

## **APPENDIX III**

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# **Trilinear Diagrams and Ion Balance Calculations**

**Regional Aquifer**

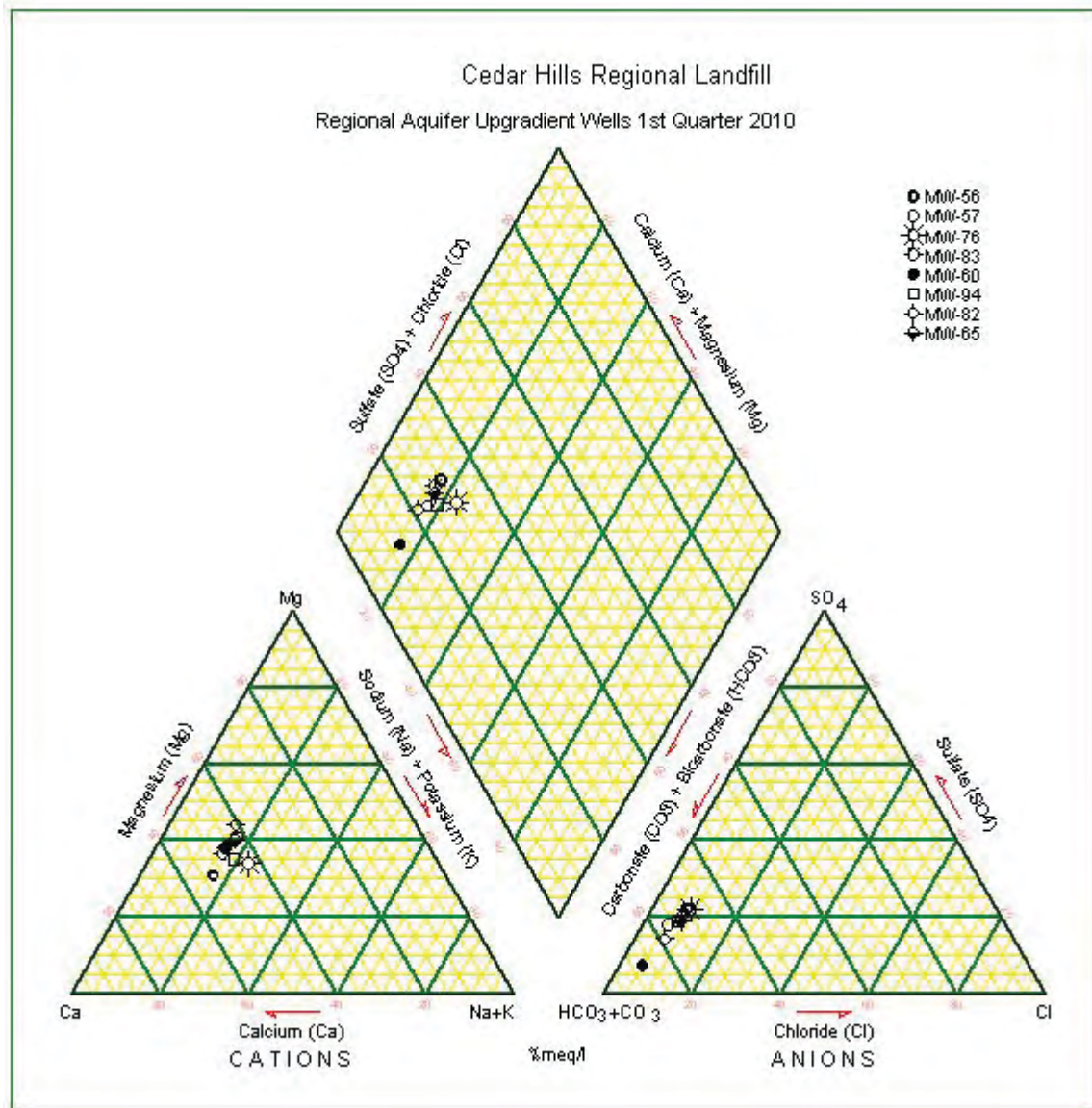
**North and West Perched Wells**

**East Main Hill Perched Zone**

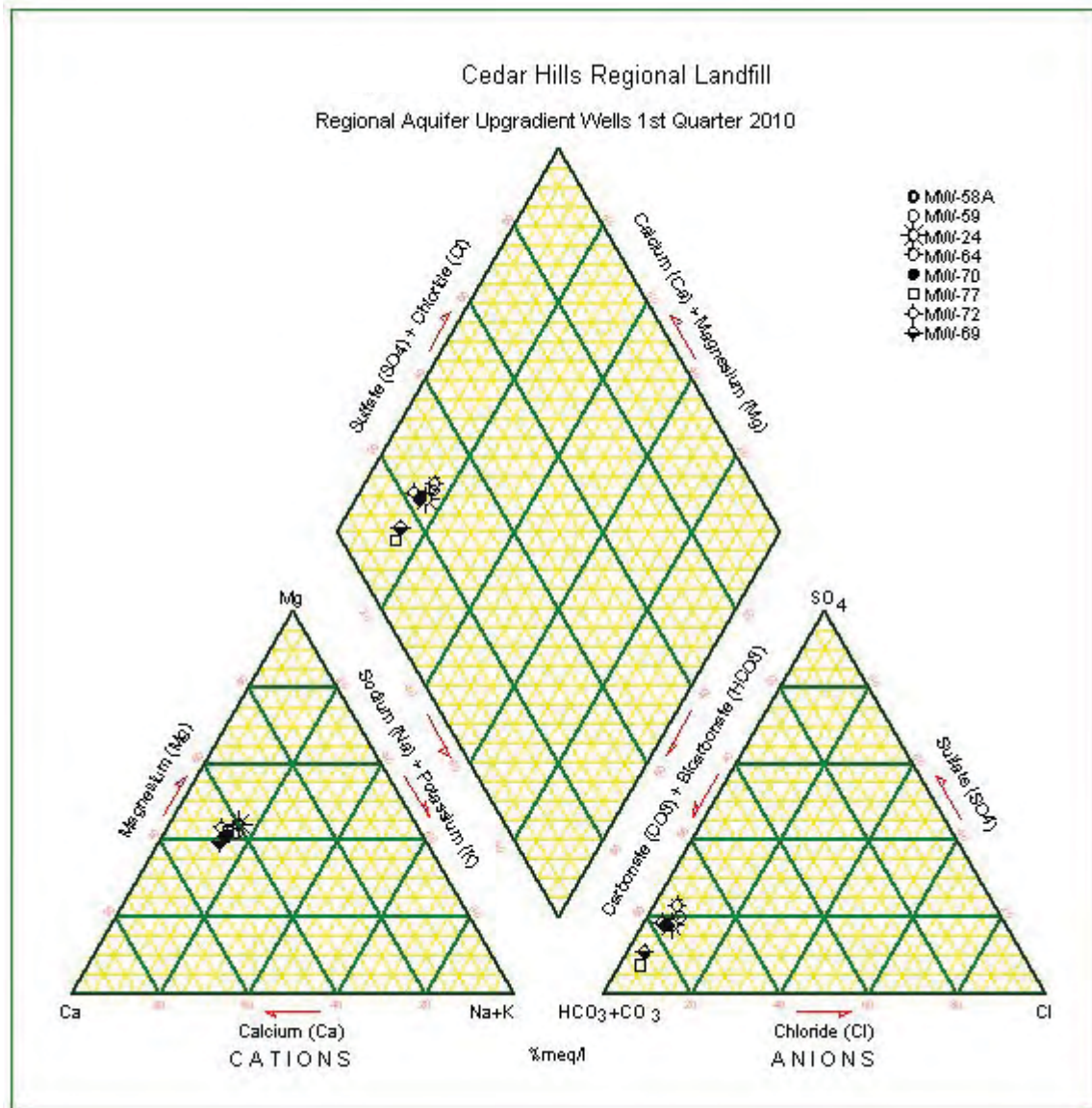
**South Solid Waste Area Perched Wells**



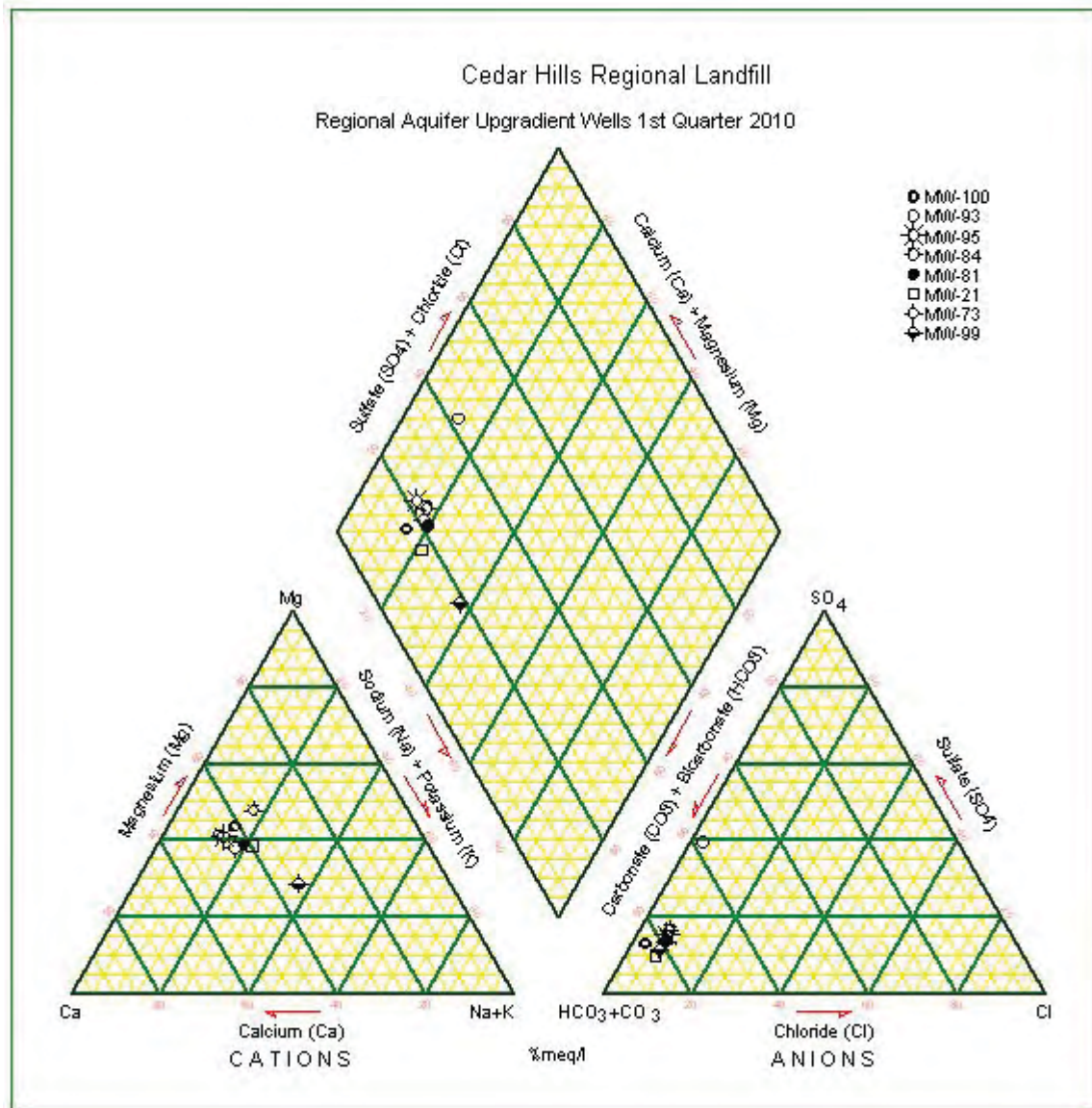
Cedar Hills Regional Landfill  
Regional Aquifer Upgradient Wells 1st Quarter 2010



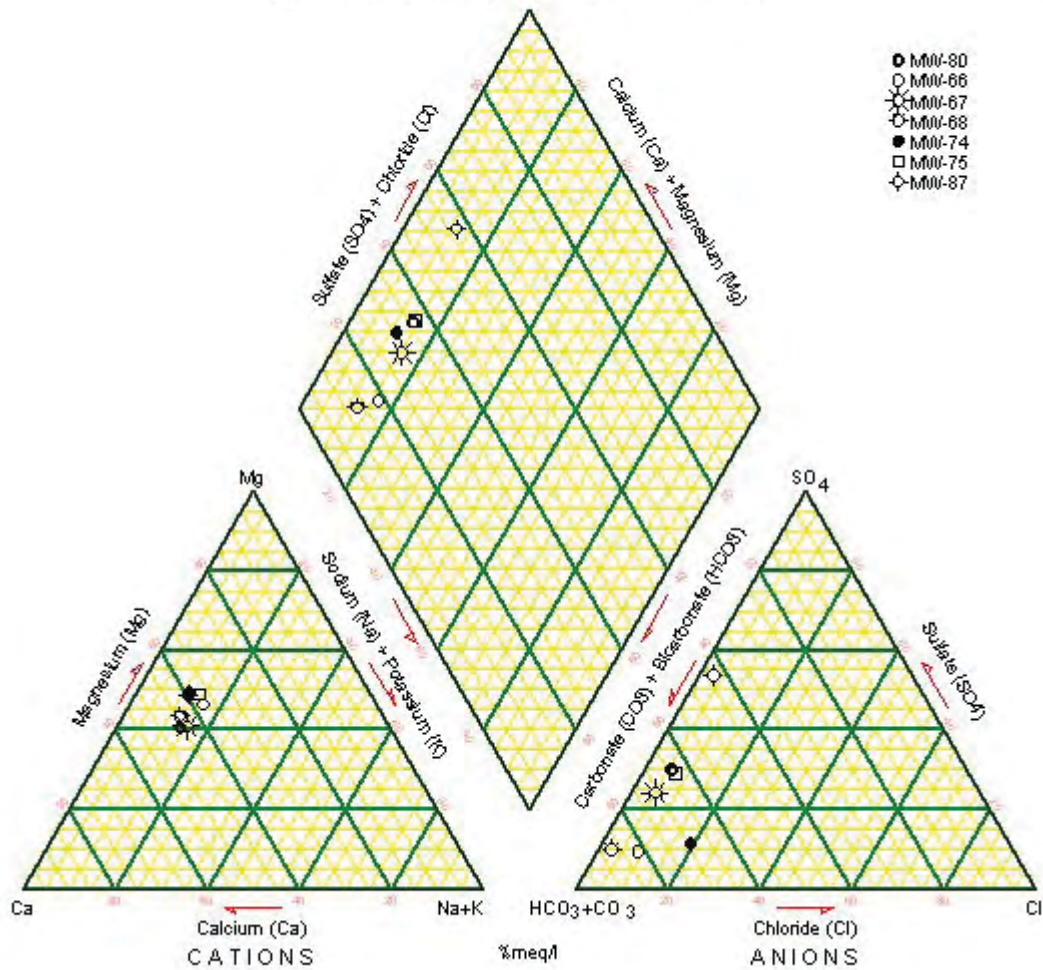
Cedar Hills Regional Landfill  
Regional Aquifer Upgradient Wells 1st Quarter 2010



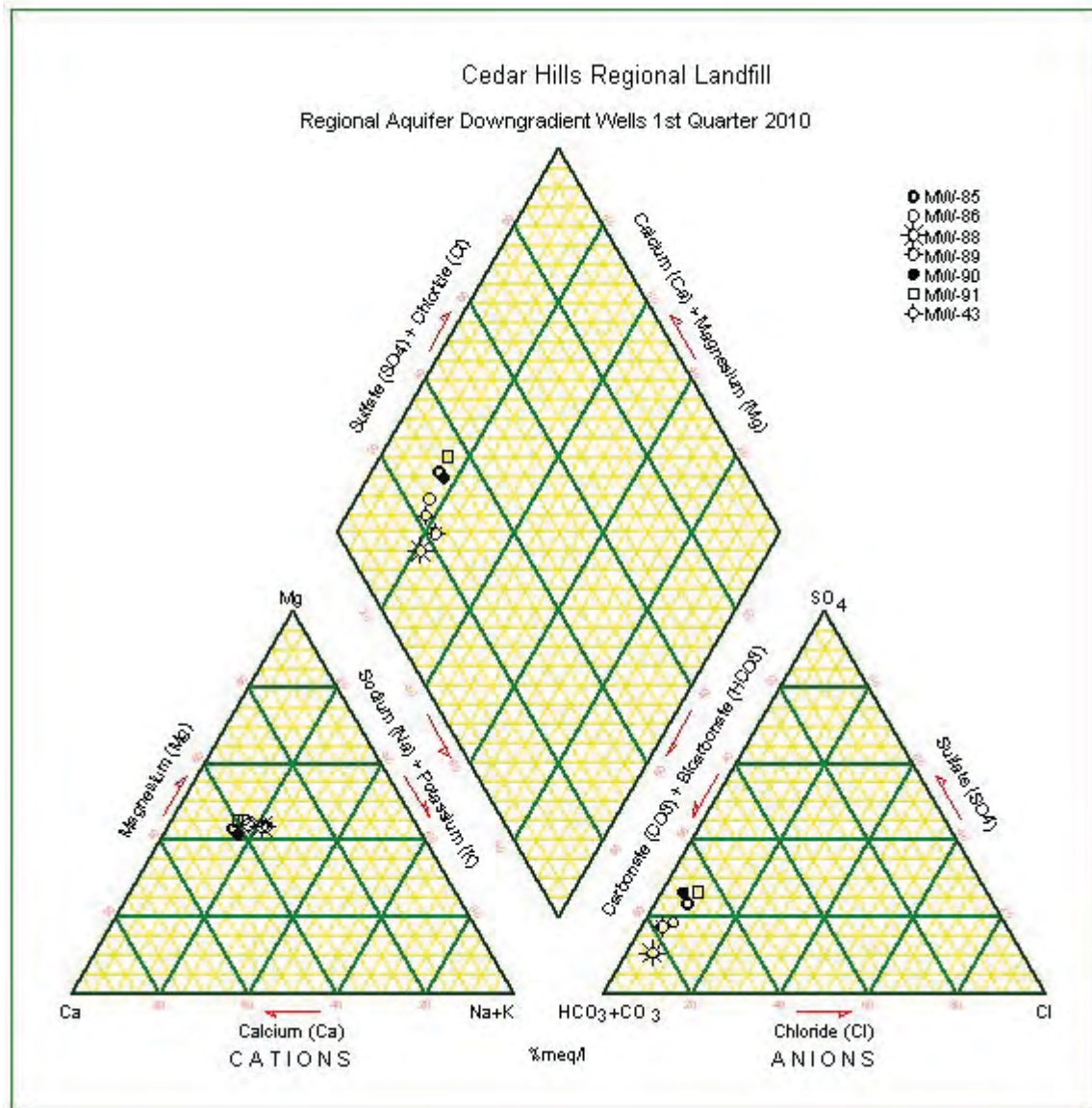
Cedar Hills Regional Landfill  
Regional Aquifer Upgradient Wells 1st Quarter 2010



Cedar Hills Regional Landfill  
Regional Aquifer Downgradient Wells 1st Quarter 2010

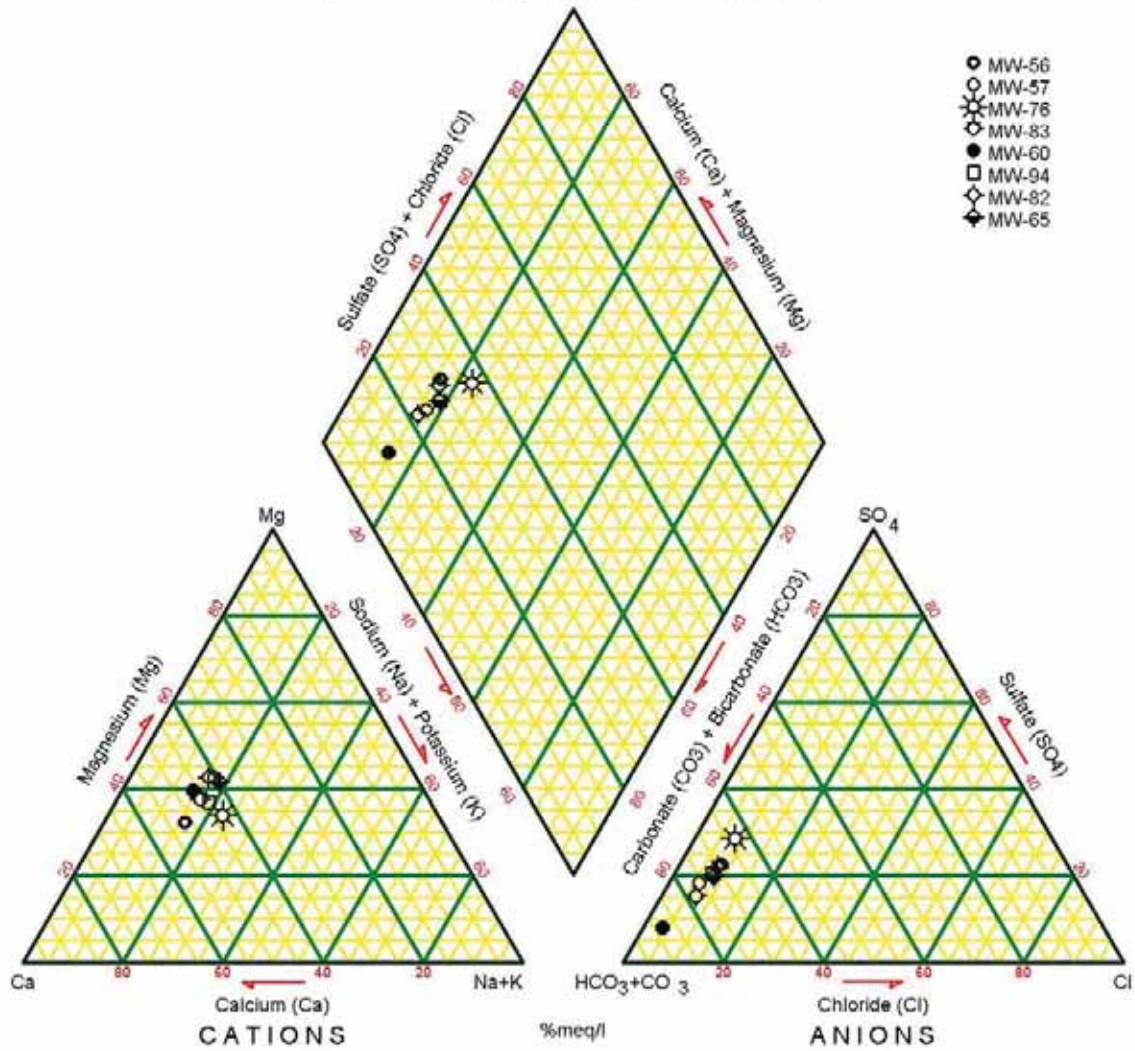


Cedar Hills Regional Landfill  
Regional Aquifer Downgradient Wells 1st Quarter 2010

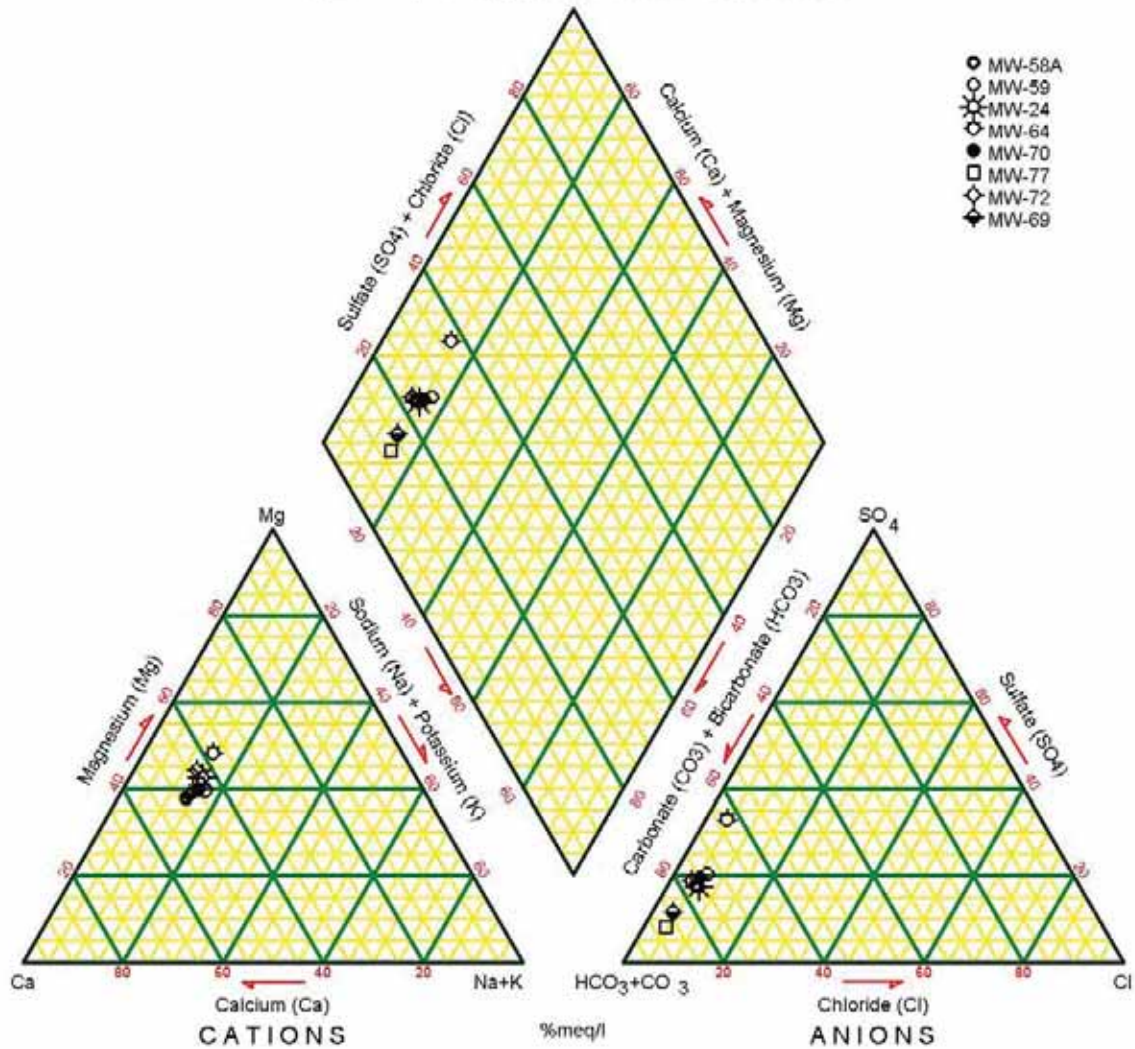




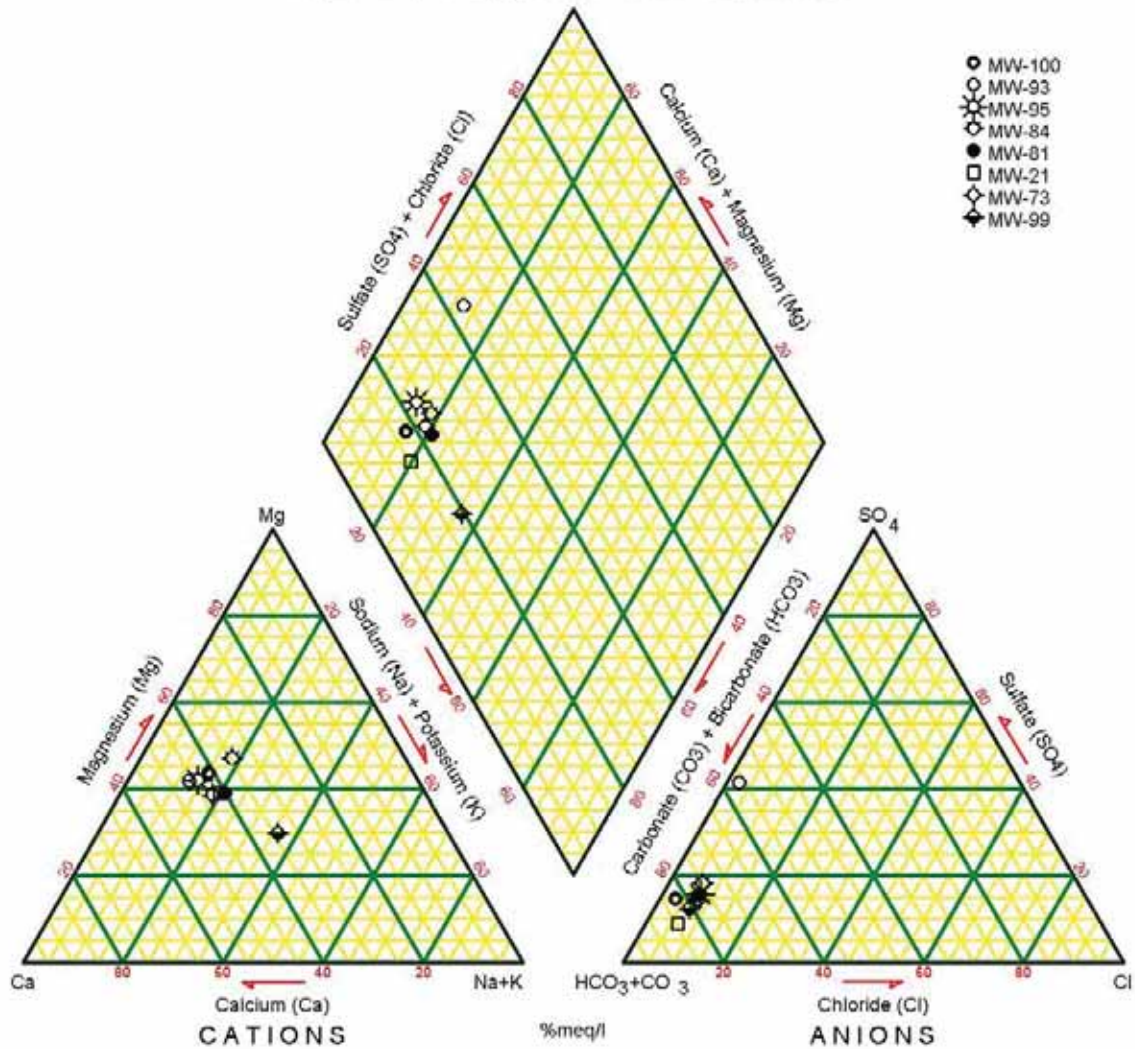
Cedar Hills Regional Landfill  
Regional Aquifer Upgradient Wells 2nd Quarter 2010



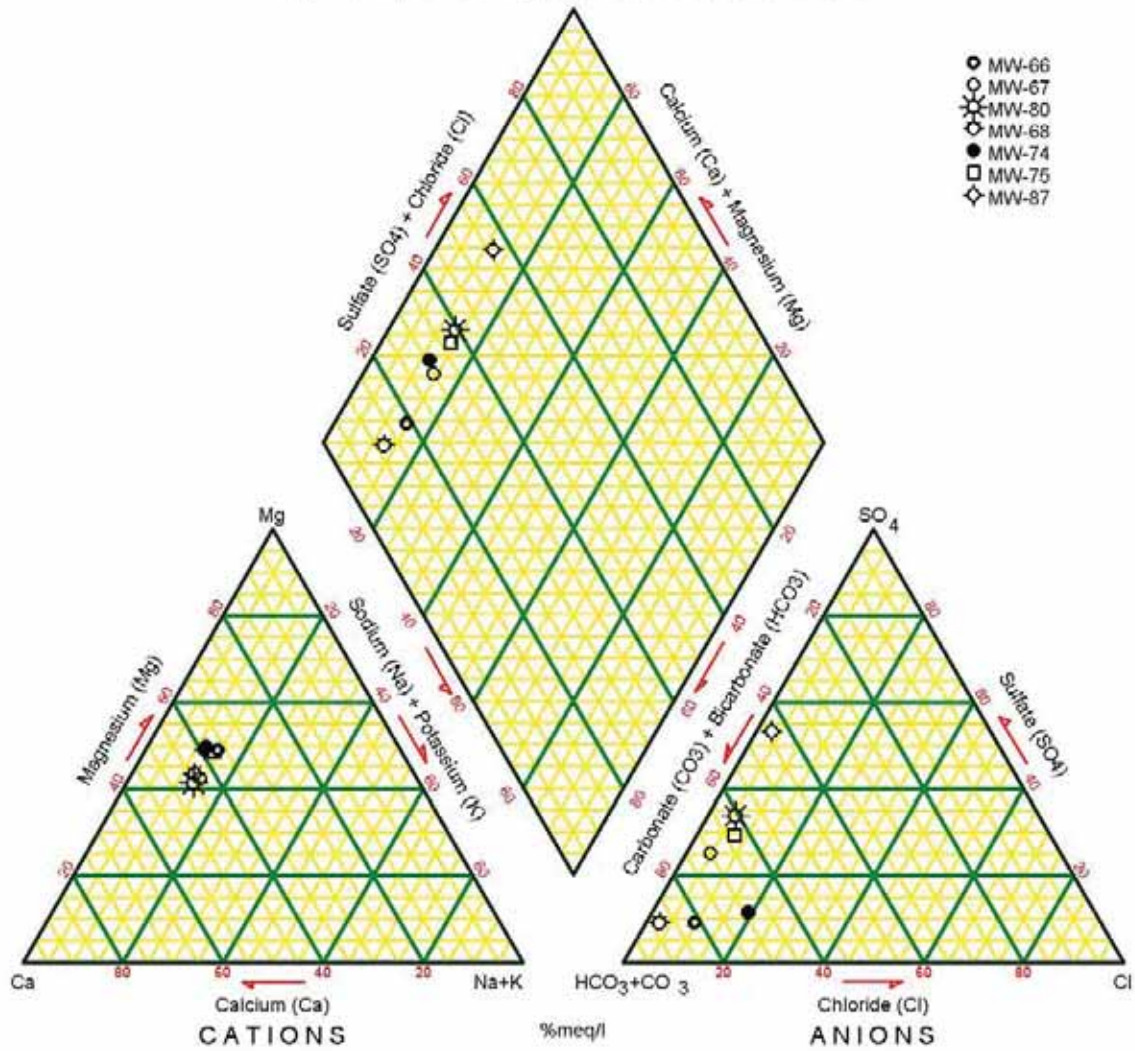
Cedar Hills Regional Landfill  
Regional Aquifer Upgradient Wells 2nd Quarter 2010



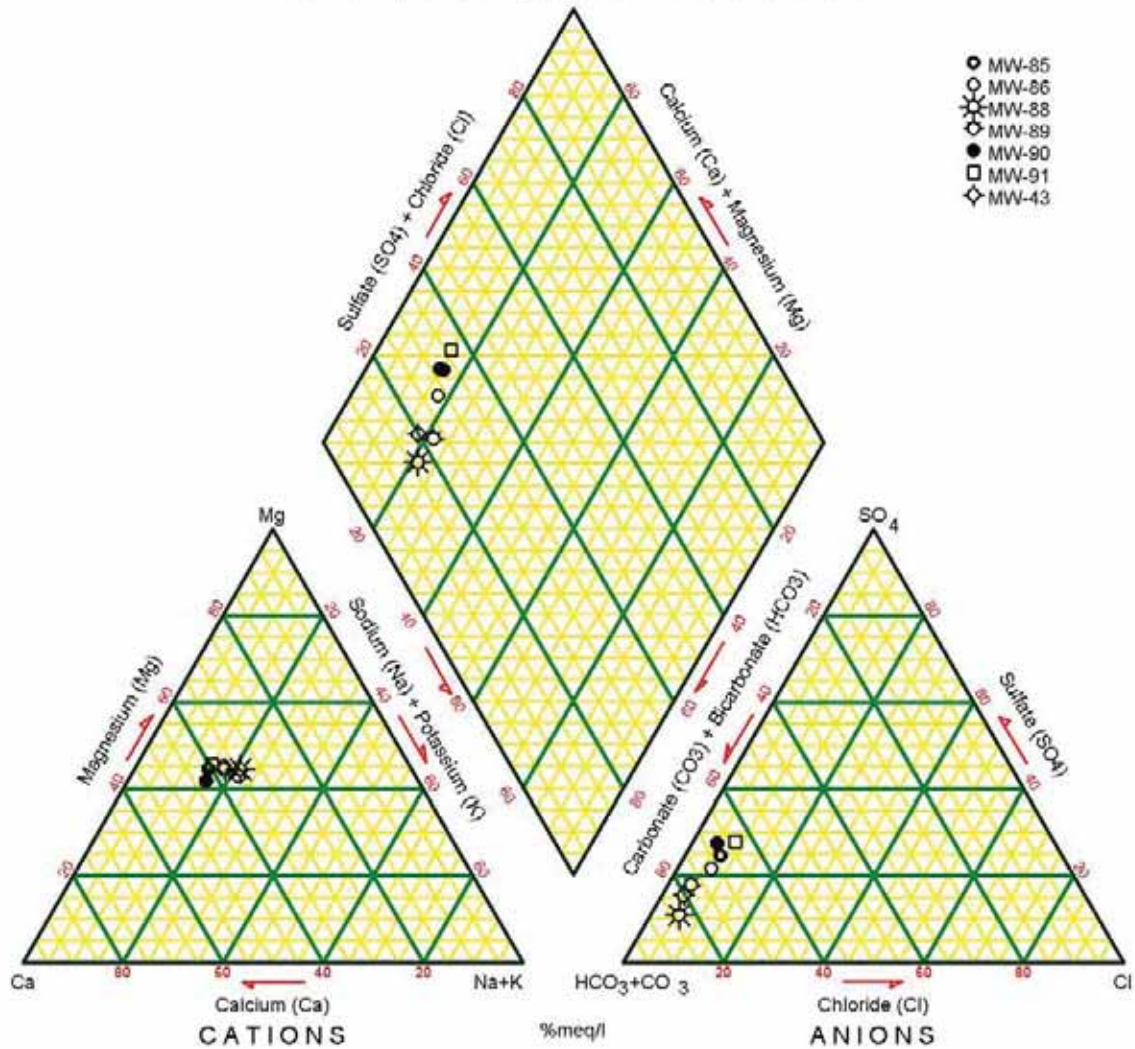
Cedar Hills Regional Landfill  
Regional Aquifer Upgradient Wells 2nd Quarter 2010



**Cedar Hills Regional Landfill**  
**Regional Aquifer Downgradient Wells 2nd Quarter 2010**

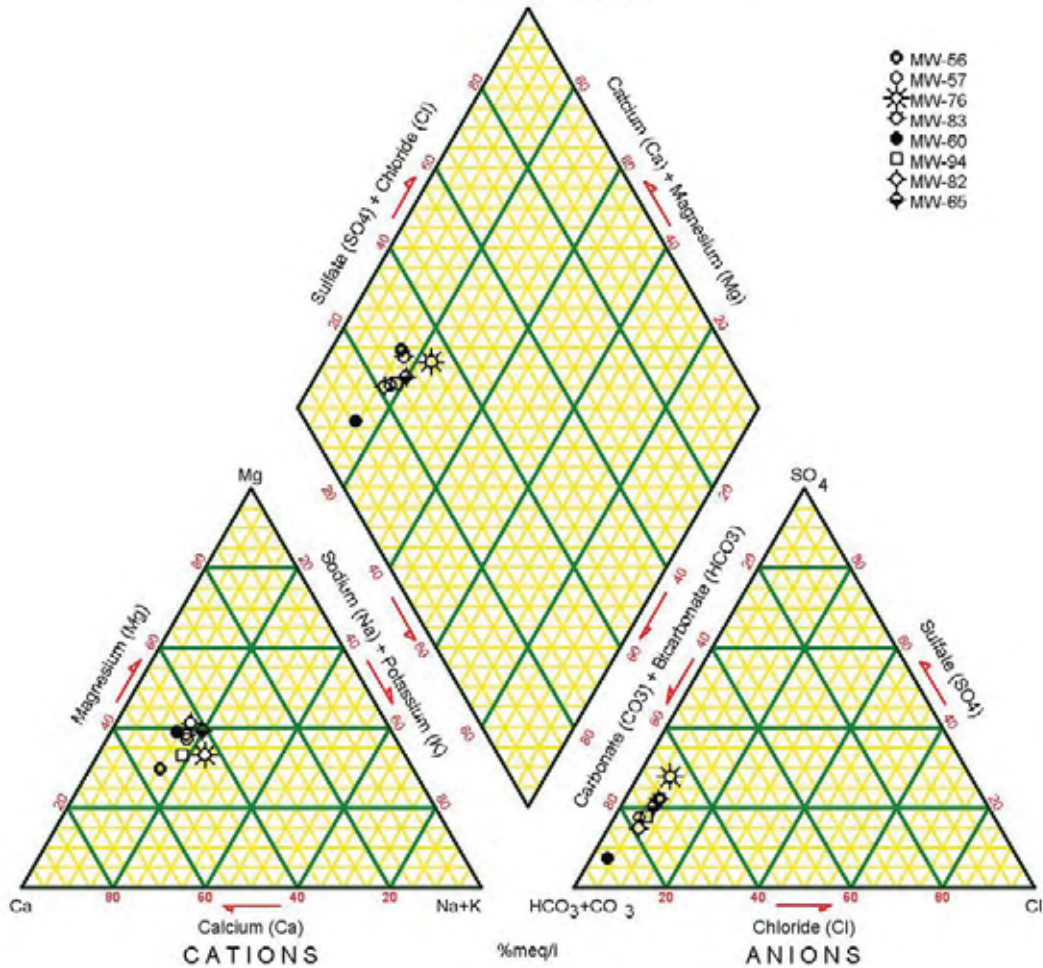


**Cedar Hills Regional Landfill**  
**Regional Aquifer Downgradient Wells 2nd Quarter 2010**

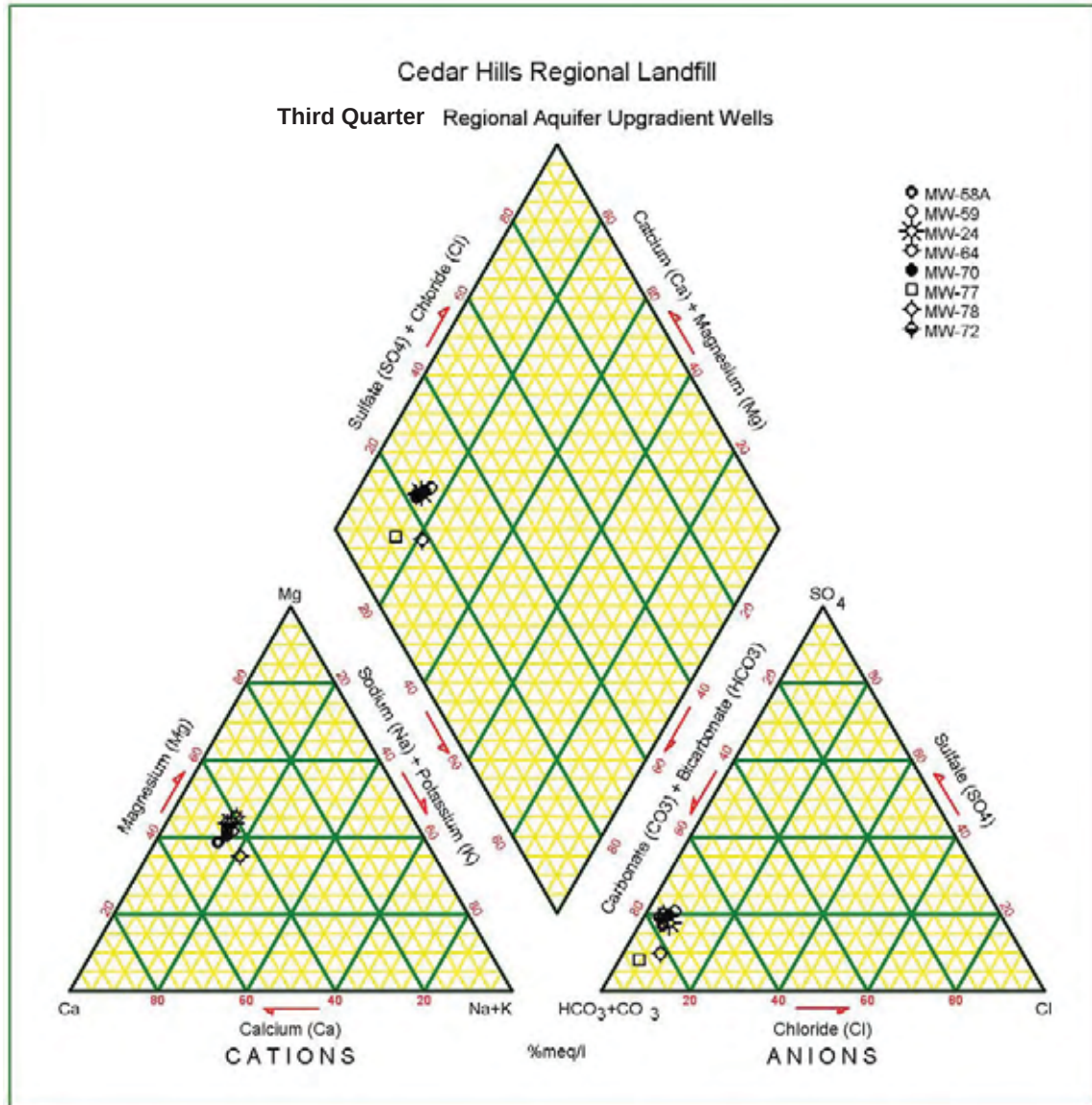




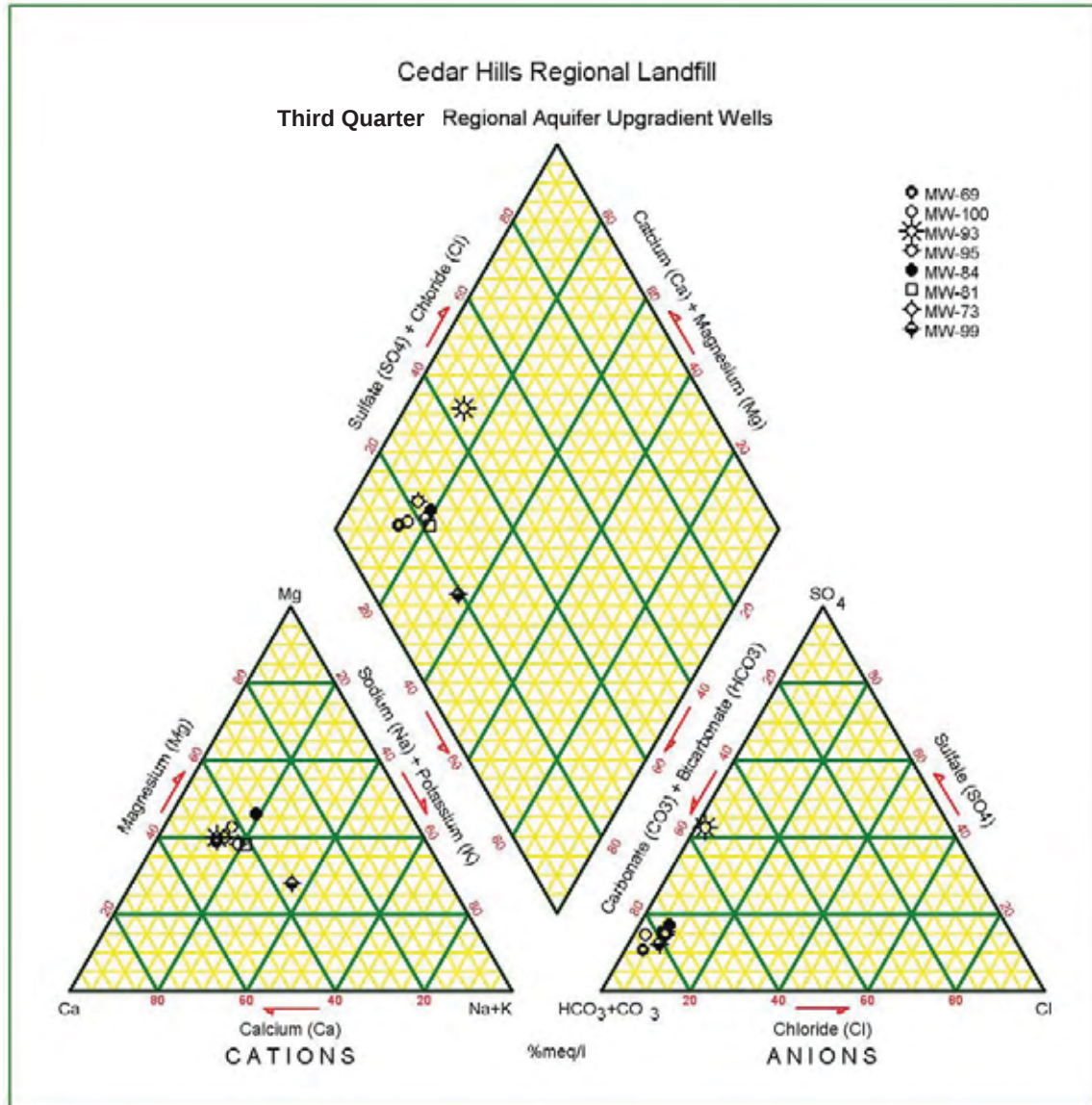
Cedar Hills Regional Landfill  
Third Quarter Regional Aquifer Upgradient Wells



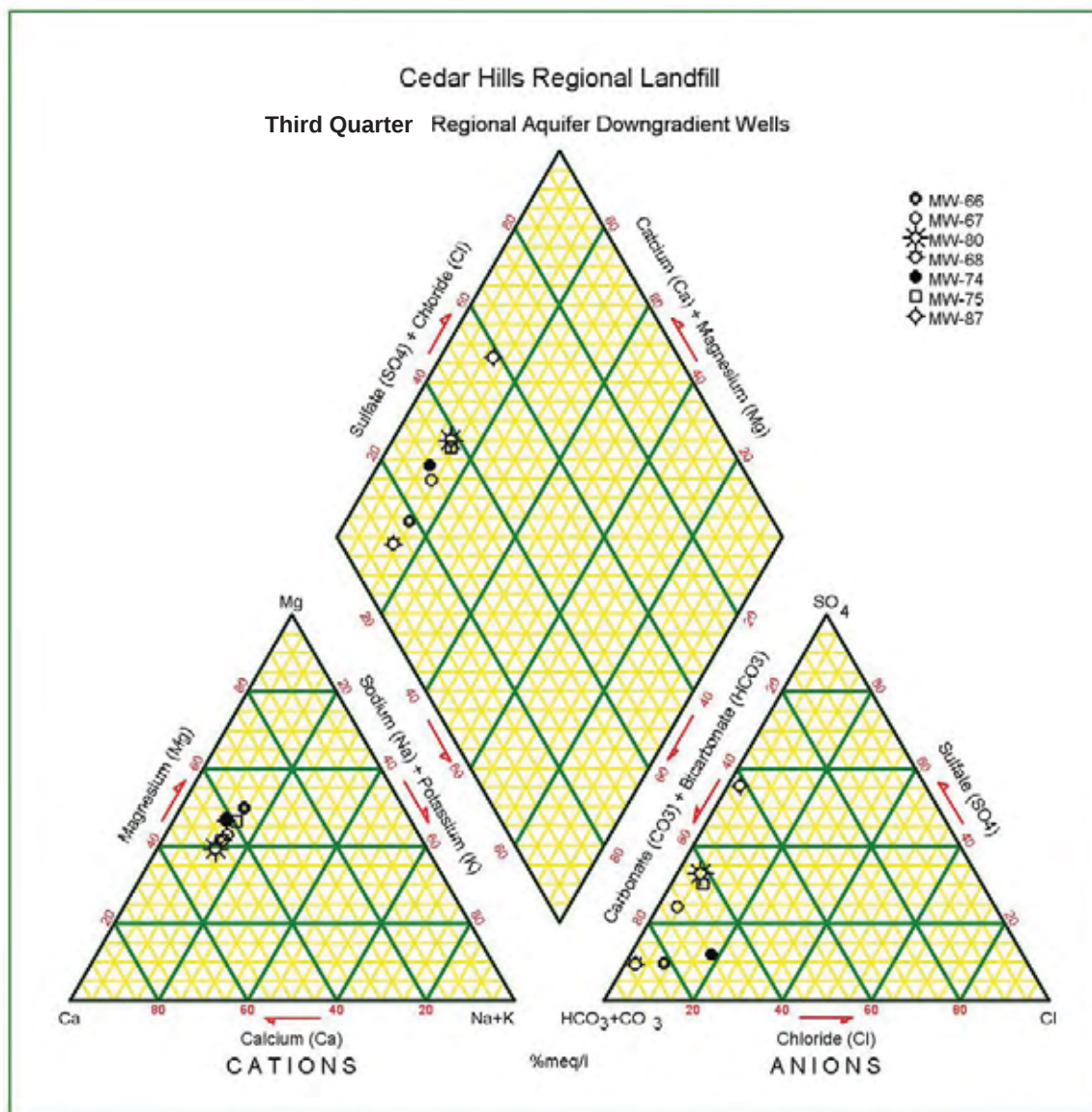
**Cedar Hills Regional Landfill**  
**Third Quarter Regional Aquifer Upgradient Wells**



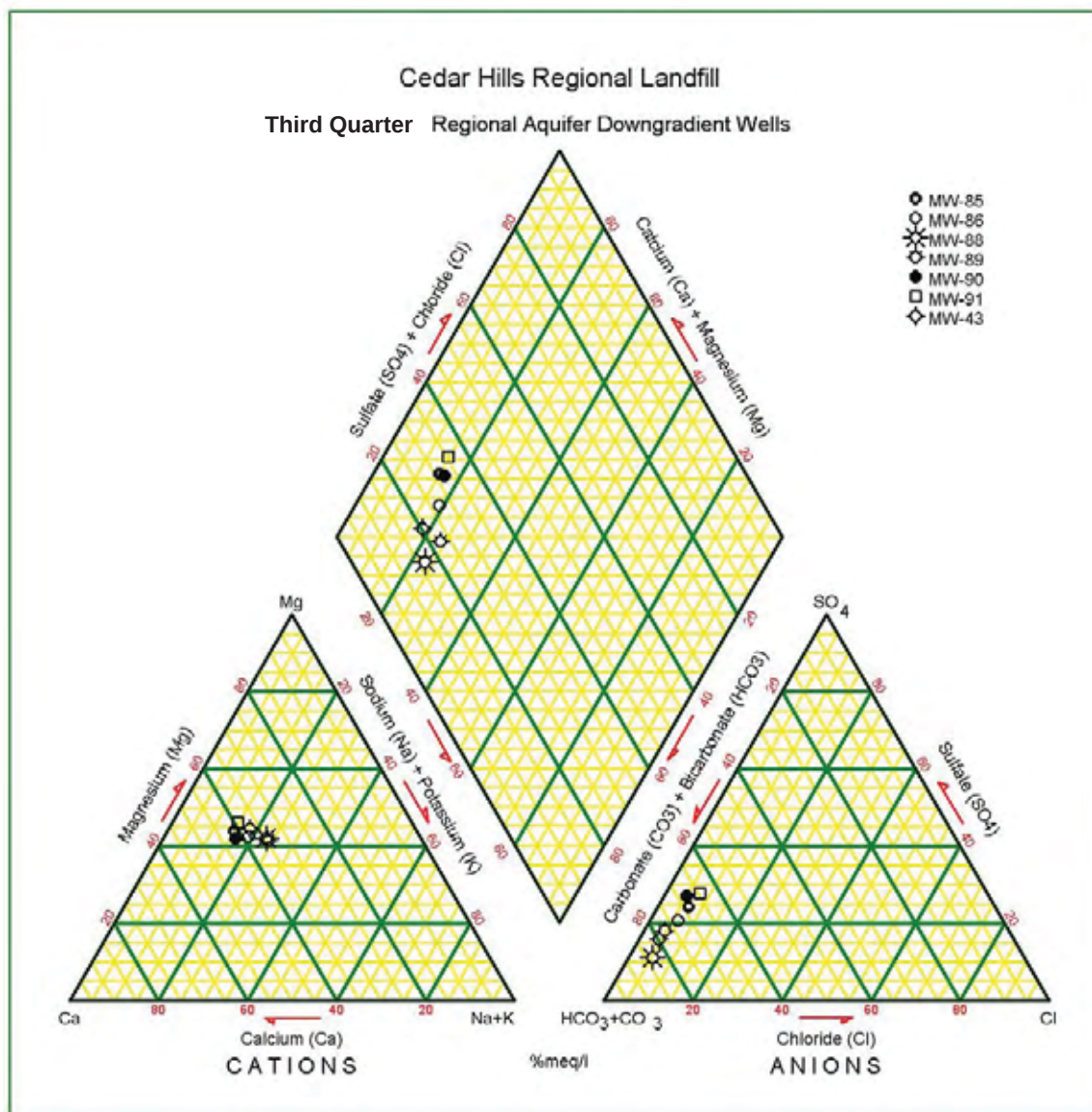
**Cedar Hills Regional Landfill**  
**Third Quarter Regional Aquifer Upgradient Wells**



Cedar Hills Regional Landfill  
Third Quarter Regional Aquifer Downgradient Wells



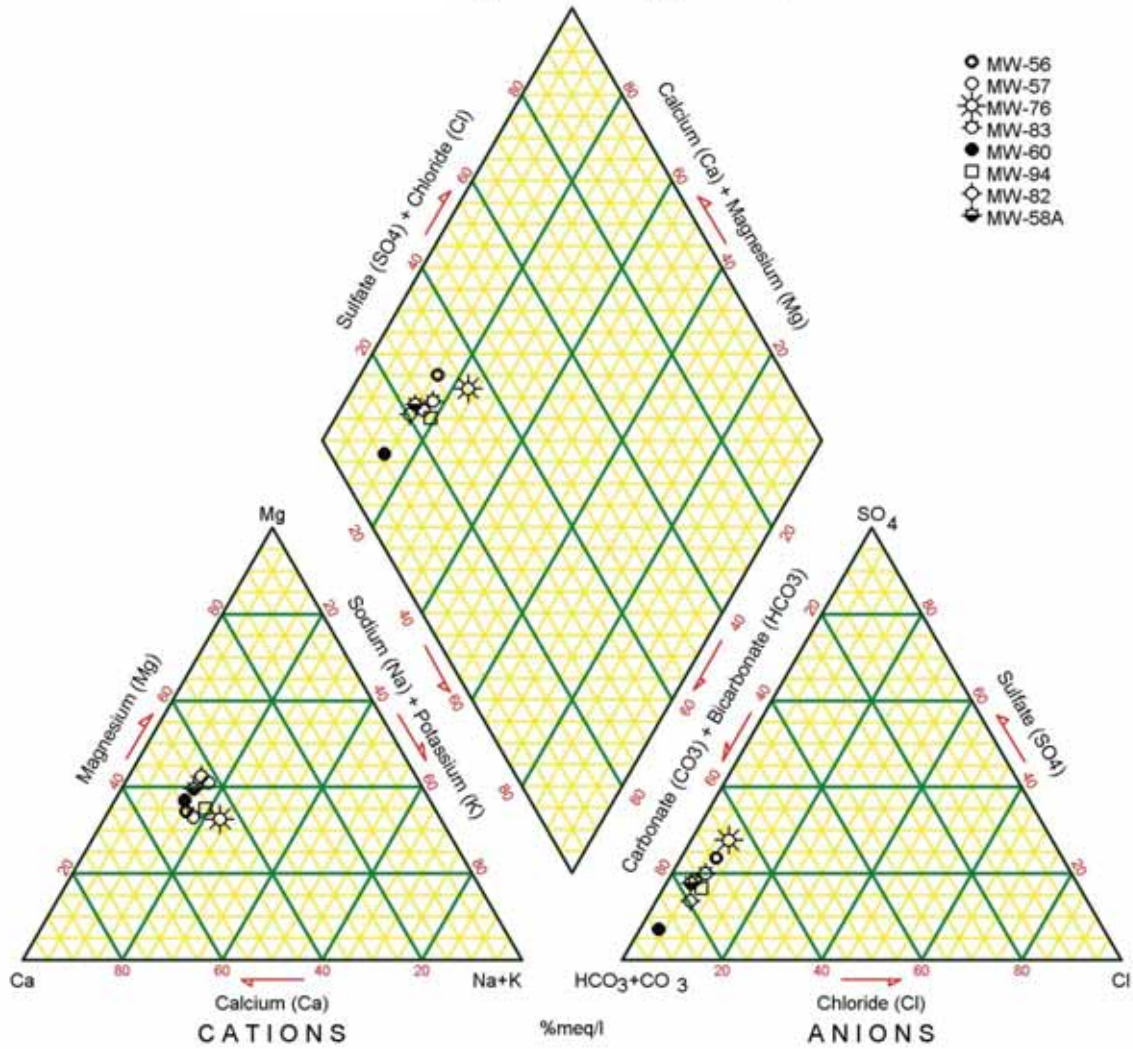
Cedar Hills Regional Landfill  
Third Quarter Regional Aquifer Downgradient Wells



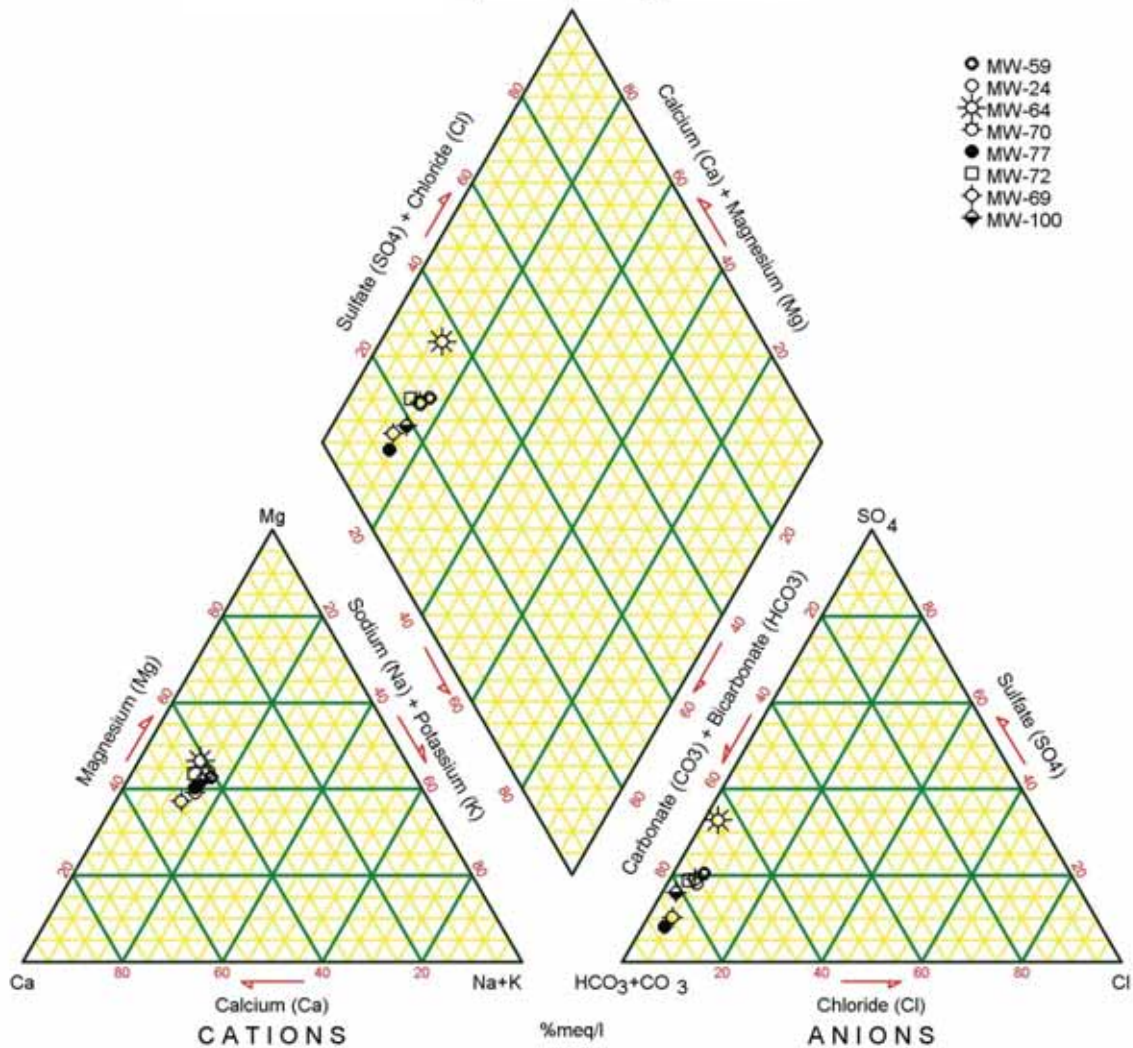


# Cedar Hills Regional Landfill

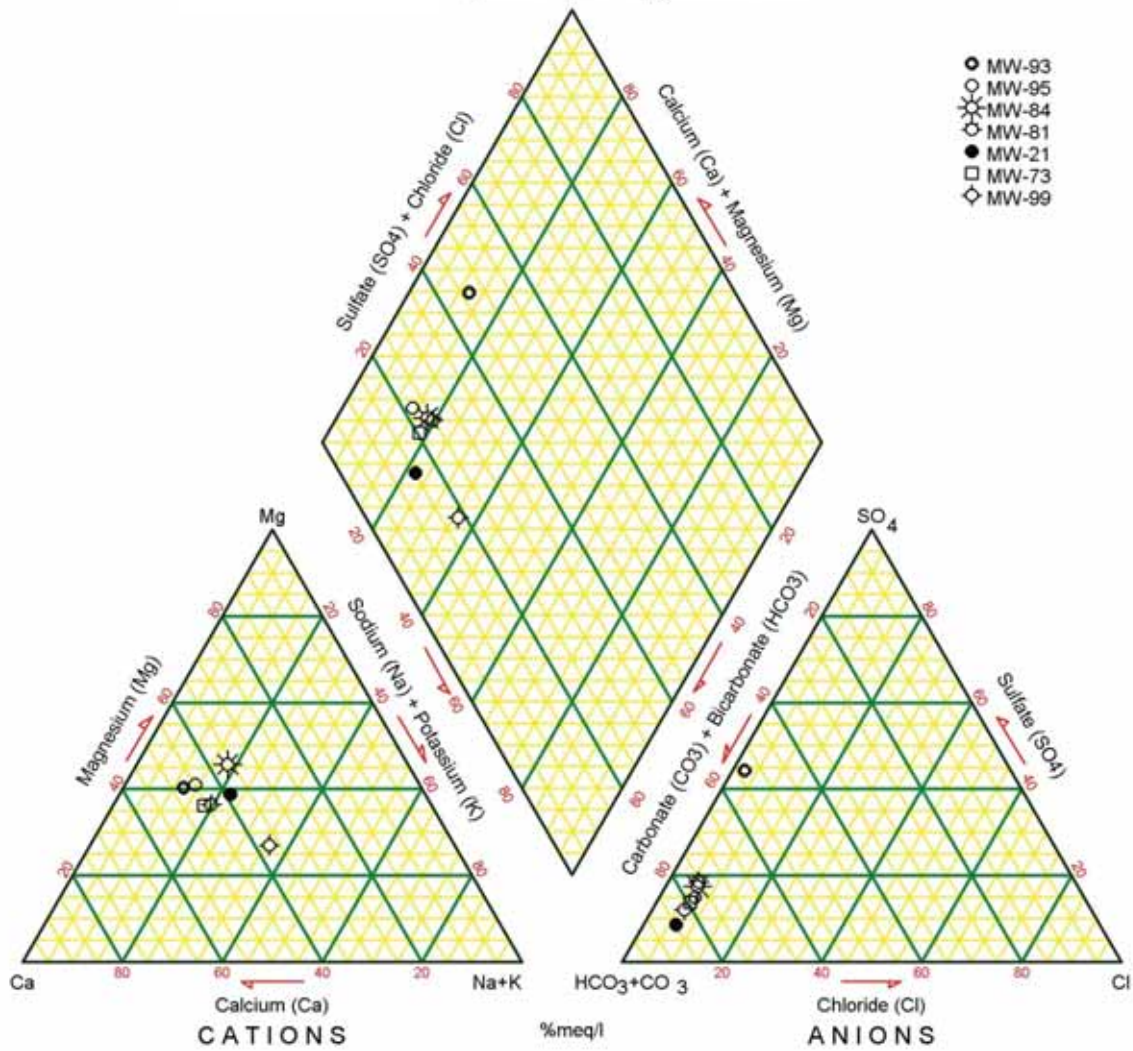
Fourth Quarter Regional Aquifer Upgradient Wells



**Cedar Hills Regional Landfill**  
**Fourth Quarter Regional Aquifer Upgradient Wells**

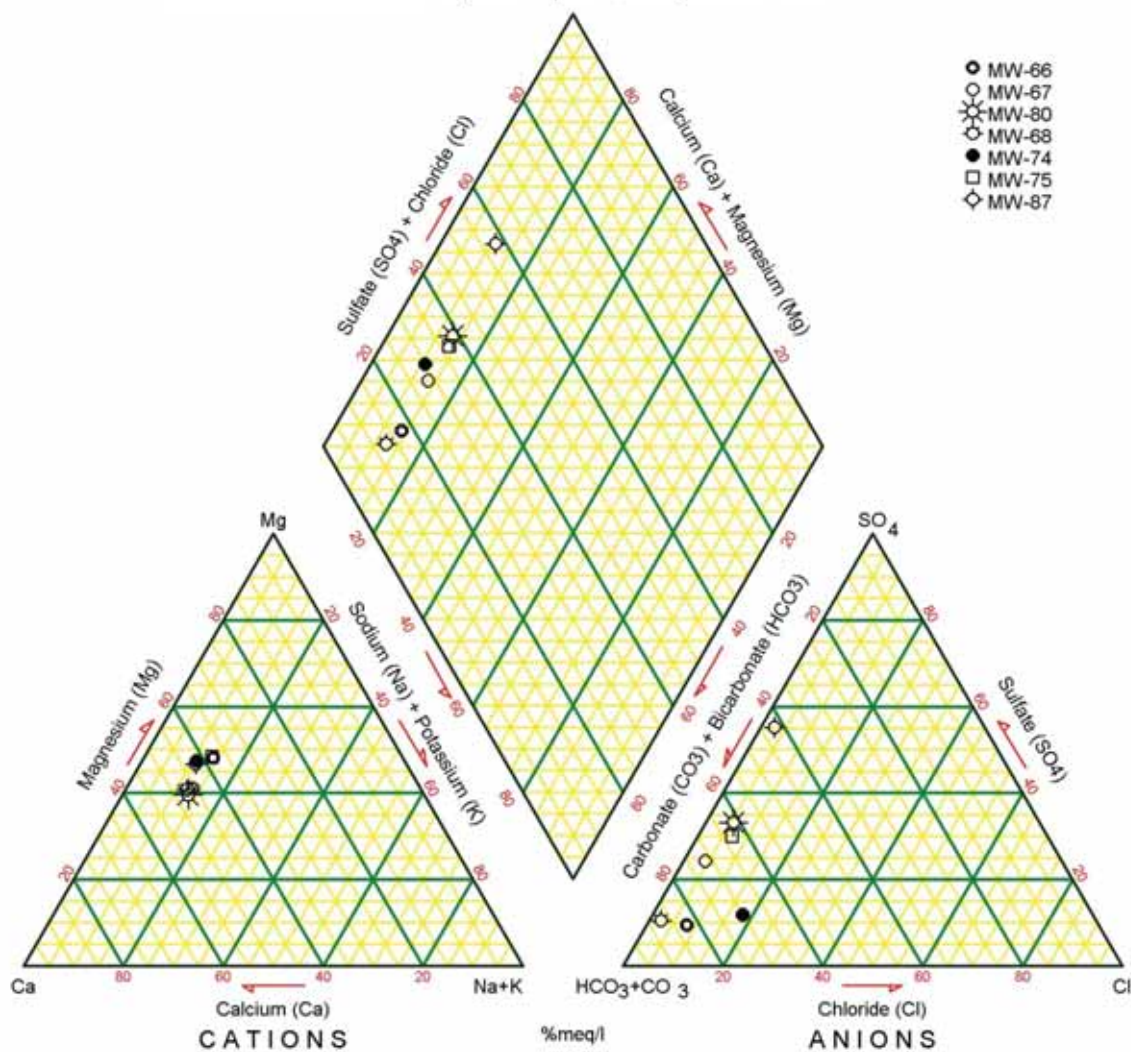


Cedar Hills Regional Landfill  
Fourth Quarter Regional Aquifer Upgradient Wells



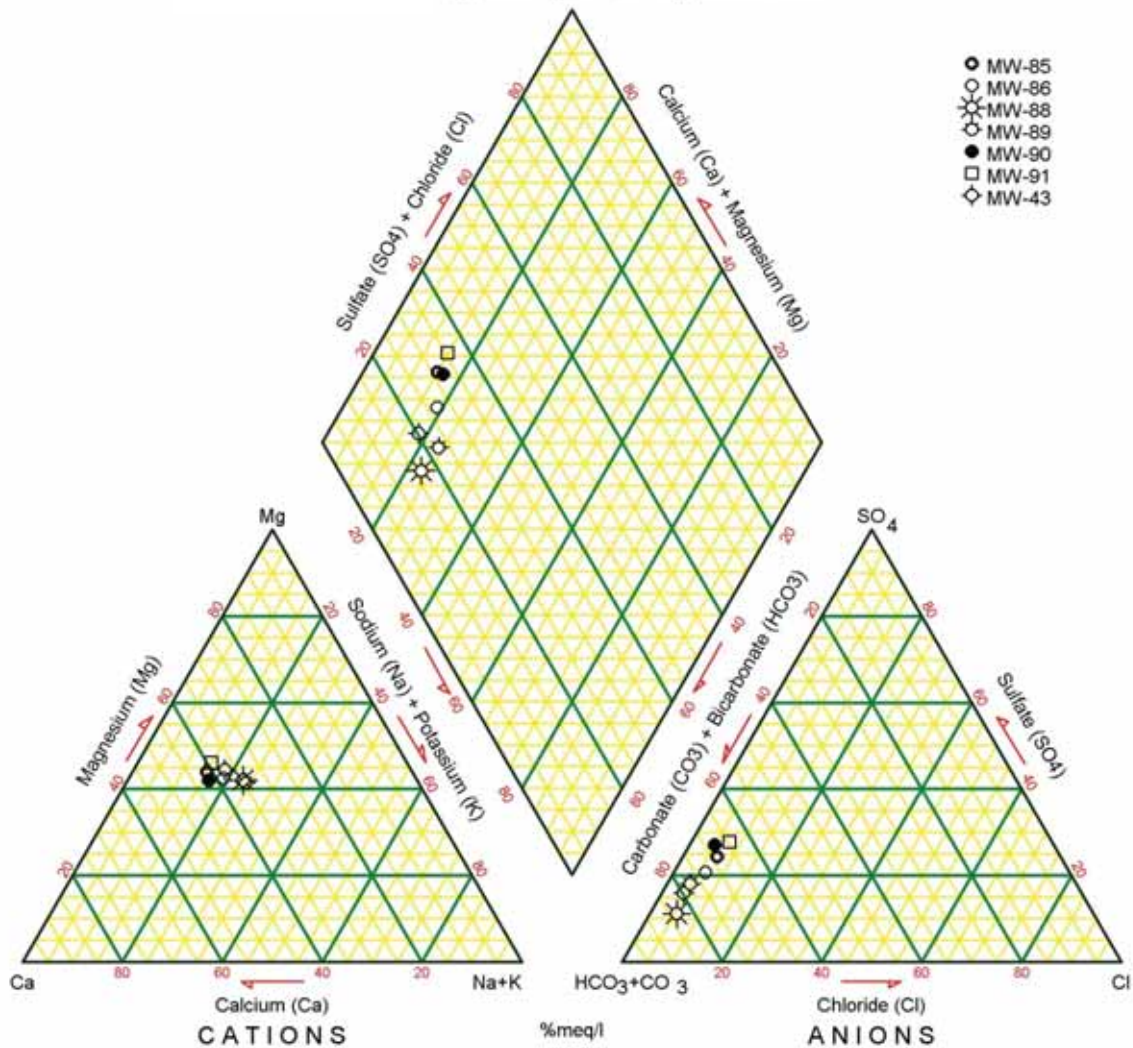
# Cedar Hills Regional Landfill

Fourth Quarter Regional Aquifer Downgradient Wells



# Cedar Hills Regional Landfill

Fourth Quarter Regional Aquifer Downgradient Wells





# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells

Data Collected from December 1, 2009 to March 31, 2010

| Site ID                                                        | MW-56                     | MW-57              | MW-76              | MW-83              | MW-60              | MW-94              |
|----------------------------------------------------------------|---------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Date                                                           | 1/7/10                    | 1/7/10             | 1/14/10            | 1/29/10            | 1/11/10            | 2/9/10             |
| Cations                                                        | mg/L meq/L % (meq)        | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) |
| Calcium                                                        | 40.1 2 13.1 0.65369 52.2  | 16.1 0.80339 36.6  | 12.4 0.61876 42.8  | 17.6 0.87824 47.4  | 16.0 0.7984 46.1   | 12.5 0.62375 45.6  |
| Magnesium                                                      | 24.3 2 4.7 0.38593 30.8   | 9.5 0.7842 35.7    | 6.0 0.49126 34.0   | 8.2 0.6764 36.5    | 8.0 0.66077 38.1   | 5.9 0.48221 35.2   |
| Potassium                                                      | 39.1 1 0.9 0.02317 1.9    | 0.9 0.02233 1.0    | 1.0 0.0266 1.8     | 1.7 0.04374 2.4    | 1.1 0.02762 1.6    | 1.4 0.03632 2.7    |
| Sodium                                                         | 23.0 1 4.2 0.18269 14.6   | 6.9 0.30013 13.7   | 7.0 0.30492 21.1   | 5.8 0.25098 13.6   | 5.6 0.24489 14.1   | 5.2 0.22445 16.4   |
| Iron                                                           | 55.8 2 0.09 0.00305 0.2   | 7.73 0.27683 12.6  | 0.05 0.00179 0.1   | 0.05 0.00179 0.1   | 0.04 0.00125 0.1   | 0.05 0.00179 0.1   |
| Manganese                                                      | 54.9 2 0.06 0.00213 0.2   | 0.25 0.00921 0.4   | 0.00 3.9E-05 0.0   | 0.00 8.8E-05 0.0   | 0.00 3.9E-05 0.0   | 0.00 3.9E-05 0.0   |
| Ammonia-N                                                      | 14.0 1 0.01 0.00071 0.1   | 0.02 0.00166 0.1   | 0.01 0.00071 0.0   | 0.01 0.00071 0.0   | 0.01 0.00071 0.0   | 0.01 0.00071 0.1   |
| <b>Total Cations (meq/L)</b>                                   | <b>1.3</b>                | <b>2.2</b>         | <b>1.4</b>         | <b>1.9</b>         | <b>1.7</b>         | <b>1.4</b>         |
| Anions                                                         |                           |                    |                    |                    |                    |                    |
| Alkalinity, Total                                              | 49                        | 79                 | 50                 | 65                 | 76                 | 51                 |
| Carbonate                                                      | 60.0 2 0.0116 0.00039 0.0 | 0.0376 0.00125 0.1 | 0.0164 0.00055 0.0 | 0.0472 0.00157 0.1 | 0.0558 0.00186 0.1 | 0.0232 0.00078 0.1 |
| Bicarbonate                                                    | 61.0 1 59.27 0.97147 67.2 | 96.06 1.57451 76.0 | 60.36 0.98931 64.5 | 79.57 1.30423 71.1 | 92.00 1.50791 82.5 | 62.17 1.01907 70.6 |
| Chloride                                                       | 35.5 1 3.8 0.10775 7.5    | 4.2 0.11734 5.7    | 4.4 0.12439 8.1    | 4.9 0.13821 7.5    | 3.1 0.08659 4.7    | 3.6 0.10211 7.1    |
| Nitrate-N                                                      | 14.0 1 0.75 0.05383 3.7   | 0.01 0.00071 0.0   | 1.45 0.10352 6.7   | 0.20 0.01399 0.8   | 1.39 0.09924 5.4   | 0.87 0.06218 4.3   |
| Sulfate                                                        | 96.1 2 15.0 0.31231 21.6  | 18.1 0.37686 18.2  | 15.2 0.31648 20.6  | 18.1 0.37686 20.5  | 6.3 0.1318 7.2     | 12.5 0.26026 18.0  |
| <b>Total Anions (meq/L)</b>                                    | <b>1.4</b>                | <b>2.1</b>         | <b>1.5</b>         | <b>1.8</b>         | <b>1.8</b>         | <b>1.4</b>         |
| <b>Total Ions (meq/L)</b>                                      | <b>2.7</b>                | <b>4.3</b>         | <b>3.0</b>         | <b>3.7</b>         | <b>3.6</b>         | <b>2.8</b>         |
| <b>Cation/Anion Ratio</b>                                      | <b>0.87</b>               | <b>1.06</b>        | <b>0.94</b>        | <b>1.01</b>        | <b>0.95</b>        | <b>0.95</b>        |
| <b>Percent Difference</b>                                      | <b>-7.2</b>               | <b>3.0</b>         | <b>-3.0</b>        | <b>0.5</b>         | <b>-2.6</b>        | <b>-2.7</b>        |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                           |                    |                    |                    |                    |                    |
| sum (Ca, Mg, Na+K)                                             | 1.25                      | 1.91               | 1.44               | 1.85               | 1.73               | 1.37               |
| Calcium                                                        | 52.49                     | 42.06              | 42.92              | 47.49              | 46.11              | 45.64              |
| Magnesium                                                      | 30.99                     | 41.06              | 34.08              | 36.57              | 38.16              | 35.28              |
| Sodium + Potassium                                             | 16.53                     | 16.88              | 23.00              | 15.94              | 15.74              | 19.08              |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.39                      | 2.07               | 1.43               | 1.82               | 1.73               | 1.38               |
| Sulfate                                                        | 22.438                    | 18.206             | 22.120             | 20.697             | 7.626              | 18.829             |
| Chloride                                                       | 7.741                     | 5.669              | 8.694              | 7.590              | 5.011              | 7.387              |
| Bicarbonate + Carbonate                                        | 69.821                    | 76.125             | 69.186             | 71.713             | 87.363             | 73.784             |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells

Data Collected from December 1, 2009 to March 31, 2010

| Site ID                                                        | MW-82                     | MW-65              | MW-58A             | MW-59              | MW-24              | MW-64              |
|----------------------------------------------------------------|---------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Date                                                           | 1/15/10                   | 3/30/10            | 1/14/10            | 1/6/10             | 1/7/10             | 1/12/10            |
| Cations                                                        | mg/L meq/L % (meq)        | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) |
| Calcium                                                        | 40.1 2 15.3 0.76347 40.8  | 11.9 0.59381 38.7  | 16.2 0.80838 43.4  | 12.9 0.64371 38.1  | 15.2 0.75848 37.0  | 15.7 0.78343 39.8  |
| Magnesium                                                      | 24.3 2 10.0 0.82288 44.0  | 6.8 0.55791 36.4   | 9.0 0.74223 39.9   | 7.9 0.65007 38.5   | 10.3 0.84756 41.4  | 10.4 0.85579 43.5  |
| Potassium                                                      | 39.1 1 1.4 0.03478 1.9    | 0.9 0.02407 1.6    | 0.9 0.02407 1.3    | 1.0 0.02517 1.5    | 0.9 0.02409 1.2    | 1.3 0.03274 1.7    |
| Sodium                                                         | 23.0 1 5.7 0.24794 13.2   | 4.8 0.20835 13.6   | 5.4 0.23358 12.5   | 5.2 0.22706 13.4   | 6.4 0.27708 13.5   | 6.2 0.27012 13.7   |
| Iron                                                           | 55.8 2 0.05 0.00179 0.1   | 3.97 0.14217 9.3   | 1.01 0.03617 1.9   | 3.91 0.14003 8.3   | 3.70 0.1325 6.5    | 0.48 0.0173 0.9    |
| Manganese                                                      | 54.9 2 0.00 3.9E-05 0.0   | 0.20 0.00735 0.5   | 0.34 0.01227 0.7   | 0.09 0.00337 0.2   | 0.15 0.0055 0.3    | 0.09 0.00326 0.2   |
| Ammonia-N                                                      | 14.0 1 0.01 0.00071 0.0   | 0.01 0.00071 0.0   | 0.07 0.00496 0.3   | 0.01 0.00071 0.0   | 0.04 0.00306 0.1   | 0.05 0.00356 0.2   |
| <b>Total Cations (meq/L)</b>                                   | <b>1.9</b>                | <b>1.5</b>         | <b>1.9</b>         | <b>1.7</b>         | <b>2.0</b>         | <b>2.0</b>         |
| Anions                                                         | 76                        | 54                 | 74                 | 59                 | 75                 | 75                 |
| Alkalinity, Total                                              |                           |                    |                    |                    |                    |                    |
| Carbonate                                                      | 60.0 2 0.0331 0.0011 0.1  | 0.0274 0.00091 0.1 | 0.1929 0.00643 0.3 | 0.0213 0.00071 0.0 | 0.0283 0.00094 0.0 | 0.1186 0.00395 0.2 |
| Bicarbonate                                                    | 61.0 1 92.65 1.51867 76.6 | 65.34 1.07092 72.8 | 89.64 1.46935 76.0 | 71.81 1.17711 72.6 | 91.08 1.49283 75.4 | 91.50 1.49982 71.5 |
| Chloride                                                       | 35.5 1 4.6 0.12947 6.5    | 4.2 0.11762 8.0    | 3.9 0.11057 5.7    | 4.2 0.11875 7.3    | 4.6 0.12862 6.5    | 3.8 0.10634 5.1    |
| Nitrate-N                                                      | 14.0 1 0.81 0.05761 2.9   | 0.01 0.00071 0.0   | 0.01 0.00071 0.0   | 0.02 0.00107 0.1   | 0.01 0.00071 0.0   | 0.02 0.00107 0.1   |
| Sulfate                                                        | 96.1 2 13.3 0.27692 14.0  | 13.5 0.28108 19.1  | 16.6 0.34563 17.9  | 15.6 0.32481 20.0  | 17.1 0.35604 18.0  | 23.4 0.48721 23.2  |
| <b>Total Anions (meq/L)</b>                                    | <b>2.0</b>                | <b>1.5</b>         | <b>1.9</b>         | <b>1.6</b>         | <b>2.0</b>         | <b>2.1</b>         |
| <b>Total Ions (meq/L)</b>                                      | <b>3.9</b>                | <b>3.0</b>         | <b>3.8</b>         | <b>3.3</b>         | <b>4.0</b>         | <b>4.1</b>         |
| <b>Cation/Anion Ratio</b>                                      | <b>0.94</b>               | <b>1.04</b>        | <b>0.96</b>        | <b>1.04</b>        | <b>1.03</b>        | <b>0.94</b>        |
| <b>Percent Difference</b>                                      | <b>-2.9</b>               | <b>2.1</b>         | <b>-1.9</b>        | <b>2.0</b>         | <b>1.7</b>         | <b>-3.3</b>        |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                           |                    |                    |                    |                    |                    |
| sum (Ca, Mg, Na+K)                                             | 1.87                      | 1.38               | 1.81               | 1.55               | 1.91               | 1.94               |
| Calcium                                                        | 40.85                     | 42.90              | 44.70              | 41.64              | 39.77              | 40.34              |
| Magnesium                                                      | 44.03                     | 40.31              | 41.05              | 42.05              | 44.44              | 44.07              |
| Sodium + Potassium                                             | 15.13                     | 16.79              | 14.25              | 16.31              | 15.79              | 15.59              |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.93                      | 1.47               | 1.93               | 1.62               | 1.98               | 2.10               |
| Sulfate                                                        | 14.377                    | 19.114             | 17.890             | 20.033             | 17.996             | 23.230             |
| Chloride                                                       | 6.722                     | 7.998              | 5.723              | 7.324              | 6.501              | 5.070              |
| Bicarbonate + Carbonate                                        | 78.902                    | 72.887             | 76.387             | 72.643             | 75.503             | 71.700             |

**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells**

Data Collected from December 1, 2009 to March 31, 2010

| Site ID                                                        | Date | MW | n | MW-70       |         | MW-77       |        | MW-72       |         | MW-69       |         | MW-100      |         | MW-93       |         |
|----------------------------------------------------------------|------|----|---|-------------|---------|-------------|--------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|
|                                                                |      |    |   | mg/L        | %(meq)  | mg/L        | %(meq) | mg/L        | %(meq)  | mg/L        | %(meq)  | mg/L        | %(meq)  | mg/L        | %(meq)  |
| Cations                                                        |      |    |   |             |         |             |        |             |         |             |         |             |         |             |         |
| Calcium                                                        | 40.1 | 2  |   | 17.4        | 0.86826 | 44.0        | 43.2   | 23.7        | 1.18263 | 25.6        | 1.27745 | 25.0        | 1.2475  | 30.6        | 1.52695 |
| Magnesium                                                      | 24.3 | 2  |   | 9.9         | 0.81794 | 41.5        | 42.3   | 14.1        | 1.16026 | 13.2        | 1.0862  | 16.2        | 1.33306 | 16.8        | 1.38243 |
| Potassium                                                      | 39.1 | 1  |   | 1.4         | 0.03478 | 1.8         | 1.3    | 1.6         | 0.0399  | 1.6         | 0.0399  | 1.9         | 0.04885 | 1.5         | 0.03709 |
| Sodium                                                         | 23.0 | 1  |   | 5.7         | 0.2475  | 12.5        | 13.0   | 6.6         | 0.28665 | 7.7         | 0.3358  | 9.5         | 0.41149 | 8.8         | 0.38104 |
| Iron                                                           | 55.8 | 2  |   | 0.05        | 0.00179 | 0.1         | 0.1    | 1.57        | 0.05623 | 1.13        | 0.04047 | 2.06        | 0.07377 | 0.05        | 0.00179 |
| Manganese                                                      | 54.9 | 2  |   | 0.03        | 0.00126 | 0.1         | 0.0    | 0.23        | 0.00848 | 0.18        | 0.00659 | 0.19        | 0.00677 | 0.28        | 0.01012 |
| Ammonia-N                                                      | 14.0 | 1  |   | 0.01        | 0.00071 | 0.0         | 0.0    | 0.01        | 0.001   | 0.01        | 0.00086 | 0.01        | 0.00071 | 0.05        | 0.00389 |
| <b>Total Cations (meq/L)</b>                                   |      |    |   | <b>2.0</b>  |         | <b>3.0</b>  |        | <b>2.7</b>  |         | <b>2.8</b>  |         | <b>3.1</b>  |         | <b>3.3</b>  |         |
| Anions                                                         |      |    |   |             |         |             |        |             |         |             |         |             |         |             |         |
| Alkalinity, Total                                              |      |    |   | 79          |         | 133         |        | 109         |         | 122         |         | 132         |         | 100         |         |
| Carbonate                                                      | 60.0 | 2  |   | 0.164       | 0.00547 | 0.3         | 0.1    | 0.1037      | 0.00346 | 0.1         | 0.1244  | 0.0371      | 0.00124 | 0.1343      | 0.00448 |
| Bicarbonate                                                    | 61.0 | 1  |   | 95.92       | 1.5723  | 76.4        | 85.5   | 132.77      | 2.17621 | 77.2        | 148.59  | 160.96      | 2.63836 | 121.73      | 1.99522 |
| Chloride                                                       | 35.5 | 1  |   | 3.7         | 0.10436 | 5.1         | 4.6    | 4.0         | 0.11198 | 4.0         | 3.9     | 3.2         | 0.09026 | 3.3         | 0.09252 |
| Nitrate-N                                                      | 14.0 | 1  |   | 0.06        | 0.00427 | 0.2         | 2.4    | 0.01        | 0.00071 | 0.0         | 0.01    | 0.01        | 0.00071 | 0.0         | 0.00071 |
| Sulfate                                                        | 96.1 | 2  |   | 17.8        | 0.37061 | 18.0        | 7.4    | 25.3        | 0.52677 | 18.7        | 15.1    | 20.1        | 0.4185  | 65.8        | 1.37001 |
| <b>Total Anions (meq/L)</b>                                    |      |    |   | <b>2.1</b>  |         | <b>3.1</b>  |        | <b>2.8</b>  |         | <b>2.9</b>  |         | <b>3.1</b>  |         | <b>3.5</b>  |         |
| <b>Total Ions (meq/L)</b>                                      |      |    |   | <b>4.0</b>  |         | <b>6.1</b>  |        | <b>5.6</b>  |         | <b>5.7</b>  |         | <b>6.3</b>  |         | <b>6.8</b>  |         |
| <b>Cation/Anion Ratio</b>                                      |      |    |   | <b>0.96</b> |         | <b>0.95</b> |        | <b>0.97</b> |         | <b>0.97</b> |         | <b>0.99</b> |         | <b>0.97</b> |         |
| <b>Percent Difference</b>                                      |      |    |   | <b>-2.1</b> |         | <b>-2.5</b> |        | <b>-1.5</b> |         | <b>-1.4</b> |         | <b>-0.4</b> |         | <b>-1.8</b> |         |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |      |    |   |             |         |             |        |             |         |             |         |             |         |             |         |
| sum (Ca, Mg, Na+K)                                             |      |    |   | 1.97        |         |             |        |             |         |             |         |             |         |             |         |
| Calcium                                                        |      |    |   |             | 44.11   |             | 43.29  |             | 2.67    |             | 2.74    |             | 3.04    |             | 3.33    |
| Magnesium                                                      |      |    |   |             | 41.55   |             | 42.38  |             |         |             |         |             |         |             | 45.89   |
| Sodium + Potassium                                             |      |    |   |             | 14.34   |             | 14.33  |             |         |             |         |             |         |             | 41.55   |
|                                                                |      |    |   |             | 100.0   |             | 100.0  |             |         |             |         |             |         |             | 12.57   |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) |      |    |   | 2.05        |         |             |        |             |         |             |         |             |         |             |         |
| Sulfate                                                        |      |    |   |             | 18.054  |             | 7.555  |             | 2.82    |             | 2.86    |             | 3.15    |             | 3.46    |
| Chloride                                                       |      |    |   |             | 5.084   |             | 4.708  |             |         |             |         |             |         |             | 39.570  |
| Bicarbonate + Carbonate                                        |      |    |   |             | 76.861  |             | 87.736 |             |         |             |         |             |         |             | 2.672   |
|                                                                |      |    |   |             |         |             |        |             |         |             |         |             |         |             | 57.758  |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells

Data Collected from December 1, 2009 to March 31, 2010

| Site ID                                                        | MW-95                      | MW-84              | MW-81              | MW-21              | MW-73              | MW-99              |
|----------------------------------------------------------------|----------------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Date                                                           | 2/9/10                     | 1/29/10            | 2/1/10             | 1/6/10             | 1/29/10            | 1/22/10            |
| Cations                                                        | mg/L meq/L % (meq)         | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) |
| Calcium                                                        | 40.1 2 19.2 0.95808 44.9   | 11.0 0.5489 34.8   | 9.6 0.47655 41.4   | 8.8 0.43862 37.3   | 14.0 0.6986 43.9   | 8.5 0.42216 34.1   |
| Magnesium                                                      | 24.3 2 10.6 0.87225 40.9   | 9.2 0.75375 47.8   | 5.4 0.44764 38.9   | 5.2 0.42707 36.3   | 7.4 0.60728 38.1   | 4.3 0.35466 28.6   |
| Potassium                                                      | 39.1 1 1.2 0.02941 1.4     | 1.0 0.02486 1.6    | 0.6 0.01517 1.3    | 0.9 0.02376 2.0    | 0.9 0.02177 1.4    | 0.8 0.02136 1.7    |
| Sodium                                                         | 23.0 1 6.1 0.26534 12.4    | 5.6 0.24489 15.5   | 4.8 0.20792 18.1   | 4.9 0.21227 18.0   | 6.0 0.26273 16.5   | 9.9 0.43237 34.9   |
| Iron                                                           | 55.8 2 0.05 0.00179 0.1    | 0.05 0.00179 0.1   | 0.05 0.00179 0.2   | 2.00 0.07162 6.1   | 0.05 0.00179 0.1   | 0.03 0.00097 0.1   |
| Manganese                                                      | 54.9 2 0.13 0.00462 0.2    | 0.01 0.00042 0.0   | 0.00 3.6E-05 0.0   | 0.06 0.00228 0.2   | 0.00 3.6E-05 0.0   | 0.06 0.00217 0.2   |
| Ammonia-N                                                      | 14.0 1 0.02 0.00143 0.1    | 0.01 0.00071 0.0   | 0.01 0.00071 0.1   | 0.01 0.00071 0.1   | 0.01 0.00071 0.0   | 0.06 0.00427 0.3   |
| <b>Total Cations (meq/L)</b>                                   | <b>2.1</b>                 | <b>1.6</b>         | <b>1.1</b>         | <b>1.2</b>         | <b>1.6</b>         | <b>1.2</b>         |
| Anions                                                         |                            |                    |                    |                    |                    |                    |
| Alkalinity, Total                                              | 88                         | 58                 | 50                 | 50                 | 57                 | 54                 |
| Carbonate                                                      | 60.0 2 0.0876 0.00292 0.1  | 0.011 0.00037 0.0  | 0.0622 0.00207 0.2 | 0.0682 0.00227 0.2 | 0.0411 0.00137 0.1 | 0.1983 0.00661 0.5 |
| Bicarbonate                                                    | 61.0 1 107.06 1.75482 77.7 | 70.74 1.15946 74.7 | 60.39 0.98978 72.2 | 60.37 0.98958 82.9 | 69.33 1.13646 72.0 | 65.23 1.06923 80.8 |
| Chloride                                                       | 35.5 1 5.4 0.1509 6.7      | 3.6 0.10098 6.5    | 3.2 0.08998 6.6    | 3.0 0.08349 7.0    | 3.8 0.1069 6.8     | 3.2 0.09082 6.9    |
| Nitrate-N                                                      | 14.0 1 0.01 0.00071 0.0    | 0.55 0.03934 2.5   | 1.57 0.11209 8.2   | 0.01 0.00071 0.1   | 1.89 0.13493 8.5   | 0.02 0.00157 0.1   |
| Sulfate                                                        | 96.1 2 16.7 0.34771 15.4   | 12.1 0.25193 16.2  | 8.5 0.17719 12.9   | 5.7 0.11785 9.9    | 9.5 0.19863 12.6   | 7.4 0.15428 11.7   |
| <b>Total Anions (meq/L)</b>                                    | <b>2.3</b>                 | <b>1.6</b>         | <b>1.4</b>         | <b>1.2</b>         | <b>1.6</b>         | <b>1.3</b>         |
| <b>Total Ions (meq/L)</b>                                      | <b>4.4</b>                 | <b>3.1</b>         | <b>2.5</b>         | <b>2.4</b>         | <b>3.2</b>         | <b>2.6</b>         |
| <b>Cation/Anion Ratio</b>                                      | <b>0.94</b>                | <b>1.01</b>        | <b>0.84</b>        | <b>0.99</b>        | <b>1.01</b>        | <b>0.94</b>        |
| <b>Percent Difference</b>                                      | <b>-2.8</b>                | <b>0.7</b>         | <b>-8.8</b>        | <b>-0.7</b>        | <b>0.5</b>         | <b>-3.3</b>        |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                            |                    |                    |                    |                    |                    |
| sum (Ca, Mg, Na+K)                                             | 2.13                       | 1.57               | 1.15               | 1.10               | 1.59               | 1.23               |
| Calcium                                                        | 45.08                      | 34.91              | 41.54              | 39.81              | 43.93              | 34.31              |
| Magnesium                                                      | 41.05                      | 47.94              | 39.02              | 38.76              | 38.18              | 28.82              |
| Sodium + Potassium                                             | 13.87                      | 17.16              | 19.44              | 21.42              | 17.89              | 36.87              |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.26                       | 1.51               | 1.26               | 1.19               | 1.44               | 1.32               |
| Sulfate                                                        | 15.410                     | 16.654             | 14.073             | 9.877              | 13.762             | 11.680             |
| Chloride                                                       | 6.688                      | 6.675              | 7.147              | 6.997              | 7.406              | 6.876              |
| Bicarbonate + Carbonate                                        | 77.902                     | 76.671             | 78.780             | 83.126             | 78.832             | 81.445             |

Table 3

**Ion Balance Calculations  
Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells**

Data Collected from December 1, 2009 to March 31, 2010

| Site ID                                                        | MW-80       |         | MW-66       |         | MW-67       |         | MW-68       |         | MW-74       |         |
|----------------------------------------------------------------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|-------------|---------|
| Date                                                           | 2/8/10      |         | 1/11/10     |         | 1/8/10      |         | 2/5/10      |         | 1/19/10     |         |
| Cations                                                        | mg/L        | meq/L   | mg/L        | meq/L   | mg/L        | meq/L   | mg/L        | meq/L   | mg/L        | meq/L   |
| Calcium                                                        | 22.7        | 1.13273 | 18.0        | 0.8982  | 23.7        | 1.18263 | 30.5        | 1.52196 | 35.7        | 1.78144 |
| Magnesium                                                      | 12.3        | 1.01214 | 13.5        | 1.11088 | 13.4        | 1.10265 | 18.2        | 1.49763 | 27.0        | 2.22177 |
| Potassium                                                      | 1.4         | 0.03581 | 1.2         | 0.03044 | 1.4         | 0.03683 | 1.6         | 0.04143 | 2.1         | 0.0532  |
| Sodium                                                         | 7.1         | 0.30709 | 8.1         | 0.35233 | 8.5         | 0.36973 | 8.8         | 0.38104 | 10.7        | 0.46542 |
| Iron                                                           | 1.3         | 0.04727 | 0.1         | 0.00179 | 0.1         | 0.00207 | 1.5         | 0.05408 | 2.6         | 0.09168 |
| Manganese                                                      | 0.2         | 0.00819 | 0.0         | 3.6E-05 | 0.1         | 0.00186 | 0.3         | 0.00987 | 0.1         | 0.00524 |
| Ammonia-N                                                      | 0.0         | 0.00071 | 0.0         | 0.00071 | 0.0         | 0.00071 | 0.0         | 0.00086 | 0.0         | 0.00071 |
| <b>Total Cations (meq/L)</b>                                   | <b>2.5</b>  |         | <b>2.4</b>  |         | <b>2.7</b>  |         | <b>3.5</b>  |         | <b>4.6</b>  |         |
| Anions                                                         |             |         |             |         |             |         |             |         |             |         |
| Alkalinity, Total                                              | 82          |         | 104         |         | 97.5        |         | 158         |         | 163         |         |
| Carbonate                                                      | 60.0        | 2       | 0.0501      | 0.00167 | 0.1         | 0.0465  | 0.00155     | 0.1     | 0.0935      | 0.00312 |
| Bicarbonate                                                    | 61.0        | 1       | 99.33       | 1.62808 | 64.2        | 126.63  | 2.07563     | 80.6    | 198.67      | 3.25639 |
| Chloride                                                       | 35.5        | 1       | 5.1         | 0.14385 | 5.7         | 7.9     | 0.22339     | 8.7     | 31.9        | 0.89978 |
| Nitrate-N                                                      | 14.0        | 1       | 0.0         | 0.00071 | 0.0         | 0.4     | 0.0307      | 1.2     | 0.0         | 0.00071 |
| Sulfate                                                        | 96.1        | 2       | 36.6        | 0.76204 | 30.0        | 11.6    | 0.24152     | 9.4     | 26.1        | 0.54342 |
| <b>Total Anions (meq/L)</b>                                    | <b>2.5</b>  |         | <b>2.6</b>  |         | <b>2.8</b>  |         | <b>3.6</b>  |         | <b>4.7</b>  |         |
| <b>Total Ions (meq/L)</b>                                      | <b>5.1</b>  |         | <b>5.0</b>  |         | <b>5.5</b>  |         | <b>7.1</b>  |         | <b>9.3</b>  |         |
| <b>Cation/Anion Ratio</b>                                      | <b>1.00</b> |         | <b>0.93</b> |         | <b>0.96</b> |         | <b>0.97</b> |         | <b>0.98</b> |         |
| <b>Percent Difference</b>                                      | <b>0.1</b>  |         | <b>-3.6</b> |         | <b>-2.1</b> |         | <b>-1.7</b> |         | <b>-0.9</b> |         |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |         |             |         |             |         |             |         |             |         |
| sum (Ca, Mg, Na+K)                                             | 2.49        |         | 2.39        |         | 2.69        |         | 3.44        |         | 4.52        |         |
| Calcium                                                        | 45.53       |         | 37.55       |         | 43.93       |         | 44.22       |         | 39.40       |         |
| Magnesium                                                      | 40.68       |         | 46.44       |         | 40.96       |         | 43.51       |         | 49.13       |         |
| Sodium + Potassium                                             | 13.78       |         | 16.00       |         | 15.10       |         | 12.27       |         | 11.47       |         |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.54        |         | 2.54        |         | 2.76        |         | 3.62        |         | 4.70        |         |
| Sulfate                                                        | 30.053      |         | 9.492       |         | 24.350      |         | 10.052      |         | 11.556      |         |
| Chloride                                                       | 5.673       |         | 8.779       |         | 5.055       |         | 2.786       |         | 19.133      |         |
| Bicarbonate + Carbonate                                        | 64.274      |         | 81.729      |         | 70.594      |         | 87.162      |         | 69.311      |         |
|                                                                |             |         | 100.0       |         | 100.0       |         | 100.0       |         |             |         |

Table 3

**Ion Balance Calculations  
Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells**

Data Collected from December 1, 2009 to March 31, 2010

| Site ID                                                        | MW-75            | MW-87            | MW-85            | MW-86            | MW-88            |
|----------------------------------------------------------------|------------------|------------------|------------------|------------------|------------------|
| Date                                                           | 1/22/10          | 1/19/10          | 1/29/10          | 1/29/10          | 2/8/10           |
| Cations                                                        |                  |                  |                  |                  |                  |
| Calcium                                                        | mg/L<br>21.6     | mg/L<br>31.4     | mg/L<br>20.1     | mg/L<br>14.6     | mg/L<br>8.6      |
|                                                                | meq/L<br>1.07784 | meq/L<br>1.56687 | meq/L<br>1.00299 | meq/L<br>0.72854 | meq/L<br>0.42914 |
|                                                                | %(meq)<br>36.5   | %(meq)<br>38.5   | %(meq)<br>41.9   | %(meq)<br>37.8   | %(meq)<br>35.0   |
| Magnesium                                                      | mg/L<br>17.2     | mg/L<br>23.4     | mg/L<br>12.5     | mg/L<br>10.6     | mg/L<br>6.5      |
|                                                                | meq/L<br>1.41535 | meq/L<br>1.92553 | meq/L<br>1.02859 | meq/L<br>0.87225 | meq/L<br>0.53487 |
|                                                                | %(meq)<br>47.9   | %(meq)<br>47.4   | %(meq)<br>43.0   | %(meq)<br>45.3   | %(meq)<br>43.6   |
| Potassium                                                      | mg/L<br>1.7      | mg/L<br>2.0      | mg/L<br>1.4      | mg/L<br>1.2      | mg/L<br>0.8      |
|                                                                | meq/L<br>0.04271 | meq/L<br>0.05064 | meq/L<br>0.03504 | meq/L<br>0.02967 | meq/L<br>0.02031 |
|                                                                | %(meq)<br>1.4    | %(meq)<br>1.2    | %(meq)<br>1.5    | %(meq)<br>1.5    | %(meq)<br>1.7    |
| Sodium                                                         | mg/L<br>8.2      | mg/L<br>9.3      | mg/L<br>7.4      | mg/L<br>6.6      | mg/L<br>5.5      |
|                                                                | meq/L<br>0.35842 | meq/L<br>0.40279 | meq/L<br>0.32362 | meq/L<br>0.28491 | meq/L<br>0.23924 |
|                                                                | %(meq)<br>12.1   | %(meq)<br>9.9    | %(meq)<br>13.5   | %(meq)<br>14.8   | %(meq)<br>19.5   |
| Iron                                                           | mg/L<br>1.5      | mg/L<br>3.0      | mg/L<br>0.1      | mg/L<br>0.3      | mg/L<br>0.1      |
|                                                                | meq/L<br>0.05515 | meq/L<br>0.10708 | meq/L<br>0.00179 | meq/L<br>0.00928 | meq/L<br>0.00179 |
|                                                                | %(meq)<br>1.9    | %(meq)<br>2.6    | %(meq)<br>0.1    | %(meq)<br>0.5    | %(meq)<br>0.1    |
| Manganese                                                      | mg/L<br>0.1      | mg/L<br>0.3      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      |
|                                                                | meq/L<br>0.00444 | meq/L<br>0.01125 | meq/L<br>3.6E-05 | meq/L<br>0.00052 | meq/L<br>3.6E-05 |
|                                                                | %(meq)<br>0.2    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    |
| Ammonia-N                                                      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      |
|                                                                | meq/L<br>0.00071 | meq/L<br>0.00093 | meq/L<br>0.00071 | meq/L<br>0.00071 | meq/L<br>0.00071 |
|                                                                | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.1    |
| <b>Total Cations (meq/L)</b>                                   | <b>3.0</b>       | <b>4.1</b>       | <b>2.4</b>       | <b>1.9</b>       | <b>1.2</b>       |
| Anions                                                         |                  |                  |                  |                  |                  |
| Alkalinity, Total                                              | mg/L<br>96.2     | mg/L<br>91.5     | mg/L<br>82.9     | mg/L<br>67.2     | mg/L<br>53.9     |
| Carbonate                                                      | mg/L<br>6E-09    | mg/L<br>0.0525   | mg/L<br>0.0274   | mg/L<br>0.0157   | mg/L<br>0.0276   |
|                                                                | meq/L<br>2E-10   | meq/L<br>0.00175 | meq/L<br>0.00091 | meq/L<br>0.00052 | meq/L<br>0.00092 |
|                                                                | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.1    |
| Bicarbonate                                                    | mg/L<br>117.36   | mg/L<br>111.52   | mg/L<br>101.08   | mg/L<br>81.95    | mg/L<br>65.70    |
|                                                                | meq/L<br>1.92371 | meq/L<br>1.82797 | meq/L<br>1.65684 | meq/L<br>1.34327 | meq/L<br>1.07692 |
|                                                                | %(meq)<br>63.7   | %(meq)<br>43.3   | %(meq)<br>68.8   | %(meq)<br>74.0   | %(meq)<br>81.3   |
| Chloride                                                       | mg/L<br>7.5      | mg/L<br>4.5      | mg/L<br>6.2      | mg/L<br>4.1      | mg/L<br>2.6      |
|                                                                | meq/L<br>0.21155 | meq/L<br>0.12608 | meq/L<br>0.17544 | meq/L<br>0.11565 | meq/L<br>0.0739  |
|                                                                | %(meq)<br>7.0    | %(meq)<br>3.0    | %(meq)<br>7.3    | %(meq)<br>6.4    | %(meq)<br>5.6    |
| Nitrate-N                                                      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.1      | mg/L<br>0.3      | mg/L<br>0.5      |
|                                                                | meq/L<br>0.00071 | meq/L<br>0.00071 | meq/L<br>0.00864 | meq/L<br>0.01842 | meq/L<br>0.0347  |
|                                                                | %(meq)<br>0.0    | %(meq)<br>0.4    | %(meq)<br>0.4    | %(meq)<br>1.0    | %(meq)<br>2.6    |
| Sulfate                                                        | mg/L<br>42.4     | mg/L<br>109.0    | mg/L<br>27.2     | mg/L<br>16.2     | mg/L<br>6.7      |
|                                                                | meq/L<br>0.8828  | meq/L<br>2.26947 | meq/L<br>0.56633 | meq/L<br>0.3373  | meq/L<br>0.13867 |
|                                                                | %(meq)<br>29.2   | %(meq)<br>53.7   | %(meq)<br>23.5   | %(meq)<br>18.6   | %(meq)<br>10.5   |
| <b>Total Anions (meq/L)</b>                                    | <b>3.0</b>       | <b>4.2</b>       | <b>2.4</b>       | <b>1.8</b>       | <b>1.3</b>       |
| <b>Total Ions (meq/L)</b>                                      | <b>6.0</b>       | <b>8.3</b>       | <b>4.8</b>       | <b>3.7</b>       | <b>2.6</b>       |
| <b>Cation/Anion Ratio</b>                                      | <b>0.98</b>      | <b>0.96</b>      | <b>0.99</b>      | <b>1.06</b>      | <b>0.93</b>      |
| <b>Percent Difference</b>                                      | <b>-1.1</b>      | <b>-1.9</b>      | <b>-0.3</b>      | <b>3</b>         | <b>-3.9</b>      |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                  |                  |                  |                  |                  |
| sum (Ca, Mg, Na+K)                                             | 2.89             | 3.95             | 2.39             | 1.92             | 1.22             |
| Calcium                                                        | 37.24            | 39.71            | 41.96            | 38.04            | 35.07            |
| Magnesium                                                      | 48.90            | 48.80            | 43.03            | 45.54            | 43.71            |
| Sodium + Potassium                                             | 13.86            | 11.49            | 15.01            | 16.42            | 21.21            |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 3.02             | 4.23             | 2.40             | 1.80             | 1.29             |
| Sulfate                                                        | 29.251           | 53.712           | 23.602           | 18.773           | 10.746           |
| Chloride                                                       | 7.009            | 2.984            | 7.312            | 6.436            | 5.727            |
| Bicarbonate + Carbonate                                        | 63.740           | 43.304           | 69.087           | 74.791           | 83.527           |

Table 3

**Ion Balance Calculations  
Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells**

Data Collected from December 1, 2009 to March 31, 2010

| Site ID                                                        | MW-89       | MW-90                                              | MW-91                                              | MW-43                                             |
|----------------------------------------------------------------|-------------|----------------------------------------------------|----------------------------------------------------|---------------------------------------------------|
| Date                                                           | 1/7/10      | 1/8/10                                             | 1/8/10                                             | 1/5/10                                            |
| Cations                                                        | MW          |                                                    |                                                    |                                                   |
| Calcium                                                        | 40.1 2      | mg/L 13.2 0.65868<br>meq/L 0.83933<br>% (meq) 33.5 | mg/L 16.2 0.80838<br>meq/L 0.80642<br>% (meq) 40.5 | mg/L 12.0 0.5988<br>meq/L 0.70274<br>% (meq) 36.8 |
| Magnesium                                                      | 24.3 2      | 10.2 0.83933<br>42.7                               | 9.8 0.80642<br>40.4                                | 8.5 0.70274<br>43.2                               |
| Potassium                                                      | 39.1 1      | 1.5 0.03734<br>1.9                                 | 1.3 0.03402<br>1.7                                 | 1.2 0.03018<br>1.9                                |
| Sodium                                                         | 23.0 1      | 9.1 0.39409<br>20.0                                | 6.8 0.29404<br>14.7                                | 5.8 0.25359<br>15.6                               |
| Iron                                                           | 55.8 2      | 0.7 0.02546<br>1.3                                 | 1.1 0.03832<br>1.9                                 | 0.9 0.03191<br>2.0                                |
| Manganese                                                      | 54.9 2      | 0.3 0.01008<br>0.5                                 | 0.3 0.00957<br>0.5                                 | 0.2 0.00728<br>0.4                                |
| Ammonia-N                                                      | 14.0 1      | 0.0 0.00153<br>0.1                                 | 0.1 0.00388<br>0.2                                 | 0.0 0.00164<br>0.1                                |
| <b>Total Cations (meq/L)</b>                                   | <b>2.0</b>  | <b>2.0</b>                                         | <b>2.5</b>                                         | <b>1.6</b>                                        |
| Anions                                                         |             |                                                    |                                                    |                                                   |
| Alkalinity, Total                                              | 78.5        | 72.1                                               | 82.9                                               | 64.7                                              |
| Carbonate                                                      | 60.0 2      | 0.1297 0.00432<br>0.2                              | 0.0558 0.00186<br>0.1                              | 0.0524 0.00175<br>0.1                             |
| Bicarbonate                                                    | 61.0 1      | 95.51 1.56544<br>77.5                              | 87.85 1.43992<br>68.6                              | 78.83 1.29206<br>77.5                             |
| Chloride                                                       | 35.5 1      | 3.3 0.09223<br>4.6                                 | 3.6 0.10041<br>4.8                                 | 2.8 0.07898<br>4.7                                |
| Nitrate-N                                                      | 14.0 1      | 0.0 0.00071<br>0.0                                 | 0.0 0.00071<br>0.0                                 | 0.0 0.00071<br>0.0                                |
| Sulfate                                                        | 96.1 2      | 17.1 0.35604<br>17.6                               | 26.7 0.55592<br>26.5                               | 14.1 0.29357<br>17.6                              |
| <b>Total Anions (meq/L)</b>                                    | <b>2.0</b>  | <b>2.1</b>                                         | <b>2.5</b>                                         | <b>1.7</b>                                        |
| <b>Total Ions (meq/L)</b>                                      | <b>4.0</b>  | <b>4.1</b>                                         | <b>5.1</b>                                         | <b>3.3</b>                                        |
| <b>Cation/Anion Ratio</b>                                      | <b>0.97</b> | <b>0.95</b>                                        | <b>1.00</b>                                        | <b>0.98</b>                                       |
| <b>Percent Difference</b>                                      | <b>-1.3</b> | <b>-2.5</b>                                        | <b>0.0</b>                                         | <b>-1.2</b>                                       |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |                                                    |                                                    |                                                   |
| sum (Ca, Mg, Na+K)                                             | 1.93        | 1.94                                               | 2.45                                               | 1.59                                              |
| Calcium                                                        | 34.14       | 41.61                                              | 39.69                                              | 37.77                                             |
| Magnesium                                                      | 43.50       | 41.51                                              | 45.31                                              | 44.33                                             |
| Sodium + Potassium                                             | 22.36       | 16.89                                              | 15.01                                              | 17.90                                             |
|                                                                |             | 100.0                                              | 100.0                                              | 100.0                                             |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.02        | 2.10                                               | 2.54                                               | 1.67                                              |
| Sulfate                                                        | 17.643      | 26.496                                             | 26.551                                             | 17.618                                            |
| Chloride                                                       | 4.571       | 4.786                                              | 8.204                                              | 4.740                                             |
| Bicarbonate + Carbonate                                        | 77.787      | 68.718                                             | 65.245                                             | 77.643                                            |
|                                                                |             | 100.0                                              | 100.0                                              | 100.0                                             |



**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells**

Data Collected from April 1, 2010 to June 30, 2010

| Site ID                                                        | MW-56       | MW-57         | MW-76       | MW-83         | MW-60          | MW-94         |
|----------------------------------------------------------------|-------------|---------------|-------------|---------------|----------------|---------------|
| Date                                                           | 4/16/10     | 4/26/10       | 4/15/10     | 4/23/10       | 4/27/10        | 4/23/10       |
| Cations                                                        | mg/L        | meq/L         | %(meq)      | mg/L          | meq/L          | %(meq)        |
| Calcium                                                        | 40.1 2      | 13.5 0.67365  | 51.3        | 16.0 0.7984   | 19.4 0.96806   | 11.4 0.56886  |
| Magnesium                                                      | 24.3 2      | 5.1 0.42296   | 32.2        | 8.0 0.65748   | 10.1 0.8311    | 5.8 0.47315   |
| Potassium                                                      | 39.1 1      | 0.9 0.0231    | 1.8         | 1.5 0.03888   | 1.2 0.03044    | 1.4 0.03376   |
| Sodium                                                         | 23.0 1      | 4.4 0.18921   | 14.4        | 5.8 0.25185   | 6.2 0.26969    | 4.8 0.20705   |
| Iron                                                           | 55.8 2      | 0.02 0.00064  | 0.0         | 0.01 0.00036  | 0.01 0.00036   | 0.01 0.00036  |
| Manganese                                                      | 54.9 2      | 0.05 0.00199  | 0.2         | 0.00 0.00016  | 0.00 4.9E-05   | 0.00 3.6E-05  |
| Ammonia-N                                                      | 14.0 1      | 0.01 0.00071  | 0.1         | 0.01 0.00071  | 0.01 0.00071   | 0.01 0.00071  |
| <b>Total Cations (meq/L)</b>                                   | <b>1.3</b>  | <b>2.2</b>    | <b>1.3</b>  | <b>1.7</b>    | <b>2.1</b>     | <b>1.3</b>    |
| Anions                                                         | mg/L        | meq/L         | %(meq)      | mg/L          | meq/L          | %(meq)        |
| Alkalinity, Total                                              | 49          | 76            | 44          | 65            | 93             | 48            |
| Carbonate                                                      | 60.0 2      | 3E-09 9.9E-11 | 0.0         | 4E-09 1.3E-10 | 6E-09 1.9E-10  | 3E-09 9.5E-11 |
| Bicarbonate                                                    | 61.0 1      | 60.02 0.98385 | 66.9        | 79.79 1.3078  | 113.22 1.85572 | 58.07 0.95186 |
| Chloride                                                       | 35.5 1      | 4.2 0.11762   | 8.0         | 5.2 0.14667   | 2.9 0.08236    | 3.7 0.09985   |
| Nitrate-N                                                      | 14.0 1      | 0.69 0.04926  | 3.3         | 0.16 0.01128  | 1.43 0.10209   | 0.90 0.06411  |
| Sulfate                                                        | 96.1 2      | 15.4 0.32064  | 21.8        | 19.7 0.41017  | 8.1 0.16802    | 13.1 0.27275  |
| <b>Total Anions (meq/L)</b>                                    | <b>1.5</b>  | <b>2.0</b>    | <b>1.5</b>  | <b>1.9</b>    | <b>2.2</b>     | <b>1.4</b>    |
| <b>Total Ions (meq/L)</b>                                      | <b>2.8</b>  | <b>4.2</b>    | <b>2.8</b>  | <b>3.6</b>    | <b>4.3</b>     | <b>2.7</b>    |
| <b>Cation/Anion Ratio</b>                                      | <b>0.89</b> | <b>1.08</b>   | <b>0.90</b> | <b>0.93</b>   | <b>0.95</b>    | <b>0.92</b>   |
| <b>Percent Difference</b>                                      | <b>-5.7</b> | <b>3.9</b>    | <b>-5.3</b> | <b>-3.5</b>   | <b>-2.5</b>    | <b>-3.9</b>   |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |               |             |               |                |               |
| sum (Ca, Mg, Na+K)                                             | 1.31        | 1.88          | 1.32        | 1.75          | 2.10           | 1.28          |
| Calcium                                                        | 51.47       | 40.43         | 43.10       | 45.71         | 46.11          | 44.34         |
| Magnesium                                                      | 32.31       | 42.59         | 33.91       | 37.64         | 39.59          | 36.88         |
| Sodium + Potassium                                             | 16.22       | 16.98         | 22.99       | 16.65         | 14.30          | 18.77         |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.42        | 2.00          | 1.39        | 1.86          | 2.11           | 1.32          |
| Sulfate                                                        | 22.547      | 18.324        | 28.560      | 21.997        | 7.978          | 20.594        |
| Chloride                                                       | 8.271       | 5.980         | 8.064       | 7.866         | 3.911          | 7.539         |
| Bicarbonate + Carbonate                                        | 69.182      | 75.696        | 63.377      | 70.137        | 88.111         | 71.868        |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells

Data Collected from April 1, 2010 to June 30, 2010

| Site ID                                                        | MW-82         | MW-65         | MW-58A         | MW-59          | MW-24          | MW-64            |
|----------------------------------------------------------------|---------------|---------------|----------------|----------------|----------------|------------------|
| Date                                                           | 4/16/10       | 4/16/10       | 4/2/10         | 4/2/10         | 4/2/10         | 4/20/10          |
| Cations                                                        | mg/L          | meq/L         | %(meq)         | mg/L           | meq/L          | %(meq)           |
| Calcium                                                        | 40.1 2        | 13.7 0.68363  | 41.5           | 13.2 0.65868   | 14.9 0.74351   | 17.6 0.87824     |
| Magnesium                                                      | 24.3 2        | 8.5 0.70109   | 42.6           | 7.2 0.59494    | 9.0 0.73812    | 13.6 1.11911     |
| Potassium                                                      | 39.1 1        | 1.3 0.03274   | 2.0            | 1.1 0.02762    | 0.9 0.02404    | 1.4 0.03504      |
| Sodium                                                         | 23.0 1        | 5.2 0.22749   | 13.8           | 5.1 0.22358    | 5.3 0.22836    | 6.6 0.28795      |
| Iron                                                           | 55.8 2        | 0.01 0.00036  | 0.0            | 3.99 0.14289   | 3.73 0.13358   | 7.1 0.01 0.00036 |
| Manganese                                                      | 54.9 2        | 0.00 3.6E-05  | 0.0            | 0.10 0.00356   | 0.14 0.00499   | 0.13 0.00477     |
| Ammonia-N                                                      | 14.0 1        | 0.01 0.00071  | 0.0            | 0.01 0.00071   | 0.04 0.00312   | 0.04 0.00311     |
| <b>Total Cations (meq/L)</b>                                   | <b>1.6</b>    | <b>1.5</b>    | <b>1.8</b>     | <b>1.7</b>     | <b>1.9</b>     | <b>2.3</b>       |
| Anions                                                         | 72            | 52            | 75             | 64             | 75             | 78               |
| Alkalinity, Total                                              | 4E-09 1.4E-10 | 0.0           | 0.1584 0.00528 | 0.0266 0.00089 | 0.0568 0.00189 | 5E-09 1.6E-10    |
| Carbonate                                                      | 60.0 2        | 87.23 1.42978 | 75.3           | 77.90 1.27692  | 91.51 1.49988  | 95.65 1.56776    |
| Bicarbonate                                                    | 61.0 1        | 4.5 0.12608   | 6.6            | 4.1 0.11593    | 4.5 0.12552    | 3.8 0.10831      |
| Chloride                                                       | 35.5 1        | 0.88 0.06247  | 3.3            | 0.01 0.00071   | 0.01 0.00071   | 0.03 0.00193     |
| Nitrate-N                                                      | 14.0 1        | 13.5 0.28108  | 14.8           | 17.1 0.35604   | 16.5 0.34354   | 39.5 0.82242     |
| Sulfate                                                        | 96.1 2        | <b>1.9</b>    | <b>1.4</b>     | <b>1.8</b>     | <b>2.0</b>     | <b>2.5</b>       |
| <b>Total Anions (meq/L)</b>                                    | <b>3.5</b>    | <b>2.9</b>    | <b>3.7</b>     | <b>3.4</b>     | <b>3.8</b>     | <b>4.8</b>       |
| <b>Total Ions (meq/L)</b>                                      | <b>0.87</b>   | <b>1.03</b>   | <b>0.90</b>    | <b>0.94</b>    | <b>0.95</b>    | <b>0.93</b>      |
| <b>Cation/Anion Ratio</b>                                      | <b>-7.1</b>   | <b>1.7</b>    | <b>-5.2</b>    | <b>-2.9</b>    | <b>-2.5</b>    | <b>-3.6</b>      |
| <b>Percent Difference</b>                                      |               |               |                |                |                |                  |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |               |               |                |                |                |                  |
| sum (Ca, Mg, Na+K)                                             | 1.64          | 1.34          | 1.70           | 1.50           | 1.73           | 2.32             |
| Calcium                                                        | 41.56         | 39.97         | 48.42          | 43.77          | 42.88          | 37.85            |
| Magnesium                                                      | 42.62         | 41.52         | 37.84          | 39.54          | 42.57          | 48.23            |
| Sodium + Potassium                                             | 15.82         | 18.50         | 13.73          | 16.69          | 14.56          | 13.92            |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.84          | 1.44          | 1.94           | 1.75           | 1.97           | 2.50             |
| Sulfate                                                        | 15.302        | 19.850        | 17.774         | 20.348         | 17.431         | 32.917           |
| Chloride                                                       | 6.864         | 8.205         | 5.614          | 6.625          | 6.369          | 4.335            |
| Bicarbonate + Carbonate                                        | 77.835        | 71.945        | 76.612         | 73.027         | 76.200         | 62.748           |

**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells**

Data Collected from April 1, 2010 to June 30, 2010

| Site ID                                                        | MW-70       | MW-77         | MW-72       | MW-69          | MW-100       | MW-93            |
|----------------------------------------------------------------|-------------|---------------|-------------|----------------|--------------|------------------|
| Date                                                           | 4/15/10     | 4/20/10       | 4/19/10     | 4/19/10        | 4/23/10      | 4/22/10          |
| Cations                                                        | mg/L        | meq/L         | %(meq)      | mg/L           | meq/L        | %(meq)           |
| Calcium                                                        | 40.1 2      | 15.3 0.76347  | 45.1 39.6   | 23.4 1.16766   | 23.7 1.18263 | 30.0 1.49701     |
| Magnesium                                                      | 24.3 2      | 8.2 0.67147   | 39.6 39.6   | 11.6 0.95454   | 15.3 1.259   | 16.6 1.36597     |
| Potassium                                                      | 39.1 1      | 1.3 0.03223   | 1.9 1.9     | 1.5 0.03709    | 1.9 0.04911  | 1.7 1.4 0.03555  |
| Sodium                                                         | 23.0 1      | 5.2 0.22445   | 13.3 13.3   | 7.1 0.3084     | 9.1 0.39365  | 8.4 0.36668      |
| Iron                                                           | 55.8 2      | 0.01 0.00036  | 0.0 0.0     | 0.01 0.00036   | 0.0 0.0      | 0.01 0.00036     |
| Manganese                                                      | 54.9 2      | 0.03 0.0011   | 0.1 0.1     | 0.16 0.00597   | 0.17 0.00633 | 0.2 0.28 0.01001 |
| Ammonia-N                                                      | 14.0 1      | 0.01 0.00071  | 0.0 0.0     | 0.01 0.00086   | 0.01 0.00071 | 0.0 0.04 0.00321 |
| <b>Total Cations (meq/L)</b>                                   | <b>1.7</b>  | <b>2.7</b>    | <b>2.6</b>  | <b>2.5</b>     | <b>3.0</b>   | <b>3.3</b>       |
| Anions                                                         |             |               |             |                |              |                  |
| Alkalinity, Total                                              | 71          | 130           | 110         | 116            | 122          | 99               |
| Carbonate                                                      | 60.0 2      | 4E-09 1.4E-10 | 0.0 0.0     | 7E-09 2.3E-10  | 0.0 0.0      | 6E-09 2E-10      |
| Bicarbonate                                                    | 61.0 1      | 86.99 1.42578 | 74.8 74.8   | 141.52 2.31965 | 84.2 84.2    | 120.41 1.9737    |
| Chloride                                                       | 35.5 1      | 3.7 0.10549   | 5.5 5.5     | 4.1 0.11508    | 3.3 0.09252  | 3.0 0.08547      |
| Nitrate-N                                                      | 14.0 1      | 0.05 0.00368  | 0.2 0.2     | 0.01 0.00071   | 0.0 0.0      | 0.01 0.00071     |
| Sulfate                                                        | 96.1 2      | 17.8 0.37061  | 19.4 19.4   | 15.3 0.31856   | 20.9 0.43516 | 70.1 1.45954     |
| <b>Total Anions (meq/L)</b>                                    | <b>1.9</b>  | <b>3.1</b>    | <b>2.9</b>  | <b>2.8</b>     | <b>3.0</b>   | <b>3.5</b>       |
| <b>Total Ions (meq/L)</b>                                      | <b>3.6</b>  | <b>5.8</b>    | <b>5.4</b>  | <b>5.2</b>     | <b>5.9</b>   | <b>6.8</b>       |
| <b>Cation/Anion Ratio</b>                                      | <b>0.89</b> | <b>0.89</b>   | <b>0.90</b> | <b>0.90</b>    | <b>1.00</b>  | <b>0.93</b>      |
| <b>Percent Difference</b>                                      | <b>-5.9</b> | <b>-6.0</b>   | <b>-5.3</b> | <b>-5.3</b>    | <b>-0.1</b>  | <b>-3.5</b>      |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |               |             |                |              |                  |
| sum (Ca, Mg, Na+K)                                             | 1.69        | 2.70          | 2.56        | 2.47           | 2.88         | 3.27             |
| Calcium                                                        | 45.13       | 44.32         | 43.06       | 47.32          | 41.00        | 45.85            |
| Magnesium                                                      | 39.69       | 41.11         | 44.33       | 38.68          | 43.65        | 41.83            |
| Sodium + Potassium                                             | 15.17       | 14.56         | 12.61       | 14.00          | 15.35        | 12.32            |
|                                                                | 100.0       | 100.0         |             |                |              |                  |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.90        | 2.97          | 2.86        | 2.75           | 2.97         | 3.52             |
| Sulfate                                                        | 19.486      | 8.059         | 18.797      | 11.570         | 14.665       | 41.479           |
| Chloride                                                       | 5.547       | 4.443         | 4.234       | 4.180          | 3.118        | 2.429            |
| Bicarbonate + Carbonate                                        | 74.967      | 87.498        | 76.969      | 84.250         | 82.217       | 56.092           |

**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells**

Data Collected from April 1, 2010 to June 30, 2010

| Site ID                                                        | MW-95       | MW-84       | MW-81       | MW-21       | MW-73       | MW-99       |
|----------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Date                                                           | 4/22/10     | 4/20/10     | 4/23/10     | 4/2/10      | 4/21/10     | 4/13/10     |
| Cations                                                        | mg/L        | mg/L        | mg/L        | mg/L        | mg/L        | mg/L        |
| Calcium                                                        | 18.0        | 10.3        | 10.2        | 9.5         | 12.2        | 7.8         |
| Magnesium                                                      | 10.4        | 8.5         | 6.0         | 5.5         | 6.7         | 4.2         |
| Potassium                                                      | 1.1         | 0.9         | 0.7         | 1.1         | 0.7         | 0.8         |
| Sodium                                                         | 5.9         | 5.7         | 5.7         | 4.7         | 5.6         | 9.0         |
| Iron                                                           | 0.01        | 0.01        | 0.01        | 2.04        | 0.01        | 0.03        |
| Manganese                                                      | 0.12        | 0.01        | 0.00        | 0.07        | 0.00        | 0.05        |
| Ammonia-N                                                      | 0.02        | 0.01        | 0.01        | 0.01        | 0.01        | 0.03        |
| <b>Total Cations (meq/L)</b>                                   | <b>2.0</b>  | <b>1.5</b>  | <b>1.3</b>  | <b>1.2</b>  | <b>1.4</b>  | <b>1.1</b>  |
| Anions                                                         | mg/L        | mg/L        | mg/L        | mg/L        | mg/L        | mg/L        |
| Alkalinity, Total                                              | 83          | 58          | 47          | 53          | 55          | 51          |
| Carbonate                                                      | 5E-09       | 3E-09       | 3E-09       | 0.1085      | 3E-09       | 3E-09       |
| Bicarbonate                                                    | 101.50      | 70.15       | 57.71       | 64.93       | 66.86       | 62.10       |
| Chloride                                                       | 5.8         | 3.6         | 3.1         | 2.9         | 3.9         | 3.1         |
| Nitrate-N                                                      | 0.01        | 0.52        | 1.55        | 0.01        | 1.85        | 0.03        |
| Sulfate                                                        | 16.4        | 13.5        | 9.1         | 5.4         | 9.8         | 7.6         |
| <b>Total Anions (meq/L)</b>                                    | <b>2.2</b>  | <b>1.6</b>  | <b>1.3</b>  | <b>1.3</b>  | <b>1.5</b>  | <b>1.3</b>  |
| <b>Total Ions (meq/L)</b>                                      | <b>4.2</b>  | <b>3.1</b>  | <b>2.6</b>  | <b>2.5</b>  | <b>3.0</b>  | <b>2.4</b>  |
| <b>Cation/Anion Ratio</b>                                      | <b>0.94</b> | <b>0.95</b> | <b>0.95</b> | <b>0.97</b> | <b>0.92</b> | <b>0.91</b> |
| <b>Percent Difference</b>                                      | <b>-2.9</b> | <b>-2.8</b> | <b>-2.5</b> | <b>-1.3</b> | <b>-4.0</b> | <b>-4.8</b> |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |             |             |             |             |             |
| sum (Ca, Mg, Na+K)                                             | 2.04        | 1.48        | 1.27        | 1.15        | 1.42        | 1.14        |
| Calcium                                                        | 44.02       | 34.67       | 40.16       | 41.16       | 42.85       | 34.14       |
| Magnesium                                                      | 41.94       | 47.01       | 38.96       | 38.97       | 38.57       | 29.84       |
| Sodium + Potassium                                             | 14.04       | 18.33       | 20.88       | 19.87       | 18.58       | 36.02       |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.17        | 1.53        | 1.22        | 1.26        | 1.41        | 1.26        |
| Sulfate                                                        | 15.742      | 18.335      | 15.499      | 8.867       | 14.432      | 12.446      |
| Chloride                                                       | 7.555       | 6.661       | 7.130       | 6.443       | 7.824       | 6.968       |
| Bicarbonate + Carbonate                                        | 76.703      | 75.004      | 77.372      | 84.690      | 77.744      | 80.587      |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells

Data Collected from April 1, 2010 to June 30, 2010

| Site ID                                                        | MW-66       | MW-67          | MW-80         | MW-68          | MW-74          |
|----------------------------------------------------------------|-------------|----------------|---------------|----------------|----------------|
| Date                                                           | 4/8/10      | 4/16/10        | 4/20/10       | 4/21/10        | 4/12/10        |
| Cations                                                        |             |                |               |                |                |
| Calcium                                                        | 40.1 2      | 21.8 1.08782   | 21.7 1.08283  | 28.3 1.41218   | 32.4 1.61677   |
| Magnesium                                                      | 24.3 2      | 12.9 1.06151   | 12.0 0.98745  | 17.0 1.39889   | 25.3 2.08188   |
| Potassium                                                      | 39.1 1      | 1.3 0.03299    | 1.3 0.03427   | 1.6 0.0399     | 2.0 0.05039    |
| Sodium                                                         | 23.0 1      | 7.5 0.32449    | 6.6 0.28752   | 8.4 0.36321    | 10.2 0.44368   |
| Iron                                                           | 55.8 2      | 0.0 0.00133    | 0.0 0.00036   | 0.0 0.00036    | 2.1 0.07628    |
| Manganese                                                      | 54.9 2      | 0.0 3.6E-05    | 0.2 0.0083    | 0.3 0.01088    | 0.1 0.00473    |
| Ammonia-N                                                      | 14.0 1      | 0.0 0.00071    | 0.0 0.00071   | 0.0 0.00114    | 0.0 0.00071    |
| <b>Total Cations (meq/L)</b>                                   | <b>2.6</b>  | <b>2.5</b>     | <b>2.4</b>    | <b>3.2</b>     | <b>4.3</b>     |
| Anions                                                         |             |                |               |                |                |
| Alkalinity, Total                                              | 107         | 99.9           | 78.6          | 154            | 164            |
| Carbonate                                                      | 60.0 2      | 6E-09 2E-10    | 5E-09 1.6E-10 | 9E-09 3.1E-10  | 1E-08 3.3E-10  |
| Bicarbonate                                                    | 61.0 1      | 130.54 2.13968 | 95.89 1.57176 | 187.88 3.07954 | 200.08 3.27951 |
| Chloride                                                       | 35.5 1      | 9.0 0.25499    | 4.7 0.13511   | 3.4 0.09449    | 32.4 0.91389   |
| Nitrate-N                                                      | 14.0 1      | 0.5 0.03313    | 1.2 0.04384   | 0.0 0.00071    | 0.0 0.00071    |
| Sulfate                                                        | 96.1 2      | 11.6 0.24152   | 34.7 0.72248  | 15.3 0.31856   | 26.1 0.54342   |
| <b>Total Anions (meq/L)</b>                                    | <b>2.7</b>  | <b>2.9</b>     | <b>2.6</b>    | <b>3.5</b>     | <b>4.7</b>     |
| <b>Total Ions (meq/L)</b>                                      | <b>5.2</b>  | <b>5.4</b>     | <b>5.0</b>    | <b>6.7</b>     | <b>9.0</b>     |
| <b>Cation/Anion Ratio</b>                                      | <b>0.96</b> | <b>0.87</b>    | <b>0.93</b>   | <b>0.92</b>    | <b>0.90</b>    |
| <b>Percent Difference</b>                                      | <b>-2.2</b> | <b>-7.2</b>    | <b>-3.8</b>   | <b>-4.0</b>    | <b>-5.1</b>    |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |                |               |                |                |
| sum (Ca, Mg, Na+K)                                             | 2.56        | 2.51           | 2.39          | 3.21           | 4.19           |
| Calcium                                                        | 36.52       | 43.39          | 45.27         | 43.94          | 38.56          |
| Magnesium                                                      | 48.95       | 42.34          | 41.28         | 43.52          | 49.65          |
| Sodium + Potassium                                             | 14.54       | 14.26          | 13.45         | 12.54          | 11.78          |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.64        | 2.86           | 2.59          | 3.49           | 4.74           |
| Sulfate                                                        | 9.162       | 25.303         | 33.830        | 9.121          | 11.472         |
| Chloride                                                       | 9.673       | 4.732          | 5.508         | 2.705          | 19.293         |
| Bicarbonate + Carbonate                                        | 81.166      | 69.965         | 60.661        | 88.174         | 69.234         |
|                                                                |             | 100.0          | 100.0         |                |                |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells

Data Collected from April 1, 2010 to June 30, 2010

| Site ID                                                        | MW-75            | MW-87            | MW-85            | MW-86            | MW-88            |
|----------------------------------------------------------------|------------------|------------------|------------------|------------------|------------------|
| Date                                                           | 4/13/10          | 4/12/10          | 4/19/10          | 4/19/10          | 4/9/10           |
| Cations                                                        |                  |                  |                  |                  |                  |
| Calcium                                                        | mg/L<br>20.1     | mg/L<br>28.6     | mg/L<br>19.3     | mg/L<br>13.0     | mg/L<br>8.2      |
|                                                                | meq/L<br>1.00299 | meq/L<br>1.42715 | meq/L<br>0.96307 | meq/L<br>0.6487  | meq/L<br>0.41118 |
|                                                                | %(meq)<br>36.7   | %(meq)<br>38.1   | %(meq)<br>40.5   | %(meq)<br>37.1   | %(meq)<br>34.3   |
| Magnesium                                                      | mg/L<br>15.8     | mg/L<br>21.7     | mg/L<br>12.9     | mg/L<br>9.6      | mg/L<br>6.5      |
|                                                                | meq/L<br>1.30014 | meq/L<br>1.78564 | meq/L<br>1.06151 | meq/L<br>0.78914 | meq/L<br>0.53322 |
|                                                                | %(meq)<br>47.5   | %(meq)<br>47.6   | %(meq)<br>44.6   | %(meq)<br>45.2   | %(meq)<br>44.4   |
| Potassium                                                      | mg/L<br>1.6      | mg/L<br>1.9      | mg/L<br>1.3      | mg/L<br>1.2      | mg/L<br>0.8      |
|                                                                | meq/L<br>0.03964 | meq/L<br>0.04885 | meq/L<br>0.03274 | meq/L<br>0.02992 | meq/L<br>0.02054 |
|                                                                | %(meq)<br>1.4    | %(meq)<br>1.3    | %(meq)<br>1.4    | %(meq)<br>1.7    | %(meq)<br>1.7    |
| Sodium                                                         | mg/L<br>7.7      | mg/L<br>8.7      | mg/L<br>7.4      | mg/L<br>6.4      | mg/L<br>5.4      |
|                                                                | meq/L<br>0.33537 | meq/L<br>0.3793  | meq/L<br>0.32014 | meq/L<br>0.27708 | meq/L<br>0.23445 |
|                                                                | %(meq)<br>12.3   | %(meq)<br>10.1   | %(meq)<br>13.5   | %(meq)<br>15.9   | %(meq)<br>19.5   |
| Iron                                                           | mg/L<br>1.5      | mg/L<br>2.8      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      |
|                                                                | meq/L<br>0.05193 | meq/L<br>0.0992  | meq/L<br>0.00036 | meq/L<br>0.00036 | meq/L<br>0.00036 |
|                                                                | %(meq)<br>1.9    | %(meq)<br>2.6    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    |
| Manganese                                                      | mg/L<br>0.1      | mg/L<br>0.3      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      |
|                                                                | meq/L<br>0.00419 | meq/L<br>0.00976 | meq/L<br>3.6E-05 | meq/L<br>0.00087 | meq/L<br>3.6E-05 |
|                                                                | %(meq)<br>0.2    | %(meq)<br>0.3    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    |
| Ammonia-N                                                      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      |
|                                                                | meq/L<br>0.00071 | meq/L<br>0.00079 | meq/L<br>0.00071 | meq/L<br>0.00071 | meq/L<br>0.00071 |
|                                                                | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.1    |
| <b>Total Cations (meq/L)</b>                                   | <b>2.7</b>       | <b>3.8</b>       | <b>2.4</b>       | <b>1.7</b>       | <b>1.2</b>       |
| Anions                                                         |                  |                  |                  |                  |                  |
| Alkalinity, Total                                              | mg/L<br>94.6     | mg/L<br>89.8     | mg/L<br>86.1     | mg/L<br>65.4     | mg/L<br>52.4     |
| Carbonate                                                      | mg/L<br>6E-09    | mg/L<br>5E-09    | mg/L<br>5E-09    | mg/L<br>4E-09    | mg/L<br>3E-09    |
|                                                                | meq/L<br>1.9E-10 | meq/L<br>1.8E-10 | meq/L<br>1.7E-10 | meq/L<br>1.3E-10 | meq/L<br>1.1E-10 |
|                                                                | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    |
| Bicarbonate                                                    | mg/L<br>115.41   | mg/L<br>109.56   | mg/L<br>105.04   | mg/L<br>79.79    | mg/L<br>63.93    |
|                                                                | meq/L<br>1.89171 | meq/L<br>1.79573 | meq/L<br>1.72174 | meq/L<br>1.3078  | meq/L<br>1.04784 |
|                                                                | %(meq)<br>63.0   | %(meq)<br>43.7   | %(meq)<br>68.2   | %(meq)<br>71.4   | %(meq)<br>81.2   |
| Chloride                                                       | mg/L<br>8.0      | mg/L<br>4.4      | mg/L<br>6.3      | mg/L<br>4.4      | mg/L<br>2.6      |
|                                                                | meq/L<br>0.2265  | meq/L<br>0.12383 | meq/L<br>0.17855 | meq/L<br>0.12326 | meq/L<br>0.07221 |
|                                                                | %(meq)<br>7.5    | %(meq)<br>3.0    | %(meq)<br>7.1    | %(meq)<br>6.7    | %(meq)<br>5.6    |
| Nitrate-N                                                      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.1      | mg/L<br>0.5      |
|                                                                | meq/L<br>0.00071 | meq/L<br>0.00071 | meq/L<br>0.00071 | meq/L<br>0.00458 | meq/L<br>0.03448 |
|                                                                | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.3    | %(meq)<br>2.7    |
| Sulfate                                                        | mg/L<br>42.4     | mg/L<br>105.0    | mg/L<br>30.0     | mg/L<br>19.0     | mg/L<br>6.6      |
|                                                                | meq/L<br>0.8828  | meq/L<br>2.18619 | meq/L<br>0.62463 | meq/L<br>0.3956  | meq/L<br>0.13658 |
|                                                                | %(meq)<br>29.4   | %(meq)<br>53.2   | %(meq)<br>24.7   | %(meq)<br>21.6   | %(meq)<br>10.6   |
| <b>Total Anions (meq/L)</b>                                    | <b>3.0</b>       | <b>4.1</b>       | <b>2.5</b>       | <b>1.8</b>       | <b>1.3</b>       |
| <b>Total Ions (meq/L)</b>                                      | <b>5.7</b>       | <b>7.9</b>       | <b>4.9</b>       | <b>3.6</b>       | <b>2.5</b>       |
| <b>Cation/Anion Ratio</b>                                      | <b>0.91</b>      | <b>0.91</b>      | <b>0.94</b>      | <b>0.95</b>      | <b>0.93</b>      |
| <b>Percent Difference</b>                                      | <b>-4.6</b>      | <b>-4.5</b>      | <b>-3.0</b>      | <b>-2</b>        | <b>-3.6</b>      |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                  |                  |                  |                  |                  |
| sum (Ca, Mg, Na+K)                                             | 2.68             | 3.64             | 2.38             | 1.74             | 1.20             |
| Calcium                                                        | 37.45            | 39.20            | 40.51            | 37.18            | 34.28            |
| Magnesium                                                      | 48.55            | 49.04            | 44.65            | 45.23            | 44.46            |
| Sodium + Potassium                                             | 14.00            | 11.76            | 14.84            | 17.59            | 21.26            |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 3.00             | 4.11             | 2.52             | 1.83             | 1.26             |
| Sulfate                                                        | 29.417           | 53.247           | 24.738           | 21.657           | 10.869           |
| Chloride                                                       | 7.547            | 3.016            | 7.071            | 6.748            | 5.746            |
| Bicarbonate + Carbonate                                        | 63.036           | 43.737           | 68.190           | 71.595           | 83.385           |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells

Data Collected from April 1, 2010 to June 30, 2010

| Site ID                                                        | MW-89                     | MW-90              | MW-91              | MW-43              |
|----------------------------------------------------------------|---------------------------|--------------------|--------------------|--------------------|
| Date                                                           | 4/9/10                    | 4/8/10             | 4/19/10            | 4/8/10             |
| Cations                                                        | mg/L meq/L % (meq)        | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) |
| Calcium                                                        | 40.1 2 13.2 0.65868 34.7  | 16.1 0.80339 41.3  | 17.8 0.88822 39.3  | 12.5 0.62375 36.5  |
| Magnesium                                                      | 24.3 2 9.7 0.79901 42.0   | 9.6 0.78914 40.6   | 12.5 1.02859 45.5  | 9.0 0.73977 43.3   |
| Potassium                                                      | 39.1 1 1.4 0.03632 1.9    | 1.3 0.03299 1.7    | 1.5 0.0376 1.7     | 1.3 0.03351 2.0    |
| Sodium                                                         | 23.0 1 8.5 0.36755 19.3   | 6.1 0.26577 13.7   | 6.9 0.29839 13.2   | 6.1 0.26664 15.6   |
| Iron                                                           | 55.8 2 0.8 0.02718 1.4    | 1.2 0.04154 2.1    | 0.0 0.00036 0.0    | 1.0 0.03545 2.1    |
| Manganese                                                      | 54.9 2 0.3 0.01041 0.5    | 0.3 0.00921 0.5    | 0.2 0.00739 0.3    | 0.2 0.00764 0.4    |
| Ammonia-N                                                      | 14.0 1 0.0 0.00151 0.1    | 0.0 0.00129 0.1    | 0.0 0.00086 0.0    | 0.0 0.00143 0.1    |
| <b>Total Cations (meq/L)</b>                                   | <b>1.9</b>                | <b>1.9</b>         | <b>2.3</b>         | <b>1.7</b>         |
| Anions                                                         |                           |                    |                    |                    |
| Alkalinity, Total                                              | 77.8                      | 69.7               | 80.2               | 71                 |
| Carbonate                                                      | 60.0 2 5E-09 1.6E-10 0.0  | 4E-09 1.4E-10 0.0  | 5E-09 1.6E-10 0.0  | 4E-09 1.4E-10 0.0  |
| Bicarbonate                                                    | 61.0 1 94.92 1.55577 77.5 | 85.03 1.39379 67.5 | 97.84 1.60376 63.7 | 86.62 1.41979 80.1 |
| Chloride                                                       | 35.5 1 3.3 0.09223 4.6    | 3.7 0.10436 5.1    | 7.5 0.21042 8.4    | 2.7 0.07729 4.4    |
| Nitrate-N                                                      | 14.0 1 0.0 0.00071 0.0    | 0.0 0.00071 0.0    | 0.0 0.00143 0.1    | 0.0 0.00071 0.0    |
| Sulfate                                                        | 96.1 2 17.2 0.35812 17.8  | 27.2 0.56633 27.4  | 33.7 0.70166 27.9  | 13.2 0.27484 15.5  |
| <b>Total Anions (meq/L)</b>                                    | <b>2.0</b>                | <b>2.1</b>         | <b>2.5</b>         | <b>1.8</b>         |
| <b>Total Ions (meq/L)</b>                                      | <b>3.9</b>                | <b>4.0</b>         | <b>4.8</b>         | <b>3.5</b>         |
| <b>Cation/Anion Ratio</b>                                      | <b>0.95</b>               | <b>0.94</b>        | <b>0.90</b>        | <b>0.96</b>        |
| <b>Percent Difference</b>                                      | <b>-2.7</b>               | <b>-3.0</b>        | <b>-5.4</b>        | <b>-1.9</b>        |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                           |                    |                    |                    |
| sum (Ca, Mg, Na+K)                                             | 1.86                      | 1.89               | 2.25               | 1.66               |
| Calcium                                                        | 35.38                     | 42.48              | 39.43              | 37.49              |
| Magnesium                                                      | 42.92                     | 41.72              | 45.66              | 44.47              |
| Sodium + Potassium                                             | 21.70                     | 15.80              | 14.91              | 18.04              |
|                                                                |                           | 100.0              | 100.0              | 100.0              |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.01                      | 2.06               | 2.52               | 1.77               |
| Sulfate                                                        | 17.851                    | 27.432             | 27.890             | 15.511             |
| Chloride                                                       | 4.598                     | 5.055              | 8.364              | 4.362              |
| Bicarbonate + Carbonate                                        | 77.551                    | 67.513             | 63.746             | 80.128             |
|                                                                |                           | 100.0              | 100.0              | 100.0              |



**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells**

Data Collected from July 1, 2010 to September 30, 2010

| Site ID                                                        | MW-56       | MW-57          | MW-76       | MW-83          | MW-60       | MW-94          |
|----------------------------------------------------------------|-------------|----------------|-------------|----------------|-------------|----------------|
| Date                                                           | 7/7/10      | 7/7/10         | 7/20/10     | 7/22/10        | 7/20/10     | 8/18/10        |
| Cations                                                        | mg/L        | meq/L          | %(meq)      | mg/L           | meq/L       | %(meq)         |
| Calcium                                                        | 40.1 2      | 16.8 0.83832   | 54.7        | 17.1 0.85329   | 44.9        | 12.8 0.63872   |
| Magnesium                                                      | 24.3 2      | 5.5 0.45505    | 29.7        | 8.9 0.72825    | 38.3        | 5.3 0.43612    |
| Potassium                                                      | 39.1 1      | 1.0 0.02583    | 1.7         | 1.6 0.04143    | 2.2         | 1.3 0.03351    |
| Sodium                                                         | 23.0 1      | 4.8 0.20792    | 13.6        | 6.4 0.27664    | 14.6        | 4.8 0.20966    |
| Iron                                                           | 55.8 2      | 0.02 0.00082   | 0.1         | 0.01 0.00036   | 0.0         | 0.01 0.00043   |
| Manganese                                                      | 54.9 2      | 0.07 0.00256   | 0.2         | 0.01 0.00021   | 0.0         | 0.00 0.00011   |
| Ammonia-N                                                      | 14.0 1      | 0.01 0.00071   | 0.0         | 0.01 0.00071   | 0.0         | 0.01 0.00071   |
| <b>Total Cations (meq/L)</b>                                   | <b>1.5</b>  | <b>2.1</b>     | <b>1.4</b>  | <b>1.9</b>     | <b>2.1</b>  | <b>1.3</b>     |
| Anions                                                         |             |                |             |                |             |                |
| Alkalinity, Total                                              | 51          | 78             | 45          | 68             | 92          | 49             |
| Carbonate                                                      | 60.0 2      | 0.0236 0.00079 | 0.1         | 0.0466 0.00155 | 0.1         | 0.0915 0.00305 |
| Bicarbonate                                                    | 61.0 1      | 61.68 1.01106  | 67.6        | 82.38 1.35024  | 70.3        | 60.08 0.9848   |
| Chloride                                                       | 35.5 1      | 3.9 0.10916    | 5.4         | 5.0 0.1416     | 7.4         | 3.2 0.08885    |
| Nitrate-N                                                      | 14.0 1      | 0.74 0.0529    | 3.5         | 0.06 0.00398   | 0.2         | 0.82 0.05883   |
| Sulfate                                                        | 96.1 2      | 15.4 0.32064   | 21.5        | 20.3 0.42266   | 22.0        | 11.1 0.23111   |
| <b>Total Anions (meq/L)</b>                                    | <b>1.5</b>  | <b>2.0</b>     | <b>1.4</b>  | <b>1.9</b>     | <b>2.2</b>  | <b>1.4</b>     |
| <b>Total Ions (meq/L)</b>                                      | <b>3.0</b>  | <b>4.1</b>     | <b>2.8</b>  | <b>3.8</b>     | <b>4.3</b>  | <b>2.7</b>     |
| <b>Cation/Anion Ratio</b>                                      | <b>1.02</b> | <b>1.01</b>    | <b>0.97</b> | <b>0.99</b>    | <b>0.98</b> | <b>0.97</b>    |
| <b>Percent Difference</b>                                      | <b>1.2</b>  | <b>0.4</b>     | <b>-1.4</b> | <b>-0.5</b>    | <b>-1.1</b> | <b>-1.8</b>    |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |                |             |                |             |                |
| sum (Ca, Mg, Na+K)                                             | 1.53        | 1.76           | 1.39        | 1.90           | 2.13        | 1.32           |
| Calcium                                                        | 54.90       | 45.46          | 43.43       | 44.92          | 46.62       | 48.46          |
| Magnesium                                                      | 29.80       | 37.20          | 33.27       | 38.34          | 39.02       | 33.09          |
| Sodium + Potassium                                             | 15.31       | 17.34          | 23.30       | 16.74          | 14.36       | 18.45          |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.44        | 2.04           | 1.37        | 1.92           | 2.07        | 1.31           |
| Sulfate                                                        | 22.241      | 17.598         | 27.796      | 22.059         | 7.434       | 17.672         |
| Chloride                                                       | 7.572       | 5.364          | 6.996       | 7.390          | 3.562       | 6.794          |
| Bicarbonate + Carbonate                                        | 70.187      | 77.038         | 65.208      | 70.551         | 89.005      | 75.535         |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells

Data Collected from July 1, 2010 to September 30, 2010

| Site ID                                                        | MW-82                     | MW-65              | MW-58A             | MW-59              | MW-24              | MW-64               |
|----------------------------------------------------------------|---------------------------|--------------------|--------------------|--------------------|--------------------|---------------------|
| Date                                                           | 7/27/10                   | 7/26/10            | 7/6/10             | 7/2/10             | 7/13/10            | 7/20/10             |
| Cations                                                        | mg/L meq/L % (meq)        | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq)  |
| Calcium                                                        | 40.1 2 15.9 0.79341 42.5  | 10.7 0.53393 36.7  | 17.2 0.85828 45.8  | 13.7 0.68363 38.5  | 15.2 0.75848 38.4  | 17.8 0.88822 39.0   |
| Magnesium                                                      | 24.3 2 9.3 0.76857 41.2   | 6.2 0.51183 35.2   | 8.6 0.7052 37.6    | 8.2 0.6764 38.1    | 9.7 0.79572 40.3   | 12.3 1.01214 44.5   |
| Potassium                                                      | 39.1 1 1.5 0.03734 2.0    | 0.9 0.0231 1.6     | 1.1 0.02711 1.4    | 1.1 0.02762 1.6    | 0.9 0.02348 1.2    | 1.5 0.03734 1.6     |
| Sodium                                                         | 23.0 1 6.1 0.26534 14.2   | 5.4 0.23402 16.1   | 5.3 0.23184 12.4   | 5.4 0.23445 13.2   | 5.7 0.24576 12.5   | 6.9 0.29926 13.1    |
| Iron                                                           | 55.8 2 0.01 0.00036 0.0   | 3.99 0.14289 9.8   | 0.95 0.03406 1.8   | 4.11 0.14719 8.3   | 3.92 0.14038 7.1   | 0.72 0.02571 1.1    |
| Manganese                                                      | 54.9 2 0.00 3.6E-05 0.0   | 0.19 0.00699 0.5   | 0.34 0.01234 0.7   | 0.10 0.00375 0.2   | 0.17 0.00608 0.3   | 0.23 0.00834 0.4    |
| Ammonia-N                                                      | 14.0 1 0.01 0.00071 0.0   | 0.01 0.00071 0.0   | 0.07 0.00508 0.3   | 0.01 0.00071 0.0   | 0.04 0.00295 0.1   | 0.08 0.00596 0.3    |
| <b>Total Cations (meq/L)</b>                                   | <b>1.9</b>                | <b>1.5</b>         | <b>1.9</b>         | <b>1.8</b>         | <b>2.0</b>         | <b>2.3</b>          |
| Anions                                                         |                           |                    |                    |                    |                    |                     |
| Alkalinity, Total                                              | 80                        | 53                 | 75                 | 63                 | 75                 | 87                  |
| Carbonate                                                      | 60.0 2 0.0253 0.00084 0.0 | 0.022 0.00073 0.1  | 0.0873 0.00291 0.2 | 0.0266 0.00089 0.1 | 0.0321 0.00107 0.1 | 0.0128 0.00043 0.0  |
| Bicarbonate                                                    | 61.0 1 97.79 1.60291 76.0 | 64.49 1.05711 72.5 | 90.83 1.48887 77.3 | 76.20 1.24893 73.0 | 91.92 1.5067 75.8  | 105.63 1.73131 75.9 |
| Chloride                                                       | 35.5 1 4.8 0.13483 6.4    | 3.7 0.1038 7.1     | 3.6 0.10267 5.3    | 3.8 0.10718 6.3    | 4.5 0.1258 6.3     | 3.3 0.09167 4.0     |
| Nitrate-N                                                      | 14.0 1 0.94 0.0669 3.2    | 0.01 0.00071 0.0   | 0.02 0.00107 0.1   | 0.01 0.00071 0.0   | 0.01 0.00071 0.0   | 0.01 0.001 0.0      |
| Sulfate                                                        | 96.1 2 14.6 0.30398 14.4  | 14.2 0.29566 20.3  | 15.9 0.33105 17.2  | 17.0 0.35395 20.7  | 17.0 0.35395 17.8  | 22.0 0.45806 20.1   |
| <b>Total Anions (meq/L)</b>                                    | <b>2.1</b>                | <b>1.5</b>         | <b>1.9</b>         | <b>1.7</b>         | <b>2.0</b>         | <b>2.3</b>          |
| <b>Total Ions (meq/L)</b>                                      | <b>4.0</b>                | <b>2.9</b>         | <b>3.8</b>         | <b>3.5</b>         | <b>4.0</b>         | <b>4.6</b>          |
| <b>Cation/Anion Ratio</b>                                      | <b>0.88</b>               | <b>1.00</b>        | <b>0.97</b>        | <b>1.04</b>        | <b>0.99</b>        | <b>1.00</b>         |
| <b>Percent Difference</b>                                      | <b>-6.1</b>               | <b>-0.2</b>        | <b>-1.4</b>        | <b>1.8</b>         | <b>-0.4</b>        | <b>-0.1</b>         |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                           |                    |                    |                    |                    |                     |
| sum (Ca, Mg, Na+K)                                             | 1.86                      | 1.30               | 1.82               | 1.62               | 1.82               | 2.24                |
| Calcium                                                        | 42.55                     | 40.98              | 47.10              | 42.14              | 41.60              | 39.71               |
| Magnesium                                                      | 41.22                     | 39.28              | 38.70              | 41.70              | 43.64              | 45.25               |
| Sodium + Potassium                                             | 16.23                     | 19.73              | 14.21              | 16.16              | 14.77              | 15.05               |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.04                      | 1.46               | 1.93               | 1.71               | 1.99               | 2.28                |
| Sulfate                                                        | 14.882                    | 20.288             | 17.193             | 20.688             | 17.809             | 20.077              |
| Chloride                                                       | 6.601                     | 7.123              | 5.332              | 6.265              | 6.329              | 4.018               |
| Bicarbonate + Carbonate                                        | 78.517                    | 72.589             | 77.475             | 73.048             | 75.862             | 75.905              |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells

Data Collected from July 1, 2010 to September 30, 2010

| Site ID                                                        | MW-70       | MW-77          | MW-78       | MW-72          | MW-69       | MW-100         |
|----------------------------------------------------------------|-------------|----------------|-------------|----------------|-------------|----------------|
| Date                                                           | 7/19/10     | 7/19/10        | 7/27/10     | 7/30/10        | 7/26/10     | 7/26/10        |
| Cations                                                        | mg/L        | meq/L          | %(meq)      | mg/L           | meq/L       | %(meq)         |
| Calcium                                                        | 40.1 2      | 17.0 0.8483    | 44.1        | 26.2 1.30739   | 43.4        | 26.2 1.30739   |
| Magnesium                                                      | 24.3 2      | 9.5 0.77844    | 40.5        | 15.3 1.259     | 41.8        | 15.3 1.259     |
| Potassium                                                      | 39.1 1      | 1.4 0.03606    | 1.9         | 1.6 0.0399     | 1.3         | 1.6 0.0399     |
| Sodium                                                         | 23.0 1      | 5.9 0.25794    | 13.4        | 9.2 0.40105    | 13.3        | 9.2 0.40105    |
| Iron                                                           | 55.8 2      | 0.01 0.00036   | 0.0         | 0.01 0.00036   | 0.0         | 0.01 0.00036   |
| Manganese                                                      | 54.9 2      | 0.03 0.00119   | 0.1         | 0.02 0.0009    | 0.0         | 0.03 0.00119   |
| Ammonia-N                                                      | 14.0 1      | 0.02 0.00129   | 0.1         | 0.01 0.00071   | 0.0         | 0.02 0.00129   |
| <b>Total Cations (meq/L)</b>                                   | <b>1.9</b>  | <b>3.0</b>     | <b>1.6</b>  | <b>2.4</b>     | <b>2.8</b>  | <b>3.0</b>     |
| Anions                                                         | mg/L        | meq/L          | %(meq)      | mg/L           | meq/L       | %(meq)         |
| Alkalinity, Total                                              | 74          | 129            | 69          | 112            | 118         | 120            |
| Carbonate                                                      | 60.0 2      | 0.0861 0.00287 | 0.1         | 0.0562 0.00187 | 0.1         | 0.0562 0.00187 |
| Bicarbonate                                                    | 61.0 1      | 89.62 1.46891  | 74.7        | 157.27 2.57774 | 85.0        | 157.27 2.57774 |
| Chloride                                                       | 35.5 1      | 3.7 0.10521    | 5.3         | 4.6 0.13088    | 4.3         | 4.6 0.13088    |
| Nitrate-N                                                      | 14.0 1      | 0.04 0.00257   | 0.1         | 1.11 0.07925   | 2.6         | 1.11 0.07925   |
| Sulfate                                                        | 96.1 2      | 18.6 0.38727   | 19.7        | 11.6 0.24152   | 8.0         | 11.6 0.24152   |
| <b>Total Anions (meq/L)</b>                                    | <b>2.0</b>  | <b>3.0</b>     | <b>1.8</b>  | <b>2.9</b>     | <b>2.8</b>  | <b>2.9</b>     |
| <b>Total Ions (meq/L)</b>                                      | <b>3.9</b>  | <b>6.0</b>     | <b>3.4</b>  | <b>5.3</b>     | <b>5.6</b>  | <b>5.9</b>     |
| <b>Cation/Anion Ratio</b>                                      | <b>0.98</b> | <b>0.99</b>    | <b>0.90</b> | <b>0.84</b>    | <b>1.02</b> | <b>1.04</b>    |
| <b>Percent Difference</b>                                      | <b>-1.1</b> | <b>-0.4</b>    | <b>-5.3</b> | <b>-8.8</b>    | <b>0.8</b>  | <b>1.8</b>     |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |                |             |                |             |                |
| sum (Ca, Mg, Na+K)                                             | 1.92        | 3.01           | 1.59        | 2.36           | 2.77        | 2.93           |
| Calcium                                                        | 44.17       | 43.47          | 43.90       | 42.52          | 47.26       | 41.92          |
| Magnesium                                                      | 40.53       | 41.86          | 35.11       | 43.61          | 38.97       | 42.71          |
| Sodium + Potassium                                             | 15.31       | 14.66          | 20.99       | 13.87          | 13.77       | 15.36          |
|                                                                | 100.0       | 100.0          |             |                |             |                |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.96        | 2.95           | 1.69        | 2.90           | 2.77        | 2.90           |
| Sulfate                                                        | 19.716      | 8.182          | 9.748       | 19.177         | 10.753      | 14.641         |
| Chloride                                                       | 5.356       | 4.434          | 8.464       | 3.561          | 4.024       | 2.645          |
| Bicarbonate + Carbonate                                        | 74.928      | 87.385         | 81.787      | 77.261         | 85.223      | 82.715         |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells

Data Collected from July 1, 2010 to September 30, 2010

| Site ID                                                        | MW-93       | MW-95       | MW-84       | MW-81       | MW-73       | MW-99       |
|----------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Date                                                           | 7/28/10     | 7/28/10     | 7/22/10     | 7/21/10     | 7/21/10     | 7/9/10      |
| Cations                                                        | mg/L        | meq/L       | %(meq)      | mg/L        | meq/L       | %(meq)      |
| Calcium                                                        | 30.8        | 1.53693     | 46.5        | 10.7        | 0.53393     | 41.1        |
| Magnesium                                                      | 24.3        | 2           | 16.0        | 6.0         | 0.4929      | 38.0        |
| Potassium                                                      | 39.1        | 1           | 1.5         | 0.8         | 0.01959     | 1.5         |
| Sodium                                                         | 23.0        | 1           | 9.2         | 5.8         | 0.25055     | 19.3        |
| Iron                                                           | 55.8        | 2           | 0.01        | 0.01        | 0.00036     | 0.0         |
| Manganese                                                      | 54.9        | 2           | 0.29        | 0.00        | 3.6E-05     | 0.0         |
| Ammonia-N                                                      | 14.0        | 1           | 0.09        | 0.01        | 0.00071     | 0.1         |
| <b>Total Cations (meq/L)</b>                                   | <b>3.3</b>  | <b>2.0</b>  | <b>1.5</b>  | <b>1.3</b>  | <b>1.5</b>  | <b>1.1</b>  |
| Anions                                                         |             |             |             |             |             |             |
| Alkalinity, Total                                              | 104         | 84          | 58          | 48          | 56          | 52          |
| Carbonate                                                      | 60.0        | 2           | 0.143       | 0.00477     | 0.0221      | 0.00074     |
| Bicarbonate                                                    | 61.0        | 1           | 126.59      | 2.07492     | 67.79       | 1.1111      |
| Chloride                                                       | 35.5        | 1           | 2.9         | 0.08208     | 3.6         | 0.10211     |
| Nitrate-N                                                      | 14.0        | 1           | 0.01        | 0.00071     | 2.01        | 0.1435      |
| Sulfate                                                        | 96.1        | 2           | 76.8        | 1.59904     | 10.0        | 0.20821     |
| <b>Total Anions (meq/L)</b>                                    | <b>3.8</b>  | <b>2.2</b>  | <b>1.6</b>  | <b>1.3</b>  | <b>1.6</b>  | <b>1.3</b>  |
| <b>Total Ions (meq/L)</b>                                      | <b>7.1</b>  | <b>4.1</b>  | <b>3.1</b>  | <b>2.6</b>  | <b>3.1</b>  | <b>2.4</b>  |
| <b>Cation/Anion Ratio</b>                                      | <b>0.88</b> | <b>0.91</b> | <b>0.98</b> | <b>0.96</b> | <b>0.96</b> | <b>0.83</b> |
| <b>Percent Difference</b>                                      | <b>-6.4</b> | <b>-4.8</b> | <b>-0.9</b> | <b>-1.9</b> | <b>-1.9</b> | <b>-9.4</b> |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |             |             |             |             |             |
| sum (Ca, Mg, Na+K)                                             | 3.29        | 1.95        | 1.52        | 1.30        | 1.51        | 1.06        |
| Calcium                                                        | 46.69       | 45.00       | 34.79       | 41.17       | 42.77       | 35.75       |
| Magnesium                                                      | 40.00       | 39.89       | 46.11       | 38.00       | 38.27       | 28.00       |
| Sodium + Potassium                                             | 13.31       | 15.12       | 19.10       | 20.83       | 18.96       | 36.25       |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 3.76        | 2.15        | 1.51        | 1.22        | 1.42        | 1.29        |
| Sulfate                                                        | 42.519      | 15.459      | 17.208      | 15.181      | 14.640      | 12.231      |
| Chloride                                                       | 2.183       | 6.780       | 6.770       | 6.448       | 7.180       | 6.970       |
| Bicarbonate + Carbonate                                        | 55.299      | 77.761      | 76.023      | 78.371      | 78.180      | 80.799      |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells

Data Collected from July 1, 2010 to September 30, 2010

| Site ID                                                        | MW-66            | MW-67            | MW-80            | MW-68            | MW-74            |
|----------------------------------------------------------------|------------------|------------------|------------------|------------------|------------------|
| Date                                                           | 7/21/10          | 7/19/10          | 8/2/10           | 7/27/10          | 7/12/10          |
| Cations                                                        |                  |                  |                  |                  |                  |
| Calcium                                                        | mg/L<br>20.0     | mg/L<br>25.4     | mg/L<br>27.3     | mg/L<br>27.5     | mg/L<br>39.2     |
|                                                                | meq/L<br>0.998   | meq/L<br>1.26747 | meq/L<br>1.12734 | meq/L<br>1.37226 | meq/L<br>1.95609 |
|                                                                | %(meq)<br>35.8   | %(meq)<br>42.9   | %(meq)<br>46.5   | %(meq)<br>43.3   | %(meq)<br>40.4   |
| Magnesium                                                      | mg/L<br>16.9     | mg/L<br>15.4     | mg/L<br>13.7     | mg/L<br>15.5     | mg/L<br>27.1     |
|                                                                | meq/L<br>0.998   | meq/L<br>1.26723 | meq/L<br>1.12734 | meq/L<br>1.27546 | meq/L<br>2.22999 |
|                                                                | %(meq)<br>49.9   | %(meq)<br>42.9   | %(meq)<br>38.5   | %(meq)<br>40.2   | %(meq)<br>46.1   |
| Potassium                                                      | mg/L<br>1.3      | mg/L<br>1.5      | mg/L<br>1.5      | mg/L<br>1.6      | mg/L<br>2.4      |
|                                                                | meq/L<br>0.03325 | meq/L<br>0.03913 | meq/L<br>0.03785 | meq/L<br>0.04195 | meq/L<br>0.06215 |
|                                                                | %(meq)<br>13.1   | %(meq)<br>12.6   | %(meq)<br>11.5   | %(meq)<br>11.9   | %(meq)<br>10.1   |
| Sodium                                                         | mg/L<br>8.4      | mg/L<br>8.6      | mg/L<br>7.8      | mg/L<br>8.7      | mg/L<br>11.2     |
|                                                                | meq/L<br>0.36581 | meq/L<br>0.3719  | meq/L<br>0.33798 | meq/L<br>0.37756 | meq/L<br>0.48717 |
|                                                                | %(meq)<br>13.1   | %(meq)<br>12.6   | %(meq)<br>11.5   | %(meq)<br>11.9   | %(meq)<br>10.1   |
| Iron                                                           | mg/L<br>0.0      | mg/L<br>0.1      | mg/L<br>1.4      | mg/L<br>2.6      | mg/L<br>2.7      |
|                                                                | meq/L<br>0.00036 | meq/L<br>0.00282 | meq/L<br>0.0505  | meq/L<br>0.09168 | meq/L<br>0.09705 |
|                                                                | %(meq)<br>0.0    | %(meq)<br>0.1    | %(meq)<br>0.3    | %(meq)<br>0.3    | %(meq)<br>0.1    |
| Manganese                                                      | mg/L<br>0.0      | mg/L<br>0.1      | mg/L<br>0.3      | mg/L<br>0.3      | mg/L<br>0.2      |
|                                                                | meq/L<br>3.6E-05 | meq/L<br>0.0027  | meq/L<br>0.0099  | meq/L<br>0.00968 | meq/L<br>0.00641 |
|                                                                | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.1    |
| Ammonia-N                                                      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      |
|                                                                | meq/L<br>0.00071 | meq/L<br>0.00071 | meq/L<br>0.001   | meq/L<br>0.00148 | meq/L<br>0.00071 |
|                                                                | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    |
| <b>Total Cations (meq/L)</b>                                   | <b>2.8</b>       | <b>3.0</b>       | <b>2.9</b>       | <b>3.2</b>       | <b>4.8</b>       |
| Anions                                                         |                  |                  |                  |                  |                  |
| Alkalinity, Total                                              | mg/L<br>112      | mg/L<br>103      | mg/L<br>79.9     | mg/L<br>149      | mg/L<br>166      |
| Carbonate                                                      | mg/L<br>0.0445   | mg/L<br>0.0503   | mg/L<br>0.0604   | mg/L<br>0.2144   | mg/L<br>0.0757   |
|                                                                | meq/L<br>0.00148 | meq/L<br>0.00168 | meq/L<br>0.00201 | meq/L<br>0.00715 | meq/L<br>0.00252 |
|                                                                | %(meq)<br>0.1    | %(meq)<br>0.1    | %(meq)<br>0.1    | %(meq)<br>0.2    | %(meq)<br>0.1    |
| Bicarbonate                                                    | mg/L<br>136.55   | mg/L<br>125.56   | mg/L<br>97.36    | mg/L<br>181.34   | mg/L<br>202.37   |
|                                                                | meq/L<br>2.23818 | meq/L<br>2.05801 | meq/L<br>1.59575 | meq/L<br>2.9724  | meq/L<br>3.31698 |
|                                                                | %(meq)<br>80.6   | %(meq)<br>70.2   | %(meq)<br>61.8   | %(meq)<br>88.0   | %(meq)<br>69.8   |
| Chloride                                                       | mg/L<br>8.4      | mg/L<br>4.5      | mg/L<br>4.8      | mg/L<br>2.9      | mg/L<br>30.6     |
|                                                                | meq/L<br>0.23693 | meq/L<br>0.12749 | meq/L<br>0.13595 | meq/L<br>0.08039 | meq/L<br>0.86311 |
|                                                                | %(meq)<br>8.5    | %(meq)<br>4.3    | %(meq)<br>5.3    | %(meq)<br>2.4    | %(meq)<br>18.2   |
| Nitrate-N                                                      | mg/L<br>0.5      | mg/L<br>0.6      | mg/L<br>0.0      | mg/L<br>0.0      | mg/L<br>0.0      |
|                                                                | meq/L<br>0.03734 | meq/L<br>0.04526 | meq/L<br>0.00071 | meq/L<br>0.00071 | meq/L<br>0.00086 |
|                                                                | %(meq)<br>1.3    | %(meq)<br>1.5    | %(meq)<br>0.0    | %(meq)<br>0.0    | %(meq)<br>0.0    |
| Sulfate                                                        | mg/L<br>12.7     | mg/L<br>33.6     | mg/L<br>40.8     | mg/L<br>15.2     | mg/L<br>27.3     |
|                                                                | meq/L<br>0.26442 | meq/L<br>0.69958 | meq/L<br>0.84949 | meq/L<br>0.31648 | meq/L<br>0.56841 |
|                                                                | %(meq)<br>9.5    | %(meq)<br>23.9   | %(meq)<br>32.9   | %(meq)<br>9.4    | %(meq)<br>12.0   |
| <b>Total Anions (meq/L)</b>                                    | <b>2.8</b>       | <b>2.9</b>       | <b>2.6</b>       | <b>3.4</b>       | <b>4.8</b>       |
| <b>Total Ions (meq/L)</b>                                      | <b>5.6</b>       | <b>5.9</b>       | <b>5.5</b>       | <b>6.5</b>       | <b>9.6</b>       |
| <b>Cation/Anion Ratio</b>                                      | <b>1.00</b>      | <b>1.01</b>      | <b>1.13</b>      | <b>0.94</b>      | <b>1.02</b>      |
| <b>Percent Difference</b>                                      | <b>0.2</b>       | <b>0.3</b>       | <b>6.2</b>       | <b>-3.2</b>      | <b>0.9</b>       |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                  |                  |                  |                  |                  |
| sum (Ca, Mg, Na+K)                                             | 2.79             | 2.95             | 2.87             | 3.07             | 4.74             |
| Calcium                                                        | 35.80            | 43.03            | 47.54            | 44.74            | 41.31            |
| Magnesium                                                      | 49.89            | 43.02            | 39.34            | 41.58            | 47.09            |
| Sodium + Potassium                                             | 14.32            | 13.95            | 13.12            | 13.68            | 11.60            |
|                                                                | 100.0            | 100.0            | 100.0            | 100.0            | 100.0            |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.74             | 2.89             | 2.58             | 3.38             | 4.75             |
| Sulfate                                                        | 9.647            | 24.234           | 32.885           | 9.373            | 11.964           |
| Chloride                                                       | 8.644            | 4.416            | 5.263            | 2.381            | 18.167           |
| Bicarbonate + Carbonate                                        | 81.709           | 71.349           | 61.852           | 88.246           | 69.869           |
|                                                                | 100.0            | 100.0            | 100.0            | 100.0            | 100.0            |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells

Data Collected from July 1, 2010 to September 30, 2010

| Site ID                                                        | MW-75        | MW-87          | MW-85        | MW-86        | MW-88       |
|----------------------------------------------------------------|--------------|----------------|--------------|--------------|-------------|
| Date                                                           | 7/9/10       | 7/12/10        | 7/22/10      | 7/27/10      | 7/28/10     |
| Cations                                                        |              |                |              |              |             |
| Calcium                                                        | 40.1 2       | 33.9 1.69162   | 20.5 1.02295 | 12.8 0.63872 | 8.1 0.40319 |
| Magnesium                                                      | 24.3 2       | 23.1 1.90084   | 13.3 1.09443 | 8.6 0.7052   | 5.9 0.48714 |
| Potassium                                                      | 39.1 1       | 2.3 0.05806    | 1.4 0.0353   | 1.2 0.03018  | 0.8 0.02118 |
| Sodium                                                         | 23.0 1       | 9.8 0.42802    | 7.7 0.33624  | 6.5 0.28447  | 5.7 0.24663 |
| Iron                                                           | 55.8 2       | 3.0 0.10815    | 0.0 0.00036  | 0.5 0.01758  | 0.0 0.00036 |
| Manganese                                                      | 54.9 2       | 0.3 0.0122     | 0.0 3.6E-05  | 0.0 0.00058  | 0.0 3.6E-05 |
| Ammonia-N                                                      | 14.0 1       | 0.0 0.00121    | 0.0 0.00071  | 0.0 0.00071  | 0.0 0.00071 |
| <b>Total Cations (meq/L)</b>                                   | <b>2.4</b>   | <b>4.2</b>     | <b>2.5</b>   | <b>1.7</b>   | <b>1.2</b>  |
| Anions                                                         |              |                |              |              |             |
| Alkalinity, Total                                              | 96.1         | 88.8           | 87           | 67.1         | 51.9        |
| Carbonate                                                      | 60.0 2       | 0.0378 0.00126 | 0.0 0.0415   | 0.00138      | 0.1 0.0254  |
| Bicarbonate                                                    | 61.0 1       | 108.26 1.77447 | 41.6 106.06  | 1.73835      | 68.4 81.81  |
| Chloride                                                       | 35.5 1       | 4.2 0.11762    | 2.8 6.1      | 0.17319      | 6.8 4.1     |
| Nitrate-N                                                      | 14.0 1       | 0.0 0.00071    | 0.0 0.2      | 0.01214      | 0.5 0.1     |
| Sulfate                                                        | 96.1 2       | 114.0 2.37358  | 55.6 29.6    | 0.6163       | 24.3 18.3   |
| <b>Total Anions (meq/L)</b>                                    | <b>3.1</b>   | <b>4.3</b>     | <b>2.5</b>   | <b>1.8</b>   | <b>1.3</b>  |
| <b>Total Ions (meq/L)</b>                                      | <b>5.5</b>   | <b>8.5</b>     | <b>5.0</b>   | <b>3.5</b>   | <b>2.4</b>  |
| <b>Cation/Anion Ratio</b>                                      | <b>0.79</b>  | <b>0.98</b>    | <b>0.98</b>  | <b>0.91</b>  | <b>0.91</b> |
| <b>Percent Difference</b>                                      | <b>-11.5</b> | <b>-0.8</b>    | <b>-1.0</b>  | <b>-5</b>    | <b>-5.0</b> |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |              |                |              |              |             |
| sum (Ca, Mg, Na+K)                                             | 2.39         | 4.08           | 2.49         | 1.66         | 1.16        |
| Calcium                                                        | 39.30        | 41.48          | 41.10        | 38.51        | 34.81       |
| Magnesium                                                      | 46.53        | 46.61          | 43.97        | 42.52        | 42.06       |
| Sodium + Potassium                                             | 14.17        | 11.92          | 14.93        | 18.97        | 23.12       |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 3.06         | 4.27           | 2.53         | 1.84         | 1.24        |
| Sulfate                                                        | 30.236       | 55.627         | 24.367       | 20.712       | 11.185      |
| Chloride                                                       | 7.051        | 2.757          | 6.847        | 6.348        | 5.353       |
| Bicarbonate + Carbonate                                        | 62.713       | 41.616         | 68.786       | 72.940       | 83.462      |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells

Data Collected from July 1, 2010 to September 30, 2010

| Site ID                                                        | MW-89       | MW-90                                      | MW-91                                     | MW-43                                      |
|----------------------------------------------------------------|-------------|--------------------------------------------|-------------------------------------------|--------------------------------------------|
| Date                                                           | 7/28/10     | 7/21/10                                    | 7/19/10                                   | 7/22/10                                    |
| Cations                                                        | MW          |                                            |                                           |                                            |
| Calcium                                                        | 40.1 2      | mg/L 12.5<br>meq/L 0.62375<br>% (meq) 34.0 | mg/L 16.0<br>meq/L 0.7984<br>% (meq) 40.6 | mg/L 12.7<br>meq/L 0.63373<br>% (meq) 36.2 |
| Magnesium                                                      | 24.3 2      | 9.1 0.7447 40.6                            | 9.8 0.8056 41.0                           | 9.2 0.75787 43.3                           |
| Potassium                                                      | 39.1 1      | 1.5 0.03709 2.0                            | 1.4 0.0353 1.8                            | 1.4 0.03478 2.0                            |
| Sodium                                                         | 23.0 1      | 9.0 0.39322 21.4                           | 6.4 0.27751 14.1                          | 6.4 0.27621 15.8                           |
| Iron                                                           | 55.8 2      | 0.7 0.02586 1.4                            | 1.1 0.03975 2.0                           | 1.1 0.0376 2.1                             |
| Manganese                                                      | 54.9 2      | 0.3 0.0091 0.5                             | 0.3 0.00914 0.5                           | 0.2 0.00761 0.4                            |
| Ammonia-N                                                      | 14.0 1      | 0.0 0.00166 0.1                            | 0.0 0.00129 0.1                           | 0.0 0.00171 0.1                            |
| <b>Total Cations (meq/L)</b>                                   | <b>1.8</b>  | <b>2.0</b>                                 | <b>2.6</b>                                | <b>1.7</b>                                 |
| Anions                                                         |             |                                            |                                           |                                            |
| Alkalinity, Total                                              | 75.3        | 68.1                                       | 83.5                                      | 69.4                                       |
| Carbonate                                                      | 60.0 2      | 0.0624 0.00208 0.1                         | 0.1074 0.00358 0.2                        | 0.1378 0.00459 0.3                         |
| Bicarbonate                                                    | 61.0 1      | 91.74 1.50369 77.2                         | 82.86 1.35821 67.7                        | 84.39 1.3832 79.4                          |
| Chloride                                                       | 35.5 1      | 3.2 0.09026 4.6                            | 3.6 0.10098 5.0                           | 2.7 0.077 4.4                              |
| Nitrate-N                                                      | 14.0 1      | 0.0 0.00071 0.0                            | 0.0 0.00071 0.0                           | 0.0 0.00071 0.0                            |
| Sulfate                                                        | 96.1 2      | 16.9 0.35187 18.1                          | 26.1 0.54342 27.1                         | 13.3 0.27692 15.9                          |
| <b>Total Anions (meq/L)</b>                                    | <b>1.9</b>  | <b>2.0</b>                                 | <b>2.6</b>                                | <b>1.7</b>                                 |
| <b>Total Ions (meq/L)</b>                                      | <b>3.8</b>  | <b>4.0</b>                                 | <b>5.2</b>                                | <b>3.5</b>                                 |
| <b>Cation/Anion Ratio</b>                                      | <b>0.94</b> | <b>0.98</b>                                | <b>1.01</b>                               | <b>1.00</b>                                |
| <b>Percent Difference</b>                                      | <b>-3.0</b> | <b>-1.0</b>                                | <b>0.4</b>                                | <b>0.2</b>                                 |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |                                            |                                           |                                            |
| sum (Ca, Mg, Na+K)                                             | 1.80        | 1.92                                       | 2.53                                      | 1.70                                       |
| Calcium                                                        | 34.68       | 41.65                                      | 39.18                                     | 37.22                                      |
| Magnesium                                                      | 41.40       | 42.03                                      | 46.11                                     | 44.51                                      |
| Sodium + Potassium                                             | 23.92       | 16.32                                      | 14.71                                     | 18.27                                      |
|                                                                |             | 100.0                                      | 100.0                                     | 100.0                                      |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.95        | 2.01                                       | 2.59                                      | 1.74                                       |
| Sulfate                                                        | 18.064      | 27.087                                     | 27.776                                    | 15.899                                     |
| Chloride                                                       | 4.634       | 5.033                                      | 7.657                                     | 4.421                                      |
| Bicarbonate + Carbonate                                        | 77.302      | 67.879                                     | 64.567                                    | 79.680                                     |
|                                                                |             | 100.0                                      | 100.0                                     | 100.0                                      |



**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells**

Data Collected from October 1, 2010 to December 31, 2010

| Site ID                                                        | MW-56                     | MW-57              | MW-76              | MW-83              | MW-60               | MW-94              |
|----------------------------------------------------------------|---------------------------|--------------------|--------------------|--------------------|---------------------|--------------------|
| Date                                                           | 10/14/10                  | 10/29/10           | 10/22/10           | 10/13/10           | 10/28/10            | 10/29/10           |
| Cations                                                        | mg/L meq/L % (meq)        | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq)  | mg/L meq/L % (meq) |
| Calcium                                                        | 40.1 2 15.8 0.78842 49.9  | 15.3 0.76347 35.7  | 12.4 0.61876 44.1  | 16.1 0.80339 49.3  | 20.7 1.03293 49.1   | 12.6 0.62874 45.9  |
| Magnesium                                                      | 24.3 2 6.6 0.54145 34.3   | 9.0 0.74306 34.8   | 5.6 0.4567 32.6    | 6.5 0.53816 33.0   | 9.4 0.77679 36.9    | 5.8 0.47974 35.0   |
| Potassium                                                      | 39.1 1 1.1 0.02711 1.7    | 0.9 0.02233 1.0    | 1.1 0.02916 2.1    | 1.8 0.04655 2.9    | 1.3 0.03223 1.5     | 1.5 0.03862 2.8    |
| Sodium                                                         | 23.0 1 5.0 0.21749 13.8   | 6.5 0.28099 13.1   | 6.8 0.29622 21.1   | 5.5 0.24098 14.8   | 6.0 0.26229 12.5    | 5.1 0.22271 16.2   |
| Iron                                                           | 55.8 2 0.02 0.00064 0.0   | 8.87 0.31765 14.9  | 0.01 0.00036 0.0   | 0.01 0.00036 0.0   | 0.01 0.00036 0.0    | 0.01 0.00036 0.0   |
| Manganese                                                      | 54.9 2 0.08 0.00287 0.2   | 0.24 0.00866 0.4   | 0.00 3.6E-05 0.0   | 0.00 3.6E-05 0.0   | 0.00 3.6E-05 0.0    | 0.00 3.6E-05 0.0   |
| Ammonia-N                                                      | 14.0 1 0.01 0.00071 0.0   | 0.02 0.00164 0.1   | 0.01 0.00071 0.1   | 0.01 0.00071 0.0   | 0.01 0.00071 0.0    | 0.01 0.00071 0.1   |
| <b>Total Cations (meq/L)</b>                                   | <b>1.6</b>                | <b>2.1</b>         | <b>1.4</b>         | <b>1.6</b>         | <b>2.1</b>          | <b>1.4</b>         |
| Anions                                                         |                           |                    |                    |                    |                     |                    |
| Alkalinity, Total                                              | 56                        | 77                 | 46                 | 67                 | 93                  | 53                 |
| Carbonate                                                      | 60.0 2 0.036 0.0012 0.1   | 0.0265 0.00088 0.0 | 0.0119 0.0004 0.0  | 0.0611 0.00204 0.1 | 0.0598 0.00199 0.1  | 0.0643 0.00214 0.1 |
| Bicarbonate                                                    | 61.0 1 68.12 1.11663 68.8 | 93.52 1.53288 76.1 | 55.49 0.90946 62.0 | 81.86 1.34176 71.9 | 113.22 1.85573 84.4 | 63.92 1.0477 72.3  |
| Chloride                                                       | 35.5 1 4.0 0.11367 7.0    | 3.9 0.10859 5.4    | 3.7 0.10521 7.2    | 4.4 0.12354 6.6    | 2.8 0.07813 3.6     | 3.7 0.10465 7.2    |
| Nitrate-N                                                      | 14.0 1 0.15 0.01092 0.7   | 0.01 0.00071 0.0   | 0.87 0.06218 4.2   | 0.45 0.03213 1.7   | 1.60 0.11423 5.2    | 0.89 0.06368 4.4   |
| Sulfate                                                        | 96.1 2 18.3 0.38102 23.5  | 17.8 0.37061 18.4  | 18.7 0.38935 26.5  | 17.6 0.36645 19.6  | 7.1 0.14866 6.8     | 11.1 0.23111 15.9  |
| <b>Total Anions (meq/L)</b>                                    | <b>1.6</b>                | <b>2.0</b>         | <b>1.5</b>         | <b>1.9</b>         | <b>2.2</b>          | <b>1.4</b>         |
| <b>Total Ions (meq/L)</b>                                      | <b>3.2</b>                | <b>4.2</b>         | <b>2.9</b>         | <b>3.5</b>         | <b>4.3</b>          | <b>2.8</b>         |
| <b>Cation/Anion Ratio</b>                                      | <b>0.97</b>               | <b>1.06</b>        | <b>0.96</b>        | <b>0.87</b>        | <b>0.96</b>         | <b>0.95</b>        |
| <b>Percent Difference</b>                                      | <b>-1.4</b>               | <b>3.0</b>         | <b>-2.3</b>        | <b>-6.7</b>        | <b>-2.2</b>         | <b>-2.8</b>        |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                           |                    |                    |                    |                     |                    |
| sum (Ca, Mg, Na+K)                                             | 1.57                      | 1.81               | 1.40               | 1.63               | 2.10                | 1.37               |
| Calcium                                                        | 50.08                     | 42.18              | 44.17              | 49.32              | 49.09               | 45.90              |
| Magnesium                                                      | 34.39                     | 41.06              | 32.60              | 33.03              | 36.92               | 35.02              |
| Sodium + Potassium                                             | 15.54                     | 16.76              | 23.23              | 17.65              | 14.00               | 19.08              |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.61                      | 2.01               | 1.40               | 1.83               | 2.08                | 1.39               |
| Sulfate                                                        | 23.629                    | 18.411             | 27.723             | 19.983             | 7.132               | 16.680             |
| Chloride                                                       | 7.049                     | 5.395              | 7.491              | 6.737              | 3.748               | 7.552              |
| Bicarbonate + Carbonate                                        | 69.322                    | 76.194             | 64.786             | 73.280             | 89.120              | 75.768             |

**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells**

Data Collected from October 1, 2010 to December 31, 2010

| Site ID                                                        | MW-82                      | MW-58A             | MW-59              | MW-24              | MW-64               | MW-70              |
|----------------------------------------------------------------|----------------------------|--------------------|--------------------|--------------------|---------------------|--------------------|
| Date                                                           | 10/28/10                   | 10/25/10           | 1/0/00             | 1/0/00             | 1/0/00              | 1/0/00             |
| Cations                                                        | mg/L meq/L % (meq)         | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq)  | mg/L meq/L % (meq) |
| Calcium                                                        | 40.1 2 19.0 0.9481 42.9    | 16.3 0.81337 44.6  | 13.1 0.65369 37.3  | 15.1 0.75349 37.7  | 24.8 1.23752 40.7   | 17.2 0.85828 45.8  |
| Magnesium                                                      | 24.3 2 11.4 0.93808 42.5   | 8.5 0.70027 38.4   | 8.3 0.68381 39.0   | 9.9 0.81794 41.0   | 17.0 1.39889 46.1   | 8.9 0.73401 39.2   |
| Potassium                                                      | 39.1 1 1.6 0.03964 1.8     | 1.0 0.02509 1.4    | 1.0 0.0254 1.4     | 0.9 0.02386 1.2    | 1.7 0.04271 1.4     | 1.4 0.03453 1.8    |
| Sodium                                                         | 23.0 1 6.5 0.28143 12.7    | 5.3 0.23141 12.7   | 5.5 0.2375 13.5    | 5.9 0.25751 12.9   | 7.5 0.32667 10.8    | 5.6 0.24489 13.1   |
| Iron                                                           | 55.8 2 0.01 0.00036 0.0    | 1.01 0.03617 2.0   | 4.14 0.14826 8.5   | 3.77 0.13501 6.8   | 0.52 0.01877 0.6    | 0.01 0.00036 0.0   |
| Manganese                                                      | 54.9 2 0.00 3.6E-05 0.0    | 0.33 0.01216 0.7   | 0.10 0.00371 0.2   | 0.15 0.00546 0.3   | 0.21 0.00761 0.3    | 0.03 0.00116 0.1   |
| Ammonia-N                                                      | 14.0 1 0.01 0.00071 0.0    | 0.07 0.00513 0.3   | 0.01 0.001 0.1     | 0.04 0.00317 0.2   | 0.07 0.00527 0.2    | 0.02 0.00107 0.1   |
| <b>Total Cations (meq/L)</b>                                   | <b>2.2</b>                 | <b>1.8</b>         | <b>1.8</b>         | <b>2.0</b>         | <b>3.0</b>          | <b>1.9</b>         |
| Anions                                                         |                            |                    |                    |                    |                     |                    |
| Alkalinity, Total                                              | 85                         | 75                 | 63                 | 73                 | 101                 | 74                 |
| Carbonate                                                      | 60.0 2 0.064 0.00213 0.1   | 0.2469 0.00823 0.4 | 0.0418 0.00139 0.1 | 0.0517 0.00172 0.1 | 0.0621 0.00207 0.1  | 0.1544 0.00515 0.3 |
| Bicarbonate                                                    | 61.0 1 103.08 1.68961 76.4 | 91.12 1.49355 76.8 | 77.26 1.26642 73.2 | 89.32 1.46405 75.8 | 123.09 2.01763 64.3 | 90.33 1.48063 75.4 |
| Chloride                                                       | 35.5 1 5.2 0.14583 6.6     | 3.4 0.09647 5.0    | 3.8 0.10718 6.2    | 4.1 0.11452 5.9    | 3.1 0.08829 2.8     | 3.5 0.09929 5.1    |
| Nitrate-N                                                      | 14.0 1 1.16 0.08282 3.7    | 0.01 0.00079 0.0   | 0.01 0.00071 0.0   | 0.01 0.00071 0.0   | 0.02 0.00164 0.1    | 0.03 0.00207 0.1   |
| Sulfate                                                        | 96.1 2 14.0 0.29149 13.2   | 16.6 0.34563 17.8  | 17.0 0.35395 20.5  | 16.8 0.34979 18.1  | 49.4 1.02855 32.8   | 18.1 0.37686 19.2  |
| <b>Total Anions (meq/L)</b>                                    | <b>2.2</b>                 | <b>1.9</b>         | <b>1.7</b>         | <b>1.9</b>         | <b>3.1</b>          | <b>2.0</b>         |
| <b>Total Ions (meq/L)</b>                                      | <b>4.4</b>                 | <b>3.8</b>         | <b>3.5</b>         | <b>3.9</b>         | <b>6.2</b>          | <b>3.8</b>         |
| <b>Cation/Anion Ratio</b>                                      | <b>1.00</b>                | <b>0.94</b>        | <b>1.01</b>        | <b>1.03</b>        | <b>0.97</b>         | <b>0.95</b>        |
| <b>Percent Difference</b>                                      | <b>-0.1</b>                | <b>-3.2</b>        | <b>0.7</b>         | <b>1.7</b>         | <b>-1.6</b>         | <b>-2.3</b>        |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                            |                    |                    |                    |                     |                    |
| sum (Ca, Mg, Na+K)                                             | 2.21                       | 1.77               | 1.60               | 1.85               | 3.01                | 1.87               |
| Calcium                                                        | 42.95                      | 45.95              | 40.85              | 40.67              | 41.17               | 45.86              |
| Magnesium                                                      | 42.50                      | 39.56              | 42.73              | 44.15              | 46.54               | 39.22              |
| Sodium + Potassium                                             | 14.55                      | 14.49              | 16.43              | 15.19              | 12.29               | 14.93              |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.13                       | 1.94               | 1.73               | 1.93               | 3.14                | 1.96               |
| Sulfate                                                        | 13.691                     | 17.780             | 20.472             | 18.123             | 32.793              | 19.209             |
| Chloride                                                       | 6.849                      | 4.963              | 6.199              | 5.933              | 2.815               | 5.061              |
| Bicarbonate + Carbonate                                        | 79.460                     | 77.257             | 73.328             | 75.944             | 64.393              | 75.731             |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells

Data Collected from October 1, 2010 to December 31, 2010

| Site ID                                                        | MW-77       | MW-72       | MW-69       | MW-100      | MW-93       | MW-95       |
|----------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Date                                                           | 1/0/00      | 1/0/00      | 1/0/00      | 1/0/00      | 1/0/00      | 1/0/00      |
| Cations                                                        | mg/L        | mg/L        | mg/L        | mg/L        | mg/L        | mg/L        |
| Calcium                                                        | 26.0        | 24.6        | 27.1        | 25.2        | 33.7        | 19.3        |
| Magnesium                                                      | 14.0        | 14.8        | 12.3        | 15.0        | 17.3        | 10.7        |
| Potassium                                                      | 1.6         | 1.8         | 1.6         | 2.0         | 1.6         | 1.3         |
| Sodium                                                         | 8.5         | 7.0         | 7.3         | 8.9         | 8.9         | 6.2         |
| Iron                                                           | 0.01        | 2.09        | 0.03939     | 1.86        | 0.01        | 0.01        |
| Manganese                                                      | 0.02        | 0.26        | 0.00663     | 0.21        | 0.01067     | 0.11        |
| Ammonia-N                                                      | 0.01        | 0.00121     | 0.00107     | 0.01        | 0.00358     | 0.02        |
| <b>Total Cations (meq/L)</b>                                   | <b>2.9</b>  | <b>2.9</b>  | <b>2.8</b>  | <b>3.0</b>  | <b>3.5</b>  | <b>2.2</b>  |
| Anions                                                         | mg/L        | mg/L        | mg/L        | mg/L        | mg/L        | mg/L        |
| Alkalinity, Total                                              | 130         | 114         | 122         | 120         | 97          | 85          |
| Carbonate                                                      | 0.0939      | 0.1189      | 0.00396     | 0.0535      | 0.00417     | 0.1816      |
| Bicarbonate                                                    | 158.41      | 138.84      | 2.42994     | 146.29      | 1.94354     | 103.82      |
| Chloride                                                       | 4.7         | 4.0         | 5.0         | 2.9         | 3.1         | 5.6         |
| Nitrate-N                                                      | 0.85        | 0.01        | 0.00071     | 0.01        | 0.00071     | 0.01        |
| Sulfate                                                        | 11.7        | 26.8        | 14.3        | 22.8        | 77.8        | 15.7        |
| <b>Total Anions (meq/L)</b>                                    | <b>3.0</b>  | <b>3.0</b>  | <b>2.9</b>  | <b>3.0</b>  | <b>3.7</b>  | <b>2.2</b>  |
| <b>Total Ions (meq/L)</b>                                      | <b>5.9</b>  | <b>5.8</b>  | <b>5.7</b>  | <b>6.0</b>  | <b>7.2</b>  | <b>4.3</b>  |
| <b>Cation/Anion Ratio</b>                                      | <b>0.94</b> | <b>0.98</b> | <b>0.96</b> | <b>1.02</b> | <b>0.97</b> | <b>0.98</b> |
| <b>Percent Difference</b>                                      | <b>-3.0</b> | <b>-1.2</b> | <b>-1.9</b> | <b>0.8</b>  | <b>-1.5</b> | <b>-0.9</b> |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |             |             |             |             |             |
| sum (Ca, Mg, Na+K)                                             | 2.86        | 2.80        | 2.72        | 2.93        | 3.53        | 2.15        |
| Calcium                                                        | 45.38       | 43.88       | 49.66       | 42.91       | 47.61       | 44.87       |
| Magnesium                                                      | 40.30       | 43.54       | 37.17       | 42.12       | 40.30       | 41.02       |
| Sodium + Potassium                                             | 14.32       | 12.58       | 13.18       | 14.97       | 12.08       | 14.12       |
|                                                                | 100.0       | 100.0       |             |             |             |             |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.97        | 2.95        | 2.88        | 2.96        | 3.66        | 2.19        |
| Sulfate                                                        | 8.189       | 18.907      | 10.341      | 16.057      | 44.312      | 14.915      |
| Chloride                                                       | 4.428       | 3.852       | 4.928       | 2.776       | 2.407       | 7.168       |
| Bicarbonate + Carbonate                                        | 87.384      | 77.242      | 84.732      | 81.167      | 53.280      | 77.917      |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Upgradient GW Monitoring Wells

Data Collected from October 1, 2010 to December 31, 2010

| Site ID                                                        | MW-84       | MW-81       | MW-21       | MW-73       | MW-99       |
|----------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|
| Date                                                           | 1/0/00      | 1/0/00      | 1/0/00      | 1/0/00      | 1/0/00      |
| Cations                                                        | mg/L        | mg/L        | mg/L        | mg/L        | mg/L        |
| Calcium                                                        | 10.9        | 11.3        | 9.1         | 13.0        | 9.0         |
| Magnesium                                                      | 8.4         | 5.7         | 5.5         | 6.3         | 4.0         |
| Potassium                                                      | 0.9         | 0.7         | 1.0         | 0.8         | 0.9         |
| Sodium                                                         | 5.8         | 5.3         | 5.4         | 5.5         | 9.5         |
| Iron                                                           | 0.01        | 0.01        | 2.07        | 0.01        | 0.04        |
| Manganese                                                      | 0.00        | 0.00        | 0.07        | 0.00        | 0.07        |
| Ammonia-N                                                      | 0.01        | 0.01        | 0.01        | 0.01        | 0.05        |
| <b>Total Cations (meq/L)</b>                                   | <b>1.5</b>  | <b>1.3</b>  | <b>1.2</b>  | <b>1.4</b>  | <b>1.2</b>  |
| Anions                                                         |             |             |             |             |             |
| Alkalinity, Total                                              | 60          | 48          | 52          | 56          | 52          |
| Carbonate                                                      | 0.0238      | 0.00079     | 0.1782      | 0.00594     | 0.0392      |
| Bicarbonate                                                    | 73.03       | 1.19703     | 62.83       | 1.0299      | 67.63       |
| Chloride                                                       | 3.6         | 0.10154     | 2.8         | 0.07926     | 3.3         |
| Nitrate-N                                                      | 0.66        | 0.04698     | 0.01        | 0.00071     | 2.00        |
| Sulfate                                                        | 13.2        | 0.27484     | 5.1         | 0.10535     | 9.2         |
| <b>Total Anions (meq/L)</b>                                    | <b>1.6</b>  | <b>1.4</b>  | <b>1.2</b>  | <b>1.5</b>  | <b>1.3</b>  |
| <b>Total Ions (meq/L)</b>                                      | <b>3.1</b>  | <b>2.7</b>  | <b>2.5</b>  | <b>3.0</b>  | <b>2.5</b>  |
| <b>Cation/Anion Ratio</b>                                      | <b>0.93</b> | <b>0.92</b> | <b>1.02</b> | <b>0.93</b> | <b>0.95</b> |
| <b>Percent Difference</b>                                      | <b>-3.6</b> | <b>-4.0</b> | <b>1.0</b>  | <b>-3.9</b> | <b>-2.5</b> |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |             |             |             |             |
| sum (Ca, Mg, Na+K)                                             | 1.51        | 1.28        | 1.17        | 1.42        | 1.21        |
| Calcium                                                        | 36.06       | 44.09       | 39.00       | 45.60       | 37.09       |
| Magnesium                                                      | 45.71       | 36.36       | 38.77       | 36.15       | 27.00       |
| Sodium + Potassium                                             | 18.23       | 19.55       | 22.23       | 18.26       | 35.91       |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.57        | 1.27        | 1.22        | 1.40        | 1.28        |
| Sulfate                                                        | 17.459      | 18.482      | 8.632       | 13.777      | 12.060      |
| Chloride                                                       | 6.450       | 6.116       | 6.494       | 6.746       | 6.434       |
| Bicarbonate + Carbonate                                        | 76.091      | 75.402      | 84.873      | 79.477      | 81.506      |

# Ion Balance Calculations

## Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells

Data Collected from October 1, 2010 to December 31, 2010

| Site ID                                                        | MW-66       | MW-67          | MW-80               | MW-68               | MW-74               |
|----------------------------------------------------------------|-------------|----------------|---------------------|---------------------|---------------------|
| Date                                                           | 10/20/10    | 10/21/10       | 10/28/10            | 10/25/10            | 10/21/10            |
| Cations                                                        |             |                |                     |                     |                     |
| Calcium                                                        | 40.1 2      | 26.1 1.3024    | 23.8 1.18762        | 30.5 1.52196        | 38.0 1.89621        |
| Magnesium                                                      | 24.3 2      | 14.3 1.17671   | 12.1 0.99568        | 16.1 1.32483        | 26.2 2.15593        |
| Potassium                                                      | 39.1 1      | 1.5 0.0376     | 1.6 0.0399          | 1.7 0.04271         | 2.2 0.0555          |
| Sodium                                                         | 23.0 1      | 8.0 0.34581    | 6.7 0.29187         | 8.2 0.35842         | 10.1 0.43933        |
| Iron                                                           | 55.8 2      | 0.1 0.00248    | 1.5 0.05408         | 2.4 0.08487         | 2.8 0.10063         |
| Manganese                                                      | 54.9 2      | 0.0 3.6E-05    | 0.2 0.00863         | 0.3 0.00939         | 0.1 0.00532         |
| Ammonia-N                                                      | 14.0 1      | 0.0 0.00071    | 0.0 0.00086         | 0.0 0.00129         | 0.0 0.00079         |
| <b>Total Cations (meq/L)</b>                                   | <b>2.7</b>  | <b>2.9</b>     | <b>2.6</b>          | <b>3.3</b>          | <b>4.7</b>          |
| Anions                                                         |             |                |                     |                     |                     |
| Alkalinity, Total                                              | 116         | 106            | 82.8                | 148                 | 169                 |
| Carbonate                                                      | 60.0 2      | 0.0713 0.00238 | 0.1 0.0753 0.00251  | 0.1 0.158 0.00527   | 0.2 0.0926 0.00309  |
| Bicarbonate                                                    | 61.0 1      | 141.37 2.31727 | 81.4 129.15 2.11688 | 70.2 100.86 1.65324 | 61.2 180.24 2.95429 |
| Chloride                                                       | 35.5 1      | 8.0 0.22537    | 7.9 4.6 0.12862     | 4.3 5.3 0.14893     | 5.5 2.9 0.08152     |
| Nitrate-N                                                      | 14.0 1      | 0.5 0.03684    | 1.3 0.6 0.04512     | 1.5 0.0 0.00071     | 0.0 0.0 0.00071     |
| Sulfate                                                        | 96.1 2      | 12.8 0.26651   | 9.4 34.6 0.7204     | 23.9 43.1 0.89738   | 33.2 17.1 0.35604   |
| <b>Total Anions (meq/L)</b>                                    | <b>2.8</b>  | <b>3.0</b>     | <b>2.7</b>          | <b>3.4</b>          | <b>4.8</b>          |
| <b>Total Ions (meq/L)</b>                                      | <b>5.6</b>  | <b>5.9</b>     | <b>5.3</b>          | <b>6.7</b>          | <b>9.5</b>          |
| <b>Cation/Anion Ratio</b>                                      | <b>0.96</b> | <b>0.95</b>    | <b>0.95</b>         | <b>0.98</b>         | <b>0.97</b>         |
| <b>Percent Difference</b>                                      | <b>-2.0</b> | <b>-2.5</b>    | <b>-2.4</b>         | <b>-0.8</b>         | <b>-1.8</b>         |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |             |                |                     |                     |                     |
| sum (Ca, Mg, Na+K)                                             | 2.73        | 2.86           | 2.52                | 3.25                | 4.55                |
| Calcium                                                        | 37.96       | 45.50          | 47.22               | 46.86               | 41.70               |
| Magnesium                                                      | 48.15       | 41.11          | 39.59               | 40.79               | 47.41               |
| Sodium + Potassium                                             | 13.90       | 13.39          | 13.19               | 12.35               | 10.88               |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.81        | 2.97           | 2.70                | 3.40                | 4.82                |
| Sulfate                                                        | 9.479       | 24.267         | 33.211              | 10.481              | 11.832              |
| Chloride                                                       | 8.016       | 4.333          | 5.512               | 2.400               | 18.077              |
| Bicarbonate + Carbonate                                        | 82.505      | 71.401         | 61.277              | 87.120              | 70.091              |
|                                                                |             | 100.0          | 100.0               |                     |                     |

# **Ion Balance Calculations** **Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells**

Data Collected from October 1, 2010 to December 31, 2010

| Site ID                                                        | MW-75              | MW-87               | MW-85               | MW-86              | MW-88              |
|----------------------------------------------------------------|--------------------|---------------------|---------------------|--------------------|--------------------|
| Date                                                           | 10/21/10           | 10/21/10            | 10/28/10            | 10/29/10           | 10/22/10           |
| Cations                                                        | mg/L meq/L % (meq) | mg/L meq/L % (meq)  | mg/L meq/L % (meq)  | mg/L meq/L % (meq) | mg/L meq/L % (meq) |
| Calcium                                                        | 23.0 1.1477 37.2   | 34.6 1.72655 41.0   | 20.7 1.03293 42.1   | 13.6 0.67864 38.7  | 8.9 0.44361 35.7   |
| Magnesium                                                      | 17.7 1.45649 47.2  | 23.2 1.90907 45.3   | 12.9 1.06151 43.2   | 9.3 0.76363 43.5   | 6.5 0.53322 42.9   |
| Potassium                                                      | 1.7 0.04399 1.4    | 2.1 0.05346 1.3     | 1.3 0.03325 1.4     | 1.2 0.03171 1.8    | 0.8 0.02146 1.7    |
| Sodium                                                         | 8.4 0.36538 11.8   | 9.2 0.40018 9.5     | 7.5 0.3258 13.3     | 6.4 0.27969 15.9   | 5.6 0.24228 19.5   |
| Iron                                                           | 1.9 0.06661 2.2    | 3.1 0.11102 2.6     | 0.0 0.00036 0.0     | 0.0 0.00036 0.0    | 0.0 0.00036 0.0    |
| Manganese                                                      | 0.1 0.00491 0.2    | 0.3 0.01187 0.3     | 0.0 3.6E-05 0.0     | 0.0 0.00039 0.0    | 0.0 3.6E-05 0.0    |
| Ammonia-N                                                      | 0.0 0.00071 0.0    | 0.0 0.00166 0.0     | 0.0 0.00071 0.0     | 0.0 0.00071 0.0    | 0.0 0.00071 0.1    |
| <b>Total Cations (meq/L)</b>                                   | <b>3.1</b>         | <b>4.2</b>          | <b>2.5</b>          | <b>1.8</b>         | <b>1.2</b>         |
| Anions                                                         |                    |                     |                     |                    |                    |
| Alkalinity, Total                                              | 97.1               | 91.2                | 88.7                | 66.3               | 52.8               |
| Carbonate                                                      | 0.0903 0.00301 0.1 | 0.0477 0.00159 0.0  | 0.0545 0.00182 0.1  | 0.0537 0.00179 0.1 | 0.0551 0.00184 0.1 |
| Bicarbonate                                                    | 118.28 1.9387 63.1 | 111.17 1.82213 42.0 | 108.10 1.77191 68.3 | 80.78 1.32401 72.5 | 64.30 1.054 81.2   |
| Chloride                                                       | 7.4 0.20986 6.8    | 4.3 0.11988 2.8     | 6.7 0.18814 7.3     | 4.4 0.12326 6.8    | 2.3 0.06516 5.0    |
| Nitrate-N                                                      | 0.0 0.00071 0.0    | 0.0 0.00071 0.0     | 0.1 0.00964 0.4     | 0.2 0.01364 0.7    | 0.6 0.03955 3.0    |
| Sulfate                                                        | 44.3 0.92236 30.0  | 115.0 2.3944 55.2   | 29.9 0.62254 24.0   | 17.4 0.36228 19.9  | 6.6 0.13763 10.6   |
| <b>Total Anions (meq/L)</b>                                    | <b>3.1</b>         | <b>4.3</b>          | <b>2.6</b>          | <b>1.8</b>         | <b>1.3</b>         |
| <b>Total Ions (meq/L)</b>                                      | <b>6.2</b>         | <b>8.6</b>          | <b>5.0</b>          | <b>3.6</b>         | <b>2.5</b>         |
| <b>Cation/Anion Ratio</b>                                      | <b>1.00</b>        | <b>0.97</b>         | <b>0.95</b>         | <b>0.96</b>        | <b>0.96</b>        |
| <b>Percent Difference</b>                                      | <b>0.2</b>         | <b>-1.5</b>         | <b>-2.8</b>         | <b>-2</b>          | <b>-2.2</b>        |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                    |                     |                     |                    |                    |
| sum (Ca, Mg, Na+K)                                             | 3.01               | 4.09                | 2.45                | 1.75               | 1.24               |
| Calcium                                                        | 38.08              | 42.22               | 42.10               | 38.70              | 35.76              |
| Magnesium                                                      | 48.33              | 46.69               | 43.27               | 43.54              | 42.98              |
| Sodium + Potassium                                             | 13.58              | 11.09               | 14.63               | 17.76              | 21.26              |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 3.07               | 4.34                | 2.58                | 1.81               | 1.26               |
| Sulfate                                                        | 30.006             | 55.196              | 24.088              | 20.001             | 10.935             |
| Chloride                                                       | 6.827              | 2.763               | 7.280               | 6.805              | 5.177              |
| Bicarbonate + Carbonate                                        | 63.167             | 42.041              | 68.632              | 73.194             | 83.889             |

# Ion Balance Calculations

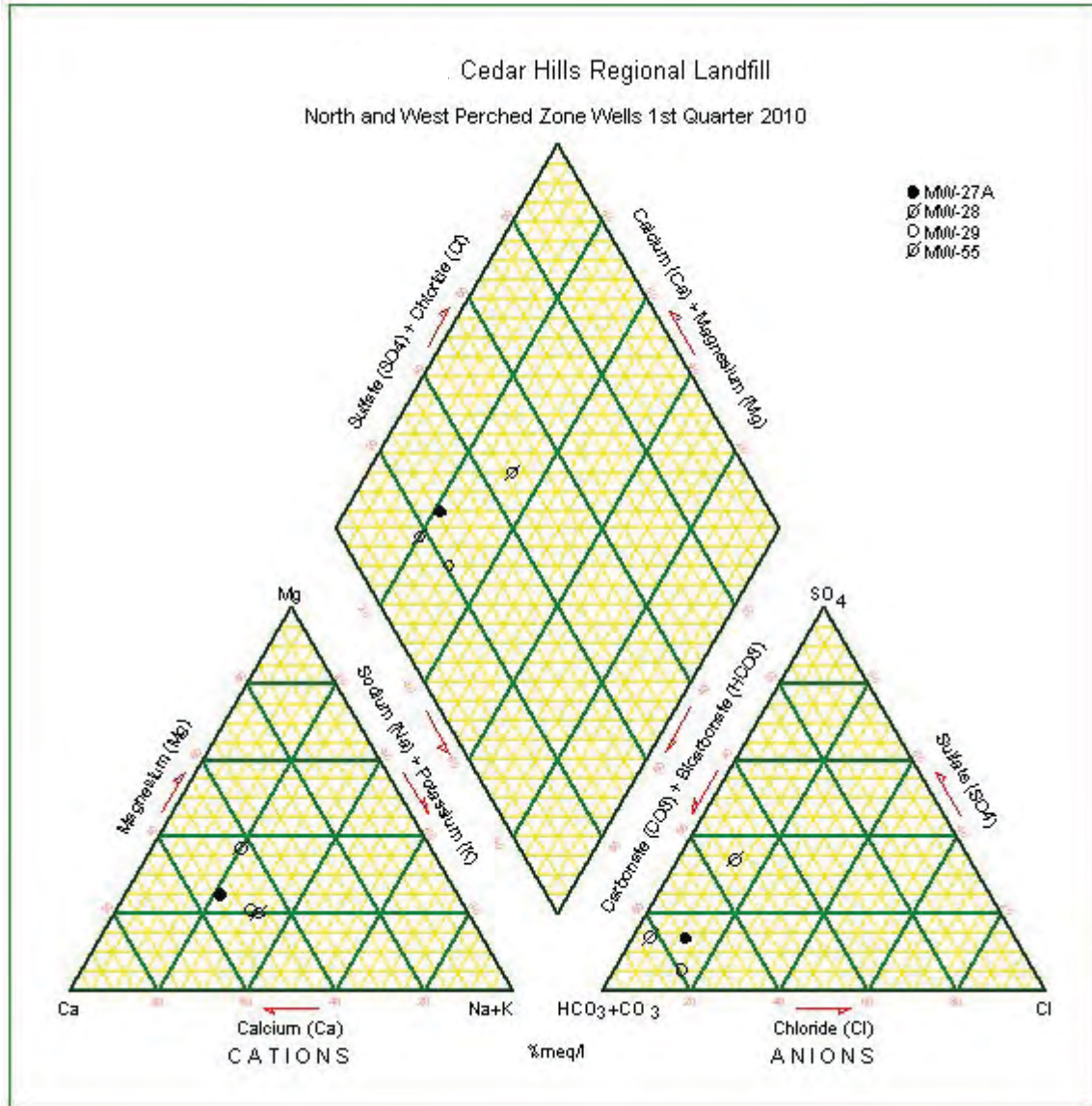
## Cedar Hills Landfill Regional Aquifer Downgradient GW Monitoring Wells

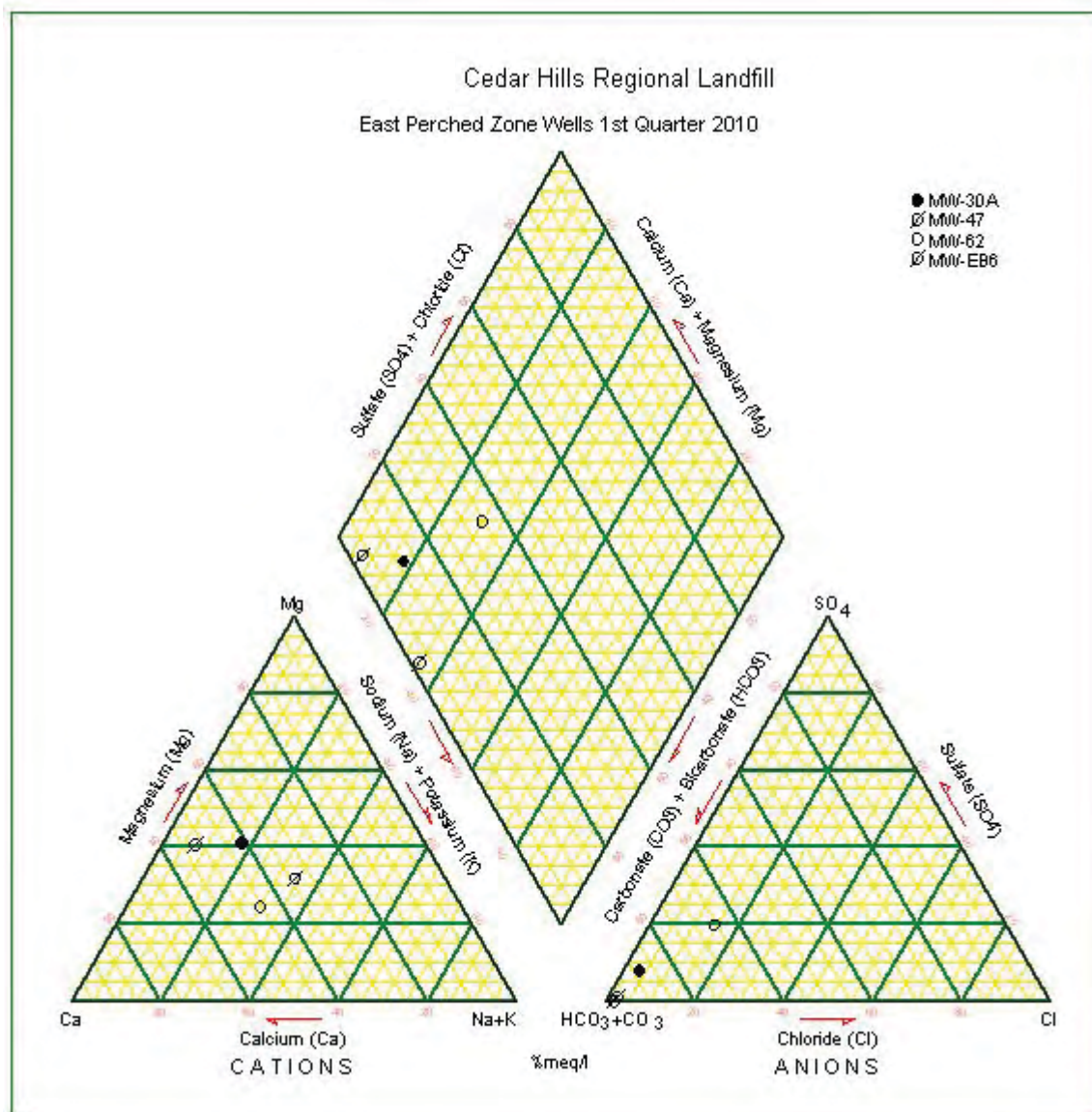
Data Collected from October 1, 2010 to December 31, 2010

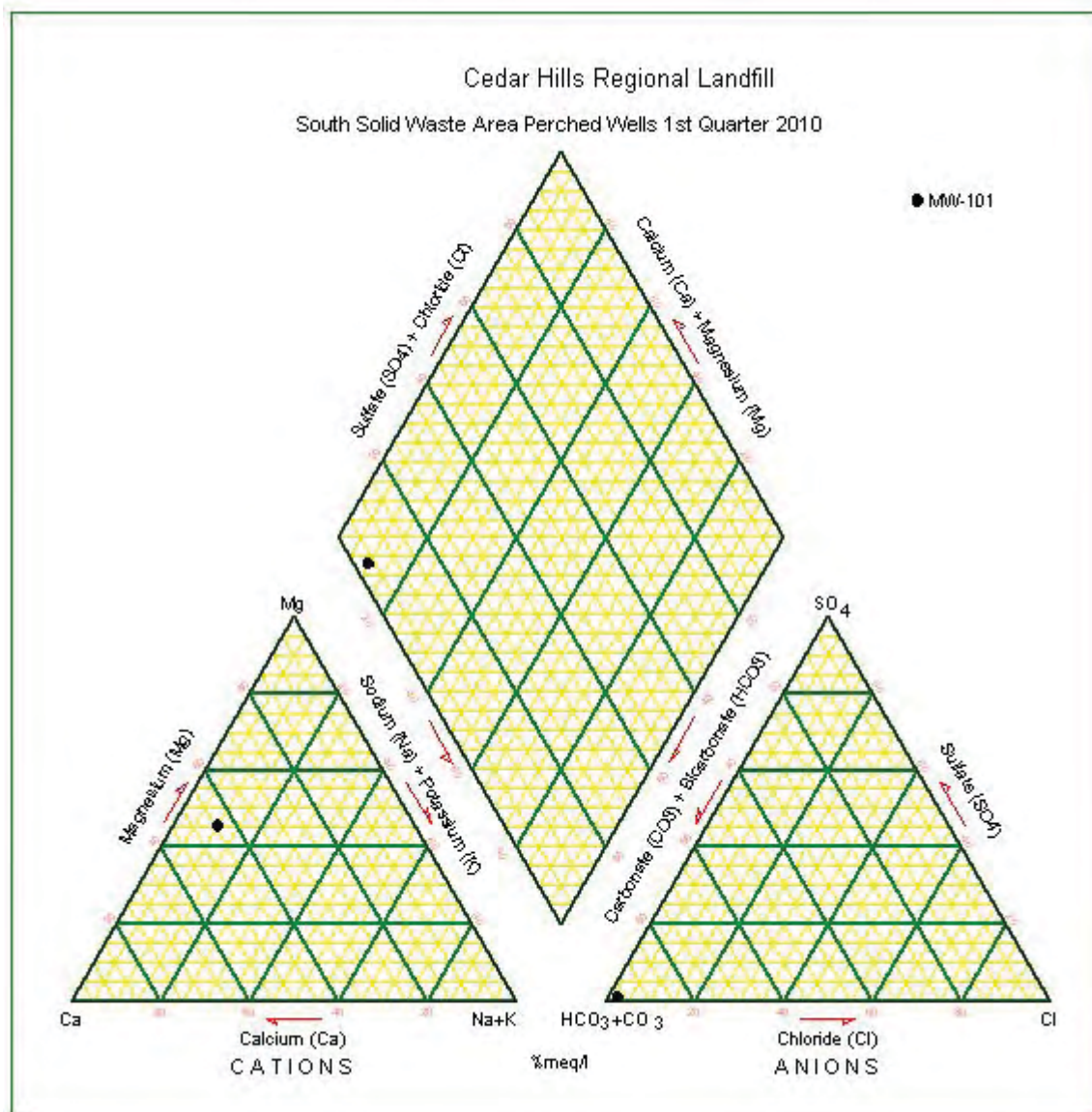
| Site ID                                                        | MW-89             | MW-90              | MW-91              | MW-43              |
|----------------------------------------------------------------|-------------------|--------------------|--------------------|--------------------|
| Date                                                           | 10/22/10          | 10/15/10           | 10/22/10           | 10/12/10           |
| Cations                                                        | MW                |                    |                    |                    |
| Calcium                                                        | 40.1 2            | mg/L meq/L % (meq) | mg/L meq/L % (meq) | mg/L meq/L % (meq) |
|                                                                | 13.8 0.68862 34.7 | 16.4 0.81836 41.4  | 21.1 1.05289 40.2  | 12.8 0.63872 36.3  |
| Magnesium                                                      | 24.3 2            | 9.8 0.80806 40.9   | 13.5 1.11088 42.4  | 9.3 0.76692 43.6   |
| Potassium                                                      | 39.1 1            | 1.3 0.03427 1.7    | 1.6 0.04169 1.6    | 1.3 0.03351 1.9    |
| Sodium                                                         | 23.0 1            | 6.0 0.26142 13.2   | 7.3 0.31797 12.1   | 6.3 0.2749 15.6    |
| Iron                                                           | 55.8 2            | 1.1 0.04047 2.0    | 2.4 0.08738 3.3    | 1.0 0.03452 2.0    |
| Manganese                                                      | 54.9 2            | 0.3 0.00925 0.5    | 0.2 0.00874 0.3    | 0.2 0.00761 0.4    |
| Ammonia-N                                                      | 14.0 1            | 0.1 0.00437 0.2    | 0.0 0.00107 0.0    | 0.0 0.00183 0.1    |
| <b>Total Cations (meq/L)</b>                                   | <b>2.0</b>        | <b>2.0</b>         | <b>2.6</b>         | <b>1.8</b>         |
| Anions                                                         |                   |                    |                    |                    |
| Alkalinity, Total                                              | 78                | 69.3               | 128                | 70                 |
| Carbonate                                                      | 60.0 2            | 0.1149 0.00383 0.2 | 0.1111 0.0037 0.1  | 0.1297 0.00432 0.2 |
| Bicarbonate                                                    | 61.0 1            | 94.93 1.55594 78.1 | 84.35 1.38254 68.1 | 85.14 1.39547 79.6 |
| Chloride                                                       | 35.5 1            | 3.2 0.09139 4.6    | 7.2 0.20168 5.8    | 2.7 0.07503 4.3    |
| Nitrate-N                                                      | 14.0 1            | 0.0 0.00071 0.0    | 0.0 0.00136 0.0    | 0.0 0.00071 0.0    |
| Sulfate                                                        | 96.1 2            | 16.4 0.34146 17.1  | 34.6 0.7204 20.7   | 13.3 0.27692 15.8  |
| <b>Total Anions (meq/L)</b>                                    | <b>2.0</b>        | <b>2.0</b>         | <b>3.5</b>         | <b>1.8</b>         |
| <b>Total Ions (meq/L)</b>                                      | <b>4.0</b>        | <b>4.0</b>         | <b>6.1</b>         | <b>3.5</b>         |
| <b>Cation/Anion Ratio</b>                                      | <b>0.99</b>       | <b>0.97</b>        | <b>0.75</b>        | <b>1.00</b>        |
| <b>Percent Difference</b>                                      | <b>-0.3</b>       | <b>-1.3</b>        | <b>-14.1</b>       | <b>0.2</b>         |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                   |                    |                    |                    |
| sum (Ca, Mg, Na+K)                                             | 1.94              | 1.92               | 2.52               | 1.71               |
| Calcium                                                        | 35.41             | 42.58              | 41.72              | 37.26              |
| Magnesium                                                      | 42.23             | 42.04              | 44.02              | 44.74              |
| Sodium + Potassium                                             | 22.37             | 15.38              | 14.25              | 17.99              |
|                                                                |                   | 100.0              | 100.0              | 100.0              |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 1.99              | 2.03               | 3.48               | 1.75               |
| Sulfate                                                        | 17.136            | 26.688             | 20.691             | 15.808             |
| Chloride                                                       | 4.586             | 4.992              | 5.792              | 4.283              |
| Bicarbonate + Carbonate                                        | 78.277            | 68.320             | 73.516             | 79.909             |
|                                                                |                   | 100.0              | 100.0              | 100.0              |



Cedar Hills Regional Landfill  
North and West Perched Zone Wells 1st Quarter 2010



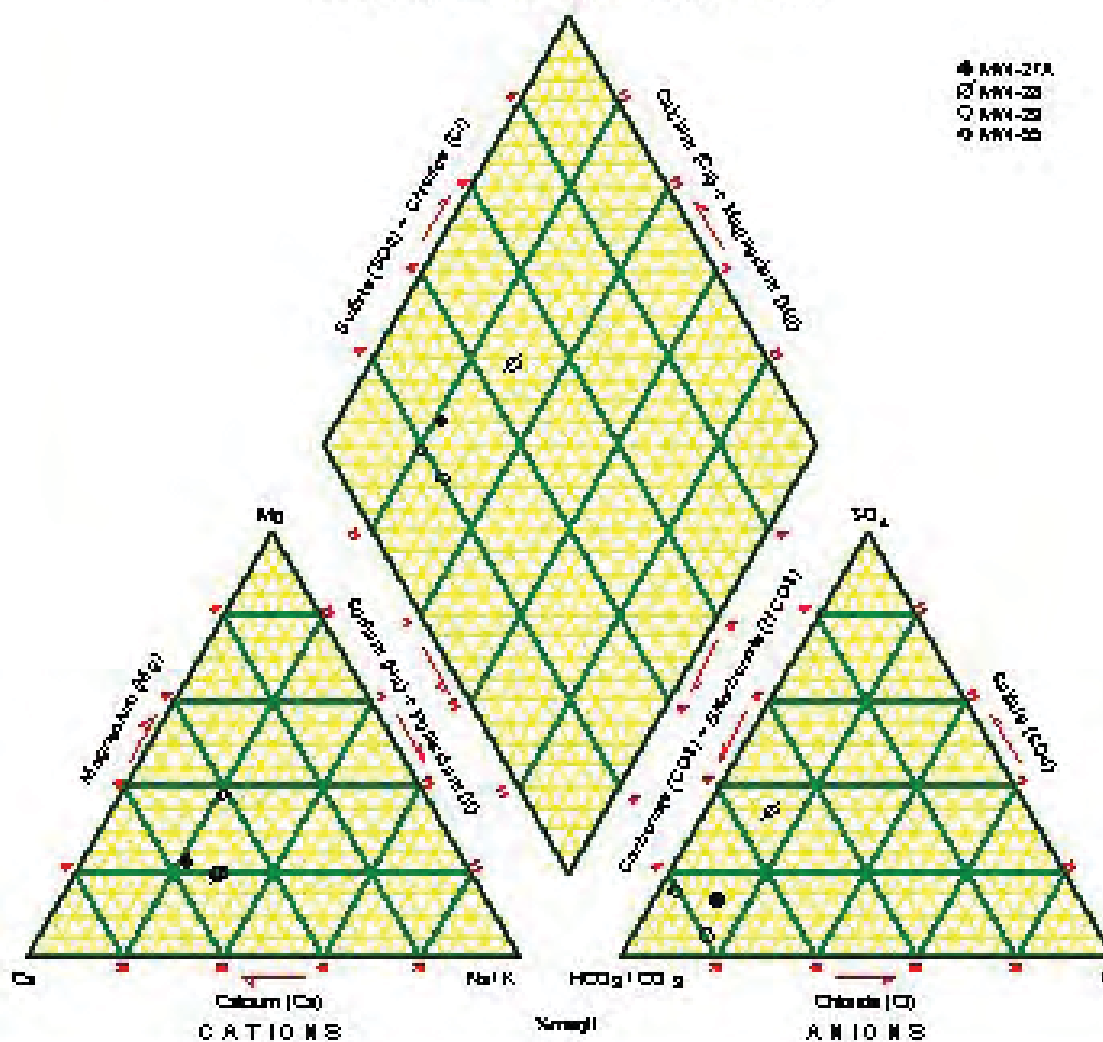




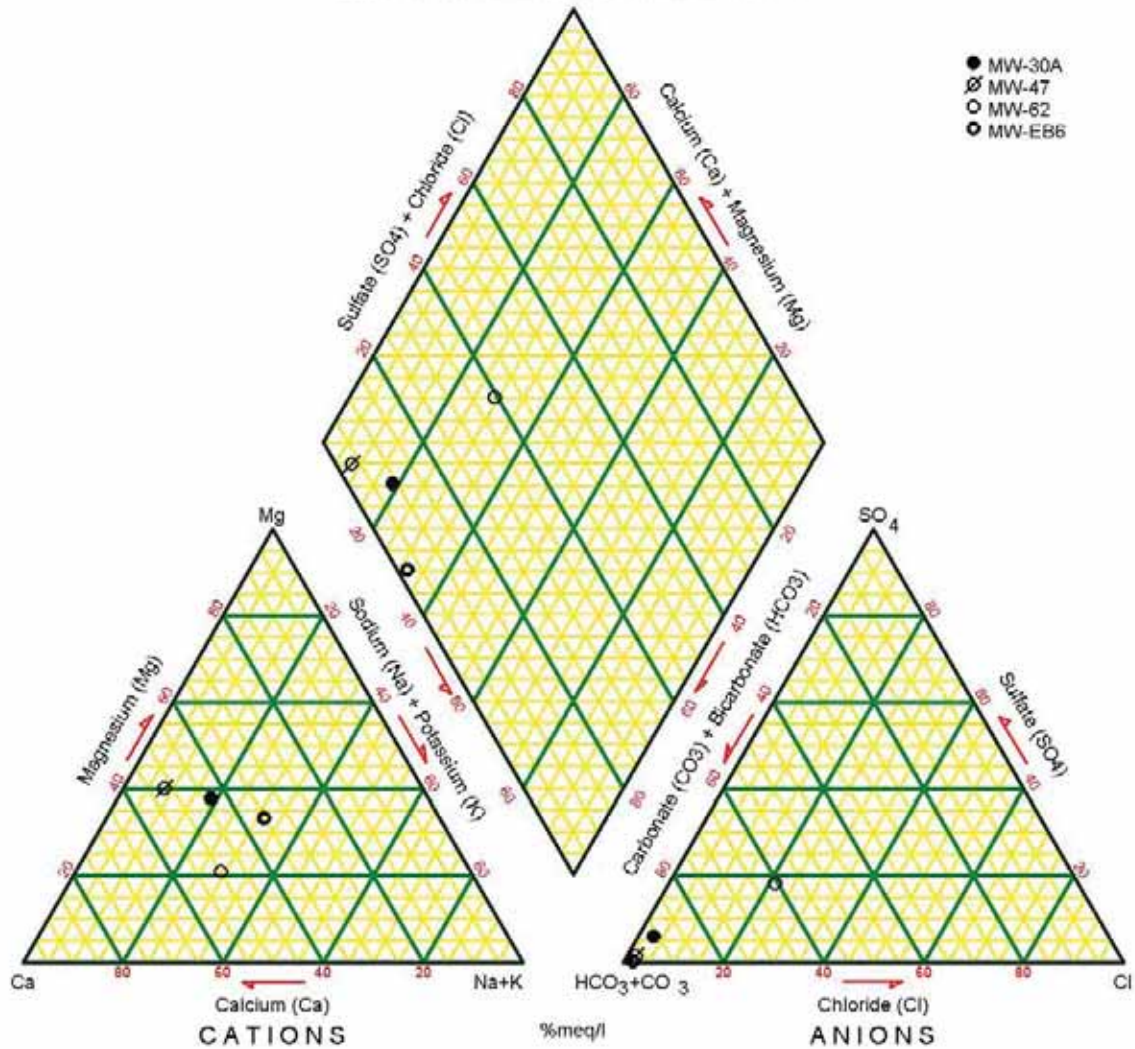


# Cedar Hills Regional Landfill

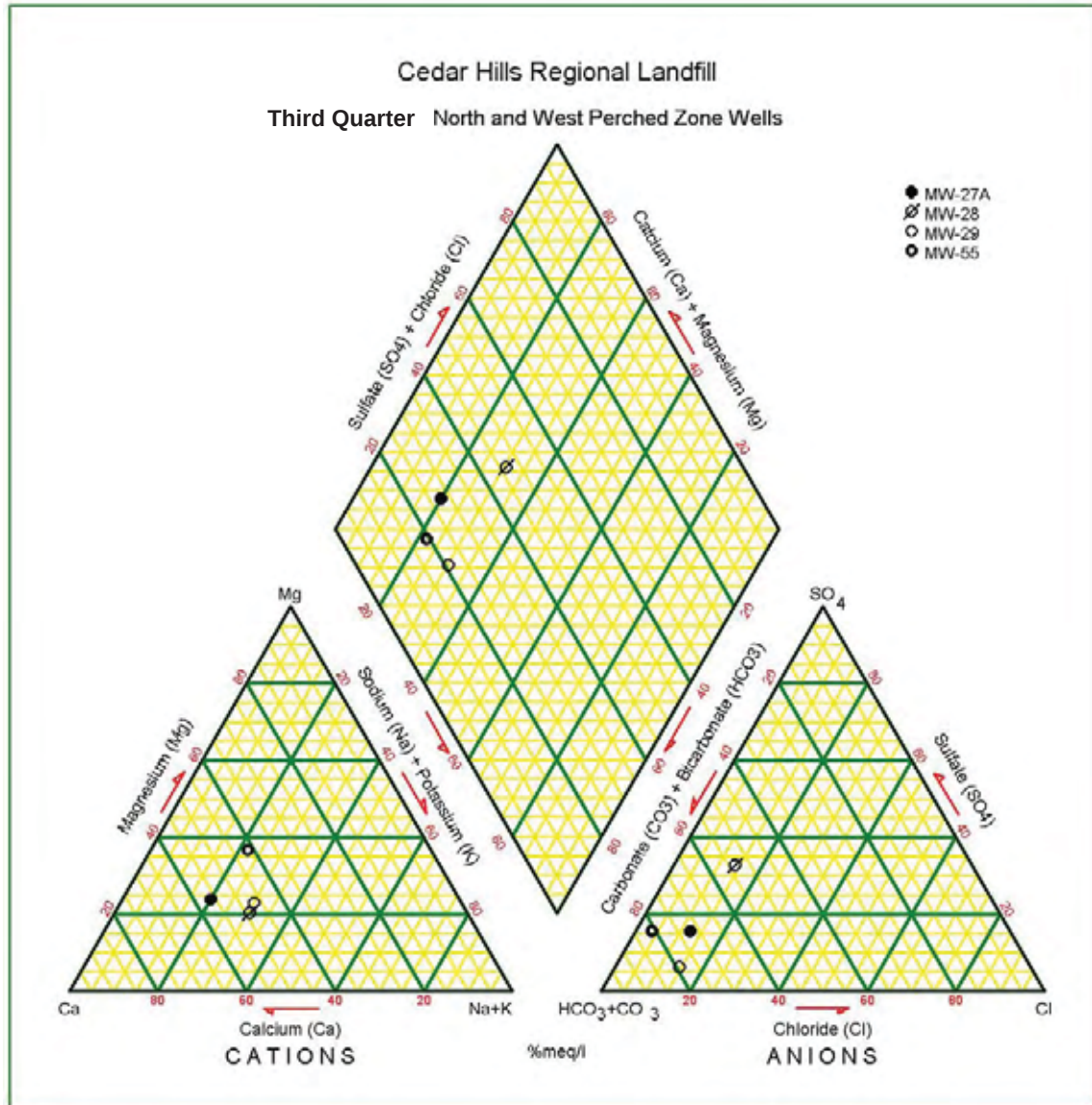
North and West Perched Wells 2nd Quarter 2010



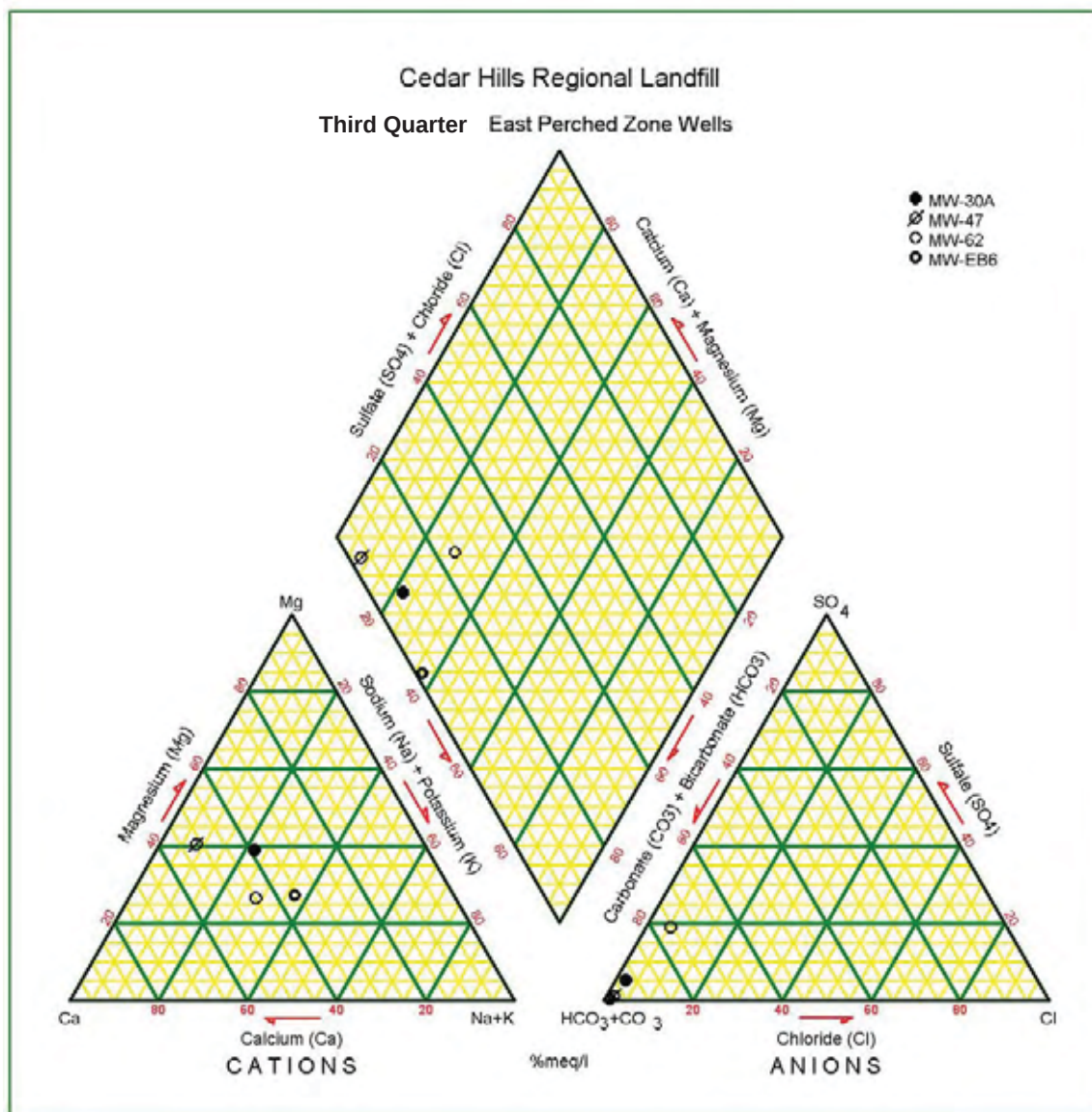
Cedar Hills Regional Landfill  
East Perched Zone Wells 2nd Quarter 2010

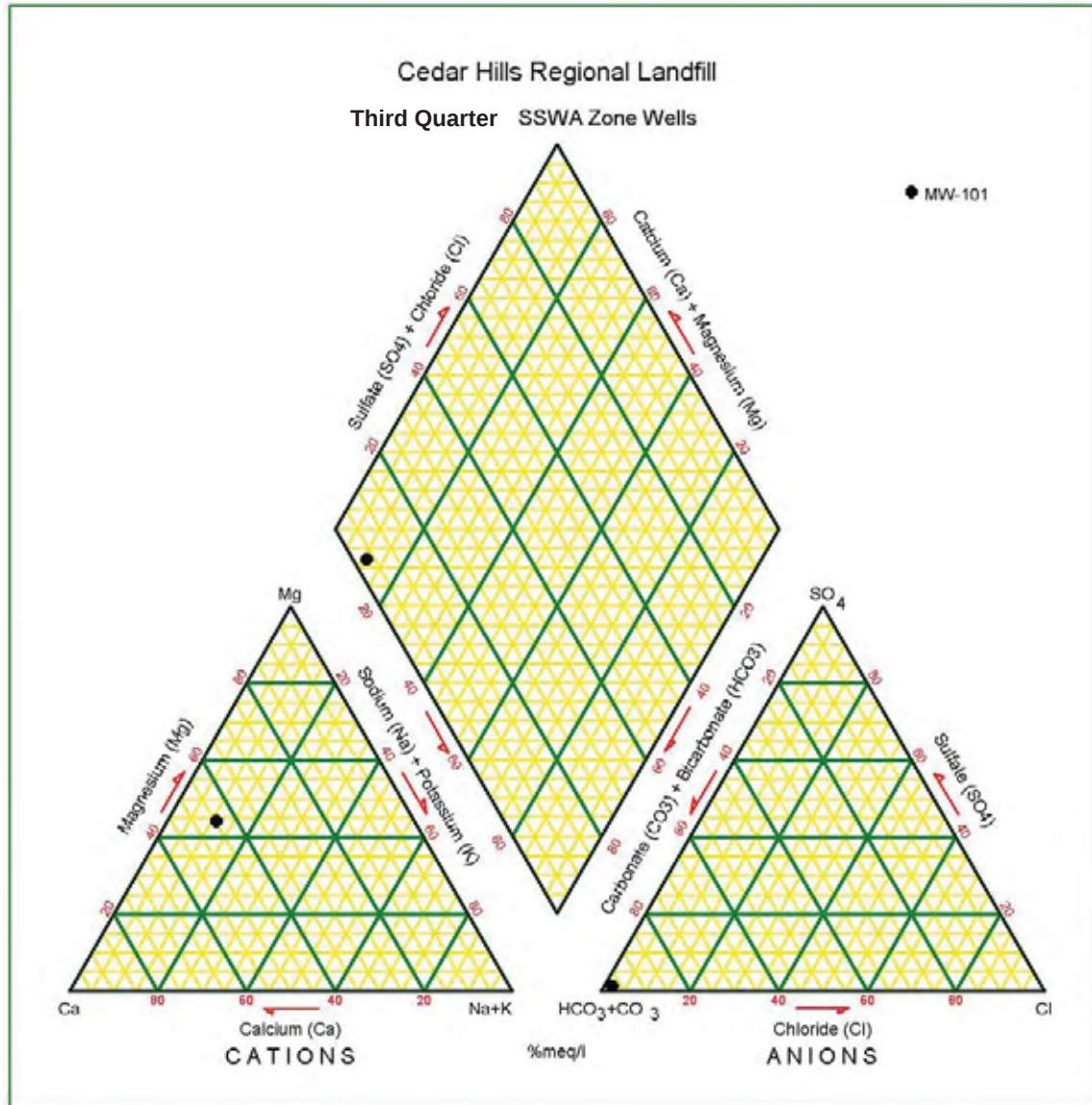


Cedar Hills Regional Landfill  
Third Quarter North and West Perched Zone Wells



Cedar Hills Regional Landfill  
Third Quarter East Perched Zone Wells

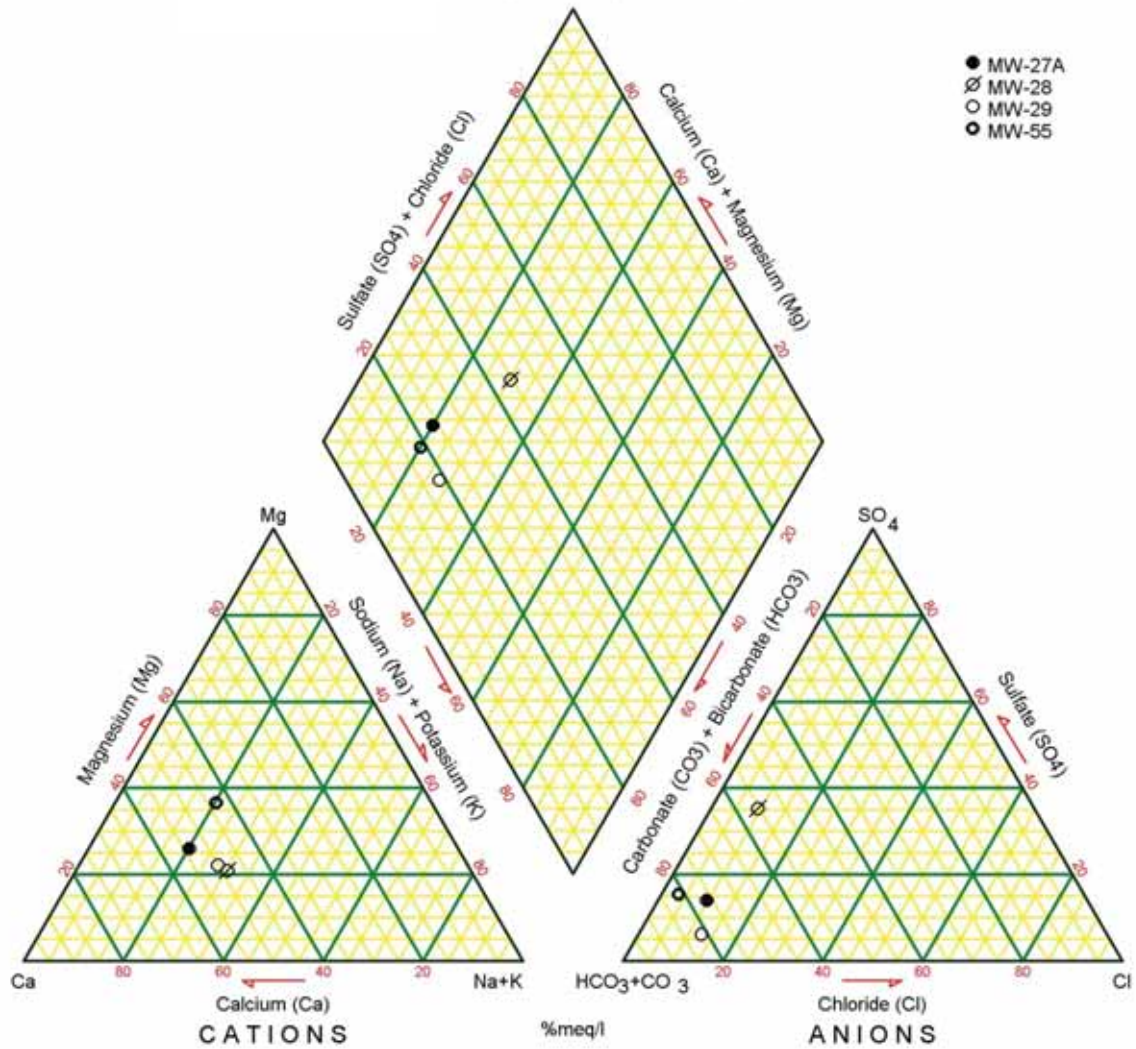




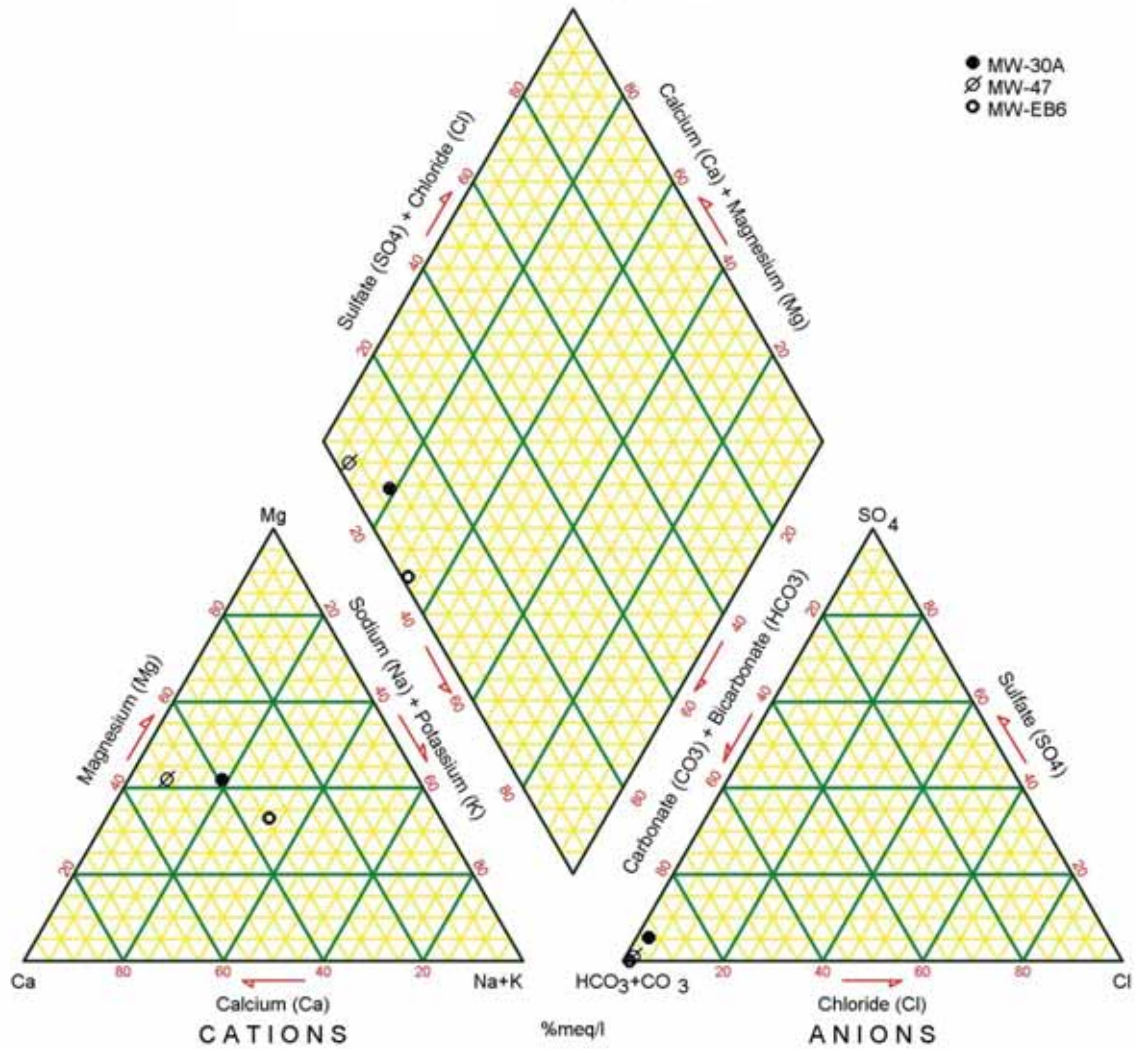


# Cedar Hills Regional Landfill

Fourth Quarter Perched Zone North and West Wells



**Cedar Hills Regional Landfill**  
**Fourth Quarter East Perched Zone Wells**



**Cedar Hills Regional Landfill**  
**Fourth Quarter SSWA Perched Zone Wells**

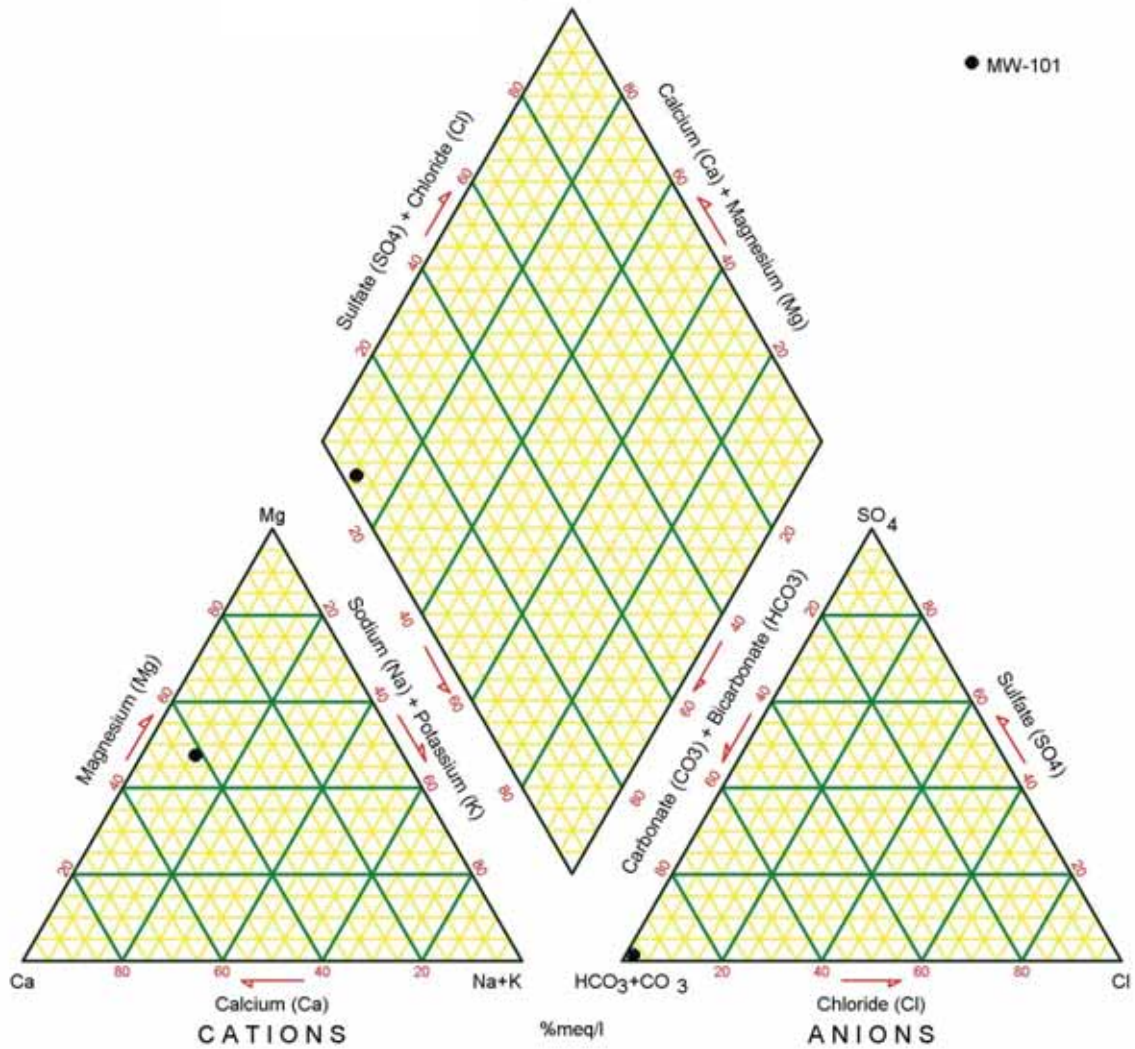




Table 7

**Ion Balance Calculations  
Cedar Hills Landfill Perched Zones GW Monitoring Wells**

Data Collected from December 1, 2009 to March 31, 2010

| Site ID<br>Date                                                | MW   | n | MW-27A<br>1/8/2010 |             |        | MW-28<br>1/8/2010 |             |        | MW-29<br>1/5/2010 |             |        | MW-55<br>1/5/2010 |             |        | MW-30A<br>1/6/2010 |             |        |
|----------------------------------------------------------------|------|---|--------------------|-------------|--------|-------------------|-------------|--------|-------------------|-------------|--------|-------------------|-------------|--------|--------------------|-------------|--------|
|                                                                |      |   | mg/L               | meq/L       | %(meq) | mg/L              | meq/L       | %(meq) | mg/L              | meq/L       | %(meq) | mg/L              | meq/L       | %(meq) | mg/L               | meq/L       | %(meq) |
| Cations                                                        |      |   |                    |             |        |                   |             |        |                   |             |        |                   |             |        |                    |             |        |
| Calcium                                                        | 40.1 | 2 | 16.7               | 0.83333     | 53.3   | 9.1               | 0.45509     | 47.2   | 6.9               | 0.34182     | 48.5   | 11.9              | 0.59381     | 42.1   | 29.2               | 1.45709     | 41.2   |
| Magnesium                                                      | 24.3 | 2 | 4.8                | 0.39333     | 25.2   | 2.4               | 0.19502     | 20.2   | 1.8               | 0.14812     | 21.0   | 6.3               | 0.51841     | 36.8   | 17.7               | 1.45649     | 41.2   |
| Potassium                                                      | 39.1 | 1 | 2.6                | 0.06752     | 4.3    | 0.9               | 0.02397     | 2.5    | 0.5               | 0.01287     | 1.8    | 1.5               | 0.03939     | 2.8    | 1.7                | 0.04246     | 1.2    |
| Sodium                                                         | 23.0 | 1 | 6.0                | 0.26229     | 16.8   | 6.6               | 0.28752     | 29.8   | 4.6               | 0.19922     | 28.3   | 5.5               | 0.23793     | 16.9   | 13.3               | 0.57852     | 16.4   |
| Iron                                                           | 55.8 | 2 | 0.1                | 0.00179     | 0.1    | 0.1               | 0.00179     | 0.2    | 0.1               | 0.00179     | 0.3    | 0.3               | 0.01053     | 0.7    | 0.1                | 0.00179     | 0.1    |
| Manganese                                                      | 54.9 | 2 | 0.0                | 0.00113     | 0.1    | 0.0               | 3.6E-05     | 0.0    | 0.0               | 3.6E-05     | 0.0    | 0.2               | 0.00564     | 0.4    | 0.0                | 3.6E-05     | 0.0    |
| Ammonia-N                                                      | 14.0 | 1 | 0.1                | 0.00389     | 0.2    | 0.0               | 0.00086     | 0.1    | 0.0               | 0.00071     | 0.1    | 0.1               | 0.00434     | 0.3    | 0.0                | 0.00071     | 0.0    |
| <b>Total Cations (meq/L)</b>                                   |      |   |                    | <b>1.6</b>  |        |                   | <b>1.0</b>  |        |                   | <b>0.7</b>  |        |                   | <b>1.4</b>  |        |                    | <b>3.5</b>  |        |
| Anions                                                         |      |   |                    |             |        |                   |             |        |                   |             |        |                   |             |        |                    |             |        |
| Alkalinity, Total                                              |      |   | 59                 |             |        | 26.4              |             |        | 26.8              |             |        | 66.5              |             |        | 160                |             |        |
| Carbonate                                                      | 60.0 | 2 | 0.07386            | 0.00246     | 0.2    | 0.00118           | 3.9E-05     | 0.0    | 0.00125           | 4.2E-05     | 0.0    | 0.19493           | 0.0065      | 0.4    | 0.01634            | 0.00054     | 0.0    |
| Bicarbonate                                                    | 61.0 | 1 | 71.71              | 1.17536     | 71.8   | 32.21             | 0.52788     | 51.6   | 32.69             | 0.53588     | 66.0   | 80.73             | 1.3233      | 81.6   | 195.17             | 3.19897     | 86.6   |
| Chloride                                                       | 35.5 | 1 | 6.6                | 0.18701     | 11.4   | 4.5               | 0.12693     | 12.4   | 3.6               | 0.10211     | 12.6   | 2.2               | 0.06121     | 3.8    | 4.5                | 0.12721     | 3.4    |
| Nitrate-N                                                      | 14.0 | 1 | 0.8                | 0.05433     | 3.3    | 0.4               | 0.02749     | 2.7    | 1.9               | 0.13707     | 16.9   | 0.0               | 0.00071     | 0.0    | 1.1                | 0.0771      | 2.1    |
| Sulfate                                                        | 96.1 | 2 | 10.5               | 0.21862     | 13.3   | 16.4              | 0.34146     | 33.4   | 1.8               | 0.03727     | 4.6    | 11.0              | 0.22903     | 14.1   | 14.0               | 0.29149     | 7.9    |
| <b>Total Anions (meq/L)</b>                                    |      |   |                    | <b>1.6</b>  |        |                   | <b>1.0</b>  |        |                   | <b>0.8</b>  |        |                   | <b>1.6</b>  |        |                    | <b>3.7</b>  |        |
| <b>Total Ions (meq/L)</b>                                      |      |   |                    | <b>3.2</b>  |        |                   | <b>2.0</b>  |        |                   | <b>1.5</b>  |        |                   | <b>3.0</b>  |        |                    | <b>7.2</b>  |        |
| <b>Cation/Anion Ratio</b>                                      |      |   |                    | <b>0.95</b> |        |                   | <b>0.94</b> |        |                   | <b>0.87</b> |        |                   | <b>0.87</b> |        |                    | <b>0.96</b> |        |
| <b>Percent Difference</b>                                      |      |   |                    | <b>-2.3</b> |        |                   | <b>-3.0</b> |        |                   | <b>-7.1</b> |        |                   | <b>-7.0</b> |        |                    | <b>-2.2</b> |        |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |      |   |                    |             |        |                   |             |        |                   |             |        |                   |             |        |                    |             |        |
| sum (Ca, Mg, Na+K)                                             |      |   |                    | 1.56        |        |                   | 0.96        |        |                   | 0.70        |        |                   | 1.39        |        |                    | 3.53        |        |
| Calcium                                                        |      |   |                    |             | 53.5   |                   |             | 47.3   |                   | 48.7        |        |                   |             | 42.7   |                    | 41.2        |        |
| Magnesium                                                      |      |   |                    |             | 25.3   |                   |             | 20.3   |                   | 21.1        |        |                   |             | 37.3   |                    | 41.2        |        |
| Sodium + Potassium                                             |      |   |                    |             | 21.2   |                   |             | 32.4   |                   | 30.2        |        |                   |             | 20.0   |                    | 17.6        |        |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) |      |   |                    | 1.58        |        |                   | 1.00        |        |                   | 0.68        |        |                   | 1.62        |        |                    | 3.62        |        |
| Sulfate                                                        |      |   |                    |             | 13.8   |                   |             | 34.3   |                   |             |        |                   |             | 14.1   |                    | 8.1         |        |
| Chloride                                                       |      |   |                    |             | 11.8   |                   |             | 12.7   |                   |             |        |                   |             | 3.8    |                    | 3.5         |        |
| Bicarbonate + Carbonate                                        |      |   |                    |             | 74.4   |                   |             | 53.0   |                   | 79.4        |        |                   |             | 82.1   |                    | 88.4        |        |

Table 7

**Ion Balance Calculations  
Cedar Hills Landfill Perched Zones GW Monitoring Wells**

Data Collected from December 1, 2009 to March 31, 2010

| Site ID                                                        | Date | MW-47 |             |         | MW-62 |         |             | MW-EB6 |         |             | MW-101 |             |         |
|----------------------------------------------------------------|------|-------|-------------|---------|-------|---------|-------------|--------|---------|-------------|--------|-------------|---------|
|                                                                |      | mg/L  | meq/L       | % (meq) | mg/L  | meq/L   | % (meq)     | mg/L   | meq/L   | % (meq)     | mg/L   | meq/L       | % (meq) |
| Cations                                                        | MW   | n     |             |         |       |         |             |        |         |             |        |             |         |
| Calcium                                                        | 40.1 | 2     | 119.0       | 5.93812 | 51.5  | 19.1    | 0.95309     | 14.2   | 0.70858 | 28.3        | 79.4   | 3.96208     | 43.9    |
| Magnesium                                                      | 24.3 | 2     | 56.6        | 4.65748 | 40.4  | 6.3     | 0.51677     | 8.2    | 0.67229 | 26.8        | 49.7   | 4.08969     | 45.3    |
| Potassium                                                      | 39.1 | 1     | 4.8         | 0.12379 | 1.1   | 1.0     | 0.02478     | 1.3    | 0.03376 | 1.3         | 3.1    | 0.07903     | 0.9     |
| Sodium                                                         | 23.0 | 1     | 17.1        | 0.74381 | 6.5   | 14.0    | 0.60897     | 28.9   | 0.68726 | 27.4        | 18.6   | 0.80906     | 9.0     |
| Iron                                                           | 55.8 | 2     | 0.0         | 0.00133 | 0.0   | 0.1     | 0.00179     | 0.1    | 8.8     | 0.31515     | 0.6    | 0.02027     | 0.2     |
| Manganese                                                      | 54.9 | 2     | 1.6         | 0.05643 | 0.5   | 0.0     | 3.6E-05     | 0.0    | 0.9     | 0.03153     | 1.7    | 0.06298     | 0.7     |
| Ammonia-N                                                      | 14.0 | 1     | 0.1         | 0.00857 | 0.1   | 0.0     | 0.00071     | 0.0    | 0.8     | 0.05733     | 0.0    | 0.00093     | 0.0     |
| <b>Total Cations (meq/L)</b>                                   |      |       | <b>11.5</b> |         |       |         | <b>2.1</b>  |        |         | <b>2.5</b>  |        | <b>9.0</b>  |         |
| Anions                                                         |      |       |             |         |       |         |             |        |         |             |        |             |         |
| Alkalinity, Total                                              |      |       | 640         |         | 70.8  |         |             | 102    |         |             | 426    |             |         |
| Carbonate                                                      | 60.0 | 2     | 0.39347     | 0.01312 | 0.1   | 0.01858 | 0.00062     | 0.0    | 0.00657 | 0.00022     | 0.1731 | 0.00577     | 0.1     |
| Bicarbonate                                                    | 61.0 | 1     | 780.00      | 12.785  | 96.8  | 86.34   | 1.41517     | 58.4   | 124.43  | 2.03947     | 519.37 | 8.51295     | 96.6    |
| Chloride                                                       | 35.5 | 1     | 8.4         | 0.23806 | 1.8   | 11.0    | 0.31027     | 12.8   | 1.3     | 0.03723     | 6.2    | 0.17601     | 2.0     |
| Nitrate-N                                                      | 14.0 | 1     | 0.0         | 0.00071 | 0.0   | 3.7     | 0.26701     | 11.0   | 0.0     | 0.00093     | 0.0    | 0           | 0.0     |
| Sulfate                                                        | 96.1 | 2     | 8.5         | 0.17698 | 1.3   | 20.7    | 0.43099     | 17.8   | 0.2     | 0.00354     | 5.8    | 0.11972     | 1.4     |
| <b>Total Anions (meq/L)</b>                                    |      |       | <b>13.2</b> |         |       |         | <b>2.4</b>  |        |         | <b>2.1</b>  |        | <b>8.8</b>  |         |
| <b>Total Ions (meq/L)</b>                                      |      |       | <b>24.7</b> |         |       |         | <b>4.5</b>  |        |         | <b>4.6</b>  |        | <b>17.8</b> |         |
| <b>Cation/Anion Ratio</b>                                      |      |       | <b>0.87</b> |         |       |         | <b>0.87</b> |        |         | <b>1.20</b> |        | <b>1.02</b> |         |
| <b>Percent Difference</b>                                      |      |       | <b>-6.8</b> |         |       |         | <b>-7.0</b> |        |         | <b>9.3</b>  |        | <b>1</b>    |         |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |      |       |             |         |       |         |             |        |         |             |        |             |         |
| sum (Ca, Mg, Na+K)                                             |      |       | 11.46       |         | 2.10  |         |             | 2.10   |         |             | 8.94   |             |         |
| Calcium                                                        |      |       |             | 51.8    |       |         | 45.31       |        |         | 33.71       |        |             | 44.32   |
| Magnesium                                                      |      |       |             | 40.6    |       |         | 24.57       |        |         | 31.98       |        |             | 45.75   |
| Sodium + Potassium                                             |      |       |             | 7.6     |       |         | 30.13       |        |         | 34.30       |        |             | 9.93    |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) |      |       | 13.21       |         | 2.16  |         |             | 2.08   |         |             | 8.81   |             |         |
| Sulfate                                                        |      |       |             | 1.3     |       |         | 20.0        |        |         | 0.2         |        |             | 1.4     |
| Chloride                                                       |      |       |             | 1.8     |       |         | 14.4        |        |         | 1.8         |        |             | 2.0     |
| Bicarbonate + Carbonate                                        |      |       |             | 96.9    |       |         | 65.6        |        |         | 98.0        |        |             | 96.6    |

**Ion Balance Calculations**  
**Cedar Hills Landfill Perched Zones GW Monitoring Wells**

Data Collected from April 1, 2010 to June 30, 2010

| Site ID                                                        | Date | North and West Perched Wells |         |             |        |                   |             |        |  |                   |             |        |      |
|----------------------------------------------------------------|------|------------------------------|---------|-------------|--------|-------------------|-------------|--------|--|-------------------|-------------|--------|------|
|                                                                |      | MW-27A<br>4/6/2010           |         |             |        | MW-28<br>4/5/2010 |             |        |  | MW-29<br>4/1/2010 |             |        |      |
| Cations                                                        | MW   | n                            | mg/L    | meq/L       | %(meq) | mg/L              | meq/L       | %(meq) |  | mg/L              | meq/L       | %(meq) |      |
| Calcium                                                        | 40.1 | 2                            | 8.7     | 0.43313     | 55.9   | 8.5               | 0.42265     | 50.9   |  | 7.4               | 0.36976     | 51.5   |      |
| Magnesium                                                      | 24.3 | 2                            | 2.1     | 0.1761      | 22.7   | 2.0               | 0.16458     | 19.8   |  | 1.7               | 0.14236     | 19.8   |      |
| Potassium                                                      | 39.1 | 1                            | 1.3     | 0.03274     | 4.2    | 0.9               | 0.02379     | 2.9    |  | 0.5               | 0.01368     | 1.9    |      |
| Sodium                                                         | 23.0 | 1                            | 3.0     | 0.13093     | 16.9   | 5.0               | 0.21836     | 26.3   |  | 4.4               | 0.19008     | 26.5   |      |
| Iron                                                           | 55.8 | 2                            | 0.0     | 0.00036     | 0.0    | 0.0               | 0.00036     | 0.0    |  | 0.0               | 0.00068     | 0.1    |      |
| Manganese                                                      | 54.9 | 2                            | 0.0     | 0.00038     | 0.0    | 0.0               | 3.6E-05     | 0.0    |  | 0.0               | 3.6E-05     | 0.0    |      |
| Ammonia-N                                                      | 14.0 | 1                            | 0.0     | 0.00157     | 0.2    | 0.0               | 0.00071     | 0.1    |  | 0.0               | 0.00071     | 0.1    |      |
| <b>Total Cations (meq/L)</b>                                   |      |                              |         | <b>0.8</b>  |        |                   | <b>0.8</b>  |        |  |                   | <b>0.7</b>  |        |      |
| <b>Anions</b>                                                  |      |                              |         |             |        |                   |             |        |  |                   |             |        |      |
| Alkalinity, Total                                              |      |                              | 29      |             |        | 23.8              |             |        |  | 27.1              |             |        | 65   |
| Carbonate                                                      | 60.0 | 2                            | 1.7E-09 | 5.7E-11     | 0.0    | 1.4E-09           | 4.8E-11     | 0.0    |  | 0.00409           | 0.00014     | 0.0    |      |
| Bicarbonate                                                    | 61.0 | 1                            | 34.77   | 0.56991     | 66.7   | 29.04             | 0.47593     | 50.7   |  | 33.05             | 0.54178     | 66.1   |      |
| Chloride                                                       | 35.5 | 1                            | 3.5     | 0.09872     | 11.6   | 4.3               | 0.12157     | 13.0   |  | 3.6               | 0.10182     | 12.4   |      |
| Nitrate-N                                                      | 14.0 | 1                            | 1.1     | 0.07853     | 9.2    | 0.4               | 0.02627     | 2.8    |  | 2.0               | 0.13922     | 17.0   |      |
| Sulfate                                                        | 96.1 | 2                            | 5.2     | 0.10744     | 12.6   | 15.1              | 0.31439     | 33.5   |  | 1.8               | 0.03664     | 4.5    |      |
| <b>Total Anions (meq/L)</b>                                    |      |                              |         | <b>0.9</b>  |        |                   | <b>0.9</b>  |        |  |                   | <b>0.8</b>  |        |      |
| <b>Total Ions (meq/L)</b>                                      |      |                              |         | <b>1.6</b>  |        |                   | <b>1.8</b>  |        |  |                   | <b>1.5</b>  |        |      |
| <b>Cation/Anion Ratio</b>                                      |      |                              |         | <b>0.91</b> |        |                   | <b>0.89</b> |        |  |                   | <b>0.88</b> |        |      |
| <b>Percent Difference</b>                                      |      |                              |         | <b>-4.9</b> |        |                   | <b>-6.1</b> |        |  |                   | <b>-6.7</b> |        |      |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |      |                              |         |             |        |                   |             |        |  |                   |             |        |      |
| sum (Ca, Mg, Na+K)                                             |      |                              | 0.77    |             |        | 0.83              |             |        |  | 0.72              |             |        | 1.34 |
| Calcium                                                        |      |                              |         | 56.0        |        |                   |             | 51.0   |  |                   |             | 51.7   | 41.0 |
| Magnesium                                                      |      |                              |         | 22.8        |        |                   |             | 19.8   |  |                   |             | 19.9   | 38.3 |
| Sodium + Potassium                                             |      |                              |         | 21.2        |        |                   |             | 29.2   |  |                   |             | 28.5   | 20.8 |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) |      |                              | 0.78    |             |        | 0.91              |             |        |  | 0.68              |             |        | 1.61 |
| Sulfate                                                        |      |                              |         | 13.8        |        |                   |             | 34.5   |  |                   |             | 5.4    | 15.8 |
| Chloride                                                       |      |                              |         | 12.7        |        |                   |             | 13.3   |  |                   |             | 15.0   | 3.5  |
| Bicarbonate + Carbonate                                        |      |                              |         | 73.4        |        |                   |             | 52.2   |  |                   |             | 79.6   | 80.7 |

**Ion Balance Calculations  
Cedar Hills Landfill Perched Zones GW Monitoring Wells**

Data Collected from April 1, 2010 to June 30, 2010

| East Perched Zone                                              |      |   |                    |         |        |                    |         |        |                   |         |        |                    |         |        |
|----------------------------------------------------------------|------|---|--------------------|---------|--------|--------------------|---------|--------|-------------------|---------|--------|--------------------|---------|--------|
| Site ID<br>Date                                                | MW   | n | MW-30A<br>4/1/2010 |         |        | MW-47<br>4/14/2010 |         |        | MW-62<br>4/6/2010 |         |        | MW-EB6<br>4/9/2010 |         |        |
|                                                                |      |   | mg/L               | meq/L   | %(meq) | mg/L               | meq/L   | %(meq) | mg/L              | meq/L   | %(meq) | mg/L               | meq/L   | %(meq) |
| Cations                                                        |      |   | 32.7               | 1.63174 | 43.4   | 105.0              | 5.23952 | 51.3   | 19.4              | 0.96806 | 49.8   | 12.5               | 0.62375 | 30.0   |
| Calcium                                                        | 40.1 | 2 | 17.3               | 1.42358 | 37.9   | 49.5               | 4.07324 | 39.9   | 5.0               | 0.40732 | 21.0   | 7.2                | 0.59247 | 28.5   |
| Magnesium                                                      | 24.3 | 2 | 1.8                | 0.04578 | 1.2    | 4.5                | 0.11433 | 1.1    | 1.0               | 0.02609 | 1.3    | 1.4                | 0.0353  | 1.7    |
| Potassium                                                      | 39.1 | 1 | 15.1               | 0.65681 | 17.5   | 16.7               | 0.72641 | 7.1    | 12.4              | 0.53937 | 27.8   | 12.1               | 0.52632 | 25.3   |
| Sodium                                                         | 23.0 | 1 | 0.0                | 0.00036 | 0.0    | 0.0                | 0.0014  | 0.0    | 0.0               | 0.00036 | 0.0    | 5.6                | 0.20055 | 9.6    |
| Iron                                                           | 55.8 | 2 | 0.0                | 3.6E-05 | 0.0    | 1.3                | 0.04733 | 0.5    | 0.0               | 3.6E-05 | 0.0    | 0.7                | 0.02465 | 1.2    |
| Manganese                                                      | 54.9 | 2 | 0.0                | 0.00071 | 0.0    | 0.1                | 0.00465 | 0.0    | 0.0               | 0.00071 | 0.0    | 1.1                | 0.07925 | 3.8    |
| Ammonia-N                                                      | 14.0 | 1 |                    |         |        |                    |         |        |                   |         |        |                    |         |        |
| Total Cations (meq/L)                                          |      |   |                    | 3.8     |        |                    | 10.2    |        |                   | 1.9     |        |                    | 2.1     |        |
| Anions                                                         |      |   |                    |         |        |                    |         |        |                   |         |        |                    |         |        |
| Alkalinity, Total                                              |      |   | 178                |         |        | 613                |         |        | 57.7              |         |        | 92.3               |         |        |
| Carbonate                                                      | 60.0 | 2 | 0.02881            | 0.00096 | 0.0    | 3.7E-08            | 1.2E-09 | 0.0    | 3.5E-09           | 1.2E-10 | 0.0    | 5.6E-09            | 1.9E-10 | 0.0    |
| Bicarbonate                                                    | 61.0 | 1 | 217.10             | 3.5585  | 89.4   | 747.86             | 12.2582 | 96.8   | 70.39             | 1.15383 | 54.0   | 112.61             | 1.84572 | 97.9   |
| Chloride                                                       | 35.5 | 1 | 4.4                | 0.12298 | 3.1    | 8.1                | 0.2296  | 1.8    | 14.4              | 0.40617 | 19.0   | 1.3                | 0.03639 | 1.9    |
| Nitrate-N                                                      | 14.0 | 1 | 0.9                | 0.0664  | 1.7    | 0.0                | 0.00071 | 0.0    | 3.2               | 0.2306  | 10.8   | 0.0                | 0.00071 | 0.0    |
| Sulfate                                                        | 96.1 | 2 | 11.2               | 0.23319 | 5.9    | 8.2                | 0.16969 | 1.3    | 16.7              | 0.34771 | 16.3   | 0.1                | 0.00291 | 0.2    |
| Total Anions (meq/L)                                           |      |   |                    | 4.0     |        |                    | 12.7    |        |                   | 2.1     |        |                    | 1.9     |        |
| Total Ions (meq/L)                                             |      |   |                    | 7.7     |        |                    | 22.9    |        |                   | 4.1     |        |                    | 4.0     |        |
| Cation/Anion Ratio                                             |      |   |                    | 0.94    |        |                    | 0.81    |        |                   | 0.91    |        |                    | 1.10    |        |
| Percent Difference                                             |      |   |                    | -2.9    |        |                    | -10.7   |        |                   | -4.8    |        |                    | 5.0     |        |
| TRILINEAR DIAGRAM DATA                                         |      |   |                    |         |        |                    |         |        |                   |         |        |                    |         |        |
| sum (Ca, Mg, Na+K)                                             |      |   | 3.76               |         |        | 10.15              |         |        | 1.94              |         |        | 1.78               |         |        |
| Calcium                                                        |      |   |                    | 43.4    |        | 51.6               |         |        |                   | 49.88   |        |                    | 35.08   |        |
| Magnesium                                                      |      |   |                    | 37.9    |        | 40.1               |         |        |                   | 20.99   |        |                    | 33.33   |        |
| Sodium + Potassium                                             |      |   |                    | 18.7    |        | 8.3                |         |        |                   | 29.13   |        |                    | 31.59   |        |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) |      |   | 3.92               |         |        | 12.66              |         |        | 1.91              |         |        | 1.89               |         |        |
| Sulfate                                                        |      |   |                    | 6.0     |        | 1.3                |         |        |                   | 18.2    |        |                    | 0.2     |        |
| Chloride                                                       |      |   |                    | 3.1     |        | 1.8                |         |        |                   | 21.3    |        |                    | 1.9     |        |
| Bicarbonate + Carbonate                                        |      |   |                    | 90.9    |        | 96.8               |         |        |                   | 60.5    |        |                    | 97.9    |        |

**Ion Balance Calculations**  
**Cedar Hills Landfill Perched Zones GW Monitoring Wells**

Data Collected from July 1, 2010 to September 30, 2010

| North and West Perched Wells                                   |         |                     |   |         |         |                   |         |         |         |                    |         |         |         |                    |         |
|----------------------------------------------------------------|---------|---------------------|---|---------|---------|-------------------|---------|---------|---------|--------------------|---------|---------|---------|--------------------|---------|
| Site ID                                                        |         | MW-27A<br>7/12/2010 |   |         |         | MW-28<br>7/8/2010 |         |         |         | MW-29<br>7/26/2010 |         |         |         | MW-55<br>7/29/2010 |         |
| Date                                                           | Cations | MW                  | n | mg/L    | meq/L   | % (meq)           | mg/L    | meq/L   | % (meq) | mg/L               | meq/L   | % (meq) | mg/L    | meq/L              | % (meq) |
| Calcium                                                        | 40.1    | 2                   |   | 24.7    | 1.23253 | 55.9              | 9.4     | 0.46657 | 49.1    | 6.7                | 0.33184 | 46.8    | 11.4    | 0.56886            | 40.9    |
| Magnesium                                                      | 24.3    | 2                   |   | 6.4     | 0.52335 | 23.7              | 2.3     | 0.19255 | 20.3    | 2.0                | 0.16211 | 22.9    | 6.1     | 0.5036             | 36.2    |
| Potassium                                                      | 39.1    | 1                   |   | 3.9     | 0.10026 | 4.5               | 1.0     | 0.02609 | 2.7     | 0.5                | 0.01348 | 1.9     | 1.6     | 0.04195            | 3.0     |
| Sodium                                                         | 23.0    | 1                   |   | 7.8     | 0.33798 | 15.3              | 6.1     | 0.26403 | 27.8    | 4.6                | 0.20052 | 28.3    | 6.0     | 0.26012            | 18.7    |
| Iron                                                           | 55.8    | 2                   |   | 0.0     | 0.00036 | 0.0               | 0.0     | 0.00036 | 0.0     | 0.0                | 0.00036 | 0.1     | 0.2     | 0.00845            | 0.6     |
| Manganese                                                      | 54.9    | 2                   |   | 0.0     | 0.00146 | 0.1               | 0.0     | 0.00012 | 0.0     | 0.0                | 3.6E-05 | 0.0     | 0.2     | 0.00582            | 0.4     |
| Ammonia-N                                                      | 14.0    | 1                   |   | 0.1     | 0.00878 | 0.4               | 0.0     | 0.00071 | 0.1     | 0.0                | 0.00071 | 0.1     | 0.1     | 0.00371            | 0.3     |
| Total Cations (meq/L)                                          |         |                     |   | 2.2     |         |                   | 1.0     |         |         | 0.7                |         |         | 1.4     |                    |         |
| Anions                                                         |         |                     |   | 80      |         |                   | 24.8    |         |         | 25.1               |         |         | 62      |                    |         |
| Alkalinity, Total                                              |         |                     |   |         |         |                   |         |         |         |                    |         |         |         |                    |         |
| Carbonate                                                      | 60.0    | 2                   |   | 0.22288 | 0.00743 | 0.3               | 0.00068 | 2.3E-05 | 0.0     | 0.00169            | 5.6E-05 | 0.0     | 0.31469 | 0.01049            | 0.7     |
| Bicarbonate                                                    | 61.0    | 1                   |   | 96.66   | 1.58433 | 71.7              | 30.25   | 0.4959  | 52.4    | 30.62              | 0.50187 | 65.9    | 75.00   | 1.22932            | 79.9    |
| Chloride                                                       | 35.5    | 1                   |   | 9.6     | 0.27163 | 12.3              | 4.6     | 0.1289  | 13.6    | 3.3                | 0.09223 | 12.1    | 2.0     | 0.05585            | 3.6     |
| Nitrate-N                                                      | 14.0    | 1                   |   | 0.0     | 0.00304 | 0.1               | 0.2     | 0.01699 | 1.8     | 1.8                | 0.12779 | 16.8    | 0.0     | 0.00071            | 0.0     |
| Sulfate                                                        | 96.1    | 2                   |   | 16.5    | 0.34354 | 15.5              | 14.6    | 0.30398 | 32.1    | 1.9                | 0.03956 | 5.2     | 11.6    | 0.24152            | 15.7    |
| Total Anions (meq/L)                                           |         |                     |   | 2.2     |         |                   | 0.9     |         |         | 0.8                |         |         | 1.5     |                    |         |
| Total Ions (meq/L)                                             |         |                     |   | 4.4     |         |                   | 1.9     |         |         | 1.5                |         |         | 2.9     |                    |         |
| Cation/Anion Ratio                                             |         |                     |   | 1.00    |         |                   | 1.00    |         |         | 0.93               |         |         | 0.91    |                    |         |
| Percent Difference                                             |         |                     |   | -0.1    |         |                   | 0.2     |         |         | -3.6               |         |         | -5.0    |                    |         |
| TRILINEAR DIAGRAM DATA                                         |         |                     |   |         |         |                   |         |         |         |                    |         |         |         |                    |         |
| sum (Ca, Mg, Na+K)                                             |         |                     |   | 2.19    |         |                   | 0.95    |         |         | 0.71               |         |         | 1.37    |                    |         |
| Calcium                                                        |         |                     |   | 56.2    |         |                   |         | 49.2    |         |                    | 46.9    |         |         | 41.4               |         |
| Magnesium                                                      |         |                     |   | 23.9    |         |                   |         | 20.3    |         |                    | 22.9    |         |         | 36.6               |         |
| Sodium + Potassium                                             |         |                     |   | 20.0    |         |                   |         | 30.6    |         |                    | 30.2    |         |         | 22.0               |         |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) |         |                     |   | 2.21    |         |                   | 0.93    |         |         | 0.63               |         |         | 1.54    |                    |         |
| Sulfate                                                        |         |                     |   | 15.6    |         |                   |         | 32.7    |         |                    | 6.2     |         |         | 15.7               |         |
| Chloride                                                       |         |                     |   | 12.3    |         |                   |         | 13.9    |         |                    | 14.6    |         |         | 3.6                |         |
| Bicarbonate + Carbonate                                        |         |                     |   | 72.1    |         |                   |         | 53.4    |         |                    | 79.2    |         |         | 80.7               |         |

**Ion Balance Calculations  
Cedar Hills Landfill Perched Zones GW Monitoring Wells**

Data Collected from July 1, 2010 to September 30, 2010

| Site ID                                                        |      |   | East Perched Zone   |         |        |         |                    |        |         |         |                   |         |         |        | SSWA               |         |        |      |                     |        |  |
|----------------------------------------------------------------|------|---|---------------------|---------|--------|---------|--------------------|--------|---------|---------|-------------------|---------|---------|--------|--------------------|---------|--------|------|---------------------|--------|--|
| Date                                                           |      |   | MW-30A<br>7/28/2010 |         |        |         | MW-47<br>7/27/2010 |        |         |         | MW-62<br>7/7/2010 |         |         |        | MW-EB6<br>7/8/2010 |         |        |      | MW-101<br>7/30/2010 |        |  |
| Cations                                                        | MW   | n | mg/L                | meq/L   | %(meq) | mg/L    | meq/L              | %(meq) | mg/L    | meq/L   | %(meq)            | mg/L    | meq/L   | %(meq) | mg/L               | meq/L   | %(meq) | mg/L | meq/L               | %(meq) |  |
| Calcium                                                        | 40.1 | 2 | 28.4                | 1.41717 | 39.0   | 116.0   | 5.78842            | 51.0   | 26.7    | 1.33234 | 44.9              | 13.6    | 0.67864 | 31.2   | 65.5               | 3.26846 | 44.2   |      |                     |        |  |
| Magnesium                                                      | 24.3 | 2 | 17.2                | 1.41535 | 38.9   | 55.5    | 4.56696            | 40.3   | 9.6     | 0.78749 | 26.5              | 6.3     | 0.51923 | 23.8   | 39.3               | 3.2339  | 43.8   |      |                     |        |  |
| Potassium                                                      | 39.1 | 1 | 1.8                 | 0.04629 | 1.3    | 4.9     | 0.12456            | 1.1    | 1.4     | 0.03504 | 1.2               | 1.7     | 0.04322 | 2.0    | 2.9                | 0.07468 | 1.0    |      |                     |        |  |
| Sodium                                                         | 23.0 | 1 | 17.4                | 0.75686 | 20.8   | 18.5    | 0.80471            | 7.1    | 18.7    | 0.81341 | 27.4              | 15.1    | 0.65681 | 30.2   | 17.0               | 0.73946 | 10.0   |      |                     |        |  |
| Iron                                                           | 55.8 | 2 | 0.0                 | 0.00036 | 0.0    | 0.1     | 0.00211            | 0.0    | 0.0     | 0.00036 | 0.0               | 3.8     | 0.13573 | 6.2    | 0.5                | 0.01683 | 0.2    |      |                     |        |  |
| Manganese                                                      | 54.9 | 2 | 0.0                 | 3.6E-05 | 0.0    | 1.4     | 0.04987            | 0.4    | 0.0     | 3.6E-05 | 0.0               | 0.8     | 0.02941 | 1.4    | 1.6                | 0.05643 | 0.8    |      |                     |        |  |
| Ammonia-N                                                      | 14.0 | 1 | 0.0                 | 0.00071 | 0.0    | 0.1     | 0.00709            | 0.1    | 0.0     | 0.00071 | 0.0               | 1.6     | 0.11423 | 5.2    | 0.0                | 0.00143 | 0.0    |      |                     |        |  |
| Total Cations (meq/L)                                          |      |   | 3.6                 |         |        | 11.3    |                    |        | 3.0     |         |                   | 2.2     |         |        | 7.4                |         |        |      |                     |        |  |
| Anions                                                         |      |   |                     |         |        |         |                    |        |         |         |                   |         |         |        |                    |         |        |      |                     |        |  |
| Alkalinity, Total                                              |      |   | 184                 |         |        | 617     |                    |        | 104     |         |                   | 97.8    |         |        | 427                |         |        |      |                     |        |  |
| Carbonate                                                      | 60.0 | 2 | 0.01563             | 0.00052 | 0.0    | 0.54805 | 0.01827            | 0.1    | 0.03854 | 0.00128 | 0.0               | 0.01121 | 0.00037 | 0.0    | 0.1657             | 0.00552 | 0.1    |      |                     |        |  |
| Bicarbonate                                                    | 61.0 | 1 | 224.45              | 3.67892 | 91.2   | 751.63  | 12.3199            | 97.1   | 126.80  | 2.0784  | 68.7              | 119.29  | 1.95533 | 98.4   | 520.60             | 8.53319 | 96.8   |      |                     |        |  |
| Chloride                                                       | 35.5 | 1 | 3.3                 | 0.09223 | 2.3    | 7.7     | 0.21578            | 1.7    | 5.4     | 0.1526  | 5.0               | 0.8     | 0.02296 | 1.2    | 5.7                | 0.1619  | 1.8    |      |                     |        |  |
| Nitrate-N                                                      | 14.0 | 1 | 0.7                 | 0.05012 | 1.2    | 0.0     | 0.00071            | 0.0    | 3.8     | 0.26772 | 8.9               | 0.0     | 0.00193 | 0.1    | 0.0                | 0.00071 | 0.0    |      |                     |        |  |
| Sulfate                                                        | 96.1 | 2 | 10.2                | 0.21237 | 5.3    | 6.7     | 0.13888            | 1.1    | 25.2    | 0.52469 | 17.3              | 0.3     | 0.00618 | 0.3    | 5.7                | 0.11826 | 1.3    |      |                     |        |  |
| Total Anions (meq/L)                                           |      |   | 4.0                 |         |        | 12.7    |                    |        | 3.0     |         |                   | 2.0     |         |        | 8.8                |         |        |      |                     |        |  |
| Total Ions (meq/L)                                             |      |   | 7.7                 |         |        | 24.0    |                    |        | 6.0     |         |                   | 4.2     |         |        | 16.2               |         |        |      |                     |        |  |
| Cation/Anion Ratio                                             |      |   | 0.90                |         |        | 0.89    |                    |        | 0.98    |         |                   | 1.10    |         |        | 0.84               |         |        |      |                     |        |  |
| Percent Difference                                             |      |   | -5.2                |         |        | -5.6    |                    |        | -0.9    |         |                   | 4.6     |         |        | -9                 |         |        |      |                     |        |  |
| TRILINEAR DIAGRAM DATA                                         |      |   |                     |         |        |         |                    |        |         |         |                   |         |         |        |                    |         |        |      |                     |        |  |
| sum (Ca, Mg, Na+K)                                             |      |   | 3.64                |         |        | 11.28   |                    |        | 2.97    |         |                   | 1.90    |         |        | 7.32               |         |        |      |                     |        |  |
| Calcium                                                        |      |   | 39.0                |         |        | 51.3    |                    |        | 44.89   |         |                   | 35.76   |         |        | 44.67              |         |        |      |                     |        |  |
| Magnesium                                                      |      |   | 38.9                |         |        | 40.5    |                    |        | 26.53   |         |                   | 27.36   |         |        | 44.20              |         |        |      |                     |        |  |
| Sodium + Potassium                                             |      |   | 22.1                |         |        | 8.2     |                    |        | 28.58   |         |                   | 36.88   |         |        | 11.13              |         |        |      |                     |        |  |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) |      |   | 3.98                |         |        | 12.69   |                    |        | 2.76    |         |                   | 1.98    |         |        | 8.82               |         |        |      |                     |        |  |
| Sulfate                                                        |      |   | 5.3                 |         |        | 1.1     |                    |        | 19.0    |         |                   | 0.3     |         |        | 1.3                |         |        |      |                     |        |  |
| Chloride                                                       |      |   | 2.3                 |         |        | 1.7     |                    |        | 5.5     |         |                   | 1.2     |         |        | 1.8                |         |        |      |                     |        |  |
| Bicarbonate + Carbonate                                        |      |   | 92.4                |         |        | 97.2    |                    |        | 75.4    |         |                   | 98.5    |         |        | 96.8               |         |        |      |                     |        |  |

**Ion Balance Calculations**  
**Cedar Hills Landfill Perched Zones GW Monitoring Wells**

Data Collected from October 1, 2010 to December 31, 2010

| Site ID                                                        | North and West Perched Wells |             |         |   |                     |             |         |  |                     |             |         |  |
|----------------------------------------------------------------|------------------------------|-------------|---------|---|---------------------|-------------|---------|--|---------------------|-------------|---------|--|
|                                                                | MW-27A<br>10/15/2010         |             |         |   | MW-28<br>10/15/2010 |             |         |  | MW-29<br>10/15/2010 |             |         |  |
| Date                                                           | mg/L                         | meq/L       | % (meq) |   | mg/L                | meq/L       | % (meq) |  | mg/L                | meq/L       | % (meq) |  |
| Cations                                                        |                              |             |         |   |                     |             |         |  |                     |             |         |  |
| Calcium                                                        | 21.9                         | 1.09281     | 53.4    | 2 | 9.7                 | 0.48453     | 48.7    |  | 7.8                 | 0.38822     | 50.0    |  |
| Magnesium                                                      | 6.4                          | 0.52746     | 25.8    | 2 | 2.5                 | 0.20736     | 20.8    |  | 2.1                 | 0.17198     | 22.1    |  |
| Potassium                                                      | 3.7                          | 0.09361     | 4.6     | 1 | 1.0                 | 0.02481     | 2.5     |  | 0.6                 | 0.01496     | 1.9     |  |
| Sodium                                                         | 7.2                          | 0.31449     | 15.4    | 1 | 6.4                 | 0.27795     | 27.9    |  | 4.6                 | 0.20052     | 25.8    |  |
| Iron                                                           | 0.0                          | 0.00036     | 0.0     | 2 | 0.0                 | 0.00036     | 0.0     |  | 0.0                 | 0.00036     | 0.0     |  |
| Manganese                                                      | 0.1                          | 0.00194     | 0.1     | 2 | 0.0                 | 9.9E-05     | 0.0     |  | 0.0                 | 3.6E-05     | 0.0     |  |
| Ammonia-N                                                      | 0.2                          | 0.01721     | 0.8     | 1 | 0.0                 | 0.00071     | 0.1     |  | 0.0                 | 0.00071     | 0.1     |  |
| <b>Total Cations (meq/L)</b>                                   |                              | <b>2.0</b>  |         |   |                     | <b>1.0</b>  |         |  |                     | <b>0.8</b>  |         |  |
| Anions                                                         |                              |             |         |   |                     |             |         |  |                     |             |         |  |
| Alkalinity, Total                                              | 79                           |             |         |   | 29.1                |             |         |  | 28.6                |             |         |  |
| Carbonate                                                      | 0.28932                      | 0.00964     | 0.5     | 2 | 0.00103             | 3.4E-05     | 0.0     |  | 0.00442             | 0.00015     | 0.0     |  |
| Bicarbonate                                                    | 95.18                        | 1.56012     | 75.7    | 1 | 35.50               | 0.58188     | 55.1    |  | 34.88               | 0.57177     | 67.6    |  |
| Chloride                                                       | 7.1                          | 0.20111     | 9.8     | 1 | 3.5                 | 0.09872     | 9.3     |  | 3.2                 | 0.08885     | 10.5    |  |
| Nitrate-N                                                      | 0.0                          | 0.00071     | 0.0     | 1 | 0.1                 | 0.00504     | 0.5     |  | 2.0                 | 0.14136     | 16.7    |  |
| Sulfate                                                        | 13.9                         | 0.28941     | 14.0    | 2 | 17.8                | 0.37061     | 35.1    |  | 2.1                 | 0.04331     | 5.1     |  |
| <b>Total Anions (meq/L)</b>                                    |                              | <b>2.1</b>  |         |   |                     | <b>1.1</b>  |         |  |                     | <b>0.8</b>  |         |  |
| <b>Total Ions (meq/L)</b>                                      |                              | <b>4.1</b>  |         |   |                     | <b>2.1</b>  |         |  |                     | <b>1.6</b>  |         |  |
| <b>Cation/Anion Ratio</b>                                      |                              | <b>0.99</b> |         |   |                     | <b>0.94</b> |         |  |                     | <b>0.92</b> |         |  |
| <b>Percent Difference</b>                                      |                              | <b>-0.3</b> |         |   |                     | <b>-2.9</b> |         |  |                     | <b>-4.2</b> |         |  |
| <b>TRILINEAR DIAGRAM DATA</b>                                  |                              |             |         |   |                     |             |         |  |                     |             |         |  |
| sum (Ca, Mg, Na+K)                                             | 2.03                         |             |         |   | 0.99                |             |         |  | 0.78                |             |         |  |
| Calcium                                                        |                              |             | 53.9    |   |                     |             | 48.7    |  |                     |             | 50.0    |  |
| Magnesium                                                      |                              |             | 26.0    |   |                     |             | 20.8    |  |                     |             | 22.2    |  |
| Sodium + Potassium                                             |                              |             | 20.1    |   |                     |             | 30.4    |  |                     |             | 27.8    |  |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) | 2.06                         |             |         |   | 1.05                |             |         |  | 0.70                |             |         |  |
| Sulfate                                                        |                              |             | 14.0    |   |                     |             | 35.3    |  |                     |             | 6.2     |  |
| Chloride                                                       |                              |             | 9.8     |   |                     |             | 9.4     |  |                     |             | 12.6    |  |
| Bicarbonate + Carbonate                                        |                              |             | 76.2    |   |                     |             | 55.4    |  |                     |             | 81.2    |  |

**Ion Balance Calculations**  
**Cedar Hills Landfill Perched Zones GW Monitoring Wells**

Data Collected from October 1, 2010 to December 31, 2010

| Site ID                                                        |      | East Perched Zone    |         |         |        |                     |         |        |         |                     |        |         |         | SSWA                |     |  |
|----------------------------------------------------------------|------|----------------------|---------|---------|--------|---------------------|---------|--------|---------|---------------------|--------|---------|---------|---------------------|-----|--|
| Date                                                           |      | MW-30A<br>10/14/2010 |         |         |        | MW-47<br>10/14/2010 |         |        |         | MW-EB6<br>12/3/2010 |        |         |         | MW-101<br>12/7/2010 |     |  |
| Cations                                                        | MW   | n                    | mg/L    | meq/L   | %(meq) | mg/L                | meq/L   | %(meq) | mg/L    | meq/L               | %(meq) | mg/L    | meq/L   | %(meq)              |     |  |
| Calcium                                                        | 40.1 | 2                    | 30.9    | 1.54192 | 39.3   | 124.0               | 6.18762 | 50.0   | 11.6    | 0.57884             | 27.8   | 62.8    | 3.13373 | 41.3                |     |  |
| Magnesium                                                      | 24.3 | 2                    | 20.0    | 1.64575 | 41.9   | 62.8                | 5.16766 | 41.8   | 6.8     | 0.55873             | 26.8   | 43.6    | 3.58774 | 47.2                |     |  |
| Potassium                                                      | 39.1 | 1                    | 1.8     | 0.04655 | 1.2    | 5.3                 | 0.13658 | 1.1    | 1.2     | 0.02941             | 1.4    | 2.8     | 0.07085 | 0.9                 |     |  |
| Sodium                                                         | 23.0 | 1                    | 15.9    | 0.69161 | 17.6   | 18.5                | 0.80471 | 6.5    | 12.0    | 0.52197             | 25.1   | 17.1    | 0.74381 | 9.8                 |     |  |
| Iron                                                           | 55.8 | 2                    | 0.0     | 0.00036 | 0.0    | 0.2                 | 0.00784 | 0.1    | 9.1     | 0.32696             | 15.7   | 0.3     | 0.00974 | 0.1                 |     |  |
| Manganese                                                      | 54.9 | 2                    | 0.0     | 3.6E-05 | 0.0    | 1.8                 | 0.06371 | 0.5    | 0.6     | 0.0233              | 1.1    | 1.3     | 0.04842 | 0.6                 |     |  |
| Ammonia-N                                                      | 14.0 | 1                    | 0.0     | 0.00071 | 0.0    | 0.1                 | 0.00643 | 0.1    | 0.6     | 0.04362             | 2.1    | 0.0     | 0.00136 | 0.0                 |     |  |
| Total Cations (meq/L)                                          |      |                      | 3.9     |         |        | 12.4                |         |        | 2.1     |                     |        | 7.6     |         |                     |     |  |
| Anions                                                         |      |                      | 185     |         |        | 620                 |         |        | 94.6    |                     |        | 422     |         |                     |     |  |
| Alkalinity, Total                                              |      |                      | 0.03359 |         |        | 0.01133             |         |        | 0.00881 |                     |        | 0.23664 |         |                     | 0.1 |  |
| Carbonate                                                      | 60.0 | 2                    | 225.63  | 3.69832 | 91.2   | 755.71              | 12.3868 | 97.2   | 115.39  | 1.89142             | 98.5   | 514.36  | 8.43084 | 97.0                |     |  |
| Bicarbonate                                                    | 61.0 | 1                    | 3.5     | 0.09731 | 2.4    | 7.3                 | 0.20675 | 1.6    | 0.9     | 0.02508             | 1.3    | 4.8     | 0.13567 | 1.6                 |     |  |
| Chloride                                                       | 35.5 | 1                    | 0.6     | 0.04191 | 1.0    | 0.0                 | 0.00071 | 0.0    | 0.0     | 0.001               | 0.1    | 0.0     | 0.00071 | 0.0                 |     |  |
| Nitrate-N                                                      | 14.0 | 1                    | 10.5    | 0.21862 | 5.4    | 6.4                 | 0.13409 | 1.1    | 0.1     | 0.00208             | 0.1    | 5.7     | 0.11785 | 1.4                 |     |  |
| Sulfate                                                        | 96.1 | 2                    | 4.1     |         |        | 12.7                |         |        | 1.9     |                     |        | 8.7     |         |                     |     |  |
| Total Anions (meq/L)                                           |      |                      | 8.0     |         |        | 25.1                |         |        | 4.0     |                     |        | 16.3    |         |                     |     |  |
| Total Ions (meq/L)                                             |      |                      | 0.97    |         |        | 0.97                |         |        | 1.08    |                     |        | 0.87    |         |                     |     |  |
| Cation/Anion Ratio                                             |      |                      | -1.6    |         |        | -1.5                |         |        | 4.1     |                     |        | -7      |         |                     |     |  |
| Percent Difference                                             |      |                      |         |         |        |                     |         |        |         |                     |        |         |         |                     |     |  |
| TRILINEAR DIAGRAM DATA                                         |      |                      |         |         |        |                     |         |        |         |                     |        |         |         |                     |     |  |
| sum (Ca, Mg, Na+K)                                             |      |                      | 3.93    |         |        | 12.30               |         |        | 1.69    |                     |        | 7.54    |         |                     |     |  |
| Calcium                                                        |      |                      | 39.3    |         |        |                     |         | 50.3   |         | 34.27               |        |         | 41.58   |                     |     |  |
| Magnesium                                                      |      |                      | 41.9    |         |        |                     |         | 42.0   |         | 33.08               |        |         | 47.61   |                     |     |  |
| Sodium + Potassium                                             |      |                      | 18.8    |         |        |                     |         | 7.7    |         | 32.65               |        |         | 10.81   |                     |     |  |
| sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> ) |      |                      | 4.02    |         |        | 12.74               |         | 1.1    | 1.92    |                     |        | 8.69    |         | 1.4                 |     |  |
| Sulfate                                                        |      |                      | 5.4     |         |        |                     |         | 1.6    |         | 0.1                 |        |         | 1.6     |                     |     |  |
| Chloride                                                       |      |                      | 2.4     |         |        |                     |         | 97.3   |         | 1.3                 |        |         | 97.1    |                     |     |  |
| Bicarbonate + Carbonate                                        |      |                      | 92.1    |         |        |                     |         |        |         | 98.6                |        |         |         |                     |     |  |