 | | 12.84 | 15.12 | 0.00 | 3.35 | 0.00 | 0.00 | 2.34 | 20.82 | 33.66 | 30.00 | 23.71 | 0.31 | 20.00 | 2.32 |
| 033 | 1.48 | 4.26 | 2.64 | | 8.38 | 9.31 | 0.00 | 3.67 | 0.00 | 0.00 | 4.27 | 17.25 | 25.63 | 30.00 | 34.62 | 0.31 | 20.00 | 18.77 |
| 034 | 6.56 | 5.53 | 7.39 | | 19.48 | 39.11 | 0.00 | 7.30 | 0.00 | 0.00 | | 46.41 | 65.89 | | | | | |

A-2 Summary of Ion concentration, Ion balance (R1) and EC check (R2) (Continued)

| Sample No. | Concentration (µeq/L) | | | | | | | | | | | | | Req. R1* | R1 | EC Cal** | Req. R2* | R2 |
|------------|-------------------------------|------------------------------|-----------------|-------------------------------|-------------|------------------------------|-----------------|----------------|------------------|------------------|----------------|--------------|--------|----------|--------|----------|----------|-------|
| | SO ₄ ²⁻ | NO ₃ ⁻ | Cl ⁻ | HCO ₃ ⁻ | Total Anion | NH ₄ ⁺ | Na ⁺ | K ⁺ | Ca ²⁺ | Mg ²⁺ | H ⁺ | Total Cation | C+A | | | | | |
| 035 | 15.60 | 16.02 | 11.56 | 12.12 | 55.30 | 81.67 | 0.00 | 5.23 | 0.00 | 0.00 | 0.46 | 87.35 | 142.65 | 8.00 | 22.47 | 1.04 | 13.00 | -6.91 |
| 036 | 5.62 | 6.47 | 4.08 | 6.81 | 22.98 | 37.44 | 0.00 | 3.59 | 0.00 | 0.00 | 0.81 | 41.84 | 64.82 | 15.00 | 29.08 | 0.48 | 13.00 | -5.61 |
| 037 | 0.46 | 3.09 | 0.79 | | 4.34 | 7.15 | 0.00 | 2.45 | 0.00 | 0.00 | 3.55 | 13.15 | 17.50 | 30.00 | 50.36 | 0.23 | 20.00 | 11.44 |
| 038 | 6.88 | 11.62 | 5.53 | 6.36 | 30.40 | 32.85 | 0.00 | 4.03 | 0.00 | 0.00 | 0.87 | 37.75 | 68.14 | 15.00 | 10.79 | 0.51 | 13.00 | 0.02 |
| 039 | 5.37 | 6.73 | 4.80 | 60.73 | 77.62 | 36.52 | 0.00 | 4.89 | 0.00 | 0.00 | 0.09 | 41.50 | 119.13 | 8.00 | -30.32 | 0.71 | 13.00 | 14.20 |
| 040 | 1.25 | 1.94 | 4.80 | 22.56 | 30.54 | 12.29 | 23.24 | 4.95 | 10.91 | 13.22 | 0.25 | 64.87 | 95.41 | 15.00 | 35.97 | 0.55 | 20.00 | 40.90 |
| 041 | 0.83 | 2.10 | 4.23 | 19.21 | 26.37 | 8.14 | 37.07 | 6.52 | 8.72 | 12.96 | 0.29 | 73.70 | 100.06 | 8.00 | 47.30 | 0.56 | 20.00 | 49.61 |
| 042 | 0.21 | 1.61 | 3.39 | 8.78 | 13.98 | 6.15 | 9.45 | 3.49 | 8.26 | 12.69 | 0.63 | 40.67 | 54.66 | 15.00 | 48.83 | 0.34 | 20.00 | 27.67 |
| 043 | 11.66 | 15.16 | 7.90 | | 34.72 | 49.62 | 15.75 | 6.89 | 16.42 | 14.79 | 1.17 | 104.64 | 139.36 | 8.00 | 50.18 | 0.97 | 13.00 | 10.44 |
| 044 | 9.37 | 13.71 | 5.36 | | 28.44 | 27.96 | 7.74 | 5.06 | 11.02 | 13.36 | 4.17 | 69.30 | 97.74 | 15.00 | 41.81 | 0.78 | 13.00 | 14.59 |
| 045 | 0.83 | 2.74 | 4.23 | | 7.81 | 14.32 | 15.39 | 5.45 | 11.63 | 13.58 | 1.78 | 62.16 | 69.96 | 15.00 | 77.69 | 0.49 | 20.00 | 30.21 |
| 046 | 3.33 | 5.00 | 4.51 | | 12.84 | 15.53 | 12.55 | 4.33 | 11.07 | 14.07 | 1.95 | 59.50 | 72.35 | 15.00 | 64.49 | 0.52 | 20.00 | 20.47 |
| 047 | 10.62 | 10.97 | 13.54 | | 35.12 | 61.45 | 11.39 | 9.87 | 27.77 | 2.80 | 2.95 | 116.22 | 151.34 | | 53.58 | 1.13 | 13.00 | 11.42 |
| 048 | 18.53 | 48.70 | 29.06 | | 96.29 | 40.91 | 25.78 | 32.04 | 128.83 | 34.21 | | 261.77 | 358.06 | | | | | |
| 049 | 8.74 | 6.29 | 5.64 | 13.60 | 34.27 | 31.16 | 6.11 | 4.64 | 20.10 | 3.12 | 0.41 | 65.55 | 99.82 | 15.00 | 31.33 | 0.66 | 13.00 | -6.13 |
| 050 | 10.83 | 9.35 | 11.57 | 11.05 | 42.80 | 28.02 | 16.12 | 4.70 | 24.63 | 4.95 | 0.50 | 78.92 | 121.72 | 8.00 | 29.68 | 0.80 | 13.00 | -1.02 |
| 051 | 8.74 | 10.16 | 6.77 | | 25.67 | 18.54 | 17.53 | 4.84 | 18.54 | 3.40 | 1.41 | 64.26 | 89.94 | 15.00 | 42.91 | 0.63 | 13.00 | -0.60 |

A-2 Summary of Ion concentration, Ion balance (R1) and EC check (R2) (Continued)

| Sample No. | Concentration (µeq/L) | | | | | | | | | | | | | Req. R1* | R1 | EC Cal** | Req. R2* | R2 |
|------------|-------------------------------|------------------------------|-----------------|-------------------------------|-------------|------------------------------|-----------------|----------------|------------------|------------------|----------------|--------------|--------|----------|--------|----------|----------|--------|
| | SO ₄ ²⁻ | NO ₃ ⁻ | Cl ⁻ | HCO ₃ ⁻ | Total Anion | NH ₄ ⁺ | Na ⁺ | K ⁺ | Ca ²⁺ | Mg ²⁺ | H ⁺ | Total Cation | C+A | | | | | |
| 052 | 3.75 | 4.84 | 2.26 | 7.65 | 18.49 | 12.28 | 11.37 | 2.68 | 6.94 | 2.05 | 0.72 | 36.05 | 54.54 | 15.00 | 32.20 | 0.36 | 20.00 | 2.93 |
| 053 | 14.37 | 7.74 | 6.49 | | 28.59 | 20.46 | 22.36 | 10.59 | 12.35 | 2.50 | 1.51 | 69.78 | 98.37 | 15.00 | 41.86 | 0.70 | 13.00 | 0.73 |
| 054 | 3.33 | 2.90 | 1.41 | 19.65 | 27.30 | 0.86 | 0.75 | 4.03 | 8.47 | 1.28 | 0.28 | 15.67 | 42.97 | 30.00 | -27.07 | 0.25 | 20.00 | 9.22 |
| 055 | 7.70 | 10.97 | 6.21 | 16.35 | 41.22 | 43.97 | 13.67 | 6.95 | 22.24 | 2.99 | 0.34 | 90.16 | 131.38 | 8.00 | 37.25 | 0.86 | 13.00 | 5.09 |
| 056 | 3.75 | 7.90 | 3.67 | 28.41 | 43.72 | 26.76 | 22.72 | 5.18 | 13.75 | 1.15 | 0.19 | 69.76 | 113.48 | 8.00 | 22.94 | 0.68 | 13.00 | 13.67 |
| 057 | 9.16 | 6.13 | 6.21 | 5.67 | 27.16 | 23.56 | 8.86 | 5.08 | 25.29 | 5.05 | 0.98 | 68.82 | 95.98 | 15.00 | 43.40 | 0.66 | 13.00 | -1.73 |
| 058 | 4.79 | 3.55 | 1.97 | | 10.31 | 8.68 | 20.41 | 7.28 | 11.24 | 2.99 | 1.51 | 52.11 | 62.42 | 15.00 | 66.96 | 0.43 | 20.00 | 19.93 |
| 059 | 4.58 | 4.19 | 7.90 | | 16.67 | 1.80 | 7.36 | 4.22 | 8.00 | 2.32 | 2.45 | 26.15 | 42.82 | 30.00 | 22.13 | 0.35 | 20.00 | -3.54 |
| 060 | 4.79 | 4.52 | 7.90 | | 17.20 | 8.51 | 4.97 | 6.68 | 13.05 | 1.58 | 1.91 | 36.70 | 53.90 | 15.00 | 36.17 | 0.42 | 20.00 | 20.06 |
| 061 | 9.79 | 10.97 | 11.85 | | 32.60 | 13.21 | 2.32 | 7.91 | 5.96 | 1.04 | | 30.44 | 63.04 | | | | | |
| 062 | 1.87 | 0.48 | 4.80 | | 7.15 | 1.98 | 1.36 | 2.75 | 13.29 | 2.32 | 1.91 | 23.60 | 30.76 | 30.00 | 53.49 | 0.26 | 20.00 | 17.26 |
| 063 | 2.29 | 2.74 | 7.62 | | 12.65 | 5.04 | 9.80 | 11.28 | 8.75 | 1.13 | 1.86 | 37.86 | 50.51 | 15.00 | 49.92 | 0.39 | 20.00 | 19.82 |
| 064 | 1.67 | 1.29 | 6.49 | | 9.44 | 8.27 | 0.00 | 3.06 | 4.64 | 2.25 | 2.14 | 20.37 | 29.81 | 30.00 | 36.64 | 0.27 | 20.00 | 12.48 |
| 065 | 12.28 | 3.55 | 12.69 | 6.07 | 34.60 | 15.00 | 0.52 | 35.17 | 107.82 | 7.94 | 0.91 | 167.37 | 201.96 | 8.00 | 65.74 | 1.34 | 13.00 | 22.86 |
| 066 | 5.21 | 4.03 | 4.80 | | 14.03 | 17.06 | 0.00 | 0.45 | 12.60 | 2.11 | 1.02 | 33.25 | 47.28 | 30.00 | 40.64 | 0.36 | 20.00 | -14.54 |
| 067 | 9.16 | 9.03 | 4.80 | 22.56 | 45.55 | 40.42 | 0.00 | 2.99 | 41.43 | 4.90 | 0.25 | 90.00 | 135.55 | 8.00 | 32.79 | 0.88 | 13.00 | -2.42 |

A-2 Summary of Ion concentration, Ion balance (R1) and EC check (R2) (Continued)

| Sample No. | Concentration ($\mu\text{eq/L}$) | | | | | | | | | | | | | Req. R1* | R1 | EC Cal** | Req. R2* | R2 |
|------------|------------------------------------|-----------------|-----------------|------------------|----------------|-----------------|-----------------|----------------|------------------|------------------|----------------|-----------------|--------|-------------|--------|-------------|-------------|--------|
| | SO_4^{2-} | NO_3^- | Cl ⁻ | HCO_3^- | Total Anion | NH_4^+ | Na ⁺ | K ⁺ | Ca ²⁺ | Mg ²⁺ | H ⁺ | Total Cation | C+A | | | | | |
| 068 | 2.71 | 2.10 | 4.23 | | 9.03 | 2.47 | 0.00 | 0.00 | 7.42 | 2.20 | 3.55 | 15.64 | 24.67 | 30.00 | 26.76 | 0.27 | 20.00 | 14.39 |
| 069 | 8.69 | 5.97 | 5.64 | | 20.30 | 12.49 | 0.00 | 1.49 | 5.17 | 1.02 | 1.55 | 21.72 | 42.02 | 30.00 | 3.39 | 0.35 | 20.00 | -1.62 |
| 070 | 1.67 | 0.65 | 3.95 | | 6.26 | 4.69 | 0.00 | 0.18 | 6.02 | 2.11 | 1.91 | 14.91 | 21.17 | 30.00 | 40.86 | 0.20 | 20.00 | -0.56 |
| 071 | 6.66 | 1.94 | 6.77 | 31.15 | 46.52 | 21.25 | 0.00 | 11.66 | 5.83 | 4.46 | 0.18 | 43.38 | 89.89 | 15.00 | -3.49 | 0.56 | 20.00 | 8.06 |
| 072 | 6.87 | 6.61 | 8.46 | 9.19 | 31.14 | 20.04 | 0.59 | 8.51 | 19.09 | 3.35 | 0.60 | 52.18 | 83.32 | 15.00 | 25.26 | 0.57 | 13.00 | -2.25 |
| 073 | 9.99 | 3.71 | 8.46 | 11.05 | 33.22 | 22.97 | 0.00 | 3.87 | 10.90 | 1.04 | 0.50 | 39.29 | 72.51 | 15.00 | 8.38 | 0.51 | 13.00 | -4.19 |
| 074 | 22.28 | 28.06 | 10.16 | 28.41 | 88.90 | 65.46 | 0.00 | 6.60 | 54.00 | 3.26 | 0.19 | 129.50 | 218.40 | 8.00 | 18.59 | 1.46 | 13.00 | -6.13 |
| 075 | 2.08 | 0.00 | 1.69 | 6.36 | 10.13 | 0.46 | 1.84 | 0.00 | 0.00 | 0.21 | 0.87 | 3.38 | 13.51 | 30.00 | -49.98 | 0.10 | 20.00 | -22.12 |
| 076 | 7.70 | 2.90 | 3.10 | | 13.71 | 1.50 | 9.36 | 8.18 | 2.58 | 1.05 | 2.69 | 25.36 | 39.07 | 30.00 | 29.82 | 0.34 | 20.00 | 23.53 |
| 077 | 6.25 | 5.00 | 2.82 | | 14.07 | 5.02 | 0.00 | 0.00 | 0.00 | 0.44 | 5.89 | 11.35 | 25.41 | 30.00 | -10.70 | 0.35 | 20.00 | 23.13 |
| 078 | 6.66 | 2.26 | 2.54 | | 11.46 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.05 | 1.05 | 12.51 | 30.00 | -83.25 | 0.13 | 20.00 | -27.38 |
| 079 | 10.62 | 10.32 | 3.67 | 7.82 | 32.43 | 14.54 | 0.00 | 4.07 | 8.66 | 0.83 | 0.71 | 28.80 | 61.23 | 15.00 | -5.94 | 0.44 | 20.00 | -3.39 |
| 080 | 5.62 | 3.23 | 0.00 | 7.30 | 16.15 | 3.26 | 0.00 | 0.00 | 0.00 | 0.00 | 0.76 | 4.01 | 20.16 | 30.00 | -60.18 | 0.15 | 20.00 | -13.97 |
| 081 | 13.95 | 15.16 | 2.54 | | 31.65 | 6.77 | 0.00 | 0.00 | 7.87 | 0.28 | 10.47 | 25.39 | 57.04 | 15.00 | -10.96 | 0.70 | 13.00 | 3.98 |
| 082 | 7.08 | 7.42 | 1.69 | | 16.19 | 13.53 | 1.13 | 0.00 | 0.00 | 0.00 | 1.91 | 16.56 | 32.75 | 30.00 | 1.13 | 0.29 | 20.00 | -7.21 |
| 083 | 5.21 | 3.71 | 1.69 | | 10.61 | 8.20 | 3.49 | 0.00 | 0.00 | 0.00 | 2.00 | 13.68 | 24.29 | 30.00 | 12.67 | 0.23 | 20.00 | -10.11 |
| 084 | 11.45 | 12.90 | 3.39 | 6.66 | 34.40 | 26.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.83 | 26.99 | 61.38 | 15.00 | -12.07 | 0.46 | 13.00 | -4.10 |

A-2 Summary of Ion concentration, Ion balance (R1) and EC check (R2) (Continued)

| Sample No. | Concentration (µeq/L) | | | | | | | | | | | | | Req. R1* | R1 | EC Cal** | Req. R2* | R2 |
|------------|-------------------------------|------------------------------|-----------------|-------------------------------|-------------|------------------------------|-----------------|----------------|------------------|------------------|----------------|--------------|--------|----------|--------|----------|----------|--------|
| | SO ₄ ²⁻ | NO ₃ ⁻ | Cl ⁻ | HCO ₃ ⁻ | Total Anion | NH ₄ ⁺ | Na ⁺ | K ⁺ | Ca ²⁺ | Mg ²⁺ | H ⁺ | Total Cation | C+A | | | | | |
| 085 | 8.33 | 5.16 | 2.26 | | 15.75 | 1.08 | 0.00 | 0.00 | 0.00 | 0.00 | 3.16 | 4.24 | 19.99 | 30.00 | -57.56 | 0.24 | 20.00 | -18.79 |
| 086 | 39.35 | 27.41 | 5.36 | | 72.13 | 38.59 | 0.00 | 0.00 | 19.17 | 0.56 | 1.15 | 59.48 | 131.60 | 8.00 | -9.61 | 0.99 | 13.00 | -5.10 |
| 087 | 19.30 | 16.44 | 4.26 | | 40.00 | 34.45 | 1.75 | 0.00 | 16.30 | 0.66 | 3.09 | 56.25 | 96.26 | 15.00 | 16.88 | 0.78 | 13.00 | -7.43 |
| 088 | 48.83 | 33.89 | 33.20 | | 115.91 | 57.64 | 19.50 | 18.23 | 57.71 | 5.24 | | 158.32 | 274.23 | | | | | |
| 089 | 48.23 | 31.08 | 37.50 | | 116.81 | 49.42 | 17.62 | 21.10 | 62.73 | 5.12 | | 155.99 | 272.80 | | | | | |
| 090 | 35.97 | 31.58 | 24.58 | | 92.13 | 39.43 | 13.79 | 1.17 | 67.24 | 5.21 | | 126.84 | 218.97 | | | | | |
| 091 | 38.38 | 33.06 | 26.92 | | 98.36 | 63.40 | 15.17 | 11.46 | 106.40 | 6.02 | | 202.45 | 300.81 | | | | | |
| 092 | 67.63 | 52.38 | 69.63 | | 189.65 | 92.85 | 73.66 | 52.01 | 173.24 | 13.41 | | 405.17 | 594.82 | | | | | |
| 093 | 39.72 | 46.82 | 13.49 | | 100.04 | 5.27 | 3.65 | 3.04 | 57.30 | 3.67 | | 72.93 | 172.96 | | | | | |
| 094 | 79.07 | 69.37 | 18.04 | | 166.48 | 32.55 | 7.67 | 3.31 | 97.82 | 7.04 | | 148.39 | 314.87 | | | | | |
| 095 | 44.69 | 12.68 | 4.32 | | 61.69 | 54.33 | 1.62 | 1.18 | 8.19 | 0.38 | 9.55 | 75.26 | 136.95 | 8.00 | 9.91 | 1.28 | 13.00 | 43.73 |
| 096 | 73.41 | 22.49 | 13.52 | | 109.41 | 87.14 | 9.38 | 69.62 | 48.55 | 10.39 | | 225.08 | 334.49 | | | | | |
| 097 | 17.97 | 25.04 | 9.21 | 10.80 | 63.02 | 40.80 | 0.88 | 3.71 | 10.28 | 0.34 | 0.51 | 56.52 | 119.53 | 8.00 | -5.44 | 0.85 | 13.00 | -10.77 |
| 098 | 80.32 | 78.89 | 21.02 | | 180.23 | 149.60 | 6.44 | 15.34 | 51.59 | 6.59 | 1.15 | 230.72 | 410.95 | 8.00 | 12.29 | 3.00 | 9.00 | -9.71 |

*Req.R1 = Required value of R1 or R2

**EC = Calculated Electro-conductivity

A-3 Summary of Acid Deposition amount per area.

| Sample No. | Deposition amount ($\mu\text{mol}/\text{m}^2$) | | | | | | | | | | | |
|------------|--|-----------------|---------------|-------------|-----------------|---------------|--------------|------------------|------------------|--------------|--------------|---------|
| | SO_4^{2-} | NO_3^- | Cl^- | Total Anion | NH_4^+ | Na^+ | K^+ | Ca^{2+} | Mg^{2+} | H^+ | Total Cation | C+A |
| 001 | 5.85 | 12.03 | 28.01 | 45.90 | 22.92 | 8.31 | 20.08 | 8.55 | 2.37 | | 62.23 | 108.13 |
| 002 | 205.83 | 400.45 | 136.76 | 743.04 | 758.81 | 26.25 | 71.29 | 338.65 | 65.72 | 18.81 | 1279.54 | 2022.58 |
| 003 | 309.38 | 436.61 | 200.68 | 946.66 | 1090.03 | 17.17 | 84.53 | 229.01 | 79.85 | 110.93 | 1611.52 | 2558.18 |
| 004 | 11.13 | 27.00 | 20.91 | 59.04 | 41.61 | 1.31 | 24.86 | 11.93 | 3.14 | | 82.85 | 141.89 |
| 005 | 23.38 | 68.55 | 16.06 | 107.98 | 31.32 | 0.00 | 2.10 | 7.64 | 2.79 | 0.77 | 44.63 | 152.61 |
| 006 | 337.69 | 322.97 | 166.33 | 826.99 | 1135.90 | 0.00 | 190.04 | 246.08 | 155.98 | 351.71 | 2079.71 | 2906.70 |
| 007 | 31.93 | 38.12 | 0.00 | 70.06 | 76.67 | 0.00 | 44.83 | 0.00 | 76.15 | 28.72 | 226.38 | 296.43 |
| 008 | 21.30 | 56.80 | 15.12 | 93.22 | 153.55 | 0.00 | 32.15 | 6.39 | 7.07 | 2.03 | 201.18 | 294.40 |
| 009 | 72.29 | 185.38 | 27.14 | 284.81 | 337.40 | 0.00 | 35.03 | 24.79 | 21.53 | 59.47 | 478.23 | 763.04 |
| 010 | 16.21 | 63.97 | 18.22 | 98.40 | 226.62 | 0.00 | 24.78 | 2.38 | 8.54 | 0.66 | 262.98 | 361.38 |
| 011 | 1.90 | 5.85 | 4.59 | 12.34 | 3.53 | 0.00 | 0.39 | 0.00 | 0.40 | | 4.31 | 16.65 |
| 012 | 42.15 | 69.36 | 63.76 | 175.26 | 177.14 | 14.54 | 30.90 | 19.48 | 9.64 | 0.67 | 252.36 | 427.62 |
| 013 | 28.42 | 38.36 | 34.54 | 101.32 | 178.06 | 0.00 | 16.78 | 21.48 | 13.80 | 1.88 | 232.00 | 333.31 |
| 014 | 12.20 | 18.93 | 12.78 | 43.92 | 37.54 | 3.74 | 2.98 | 11.83 | 2.99 | | 59.10 | 103.02 |
| 015 | 38.90 | 62.77 | 47.05 | 148.72 | 25.49 | 18.03 | 22.39 | 117.05 | 140.46 | 0.24 | 323.66 | 472.39 |
| 016 | 143.59 | 362.21 | 0.00 | 505.79 | 842.01 | 0.00 | 72.15 | 41.92 | 59.10 | 33.48 | 1048.66 | 1554.46 |
| 017 | 22.73 | 79.12 | 0.00 | 101.85 | 193.00 | 0.00 | 25.49 | 96.82 | 196.36 | 10.87 | 522.55 | 624.40 |

A-3 Summary of Acid Deposition amount per area (Continued)

| Sample No. | Deposition amount ($\mu\text{mol}/\text{m}^2$) | | | | | | | | | | | |
|------------|--|-----------------|---------------|-------------|-----------------|---------------|--------------|------------------|------------------|--------------|--------------|---------|
| | SO_4^{2-} | NO_3^- | Cl^- | Total Anion | NH_4^+ | Na^+ | K^+ | Ca^{2+} | Mg^{2+} | H^+ | Total Cation | C+A |
| 018 | 133.98 | 269.56 | 0.00 | 403.54 | 487.54 | 0.00 | 47.32 | 23.96 | 0.00 | 196.58 | 755.40 | 1158.94 |
| 019 | 24.90 | 54.61 | 68.99 | 148.50 | 258.34 | 0.00 | 70.83 | 0.00 | 0.00 | 33.16 | 362.32 | 510.82 |
| 020 | 3.64 | 7.59 | 5.72 | 16.95 | 32.89 | 0.00 | 4.93 | 0.00 | 0.00 | 1.82 | 39.64 | 56.59 |
| 021 | 5.58 | 8.26 | 8.60 | 22.45 | 24.37 | 0.00 | 3.59 | 2.90 | 0.00 | | 30.85 | 53.30 |
| 022 | 4.16 | 10.48 | 6.13 | 20.76 | 44.71 | 0.00 | 7.80 | 0.00 | 0.04 | 4.31 | 56.86 | 77.62 |
| 023 | 78.58 | 160.43 | 70.27 | 309.28 | 351.67 | 0.00 | 36.06 | 74.49 | 8.76 | 14.91 | 485.89 | 795.17 |
| 024 | 8.06 | 19.42 | 24.15 | 51.63 | 34.11 | 5.53 | 3.80 | 26.26 | 2.90 | | 72.61 | 124.23 |
| 025 | 3.76 | 9.75 | 8.82 | 22.33 | 5.21 | 1.75 | 1.48 | 27.52 | 2.80 | | 38.77 | 61.11 |
| 026 | 10.80 | 27.87 | 17.44 | 56.10 | 33.50 | 0.00 | 3.80 | 73.06 | 5.00 | 0.10 | 115.47 | 171.57 |
| 027 | 12.58 | 58.90 | 0.00 | 71.48 | 176.46 | 0.00 | 21.04 | 14.37 | 0.00 | 10.02 | 221.89 | 293.37 |
| 028 | 18.62 | 45.58 | 19.70 | 83.90 | 74.25 | 0.00 | 10.54 | 10.10 | 0.77 | 5.53 | 101.19 | 185.08 |
| 029 | 1.54 | 4.65 | 2.70 | 8.89 | 14.58 | 0.00 | 1.33 | 1.37 | 0.11 | | 17.38 | 26.27 |
| 030 | 1.72 | 6.07 | 3.34 | 11.12 | 17.34 | 0.00 | 1.74 | 1.15 | 0.12 | | 20.35 | 31.47 |
| 031 | 16.04 | 55.82 | 40.49 | 112.35 | 151.21 | 0.00 | 33.54 | 0.00 | 0.00 | 23.44 | 208.19 | 320.53 |
| 032 | 4.46 | 9.20 | 12.53 | 26.20 | 46.85 | 0.00 | 3.40 | 1.71 | 0.35 | 0.23 | 52.53 | 78.73 |
| 033 | 9.30 | 53.68 | 33.29 | 96.27 | 117.36 | 0.00 | 46.27 | 0.00 | 0.00 | 53.75 | 217.38 | 313.66 |
| 034 | 0.66 | 1.11 | 1.48 | 3.24 | 7.82 | 0.00 | 1.46 | 0.00 | 0.00 | | 9.28 | 12.52 |

A-3 Summary of Acid Deposition amount per area (Continued)

| Sample No. | Deposition amount ($\mu\text{mol}/\text{m}^2$) | | | | | | | | | | | |
|------------|--|-----------------|---------------|-------------|-----------------|---------------|--------------|------------------|------------------|--------------|--------------|-------|
| | SO_4^{2-} | NO_3^- | Cl^- | Total Anion | NH_4^+ | Na^+ | K^+ | Ca^{2+} | Mg^{2+} | H^+ | Total Cation | C+A |
| 035 | 6.24 | 12.82 | 9.25 | 28.31 | 65.33 | 0.00 | 4.18 | 0.00 | 0.00 | 0.37 | 69.88 | 98.18 |
| 036 | 4.50 | 10.35 | 6.53 | 21.37 | 59.90 | 0.00 | 5.74 | 0.00 | 0.00 | 1.30 | 66.94 | 88.31 |
| 037 | 2.33 | 31.57 | 8.07 | 41.97 | 72.98 | 0.00 | 25.00 | 0.00 | 0.00 | 36.19 | 134.17 | 41.97 |
| 038 | 8.26 | 27.89 | 13.28 | 49.43 | 78.84 | 0.00 | 9.67 | 0.00 | 0.00 | 2.09 | 90.60 | 49.43 |
| 039 | 9.13 | 22.87 | 16.30 | 48.30 | 124.17 | 0.00 | 16.64 | 0.00 | 0.00 | 0.31 | 141.11 | 48.30 |
| 040 | 6.81 | 21.09 | 52.27 | 80.17 | 133.98 | 253.34 | 53.99 | 59.47 | 72.06 | 2.68 | 575.50 | 80.17 |
| 041 | 3.41 | 17.19 | 34.70 | 55.30 | 66.74 | 303.95 | 53.44 | 35.77 | 53.14 | 2.36 | 515.41 | 55.30 |
| 042 | 1.10 | 17.09 | 35.88 | 54.08 | 65.17 | 100.21 | 37.00 | 43.78 | 67.26 | 6.69 | 320.10 | 54.08 |
| 043 | 7.00 | 18.19 | 9.48 | 34.66 | 59.55 | 18.90 | 8.26 | 9.85 | 8.87 | 1.41 | 106.85 | 34.66 |
| 044 | 14.05 | 41.12 | 16.08 | 71.26 | 83.88 | 23.22 | 15.17 | 16.53 | 20.04 | 12.51 | 171.34 | 71.26 |
| 045 | 2.91 | 19.19 | 29.62 | 51.72 | 100.24 | 107.76 | 38.18 | 40.71 | 47.52 | 12.45 | 346.86 | 51.72 |
| 046 | 12.33 | 36.99 | 33.40 | 82.72 | 114.95 | 92.90 | 32.02 | 40.95 | 52.05 | 14.43 | 347.31 | 82.72 |
| 047 | 11.68 | 24.13 | 29.79 | 65.59 | 135.18 | 25.05 | 21.71 | 30.55 | 3.08 | 6.49 | 222.06 | 65.59 |
| 048 | 0.74 | 3.90 | 2.32 | 6.96 | 3.27 | 2.06 | 2.56 | 5.15 | 1.37 | | 14.42 | 6.96 |
| 049 | 10.49 | 15.09 | 13.54 | 39.13 | 74.79 | 14.67 | 11.15 | 24.12 | 3.75 | 0.98 | 129.45 | 10.49 |
| 050 | 6.50 | 11.22 | 13.88 | 31.60 | 33.62 | 19.35 | 5.65 | 14.78 | 2.97 | 0.60 | 76.96 | 6.50 |
| 051 | 5.68 | 13.21 | 8.80 | 27.69 | 24.10 | 22.79 | 6.30 | 12.05 | 2.21 | 1.84 | 69.28 | 5.68 |

A-3 Summary of Acid Deposition amount per area (Continued)

| Sample No. | Deposition amount ($\mu\text{mol}/\text{m}^2$) | | | | | | | | | | | |
|------------|--|-----------------|---------------|-------------|-----------------|---------------|--------------|------------------|------------------|--------------|--------------|-------|
| | SO_4^{2-} | NO_3^- | Cl^- | Total Anion | NH_4^+ | Na^+ | K^+ | Ca^{2+} | Mg^{2+} | H^+ | Total Cation | C+A |
| 052 | 10.12 | 26.12 | 12.19 | 48.43 | 66.31 | 61.38 | 14.48 | 18.73 | 5.55 | 3.91 | 170.37 | 10.12 |
| 053 | 17.24 | 18.58 | 15.57 | 51.39 | 49.11 | 53.66 | 25.40 | 14.82 | 3.00 | 3.63 | 149.63 | 17.24 |
| 054 | 11.99 | 20.90 | 10.16 | 43.05 | 6.20 | 5.41 | 29.02 | 30.48 | 4.60 | 2.03 | 77.74 | 11.99 |
| 055 | 3.85 | 10.97 | 6.21 | 21.02 | 43.97 | 13.67 | 6.95 | 11.12 | 1.50 | 0.34 | 77.54 | 3.85 |
| 056 | 1.50 | 6.32 | 2.93 | 10.75 | 21.41 | 18.17 | 4.14 | 5.50 | 0.46 | 0.16 | 49.84 | 1.50 |
| 057 | 60.46 | 80.89 | 81.92 | 223.27 | 310.93 | 116.99 | 67.09 | 166.91 | 33.34 | 12.90 | 708.17 | 60.46 |
| 058 | 32.08 | 47.54 | 26.46 | 106.08 | 116.32 | 273.55 | 97.51 | 75.28 | 20.04 | 20.28 | 602.98 | 32.08 |
| 059 | 25.19 | 46.12 | 86.88 | 158.20 | 19.85 | 80.94 | 46.39 | 43.97 | 12.74 | 27.00 | 230.90 | 25.19 |
| 060 | 17.24 | 32.51 | 56.87 | 106.62 | 61.30 | 35.79 | 48.11 | 46.99 | 5.68 | 13.72 | 211.58 | 17.24 |
| 061 | 1.47 | 3.29 | 3.55 | 8.31 | 3.96 | 0.70 | 2.37 | 0.89 | 0.16 | | 8.08 | 1.47 |
| 062 | 52.47 | 27.09 | 268.55 | 348.11 | 110.75 | 76.20 | 153.96 | 372.16 | 64.95 | 106.71 | 884.72 | 52.47 |
| 063 | 2.06 | 4.93 | 13.71 | 20.71 | 9.07 | 17.64 | 20.31 | 7.87 | 1.01 | 3.35 | 59.26 | 2.06 |
| 064 | 26.15 | 40.51 | 203.72 | 270.38 | 259.79 | 0.00 | 96.03 | 72.87 | 35.40 | 67.13 | 531.21 | 26.15 |
| 065 | 78.62 | 45.41 | 162.48 | 286.51 | 191.96 | 6.68 | 450.18 | 690.05 | 50.85 | 11.67 | 1401.38 | 78.62 |
| 066 | 30.81 | 47.73 | 56.78 | 135.33 | 202.00 | 0.00 | 5.37 | 74.59 | 12.48 | 12.12 | 306.57 | 30.81 |
| 067 | 27.48 | 54.18 | 28.77 | 110.44 | 242.54 | 0.00 | 17.96 | 124.30 | 14.71 | 1.47 | 400.99 | 27.48 |
| 068 | 24.36 | 37.74 | 76.16 | 138.26 | 44.53 | 0.00 | 0.00 | 66.75 | 19.79 | 63.87 | 194.94 | 24.36 |

A-3 Summary of Acid Deposition amount per area (Continued)

| Sample No. | Deposition amount ($\mu\text{mol}/\text{m}^2$) | | | | | | | | | | | |
|------------|--|-----------------|---------------|-------------|-----------------|---------------|--------------|------------------|------------------|--------------|--------------|--------|
| | SO_4^{2-} | NO_3^- | Cl^- | Total Anion | NH_4^+ | Na^+ | K^+ | Ca^{2+} | Mg^{2+} | H^+ | Total Cation | C+A |
| 069 | 17.38 | 23.87 | 22.57 | 63.81 | 49.98 | 0.00 | 5.95 | 10.35 | 2.04 | 6.20 | 74.51 | 17.38 |
| 070 | 47.80 | 37.03 | 226.69 | 311.52 | 269.38 | 0.00 | 10.62 | 172.77 | 60.50 | 109.37 | 622.64 | 47.80 |
| 071 | 44.64 | 25.93 | 90.72 | 161.29 | 284.74 | 0.00 | 156.25 | 39.07 | 29.87 | 2.38 | 512.32 | 44.64 |
| 072 | 36.41 | 70.09 | 89.70 | 196.20 | 212.37 | 6.29 | 90.16 | 101.19 | 17.78 | 6.39 | 434.18 | 36.41 |
| 073 | 8.00 | 5.93 | 13.54 | 27.47 | 36.76 | 0.00 | 6.20 | 8.72 | 0.83 | 0.80 | 53.31 | 8.00 |
| 074 | 11.14 | 28.06 | 10.16 | 49.35 | 65.46 | 0.00 | 6.60 | 27.00 | 1.63 | 0.19 | 100.87 | 11.14 |
| 075 | 70.79 | 0.00 | 115.09 | 185.88 | 31.25 | 124.93 | 0.00 | 0.00 | 7.21 | 59.23 | 222.62 | 70.79 |
| 076 | 71.64 | 53.99 | 57.72 | 183.35 | 27.93 | 174.05 | 152.07 | 24.00 | 9.77 | 50.06 | 437.88 | 71.64 |
| 077 | 29.36 | 46.99 | 26.52 | 102.87 | 47.21 | 0.00 | 0.00 | 0.00 | 2.04 | 55.35 | 104.61 | 29.36 |
| 078 | 103.94 | 70.44 | 79.21 | 253.59 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 32.67 | 32.67 | 103.94 |
| 079 | 26.55 | 51.60 | 18.34 | 96.49 | 72.68 | 0.00 | 20.33 | 21.64 | 2.07 | 3.54 | 120.27 | 26.55 |
| 080 | 50.03 | 57.41 | 0.00 | 107.44 | 57.95 | 0.00 | 0.00 | 0.00 | 0.00 | 13.50 | 71.45 | 50.03 |
| 081 | 48.13 | 104.60 | 17.52 | 170.24 | 46.70 | 0.00 | 0.00 | 27.16 | 0.97 | 72.25 | 147.08 | 48.13 |
| 081 | 48.13 | 104.60 | 17.52 | 170.24 | 46.70 | 0.00 | 0.00 | 27.16 | 0.97 | 72.25 | 147.08 | 48.13 |
| 082 | 14.16 | 29.67 | 6.77 | 50.60 | 54.11 | 4.51 | 0.00 | 0.00 | 0.00 | 7.62 | 66.24 | 14.16 |
| 083 | 17.18 | 24.48 | 11.17 | 52.83 | 54.14 | 23.00 | 0.00 | 0.00 | 0.00 | 13.17 | 90.31 | 17.18 |
| 084 | 13.74 | 30.96 | 8.12 | 52.83 | 62.77 | 0.00 | 0.00 | 0.00 | 0.00 | 2.00 | 64.77 | 13.74 |

A-3 Summary of Acid Deposition amount per area (Continued)

| Sample No. | Deposition amount ($\mu\text{mol}/\text{m}^2$) | | | | | | | | | | | |
|------------|--|-----------------|---------------|-------------|-----------------|---------------|--------------|------------------|------------------|--------------|--------------|--------|
| | SO_4^{2-} | NO_3^- | Cl^- | Total Anion | NH_4^+ | Na^+ | K^+ | Ca^{2+} | Mg^{2+} | H^+ | Total Cation | C+A |
| 085 | 46.64 | 57.80 | 25.28 | 129.71 | 12.08 | 0.00 | 0.00 | 0.00 | 0.00 | 35.42 | 47.50 | 46.64 |
| 086 | 82.64 | 115.14 | 22.51 | 220.29 | 162.09 | 0.00 | 0.00 | 40.26 | 1.18 | 4.82 | 208.36 | 82.64 |
| 087 | 38.61 | 65.76 | 17.03 | 121.40 | 137.80 | 7.00 | 0.00 | 32.60 | 1.33 | 12.36 | 191.09 | 38.61 |
| 088 | 2.69 | 3.73 | 3.65 | 10.06 | 6.34 | 2.14 | 2.01 | 3.17 | 0.29 | | 13.95 | 2.69 |
| 089 | 4.82 | 6.22 | 7.50 | 18.54 | 9.88 | 3.52 | 4.22 | 6.27 | 0.51 | | 24.42 | 4.82 |
| 090 | 1.44 | 2.53 | 1.97 | 5.93 | 3.15 | 1.10 | 0.09 | 2.69 | 0.21 | | 7.25 | 1.44 |
| 091 | 4.99 | 8.59 | 7.00 | 20.58 | 16.48 | 3.94 | 2.98 | 13.83 | 0.78 | | 38.02 | 4.99 |
| 092 | 2.03 | 3.14 | 4.18 | 9.35 | 5.57 | 4.42 | 3.12 | 5.20 | 0.40 | | 18.71 | 2.03 |
| 093 | 7.94 | 18.73 | 5.40 | 32.07 | 2.11 | 1.46 | 1.22 | 11.46 | 0.73 | | 16.98 | 7.94 |
| 094 | 3.95 | 6.94 | 1.80 | 12.69 | 3.26 | 0.77 | 0.33 | 4.89 | 0.35 | | 9.60 | 3.95 |
| 095 | 192.18 | 109.02 | 37.17 | 338.37 | 467.23 | 13.94 | 10.17 | 35.23 | 1.65 | 82.13 | 610.34 | 192.18 |
| 096 | 2.94 | 1.80 | 1.08 | 5.82 | 6.97 | 0.75 | 5.57 | 1.94 | 0.42 | | 15.65 | 2.94 |
| 097 | 39.52 | 110.18 | 40.52 | 190.22 | 179.52 | 3.87 | 16.32 | 22.62 | 0.74 | 2.26 | 225.32 | 39.52 |
| 098 | 16.06 | 31.56 | 8.41 | 56.03 | 59.84 | 2.58 | 6.14 | 10.32 | 1.32 | 0.46 | 80.65 | 16.06 |

A-4 Measurement results of air concentration analysis by Filter Packs.

| Sample No. | Sampling period | | | | Average Temp (°C) | Air Volume (m ³) | Gas (nmol/m ³) | | | | | | Particle (nmol/m ³) | | | | | |
|------------|-----------------|------|------------|------|-------------------|------------------------------|----------------------------|------------------|-------|-----------------|-------------------------------|------------------------------|---------------------------------|------------------------------|-----------------|----------------|------------------|------------------|
| | Start | | End | | | | SO ₂ | HNO ₃ | HCl | NH ₃ | SO ₄ ²⁻ | NO ₃ ⁻ | Cl ⁻ | NH ₄ ⁺ | Na ⁺ | K ⁺ | Mg ²⁺ | Ca ²⁺ |
| | Date | Time | Date | Time | | | | | | | | | | | | | | |
| 1 | 26/4/03 | 8.30 | 3/5/2003 | 8.30 | 28.014 | 9.540 | N.D. | 2.31 | N.D. | 799.66 | 0.93 | 2.07 | N.D. | 222.06 | 6.62 | 26.37 | 5.10 | 40.70 |
| 2 | 25/5/03 | 8.30 | 1/6/2003 | 8.30 | 30.036 | 9.341 | N.D. | N.D. | 32.31 | 1040.78 | 30.44 | 1.43 | N.D. | 123.76 | 32.32 | 17.53 | 28.03 | 168.19 |
| 3 | 24/6/03 | 8.30 | 1/7/2003 | 8.30 | 27.093 | 9.341 | 5.66 | 5.01 | 24.89 | 465.75 | 1.88 | 4.87 | N.D. | 8.50 | N.D. | N.D. | 7.10 | 0.00 |
| 4 | 27/7/03 | 9.05 | 3/8/2003 | 9.05 | 27.943 | 9.609 | 5.27 | 5.42 | 5.10 | 108.75 | 6.96 | 4.86 | 2.27 | 16.62 | 10.04 | 11.07 | 1.27 | 13.32 |
| 5 | 26/8/03 | 8.15 | 2/9/2003 | 8.10 | 26.721 | 9.170 | 1.80 | 4.31 | 4.54 | -6.26 | 0.54 | 9.81 | N.D. | 6.78 | N.D. | 6.44 | 2.32 | 18.96 |
| 6 | 21/9/03 | 8.45 | 28/9/2003 | 8.45 | 27.729 | 10.092 | 2.95 | 2.42 | -2.88 | 79.62 | 7.09 | 1.51 | 0.31 | 9.34 | N.D. | 2.08 | 75.17 | 4.63 |
| 7 | 21/10/03 | 8.25 | 28/10/2003 | 8.20 | 25.857 | 9.355 | 23.42 | 10.78 | 1.44 | 88.04 | 59.57 | 0.75 | 4.79 | 108.31 | N.D. | 0.00 | 1.29 | 6.74 |
| 8 | 25/11/03 | 8.15 | 2/12/2003 | 8.22 | 23.657 | 9.109 | 62.95 | 2.59 | 7.04 | 168.83 | 3.04 | 0.22 | 0.51 | 3.99 | N.D. | 0.83 | 0.02 | 0.11 |
| 9 | 23/12/03 | 8.20 | 30/12/2003 | 8.30 | 19.914 | 11.471 | 20.60 | 25.06 | 14.06 | 151.23 | 86.91 | 11.84 | N.D. | 116.84 | N.D. | 21.04 | 0.11 | 10.63 |
| 10 | 21/1/04 | 8.21 | 28/1/2004 | 8.31 | 20.314 | 9.492 | 42.02 | 28.57 | 10.16 | 291.08 | N.D. | 2.36 | 15.73 | 7.97 | N.D. | 2.76 | N.D. | 8.66 |
| 11 | 22/2/04 | 8.22 | 29/2/2004 | 8.32 | 22.479 | 9.241 | 17.70 | 37.79 | 12.84 | 286.91 | 23.55 | 31.08 | 2.82 | 54.60 | 2.51 | 29.95 | 1.88 | 17.79 |
| 12 | 20/3/04 | 8.23 | 27/3/2004 | 8.33 | 27.193 | 8.7 | 31.35 | 47.93 | 29.77 | 511.56 | 55.66 | 38.17 | 1.75 | 100.61 | 10.73 | 52.97 | 4.40 | 34.46 |

A-5 Calculation example for Sulfate; SO₄²⁻

Detected concentration = 4.472 mg/L.

$$\mu\text{mol/L unit} = \text{mg/L of SO}_4^{2-} \times \left(\frac{1000}{M}\right) = 4.471 \times \left(\frac{1000}{96.1}\right) = 46.55$$

where; M = Molecular Weight of interest ion

Calculation for R1 and R2

The presents of anion and cation equivalent were used to calculate the ion balance (R1) and the detected EC was used to find R2 value. The used equations were shown in chapter 1 and example of calculation is shown as follows;

$$R1 = \left(\frac{171.50 - 192.37}{171.50 + 192.37}\right) \times 100\%$$

$$= \left(\frac{-20.87}{363.87}\right) \times 100\%$$

$$= -5.74$$

$$R2 = \left(\frac{(\Lambda_{calc} - \Lambda_{meas})}{(\Lambda_{calc} + \Lambda_{meas})}\right) \times 100\%$$

Where;

?_{mea} = Measurement value Electro-Conductivity

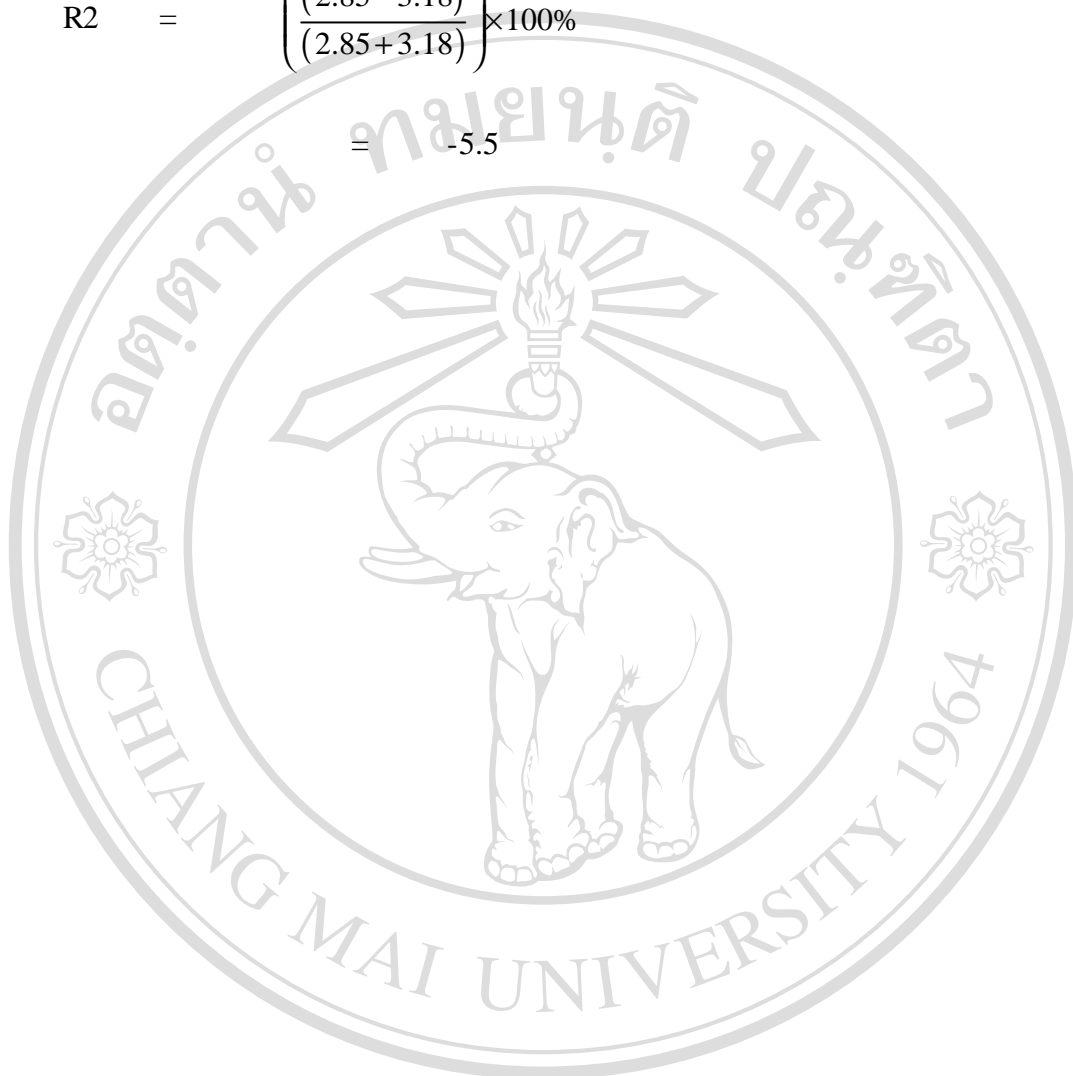
$$\Lambda_{calc} = \left\{ \begin{array}{l} 349.7 \times 10^{(6-4.97)} + 80.0 \times 2c(93.10) + 71.5c(30.08) + 76.3c(69.19) \\ + 73.5c(49.99) + 50.1(45.56) + 73.5c(5.77) + 59.8 \times 2c(47.58) + 53.3 \times 2c(11.88) \end{array} \right\} / 1000$$

$$= 2.85$$

Thus;

$$R2 = \left(\frac{(2.85 - 3.18)}{(2.85 + 3.18)} \right) \times 100\%$$

$$= -5.5$$



ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
 Copyright © by Chiang Mai University
 All rights reserved

Appendix B

B-1 Median value of Meteorological Data of Chiang Mai Province

| Date | Air pressure | | | Temperature (°C) | | | Humidity (%) | | | Rain (mm) | Evaporation (mm) | Sunny (hr.) | Wind | |
|---------------|--------------|--------|--------|------------------|------|------|--------------|------|------|--------------|---------------------|----------------|-----------|---------------|
| | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | | | | Direction | Speed (km/hr) |
| Apr-03 | 1010.0 | 1003.5 | 1007.1 | 35.9 | 22.9 | 28.6 | 83.5 | 41.5 | 63.1 | 0.0 | 5.02 | 8.65 | 195.0 | 18.5 |
| May-03 | 1007.3 | 1002.2 | 1005.4 | 34.0 | 24.0 | 28.4 | 88.0 | 52.0 | 70.9 | 0.0 | 5.81 | 8.80 | 210.0 | 25.9 |
| Jun-03 | 1006.8 | 1002.5 | 1004.9 | 31.0 | 23.8 | 26.8 | 96.0 | 65.5 | 82.1 | 2.2 | 3.90 | 3.75 | 190.0 | 6.0 |
| Jul-03 | 1008.4 | 1003.7 | 1006.4 | 31.7 | 23.8 | 27.3 | 96.0 | 63.0 | 80.1 | 0.3 | 4.64 | 5.30 | 220.0 | 5.0 |
| Aug-03 | 1006.5 | 1002.5 | 1004.4 | 31.3 | 23.9 | 26.6 | 95.0 | 65.0 | 81.9 | 0.6 | 3.77 | 3.90 | 205.0 | 18.5 |
| Sep-03 | 1008.8 | 1003.7 | 1006.7 | 31.5 | 23.7 | 26.3 | 97.0 | 64.0 | 85.3 | 3.9 | 3.69 | 4.10 | 245.0 | 19.0 |
| Oct-03 | 1011.0 | 1013.2 | 1016.0 | 31.9 | 23.1 | 26.3 | 96.0 | 56.0 | 78.8 | 0.0 | 3.56 | 7.70 | 190.0 | 17.0 |
| Nov-03 | 1014.6 | 1009.9 | 1012.2 | 31.8 | 18.6 | 24.4 | 94.5 | 46.5 | 71.9 | 0.0 | 4.14 | 8.70 | 170.0 | 13.0 |
| Dec-03 | 1017.1 | 1011.0 | 1014.2 | 28.6 | 15.7 | 21.8 | 94.0 | 42.0 | 69.5 | 0.0 | 3.27 | 8.10 | 170.0 | 13.0 |
| Jan-04 | 1015.7 | 1009.1 | 1012.7 | 29.9 | 14.7 | 22.5 | 92.0 | 38.0 | 66.9 | 0.0 | 3.33 | 8.40 | 170.0 | 13.0 |

B-1 Median value of Meteorological Data of Chiang Mai province

| Date | Air pressure | | | Temperature (°C) | | | Humidity (%) | | | Rain (mm) | Evaporation (mm) | Sunny (hr.) | Wind | |
|---------------|--------------|--------|--------|------------------|------|------|--------------|------|------|--------------|---------------------|----------------|-----------|---------------|
| | Max | Min | Ave | Max | Min | Ave | Max | Min | Ave | | | | Direction | Speed (km/hr) |
| Feb-04 | 1013.5 | 1006.0 | 1010.0 | 32.1 | 16.5 | 23.8 | 80.0 | 29.0 | 55.8 | 0.0 | 4.14 | 8.70 | 200.0 | 18.0 |
| Mar-04 | 1010.7 | 1003.2 | 1007.4 | 36.5 | 21.0 | 28.8 | 71.0 | 25.0 | 47.4 | 0.0 | 9.20 | 5.46 | 190.0 | 19.0 |

B-2 Monthly Median Meteorological Data of Mae Hea Research Center, CMU

| Month | Temperature (°C) | | | Humidity (%) | | | Rain (mm.) | Evaporation (cm) | Note |
|---------------|------------------|-------|-------|--------------|-------|-------|---------------|---------------------|------|
| | Max | Min | Ave | Max | Min | Ave | | | |
| Apr-03 | 36.50 | 21.00 | 28.75 | 76.7 | 35.35 | 56.03 | - | 5.47 | |
| May-03 | 35.00 | 23.00 | 29.00 | 79.40 | 47.00 | 63.20 | 23.93 | 6.40 | |
| Jun-03 | 32.00 | 24.50 | 28.25 | 86.80 | 69.25 | 78.03 | 8.05 | 4.36 | |
| Jul-03 | 32.50 | 24.00 | 28.25 | 87.40 | 68.80 | 78.10 | 4.30 | 5.13 | |
| Aug-03 | 32.00 | 23.40 | 27.70 | 89.20 | 70.50 | 79.85 | 14.90 | 4.79 | |
| Sep-03 | 32.00 | 23.50 | 27.75 | 90.10 | 74.00 | 82.05 | 14.60 | 4.94 | |
| Oct-03 | 32.00 | 21.30 | 26.65 | 90.60 | 63.20 | 76.90 | 6.70 | 4.41 | |
| Nov-03 | 31.85 | 18.50 | 25.18 | 87.45 | 46.85 | 67.15 | 13.10 | 4.16 | |
| Dec-03 | 28.00 | 13.00 | 20.50 | 91.60 | 43.20 | 67.40 | - | 3.62 | |
| Jan-04 | 30.50 | 10.80 | 20.65 | 88.60 | 38.60 | 63.60 | 6.50 | 3.79 | |

B-2 Monthly Median Meteorological Data of Mae Hea Research Center, CMU

| Month | Temperature (°C) | | | Humidity (%) | | | Rain (mm.) | Evaporation (cm) | Note |
|---------------|------------------|-------|-------|--------------|-------|-------|---------------|---------------------|------|
| | Max | Min | Ave | Max | Min | Ave | | | |
| Feb-04 | 32.00 | 13.30 | 22.65 | 80.50 | 22.70 | 51.60 | 3.55 | 4.42 | * |
| Mar-04 | 36.00 | 18.00 | 27.00 | 73.10 | 26.30 | 49.70 | - | 5.94 | |

* Construction during 13-29 Feb, 04

B-3 Number of Forest fire event in Chiang Mai during Oct, 03 - Sep, 04

(Forest fire Control Unit., 2004)

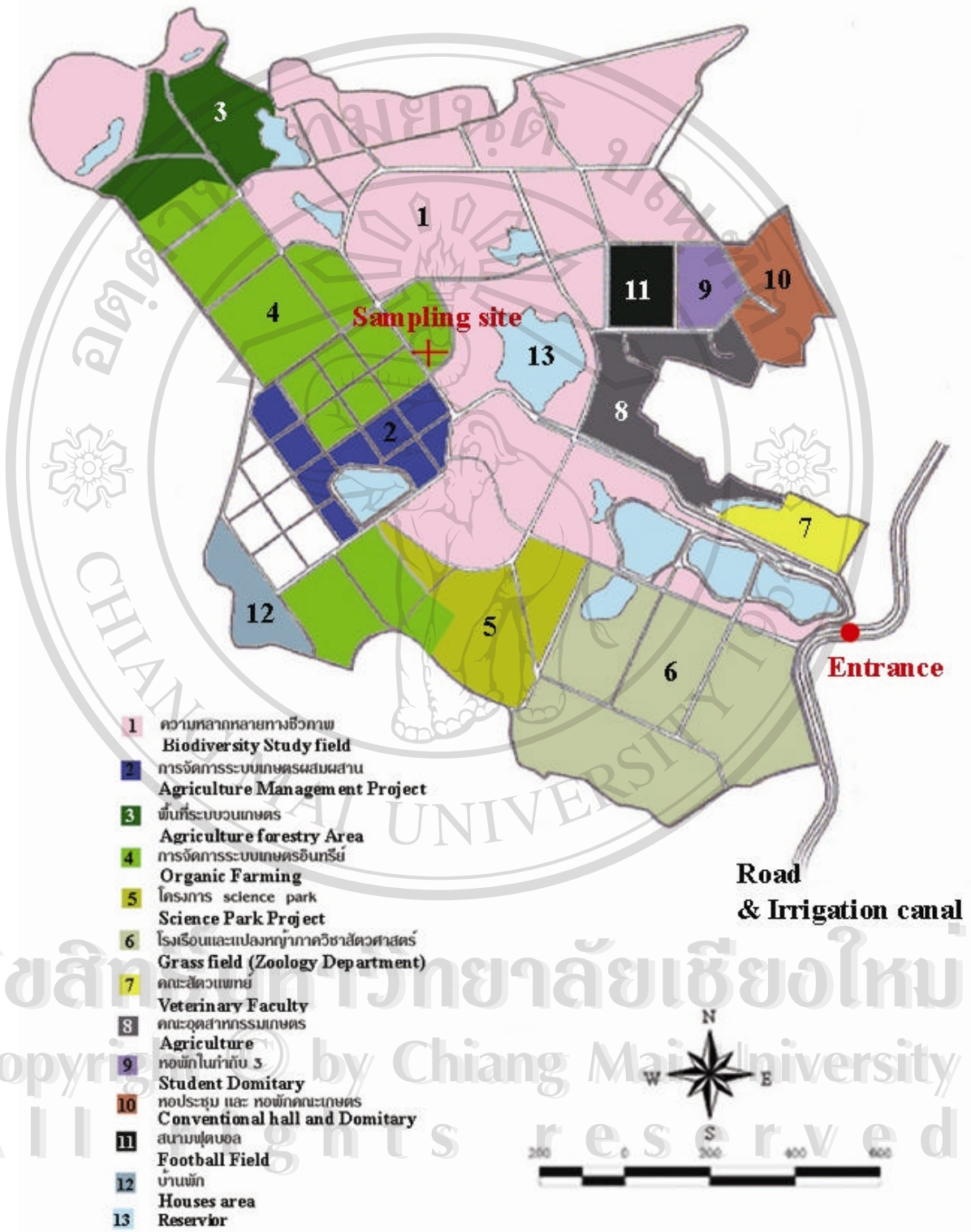
| District | No. of Forest fire event | Damaged area (rai) |
|-----------------|---------------------------------|---------------------------|
| Aom Koy | 128 | 1246.5 |
| Chiang Doaw | 114 | 638 |
| Chai Pra Karn | 84 | 501 |
| Doi Lor | 2 | 16 |
| Doi Sa-ket | 234 | 1166 |
| Doi Toaw | 8 | 54 |
| Hang Dong | 97 | 752 |
| Hod | 174 | 865 |
| Jom Tong | 458 | 5153 |
| Mae Aei | 90 | 834.25 |
| Mae Jam | 170 | 2605 |
| Mae On | 211 | 667 |
| Mae Rim | 85 | 706.5 |
| Mae Tang | 109 | 1439.5 |
| Mae Wang | 18 | 257 |
| Moang | 164 | 1,294.50 |
| Phang | 23 | 135.00 |
| Proaw | - | - |
| Sa Moung | 338 | 2259.75 |
| Sa Ra Pee | - | - |
| San Kam Pang | 15 | 53 |
| San Pa Tong | - | - |
| San Sai | 6 | 101 |
| Weang Hang | - | - |
| Total | 2528 | 20744 |

B-4 Conclusion of agriculture area in Chiang Mai

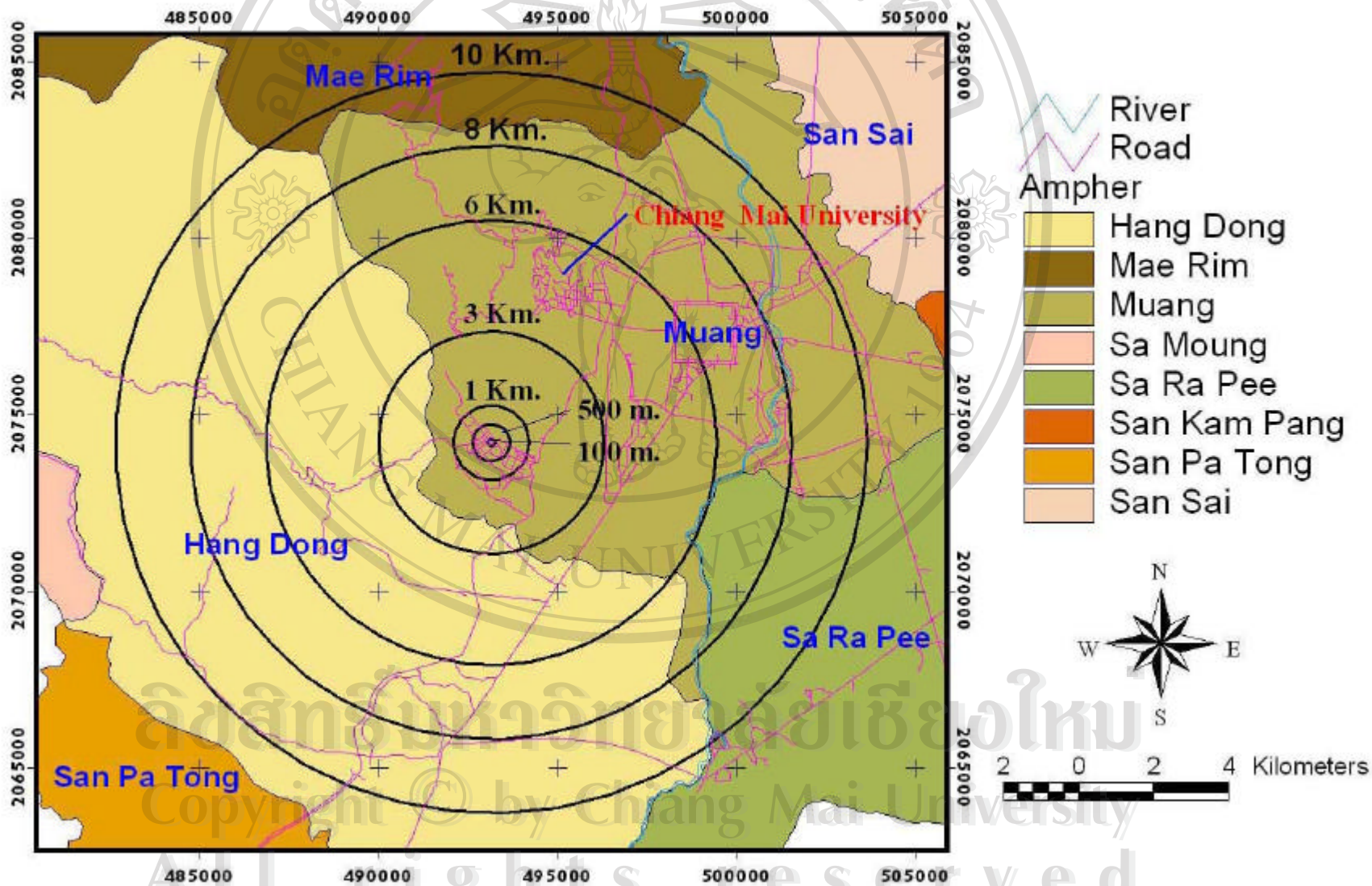
| District | Area (rai.) | Total Product (tons.) |
|-----------------|------------------------|----------------------------------|
| Aom Koy | 51,075.0 | 35,938.00 |
| Chiang Doaw | 150,908.0 | 189,772.00 |
| Chai Pra Karn | 72,476.0 | 104,848.00 |
| Doi Lor | 27,135.0 | 32,275.00 |
| Doi Sa-ket | 54,356.0 | 38,502.00 |
| Doi Toaw | 30,792.0 | 27,538.00 |
| Hang Dong | 37,011.0 | 22,117.00 |
| Hod | 64,218.0 | 68,248.00 |
| Jom Tong | 66,336.0 | 63,529.00 |
| Mae Aei | 133,749.0 | 104,684.00 |
| Mae Jam | 304,825.0 | 754,851.00 |
| Mae On | 22,656.0 | 19,186.00 |
| Mae Rim | 57,861.0 | 43,648.00 |
| Mae Tang | 57,090.0 | 39,866.00 |
| Mae Wang | 46,708.0 | 48,478.00 |
| Meung | 8,868.0 | 8,399.00 |
| Phang | 135,210.0 | 222,285.00 |
| Proaw | 100,428.0 | 96,866.00 |
| Sa Moung | 29,389.0 | 25,440.00 |
| Sa Ra Pee | 37,788.0 | 46,589.00 |
| San Kam Pang | 52,637.0 | 44,214.00 |
| San Pa Tong | 64,423.0 | 57,882.00 |
| San Sai | 62,208.0 | 48,814.00 |
| Weang Hang | 21,134.0 | 11,762.00 |
| Total | 1,689,281.0 | 2,155,731.0 |

Appendix C

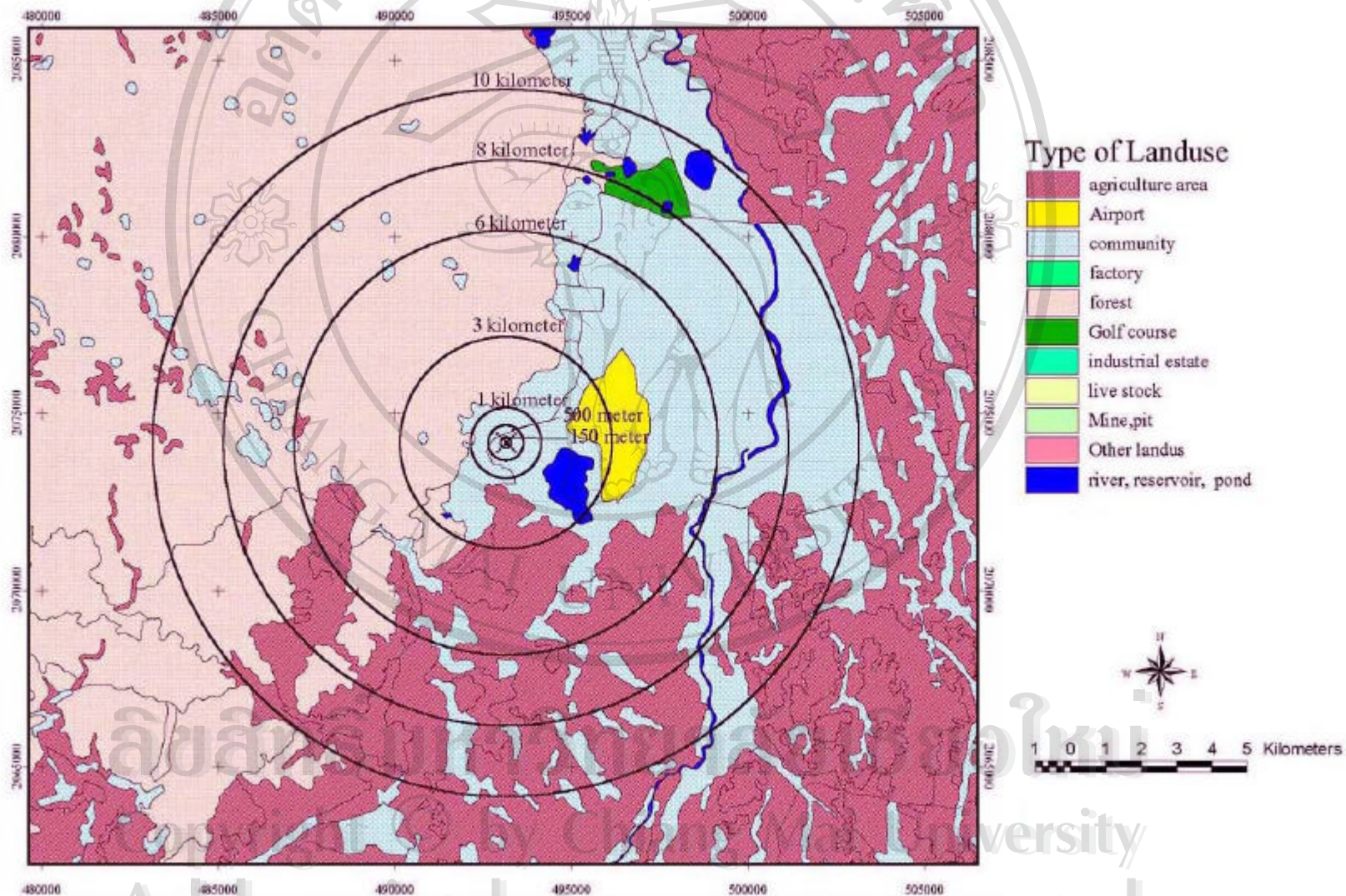
C-1 Land used of Mae Hia Research Center



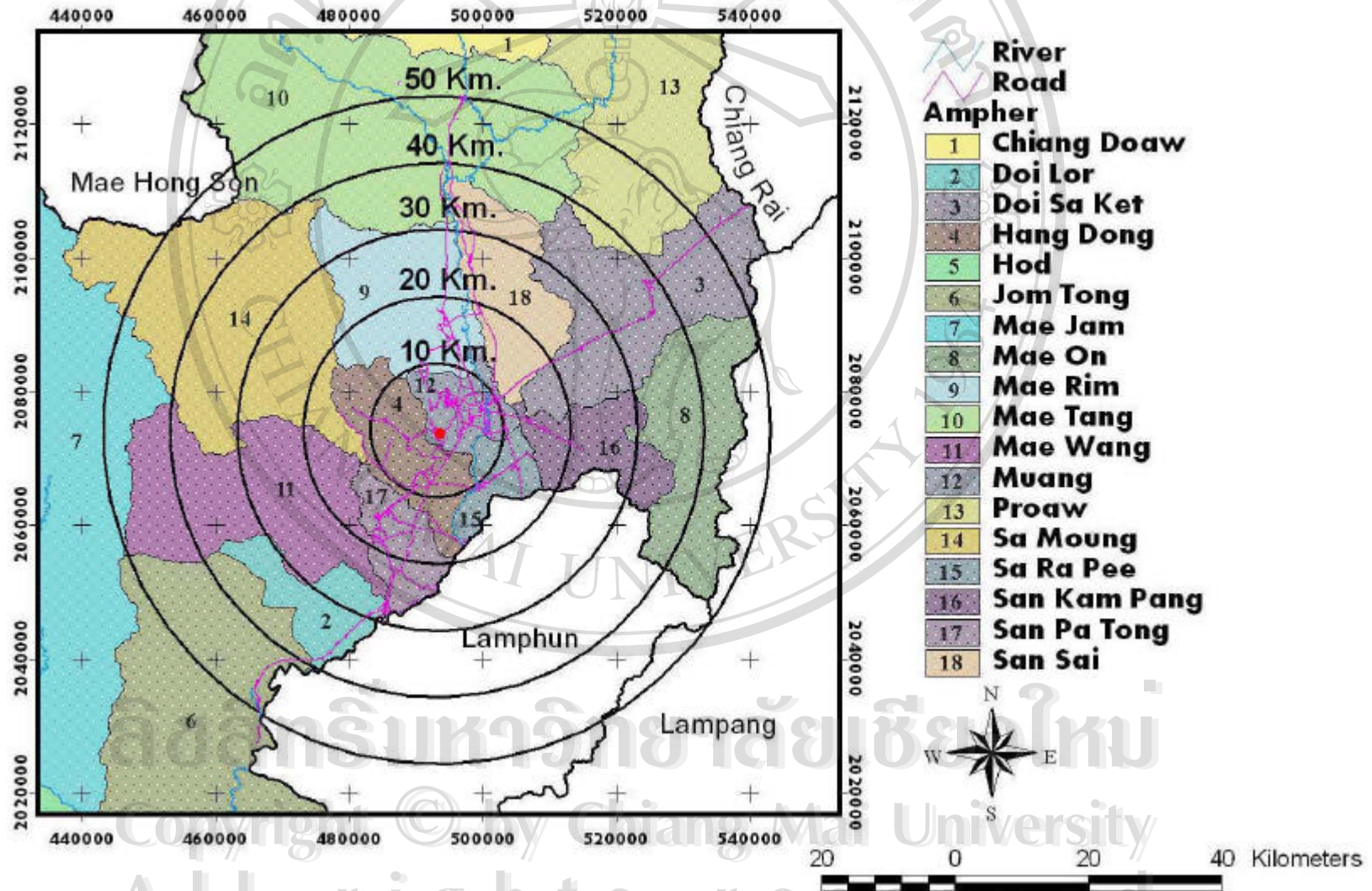
C-2 District Boundary in Local scale



C-3 Land Used Profile in Local scale

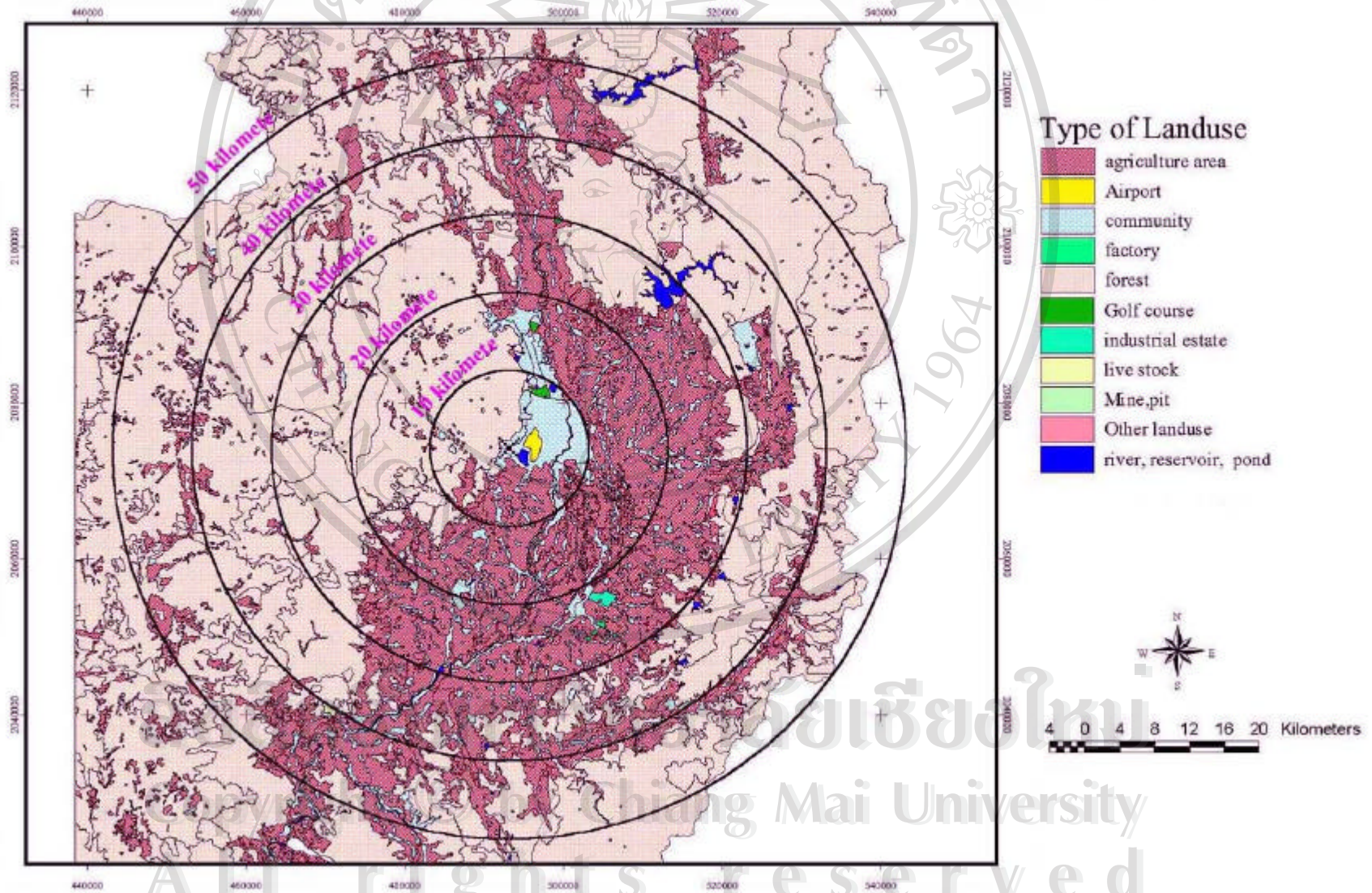


C-4 District Boundary in Reginal scale



All rights reserved

C-5 Land Used Profile in Regional scale



CURRICULUM VITAE

Name: Nattaporn Chirasathaworn,

Sex: Female.

Date of Birth: June 3, 1979

Nationality Thai.

Educations Background:

June 1997 – April 2001 King Mongkut's Institute North Bangkok, Thailand

Bachelor of Science in Agro-Technology

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่
Copyright © by Chiang Mai University
All rights reserved