Department of the Environment and Climate Change

HM Government of Gibraltar

Annual Statistics Digest

2013

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Chapter 1: Air Quality

1.1 Introduction

This section of the report provides data of Gibraltar's air quality measurements for the calendar year of 2013. It includes data for the automatic and non-automatic monitoring networks.

- The primary objectives of the monitoring networks are;
  - To provide the public with rapid and reliable information on urban air quality.
  - To monitor compliance with European Directives and local statutory instruments.
  - To assist in developing new policies.

The Gibraltar Air Monitoring Programme consists of three automatic monitoring stations measuring a variety of pollutants and a passive monitoring network measuring nitrogen dioxide and Volatile Organic Compounds through the use of diffusive samplers.

The equipment deployed on the existing network was selected to ensure robust measurements at the necessary level of accuracy and time resolution to meet the data quality objectives within the European Air Quality Directives and national legislation, and consists of the below set out in Table 1.1.

Table 1.1 The Gibraltar Air Monitoring Programme

Location	Pollutants Measured	Equipment Types
Electricity Offices (Rosia Road)	Sulphur dioxide	API M100E (Ultraviolet flourescence)
	Oxides of nitrogen	API M200E (Chemiluminescence)
	Carbon monoxide	API M300E (Infrared Absorption)
	PM_{10} Gravimetry	R&P Partisol 2025
	$PM_{2.5}$ Gravimetry	R&P Partisol 2025
	PM_{10} Automatic	TEOM FDMS
	Poly Aromatic Hydrocarbons	Digitel High Volume Sampler
	Volatile Organic Compounds	Environment VOC71M Gas Chromatograph
	Wind speed & direction	Gill Windsonic
	Ambient temperature	Met One 592
Bleak House (Near Europa Point)	Oxides of nitrogen	API M200E (Chemiluminescence)
	Ozone	API M400E (Ultraviolet absorption)
	PM_{10} Gravimetry	R&P Partisol 2025
	Wind speed & direction	Gill Windsonic

Witham's Road	Ambient temperature	Met One 592
	Oxides of nitrogen	API M200E (Chemiluminescence)
	Wind speed & direction	Gill Windsonic
Passive Network (Various locations)	Ambient temperature	Met One 592
	Nitrogen Dioxide	Diffusive Samplers - Palmes Tubes at 27 sites
	Volatile Organic Compounds	Diffusive Samplers – SorbentTubes at 15 sites

Data gathered to meet the Gibraltar Government's monitoring obligations are disseminated in near real-time on the www.gibraltarairquality.gi website. This web-based dissemination and reporting is an important tool for delivery of air quality data and descriptive statistics to a broad range of end users.

The site provides wide and unrestricted accessibility to air quality data and has been designed to be user-friendly, interactive and responsive.

Users may download unlimited portions of the database in spread-sheet format or graphs. The website has proved, and continues to prove, popular as demonstrated in Table 1.2.

Table 1.2 Gibraltar Air Quality Website Hits 2013

Month	Unique visitors	Number of visits	Hits
Jan	104	230	627
Feb	84	237	698
Mar	103	202	540
Apr	115	255	1,050
May	111	235	609
Jun	104	223	467
Jul	131	274	820
Aug	113	235	545
Sep	86	215	529
Oct	152	314	755
Nov	195	316	742
Dec	114	272	715
Total	3,008	1,412	8,097

1.2 Gibraltar Air Quality Standards

Standards and objectives are set for air pollutant concentrations in ambient air, over a given time period, that are considered to be acceptable in the light of what is known about the effects of each pollutant on health and on the environment. They can also be used as a benchmark to see if air pollution is getting better or worse.

The Gibraltar Ambient Air Quality Standards, in place for the purpose of local air quality management, are found in the Environment (Air Quality Standards) Regulations 2010. This transposed into Gibraltar law the latest Air Quality Directive 2008/50/EC (known as the CAFÉ Directive - Clean Air For Europe), which merged all existing air quality directives into a single Directive. It also lays down Air Quality values for $PM_{2.5}$.

A summary of the current Gibraltar Air Quality Objectives is set out in Table 1.3.

Table 1.3 Summary of current Limit Values and Target Values (the number of permissible exceedances per year are given in brackets next to the Value)

Pollutant	Type	Year in force	Metric	Value
NO_2	LV	2010	Annual mean	40 µg m^{-3}
NO_2	LV	2010	1-hr mean	200 µg m^{-3} (18 allowed)
PM_{10}	LV	2005	Annual mean	40 µg m^{-3}
PM_{10}	LV	2005	24-hr mean	50 µg m^{-3} (35 allowed)
$PM_{2.5}$	TV/LV (stage 1)	2010/2015	Annual mean	25 µg m^{-3}
$PM_{2.5}$	LV (stage 2)	2020	Annual mean	20 µg m^{-3}
CO	LV	2005	Max daily running 8-hr mean	10 mg m^{-3}
SO_2	LV	2005	1-hr mean	350 µg m^{-3} (24 allowed)
SO_2	LV	2005	24-hr mean	125 µg m^{-3} (3 allowed)
O_3	LTO	Not defined	Max daily running 8-hr mean	120 µg m^{-3}
Benzene	LV	2010	Annual mean	5 µg m^{-3}
Lead	LV	2005	Annual mean	0.5 µg m^{-3}
BaP	TV	2013	Annual mean	1 ng m^{-3}
Arsenic	TV	2013	Annual mean	6 ng m^{-3}
Cadmium	TV	2013	Annual mean	5 ng m^{-3}
Nickel	TV	2013	Annual mean	20 g m^{-3}

1.3 Annual Automatic Data Summary Reports

1.3.1 Rosia Road: 1st January to 31st December 2013

Rosia Road air quality monitoring station has been in operation since early 2005, measuring the following parameters: Carbon Monoxide, Nitrous Oxides, Particulate Matter, Sulphur Dioxide, Metals and Polycyclic aromatic hydrocarbons (PAHs). The station is situated on a busy roadside, encapsulating measurements from vehicular traffic and the OESCO Power Station in the nearby area. Graphs 1.1 – 1.3 summarise the hourly mean data of CO, NO_2 & NO_2 respectively. Tables 1.4 & 1.5 show the data capture from specific pollutants measured on site.

Table 1.4

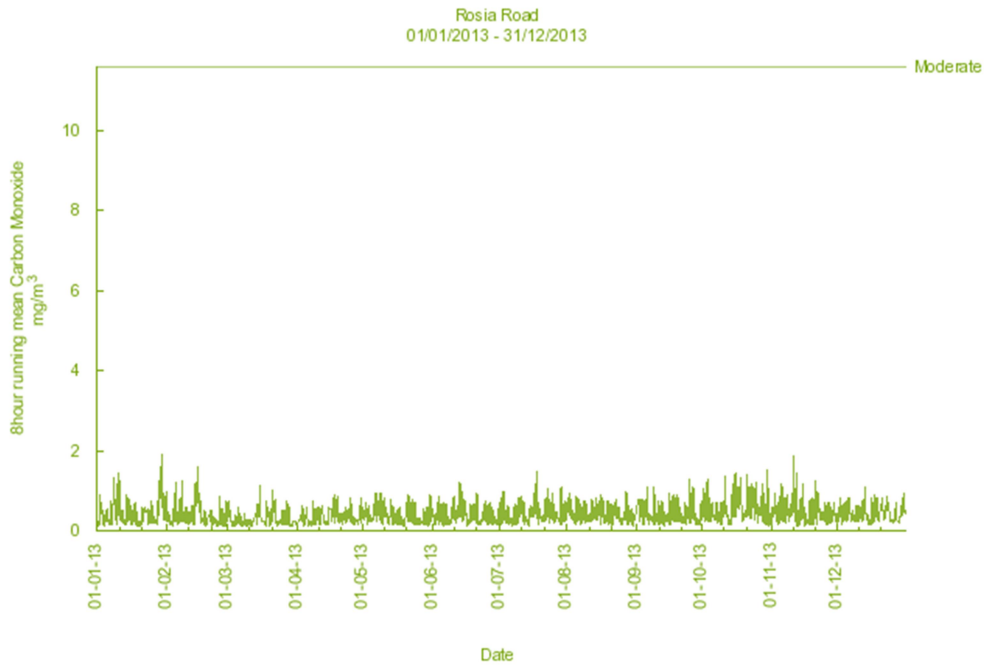
POLLUTANT	BENZ	CO	NO_2	SO_2
Maximum hourly mean	81.3 µg m^{-3}	3.8 mg m^{-3}	375 µg m^{-3}	109 µg m^{-3}
Maximum running 8-hour mean	33.4 µg m^{-3}	1.9 mg m^{-3}	149 µg m^{-3}	59 µg m^{-3}
Maximum running 24-hour mean	12.8 µg m^{-3}	1.2 mg m^{-3}	103 µg m^{-3}	37 µg m^{-3}
Maximum daily mean	12.0 µg m^{-3}	1.1 mg m^{-3}	102 µg m^{-3}	31 µg m^{-3}
Average	1.3 µg m^{-3}	0.4 mg m^{-3}	44 µg m^{-3}	7 µg m^{-3}
Data capture	89 %	97 %	88 %	97 %

Table 1.5

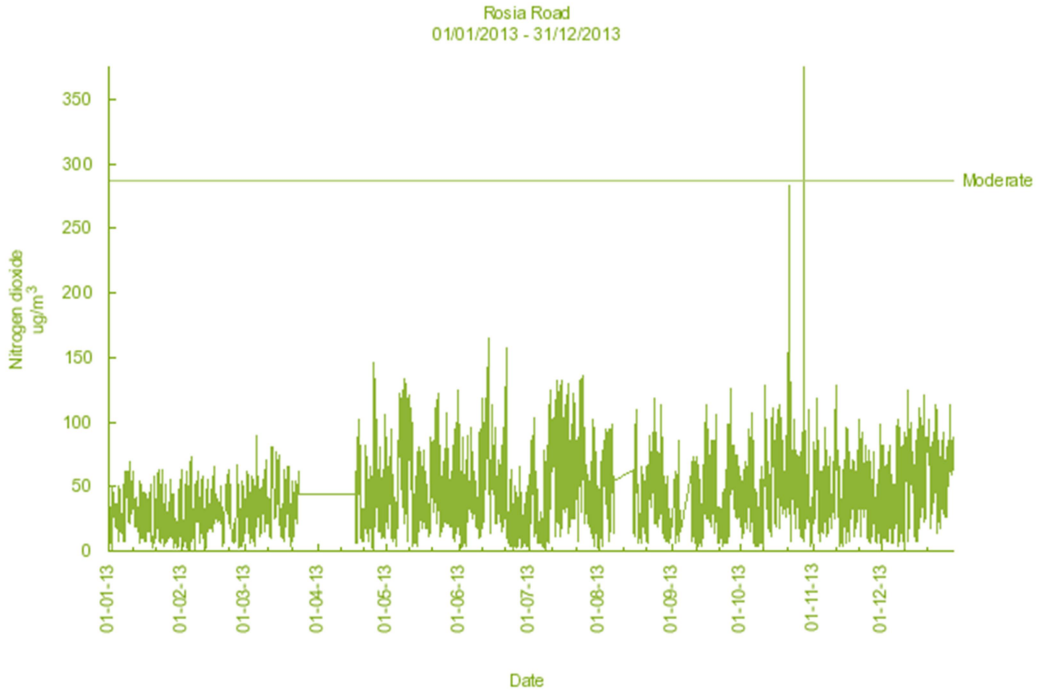
Pollutant	Public Health (Air Quality Limit Values) Rules 2002, (Amendment) Rules 2003 and (Ozone) Rules 2004	Exceedances	Days
Carbon Monoxide	Running 8-hour mean > 10.0 mg m^{-3}	0	-
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	1	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	3	-
Sulphur Dioxide	Annual mean > 20 µg m^{-3}	0	-

SUMMARY: The tables above show that during 2013, Rosia Road experienced exceedances in both annual and hourly mean thresholds for nitrogen dioxide as outlined above. The annual mean was exceeded by 4 µg m^{-3}. No exceedances were experienced for sulphur dioxide and carbon monoxide.

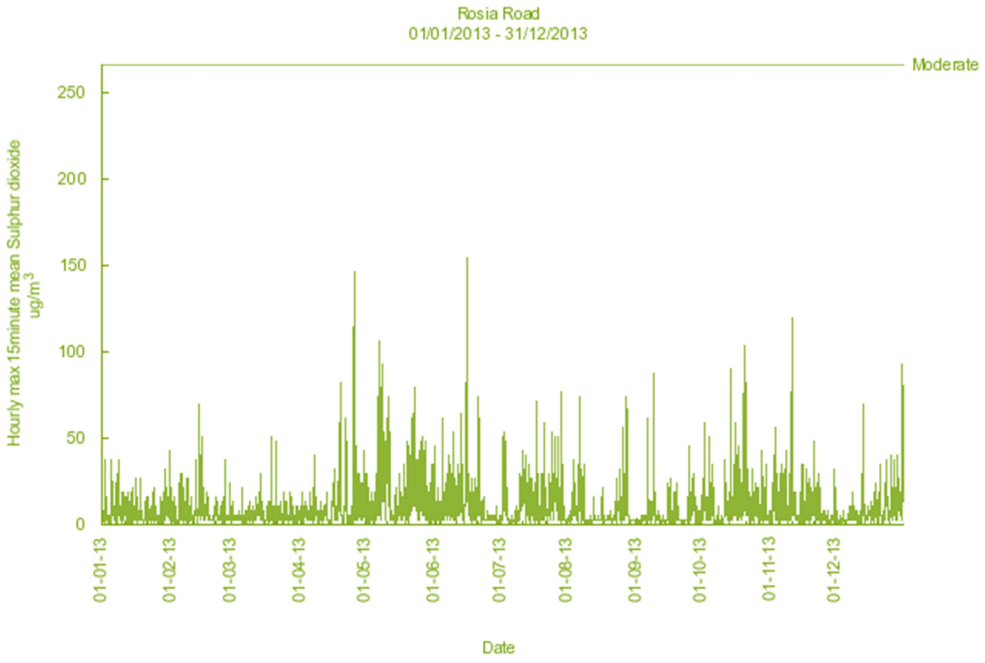
Graph 1.1 Hourly Mean Data for 1st January to 31st December 2013 of CO



Graph 1.2 Hourly Mean Data for 1st January to 31st December 2013 of NO_2



Graph 1.3 Hourly Mean Data for 1st January to 31st December 2013 of SO_2



1.3.2 Bleak House: 1st January to 31st December 2013

Bleak House air quality monitoring station has been in operation since February 2005. This location was chosen to give a background suburban area reading in comparison to roadside monitoring stations such as Rosia Road and Witham's Road stations.

Table 1.6

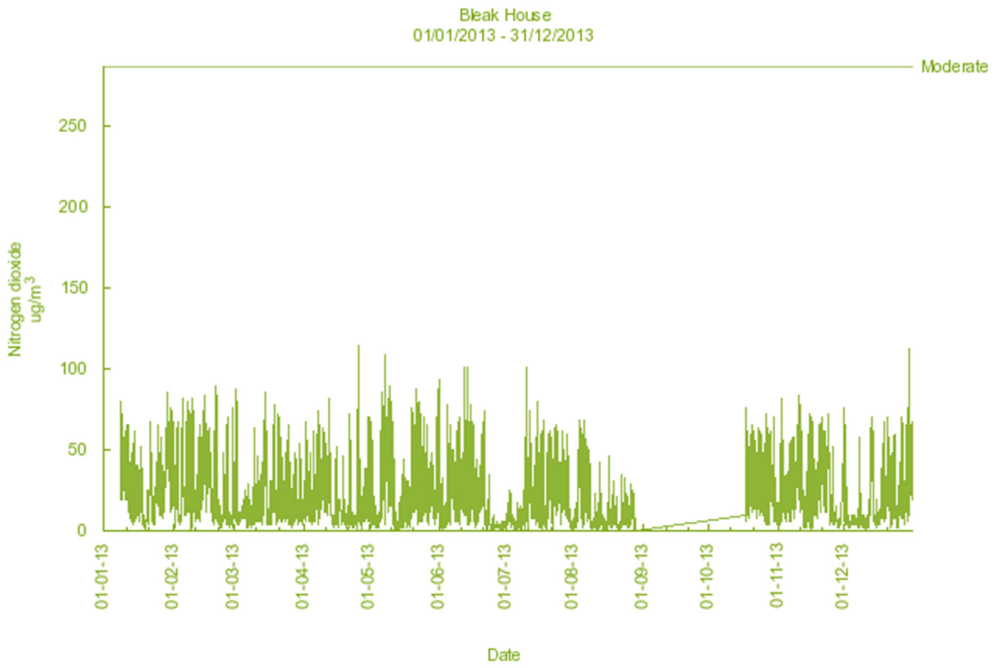
POLLUTANT	NO_2	O_3
Maximum hourly mean	115 µg m^{-3}	128 µg m^{-3}
Maximum running 8-hour mean	87 µg m^{-3}	124 µg m^{-3}
Maximum running 24-hour mean	61 µg m^{-3}	112 µg m^{-3}
Maximum daily mean	56 µg m^{-3}	110 µg m^{-3}
Average	22 µg m^{-3}	58 µg m^{-3}
Data capture	83 %	98 %

Table 1.7

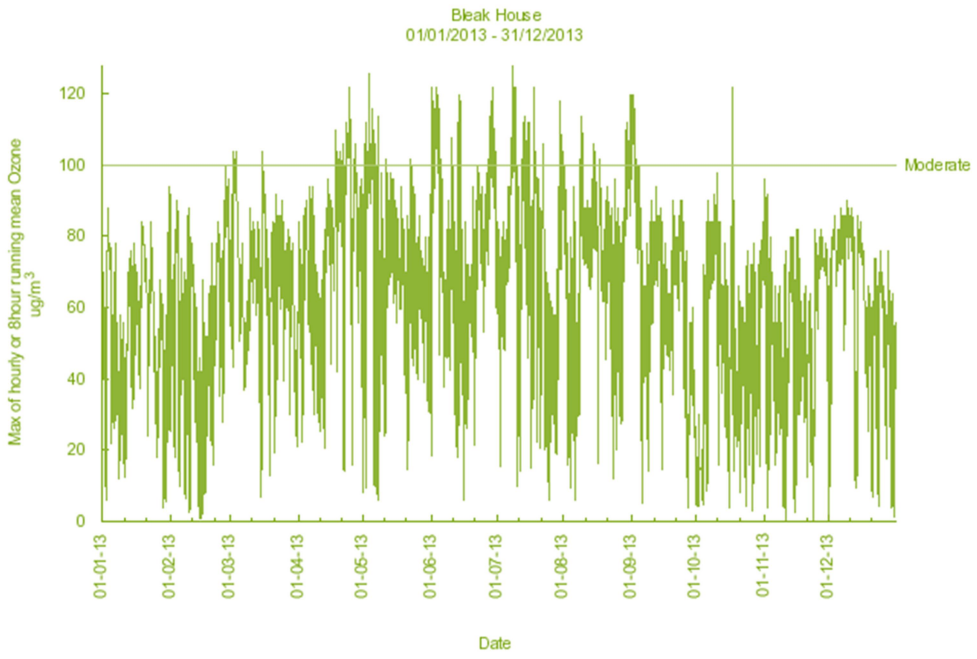
Pollutant	Public Health (Air Quality Limit Values) Rules 2002, (Amendment) Rules 2003 and (Ozone) Rules 2004	Exceedances	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	0	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	-
Ozone	Running 8-hour mean > 120 µg m^{-3}	3	-

SUMMARY: Tables 1.6 and 1.7 show the data capture and measurements for specific pollutants and shows that no exceedances were experienced for nitrogen dioxide, but that there were three exceedances in ozone.

Graph 1.4 Hourly Mean Data for 1st January to 31st December 2013 of NO_2



Graph 1.5 Hourly Mean Data for 1st January to 31st December 2013 of Ozone.



1.3.3 Witham's Road: 1st January to 31st December 2013

Witham's Road air quality monitoring station has been in operation since 2008. The station's location is roadside in an urban setting, where the OESCO and ISGS power stations are in the vicinity. This location was chosen to closely monitor the effect of traffic and emissions from the power stations.

Table 1.8

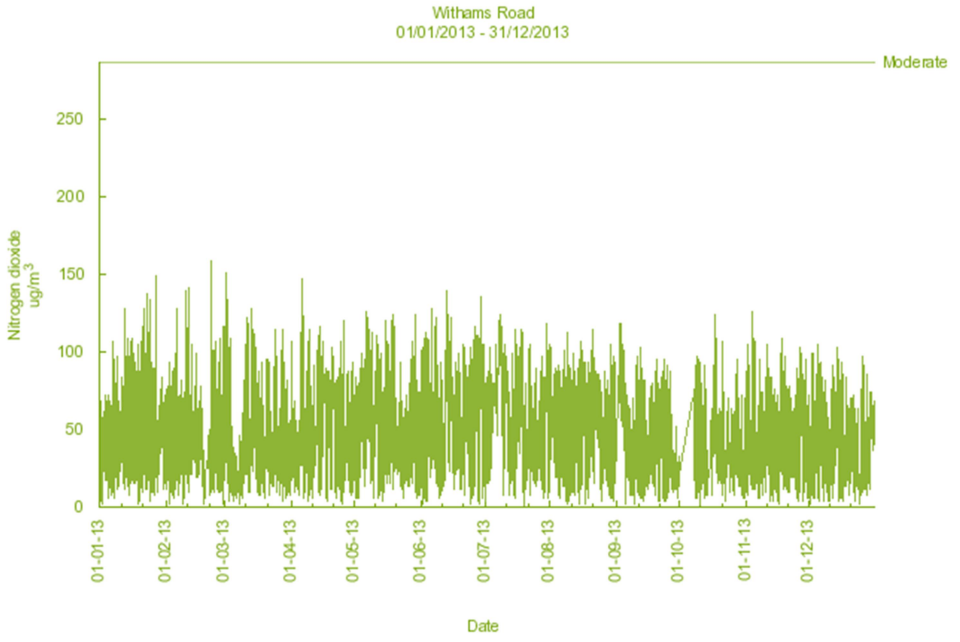
POLLUTANT	NO_2
Maximum hourly mean	159 µg m^{-3}
Maximum running 8-hour mean	126 µg m^{-3}
Maximum running 24-hour mean	108 µg m^{-3}
Maximum daily mean	108 µg m^{-3}
Average	49 µg m^{-3}
Data capture	95 %

Table 1.9

Pollutant	Public Health (Air Quality Limit Values) Rules 2002, (Amendment) Rules 2003 and (Ozone) Rules 2004	Exceedances	Days
Nitrogen Dioxide	Annual mean > 40 µg m^{-3}	1	-
Nitrogen Dioxide	Hourly mean > 200 µg m^{-3}	0	-

SUMMARY: Tables 1.8 and 1.9 present pollutant data measured at Witham's Road and shows that the annual mean for nitrogen dioxide was exceeded at this site by 9 µg m^{-3}

Graph 1.6 Hourly Mean Data for 1st January to 31st December 2013 of NO_2



1.4 Overview of Gibraltar's automatic air pollution measurement

The data capture figures reflect data capture over the whole year, 1st January to 31st December 2013.

Table 1.10 Data capture in 2013 (%)

	UK	Gibraltar
NO_2	**93.1**	88.7
SO_2	**91.4**	97.4
CO	**94.6**	97.2
PM_{10} (grav.)	**84.9**	87.1
$PM_{2.5}$ (grav.)	**87.9**	75.3
O_3	**94.7**	98.2

1.4.1 Carbon monoxide

Carbon monoxide (CO) is a colourless, odourless, poisonous gas produced by incomplete or inefficient combustion of fuel. It is produced predominantly by the road transport sector, particularly by petrol engines. It prevents the normal transport of oxygen by the blood, which in turn can lead to a significant reduction in the supply of oxygen to the heart, particularly in people suffering from heart disease.

This pollutant is measured at the Rosia Road station.

Table 1.11

Air quality objective for CO (as maximum daily running 8hr mean)	Recorded levels (as maximum daily running 8hr mean)
10.0 mg m^{-3}	**1.9 mg m^{-3}**

SUMMARY: Gibraltar's recorded levels are well below the maximum permissible under the Air Quality Rules. No exceedances of the carbon monoxide air quality objectives within our National Rules or the European Limit Values.

1.4.2 Nitrogen Dioxide

Nitrogen oxides (NO_x) is a collective term used to refer to two species of oxides of nitrogen, nitric oxide (NO) and nitrogen dioxide (NO_2). NO is mainly derived from road transport emissions and other combustion processes such as electricity supply. NO is not considered to be harmful to health, however, once released into the atmosphere, NO is very rapidly oxidised to NO_2 which can be harmful to human health, irritating the lungs and lowering resistance to respiratory infections such as influenza.

This pollutant is measured at Rosia Road, Witham's Road and Bleak House monitoring stations. There are two air quality objectives for NO_2: a long-term annual mean objective, set to protect against long-term exposure to elevated NO_2 concentrations; and a short-term 1-hour objective set to protect against short-term elevated NO_2 concentrations.

Annual Objective

As per the Air Quality Directive 2008/50/EC, Gibraltar's annual mean air quality objective for NO_2 is 40 µg m-^{3}. It can be seen from table 1.12 that this level was exceeded at Rosia Road and Witham's Road stations.

Table 1.12

Air Quality Objective for NO_2	Recorded Annual Mean
40 µg m^{-3}	**44 µg m^{-3} (Rosia Road)** **49 µg m^{-3} (Witham's Road)** **22 µg m^{-3} (Bleak House)**

In 2010 Gibraltar was successful in its application for a Time Extension Notification. Gibraltar has until the end of 2014 to achieve compliance with the air quality objective for NO_2 of 40µg m^{-3}.

Hourly Objective

The 1-hour air quality objective for nitrogen dioxide is 200µg m^{-3} which cannot be exceeded more than 18 times per year.

Air Quality Objective for NO_2 (1 hour mean)	Recorded 1 hour mean
200 µg m^{-3} not to be exceeded more than 18 times per year	**375 µg m^{-3} (Rosia Road)** **159 µg m^{-3} (Witham's Road)** **115 µg m^{-3} (Bleak House)**

SUMMARY: There were three exceedances of the 1-hour air quality objective for nitrogen dioxide at the Rosia Road monitoring site. This is still compliant with the air quality objectives in place.

1.4.3 Sulphur Dioxide

Sulphur Dioxide (SO_2) is produced when a material, or fuel, containing sulphur is burned. Globally, much of the sulphur dioxide in the atmosphere comes from natural sources, but in Gibraltar the predominant source is the power station and shipping burning fuel oils.

Even moderate concentrations of sulphur dioxide may result in a fall in lung function in asthmatics. Tightness in the chest and coughing occur at high levels and lung function of asthmatics may be impaired to the extent that medical assistance is required. Sulphur dioxide pollution is considered more harmful when particulate and other pollution concentrations are high.

This pollutant is measured at the Rosia Road station. There are two air quality objectives set for SO2, a daily mean objective and a 1-hour objective, as set out below.

Table 1.14

Air Quality Objective for SO_2 (Daily Mean)	Recorded Daily Mean
125 µg m^{-3} not to be exceeded more than 3 times per year	**31 µg m^{-3}**
350 µg m^{-3} not to be exceeded more than 24 times per year	**109 µg m^{-3}**

SUMMARY: There were no exceedances of either limit value for sulphur dioxide in 2013.

1.4.4 Benzene

Benzene is a volatile organic compound which is a minor constituent of petrol (approximately 1% by volume). The main sources of atmospheric benzene in Europe are the distribution and combustion of petrol. Of these, combustion by petrol vehicles is the single biggest source.

Possible chronic health effects include cancer, central nervous system disorders, liver and kidney damage, reproductive disorders and birth defects.

This pollutant is measured at the Rosia Road station. The air quality objective for benzene is 5 µg m^{-3}, measured as an annual mean. In 2013, the annual mean was measured at 1.7 µg m^{-3}, which is below the Benzene Annual Mean Limit Value.

Table 1.15

Air Quality Objective for Benzene (Annual Mean)	Recorded Annual Mean
5 µg m^{-3}	**1.3 µg m^{-3}**

SUMMARY: There was no exceedance of the Benzene annual mean objective in 2013.

1.4.5 Ozone

Ozone (O_3) is not directly emitted from any man-made source in significant quantities. In the lower atmosphere, O_3 is primarily formed by the sunlight-initiated oxidation of volatile organic compounds (VOCs) in the presence of nitrogen oxides (NO_x). The sources of VOCs are similar to those described for NO_x above, but also include other activities such as solvent use and petrol handling & distribution.

The chemical reactions do not take place instantaneously, therefore ozone measured at a particular location may have arisen from VOC and NO_x emissions many hundreds or even thousands of miles away. Maximum concentrations generally occur downwind of the source areas of the precursor pollutant emissions. Ozone irritates the airways of the lungs, increasing the symptoms of those suffering from asthma and lung diseases.

This pollutant is measured at Bleak House Station. The air quality target value for ozone is expressed as a maximum daily 8 hour mean of 120 µg m^{-3}. This value should not be exceeded more than 25 days per calendar year, averaged over 3 years. The target value was exceeded on 2 days during 2013. The maximum hourly mean was recorded as 57 µg m-3, which is below the EU Information Threshold of 180 µg m-3 and the EU Alert Threshold of 240 µg m-3.

Table 1.16

Air Quality Objective for Ozone (Maximum Daily 8 Hour Mean)	Maximum rolling 8-hr mean (µg m-3)
120 µg m^{-3} not to be exceeded more than 25 days per calendar year, averaged over 3 years.	**124 µg m^{-3}** Target value exceeded on 3 days

SUMMARY: There was no exceedance of the Ozone objective.

1.5 Review of Gibraltar's non-automatic air pollution measurements

1.5.1 Lead

The majority of Lead (Pb) emissions arise from vehicles fuelled with leaded petrol. Industry, in particular secondary non-ferrous metal smelters, may contribute to emissions of lead in industrial areas, though none exist within Gibraltar. This source can become increasingly significant due to the reduction in the lead content of leaded petrol and the increasing use of unleaded petrol (leading to significant reductions in urban lead levels).

Even small amounts of lead can be harmful, especially to infants and young children. In addition, lead taken in by the mother can interfere with the health of the unborn child. Exposure has also been linked to impaired mental function, visual-motor performance and neurological damage in children, and memory and attention span.

The air quality objective for lead is 0.5µg m^{-3} measured as an annual mean to have been achieved by 2005. The 2013 annual mean was measured at 0.01 µg m^{-3}.

Table 1.17

Air Quality Objective for Lead (measured as an annual mean)	Recorded Annual Mean
0.5µg m^{-3}	**0.01µg m^{-3}**

SUMMARY: There was no exceedance of the lead annual mean objective.

1.5.2 Particulate Matter

Fine particles are composed of a wide range of materials arising from a variety of sources including:

- Combustion sources (mainly road traffic);
- Secondary particles, mainly sulphate and nitrate formed by chemical reactions in the atmosphere, and often transported from far across Europe;
- Coarse particles, suspended soils and dusts (e.g. from the Sahara), sea salt, biological particles and particles from construction work.

Particles are measured in a number of different size fractions according to their mean aerodynamic diameter. Most of the monitoring requirements are currently focused on PM_{10}, but the finer fractions such as $PM_{2.5}$ and PM_1 are becoming of increasing interest in terms of health effects. Fine particles can be carried deep into the lungs where they can cause inflammation and a worsening of

the condition of people with heart and lung diseases. In addition, they may carry surface-absorbed carcinogenic compounds into the lungs.

1.5.2.1 Particulate Matter (PM_{10})

There are two air quality objectives set for particulate matter (measured as the PM_{10} size fraction) - a daily mean objective and an annual mean objective.

The annual mean air quality objective for PM_{10} is 40µg m^{-3}, the daily mean objective is set at 50 µg m^{-3}, not to be exceeded on more than 35 days per year. These objectives were to be met by 2005.

Table 1.18

Air Quality Objective for PM_{10} (measured as an annual mean)	Recorded Annual Mean
40 µg m^{-3}	**36 µg m^{-3}**
Air Quality Objective for PM_{10} (measured as a daily mean)	**No. of exceedances of maximum daily mean**
50 µg m^{-3} not to be exceeded more than 35 times in a year	**15**

SUMMARY: Although the table above shows that measured levels for PM_{10} have not exceeded the annual mean objectives, 15 exceedances occurred above the daily mean threshold. Since this is below the permitted 35 exceedances a year, however, the PM_{10} air quality objective for Gibraltar was achieved.

Table 1.19 PM_{10} Statistics for Rosia Road

	2007	2008	2009	2010	2011	2012	2013
Valid Days of Data	362	330	356	347	311	329	266
% Data Capture	99	90	98	95	85	90	73
Annual Mean PM_{10} (40 µg m^{-3})*	45	41	38.2	40.6	34	34	36
Max. 24-hour mean PM_{10}	249.8	179	79	130	65	83	88
Days > 50 µg m^{-3} (35 day limit)*	109	63	37	64	25	18	15

* Limit values – annual mean and maximum number of days; daily limit value can be exceeded.

1.5.2.2 Particulate Matter ($PM_{2.5}$)

Particulate matter $PM_{2.5}$ was measured at the Rosia Road station in compliance with Part 4 of the Environment (Air Quality Standards) Regulations 2011. The annual mean was measured at 14 µg m^{-3}, the lowest annual mean measured since records began in 2005.

Graph 1.7 $PM_{2.5}$ concentrations from 2005 to 2013

1.5.3 Arsenic, Cadmium, Nickel & Poly Aromatic Hydrocarbons (measured as Benzo(a)pyrene)

Evidence suggests that there is no identifiable threshold below which these substances do not pose a risk to human health. Impact on human health and the environment occurs via concentrations in ambient air and via deposition. The major sources of these metals in the Gibraltar region are likely to be shipping and power generation. Target values are set with the aim of minimising the harmful effects of airborne arsenic, cadmium and nickel on human health, paying particular attention to sensitive populations, and the environment as a whole.

Polycyclic Aromatic Hydrocarbons are toxic organic micro pollutants (TOMPS) that cause a wide range of effects, from cancer to reduced immunity to nervous system disorders that interfere with child development. There is no "threshold" dose - the tiniest amount can cause damage. Target values are set with the aim of minimising the harmful effects of airborne Polycyclic Aromatic Hydrocarbons on human health, paying particular attention to sensitive populations, and the environment as a whole. Benzo[a]pyrene is used as a marker for the carcinogenic risk of polycyclic aromatic hydrocarbons in ambient air. Monitoring in Gibraltar began in late 2005.

Table 1.20 Pollutants regulated by the 4th Daughter Directive. Results for 2013.

Pollutant	Parameter	Target Value	Recorded Average
Arsenic	Annual average	6 ng m^{-3}	0.8 ng m^{-3}
Cadmium	Annual average	5 ng m^{-3}	0.31 ng m^{-3}
Nickel	Annual average	20 ng m^{-3}	37.16 ng m^{-3}
BAP	Annual average	1 ng m^{-3}	0.09 ng m^{-3}

The annual averages recorded reveal that arsenic, cadmium, and poly aromatic hydrocarbons are well below their corresponding target values in 2013. Nickel, however, has exceeded the target value by 17.16 ng m-3. Due to the historically high regional levels of nickel in the Gibraltar Bay area and the wider region it has not been possible to apportion the source or the cause for the nickel exceedances. In an effort to improve the heavy metal datasets and increase network monitoring capabilities, as of 2014 metals will also be monitored at the Bleak house site. In order to improve monitoring sensitivity the schedule for metals analysis will be reorganised so that the concentrations are more frequently monitored throughout the year.

1.6 Diffusion Tube Networks

Diffusion tube samplers are used to measure nitrogen dioxide (NO_2) and hydrocarbons across Gibraltar. Monitoring sites were selected to include areas likely to be affected by specific emission sources (such as heavy traffic, power generation plants, petrol stations, or vents from fuel storage), as well as general background locations. NO_2 and hydrocarbon (BTEX) diffusion tubes are exposed for 4-week periods and are bias adjusted using data from co-location studies carried out at Rosia Road, Witham's Road and Bleak House. For 2013, the data collected is as follows.

1.6.1 Summary of Hydrocarbon Results

Table 1.13 Average hydrocarbon concentrations 2013

Code	Site	Conc. (µg m-3)
GIB1	Rosia Road	1.4
GIB15	Catalan Bay Road	0.7
GIB16	Laguna Estate	0.7
GIB17	Kings Lines Fuel Depot	1
GIB18	Moorish Castle Estate	1
GIB19	North Mole	0.9
GIB2	Bleak House	0.8
GIB20	Sundial Roundabout	1.3
GIB21	Anchorage Rosia Road	1
GIB3	Jumper's	1
GIB30	Governor's Meadow House	1.1
GIB4	Devil's Tower Road	1.3
GIB5	Glacis Road	2
GIB6	Queensway	1.6
GIB7	Harbour Views	1.6

Annual mean benzene levels across Gibraltar in 2013 are shown in Table 1.13 above. Concentrations measured were found to be within the range of 0.7 – 2 µg m^{-3} with the lowest readings occurring at Catalan Bay Road and Laguna Estate. The location with the highest significant reading was found to be at Glacis Road. Reasons for this could be the areas high predisposal to traffic and congestion, which is often experienced in this area at peak hours. Despite this, no sites had annual mean benzene concentrations greater than the EC Limit Value or Gibraltar Air Quality Objective of 5 µg m^{-3} in 2013.

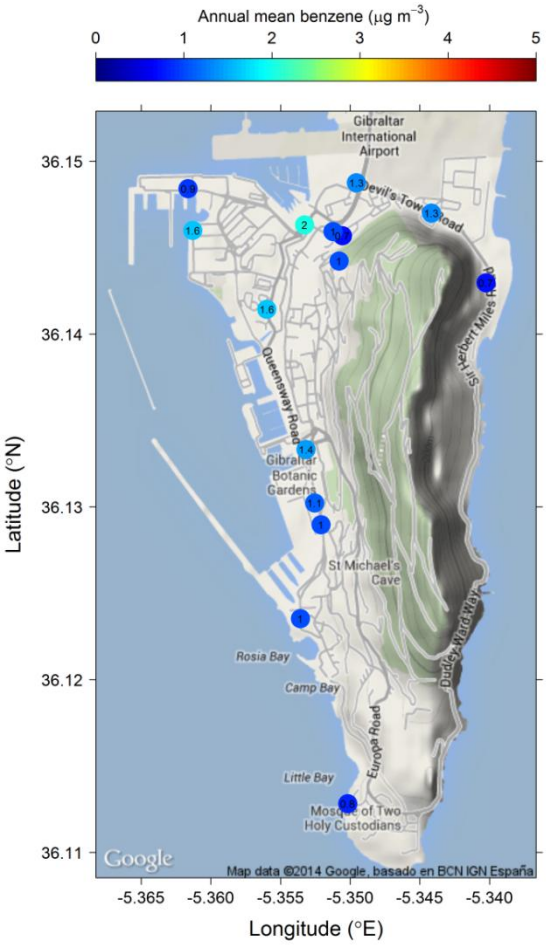


Figure 1.1 Benzene annual average concentrations for 2013

1.6.2 Nitrogen Dioxide Network

Table 1.14 Annual Mean NO_2 Concentrations 2013

Code	Site	Conc. (µg m^{-3})
GIB1	Rosia Road	54
GIB10	South Barracks Road	65
GIB11	Main Street	42
GIB12	Water Gardens	62
GIB13	George Don House	54
GIB14	Prince Edwards Road	51
GIB2	Bleak House	30
GIB20	Sundial Winston Churchill Avenue Roundabout	63
GIB21	Anchorage Rosia Road	59
GIB22	Rosia Promenade	56
GIB23	Lathbury Industrial Park	29
GIB24	Upper Withams Entrance	58
GIB25	Churchill House Withams Road	56
GIB26	Open Air Theatre Alameda Gardens	44
GIB27	Alameda Gardens Main Access Road	45
GIB28	Rock Hotel	56
GIB29	Gardiners Road	42
GIB3	Jumper's	60
GIB30	Governor's Meadow House	54
GIB31	Dockyard Road	59
GIB32	Woodford Cottage Europa	61
GIB4	Devil's Tower Road	48
GIB5	Glacis Road	70
GIB6	Queensway	53
GIB7	Harbour Views	43
GIB8	Red Sands Road	49
GIB9	Lime Kiln Road	48

Annual mean NO_2 concentrations for 2013 range from 29 – 70 µg m^{-3} as shown in Table 1.14 above. The lowest concentrations were monitored at Lathbury Industrial Park and to contrast, highest rates recorded for NO_2 were at Glacis Road. Given that highest concentrations for benzene were also registered in this area, this suggests that there are significant sources of pollution here that may be contributing to this including traffic.

The number of sites which were greater than, or equal to, the EU annual mean Limit Value of 40µg m^{-3} for NO_2 concentrations increased during 2013 to 25 sites in comparison to 2012 which was 23 sites and 2011 which has 21 sites.

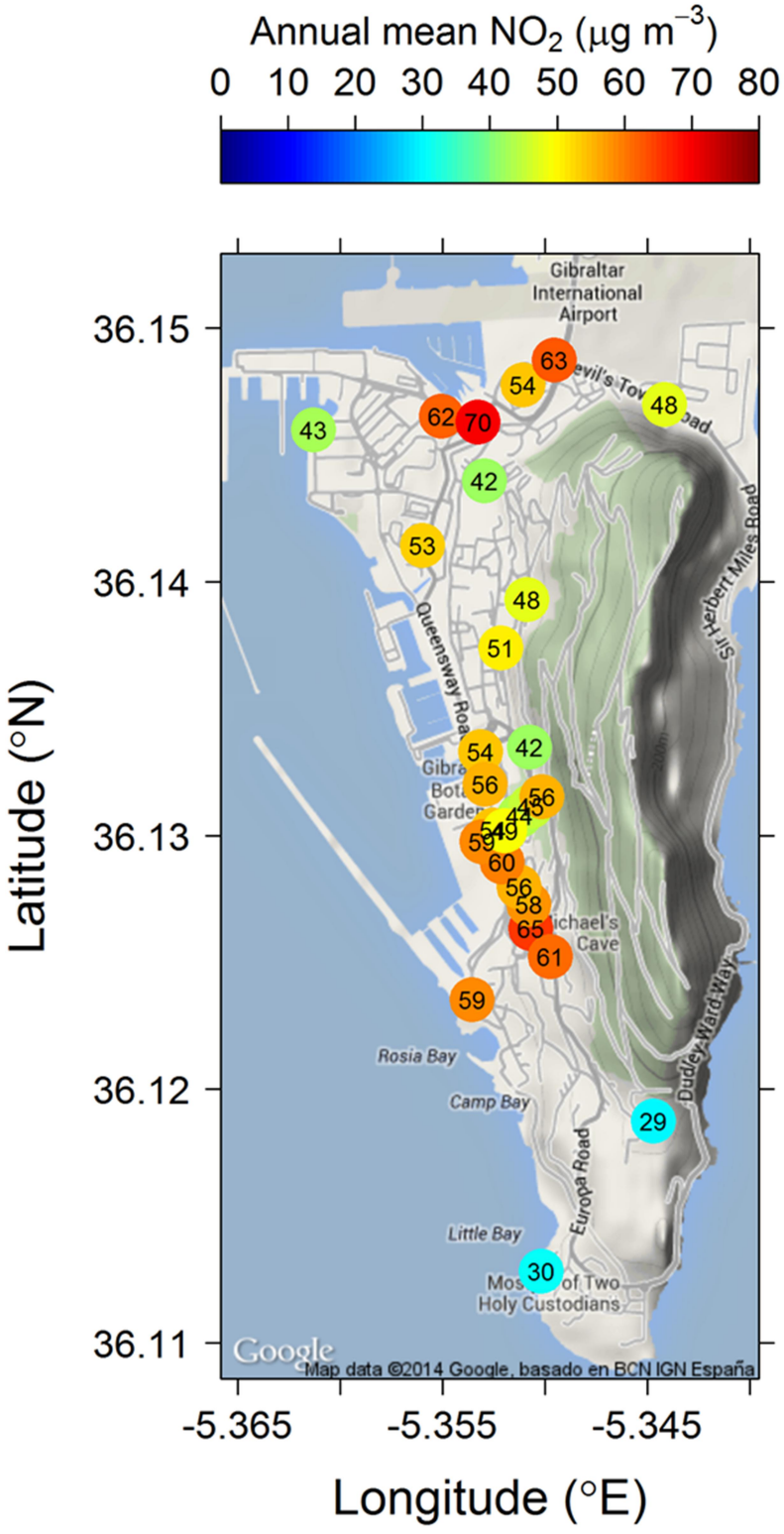


Figure 1.2 NO_2 annual average concentrations for 2013

Chapter 2: Natural Resources

2.1 Bathing water

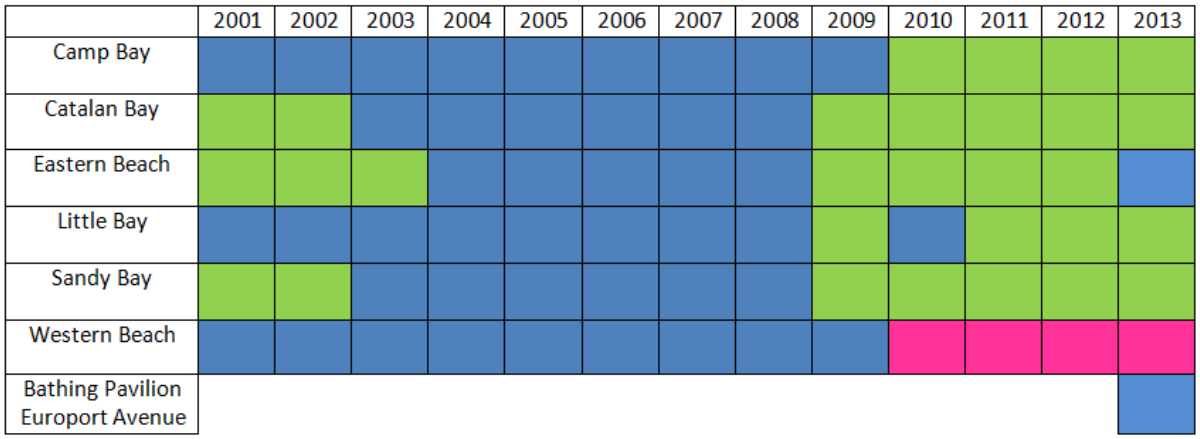
Gibraltar has six bathing areas, Camp Bay, Catalan Bay, Eastern Beach, Little Bay, Sandy Bay and Western Beach. These areas are monitored on a weekly basis throughout the year. The EU minimum requirement is for fortnightly samples but Gibraltar is sampling more often than this requirement. Western Beach and Eastern Beach have a stricter sampling routine and are sampled more frequently by the Environmental Agency.

Beaches in Gibraltar have always met the Mandatory Values and some of them have met the more stringent Guide Values consistently each year. This year, results of samples taken from Western Beach have again shown that the quality of the water has suffered deterioration and has failed to meet the Mandatory Values on several occasions. This was attributed to discharges from a storm drain by the municipal authorities in Spain, which services La Linea. This drain acts as a combined sewage/storm water overflow that discharges into the area adjacent to Western Beach.

Table 2.1 Bathing Water samples taken in 2013

Name	No of samples
Camp Bay	**42**
Catalan Bay	**42**
Eastern Beach	**42**
Little Bay	**41**
Sandy Bay	**42**
Western Beach	**108**

Table 2.2 Bathing Water quality values for all beaches



Meets Guide Values set by National legislation and EEC Directive 76/160/EEC

Meets Mandatory Values set by National legislation and EEC Directive 76/160/EEC

Fails Mandatory Values set by National legislation and EEC Directive 76/160/EEC

The annual Bathing Water Report and Tourist Atlas for all EU bathing water can be viewed at http://ec.europa.eu/water/water-bathing/index_en.html. Further information on bathing waters can be found at Water Information System for Europe (WISE) http://www.eea.europa.eu/themes/water.

2.2 Potable Water Supply

Water quality is checked under a two-tier sampling and analysis programme carried out throughout the year by both the Environmental Agency and AquaGib Ltd.

a) The Environmental Agency carries out its own independent monitoring programme taking samples at consumers' taps. This programme is designed to meet the sampling criteria outlined in the Drinking Water Directive (DWD) 98/83/EC and national legislation.

b) AquaGib Ltd has its own "in house" water quality programme and also sends samples to laboratories in the United Kingdom. Samples are taken throughout production, storage at service reservoirs, control points and consumer taps.

The purpose of the "check" monitoring is –

- To provide information on the organoleptic and microbiological quality of the water.
- To test the effectiveness of the water treatment.
- To the check whether the water complies with the relevant parametric values laid down by the Directive and national legislation.

The following parameters are included in the "check" monitoring carried out by the Environmental Agency:-

- Odour
- Taste
- Colour
- Turbidity
- pH
- Conductivity
- Ammonium
- Hardness
- Chloride
- Residual Chlorine
- Total Coliforms
- Faecal Coliforms

The following table shows the number of samples taken in Gibraltar:-

Table 2.3 National summary information on drinking water quality in water supply zones exceeding 1000 m^3 per day as an average or serving more than 5000 persons

Member State	United kingdom (Gibraltar)				
Year	2013				
Parameter	**Numbers of WSZ Monitored**	**Numbers of WSZ with Non-Compliance**	**Number of Analyses**	**Number of Analyses not complying**	**% of Analyses Complying**
Microbiological Parameters					
Escherichia (E.coli)	1	0	139	0	100
Enterococci	1	0	141	0	100
Chemical Parameters					
Antimony	1	0	10	0	100
Arsenic	1	0	10	0	100
Benzene	1	0	10	0	100
Benzo(a)pyrene	1	0	10	0	100
Boron	1	0	9	0	100
Bromate	1	0	10	0	100
Cadmium	1	0	10	0	100
Chromium	1	0	10	0	100
Copper	1	0	10	0	100
Cyanide	1	0	8	0	100
1,2-dichloroethane	1	0	10	0	100
Fluoride	1	0	10	0	100
Lead	1	0	10	0	100
Mercury	1	0	10	0	100

Nickel	1	0	10	0	100
Nitrite in distribution at the tap	1	0	10	0	100
Nitrate/nitrite formula$_3$	1	0	10	0	100
Pesticides – total	1	0	10	0	100
Polycyclic Aromatic Hydrocarbons	1	0	10	0	100
Selenium	1	0	10	0	100
Tetrachloroethane and Trichloroethane	1	0	10	0	100
Trihalomethanes - Total	1	0	8	0	100
Indicator Parameters					
Aluminium	1	0	10	0	100
Ammonium	1	0	258	0	100
Chloride	1	1	258	3	99
Colour	1	0	258	0	100
Conductivity	1	0	261	0	100
pH	1	0	261	0	100
Iron	1	1	10	1	90
Manganese	1	0	10	0	100
Odour	1	0	258	0	100
Oxidisability	1	0	10	0	100
Sulphate	1	0	10	0	100
Sodium	1	0	10	0	100
Taste	1	0	268	0	100
Coliform	1	0	270	0	100
Turbidity	1	0	261	0	100

2.3 Coastal Water Sampling

In order to comply with the requirements of the Water Framework Directive (WFD) 2000/60/EC requirements, good chemical and ecological status should be attained and maintained in Gibraltar coastal and ground waters by 2015. As part of the water quality monitoring, the Department of the Environment has been undertaking chemical water quality and phytoplankton analysis in its coastal waters since July 2009. Groundwater monitoring was previously carried out by AquaGib Ltd under contract to the Department of the Environment. As from this year, the Department of the Environment will be carrying out groundwater monitoring. This section of the annual report provides data collected thus far.

2.3.1 Coastal Water monitoring

Sea water samples were collected for water quality analysis of the coastal waters of Gibraltar within 500m of the shoreline (fig 2.1). Prior to 2010, four sampling sites were used around the coast of Gibraltar and these were increased to eight in 2011. These consist of four core sites and four additional investigative sites, two of which are located within the harbour, and two of which are located at the eastside of Gibraltar.

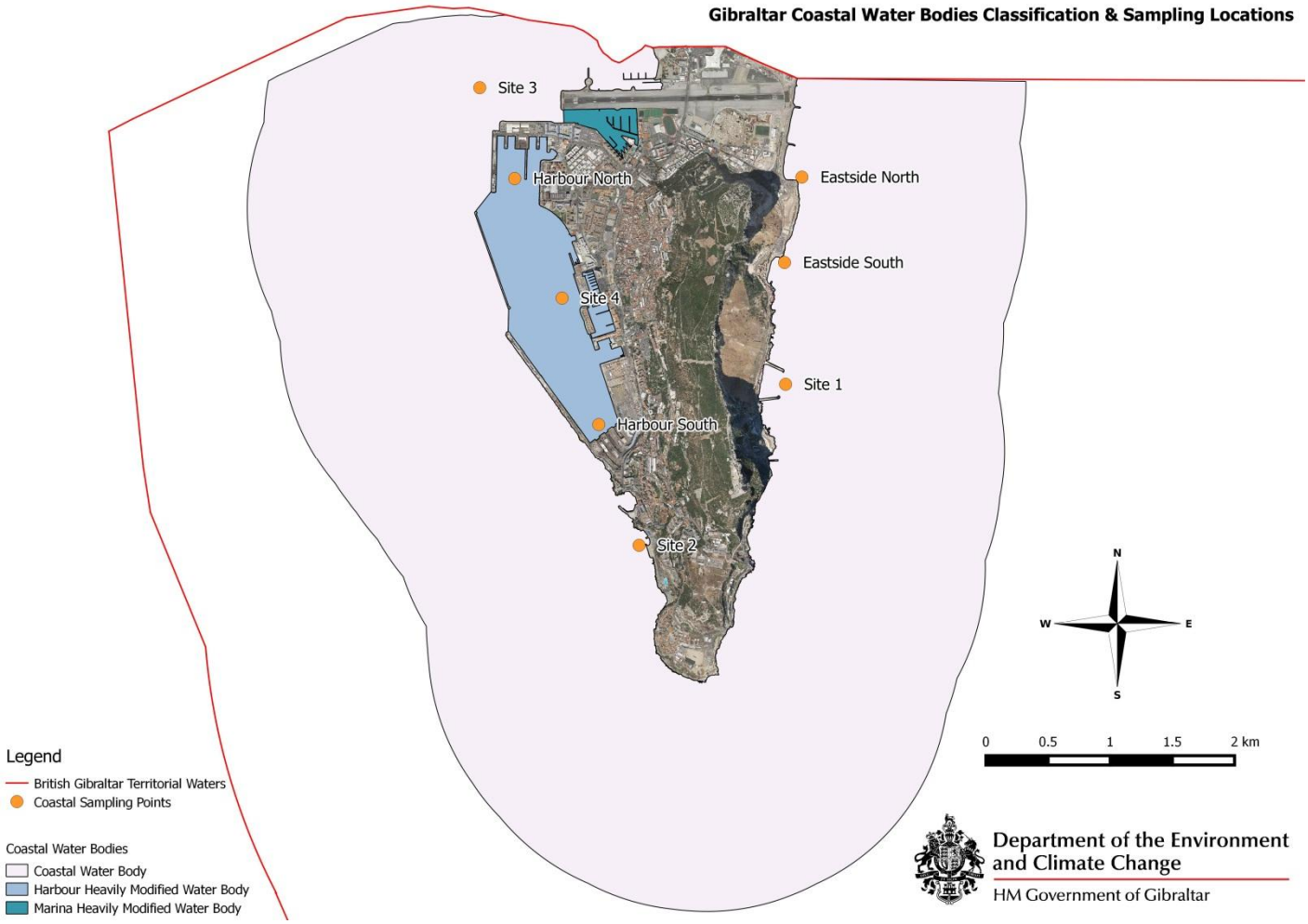


Figure 2.1 Gibraltar Coastal Water Sampling Locations

The two additional investigative sites within the harbour were included in the programme to monitor levels of tributyltin (TBT). TBT is an active compound found in vessel antifouling paint and is considered to be a toxic chemical having negative effects on human health and the environment. The two additional sites located on the eastside of Gibraltar were included in the programme in order to monitor chemical/physio-chemical parameters in the coastal areas within the vicinity of the eastside reclamation.

Table 2.4 Chemical/Physio-chemical parameters measured

Chemical / physio-chemical parameters	*Frequency*
General	**Monthly**
Temperature	**Monthly**
Nutrient status - Total N, Total P, NO3, NO2, NH4, PO4	**Monthly**
Salinity	**Monthly**
Total suspended solids	**Monthly**
Dissolved |Oxygen (DO)*	**Monthly**
Transparency*	**Monthly**
Chlorophyll-a*	**Monthly**
pH*	**Monthly**
Specific pollutants	
Pesticides	
Alachlor	**4 times per year**
Atrazine	**4 times per year**
Chlorfenvinphos	**4 times per year**
Chlorpyrifos	**4 times per year**
Endosulfan (alpha-endosulfan)	**4 times per year**
Hexachlorobutadiene	**4 times per year**
Hexachlorocyclohexane	**4 times per year**
(gamma-isomer, Lindane)	**4 times per year**
Simazine	**4 times per year**
Trifluralin	**4 times per year**
Metals	**4 times per year**
Cadmium and its compounds	**4 times per year**
Lead and its compounds	**4 times per year**
Mercury and its compounds	**4 times per year**
Nickel and its compounds	**4 times per year**
Polyaromatic hydrocarbons	
Anthracene	**4 times per year**
Fluoranthene	**4 times per year**
Naphthalene	**4 times per year**
(Benzo(a)pyrene)	**4 times per year**
(Benzo(b)fluoranthene)	**4 times per year**
(Benzo(g,h,i)perylene)	**4 times per year**

(Benzo(k)fluoranthene)	**4 times per year**
(Indeno(1,2,3-cd)pyrene)	**4 times per year**
Chlorinated Hydrocarbons	**4 times per year**
1,2-Dichloroethane	**4 times per year**
Dichloromethane	**4 times per year**
Hexachlorobenzene	**4 times per year**
Pentachlorobenzene	**4 times per year**
Trichlorobenzenes (1,2,4-Trichlorobenzene)	**4 times per year**
Trichloromethane (Chloroform)	**4 times per year**
TBT	
Tributyltin compounds (Tributyltin-cation)	**4 times per year**
Other hydrocarbons	**4 times per year**
C10-13-chloroalkanes	**4 times per year**
Benzene	**4 times per year**
BDEs	
Brominated diphenylethers	**4 times per year**
DEHP	
Di(2-ethylhexyl)phthalate	**4 times per year**
Urons	
Diuron	**4 times per year**
Isoproturon	**4 times per year**
Phenols	
Nonylphenols (4-(para)-nonylphenol)	**4 times per year**
Octylphenols (para-tert-octylphenol)	**4 times per year**
Pentachlorophenol	**4 times per year**
Other pollutants	
Chromium	**4 times per year**
Copper	**4 times per year**
Zinc	**4 times per year**
Biological parameters	
Phytoplankton - Abundance & composition (Abn. & Comp.)	**4 times per year**
Benthic macroinvertebrates - Abundance, composition & biomass	**Every 6 years**

Chapter 3: Habitats

3.1 Birds

3.1.1 Nesting Birds of Prey Surveys

The Gibraltar Ornithological and Natural History Society (GONHS) conduct surveys of birds of prey during the breeding season. The GONHS Bird of Prey Unit now surveys four species annually. These are the Peregrine Falco peregrinus, Common Kestrel (Falco tinnunculus), Lesser Kestrel (Falco naumanni) and Little Owl (Athene noctua). The Tawny Owl (Strix aluco) and Eagle Owl (Bubo bubo) are also present in Gibraltar and sightings of these species are recorded. Results of some of these recordings are shown below.

3.1.1.a Lesser and Common Kestrel

Table 3.1 Pairs of Lesser Kestrel & Common Kestrel in Gibraltar

Year	Lesser Kestrel	Common Kestrel
2001	9	8
2002	9	9
2003	7	10
2004	9	10
2005	14	10
2006	15	10
2007	19	11
2008	21	11
2009	15	11
2010	16	11
2011	18	9
2012	13	8
2013	5	5

3.1.1.b Peregrine Falcon

Table 3.2 Locations of breeding success of Peregrines in Gibraltar

Year	North face	Catalan Bay	Both Worlds	Oil Tanks	Med Steps	Camp Bay	Mosque	Total
2000	5	3	3	3	2			**16**
2001	4	2	2	2	3	0		**13**
2002	5	0	0	2	6	0		**13**
2003	4	0	0	3	5	0		**12**
2004	2	0	0	3	4	4		**13**
2005	2	0	0	2	2	3	0	**9**
2006	2	2	3	3	4	4	5	**23**
2007	3	0	3	2	0	1	3	**12**
2008	3	3	3	4	0	1	3	**17**
2009	2	2	4	3	3	4	2	**20**
2010	0	0	3	2	0	2	0	**7**
2011	2	3	3	0		3	3	**14**
2012	0	3	2	0		1	2	**8**
2013	4	3	3	0	3	0	0	**13**

Blank entries denote no pairs present at this site

3.1.1.c Yellow-legged Gulls

The Upper Rock Nature Reserve and the eastern sand slopes continue to be the main nesting sites for Yellow-legged Gulls. A combination of the four-year cull by the Food and Environment Research Agency (FERA) and the GONHS gull control effort has seen a continuous decline of the species nesting in Gibraltar

Table 3.2 Total of Yellow-legged Gulls culled throughout 2013

	Adults	1st/yr	2nd/yr	3rd/yr	juvs	Total
January	229	1	4	2		**236**
February	223	2	6			**231**
March	280		4	1		**285**
April	569	1	5	2		**577**
May	270			10	157	**437**
June	198				240	**438**
July	35				136	**171**
August	44	5	1		8	**58**
September	4					**4**
October	51	6		1		**58**
November	134	2	1	3		**140**
December	14					**14**
Total	2051	17	21	19	541	**2649**

In 2013, the overall total number of gulls culled in 2013 by both teams was 2976. This comprised of 2051 adults, 17 first-year birds, 21 second year birds, 19 third-year birds and 541 juveniles or chicks. They also destroyed 127 eggs. This is 510 gulls less than last year.

3.2 Mammals

3.2.1 Barbary Macaques

The Macaque population in Gibraltar consists of 5 groups plus 4 subgroups as shown in Table 3.3 below.

Table 3.3 Barbary Macaque groups and subgroups in 2013

GROUP	TOTAL	SUBGROUP
Middle Hill	54	Middle Hill Rock Gun Catalan Bay / Sandy bay
Prince Philip's Arch	67	Prince Philip's Arch Cable car station
Anglian Way	28	Anglian Way St Michael's Cave Europa Advance
Apes Den	35	None
Farringdon's Area	12	None

The population at the beginning of 2014 was 196, meaning that during 2013 there was a decrease of 13 Macaques from a total of 209 at the beginning of the year. In addition to this 40 deaths were recorded in 2013, an increase of 27 from the previous year: seven at Anglian Way, two at Prince Philip's Arch, seventeen at Middle Hill, thirteen at Apes Den and one at Farringdon. Breeding success resulted in 33 births but there were six infant deaths as well.

Table 3.4 Births and deaths of Barbary Macaques in 2013

LOCATION	BIRTHS	INFANT DEATHS
Middle Hill	13	0
Prince Philip's Arch	8	3
Anglian Way	8	3
Apes Den	6	0
Farringdon's area	1	0
TOTAL	33	6

Chapter 4: Waste Management

4.1 Industrial Waste

Due to the absence of heavy industry in Gibraltar, the main sources of industrial waste are shipping, the Ministry of Defence (MOD), light industry and clinical/medical practices. A limited amount of hazardous material is also produced from municipal sources and via construction and demolition activities.

Industrial waste materials are stored locally under strict licence conditions until sufficient quantities have been gathered to warrant their transfrontier shipment. It predominantly consists of waste oils, asbestos and asbestos containing products. A detailed breakdown of locally produced hazardous wastes during 2013 is given in Table 4.1.

Table 4.1 Breakdown of Industrial Waste Arisings 2013

WASTE CODE(S)	DESIGNATION & COMPOSITION OF THE WASTE	TOTAL EXPORTED 2013
19 01 11*	Bottom ash and slag containing dangerous substances	19154.89 tn
19 01 13*	Fly ash containing dangerous substances	0.9 tn
15 02 02*	Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances	4.4 tn
17 05 03*	Soil and stones containing dangerous substances	5.45 tn
17 06 05*	Construction materials containing asbestos	27.4 tn
16 02 13*	Discarded equipment containing hazardous components (16) other than those mentioned in	40.96 tn
16 02 11*	Discarded equipment containing chlorofluorocarbons, HCFC, HFC	6.66 tn
08 01 11*	Waste paint and varnish containing organic solvents or other dangerous substances	19.52 tn
17 06 05*	Construction materials containing asbestos	815.05 tn
13 04 01*	Bilge oils from inland navigation	2755 M3
13 02	Waste engine, gear and lubricating oils	12.58 M3
13 04	Bilge oils	70.48 M3
09 01 02*	Water-based offset plate developer solutions	1 M3
08 01 11*	Waste paint and varnish containing organic solvents or other dangerous substances	4.98 M3
20 01 29*	Detergents containing dangerous substances	30.68 M3
06 03 13*	Solid salts and solutions containing heavy metals	0.691 M3

16 05 04*	Gases in pressure containers (including halons) containing dangerous substances	0.54 M3
07 02 13	Waste plastic	6 mt
08 03 17*	Waste printing toner containing dangerous substances	0.2 mt
16 06 04	Alkaline batteries (except 16 06 03)	0.7 mt
20 03 01 **20 03 03** **20 03 99**	(1) mixed municipal waste (2) street-cleaning residues (3) municipal wastes not otherwise specified	11769.67 mt
16 01 07*	Oil filters	4.84 M3
15 02 02*	Absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by dangerous substances 15 02 02*	7.9 M3
13 05 02*	Sludges from oil / water separators 13 05 02*	15.5 mt
16 10 01*	Aqueous liquid wastes containing dangerous substances 16 10 01*	62.2 mt
18 01 03*	Wastes whose collection and disposal is subject to special requirements in order to prevent infection 18 01 03*	641.52 M3
20 01 35*	Discarded electrical and electronic equipment other than those mentioned in 20 01 21 and 20 01 23 containing hazardous components 20 01 35*	12.77 mt
20 01 21*	Fluorescent tubes and other mercury-containing waste 20 01 21*	1.37 mt
16 06 01*	Lead batteries EWC 16 06 01*	23.954 mt
13 07 03*	Other fuels (including mixtures), corresponding to EWC 13 07 03*	883.596 M3
16 06 01*	Lead batteries	93.2 M3
16 01 07*	Oil filters 16 01 07*	2.51 M3
15 02 02*	Packaging containing residues of or contaminated by dangerous substances 15 02 02*	1.097 M3
19 08 11*	Sludges containing dangerous substances from biological treatment of industrial waste water 19 08 11*	187.48 mt
13 07 03*	Other fuels (including mixtures), corresponding to EWC 13 07 03*	1502.409 mt
08 03 17*	Waste printing toner 08 03 17*	7 M3
15 02 02*	Absorbents	9.67 mt
19 01 13*	Fly ash	3.25 mt
19 01 11*	Bottom ash and slag containing dangerous substances	10.01 mt
13 05 02*	Sludges from oil/water separators	13.8 mt

07 02 13	Waste plastic	0.35 mt
16 06 04	Alkaline batteries	0.4 M3
12 01 16*	Waste blasting materials 12 01 16*	3444.84 MT
08 01 11*	Waste paint & varnish 08 01 11*	46.31 mt
13 07 03*	Waste liquid fuels	76986.993 mt
16 02 11*	Discarded equipment containing chlorofluorcarbons, HCFC, HFC	50.76 mt
16 02 13*	Discarded equipment containg hazardous components other than those mentioned in 16 02 09 to 16 02 12	210.62 mt
16 07 08*	Wastes containing oil	1.719 mt
15 01 10*	Packaging containing residues of or contaminated by dangerous substances	0.181 mt
13 02 05* **13 02 06*** **13 02 07***	Engine oils	357.56 mt
13 04 01* **13 04 02*** **13 04 03***	Bilge oils	389.48 mt
13 05 06* **13 05 07***	Oil from oil/water separators	145.68 mt
13 04 01* **13 04 02*** **13 04 03***	Bilge oils	1615 M3
20 03 01 **20 03 03** **20 03 99**	Municipal waste	15035.52 mt
17 05 04	Soil and stones other than those mentioned in 17 05 03*	19154.89 mt
17 06 05*	Construction materials containing asbestos	155.52 M3
17 05 03*	Soil & stones containing dangerous substances	11 mt
17 06 05*	Construction materials containing asbestos	19.17 mt
08 01 11*	Waste paint and varnish containing organic solvents or other dangerous substances	2.6 mt
20 01 21*	Fluorescent tubes and other mercury-containing waste	0.62 mt
08 03 17*	Waste ink containing dangerous substances 08 03 12* & waste printing toner containing dangerous substances	3.9433 mt
13 07 03*	Other fuels (including mixtures)	7089.811 M3
17 05 05*	Dredging spoil containing dangerous substances	543960 M3
18 01 03*	Waste whose collection & disposal is subject to special requirements to prevent infections	155.52 M3
16 07 07*	Oil filters	1.206 mt
17 05 05*	Dredging spoil containing dangerous substances	6530 M3

4.2 Municipal Waste

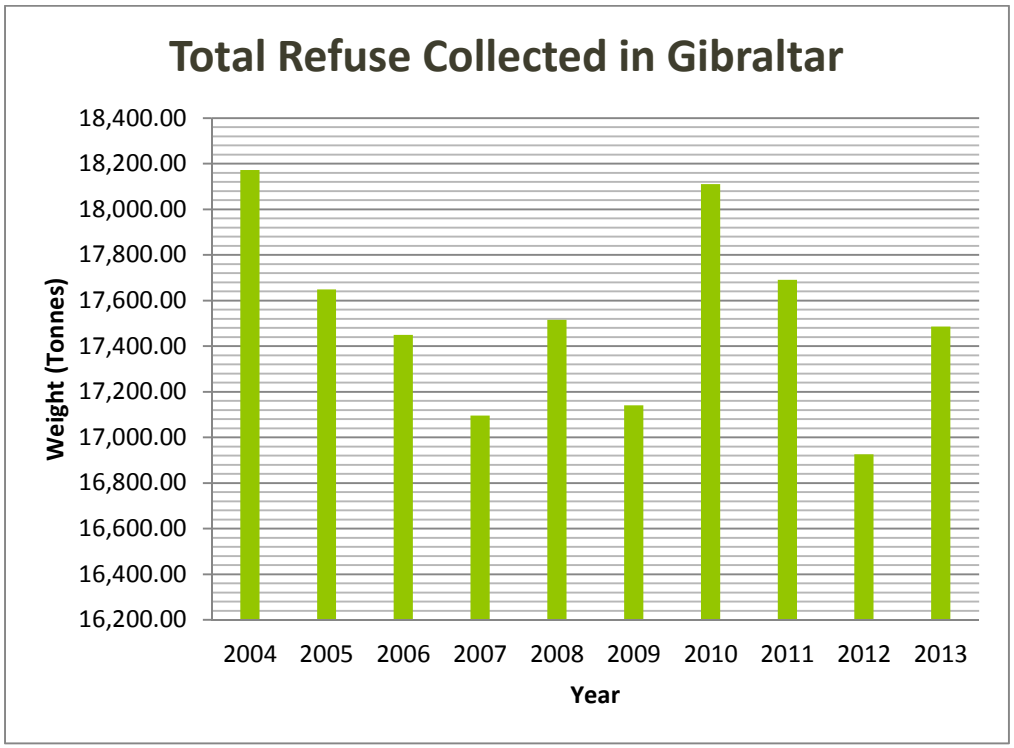
Municipal waste in Gibraltar is collected by Gibraltar Industrial Cleaners (GIC), a wholly owned Government company, and Master Service (Gib) Ltd, a private company.

In 2013, the total amount of municipal waste collected and sent to Spain for disposal was 27,158.37 tonnes. This includes mattresses and bulky household items as illustrated in Table 4.2. Removing the latter from the total volumes leaves 17,486.34 tonnes of refuse, equating to 534 kg per person for the year.

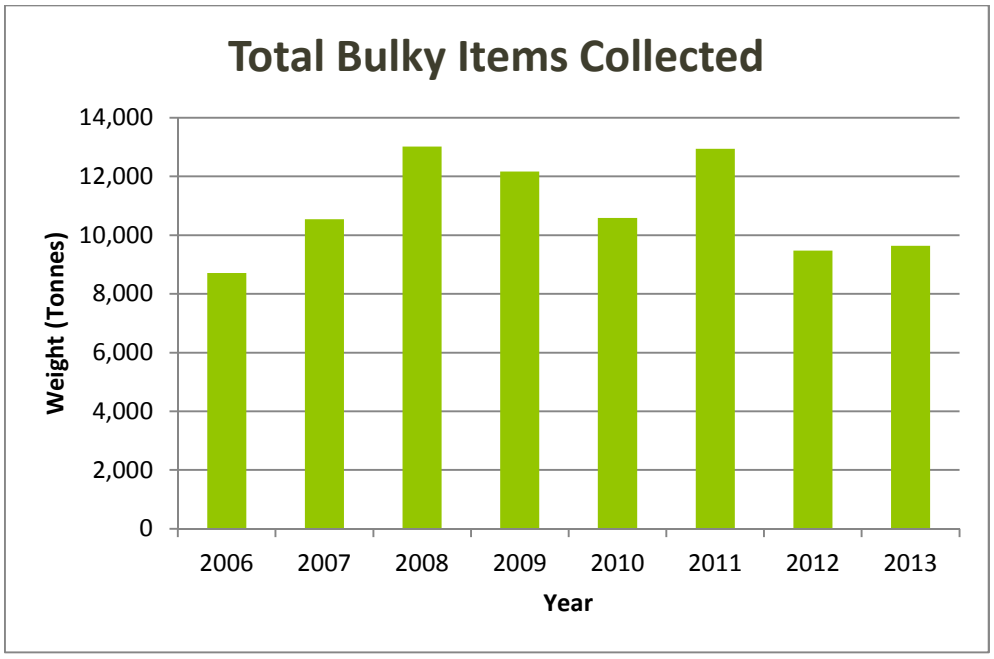
Table 4.2 Municipal Waste in Gibraltar in 2013

2013 MONTH	HOUSEHOLDS Weight (TONs)	REFUSE Weight (TONs)	MATTRESSES Weight (TONs)	Total Refuse for Month Weight (TONs)
Jan-2013	788.70	1662.78	5.66	2457.14
Feb-2013	670.04	1252.58	4.40	1927.02
Mar-2013	749.84	1355.34	-	2105.18
Apr-2013	903.14	1565.50	-	2468.64
May-2013	660.42	1199.82	-	1860.24
Jun-2013	821.47	1469.94	2.06	2293.47
Jul-2013	869.10	1667.56	7.68	2544.34
Aug-2013	673.96	1418.82	-	2092.78
Sep-2013	733.38	1398.42	2.70	2134.50
Oct-2013	1078.58	1635.38	2.62	2716.58
Nov-2013	920.58	1437.26	8.00	2365.84
Dec-2013	767.58	1422.94	2.12	2192.64
TOTALS	**9636.79**	**17486.34**	**35.24**	**27158.37**

Graph 4.1 Annual Refuse Total Comparison (2004 – 2013)



Graph 4.2 Annual Bulky Items Total Comparison (2006 – 2013)



Graph 4.2 refers to the annual totals with regards to Household Bulky Items. As can be noted in the chart, 2013 has seen a slight increase in the amount of waste being generated and sent to landfill. This increase amounted to approximately 165 tonnes more than in 2012.

Graph 4.3 Annual Mattress Total Comparison (2006 – 2013)

Graph 4.3 refers to the annual totals with regards to the collection for disposal of mattresses. As can be seen from the chart, a marked decrease in the generation of waste mattresses can be noted equating approximately 20.86 tonnes.

4.3 Recycling

4.3.1 2013 Totals

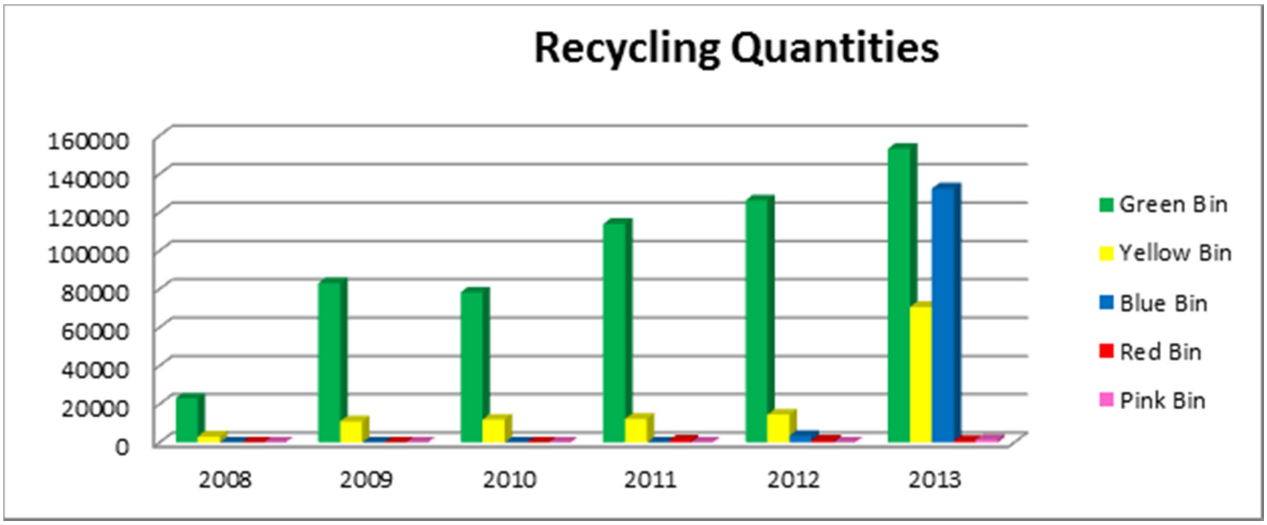
Recycling rates across all waste streams have progressively increased per annum since the introduction of recycling initiatives began. Although this is a step in the right direction, there is still a long way to go before target figures of 50% by 2020 of Article 11 of the Waste Framework Directive (2008/98/EC) are achieved.

Table 4.3 Recycling quantities for 2013

	Green Bin	Yellow Bin	Blue Bin	Red Bin	Pink Bin
Year					
2013	153248	70720	132495	860	1412.738

* weight given in Kilograms (Kgs)

Graph 4.4 Recycling quantities (2008 – 2013)



At the end of 2012, H.M. Department of the Environment introduced paper recycling bins hence the marked increase in numbers during 2013. This increase also reflects data capture from private companies collecting and recycling paper and cardboard. In reference to the pink WEEE bins, these were only introduced in September 2013, which is why recycling quantities for this are significantly lower than the other waste categories.

4.3.2 WEEE

The WEEE Directive was transposed into local law through the Environment (Waste) Regulations 2007 (WEEE Regulations). This legislation looks to minimise the environmental impacts of electrical and electronic equipment (EEE) when it reaches the end of its useful life. As a result, systems have been set up to facilitate and encourage the separate collection, subsequent treatment, re-use, recycling and ultimately environmentally sound disposal of WEEE. A list of the quantities of WEEE imported, collected, and exported for treatment and recovery during 2013 are shown below.

Table 4.4 WEEE generation in Gibraltar during 2013

Year: *2013*	Imported		Collected		Sent for treatment		Recovery
Categories	**Quantity (No.)**	**Weight (tonnes)**	**Quantity (No.)**	**Weight (tonnes)**	**Quantity (No.)**	**Weight (tonnes)**	**%**
Large Household appliances	1948	65.15416	3514		6970	289.141	50.41607
Small Household appliances	1162	3.35925	682		449	1.6755	151.8931
IT and Telecoms Equipment	11579	65.75108	2846		2462	34.5525	115.5971
Consumer Equipment	17168	9.7533	1373		823	16.8425	166.8287

Lighting equipment	21980	21980	385		6	0.7295	6416.667
Electrical and electronic tools	2167	4.18041	45		43	0.63	104.6512
Toys, Leisure & Sports Equipment	343	1.3451	45		41	0.09	109.7561
Medical devices	5	0.077	2		1	0.002	200
Monitoring & Control Instruments	370	1.0389	699		2	0.03	34950
Automatic dispensers	2	0.416	2		2	0.45	100
Total WEEE:		22131.0752		n/a		344.143	

Table 4.5 Battery generation in Gibraltar (2010 – 2013)

Year		Imported		Collected		Sent for treatment		Recovery	Recycled
	Categories	Quantity (No.)	Weight (tonnes)	Quantity (No.)	Weight (tonnes)	Quantity (No.)	Weight (tonnes)	%	%
2010	Batteries	0	0	25010	0.95	0	0	0	0
2011	Batteries	0	0	1866	2.1155	0	0	0	0
2012	Batteries	2322	27.4619	41107	1.7845	0	1.34	133.1716	6.498094
2013	Batteries	1228	7.36858	117	1.33455	0	0.7	190.65	18.11136

4.3.3 Clinical Waste

In Gibraltar, all clinical waste is serviced by Environmental Waste Management Services (EWMS) Ltd, which is based at Governor's Cottage, Europa Advance Road. Providing collection, transportation and incineration services to all local clinical and medical waste producers, this includes hospitals, laboratories, surgeries, medical, dental and veterinary clinics. A breakdown of the clinical waste arisings for 2013 can be seen in Tables 4.6, 4.7, and 4.8.

Table 4.6 Clinical Waste collected during 2013

Year		2013		
Month		**No. of Cont**	**Ltrs per Cont**	**Total Ltrs**
January		4466	60	267960
February		3823	60	229380
March		4295	60	257700
April		4309	60	258540
May		4174	60	250440
June		3695	60	221700
July		4351	60	261060

August	4145	60	248700
September	3990	60	239400
October	4344	60	260640
November	4049	60	242940
December	3984	60	239040
Annual Total	**49625**		**2977500**

Table 4.7 Clinical Waste locally incinerated during 2013

Year	**2013**		
Month	**No. of Cont**	**Ltrs per Cont**	**Total Ltrs**
January	3457	60	207420
February	2803	60	168180
March	3361	60	201660
April	3664	60	219840
May	3304	60	198240
June	3196	60	191760
July	3258	60	195480
August	3290	60	197400
September	3196	60	191760
October	724	60	43440
November	2576	60	154560
December	3212	60	192720
Annual Total	**36041**		**2162460**

Table 4.8 Clinical Waste exported for incineration during 2013

Year	**2013**		
Month	**No. of Cont**	**Ltrs per Cont**	**Total Ltrs**
January	864	60	51840
February	1296	60	77760
March	864	60	51840
April	432	60	25920
May	1296	60	77760
June	432	60	25920
July	864	60	51840
August	864	60	51840
September	1296	60	77760

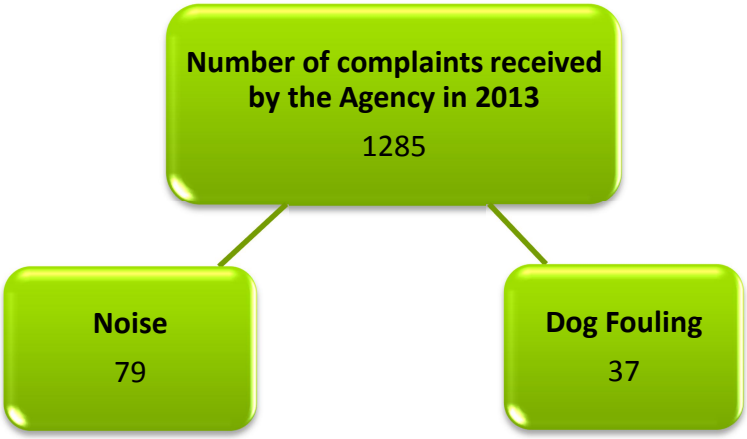
October	2592	60	155520
November	2160	60	129600
December	432	60	25920
Annual Total	**13392**		**803520**

Chapter 5: Environmental Health

5.1 Environmental Health

The Environmental Agency (EA) has an essential role in maintaining and improving the well-being of the community. The Agency is contracted by the Government of Gibraltar to be responsible for the enforcement of Environmental and Public Health legislation, and as such address any complaints made by the general public. Figure 5.1 below summarizes the nature and number of complaints received by them in 2013.

Figure 5.1 Summary of Complaints received by the Agency in 2013



5.2 Food Safety

Food safety encompasses actions aimed at ensuring that all food you make, serve or sell is as safe as possible. Addressing, as part of their everyday duties, cases of food contamination and poisoning, the Environmental Health Officers at the Agency carry out a programmed food hygiene inspection of at a number of food premises in Gibraltar in order to avoid the same. These premises consist of restaurants, supermarkets, delicatessens, bakeries, groceries and confectionery outlets, as well as one soda bottling plant.

Premises inspected are done so in accordance with a risk rating allocated to each. The inspection programme is focused on 'high risk' premises, for example, those that sell 'open food' (without wrapping). This is in line with the objective of risk-based, proportionate enforcement. The risk rating given (i.e. High, Medium or Low) requires officers to consider the following elements in each premises:

- Potential Hazard:
  - The type of food and method of handling.
  - The processing of the food (if applicable).
  - Consumer groups at risk.
- Compliance:
  - With food hygiene and safety.
  - Structural and equipment requirements.
- Confidence in management/control systems.
- Significance of risk of contamination of food.

During 2013, The Environmental Agency carried out a total of 986 food premises inspections. The breakdown of this can be reviewed in Table 5.1 below.

Table 5.1 Total number of food premises inspected in 2013

	Total number of food premises inspected in 2013
High Risk	694
Medium	162
Low Risk	130
Total	986

In addition to food premises inspections, Environmental Health Officers also routinely execute food samples on food types that have high protein contents such as cooked meals, meat and poultry products and meals prepared with meat and poultry. Reasons for this are because these foods are known as high-risk foods susceptible to bacteria poisoning. Other foods are also sampled to ensure that they comply with compositional standards set down in food additives legislation.

In 2013, the total number of food samples taken by the Environmental Agency was 166, and during this time, a total of 44 food borne infections were detected which are listed below.

Table 5.2 - Laboratory Confirmed Food borne infections (2007-2012).

Organism Isolated	2007	2008	2009	2010	2011	2012	2013
Campylobacter Species	67	37	31	29	25	43	23
Salmonella species	14	26	18	12	11	10	21
Hepatitis A	4	2	4	3	0	0	0
Shigella species		1	2	0	0	2	0
Total	**85**	**66**	**55**	**44**	**36**	**55**	**44**