

**Tegral Building Products Ltd.**

**Annual Environmental Report (AER) 2013**

**In Relation To**

**Waste Disposal Facility**

**At**

**Ballyllnan, Co. Laois**

**Waste Management License Reference 0046-01**

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## **1. Introduction**

### **1.1. Licensee**

Tegral Building Products Ltd.  
Athy,  
Co. Kildare.

### **1.2. Register Number**

**W046-01**

### **1.3. Reporting Period**

1<sup>st</sup> January to 31<sup>st</sup> December 2013

### **1.4. Location**

Ballylinan,  
Co.Laois.

### **1.5. Environmental Policy**

For the Environment Policy Statement refer to Appendix 1.

### **1.6. Summary of Compliance (1<sup>st</sup> January to 31<sup>st</sup> December 2013)**

The landfill site at Ballylinan was not used for disposal of waste in 2013. Implementation of the agreed closure plan was completed in September 2007.

No non-compliance was notified by the Agency, in the period.

## **2. Site Description**

### **2.1. Location**

The landfill disposal site is located in the Ballylinan Townland approximately 1 km East of the village of Ballylinan, Co. Laois. The National Grid Reference for the site is:

**2656 E, 1884 N.**

The site comprises an area of 1.489 hectares of which approximately 0.755 hectares is a disused limestone quarry and the remaining 0.734 hectares is grass borders and site access road. The site has been in use since 1990, initially under Permit from Laois County Council and is licensed by the E.P.A. since 18<sup>th</sup> May 1999. The site was used exclusively for the disposal of wastes arising from the manufacture of fibre-cement products at the Athy factory.

### **3. Site Management Personnel**

#### **3.1. Board of Directors**

The Board of Directors bears ultimate statutory responsibility for the actions of the company. Consequently, the ultimate authority within the company rests with the Board.

#### **3.2. Works Manager**

The Works Manager is **Mr. Stephen Gormalley** and his duties regarding Ballylinan Landfill Site include the following:

- Ensuring compliance with all relevant environmental legislative requirements;
- Ensuring that at all times competent staff and appropriate resources are available to meet the requirements of the Waste Management License.

#### **3.3. Facility Manager**

The Facility Manager is **Mr. Paul Loughman** who is responsible for the following;

- Ensuring compliance with all relevant environmental legislative requirements;

#### **3.4. Deputy Facility Manager**

The Deputy Facility Manger, when the site was active was **Mr. Paul Molloy** who is employed by Tegral as Relief Day Shift & Warehouse Manager.

#### **3.5. Other Personnel**

No other personnel were involved on the site in 2013.

**4. Waste Acceptance and Handling**

**4.1. Waste Types**

No wastes were deposited on the site in 2013.

**4.2. Quantities**

No waste was deposited on the site in 2013.

**4.3. Deposition of Waste**

No waste was deposited on the site in 2013.

**4.3.1. Further Procedural Guidelines**

Now not relevant

## 5. Landfill Monitoring

### 5.1 Groundwater Monitoring

In accordance with the requirements of the Waste Management License (W046-01) groundwater in the vicinity of the site is sampled four times per year at nine locations. Five of these locations are from monitoring wells installed in and around the landfill site and designated MW01-MW05. One sampling location, designated MW06 is a public hand pump located North of the site (although no samples could be obtained at this location), MW08 is located South East of the site. Samples were also taken at two additional wells not referenced in the waste management licence. These are MW09 located up gradient of the facility and MW10 located down gradient. These wells were installed following a hydro geological assessment of the site undertaken in December 2004.

O'Callaghan Moran & Associates (OCM) were contracted to do the sampling and analysis as required in the license. The following reports, produced by OCM were submitted to the Agency during the year.

|                              |                  |            |
|------------------------------|------------------|------------|
| 1 <sup>st</sup> Quarter 2013 | Report Submitted | 11/04/2013 |
| 2 <sup>nd</sup> Quarter 2013 | Report Submitted | 24/06/2013 |
| 3 <sup>rd</sup> Quarter 2013 | Report Submitted | 04/11/2013 |
| 4 <sup>th</sup> Quarter 2013 | Report Submitted | 23/01/2014 |

In addition, a response to an EPA inspection report was submitted on 19/12/2013.

### 5.2. Air Monitoring

No wastes were deposited on the site in 2013, however, one fibre in air measurements was undertaken.

### 5.3. Climatological Data

Data for rainfall and wind speed and direction is, as agreed with the Agency, obtained from Met Eireann. This data was obtained for the Oak Park station in Carlow. The daily figures for rainfall, mean wind speed and wind direction are included in Appendix 2 and are summarized below.

**Monthly Precipitation Data Oak Park**

| <b>Month</b>        | <b>Total Precipitation mm</b> | <b>Number of Days with No Precipitation</b> | <b>Daily Max. Precipitation mm</b> |
|---------------------|-------------------------------|---|------------------------------------|
| <b>Jan</b>          | 76.4                          | 9   | 21.1                               |
| <b>Feb</b>          | 35.2                          | 14  | 14                                 |
| <b>March</b>        | 57.6                          | 18  | 20.3                               |
| <b>April</b>        | 45.1                          | 13  | 14.7                               |
| <b>May</b>          | 97                            | 9   | 25.3                               |
| <b>June</b>         | 37.6                          | 18  | 9.8                                |
| <b>July</b>         | 32.3                          | 21  | 8.7                                |
| <b>August</b>       | 85.6                          | 13  | 29.5                               |
| <b>September</b>    | 24.4                          | 12  | 2.3                                |
| <b>October</b>      | 170                           | 5   | 28.6                               |
| <b>November</b>     | 27.7                          | 13  | 9.6                                |
| <b>December</b>     | 136.6                         | 6   | 19                                 |
| <b>Annual Total</b> | <b>825.5</b>                  | <b>151</b>                                  | <b>-</b>                           |

**Monthly Mean Wind Speeds – Knots \***

|               | <b>Jan</b> | <b>Feb</b> | <b>Mar</b> | <b>Apr</b> | <b>May</b> | <b>Jun</b> | <b>Jul</b> | <b>Aug</b> | <b>Sep</b> | <b>Oct</b> | <b>Nov</b> | <b>Dec</b> |
|---------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Carlow</b> | 7.9        | 7.5        | 7.1        | 9.3        | 9.3        | 6.3        | 5.4        | 7          | 6.5        | 7.6        | 6.8        | 10.9       |

**Annual Mean Oakpark = 7.63**

\* Source Met Eireann, Oakpark, Carlow



## **6. Emission Impacts**

### **6.1. Groundwater**

#### **6.1.1. Discharges to Groundwater**

There are no direct discharges to groundwater from the facility. Indirect discharges are calculated based on the net precipitation over the area of the site enclosed by the quarry rock face, which is 0.755 hectares. The measured total precipitation at the Met Eireann Station in Oakpark during 2013 was 825.5 mm.

The average potential evaporation for Kilkenny for the period 1975 – 1999 (Met Eireann) was 463.84 mm. This gives a net precipitation of 361.66 mm.

This yields a volume of 2,731m<sup>3</sup> of which a maximum of 5% would have penetrated the cap and percolated through the waste. The maximum indirect discharge to groundwater is therefore estimated to be 137m<sup>3</sup>.

#### **6.1.2. Groundwater Quality**

All of the groundwater monitoring data is presented on the following tables. There are no standards prescribed in the waste management license for groundwater quality. It is important to note that there are no private wells in the immediate vicinity of the landfill site. The local residents are serviced by a public water supply scheme.

The groundwater monitoring programme, which has been ongoing since 1999 has identified the consistent presence of elevated levels of ammonia, pH and potassium in a number of the monitoring wells.

In general, however, the 2013 monitoring results are consistent with those of previous years. The presence of faecal organisms in some of the wells is a clear indication of an external source of contamination

Trace levels of Toluene, Benzene, ethylbenzene and Xylene were detected in MW9 in (Q3 & Q4). Trace levels of VOC's were also detected MW01. These VOC results are consistent with results previously submitted to the agency. The trigger levels which have been agreed with the agency were not exceeded in any of the monitoring wells.

**Ballylinan Landfill Site**  
**Groundwater Monitoring Results 2013**  
**Monitoring Well No. MW-01**

**N 188424**  
**E 265543**

**West of Centre**

| Parameter                       | Units     | Monitoring Dates |        |        |        |
|---------------------------------|-----------|------------------|--------|--------|--------|
|                                 |           | Q1               | Q2     | Q3     | Q4     |
| pH                              | pH Units  | 9.81             | 10.21  | 10.07  | 10.24  |
| Conductivity                    | mS/cm     | 0.589            | 0.648  | 0.655  | 0.774  |
| Ammonia - N                     | mg/l      | 12.15            | 17.55  | 19.46  | 25.26  |
| Nitrate - N                     | mg/l      | <0.2             | 0.5    | 0.3    | <0.2   |
| Nitrite - N                     | mg/l      | <0.02            | <0.02  | <0.02  | <0.02  |
| TOC                             | mg/l      | 29               | 55     | 32     | 52     |
| TON                             | mg/l      | <0.2             | <0.2   | <0.2   | <0.2   |
| Alkalinity (CaCO <sub>3</sub> ) | mg/l      |                  |        | 300    |        |
| Fluoride                        | mg/l      |                  |        | <0.3   |        |
| Chloride                        | mg/l      | 27.4             | 24.2   | 26.6   | 23.4   |
| Sulphate                        | mg/l      | 8.14             | 10.23  | <0.05  | <0.05  |
| Total Phosphorus                | mg/l      |                  |        | 0.208  |        |
| Calcium                         | mg/l      | 4.2              | 2.6    | 4.0    | 7.5    |
| Magnesium                       | mg/l      |                  |        | 0.3    |        |
| Sodium                          | mg/l      | 51.4             | 59.9   | 70     | 92.7   |
| Potassium                       | mg/l      | 87.8             | 127.0  | 122.2  | 160.0  |
| Iron                            | mg/l      | 0.052            | 0.124  | 0.087  | 0.141  |
| Manganese                       | mg/l      | 0.003            | <0.002 | 0.004  | 0.005  |
| Phenols                         | mg/l      | 0.085            | 0.106  | <0.001 | 0.135  |
| Zinc                            | µg/l      |                  |        | 4      |        |
| Mercury                         | µg/l      |                  |        | <1     |        |
| Lead                            | µg/l      |                  |        | <5     |        |
| Cyanide                         | mg/l      |                  |        | <0.01  |        |
| Barium                          | mg/l      | 0.004            | <0.003 | <0.003 | <0.003 |
| Boron                           | µg/l      |                  |        | 33     |        |
| Cadmium                         | µg/l      |                  |        | <0.5   |        |
| Chromium                        | µg/l      |                  |        | <1.5   |        |
| Copper                          | µg/l      |                  |        | <7     |        |
| Total Coliforms                 | mpn/100ml |                  |        | 9.6    |        |
| Faecal Coliforms                | mpn/100ml |                  |        | 4.4    |        |
| Total Solids                    | mg/l      |                  |        | 457    |        |
| Benzene                         | µg/l      |                  |        | 3.3    |        |
| Toluene                         | µg/l      |                  |        | 71.1   |        |
| Ethylbenzene                    | µg/l      |                  |        | 21.7   |        |
| Xylene                          | µg/l      |                  |        | 45     |        |

ND – Non-detect

**Ballylinan Landfill Site**  
**Groundwater Monitoring Results 2013**  
**Monitoring Well No. MW-02**

**N 188464**  
**E 265602**

**North of Centre**

| Parameter                       | Units     | Monitoring Dates |        |         |       |
|---------------------------------|-----------|------------------|--------|---------|-------|
|                                 |           | Q1               | Q2     | Q3      | Q4    |
| pH                              | pH Units  | 7.90             | 7.58   | 8.88    | 8.56  |
| Conductivity                    | mS/cm     | 0.703            | 0.684  | 0.536   | 0.679 |
| Ammonia - N                     | mg/l      | 6.79             | 12.71  | 19.30   | 12.96 |
| Nitrate N                       | mg/l      | 0.6              | 0.5    | 0.5     | <0.02 |
| Nitrite N                       | mg/l      | <0.02            | <0.02  | <0.02   | <0.2  |
| TOC                             | mg/l      | 9                | 5      | 35      | 20    |
| TON                             | mg/l      | <0.2             | <0.2   | <0.2    | 0.4   |
| Alkalinity (CaCO <sub>3</sub> ) | mg/l      |                  |        | 226     |       |
| Fluoride                        | mg/l      |                  |        | <0.3    |       |
| Chloride                        | mg/l      | 18.0             | 15.3   | 31.1    | 38.2  |
| Sulphate                        | mg/l      | 8.61             | 8.96   | <0.05   | 20.0  |
| Total Phosphorus                | mg/l      |                  |        | 0.165   |       |
| Calcium                         | mg/l      | 87.7             | 98.6   | 23.5    | 40.0  |
| Magnesium                       | mg/l      |                  |        | 1.2     |       |
| Sodium                          | mg/l      | 15.3             | 10.5   | 29.9    | 29.0  |
| Potassium                       | mg/l      | 42.1             | 29.6   | 75.9    | 112.6 |
| Iron                            | mg/l      | <0.020           | <0.020 | 0.087   | 0.063 |
| Manganese                       | mg/l      | 0.180            | 0.118  | 0.025   | 0.025 |
| Phenols                         | mg/l      | 0.043            | 0.032  | <0.0001 | 0.051 |
| Zinc                            | µg/l      |                  |        | 5       |       |
| Mercury                         | µg/l      |                  |        | <1      |       |
| Lead                            | µg/l      |                  |        | <5      |       |
| Cyanide                         | mg/l      |                  |        | <0.01   |       |
| Barium                          | mg/l      | 0.028            | 0.016  | 0.07    | 0.011 |
| Boron                           | µg/l      |                  |        | 37      |       |
| Cadmium                         | µg/l      |                  |        | <0.5    |       |
| Chromium                        | µg/l      |                  |        | <.15    |       |
| Copper                          | µg/l      |                  |        | <7      |       |
| Total Coliforms                 | mpn/100ml |                  |        | 3840.0  |       |
| Faecal Coliforms                | mpn/100ml |                  |        | 1470.0  |       |
| Total Solids                    | mg/l      |                  |        | 387     |       |
| Benzene                         | µg/l      |                  |        | ND      |       |
| Toluene                         | µg/l      |                  |        | 1.9     |       |
| Ethylbenzene                    | µg/l      |                  |        | 1.6     |       |
| Xylene                          | µg/l      |                  |        | 4       |       |

ND – Non-detect

**Ballylinan Landfill Site**  
**Groundwater Monitoring Results 2013**  
**Monitoring Well No. MW-03**

**N 188411**  
**E 265684**

**East of Centre**

| Parameter                       | Units     | Monitoring Dates |         |         |         |
|---------------------------------|-----------|------------------|---------|---------|---------|
|                                 |           | Q1               | Q2      | Q3      | Q4      |
| pH                              | pH Units  | 7.49             | 7.24    | 7.25    | 7.23    |
| Conductivity                    | mS/cm     | 0.852            | 0.822   | 0.929   | 0.906   |
| Ammonia - N                     | mg/l      | 1.93             | 0.03    | 0.04    | 2.77    |
| Nitrate N                       | mg/l      | 7.9              | 15.7    | 14.7    | 2.7     |
| Nitrite N                       | mg/l      | <0.02            | <0.02   | <0.02   | <0.02   |
| TOC                             | mg/l      | 3                | <2      | 11      | 7       |
| TON                             | mg/l      | 1.8              | 3.5     | 3.3     | 0.6     |
| Alkalinity (CaCO <sub>3</sub> ) | mg/l      |                  |         | 374     |         |
| Fluoride                        | mg/l      |                  |         | <0.3    |         |
| Chloride                        | mg/l      | 23.6             | 23.8    | 23.7    | 26.1    |
| Sulphate                        | mg/l      | 54.81            | 62.06   | 94.86   | 87.75   |
| Total Phosphorus                | mg/l      |                  |         | 0.408   |         |
| Calcium                         | mg/l      | 130.0            | 117.9   | 153.7   | 140.7   |
| Magnesium                       | mg/l      |                  |         | 7.6     |         |
| Sodium                          | mg/l      | 17.1             | 15.9    | 17.7    | 17.8    |
| Potassium                       | mg/l      | 37.9             | 41.2    | 49.5    | 56.6    |
| Iron                            | mg/l      | <0.020           | <0.020  | <0.020  | <0.020  |
| Manganese                       | mg/l      | 0.515            | <0.002  | 0.819   | 1.241   |
| Phenols                         | mg/l      | <0.006           | <0.0005 | <0.0001 | <0.0005 |
| Zinc                            | µg/l      |                  |         | 9       |         |
| Mercury                         | µg/l      |                  |         | <1      |         |
| Lead                            | µg/l      |                  |         | <5      |         |
| Cyanide                         | mg/l      |                  |         | <0.01   |         |
| Barium                          | mg/l      | 0.067            | 0.040   | 0.068   | 0.072   |
| Boron                           | µg/l      |                  |         | 53      |         |
| Cadmium                         | µg/l      |                  |         | <0.5    |         |
| Chromium                        | µg/l      |                  |         | <1.5    |         |
| Copper                          | µg/l      |                  |         | <7      |         |
| Total Coliforms                 | mpn/100ml |                  |         | 8164    |         |
| Faecal Coliforms                | mpn/100ml |                  |         | 155     |         |
| Total Solids                    | mg/l      |                  |         | 662     |         |
| Benzene                         | µg/l      |                  |         | ND      |         |
| Toluene                         | µg/l      |                  |         | ND      |         |
| Ethylbenzene                    | µg/l      |                  |         | ND      |         |
| Xylene                          | µg/l      |                  |         | ND      |         |

ND – Non-detect

**Ballylinan Landfill Site**  
**Groundwater Monitoring Results 2013**  
**Monitoring Well No. MW-04**

**N 188362**  
**E 265618**

**South of Centre**

| Parameter                       | Units     | Monitoring Dates |         |         |         |
|---------------------------------|-----------|------------------|---------|---------|---------|
|                                 |           | Q1               | Q2      | Q3      | Q4      |
| PH                              | pH Units  | 7.58             | 7.20    | 7.22    | 7.28    |
| Conductivity                    | mS/cm     | 0.786            | 0.744   | 0.733   | 0.732   |
| Ammonia - N                     | mg/l      | 1.16             | 0.57    | 3.07    | 1.65    |
| Nitrate N                       | mg/l      | 0.3              | 2.0     | 0.7     | 0.8     |
| Nitrite N                       | mg/l      | <0.02            | <0.02   | <0.02   | <0.02   |
| TOC                             | mg/l      | 3                | <2      | 10      | 7       |
| TON                             | mg/l      | <0.2             | 0.4     | 4.7     | <0.2    |
| Alkalinity (CaCO <sub>3</sub> ) | mg/l      |                  |         | 372     | 1.65    |
| Fluoride                        | mg/l      |                  |         | <0.3    |         |
| Chloride                        | mg/l      | 16.9             | 17.5    | 17.5    | 16.9    |
| Sulphate                        | mg/l      | 14.66            | 17.97   | 1.72    | 9.41    |
| Total Phosphorus                | mg/l      |                  |         | 0.036   |         |
| Calcium                         | mg/l      | 111.7            | 117.9   | 114.8   | 117.1   |
| Magnesium                       | mg/l      |                  |         | 4.4     |         |
| Sodium                          | mg/l      | 32.8             | 15.9    | 26      | 28.2    |
| Potassium                       | mg/l      | 23.0             | 24.9    | 24.7    | 24.4    |
| Iron                            | mg/l      | <0.020           | <0.020  | <0.020  | <0.020  |
| Manganese                       | mg/l      | 0.869            | 0.641   | 1.476   | 0.960   |
| Phenols                         | mg/l      | <0.0005          | <0.0005 | <0.0001 | <0.0005 |
| Zinc                            | µg/l      |                  |         | 4       |         |
| Mercury                         | µg/l      |                  |         | <1      |         |
| Lead                            | µg/l      |                  |         | <5      |         |
| Cyanide                         | mg/l      |                  |         | <0.01   |         |
| Barium                          | mg/l      | 0.091            | 0.066   | 0.077   | 0.079   |
| Boron                           | µg/l      |                  |         | 25      |         |
| Cadmium                         | µg/l      |                  |         | <0.5    |         |
| Chromium                        | µg/l      |                  |         | <1.5    |         |
| Copper                          | µg/l      |                  |         | <7      |         |
| Total Coliforms                 | mpn/100ml |                  |         | 6.3     |         |
| Faecal Coliforms                | mpn/100ml |                  |         | <1      |         |
| Total Solids                    | mg/l      |                  |         | 368     |         |
| Benzene                         | µg/l      |                  |         | ND      |         |
| Toluene                         | µg/l      |                  |         | ND      |         |
| Ethylbenzene                    | µg/l      |                  |         | ND      |         |
| Xylene                          | µg/l      |                  |         | ND      |         |

ND – Non-detect

**Ballylinan Landfill Site**  
**Groundwater Monitoring Results 2013**  
**Monitoring Well No. MW-05**

**N 188465**  
**E 265657**

**North-East of Centre**

| Parameter                       | Units     | Monitoring Dates |         |     |         |
|---------------------------------|-----------|------------------|---------|-----|---------|
|                                 |           | Q1               | Q2      | Q3  | Q4      |
| pH                              | pH Units  | 7.53             | 7.20    | Dry | 7.15    |
| Conductivity                    | mS/cm     | 0.800            | 0.817   | Dry | 0.882   |
| Ammonia - N                     | mg/l      | 0.13             | 0.05    | Dry | 0.16    |
| Nitrate N                       | mg/l      | 5.1              | 1.3     | Dry | 0.8     |
| Nitrite N                       | mg/l      | <0.02            | <0.02   | Dry | <0.02   |
| TOC                             | mg/l      | 3                | 3       | Dry | 7       |
| TON                             | mg/l      | 1.1              | 8.0     | Dry | 0.3     |
| Alkalinity (CaCO <sub>3</sub> ) | mg/l      |                  |         | Dry | 404     |
| Fluoride                        | mg/l      |                  |         | Dry | <0.3    |
| Chloride                        | mg/l      | 15.3             | 16.2    | Dry | 36.2    |
| Sulphate                        | mg/l      | 16.15            | 17.74   | Dry | 22.49   |
| Total Phosphorus                | mg/l      |                  |         | Dry | 0.113   |
| Calcium                         | mg/l      | 127.4            | 128.3   | Dry | 155.9   |
| Magnesium                       | mg/l      |                  |         | Dry | 8.2     |
| Sodium                          | mg/l      | 9.8              | 10.1    | Dry | 11.5    |
| Potassium                       | mg/l      | 21.5             | 27.1    | Dry | 28.0    |
| Iron                            | mg/l      | <0.020           | <0.020  | Dry | <0.020  |
| Manganese                       | mg/l      | 0.294            | <0.002  | Dry | 1.383   |
| Phenols                         | mg/l      | <0.0005          | <0.0005 | Dry | <0.0005 |
| Zinc                            | µg/l      |                  |         | Dry | 5       |
| Mercury                         | µg/l      |                  |         | Dry | <1      |
| Lead                            | µg/l      |                  |         | Dry | <5      |
| Cyanide                         | mg/l      |                  |         | Dry | <0.01   |
| Barium                          | mg/l      | 0.174            | 0.175   | Dry | 0.206   |
| Boron                           | µg/l      |                  |         | Dry | 36      |
| Cadmium                         | µg/l      |                  |         | Dry | 155.9   |
| Chromium                        | µg/l      |                  |         | Dry | <1.5    |
| Copper                          | µg/l      |                  |         | Dry | <7      |
| Total Coliforms                 | mpn/100ml |                  |         | Dry |         |
| Faecal Coliforms                | mpn/100ml |                  |         | Dry |         |
| Total Solids                    | mg/l      |                  |         | Dry | 622     |
| Benzene                         | µg/l      |                  |         | Dry | ND      |
| Toluene                         | µg/l      |                  |         | Dry | ND      |
| Ethylbenzene                    | µg/l      |                  |         | Dry | ND      |
| Xylene                          | µg/l      |                  |         | Dry | ND      |

ND – Non-detect

**Ballylinan Landfill Site**  
**Groundwater Monitoring Results 2013**  
**Monitoring Well No. MW-08**

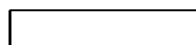
**N 188359**  
**E 265781**

**Murphy's Well**  
**East-South-East of Centre**

| Parameter                       | Units     | Monitoring Dates |         |         |         |
|---------------------------------|-----------|------------------|---------|---------|---------|
|                                 |           | Q1               | Q2      | Q3      | Q4      |
| PH                              | pH Units  | 7.47             | 7.34    | 7.44    | 7.44    |
| Conductivity                    | mS/cm     | 1.154            | 0.800   | 0.652   | 0.765   |
| Ammonia - N                     | mg/l      | 0.14             | 0.09    | 0.05    | <0.03   |
| Nitrate N                       | mg/l      | 76.2             | 35.3    | 20.7    | 26.9    |
| Nitrite N                       | mg/l      | <0.02            | <0.02   | <0.02   | <0.02   |
| TOC                             | mg/l      | 2                | <2      | 3       | 5       |
| TON                             | mg/l      | 17.2             | 8.0     | 4.7     | 6.1     |
| Alkalinity (CaCO <sub>3</sub> ) | mg/l      |                  |         | 300     |         |
| Fluoride                        | mg/l      |                  |         | <0.3    |         |
| Chloride                        | mg/l      | 63.9             | 22.5    | 20.1    | 24.6    |
| Sulphate                        | mg/l      | 24.61            | 20.86   | 13.59   | 18.70   |
| Total Phosphorus                | mg/l      |                  |         | 0.019   |         |
| Calcium                         | mg/l      | 161.6            | 129.5   | 118.5   | 137.8   |
| Magnesium                       | mg/l      |                  |         | 10.4    |         |
| Sodium                          | mg/l      | 23.7             | 12.2    | 10.2    | 11.8    |
| Potassium                       | mg/l      | 48.7             | 20.9    | 4.4     | 11.0    |
| Iron                            | mg/l      | <0.020           | <0.020  | <0.020  | <0.020  |
| Manganese                       | mg/l      | 0.022            | 0.024   | <0.002  | <0.002  |
| Phenols                         | mg/l      | <0.0005          | <0.0005 | <0.0001 | <0.0005 |
| Zinc                            | µg/l      |                  |         | 18      |         |
| Mercury                         | µg/l      |                  |         | <1      |         |
| Lead                            | µg/l      |                  |         | <5      |         |
| Cyanide                         | mg/l      |                  |         | <0.01   |         |
| Barium                          | mg/l      | 0.104            | 0.048   | 0.027   | 0.033   |
| Boron                           | µg/l      |                  |         | 26      |         |
| Cadmium                         | µg/l      |                  |         | <0.5    |         |
| Chromium                        | µg/l      |                  |         | <1.5    |         |
| Copper                          | µg/l      |                  |         | 21      |         |
| Total Coliforms                 | mpn/100ml |                  |         | <1      |         |
| Faecal Coliforms                | mpn/100ml |                  |         | <1      |         |
| Total Solids                    | mg/l      |                  |         | 380     |         |
| Benzene                         | µg/l      |                  |         | ND      |         |
| Toluene                         | µg/l      |                  |         | ND      |         |
| Ethylbenzene                    | µg/l      |                  |         | ND      |         |
| Xylene                          | µg/l      |                  |         | ND      |         |

ND – Non-detect

**Ballylinan Landfill Site**  
**Groundwater Monitoring Results 2013**  
**Monitoring Well No. MW-09**

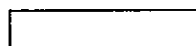


| Parameter                       | Units     | Monitoring Dates |        |        |        |
|---------------------------------|-----------|------------------|--------|--------|--------|
|                                 |           | Q1               | Q2     | Q3     | Q4     |
| PH                              | pH Units  | 12.14            | 12.23  | 11.89  | 12.09  |
| Conductivity                    | mS/cm     | 2.333            | 1.864  | 1.748  | 2.190  |
| Ammonia - N                     | mg/l      | 27.64            | 26.89  | 27.55  | 27.16  |
| Nitrate N                       | mg/l      | <0.2             | 0.6    | 0.3    | <0.2   |
| Nitrite N                       | mg/l      | <0.02            | <0.02  | <0.02  | <0.02  |
| TOC                             | mg/l      | 102              | 98     | 84     | 105    |
| TON                             | mg/l      | <0.2             | <0.2   | <0.2   | <0.2   |
| Alkalinity (CaCO <sub>3</sub> ) | mg/l      |                  |        | 736    | 708    |
| Fluoride                        | mg/l      |                  |        | <0.3   |        |
| Chloride                        | mg/l      | 27.1             | 27.1   | 26.4   | 26.1   |
| Sulphate                        | mg/l      | 11.22            | 11.25  | 8.64   | 8.30   |
| Total Phosphorus                | mg/l      |                  |        | 0.739  | 0.518  |
| Calcium                         | mg/l      | 17.9             | 12.1   | 2.5    | 14.9   |
| Magnesium                       | mg/l      |                  |        | <0.1   | <0.1   |
| Sodium                          | mg/l      | 122.4            | 110.8  | 134.9  | 146.0  |
| Potassium                       | mg/l      | 280.0            | 338.7  | 376.6  | 381.1  |
| Iron                            | mg/l      | 0.036            | 0.027  | 0.115  | 0.023  |
| Manganese                       | mg/l      | <0.002           | <0.002 | 0.003  | <0.002 |
| Phenols                         | mg/l      | 0.036            | 0.0051 | <0.001 | 0.008  |
| Zinc                            | µg/l      |                  |        | <3     | <3     |
| Mercury                         | µg/l      |                  |        | <1     | <1     |
| Lead                            | µg/l      |                  |        | <5     | <5     |
| Cyanide                         | mg/l      |                  |        | <0.01  | <0.01  |
| Barium                          | mg/l      | 0.048            | 0.026  | 0.009  | 0.029  |
| Boron                           | µg/l      |                  |        | 34     | 21     |
| Cadmium                         | µg/l      |                  |        | <0.5   | <0.5   |
| Chromium                        | µg/l      |                  |        | <1.5   | <1.5   |
| Copper                          | µg/l      |                  |        | 13     | <7     |
| Total Coliforms                 | mpn/100ml |                  |        | <1     |        |
| Faecal Coliforms                | mpn/100ml |                  |        | <1     |        |
| Total Solids                    | mg/l      |                  |        | 1398   | 1822   |
| Benzene                         | µg/l      |                  |        | 4.2    | 10.6   |
| Toluene                         | µg/l      |                  |        | 75.5   | 268.2  |
| Ethylbenzene                    | µg/l      |                  |        | 5.3    | 82.1   |
| Xylene                          | µg/l      |                  |        | 31     |        |

ND – Non-detect



**Ballylinan Landfill Site**  
**Groundwater Monitoring Results 2013**  
**Monitoring Well No. MW-10**



| Parameter                       | Units     | Monitoring Dates |         |         |         |
|---------------------------------|-----------|------------------|---------|---------|---------|
|                                 |           | Q1               | Q2      | Q3      | Q4      |
| pH                              | pH Units  | 7.45             | 7.29    | 7.23    | 7.22    |
| Conductivity                    | mS/cm     | 0.778            | 0.736   | 1.228   | 0.732   |
| Ammonia - N                     | mg/l      | <0.03            | <0.03   | 0.06    | <0.03   |
| Nitrate N                       | mg/l      | 16.9             | 21.6    | 20.5    | 22.1    |
| Nitrite N                       | mg/l      | <0.02            | <0.02   | <0.02   | <0.02   |
| TOC                             | mg/l      | <2               | 2       | 7       | 6       |
| TON                             | mg/l      | 3.8              | 4.9     | 4.6     | 5.0     |
| Alkalinity (CaCO <sub>3</sub> ) | mg/l      |                  |         | 0.06    |         |
| Fluoride                        | mg/l      |                  |         | <0.3    |         |
| Chloride                        | mg/l      | 13.6             | 17.5    | 19.9    | 20.8    |
| Sulphate                        | mg/l      | 11.36            | 14.79   | 16.39   | 17.56   |
| Total Phosphorus                | mg/l      |                  |         | 0.580   |         |
| Calcium                         | mg/l      | 138.8            | 127.3   | 135.3   | 139.1   |
| Magnesium                       | mg/l      |                  |         | 8.4     |         |
| Sodium                          | mg/l      | 9.1              | 9.4     | 10.7    | 10.8    |
| Potassium                       | mg/l      | 2.6              | 3.1     | 2.7     | 2.9     |
| Iron                            | mg/l      | 0.024            | <0.020  | <0.020  | <0.020  |
| Manganese                       | mg/l      | <0.002           | <0.002  | <0.002  | <0.002  |
| Phenols                         | mg/l      | <0.0005          | <0.0005 | <0.0001 | <0.0005 |
| Zinc                            | µg/l      |                  |         | <3      |         |
| Mercury                         | µg/l      |                  |         | <1      |         |
| Lead                            | µg/l      |                  |         | <5      |         |
| Cyanide                         | mg/l      |                  |         | <0.01   |         |
| Barium                          | mg/l      | 0.037            | 0.027   | 0.035   | 0.027   |
| Boron                           | µg/l      |                  |         | 52      |         |
| Cadmium                         | µg/l      |                  |         | <0.5    |         |
| Chromium                        | µg/l      |                  |         | <1.5    |         |
| Copper                          | µg/l      |                  |         | <7      |         |
| Total Coliforms                 | mpn/100ml |                  |         | 13540   |         |
| Faecal Coliforms                | mpn/100ml |                  |         | 677     |         |
| Total Solids                    | mg/l      |                  |         | 1936    |         |
| Benzene                         | µg/l      |                  |         | ND      |         |
| Toluene                         | µg/l      |                  |         | ND      |         |
| Ethylbenzene                    | µg/l      |                  |         | ND      |         |
| Xylene                          | µg/l      |                  |         | ND      |         |

ND – Non-detect

## **6.2. Air Quality**

### **6.2.1. Fibres in Air**

One fibre in air monitoring sample was taken in 2013. All results were <0.01f/ml and comply with the required standard.

### **6.2.2. Dust Deposition**

Dust deposition monitoring has ceased as agreed with the agency.

## **7. Site Design / Development**

### **7.1. Security**

Security is ensured by the provision of fencing with secure and lockable gates. The access road to the site is private; therefore the landfill is not adjoining a public road.

There are two gates between the public road and the landfill site. The external gate is used for access to the site inner gate, along the private access road, which is also used by the farmer from whom the land is leased to access his other property. The internal gate is used exclusively for site entry, and is open to allow free movement of sheep who graze the property as agreed with the agency. Some damage to the fencing was discovered during a routine inspection with the EPA in 2013. The fencing was immediately repaired by Tegral Building Products Ltd. In addition, the cap on MW5 was repaired.

### **7.2. Site Inspections**

No waste was deposited on the site in 2013 and there was no need for the routine inspections undertaken during the operational phase of the site. The site was inspected by O'Callaghan Moran Consultants to ensure there were no indications of settlement, surface ponding, leachate outbreaks, etc.

### **7.3. Site Roads**

When the site was active the private site access road was inspected on a regular basis. The site owner also uses this as a means of access to a portion of his land.

### **7.4. Electricity Supply**

The electrical supply to the site was disconnected by the ESB in 2008 as there is now no need to maintain such a supply.

### **7.5. Other Infrastructure**

There is no other infrastructure on the site.

### **7.6. Restoration**

The implementation of the restoration plan agreed with the Agency was completed in September 2007.

### **7.7. Site Development Works**

There were no such works.

### **7.8. Topographical Survey**

The finished site levels are shown on the drawings with the Construction Validation reported prepared by O'Callaghan Moran / Capita Simmons.

#### **7.8.1. Area Covered by Waste**

0.755 hectares has been covered with waste.

## **8. Objective and Targets**

### **8.1.**

The objective set for 2013 was to continue to implement the monitoring and other relevant requirements of the licence.

This was achieved.

### **8.2. Objectives for 2014**

The objective for 2014 is to continue to implement the monitoring and other relevant requirements of the licence.

## **9. Resources and Energy Consumption**

### **9.1. Cover Material**

Disposal activities at the site ceased in May 2005. No cover material was used in 2013.

### **9.2. Diesel Fuel**

Not relevant as site not in use for disposal of waste in 2013.

### **9.3. Electricity**

Not relevant as site not in sue for disposal of waste in 2013.

**10. Non-Compliance with License Conditions**

No non-compliances with the Waste Management License were notified during the year.

**11. Complaints**

No complaints were received during 2013.

**12. Incidents**

There were no incidents during the year.

**13. Financial Provisions**

In accordance with the requirements of Condition 11.2 of the license Tegral contracted Bord na Mona to undertake an environmental liabilities and risk assessment of the activity. Their report was submitted to the Agency in February 2000. According to their findings the worst-case scenario would be a targeted groundwater clean-up programme. Tegral Building Products Limited have made a provision of 127,000 Euro in the accounts to cover such an eventuality. On the basis of the monitoring results generated during 2012 and the risk assessment undertaken by O'Callaghan Moran & Associates, it is considered that this provision is adequate.

# APPENDIX 1

# ENVIRONMENTAL

# POLICY

## **Tegral Buildings Products Annual Environmental Report 2013**

### **Environmental Policy Statement**

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Tegral Building Products Limited is committed to complying with all relevant current licensing regulations with regard to operations carried out at its manufacturing plant in Athy, County Kildare and associated activities at its licensed landfill site at Ballylinan, County Laois.

In order to re-enforce this policy, Tegral is committed to the continued implementation of an Environmental Management System in compliance with the ISO 14001 International Standard. Certification to this standard was achieved in December 2001 and upgraded in 2005 to ISO14001:2004

The company undertakes to provide the necessary resources, including manpower and related training to achieve and demonstrate sound environmental performance and foster environmental protection by controlling the impact of its operational activities on the environment at large.

All employees shall be made aware of the commitment necessary to support environmental protection in the performance of their duties.

  
**PATRICK KELLY**  
**Managing Director**

  
**PAUL LOUGHMAN**  
**Quality & Environment Manager**



# APPENDIX 2

## MET EIREANN

### DATA

| Date       | Rainfall(mm) | Mean Wind<br>Speed(knots) |
|------------|--------------|---------------------------|
| 01/01/2013 | 0.1          | 9.8                       |
| 02/01/2013 | 0            | 7.5                       |
| 03/01/2013 | 0            | 7.3                       |
| 04/01/2013 | 0            | 8                         |
| 05/01/2013 | 0.1          | 8.7                       |
| 06/01/2013 | 0.1          | 8.5                       |
| 07/01/2013 | 1.8          | 12.3                      |
| 08/01/2013 | 1.1          | 5.8                       |
| 09/01/2013 | 0            | 0.3                       |
| 10/01/2013 | 1.4          | 4.1                       |
| 11/01/2013 | 0.4          | 4.9                       |
| 12/01/2013 | 0.5          | 5.2                       |
| 13/01/2013 | 0.7          | 2.8                       |
| 14/01/2013 | 1            | 7.5                       |
| 15/01/2013 | 0            | 3.3                       |
| 16/01/2013 | 7.7          | 5.4                       |
| 17/01/2013 | 3.8          | 8                         |
| 18/01/2013 | 5.5          | 9                         |
| 19/01/2013 | 0.3          | 4                         |
| 20/01/2013 | 0            | 3.6                       |
| 21/01/2013 | 0            | 3.1                       |
| 22/01/2013 | 0            | 3.4                       |
| 23/01/2013 | 0            | 3.2                       |
| 24/01/2013 | 0.2          | 4.9                       |
| 25/01/2013 | 21.1         | 13.1                      |
| 26/01/2013 | 4.9          | 13.1                      |
| 27/01/2013 | 1.1          | 16.7                      |
| 28/01/2013 | 13.3         | 16.8                      |
| 29/01/2013 | 4            | 13.0                      |
| 30/01/2013 | 0.8          | 16.8                      |
| 31/01/2013 | 6.5          | 13.6                      |
| 01/02/2013 | 0.1          | 9.7                       |
| 02/02/2013 | 0            | 5.0                       |
| 03/02/2013 | 3.5          | 9.8                       |
| 04/02/2013 | 5.4          | 18.1                      |
| 05/02/2013 | 0.4          | 15.7                      |
| 06/02/2013 | 0            | 10.3                      |
| 07/02/2013 | 2.6          | 8.3                       |
| 08/02/2013 | 0.1          | 6.4                       |
| 09/02/2013 | 1.8          | 4.0                       |
| 10/02/2013 | 14           | 6.9                       |
| 11/02/2013 | 0.6          | 5.1                       |
| 12/02/2013 | 0.4          | 3.4                       |
| 13/02/2013 | 5.7          | 9.0                       |
| 14/02/2013 | 0.3          | 9.3                       |
| 15/02/2013 | 0.2          | 4.5                       |
| 16/02/2013 | 0            | 8.9                       |

|            |      |      |
|------------|------|------|
| 17/02/2013 | 0    | 11.7 |
| 18/02/2013 | 0    | 7.9  |
| 19/02/2013 | 0    | 4.9  |
| 20/02/2013 | 0    | 9.3  |
| 21/02/2013 | 0    | 11.1 |
| 22/02/2013 | 0    | 6.3  |
| 23/02/2013 | 0.1  | 3.8  |
| 24/02/2013 | 0    | 3.1  |
| 25/02/2013 | 0    | 4.0  |
| 26/02/2013 | 0    | 2.4  |
| 27/02/2013 | 0    | 4.6  |
| 28/02/2013 | 0    | 6.6  |
| 01/03/2013 | 0    | 4.1  |
| 02/03/2013 | 0    | 2.9  |
| 03/03/2013 | 0    | 4    |
| 04/03/2013 | 0    | 5.8  |
| 05/03/2013 | 0    | 2.7  |
| 06/03/2013 | 9.2  | 3.8  |
| 07/03/2013 | 5    | 6.3  |
| 08/03/2013 | 4    | 8.5  |
| 09/03/2013 | 0.5  | 7    |
| 10/03/2013 | 0    | 11.8 |
| 11/03/2013 | 1.3  | 11.7 |
| 12/03/2013 | 0    | 7.4  |
| 13/03/2013 | 0.9  | 6.1  |
| 14/03/2013 | 0    | 6.5  |
| 15/03/2013 | 3    | 8.3  |
| 16/03/2013 | 0    | 3.7  |
| 17/03/2013 | 1.7  | 6    |
| 18/03/2013 | 0    | 6.1  |
| 19/03/2013 | 0.1  | 5.9  |
| 20/03/2013 | 0    | 3.7  |
| 21/03/2013 | 11.3 | 12.6 |
| 22/03/2013 | 20.3 | 13.7 |
| 23/03/2013 | 0.2  | 9.4  |
| 24/03/2013 | 0    | 9    |
| 25/03/2013 | 0    | 9.5  |
| 26/03/2013 | 0.1  | 6.5  |
| 27/03/2013 | 0    | 5.6  |
| 28/03/2013 | 0    | 6.1  |
| 29/03/2013 | 0    | 8    |
| 30/03/2013 | 0    | 6.5  |
| 31/03/2013 | 0    | 10.7 |
| 01/04/2013 | 0    | 9.4  |
| 02/04/2013 | 0    | 7.5  |
| 03/04/2013 | 0    | 6.7  |
| 04/04/2013 | 0    | 8.1  |
| 05/04/2013 | 0    | 6.9  |
| 06/04/2013 | 0    | 4.7  |

|            |      |      |
|------------|------|------|
| 07/04/2013 | 0    | 8.1  |
| 08/04/2013 | 0    | 9.7  |
| 09/04/2013 | 0    | 6.8  |
| 10/04/2013 | 0.7  | 3.9  |
| 11/04/2013 | 14.7 | 4.9  |
| 12/04/2013 | 0.1  | 5.3  |
| 13/04/2013 | 3    | 10.9 |
| 14/04/2013 | 5.1  | 20.2 |
| 15/04/2013 | 2    | 16.1 |
| 16/04/2013 | 0.1  | 14.5 |
| 17/04/2013 | 7.3  | 21.2 |
| 18/04/2013 | 3    | 16.4 |
| 19/04/2013 | 0.1  | 5.5  |
| 20/04/2013 | 0    | 8.8  |
| 21/04/2013 | 2.7  | 9.2  |
| 22/04/2013 | 1    | 10.1 |
| 23/04/2013 | 0    | 9.1  |
| 24/04/2013 | 0.5  | 7.2  |
| 25/04/2013 | 3.5  | 6.7  |
| 26/04/2013 | 0.8  | 8.8  |
| 27/04/2013 | 0    | 8.3  |
| 28/04/2013 | 0.4  | 11.1 |
| 29/04/2013 | 0.1  | 10.7 |
| 30/04/2013 | 0    | 3.1  |
| 01/05/2013 | 0.1  | 4.5  |
| 02/05/2013 | 0    | 9.2  |
| 03/05/2013 | 11.4 | 13.5 |
| 04/05/2013 | 1.3  | 12.3 |
| 05/05/2013 | 5.8  | 10.9 |
| 06/05/2013 | 0.5  | 6.2  |
| 07/05/2013 | 1.7  | 8.9  |
| 08/05/2013 | 25.3 | 13.6 |
| 09/05/2013 | 12.2 | 14.1 |
| 10/05/2013 | 0.6  | 12.8 |
| 11/05/2013 | 1.5  | 12.6 |
| 12/05/2013 | 3.1  | 12.9 |
| 13/05/2013 | 6.4  | 12   |
| 14/05/2013 | 2.6  | 10   |
| 15/05/2013 | 1.5  | 10.4 |
| 16/05/2013 | 5.5  | 5.2  |
| 17/05/2013 | 0.1  | 6.1  |
| 18/05/2013 | 1.6  | 8    |
| 19/05/2013 | 0    | 3.1  |
| 20/05/2013 | 0    | 9.1  |
| 21/05/2013 | 0    | 7.8  |
| 22/05/2013 | 0.1  | 9.7  |
| 23/05/2013 | 0    | 11.4 |
| 24/05/2013 | 0    | 8.5  |
| 25/05/2013 | 1.4  | 5    |

|            |     |      |
|------------|-----|------|
| 26/05/2013 | 4.6 | 7.8  |
| 27/05/2013 | 7.6 | 11.3 |
| 28/05/2013 | 2.1 | 6.8  |
| 29/05/2013 | 0   | 8.3  |
| 30/05/2013 | 0   | 8.3  |
| 31/05/2013 | 0   | 7.5  |
| 01/06/2013 | 0   | 6.6  |
| 02/06/2013 | 0   | 2.7  |
| 03/06/2013 | 0   | 2.2  |
| 04/06/2013 | 0   | 3.2  |
| 05/06/2013 | 0   | 3.7  |
| 06/06/2013 | 0   | 2.6  |
| 07/06/2013 | 0   | 4.8  |
| 08/06/2013 | 0   | 2.6  |
| 09/06/2013 | 0   | 5    |
| 10/06/2013 | 2   | 8.7  |
| 11/06/2013 | 5.9 | 8.2  |
| 12/06/2013 | 2.3 | 4.8  |
| 13/06/2013 | 5.1 | 8.6  |
| 14/06/2013 | 9.8 | 10.1 |
| 15/06/2013 | 1.9 | 10.4 |
| 16/06/2013 | 5.6 | 5.9  |
| 17/06/2013 | 0.7 | 3.4  |
| 18/06/2013 | 0   | 3.7  |
| 19/06/2013 | 0   | 4.5  |
| 20/06/2013 | 0   | 4.5  |
| 21/06/2013 | 0.8 | 8.2  |
| 22/06/2013 | 1.6 | 12.7 |
| 23/06/2013 | 1.2 | 13.1 |
| 24/06/2013 | 0   | 5.3  |
| 25/06/2013 | 0   | 4.4  |
| 26/06/2013 | 0   | 4.5  |
| 27/06/2013 | 0   | 6.7  |
| 28/06/2013 | 0   | 9.7  |
| 29/06/2013 | 0.7 | 6.9  |
| 30/06/2013 | 0   | 10.5 |
| 01/07/2013 | 0   | 7.5  |
| 02/07/2013 | 4.1 | 8.7  |
| 03/07/2013 | 0   | 8.2  |
| 04/07/2013 | 0.4 | 9.8  |
| 05/07/2013 | 0   | 5.2  |
| 06/07/2013 | 0   | 4.2  |
| 07/07/2013 | 0   | 3.9  |
| 08/07/2013 | 0   | 2.1  |
| 09/07/2013 | 0   | 3    |
| 10/07/2013 | 0   | 5    |
| 11/07/2013 | 0   | 3.3  |
| 12/07/2013 | 0   | 4    |

|            |      |      |
|------------|------|------|
| 13/07/2013 | 0    | 4.3  |
| 14/07/2013 | 0    | 4.1  |
| 15/07/2013 | 0    | 3.9  |
| 16/07/2013 | 0    | 3.1  |
| 17/07/2013 | 0    | 3.8  |
| 18/07/2013 | 0    | 2.7  |
| 19/07/2013 | 0    | 3.9  |
| 20/07/2013 | 0    | 4.3  |
| 21/07/2013 | 0    | 4.2  |
| 22/07/2013 | 0    | 5.4  |
| 23/07/2013 | 5.1  | 6.8  |
| 24/07/2013 | 2.7  | 9.2  |
| 25/07/2013 | 3.9  | 4.7  |
| 26/07/2013 | 2    | 6.1  |
| 27/07/2013 | 0.5  | 5.3  |
| 28/07/2013 | 4.4  | 5.9  |
| 29/07/2013 | 0.5  | 7.6  |
| 30/07/2013 | 0    | 8.4  |
| 31/07/2013 | 8.7  | 7.3  |
| 01/08/2013 | 12.2 | 12.5 |
| 02/08/2013 | 5.6  | 10.8 |
| 03/08/2013 | 2.6  | 8.1  |
| 04/08/2013 | 29.5 | 3.9  |
| 05/08/2013 | 0.8  | 7.3  |
| 06/08/2013 | 0    | 6.3  |
| 07/08/2013 | 0    | 3.2  |
| 08/08/2013 | 0.3  | 8.1  |
| 09/08/2013 | 0    | 6.8  |
| 10/08/2013 | 0    | 6.7  |
| 11/08/2013 | 0    | 9.6  |
| 12/08/2013 | 0    | 6.9  |
| 13/08/2013 | 0    | 6.9  |
| 14/08/2013 | 1    | 7.3  |
| 15/08/2013 | 22.5 | 8.8  |
| 16/08/2013 | 0.2  | 5.9  |
| 17/08/2013 | 2.4  | 11.5 |
| 18/08/2013 | 0.2  | 9.3  |
| 19/08/2013 | 0.2  | 8.2  |
| 20/08/2013 | 0    | 9.6  |
| 21/08/2013 | 0    | 8.7  |
| 22/08/2013 | 0.1  | 5.1  |
| 23/08/2013 | 4.7  | 5.1  |
| 24/08/2013 | 1.7  | 4.1  |
| 25/08/2013 | 1.1  | 5.9  |
| 26/08/2013 | 0.1  | 3.1  |
| 27/08/2013 | 0.4  | 3.1  |
| 28/08/2013 | 0    | 5.3  |
| 29/08/2013 | 0    | 6.2  |
| 30/08/2013 | 0    | 8.4  |

|            |      |      |
|------------|------|------|
| 31/08/2013 | 0    | 5.3  |
| 01/09/2013 | 0    | 6.9  |
| 02/09/2013 | 0.1  | 6.4  |
| 03/09/2013 | 0    | 5.8  |
| 04/09/2013 | 0    | 7.8  |
| 05/09/2013 | 0    | 5.8  |
| 06/09/2013 | 0.8  | 6.6  |
| 07/09/2013 | 2.2  | 8.7  |
| 08/09/2013 | 0.2  | 6    |
| 09/09/2013 | 1.3  | 5.3  |
| 10/09/2013 | 0.1  | 6.9  |
| 11/09/2013 | 2.2  | 5.1  |
| 12/09/2013 | 0.9  | 5.2  |
| 13/09/2013 | 0.2  | 3.5  |
| 14/09/2013 | 0    | 3.2  |
| 15/09/2013 | 1.9  | 14   |
| 16/09/2013 | 0    | 13.2 |
| 17/09/2013 | 8.2  | 9.4  |
| 18/09/2013 | 0.6  | 7.1  |
| 19/09/2013 | 2.3  | 11.4 |
| 20/09/2013 | 0    | 6.1  |
| 21/09/2013 | 0    | 6.5  |
| 22/09/2013 | 0.1  | 6.5  |
| 23/09/2013 | 0    | 6.8  |
| 24/09/2013 | 0    | 4.8  |
| 25/09/2013 | 0.3  | 1.7  |
| 26/09/2013 | 1.3  | 3.9  |
| 27/09/2013 | 0    | 4.5  |
| 28/09/2013 | 1.5  | 3.2  |
| 29/09/2013 | 0    | 5.6  |
| 30/09/2013 | 0.2  | 6.9  |
| 01/10/2013 | 28.4 | 9.1  |
| 02/10/2013 | 14.4 | 10.3 |
| 03/10/2013 | 17.3 | 6.3  |
| 04/10/2013 | 2.1  | 5.1  |
| 05/10/2013 | 0    | 6.9  |
| 06/10/2013 | 0.1  | 7.6  |
| 07/10/2013 | 0.3  | 9.4  |
| 08/10/2013 | 0.4  | 5    |
| 09/10/2013 | 0.1  | 7.2  |
| 10/10/2013 | 0    | 6.4  |
| 11/10/2013 | 0.1  | 7.1  |
| 12/10/2013 | 0    | 5.4  |
| 13/10/2013 | 0    | 5.3  |
| 14/10/2013 | 0.2  | 5.4  |
| 15/10/2013 | 0    | 3    |
| 16/10/2013 | 28.6 | 8    |
| 17/10/2013 | 0.1  | 6.1  |
| 18/10/2013 | 16.5 | 9.2  |

|            |      |      |
|------------|------|------|
| 19/10/2013 | 8.1  | 7.8  |
| 20/10/2013 | 2.5  | 8.7  |
| 21/10/2013 | 9.1  | 9.2  |
| 22/10/2013 | 1.8  | 8.7  |
| 23/10/2013 | 0.4  | 8    |
| 24/10/2013 | 2.4  | 6.1  |
| 25/10/2013 | 14.9 | 8.2  |
| 26/10/2013 | 9.8  | 7.5  |
| 27/10/2013 | 5.8  | 13.2 |
| 28/10/2013 | 2.1  | 10.6 |
| 29/10/2013 | 0    | 8.6  |
| 30/10/2013 | 3.7  | 8.6  |
| 31/10/2013 | 0.8  | 7.3  |
| 01/11/2013 | 0.1  | 3.4  |
| 02/11/2013 | 5.2  | 38   |
| 03/11/2013 | 1    | 7.9  |
| 04/11/2013 | 0    | 4.4  |
| 05/11/2013 | 1.7  | 10.9 |
| 06/11/2013 | 1.5  | 5    |
| 07/11/2013 | 0.1  | 8.1  |
| 08/11/2013 | 0.2  | 7.5  |
| 09/11/2013 | 0.5  | 5.4  |
| 10/11/2013 | 9.6  | 4.2  |
| 11/11/2013 | 0.3  | 6.1  |
| 12/11/2013 | 0.1  | 5.7  |
| 13/11/2013 | 1.2  | 8.7  |
| 14/11/2013 | 0    | 9.9  |
| 15/11/2013 | 0    | 3.8  |
| 16/11/2013 | 0    | 4.5  |
| 17/11/2013 | 0.6  | 5.7  |
| 18/11/2013 | 3.4  | 5.9  |
| 19/11/2013 | 0    | 7.6  |
| 20/11/2013 | 1.5  | 13.4 |
| 21/11/2013 | 0    | 7.4  |
| 22/11/2013 | 0    | 4.9  |
| 23/11/2013 | 0    | 2.3  |
| 24/11/2013 | 0    | 2.9  |
| 25/11/2013 | 0    | 1.7  |
| 26/11/2013 | 0    | 1.5  |
| 27/11/2013 | 0    | 1.9  |
| 28/11/2013 | 0.6  | 1.6  |
| 29/11/2013 | 0.1  | 9.6  |
| 30/11/2013 | 0    | 3.6  |
| 01/12/2013 | 0.4  | 1.5  |
| 02/12/2013 | 0.1  | 2    |
| 03/12/2013 | 0.4  | 5.1  |
| 04/12/2013 | 0.1  | 4.6  |
| 05/12/2013 | 0.7  | 13.1 |
| 06/12/2013 | 0.1  | 6    |



|            |      |      |
|------------|------|------|
| 07/12/2013 | 0    | 7.6  |
| 08/12/2013 | 0    | 9.6  |
| 09/12/2013 | 0.1  | 9.3  |
| 10/12/2013 | 0.2  | 12.6 |
| 11/12/2013 | 0    | 13   |
| 12/12/2013 | 1.6  | 14   |
| 13/12/2013 | 1.6  | 12.6 |
| 14/12/2013 | 16.3 | 15.9 |
| 15/12/2013 | 3.2  | 11.3 |
| 16/12/2013 | 3.6  | 6.4  |
| 17/12/2013 | 0.7  | 10.4 |
| 18/12/2013 | 16.7 | 15.9 |
| 19/12/2013 | 2.1  | 10.8 |
| 20/12/2013 | 3.7  | 15.4 |
| 21/12/2013 | 10.7 | 14.5 |
| 22/12/2013 | 2    | 11.6 |
| 23/12/2013 | 9.9  | 15.8 |
| 24/12/2013 | 0    | 17.9 |
| 25/12/2013 | 0    | 3.2  |
| 26/12/2013 | 7.2  | 12.2 |
| 27/12/2013 | 5.8  | 22.2 |
| 28/12/2013 | 0    | 6.8  |
| 29/12/2013 | 14.6 | 12   |
| 30/12/2013 | 19   | 12.6 |
| 31/12/2013 | 15.8 | 10.7 |